STORMWATER MANAGEMENT PLAN

Cook Road Retirement Community
Windham, Maine

The following Stormwater Management Plan has been prepared for Mr. Jim Cummings to evaluate stormwater runoff and erosion control for the proposed Cook Road Retirement Community project to be located off Cook Road & Gray Road (Route 202) in Windham, Maine.

Site Calculations

Total Property Area	12.88 Ac (+/-)
Total Proposed Impervious Area	2.77 Ac (120,766 sf)
Total Disturbed/Developed Area	5.93 Ac (258,260)

Existing Conditions

The development parcel is located on the southwesterly side of the Cook Road/Gray Road (Route 202) in Windham, Maine. The development property is approximately 12.88 acres and will contain a proposed 46 unit retirement community. The site contains a single family home near the midpoint of the Gray Road frontage. The remainder of the lot is an undeveloped forest. There is a centrally located wetland area that bisects the site. The wetland area spans the site from north to south and is generally located between 300' and 400' from Gray Road. A copy of the U.S.G.S. Quadrangle Map (North Windham) is attached to this submittal.

The property is located in the Pleasant River Watershed, just upstream from the confluence of the Pleasant River & Presumpscot River.

Proposed Development

The applicant intends to construct a forty six unit retirement community with associated club house, parking areas & amenities. Each two story duplex unit will contain a garage. One unit will feature a two car garage, while the other will have a one car garage. The club house will be a one story, 1,040 square foot building with an associated on-street parking. There will be a paved shoulder running through the project to provide for improved pedestrian safety. The site will be landscaped to meet the Town of Gray ordinance requirements. The total proposed building coverage on the site is 51,200 SF. This development will feature three under-drained filter basins.

The main road will cross the central wetland area. A Tier 1 wetland alteration permit will be required.

Flooding

The development area is not located within a 100 year flood zone according to the Federal Insurance Rate Map 230189 0030 B. See attached map.

Modeling Assumptions

The onsite stormwater facilities were sized utilizing the USDA Soil Conservation Service (SCS) TR-20 Runoff Simulation Model, as contained in the HydroCAD computer software program (Version 10.0). Runoff curve numbers were determined for each direct watershed by measuring the area of each hydrologic soil group within each type of land cover. Weighted curve numbers were then calculated using curve numbers for various cover types and hydrologic soil groups, assuming "good" conditions as defined in U.S Soil Conservation Service (SCS) publications. Times of concentration and travel times were determined from site topographic maps in accordance with SCS procedures. A maximum length of 150 feet was used for sheet flow.

All of the watersheds' peak runoff rates were analyzed for the 25-year frequency, 24-hour duration storm events to ensure that the onsite stormwater facilities were properly sized. A Type III rainfall distribution was applied to these storms. The rainfall amounts for Cumberland County southeast) are as follows:

Storm Frequency Precipitation (in./24 hr)	
2-year	3.1
10-year	4.6
25-year	5.8
100-year	8.1

Onsite & Offsite Soils

The soils were delineated from the Cumberland County Medium Intensity Soil Survey as shown on the Soil Data Viewer on the NRCS website (See attached map). The soil survey reports that the watershed soils are as summarized below:

Soil Type Summary Table		
Soil Symbol	Soil Name	HSG
BgB	Belgrade	B
HrB, HrC	Lyman-Tunbridge	D
PbB	Paxton	C
Sn	Scantic	D
Sp	Sebago Mucky Peat	A/D
SuD2	Suffield	C

The medium intensity soil survey indicates that much of the site contains hydrologic group C & D. We have modeled the upland areas as hydrologic group C and wetlands as hydrologic group D soils to ensure that the drainage structures are properly sized.

Water Quantity (Flooding Standard)

The following table summarizes the results of stormwater calculations for the design storm events for the project areas. Calculations and computer modeling sheets are provided with this report.

Table 1 - Stormwater Runoff Summary Table
Pre-Development vs. Post-Development

Study Point #	2Yr/24Hr (cfs)		10Yr/24Hr (cfs)		25Yr/24Hr (cfs)	
	Pre	Post	Pre	Post	Pre	Post
1	7.6	7.2	13.9	13.9	17.1	17.1
2	0.5	0.5	1.3	1.1	2.0	1.5

As the above result table shows, the post-development flow rates for the 2, 10, and 25-year/24 hour design storm events do not exceed the pre-development conditions.

Water Quality (BMP Standard)

The water quality requirements will be met by the construction of two gravel wetlands, one filter basin and selectively placed roof drain filter strips. A table showing a detailed breakdown of treatment by watershed can be found on the Post Development Watershed Map.

The impervious and developed treatment percentages are detailed below:

Impervious Area: The project will result in the creation of approximately 120,776 SF of impervious area in the form of roadway, sidewalks, driveways & roof. Approximately 2,736 SF of roadway will be built over the wetland crossing. Therefore, approximately 118,030 SF of new impervious area needs to be treated. Filter Basin #1 also treats a portion of the Cook Road right of way. The stormwater basins & filter strips will result in the treatment of approximately 116,954 SF of impervious area resulting in a treatment percentage of (116,954/118,030) x 100%= 99.09%.

Percentage of Treatment of the Impervious Area =99.1% (95% req'd)

Project Developed Area: The project will result in the creation of approximately 258,000 SF of developed area. Three stormwater basins & roof drain filter strips will result in the treatment of approximately 217,591 SF of the developed area resulting in a treatment percentage of (217,591/228,000) x 100%= 84.3%

Percentage of Treatment of the Developed Area = 84.3% (80% required)

Housekeeping and Maintenance & Inspection guidelines are attached to this report.

BMP Sizing

Gravel Wetland #1

Forebay

STAGE (FT)	AREA (SF)	STORAGE (CF)
274.5	100	0
275	150	63
275.5	200	150

Cell #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
274	1300	0
275	1800	1550
275.5	2050	2513

Cell #2

STAGE (FT)	AREA (SF)	STORAGE (CF)
274	1300	0
275	1800	1550
275.5	2050	2513

Total Pond

STAGE (FT)	AREA (SF)	STORAGE (CF)
274	2700	0
275	3750	3163
275.5	4300	5175
275.51	4800	5175
276	5326	7656
276.5	5843	10453
277	6400	13313

WATERSHED IMPERVIOUS AREA=	44,934	SF
WATERSHED LANDSCAPED AREA=	32,300	SF
REQUIRED WATER QUALITY VOLUME=	4,821	CF
PROVIDED WATER QUALITY VOLUME=	5,175	CF

The required water quality volume was calculated by multiplying the impervious area by 1.0” and the landscaped area by 0.4”.

Gravel Wetland #2

Forebay

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	150	0
277	270	210
277.5	330	360

Cell #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	700	0
277	1047	873
277.5	1220	1440

Cell #2

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	700	0
277	1047	873
277.5	1220	1440

Total Pond

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	1550	0
277	2363	1957
277.5	2770	3240
277.51	3215	3240
278	3638	4919
278.5	4059	5845
279	4500	8820

WATERSHED IMPERVIOUS AREA=	24,478	SF
WATERSHED LANDSCAPED AREA=	22,487	SF
REQUIRED WATER QUALITY VOLUME=	2,789	CF
PROVIDED WATER QUALITY VOLUME=	3,240	CF

The required water quality volume was calculated by multiplying the impervious area by 1.0” and the landscaped area by 0.4”.

Filtration Basin #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
278	2250	0
279	3000	2625
279.4	3300	3885
280	3750	6000
281	4500	10125

WATERSHED IMPERVIOUS AREA=	30,389	SF
WATERSHED LANDSCAPED AREA=	36,875	SF
REQUIRED WATER QUALITY VOLUME=	3,799	CF
PROVIDED WATER QUALITY VOLUME=	3,885	CF

The required water quality volume was calculated by multiplying the impervious area by 1.0" and the landscaped area by 0.4".

Roof Dripline Filter Bed

We propose to provide treatment for the rear portion of the roof on Units 23-46. The bed is required to provide volume for 1" of runoff from the contributing area and store it within a reservoir bed. The bed sizing is as follows:

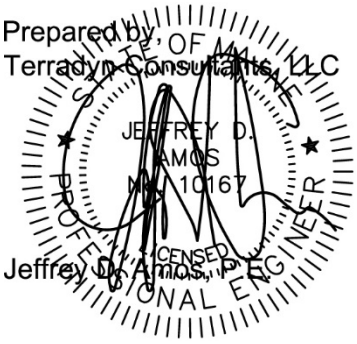
Area of Roof: 28' x 18' = 504 SF
Treatment Volume Required: Area x runoff depth: 504 SF x 1/12 FT = 42 CF
Bed Sizing:
Porosity = 40% Bed Length = 28' Bed Width = 3' Bed Depth = 1.5
Available Volume= 28' x 3' x 1.5' x 0.40 = 50 CF.

The design is adequate since the available volume exceeds the required volume.

Summary

Based on the results of this evaluation, the proposed stormwater design is not expected to cause flooding, erosion or other significant adverse effects downstream of the site.

Prepared by,
Terradyn Consultants, LLC



Jeffrey D. Amos, P.E.

Attached:
U.S.G.S. Quadrangle Map
FEMA Flood Map
NRCS Medium Intensity Soil Survey
Pre-Development Hydrocad Calculations
Post Development Hydrocad Calculations
100 Year Pond Capacity Check
Pond Drawdown Table
Maintenance & Inspection of Stormwater Facilities
Housekeeping Plan
Pre & Post Development Watershed Maps

SHEET DESCRIPTION

AERIAL MAP
COOK ROAD RETIREMENT COMMUNITY

PREPARED FOR

JIM CUMMINGS
P.O. BOX 957
WINDHAM, MAINE 04062

TERRADYN
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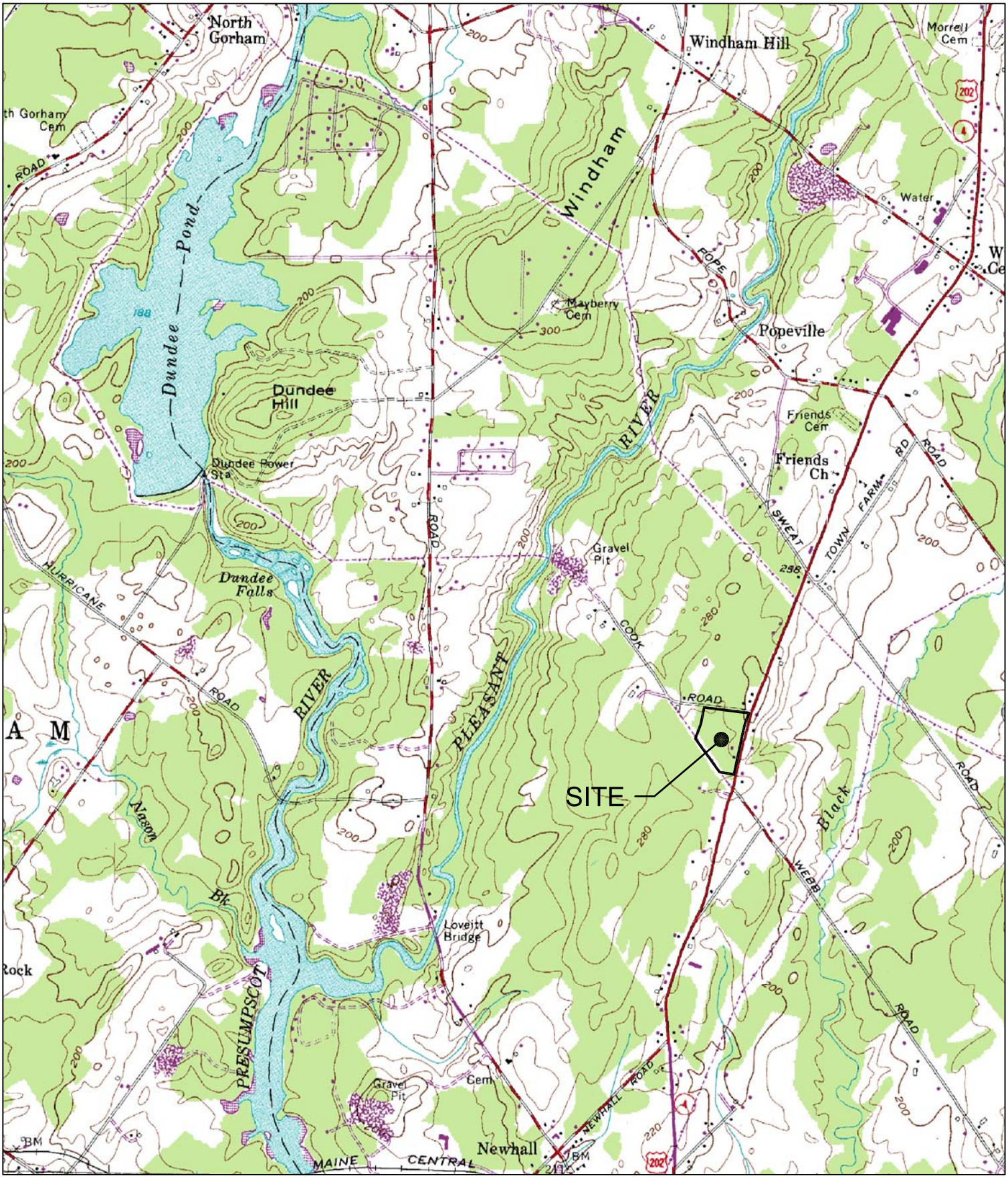
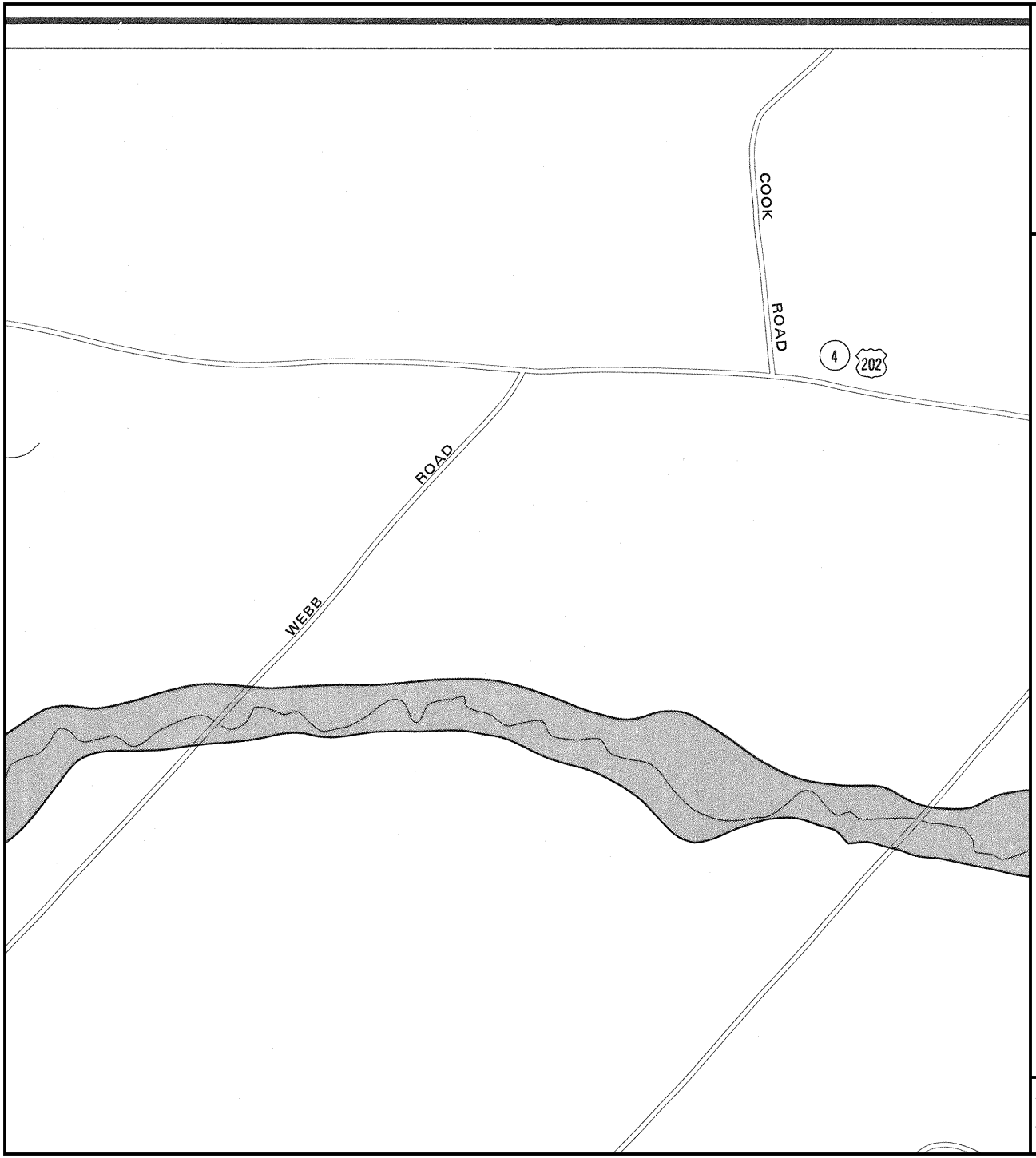
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

JOB NO.	SHEET
1841	1
DATE	OF
11/12/2018	1
SCALE	
1"=200'	



SHEET DESCRIPTION U.S.G.S. QUADRANGLE MAP COOK ROAD RETIREMENT COMMUNITY	TERRADYN CONSULTANTS, LLC P.O. Box 339 111 Elderberry Lane New Gloucester, ME 04260 Office: (207) 926-5111 Fax: (207) 221-1317 www.terradynconsultants.com Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting	JOB NO. 1841 DATE 9/12/2018 SCALE 1"=2,000'	SHEET 1 OF 1
PREPARED FOR JIM CUMMINGS P.O. BOX 957 WINDHAM, MAINE 04062			



APPROXIMATE SCALE

800 0 800 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

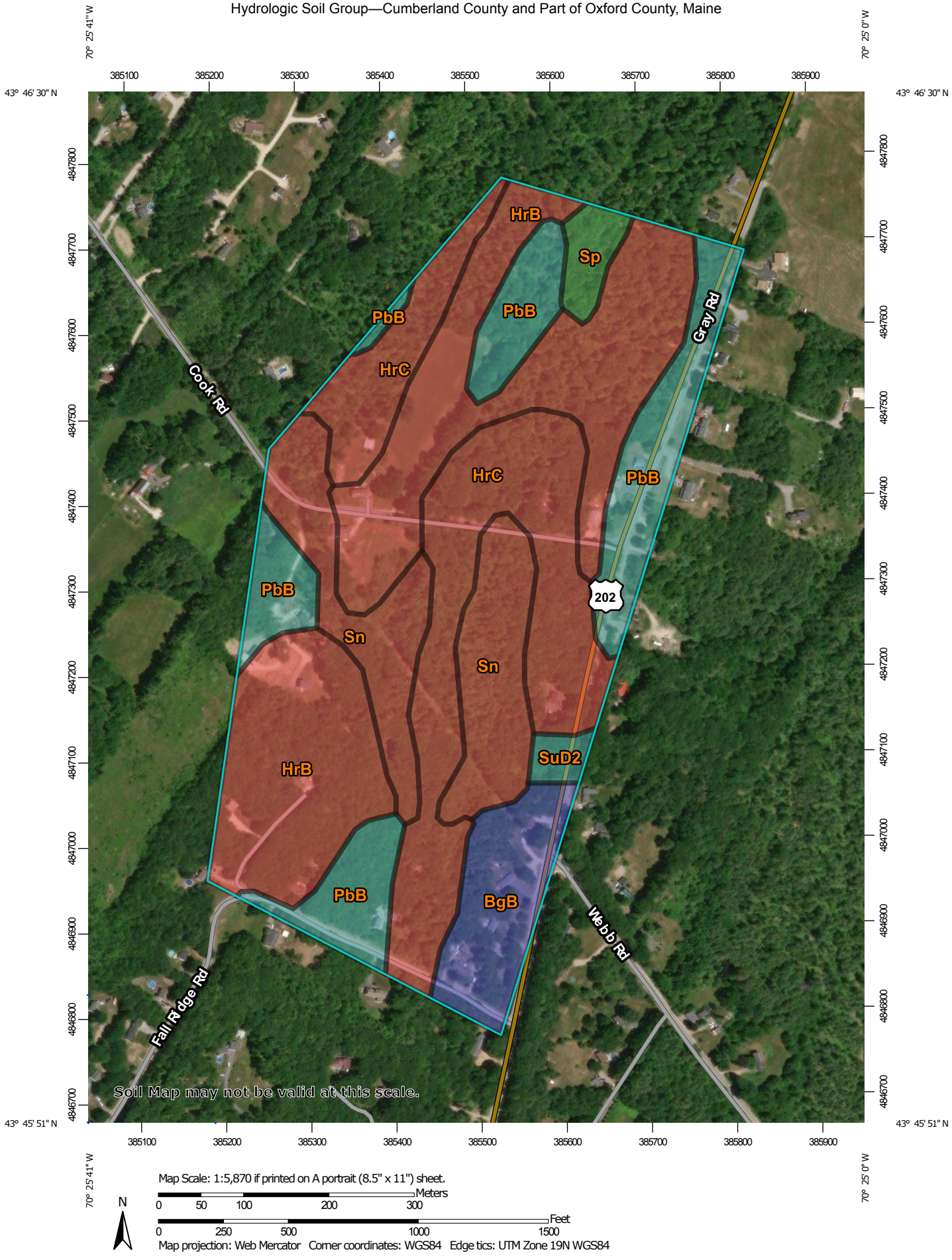
TOWN OF
WINDHAM, MAINE
CUMBERLAND COUNTY

PANEL 30 OF 35
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230189 0030 B

EFFECTIVE DATE:
SEPTEMBER 2, 1981

federal emergency management agency
federal insurance administration



Map Scale: 1:5,870 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 15, Sep 6, 2018

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

Date(s) aerial images were photographed: Apr 29, 2012—Jun 26, 2016

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BgB	Belgrade very fine sandy loam, 0 to 8 percent slopes	B	6.6	7.2%
HrB	Lyman-Tunbridge complex, 0 to 8 percent slopes, rocky	D	30.9	33.3%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	D	22.6	24.4%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	C	16.0	17.3%
Sn	Scantic silt loam, 0 to 3 percent slopes	D	13.9	15.0%
Sp	Sebago mucky peat	A/D	1.8	1.9%
SuD2	Suffield silt loam, 15 to 25 percent slopes, eroded	C	0.9	1.0%
Totals for Area of Interest			**92.6**	**100.0%**

Description

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

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

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

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

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

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

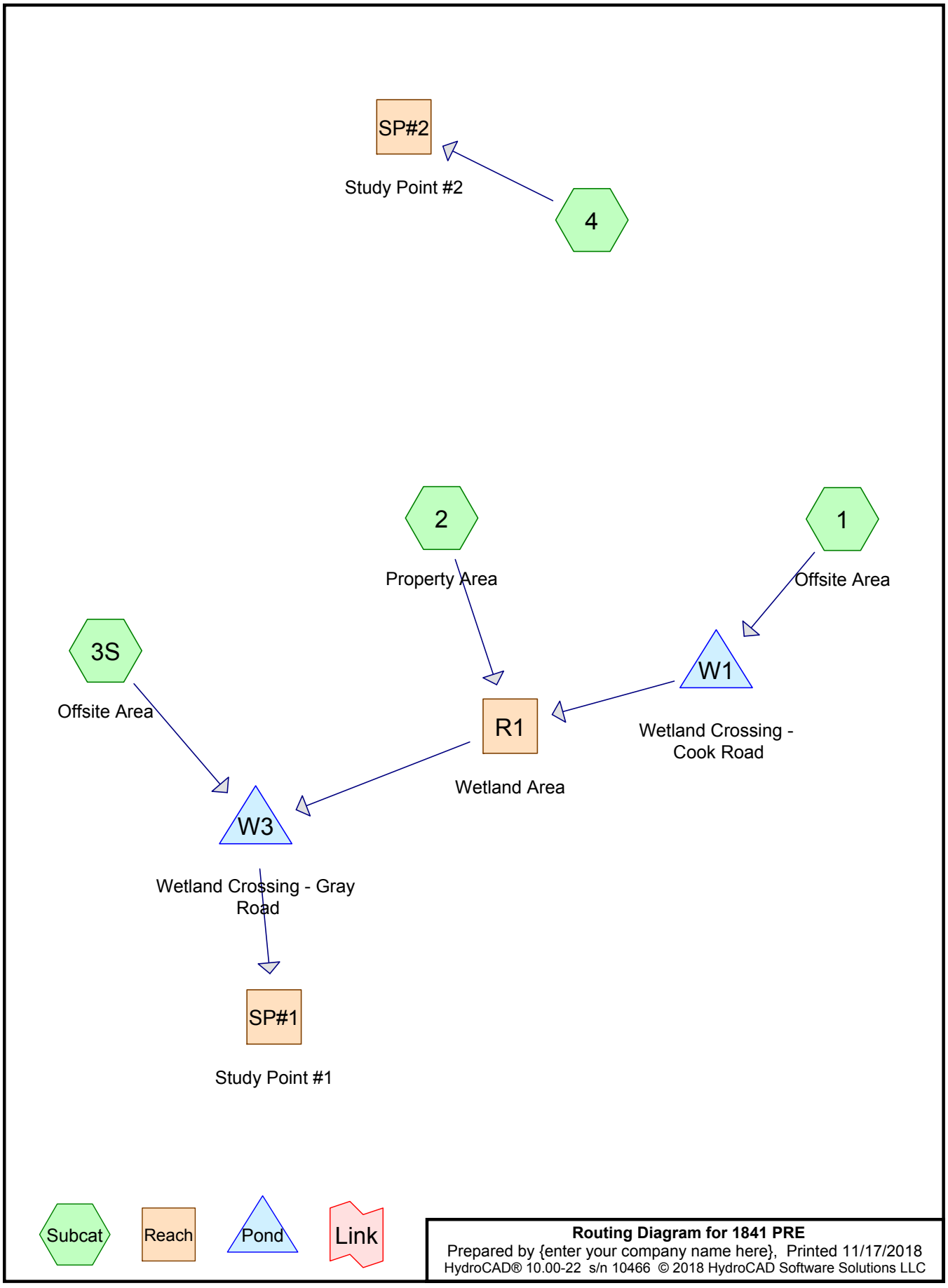
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Routing Diagram for 1841 PRE

Prepared by {enter your company name here}, Printed 11/17/2018

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

Subcatchment 1: Offsite Area Runoff Area=8.480 ac 5.25% Impervious Runoff Depth>0.97"
Flow Length=425' Tc=48.3 min CN=76 Runoff=4.58 cfs 0.687 af

Subcatchment 2: Property Area Runoff Area=9.990 ac 2.00% Impervious Runoff Depth>0.75"
Flow Length=530' Tc=90.5 min CN=72 Runoff=2.76 cfs 0.626 af

Subcatchment 3S: Offsite Area Runoff Area=17.710 ac 4.66% Impervious Runoff Depth>0.86"
Flow Length=750' Tc=63.3 min CN=74 Runoff=7.16 cfs 1.271 af

Subcatchment 4: Runoff Area=34,912 sf 0.00% Impervious Runoff Depth>0.69"
Flow Length=60' Slope=0.1200 '/' Tc=12.3 min CN=70 Runoff=0.51 cfs 0.046 af

Total Runoff Area = 36.981 ac Runoff Volume = 2.631 af Average Runoff Depth = 0.85"
96.03% Pervious = 35.511 ac 3.97% Impervious = 1.470 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

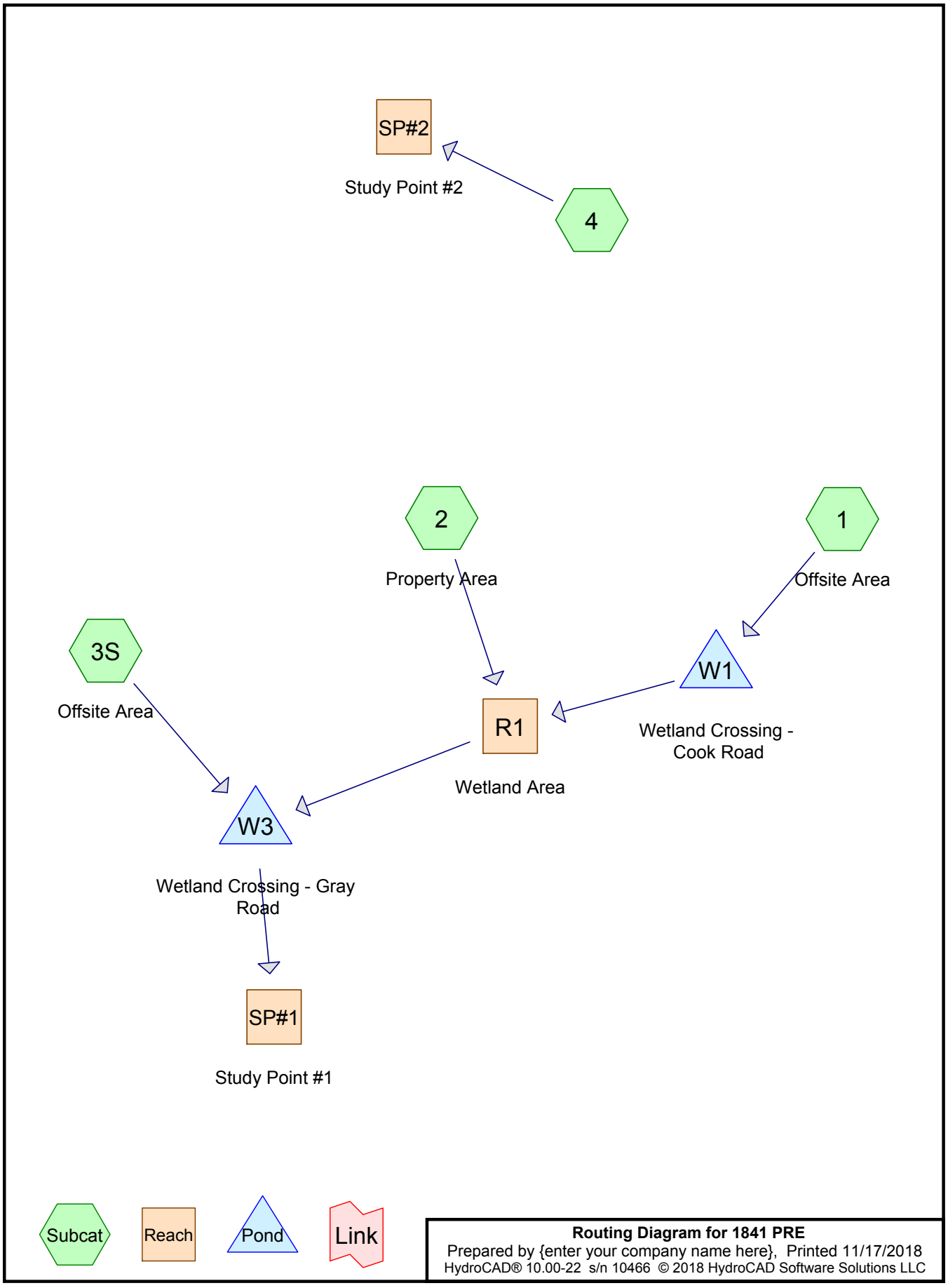
Subcatchment 1: Offsite Area Runoff Area=8.480 ac 5.25% Impervious Runoff Depth>2.02"
Flow Length=425' Tc=48.3 min CN=76 Runoff=9.71 cfs 1.425 af

Subcatchment 2: Property Area Runoff Area=9.990 ac 2.00% Impervious Runoff Depth>1.68"
Flow Length=530' Tc=90.5 min CN=72 Runoff=6.52 cfs 1.400 af

Subcatchment 3S: Offsite Area Runoff Area=17.710 ac 4.66% Impervious Runoff Depth>1.85"
Flow Length=750' Tc=63.3 min CN=74 Runoff=15.98 cfs 2.732 af

Subcatchment 4: Runoff Area=34,912 sf 0.00% Impervious Runoff Depth>1.60"
Flow Length=60' Slope=0.1200 '/' Tc=12.3 min CN=70 Runoff=1.28 cfs 0.107 af

Total Runoff Area = 36.981 ac Runoff Volume = 5.664 af Average Runoff Depth = 1.84"
96.03% Pervious = 35.511 ac 3.97% Impervious = 1.470 ac



Routing Diagram for 1841 PRE

Prepared by {enter your company name here}, Printed 11/17/2018

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

Subcatchment 1: Offsite Area Runoff Area=8.480 ac 5.25% Impervious Runoff Depth>2.95"
Flow Length=425' Tc=48.3 min CN=76 Runoff=14.19 cfs 2.083 af

Subcatchment 2: Property Area Runoff Area=9.990 ac 2.00% Impervious Runoff Depth>2.54"
Flow Length=530' Tc=90.5 min CN=72 Runoff=9.94 cfs 2.113 af

Subcatchment 3S: Offsite Area Runoff Area=17.710 ac 4.66% Impervious Runoff Depth>2.75"
Flow Length=750' Tc=63.3 min CN=74 Runoff=23.82 cfs 4.055 af

Subcatchment 4: Runoff Area=34,912 sf 0.00% Impervious Runoff Depth>2.44"
Flow Length=60' Slope=0.1200 '/' Tc=12.3 min CN=70 Runoff=1.98 cfs 0.163 af

Total Runoff Area = 36.981 ac Runoff Volume = 8.415 af Average Runoff Depth = 2.73"
96.03% Pervious = 35.511 ac 3.97% Impervious = 1.470 ac

Summary for Subcatchment 1: Offsite Area

Runoff = 14.19 cfs @ 12.67 hrs, Volume= 2.083 af, Depth> 2.95"

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 25 Year Rainfall=5.80"

Area (ac)	CN	Description
0.490	92	Paved roads w/open ditches, 50% imp, HSG C
1.000	79	1 acre lots, 20% imp, HSG C
0.000	77	2 acre lots, 12% imp, HSG C
2.990	70	Woods, Good, HSG C
4.000	77	Woods, Good, HSG D
8.480	76	Weighted Average
8.035		94.75% Pervious Area
0.445		5.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.3	275	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
48.3	425	Total			

Summary for Subcatchment 2: Property Area

Runoff = 9.94 cfs @ 13.21 hrs, Volume= 2.113 af, Depth> 2.54"

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 25 Year Rainfall=5.80"

Area (ac)	CN	Description
0.400	92	Paved roads w/open ditches, 50% imp, HSG C
0.000	79	1 acre lots, 20% imp, HSG C
0.000	77	2 acre lots, 12% imp, HSG C
7.370	70	Woods, Good, HSG C
2.220	77	Woods, Good, HSG D
9.990	72	Weighted Average
9.790		98.00% Pervious Area
0.200		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.5	150	0.0200	0.05		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.5	300	0.0030	0.14		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
90.5	530	Total			

Summary for Subcatchment 3S: Offsite Area

Runoff = 23.82 cfs @ 12.87 hrs, Volume= 4.055 af, Depth> 2.75"

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 25 Year Rainfall=5.80"

Area (ac)	CN	Description
0.690	92	Paved roads w/open ditches, 50% imp, HSG C
0.000	79	1 acre lots, 20% imp, HSG C
4.000	77	2 acre lots, 12% imp, HSG C
8.020	70	Woods, Good, HSG C
5.000	77	Woods, Good, HSG D
17.710	74	Weighted Average
16.885		95.34% Pervious Area
0.825		4.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.5	150	0.0200	0.05		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
10.8	600	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
63.3	750	Total			

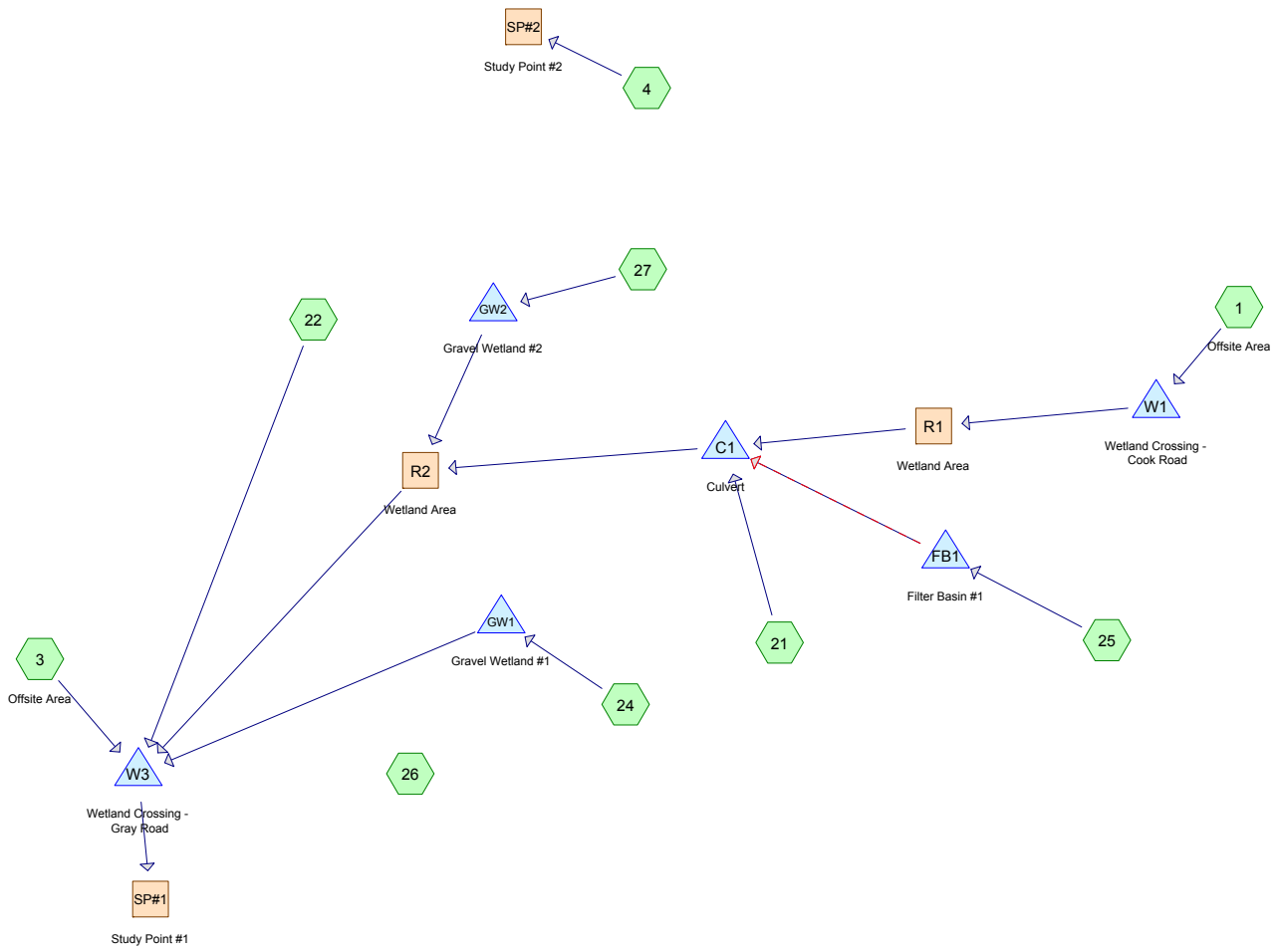
Summary for Subcatchment 4:

Runoff = 1.98 cfs @ 12.18 hrs, Volume= 0.163 af, Depth> 2.44"

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 25 Year Rainfall=5.80"

Area (sf)	CN	Description
34,912	70	Woods, Good, HSG C
0	77	Woods, Good, HSG D
34,912	70	Weighted Average
34,912		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	60	0.1200	0.08		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"



Subcat Reach Pond Link

Routing Diagram for 1841 Post

Prepared by {enter your company name here}, Printed 11/20/2018

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

Subcatchment 1: Offsite Area Runoff Area=8.480 ac 5.25% Impervious Runoff Depth>0.97"
Flow Length=425' Tc=48.3 min CN=76 Runoff=4.58 cfs 0.687 af

Subcatchment 3: Offsite Area Runoff Area=650,338 sf 3.92% Impervious Runoff Depth>0.91"
Flow Length=750' Tc=63.3 min CN=75 Runoff=6.45 cfs 1.135 af

Subcatchment 4: Runoff Area=16,726 sf 24.11% Impervious Runoff Depth>1.05"
Flow Length=60' Slope=0.1200 '/' Tc=4.7 min CN=77 Runoff=0.50 cfs 0.033 af

Subcatchment 21: Runoff Area=102,636 sf 16.58% Impervious Runoff Depth>1.10"
Flow Length=150' Slope=0.0200 '/' Tc=20.1 min CN=78 Runoff=2.16 cfs 0.215 af

Subcatchment 22: Runoff Area=167,994 sf 4.33% Impervious Runoff Depth>0.85"
Flow Length=530' Tc=90.5 min CN=74 Runoff=1.23 cfs 0.273 af

Subcatchment 24: Runoff Area=77,234 sf 58.18% Impervious Runoff Depth>1.78"
Tc=10.0 min CN=88 Runoff=3.42 cfs 0.264 af

Subcatchment 25: Runoff Area=93,719 sf 32.91% Impervious Runoff Depth>1.28"
Flow Length=400' Tc=24.6 min CN=81 Runoff=2.14 cfs 0.229 af

Subcatchment 26: Runoff Area=79,532 sf 19.41% Impervious Runoff Depth>1.16"
Flow Length=550' Tc=14.3 min CN=79 Runoff=2.03 cfs 0.176 af

Subcatchment 27: Runoff Area=46,965 sf 52.12% Impervious Runoff Depth>1.71"
Tc=10.0 min CN=87 Runoff=1.99 cfs 0.153 af

Reach R1: Wetland Area Avg. Flow Depth=0.28' Max Vel=0.27 fps Inflow=3.63 cfs 0.683 af
n=0.150 L=360.0' S=0.0067 '/' Capacity=121.31 cfs Outflow=3.28 cfs 0.665 af

Reach R2: Wetland Area Avg. Flow Depth=0.41' Max Vel=0.14 fps Inflow=3.93 cfs 1.031 af
n=0.150 L=460.0' S=0.0011 '/' Capacity=48.98 cfs Outflow=3.01 cfs 0.954 af

Reach SP#1: Study Point #1 Inflow=7.22 cfs 2.300 af
Outflow=7.22 cfs 2.300 af

Reach SP#2: Study Point #2 Inflow=0.50 cfs 0.033 af
Outflow=0.50 cfs 0.033 af

Pond C1: Culvert Peak Elev=274.69' Storage=7,572 cf Inflow=4.15 cfs 1.019 af
36.0" Round Culvert w/ 12.0" inside fill x 2.00 n=0.030 L=40.0' S=0.0050 '/' Outflow=3.74 cfs 0.952 af

Pond FB1: Filter Basin #1 Peak Elev=279.51' Storage=4,300 cf Inflow=2.14 cfs 0.229 af
Primary=0.93 cfs 0.095 af Secondary=0.06 cfs 0.043 af Outflow=0.98 cfs 0.138 af

Pond GW1: Gravel Wetland #1 Peak Elev=275.63' Storage=5,878 cf Inflow=3.42 cfs 0.264 af
Outflow=1.29 cfs 0.142 af

Pond GW2: Gravel Wetland #2 Peak Elev=277.57' Storage=3,462 cf Inflow=1.99 cfs 0.153 af
Outflow=0.51 cfs 0.079 af

Pond W1: Wetland Crossing - Cook Road Peak Elev=278.32' Storage=3,713 cf Inflow=4.58 cfs 0.687 af
Outflow=3.63 cfs 0.683 af

Pond W3: Wetland Crossing - Gray Road Peak Elev=272.01' Storage=18,936 cf Inflow=8.87 cfs 2.504 af
Outflow=7.22 cfs 2.300 af

Total Runoff Area = 36.835 ac Runoff Volume = 3.166 af Average Runoff Depth = 1.03"
88.23% Pervious = 32.498 ac 11.77% Impervious = 4.337 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

Subcatchment 1: Offsite Area Runoff Area=8.480 ac 5.25% Impervious Runoff Depth>2.02"
Flow Length=425' Tc=48.3 min CN=76 Runoff=9.71 cfs 1.425 af

Subcatchment 3: Offsite Area Runoff Area=650,338 sf 3.92% Impervious Runoff Depth>1.93"
Flow Length=750' Tc=63.3 min CN=75 Runoff=14.05 cfs 2.397 af

Subcatchment 4: Runoff Area=16,726 sf 24.11% Impervious Runoff Depth>2.13"
Flow Length=60' Slope=0.1200 '/' Tc=4.7 min CN=77 Runoff=1.05 cfs 0.068 af

Subcatchment 21: Runoff Area=102,636 sf 16.58% Impervious Runoff Depth>2.20"
Flow Length=150' Slope=0.0200 '/' Tc=20.1 min CN=78 Runoff=4.39 cfs 0.432 af

Subcatchment 22: Runoff Area=167,994 sf 4.33% Impervious Runoff Depth>1.83"
Flow Length=530' Tc=90.5 min CN=74 Runoff=2.75 cfs 0.588 af

Subcatchment 24: Runoff Area=77,234 sf 58.18% Impervious Runoff Depth>3.10"
Tc=10.0 min CN=88 Runoff=5.80 cfs 0.458 af

Subcatchment 25: Runoff Area=93,719 sf 32.91% Impervious Runoff Depth>2.44"
Flow Length=400' Tc=24.6 min CN=81 Runoff=4.10 cfs 0.438 af

Subcatchment 26: Runoff Area=79,532 sf 19.41% Impervious Runoff Depth>2.28"
Flow Length=550' Tc=14.3 min CN=79 Runoff=4.03 cfs 0.348 af

Subcatchment 27: Runoff Area=46,965 sf 52.12% Impervious Runoff Depth>3.00"
Tc=10.0 min CN=87 Runoff=3.44 cfs 0.270 af

Reach R1: Wetland Area Avg. Flow Depth=0.36' Max Vel=0.31 fps Inflow=5.79 cfs 1.418 af
n=0.150 L=360.0' S=0.0067 '/' Capacity=121.31 cfs Outflow=5.61 cfs 1.391 af

Reach R2: Wetland Area Avg. Flow Depth=0.60' Max Vel=0.18 fps Inflow=7.47 cfs 2.282 af
n=0.150 L=460.0' S=0.0011 '/' Capacity=48.98 cfs Outflow=6.67 cfs 2.174 af

Reach SP#1: Study Point #1 Inflow=13.88 cfs 5.248 af
Outflow=13.88 cfs 5.248 af

Reach SP#2: Study Point #2 Inflow=1.05 cfs 0.068 af
Outflow=1.05 cfs 0.068 af

Pond C1: Culvert Peak Elev=274.93' Storage=12,138 cf Inflow=9.42 cfs 2.170 af
36.0" Round Culvert w/ 12.0" inside fill x 2.00 n=0.030 L=40.0' S=0.0050 '/' Outflow=7.04 cfs 2.087 af

Pond FB1: Filter Basin #1 Peak Elev=279.68' Storage=4,900 cf Inflow=4.10 cfs 0.438 af
Primary=3.80 cfs 0.297 af Secondary=0.06 cfs 0.049 af Outflow=3.86 cfs 0.347 af

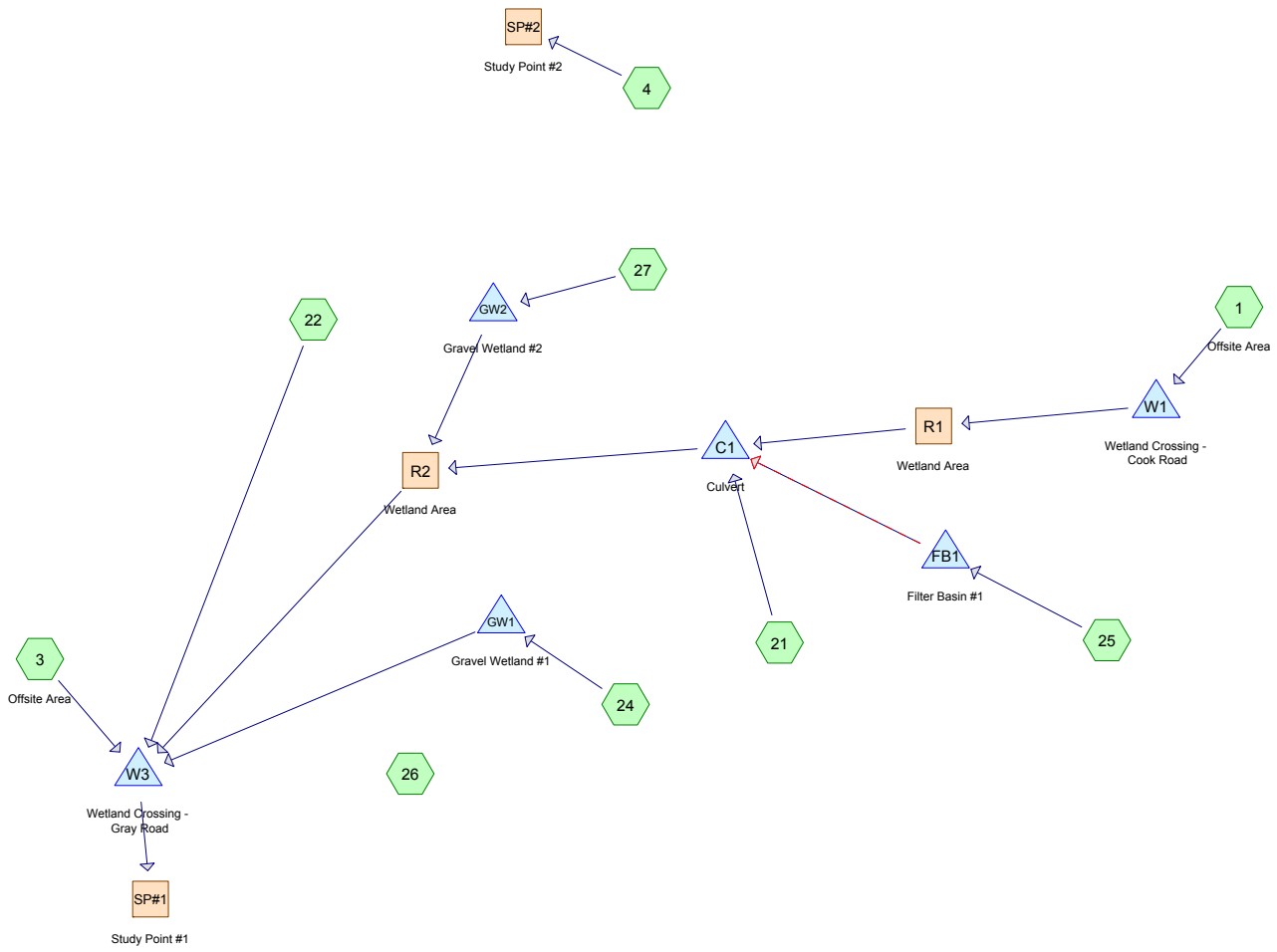
Pond GW1: Gravel Wetland #1 Peak Elev=275.83' Storage=6,860 cf Inflow=5.80 cfs 0.458 af
Outflow=4.95 cfs 0.335 af

Pond GW2: Gravel Wetland #2 Peak Elev=277.73' Storage=3,991 cf Inflow=3.44 cfs 0.270 af
Outflow=2.87 cfs 0.195 af

Pond W1: Wetland Crossing - Cook Road Peak Elev=279.26' Storage=12,195 cf Inflow=9.71 cfs 1.425 af
Outflow=5.79 cfs 1.418 af

Pond W3: Wetland Crossing - Gray Road Peak Elev=272.88' Storage=50,821 cf Inflow=21.93 cfs 5.494 af
Outflow=13.88 cfs 5.248 af

Total Runoff Area = 36.835 ac Runoff Volume = 6.422 af Average Runoff Depth = 2.09"
88.23% Pervious = 32.498 ac 11.77% Impervious = 4.337 ac



Subcat Reach Pond Link

Routing Diagram for 1841 Post

Prepared by {enter your company name here}, Printed 11/20/2018

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

Subcatchment 1: Offsite Area Runoff Area=8.480 ac 5.25% Impervious Runoff Depth>2.95"
Flow Length=425' Tc=48.3 min CN=76 Runoff=14.19 cfs 2.083 af

Subcatchment 3: Offsite Area Runoff Area=650,338 sf 3.92% Impervious Runoff Depth>2.84"
Flow Length=750' Tc=63.3 min CN=75 Runoff=20.75 cfs 3.532 af

Subcatchment 4: Runoff Area=16,726 sf 24.11% Impervious Runoff Depth>3.09"
Flow Length=60' Slope=0.1200 '/' Tc=4.7 min CN=77 Runoff=1.51 cfs 0.099 af

Subcatchment 21: Runoff Area=102,636 sf 16.58% Impervious Runoff Depth>3.17"
Flow Length=150' Slope=0.0200 '/' Tc=20.1 min CN=78 Runoff=6.30 cfs 0.622 af

Subcatchment 22: Runoff Area=167,994 sf 4.33% Impervious Runoff Depth>2.72"
Flow Length=530' Tc=90.5 min CN=74 Runoff=4.11 cfs 0.873 af

Subcatchment 24: Runoff Area=77,234 sf 58.18% Impervious Runoff Depth>4.18"
Tc=10.0 min CN=88 Runoff=7.71 cfs 0.618 af

Subcatchment 25: Runoff Area=93,719 sf 32.91% Impervious Runoff Depth>3.45"
Flow Length=400' Tc=24.6 min CN=81 Runoff=5.74 cfs 0.619 af

Subcatchment 26: Runoff Area=79,532 sf 19.41% Impervious Runoff Depth>3.27"
Flow Length=550' Tc=14.3 min CN=79 Runoff=5.74 cfs 0.497 af

Subcatchment 27: Runoff Area=46,965 sf 52.12% Impervious Runoff Depth>4.08"
Tc=10.0 min CN=87 Runoff=4.60 cfs 0.366 af

Reach R1: Wetland Area Avg. Flow Depth=0.40' Max Vel=0.33 fps Inflow=7.02 cfs 2.073 af
n=0.150 L=360.0' S=0.0067 '/' Capacity=121.31 cfs Outflow=6.90 cfs 2.041 af

Reach R2: Wetland Area Avg. Flow Depth=0.69' Max Vel=0.20 fps Inflow=11.11 cfs 3.386 af
n=0.150 L=460.0' S=0.0011 '/' Capacity=48.98 cfs Outflow=9.17 cfs 3.255 af

Reach SP#1: Study Point #1 Inflow=17.05 cfs 7.877 af
Outflow=17.05 cfs 7.877 af

Reach SP#2: Study Point #2 Inflow=1.51 cfs 0.099 af
Outflow=1.51 cfs 0.099 af

Pond C1: Culvert Peak Elev=275.11' Storage=16,223 cf Inflow=13.96 cfs 3.189 af
36.0" Round Culvert w/ 12.0" inside fill x 2.00 n=0.030 L=40.0' S=0.0050 '/' Outflow=10.12 cfs 3.095 af

Pond FB1: Filter Basin #1 Peak Elev=279.76' Storage=5,186 cf Inflow=5.74 cfs 0.619 af
Primary=5.57 cfs 0.473 af Secondary=0.06 cfs 0.054 af Outflow=5.63 cfs 0.527 af

Pond GW1: Gravel Wetland #1 Peak Elev=275.91' Storage=7,288 cf Inflow=7.71 cfs 0.618 af
Outflow=6.97 cfs 0.495 af

Pond GW2: Gravel Wetland #2 Peak Elev=277.80' Storage=4,226 cf Inflow=4.60 cfs 0.366 af
Outflow=4.26 cfs 0.291 af

Pond W1: Wetland Crossing - Cook Road Peak Elev=279.99' Storage=22,176 cf Inflow=14.19 cfs 2.083 af
Outflow=7.02 cfs 2.073 af

Pond W3: Wetland Crossing - Gray Road Peak Elev=273.49' Storage=94,208 cf Inflow=33.53 cfs 8.156 af
Outflow=17.05 cfs 7.877 af

Total Runoff Area = 36.835 ac Runoff Volume = 9.309 af Average Runoff Depth = 3.03"
88.23% Pervious = 32.498 ac 11.77% Impervious = 4.337 ac

Summary for Subcatchment 1: Offsite Area

Runoff = 14.19 cfs @ 12.67 hrs, Volume= 2.083 af, Depth> 2.95"

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 25 Year Rainfall=5.80"

Area (ac)	CN	Description
0.490	92	Paved roads w/open ditches, 50% imp, HSG C
1.000	79	1 acre lots, 20% imp, HSG C
0.000	77	2 acre lots, 12% imp, HSG C
2.990	70	Woods, Good, HSG C
4.000	77	Woods, Good, HSG D
8.480	76	Weighted Average
8.035		94.75% Pervious Area
0.445		5.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.0	150	0.0330	0.06		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
5.3	275	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
48.3	425	Total			

Summary for Subcatchment 3: Offsite Area

Runoff = 20.75 cfs @ 12.86 hrs, Volume= 3.532 af, Depth> 2.84"

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 25 Year Rainfall=5.80"

Area (sf)	CN	Description
9,200	92	Paved roads w/open ditches, 50% imp, HSG C
0	79	1 acre lots, 20% imp, HSG C
174,240	77	2 acre lots, 12% imp, HSG C
249,098	70	Woods, Good, HSG C
217,800	77	Woods, Good, HSG D
650,338	75	Weighted Average
624,829		96.08% Pervious Area
25,509		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.5	150	0.0200	0.05		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
10.8	600	0.0340	0.92		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
63.3	750	Total			

Summary for Subcatchment 4:

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

Runoff = 1.51 cfs @ 12.07 hrs, Volume= 0.099 af, Depth> 3.09"

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 25 Year Rainfall=5.80"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	4,032	98	Proposed Impervious
	1,000	74	>75% Grass cover, Good, HSG C
	11,694	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	16,726	77	Weighted Average
	12,694		75.89% Pervious Area
	4,032		24.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	60	0.1200	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"

Summary for Subcatchment 21:

Runoff = 6.30 cfs @ 12.28 hrs, Volume= 0.622 af, Depth> 3.17"

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 25 Year Rainfall=5.80"

	Area (sf)	CN	Description
	5,825	92	Paved roads w/open ditches, 50% imp, HSG C
*	14,102	98	Proposed Impervious
	13,000	74	>75% Grass cover, Good, HSG C
	29,709	70	Woods, Good, HSG C
	40,000	77	Woods, Good, HSG D
	102,636	78	Weighted Average
	85,622		83.42% Pervious Area
	17,015		16.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	150	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"

Summary for Subcatchment 22:

Runoff = 4.11 cfs @ 13.20 hrs, Volume= 0.873 af, Depth> 2.72"

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 25 Year Rainfall=5.80"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	7,273	98	Proposed Impervious
	18,732	74	>75% Grass cover, Good, HSG C
	89,989	70	Woods, Good, HSG C
	52,000	77	Woods, Good, HSG D
	167,994	74	Weighted Average
	160,721		95.67% Pervious Area
	7,273		4.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
52.5	150	0.0200	0.05		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.5	300	0.0030	0.14		**Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps
90.5	530	Total			

Summary for Subcatchment 24:

Runoff = 7.71 cfs @ 12.14 hrs, Volume= 0.618 af, Depth> 4.18"

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 25 Year Rainfall=5.80"

	Area (sf)	CN	Description
	0	92	Paved roads w/open ditches, 50% imp, HSG C
*	44,934	98	Proposed Impervious
	32,300	74	>75% Grass cover, Good, HSG C
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	77,234	88	Weighted Average
	32,300		41.82% Pervious Area
	44,934		58.18% Impervious Area

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

Summary for Subcatchment 25:

Runoff = 5.74 cfs @ 12.34 hrs, Volume= 0.619 af, Depth> 3.45"

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 25 Year Rainfall=5.80"

	Area (sf)	CN	Description
	9,750	92	Paved roads w/open ditches, 50% imp, HSG C
*	25,964	98	Proposed Impervious
	32,000	74	>75% Grass cover, Good, HSG C
	26,005	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	93,719	81	Weighted Average
	62,880		67.09% Pervious Area
	30,839		32.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0500	0.06		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.10"
8.3	100	0.0800	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.2	250	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
24.6	400	Total			

Summary for Subcatchment 26:

Runoff = 5.74 cfs @ 12.20 hrs, Volume= 0.497 af, Depth> 3.27"

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 25 Year Rainfall=5.80"

	Area (sf)	CN	Description
	20,800	92	Paved roads w/open ditches, 50% imp, HSG C
*	5,040	98	Proposed Impervious
	20,000	74	>75% Grass cover, Good, HSG C
	33,692	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	79,532	79	Weighted Average
	64,092		80.59% Pervious Area
	15,440		19.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	80	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
0.4	80	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.1	40	0.0500	12.75	15.65	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
1.7	350	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.3	550	Total			

Summary for Subcatchment 27:

Runoff = 4.60 cfs @ 12.14 hrs, Volume= 0.366 af, Depth> 4.08"

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 25 Year Rainfall=5.80"

	Area (sf)	CN	Description
	2,050	92	Paved roads w/open ditches, 50% imp, HSG C
*	23,453	98	Proposed Impervious
	21,462	74	>75% Grass cover, Good, HSG C
	0	70	Woods, Good, HSG C
	0	77	Woods, Good, HSG D
	46,965	87	Weighted Average
	22,487		47.88% Pervious Area
	24,478		52.12% Impervious Area

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

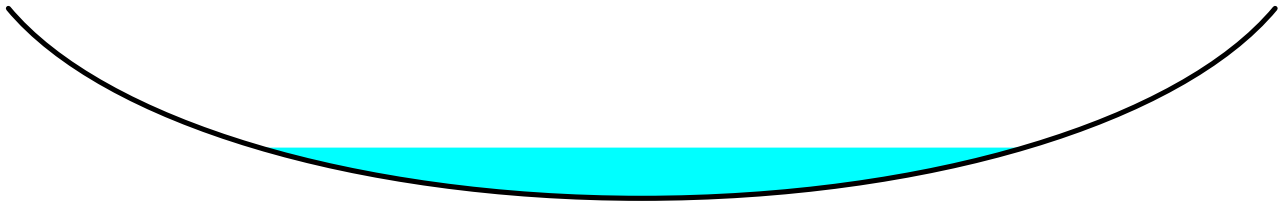
Summary for Reach R1: Wetland Area

Inflow Area = 8.480 ac, 5.25% Impervious, Inflow Depth > 2.93" for 25 Year event
Inflow = 7.02 cfs @ 13.25 hrs, Volume= 2.073 af
Outflow = 6.90 cfs @ 13.53 hrs, Volume= 2.041 af, Atten= 2%, Lag= 16.5 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.33 fps, Min. Travel Time= 17.9 min
Avg. Velocity = 0.20 fps, Avg. Travel Time= 30.8 min

Peak Storage= 7,417 cf @ 13.53 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.50' Flow Area= 150.0 sf, Capacity= 121.31 cfs

150.00' x 1.50' deep Parabolic Channel, n= 0.150 Dense willows
Length= 360.0' Slope= 0.0067 '/'
Inlet Invert= 276.60', Outlet Invert= 274.20'



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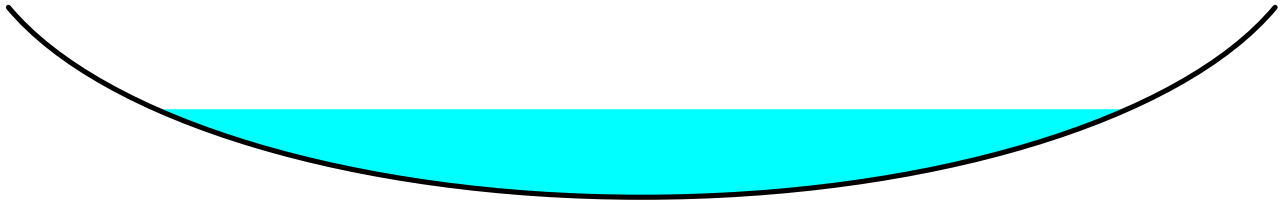
Summary for Reach R2: Wetland Area

Inflow Area = 14.066 ac, 14.97% Impervious, Inflow Depth > 2.89" for 25 Year event
Inflow = 11.11 cfs @ 12.61 hrs, Volume= 3.386 af
Outflow = 9.17 cfs @ 13.46 hrs, Volume= 3.255 af, Atten= 17%, Lag= 51.4 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.20 fps, Min. Travel Time= 39.3 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 81.3 min

Peak Storage= 21,635 cf @ 13.46 hrs
Average Depth at Peak Storage= 0.69'
Bank-Full Depth= 1.50' Flow Area= 150.0 sf, Capacity= 48.98 cfs

150.00' x 1.50' deep Parabolic Channel, n= 0.150 Dense willows
Length= 460.0' Slope= 0.0011 '/'
Inlet Invert= 274.00', Outlet Invert= 273.50'



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Summary for Reach SP#1: Study Point #1

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

Inflow Area = 34.625 ac, 11.23% Impervious, Inflow Depth > 2.73" for 25 Year event
Inflow = 17.05 cfs @ 14.22 hrs, Volume= 7.877 af
Outflow = 17.05 cfs @ 14.22 hrs, Volume= 7.877 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP#2: Study Point #2

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

Inflow Area = 0.384 ac, 24.11% Impervious, Inflow Depth > 3.09" for 25 Year event
Inflow = 1.51 cfs @ 12.07 hrs, Volume= 0.099 af
Outflow = 1.51 cfs @ 12.07 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond C1: Culvert

[62] Hint: Exceeded Reach R1 OUTLET depth by 0.58' @ 12.60 hrs

Inflow Area = 12.988 ac, 11.88% Impervious, Inflow Depth > 2.95" for 25 Year event
Inflow = 13.96 cfs @ 12.35 hrs, Volume= 3.189 af
Outflow = 10.12 cfs @ 12.75 hrs, Volume= 3.095 af, Atten= 27%, Lag= 23.7 min
Primary = 10.12 cfs @ 12.75 hrs, Volume= 3.095 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 275.11' @ 12.75 hrs Surf.Area= 24,348 sf Storage= 16,223 cf

Plug-Flow detention time= 34.7 min calculated for 3.095 af (97% of inflow)
Center-of-Mass det. time= 25.2 min (872.2 - 847.0)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	145,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	5,000	0	0
276.00	40,000	45,000	45,000
278.00	60,000	100,000	145,000

Device	Routing	Invert	Outlet Devices
#1	Primary	274.20'	**36.0" Round Culvert X 2.00 w/ 12.0" inside fill** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 273.20' / 273.00' S= 0.0050 '/' Cc= 0.900 n= 0.030, Flow Area= 5.01 sf

Primary OutFlow Max=10.12 cfs @ 12.75 hrs HW=275.11' TW=274.62' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 10.12 cfs @ 2.52 fps)

Summary for Pond FB1: Filter Basin #1

Inflow Area = 2.151 ac, 32.91% Impervious, Inflow Depth > 3.45" for 25 Year event
Inflow = 5.74 cfs @ 12.34 hrs, Volume= 0.619 af
Outflow = 5.63 cfs @ 12.38 hrs, Volume= 0.527 af, Atten= 2%, Lag= 2.8 min
Primary = 5.57 cfs @ 12.38 hrs, Volume= 0.473 af
Secondary = 0.06 cfs @ 12.38 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 279.76' @ 12.38 hrs Surf.Area= 3,640 sf Storage= 5,186 cf

Plug-Flow detention time= 66.8 min calculated for 0.527 af (85% of inflow)
Center-of-Mass det. time= 24.4 min (818.9 - 794.5)

Volume	Invert	Avail.Storage	Storage Description
#1	278.00'	10,215 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
278.00	2,250	0	0
279.00	3,000	2,625	2,625
279.40	3,479	1,296	3,921
280.00	3,750	2,169	6,090
281.00	4,500	4,125	10,215

Device	Routing	Invert	Outlet Devices
#1	Primary	279.40'	**10.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63
#2	Secondary	275.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	275.50'	**4.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 275.00' / 275.50' S= -0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#4	Device 3	278.00'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 275.00'

Primary OutFlow Max=5.55 cfs @ 12.38 hrs HW=279.75' TW=274.95' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 5.55 cfs @ 1.57 fps)

Secondary OutFlow Max=0.06 cfs @ 12.38 hrs HW=279.75' TW=274.95' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 10.45 fps)
└─**3=Culvert** (Passes 0.06 cfs of 0.52 cfs potential flow)
└─**4=Exfiltration** (Passes 0.06 cfs of 0.29 cfs potential flow)

Summary for Pond GW1: Gravel Wetland #1

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.773 ac, 58.18% Impervious, Inflow Depth > 4.18" for 25 Year event
Inflow = 7.71 cfs @ 12.14 hrs, Volume= 0.618 af
Outflow = 6.97 cfs @ 12.19 hrs, Volume= 0.495 af, Atten= 10%, Lag= 3.3 min
Primary = 6.97 cfs @ 12.19 hrs, Volume= 0.495 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 275.91' @ 12.19 hrs Surf.Area= 5,229 sf Storage= 7,288 cf

Plug-Flow detention time= 95.9 min calculated for 0.495 af (80% of inflow)

Center-of-Mass det. time= 43.1 min (808.7 - 765.6)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	13,627 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	2,700	0	0
275.00	3,750	3,225	3,225
275.50	4,300	2,013	5,238
275.51	4,800	45	5,283
277.00	6,400	8,344	13,627

Device	Routing	Invert	Outlet Devices
#1	Primary	275.50'	**10.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63
#2	Primary	273.67'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 273.67' / 273.40' S= 0.0090 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	271.25'	**1.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	275.25'	**4.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 271.25' / 275.25' S= -0.0800 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#5	Device 4	274.00'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 273.66'

Primary OutFlow Max=6.92 cfs @ 12.19 hrs HW=275.91' TW=271.83' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 6.89 cfs @ 1.69 fps)
- **2=Culvert** (Passes 0.04 cfs of 7.50 cfs potential flow)
  - **3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.20 fps)
    - **4=Culvert** (Passes 0.04 cfs of 0.20 cfs potential flow)
      - **5=Exfiltration** (Passes 0.04 cfs of 1.27 cfs potential flow)

Summary for Pond GW2: Gravel Wetland #2

Inflow Area = 1.078 ac, 52.12% Impervious, Inflow Depth > 4.08" for 25 Year event
Inflow = 4.60 cfs @ 12.14 hrs, Volume= 0.366 af
Outflow = 4.26 cfs @ 12.19 hrs, Volume= 0.291 af, Atten= 7%, Lag= 2.8 min
Primary = 4.26 cfs @ 12.19 hrs, Volume= 0.291 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 277.80' @ 12.19 hrs Surf.Area= 3,462 sf Storage= 4,226 cf

Plug-Flow detention time= 88.6 min calculated for 0.290 af (79% of inflow)
Center-of-Mass det. time= 35.6 min (803.9 - 768.3)

Volume	Invert	Avail.Storage	Storage Description
#1	276.00'	9,017 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
276.00	1,550	0	0
277.00	2,363	1,957	1,957
277.50	2,770	1,283	3,240
277.51	3,215	30	3,270
279.00	4,500	5,748	9,017

Device	Routing	Invert	Outlet Devices
#1	Primary	277.50'	**10.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63
#2	Primary	275.67'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 275.67' / 275.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	273.25'	**1.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	273.25'	**4.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.25' / 273.25' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#5	Device 4	276.00'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 275.66'

Primary OutFlow Max=4.21 cfs @ 12.19 hrs HW=277.79' TW=274.31' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 4.17 cfs @ 1.42 fps)
- **2=Culvert** (Passes 0.04 cfs of 6.95 cfs potential flow)
  - **3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.02 fps)
    - **4=Culvert** (Passes 0.04 cfs of 0.37 cfs potential flow)
      - **5=Exfiltration** (Passes 0.04 cfs of 0.74 cfs potential flow)

Summary for Pond W1: Wetland Crossing - Cook Road

Inflow Area = 8.480 ac, 5.25% Impervious, Inflow Depth > 2.95" for 25 Year event
Inflow = 14.19 cfs @ 12.67 hrs, Volume= 2.083 af
Outflow = 7.02 cfs @ 13.25 hrs, Volume= 2.073 af, Atten= 51%, Lag= 35.2 min
Primary = 7.02 cfs @ 13.25 hrs, Volume= 2.073 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 279.99' @ 13.25 hrs Surf.Area= 15,923 sf Storage= 22,176 cf

Plug-Flow detention time= 30.9 min calculated for 2.073 af (100% of inflow)
Center-of-Mass det. time= 29.2 min (852.5 - 823.3)

Volume	Invert	Avail.Storage	Storage Description
#1	277.10'	144,389 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
277.10	20	0	0
278.00	4,400	1,989	1,989
280.00	16,000	20,400	22,389
282.00	30,000	46,000	68,389
284.00	46,000	76,000	144,389

Device	Routing	Invert	Outlet Devices
#1	Primary	277.10'	**15.0" Round Culvert** L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 277.10' / 276.64' S= 0.0092 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	283.50'	**40.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=7.02 cfs @ 13.25 hrs HW=279.99' TW=276.99' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.02 cfs @ 5.72 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond W3: Wetland Crossing - Gray Road

Inflow Area = 34.625 ac, 11.23% Impervious, Inflow Depth > 2.83" for 25 Year event
Inflow = 33.53 cfs @ 12.93 hrs, Volume= 8.156 af
Outflow = 17.05 cfs @ 14.22 hrs, Volume= 7.877 af, Atten= 49%, Lag= 77.5 min
Primary = 17.05 cfs @ 14.22 hrs, Volume= 7.877 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 273.49' @ 14.22 hrs Surf.Area= 85,803 sf Storage= 94,208 cf

Plug-Flow detention time= 71.7 min calculated for 7.851 af (96% of inflow)
Center-of-Mass det. time= 60.5 min (923.1 - 862.6)

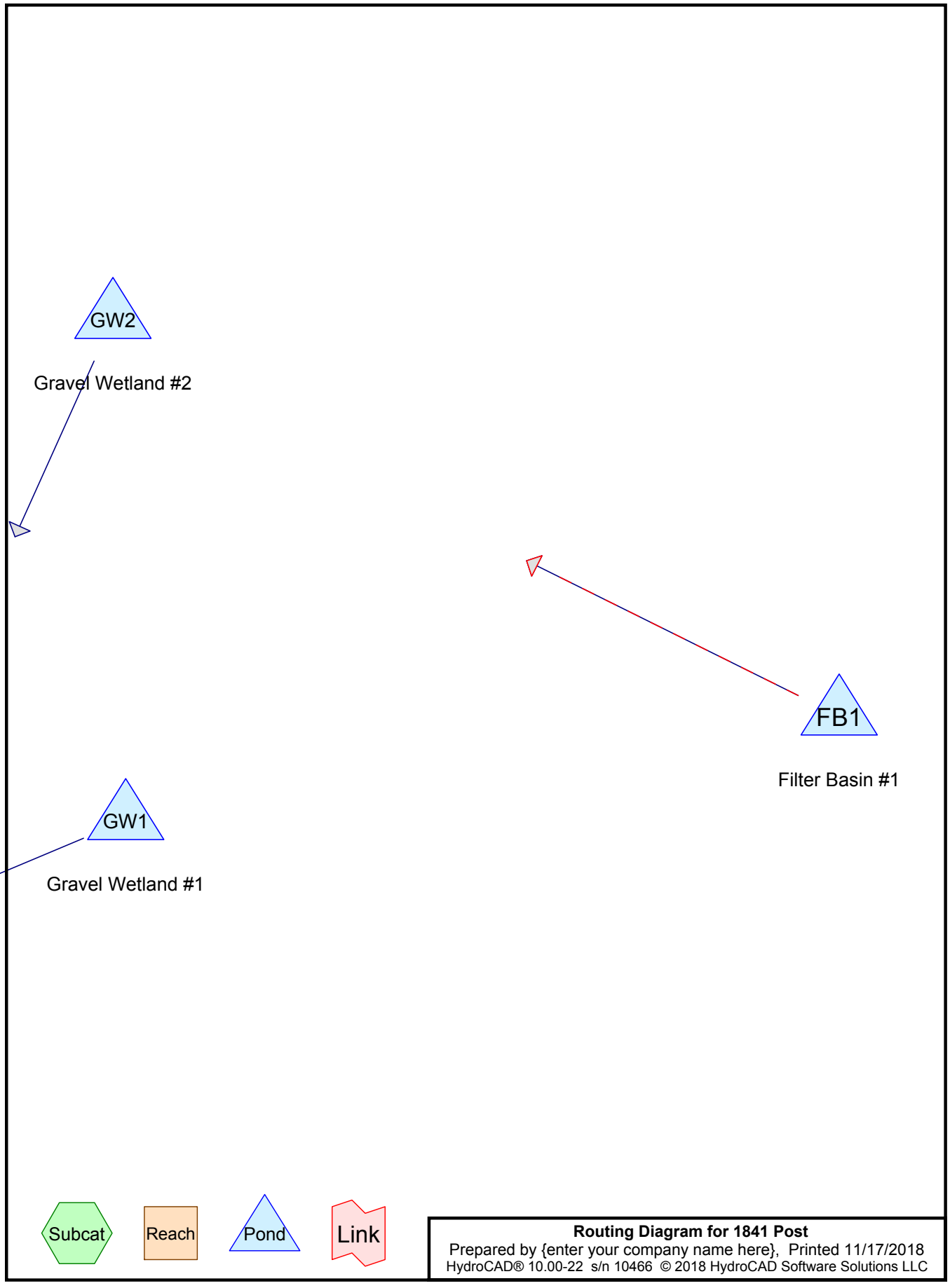
Volume	Invert	Avail.Storage	Storage Description
#1	270.00'	1,784,450 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
270.00	3,050	0	0
272.00	15,700	18,750	18,750
274.00	110,000	125,700	144,450
282.00	300,000	1,640,000	1,784,450

Device	Routing	Invert	Outlet Devices
#1	Primary	270.77'	**22.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 270.77' / 269.02' S= 0.0175 '/' Cc= 0.900 n= 0.012, Flow Area= 2.64 sf
#2	Primary	281.77'	**40.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=17.05 cfs @ 14.22 hrs HW=273.49' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 17.05 cfs @ 6.46 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)



Routing Diagram for 1841 Post
Prepared by {enter your company name here}, Printed 11/17/2018

Summary for Pond FB1: Filter Basin #1

Inflow Area = 2.151 ac, 32.91% Impervious, Inflow Depth > 5.47" for 100 Year event
Inflow = 8.94 cfs @ 12.33 hrs, Volume= 0.981 af
Outflow = 8.81 cfs @ 12.37 hrs, Volume= 0.891 af, Atten= 1%, Lag= 2.5 min
Primary = 8.76 cfs @ 12.37 hrs, Volume= 0.833 af
Secondary = 0.06 cfs @ 12.37 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 280.58' @ 12.37 hrs Surf.Area= 3,948 sf Storage= 5,569 cf

Plug-Flow detention time= 51.0 min calculated for 0.891 af (91% of inflow)
Center-of-Mass det. time= 21.0 min (804.7 - 783.7)

Volume	Invert	Avail.Storage	Storage Description
#1	278.75'	9,636 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
278.75	2,150	0	0
279.00	2,396	568	568
280.10	3,479	3,231	3,800
281.00	4,365	3,530	7,329
281.50	4,860	2,306	9,636

Device	Routing	Invert	Outlet Devices
#1	Primary	280.10'	**10.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63
#2	Secondary	276.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	276.50'	**4.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 276.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#4	Device 3	278.75'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 276.00'

Primary OutFlow Max=8.70 cfs @ 12.37 hrs HW=280.57' TW=275.27' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 8.70 cfs @ 1.83 fps)

Secondary OutFlow Max=0.06 cfs @ 12.37 hrs HW=280.57' TW=275.27' (Dynamic Tailwater)
2=Orifice/Grate (Orifice Controls 0.06 cfs @ 10.25 fps)
3=Culvert (Passes 0.06 cfs of 0.52 cfs potential flow)
4=Exfiltration (Passes 0.06 cfs of 0.33 cfs potential flow)

Summary for Pond GW1: Gravel Wetland #1

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.773 ac, 58.18% Impervious, Inflow Depth > 6.29" for 100 Year event
Inflow = 11.35 cfs @ 12.14 hrs, Volume= 0.930 af
Outflow = 10.44 cfs @ 12.19 hrs, Volume= 0.806 af, Atten= 8%, Lag= 2.9 min
Primary = 10.44 cfs @ 12.19 hrs, Volume= 0.806 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 276.03' @ 12.19 hrs Surf.Area= 5,361 sf Storage= 7,936 cf

Plug-Flow detention time= 78.0 min calculated for 0.806 af (87% of inflow)
Center-of-Mass det. time= 37.1 min (794.1 - 757.0)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	13,627 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	2,700	0	0
275.00	3,750	3,225	3,225
275.50	4,300	2,013	5,238
275.51	4,800	45	5,283
277.00	6,400	8,344	13,627

Device	Routing	Invert	Outlet Devices
#1	Primary	275.50'	**10.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63
#2	Primary	273.67'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 273.67' / 273.40' S= 0.0090 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	271.25'	**1.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	275.25'	**4.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 271.25' / 275.25' S= -0.0800 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#5	Device 4	274.00'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 273.66'

Primary OutFlow Max=10.31 cfs @ 12.19 hrs HW=276.03' TW=272.40' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 10.27 cfs @ 1.95 fps)
- **2=Culvert** (Passes 0.04 cfs of 7.78 cfs potential flow)
  - **3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.39 fps)
    - **4=Culvert** (Passes 0.04 cfs of 0.22 cfs potential flow)
      - **5=Exfiltration** (Passes 0.04 cfs of 1.34 cfs potential flow)

Summary for Pond GW2: Gravel Wetland #2

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.078 ac, 52.12% Impervious, Inflow Depth > 6.18" for 100 Year event
Inflow = 6.82 cfs @ 12.14 hrs, Volume= 0.556 af
Outflow = 6.41 cfs @ 12.18 hrs, Volume= 0.480 af, Atten= 6%, Lag= 2.3 min
Primary = 6.41 cfs @ 12.18 hrs, Volume= 0.480 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 277.89' @ 12.18 hrs Surf.Area= 3,541 sf Storage= 4,546 cf

Plug-Flow detention time= 73.7 min calculated for 0.480 af (86% of inflow)
Center-of-Mass det. time= 32.1 min (791.3 - 759.2)

Volume	Invert	Avail.Storage	Storage Description
#1	276.00'	9,017 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
276.00	1,550	0	0
277.00	2,363	1,957	1,957
277.50	2,770	1,283	3,240
277.51	3,215	30	3,270
279.00	4,500	5,748	9,017

Device	Routing	Invert	Outlet Devices
#1	Primary	277.50'	**10.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63
#2	Primary	275.67'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 275.67' / 275.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 2	273.25'	**1.0" Vert. Orifice/Grate** C= 0.600
#4	Device 3	273.25'	**4.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.25' / 273.25' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#5	Device 4	276.00'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 275.66'

Primary OutFlow Max=6.31 cfs @ 12.18 hrs HW=277.88' TW=274.54' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 6.27 cfs @ 1.63 fps)
- **2=Culvert** (Passes 0.04 cfs of 7.24 cfs potential flow)
  - **3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.16 fps)
    - **4=Culvert** (Passes 0.04 cfs of 0.38 cfs potential flow)
      - **5=Exfiltration** (Passes 0.04 cfs of 0.78 cfs potential flow)

Hydrograph for Pond GW1: Gravel Wetland #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	274.00	0.00
6.00	0.00	0	274.00	0.00
7.00	0.00	0	274.00	0.00
8.00	0.01	0	274.00	0.01
9.00	0.04	2	274.00	0.03
10.00	0.08	95	274.03	0.04
11.00	0.17	402	274.14	0.04
12.00	**1.70**	**1,997**	**274.66**	**0.06**
13.00	**0.40**	**5,533**	**275.56**	**0.48**
14.00	0.25	5,415	275.54	0.27
15.00	0.19	5,367	275.53	0.20
16.00	0.13	5,325	275.52	0.15
17.00	0.11	5,291	275.51	0.11
18.00	0.08	5,262	275.51	0.09
19.00	0.07	5,235	275.50	0.08
20.00	0.07	5,195	275.49	0.08
21.00	0.06	5,132	275.48	0.08
22.00	0.05	5,051	275.46	0.08
23.00	0.05	4,951	275.43	0.08
24.00	0.04	4,835	275.41	0.08
25.00	0.00	4,581	275.34	0.08
26.00	0.00	4,308	275.28	0.07
27.00	0.00	4,041	275.21	0.07
28.00	0.00	3,780	275.14	0.07
29.00	0.00	3,524	275.08	0.07
30.00	0.00	3,275	275.01	0.07
31.00	0.00	3,031	274.95	0.07
32.00	0.00	2,794	274.88	0.07
33.00	0.00	2,563	274.82	0.06
34.00	0.00	2,338	274.76	0.06
35.00	0.00	2,120	274.69	0.06
36.00	0.00	1,908	274.63	0.06
37.00	0.00	1,703	274.57	0.06
38.00	0.00	1,505	274.51	0.05
39.00	0.00	1,314	274.45	0.05
40.00	0.00	1,130	274.39	0.05
41.00	0.00	953	274.33	0.05
42.00	0.00	784	274.28	0.05
43.00	0.00	622	274.22	0.04
44.00	0.00	468	274.17	0.04
45.00	0.00	322	274.12	0.04
46.00	0.00	184	274.07	0.04
47.00	0.00	54	274.02	0.03
48.00	0.00	0	274.00	0.00

Hydrograph for Pond GW2: Gravel Wetland #2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	276.00	0.00
7.50	0.00	0	276.00	0.00
10.00	**0.04**	57	276.04	0.02
12.50	**0.68**	**3,429**	**277.56**	**0.41**
15.00	0.11	**3,306**	**277.52**	**0.12**
17.50	0.06	3,268	277.51	0.06
20.00	0.04	3,249	277.50	0.04
22.50	0.03	3,229	277.50	0.04
25.00	0.00	3,077	277.44	0.03
27.50	0.00	2,768	277.33	0.03
30.00	0.00	2,469	277.21	0.03
32.50	0.00	2,181	277.09	0.03
35.00	0.00	1,905	276.98	0.03
37.50	0.00	1,641	276.86	0.03
40.00	0.00	1,389	276.75	0.03
42.50	0.00	1,150	276.64	0.03
45.00	0.00	925	276.52	0.02
47.50	0.00	713	276.42	0.02
50.00	0.00	517	276.31	0.02
52.50	0.00	336	276.21	0.02
55.00	0.00	171	276.11	0.02
57.50	0.00	24	276.02	0.02
60.00	0.00	0	276.00	0.00

Hydrograph for Pond FB1: Filter Basin #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
5.00	0.00	0	278.00	0.00	0.00	0.00
6.00	0.00	0	278.00	0.00	0.00	0.00
7.00	0.00	0	278.00	0.00	0.00	0.00
8.00	0.00	0	278.00	0.00	0.00	0.00
9.00	0.00	0	278.00	0.00	0.00	0.00
10.00	0.02	0	278.00	0.02	0.00	0.02
11.00	0.07	18	278.01	0.05	0.00	0.05
12.00	**0.62**	**541**	**278.23**	**0.05**	**0.00**	**0.05**
13.00	**0.60**	**4,220**	**279.49**	**0.71**	**0.65**	**0.06**
14.00	0.28	4,072	279.44	0.29	0.23	0.06
15.00	0.20	4,036	279.43	0.21	0.16	0.06
16.00	0.15	4,009	279.43	0.16	0.10	0.05
17.00	0.12	3,985	279.42	0.12	0.06	0.05
18.00	0.09	3,968	279.41	0.10	0.04	0.05
19.00	0.08	3,954	279.41	0.08	0.02	0.05
20.00	0.07	3,947	279.41	0.07	0.02	0.05
21.00	0.06	3,940	279.41	0.07	0.01	0.05
22.00	0.06	3,933	279.40	0.06	0.01	0.05
23.00	0.05	3,924	279.40	0.06	0.00	0.05
24.00	0.05	3,904	279.40	0.05	0.00	0.05
25.00	0.00	3,770	279.36	0.05	0.00	0.05
26.00	0.00	3,574	279.30	0.05	0.00	0.05
27.00	0.00	3,380	279.24	0.05	0.00	0.05
28.00	0.00	3,187	279.18	0.05	0.00	0.05
29.00	0.00	2,995	279.12	0.05	0.00	0.05
30.00	0.00	2,805	279.06	0.05	0.00	0.05
31.00	0.00	2,616	279.00	0.05	0.00	0.05
32.00	0.00	2,429	278.93	0.05	0.00	0.05
33.00	0.00	2,243	278.87	0.05	0.00	0.05
34.00	0.00	2,059	278.81	0.05	0.00	0.05
35.00	0.00	1,876	278.74	0.05	0.00	0.05
36.00	0.00	1,695	278.68	0.05	0.00	0.05
37.00	0.00	1,516	278.61	0.05	0.00	0.05
38.00	0.00	1,338	278.55	0.05	0.00	0.05
39.00	0.00	1,162	278.48	0.05	0.00	0.05
40.00	0.00	988	278.41	0.05	0.00	0.05
41.00	0.00	815	278.34	0.05	0.00	0.05
42.00	0.00	644	278.27	0.05	0.00	0.05
43.00	0.00	475	278.20	0.05	0.00	0.05
44.00	0.00	308	278.13	0.05	0.00	0.05
45.00	0.00	143	278.06	0.05	0.00	0.05
46.00	0.00	0	278.00	0.00	0.00	0.00
47.00	0.00	0	278.00	0.00	0.00	0.00
48.00	0.00	0	278.00	0.00	0.00	0.00

MAINTENANCE PLAN OF STORMWATER MANAGEMENT FACILITIES
FOR:
COOK ROAD RETIREMENT COMMUNITY
WINDHAM, MAINE

Project Developer: Mr. Jim Cummings
P.O. Box 957
Windham, ME 04062

Responsible Party: Cook Road Retirement Community Owners Association
P.O. Box 957
Windham, ME 04062

Prepared By: Terradyn Consultants, LLC
PO Box 339
New Gloucester, ME 04260

LIST OF STORMWATER MEASURES:

Conveyance & Distribution System (Stormwater Channels & Culverts)
Roadways & Parking Surfaces
Level Spreaders
Catch Basin Systems
Gravel Wetland
Grassed Underdrained Soil Filtery

INTRODUCTION:

The owner or operator of the proposed project will be responsible for the maintenance of all stormwater management structures except the rain gardens located on individual lots, the establishment of any contract services required to implement the program, and the keeping of records and maintenance log book. Records of all inspections and maintenance work accomplished must be kept on file and retained for a minimum 5 year time span. The maintenance log book will be made available to the DEP upon request. At a minimum, the appropriate and relevant activities for each of the stormwater management systems will be performed on the prescribed schedule.

INSPECTION & MAINTENANCE TASKS:

Inspections should be performed by qualified erosion control professional. NOTE: The following instruction are excerpts from the Maine Department of Environmental Protection's *Stormwater Management for Maine, Volume III BMPs Technical Design Manual*, dated January 2006.

CONVEYANCE & DISTRIBUTION SYSTEMS: (STORMWATER CHANNELS & CULVERTS, ETC.)

1. **Inspection schedule:**
   - **1.1.** Inspect ditches, swales and other open stormwater channels in the spring, in late fall, and after heavy rains to remove any obstructions to flow, remove accumulated sediments and debris, to control vegetated growth that could obstruct flow, and to repair any erosion of the ditch lining. Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If

the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. The channel must receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side-slopes.

1.2. Inspect culverts in the spring, in late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the culvert's inlet and outlet.

1.3. Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

2. **Mowing:** Grass should not be trimmed extremely short, as this will reduce the filtering effect of the swale (MPCA, 1989). The cut vegetation should be removed to prevent the decaying organic litter from adding pollutants to the discharge from the swale. The mowed height of the grass should be 2-4 inches taller than the maximum flow depth of the design water quality storm. A minimum mow height of 6 inches is generally recommended (Galli, 1993).

3. **Erosion:** It is important to install erosion and sediment control measures to stabilize this area as soon as possible and to retain any organic matter in the bottom of the trench.

4. **Fertilization:** Routine fertilization and/or use of pesticides is strongly discouraged. If complete re-seeding is necessary, half the original recommended rate of fertilizer should be applied with a full rate of seed.

5. **Sediment Removal:** The level of sediment deposition in the channel should be monitored regularly, and removed from grassed channels before permanent damage is done to the grassed vegetation, or if infiltration times are longer than 12 hours. Sediment should be removed from riprap channels when it reduces the capacity of the channel.

ROADWAYS & PARKING SURFACES:

1. Paved surfaces shall be swept or vacuumed at least twice annually in the Spring to remove all Winter sand, and periodically during the year on an as-needed basis to minimize transportation of sediment during rainfall events.

LEVEL SPREADERS:

1. **Inspections:** At least once a year and following major storms, the level spreader pool should be inspected for sand accumulation and debris that may reduce its capacity.

2. **Sediment Removal:** Sediment build-up within the swale should be removed when it has accumulated to approximately 25% of design volume or channel capacity. Dispose of the sediments appropriately.

3. **Debris:** Remove debris such as leaf litter, branches and tree growth from the spreader.

4. **Mowing***:* Vegetated spreaders may require mowing.

5. **Snow Storage:** Do not store snow within the area of the level spreader.

6. **Level Spreader Replacement:** The reconstruction of the level spreader may be necessary when sheet flow from the spreader channelize into the buffer.

CATCH BASIN SYSTEMS:

1. Catch basins are designed with a deep sump to trap larger sediment. Catch basins shall be inspected for sediment depth in the spring and fall, and accumulated sediment shall be removed and disposed of lawfully when it reaches 50% of the design capacity of the sump.

GRAVEL WETLANDS:

1ST YEAR POST-CONSTRUCTION: Inspection frequency should be after every major storm in the first year following construction.

1. Inspect to be certain system drains within 24-48 hours.
2. Watering plants as necessary during the first growing season
3. Re-vegetating poorly established areas as necessary
4. Quarterly inspection of soil and repairing eroded areas, especially on slopes & make timely repairs.
5. Checking inlets, outlets, and overflow spillway for blockage, structural integrity, and evidence of erosion. Risers may need to be cleaned.

POST-CONSTRUCTION: Inspection frequency should be at least every 6 months and after every major storm. Activities are expected to include:

1. Check the basin for a dense root mat establishment of wetland vegetation.
2. Check and clean the risers if there is evidence of standing water, discolored water or accumulated sediments in the cells.
3. Check and clean the forebay for sediments, trash and debris. When sediments have accumulated to a depth of 12 inches, standing water is persistent or wetland vegetation become established, the forebay will need to be excavated and reformed.
4. Verify that the cells drain within 24-48 hours. Sediment will need to be removed when an accumulation of 4 inches is evident over the wetland surface.
5. Check and clean all outlets and overflow spillway if blocked or there is evidence of structural damage or erosion.
6. Remove decaying vegetation, litter and debris.
7. Check for foreign species. Particular care must be used to avoid the unintended introduction of invasive species such as purple loosestrife (Lythrum salicaria) and common reed (Phragmites australis). It is recommended that a qualified wetland biologist be consulted when these are found in the area of the gravel wetland.

CLEANING CRITERIA FOR SEDIMENTATION FOREBAY: Sediment should be removed from the sedimentation chamber (forebay) when it accumulates to a depth of more than 12 inches (30 cm) or 10 percent of the pretreatment volume. The sedimentation forebay should be cleaned of vegetation if persistent standing water and wetland vegetation becomes dominant. The cleaning interval is approximately every 4 years. A dry sedimentation forebay is the optimal condition while in practice this condition is rarely achieved. The sedimentation chamber, forebay, and treatment cell outlet devices should be cleaned when drawdown times exceed 60 to 72 hours. Materials can be removed with heavy construction equipment; however, this equipment should not track on the wetland surface. Revegetation of disturbed areas as necessary. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

CLEANING CRITERIA FOR GRAVEL WETLAND TREATMENT CELLS: Sediment should be removed from the gravel wetland surface when it accumulates to a depth of several inches (>10 cm) across the wetland surface. Materials should be removed with rakes rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

Grassed Underdrained Soil Filter

During the first year, the basin will be inspected semi-annually and following major storm events. Debris and sediment buildup shall be removed from the forebay and basin as needed. Mowing of a grassed basin can occur semiannually to a height no less than 6 inches. Any bare area or erosion rills shall be repaired with new filter media or sandy loam then seeded and mulched. Maintaining good grass cover will minimize clogging with fine sediments and if ponding exceeds 48 hours, the top of the filter bed must be rototilled to reestablish the soil's filtration capacity.

Maintenance Agreement: A legal entity should be established with responsibility for inspecting and maintaining any underdrained filter. The legal agreement establishing the entity should list specific maintenance responsibilities (including timetables) and provide for the funding to cover long-term inspection and maintenance.

Soil Filter Inspection: The soil filter should be inspected after every major storm in the first year to be sure it is functioning properly. Thereafter, the filter should be inspected at least once every six months to ensure that it is draining within 48 hours following a one inch storm or greater. And that following a storms that fill the system to overflow, it drains in no less than 36 to 6o hours. If the system drains too fast, an orifice may need to be added on the underdrain outlet or, if already present, may need to be modified. Soil

Filter Replacement: The top several inches of the filter shall be replaced with fresh material when water ponds on the surface of the bed for more than 72 hours. The removed sediments should be disposed of in an acceptable manner.

Sediment Removal: Sediment and plant debris should be removed from the pretreatment structure at least annually.

Mowing: If mowing is desired, only hand held string trimmers or push-mowers are allowed on the filter (no tractor) and the grass bed should be mowed no more than 2 times per growing season to maintain grass heights of no less than 6 inches.

Fertilization: Fertilization of the underdrained filter area should be avoided unless absolutely necessary to establish vegetation.

Harvesting and Weeding: Harvesting and pruning of excessive growth will need to be done occasionally. Weeding to control unwanted or invasive plants may also be necessary. Add new mulch only as necessary for bioretention cell.

SAMPLE MAINTENANCE LOG SHEET:

Maintenance Log Sheet			
BMP's	**Date Inspected**	**Repairs Needed?**	**Date Repaired**
Example	8/17/2017	Y	8/27/2017
1. Conveyance & Distribution System			
2. Roadways & Parking			
3. Level Spreaders			
4. Catch Basin Systems			
5. Gravel Wetland			
6. Grassed Underdrained Soil Filter			

Detailed Repair Notes:		
BMP Type	**Date**	**Description of Repair Made**
3	8/27/2017	Removed sediment from sump

HOUSEKEEPING PERFORMANCE STANDARDS
FOR:
COOK ROAD RETIREMENT COMMUNITY
WINDHAM, MAINE

Project Developer: Mr. Jim Cummings
P.O. Box 957
Windham, ME 04062

Responsible Party: Cook Road Retirement Community Owners Association
P.O. Box 957
Windham, ME 04062

Introduction:
The contractor shall be responsible for maintaining proper housekeeping standards throughout the construction phase of the project. After the construction phase has been completed, the owner or operator of the project will be responsible.

Standards:
In accordance with the housekeeping performance standards required by MDEP chapter 500 stormwater regulations, the following standards shall be met:

1. **Spill prevention.** Controls must be used to prevent pollutants from being discharged from materials on site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.
2. **Groundwater protection.** During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.
3. **Fugitive sediment and dust.** Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control.

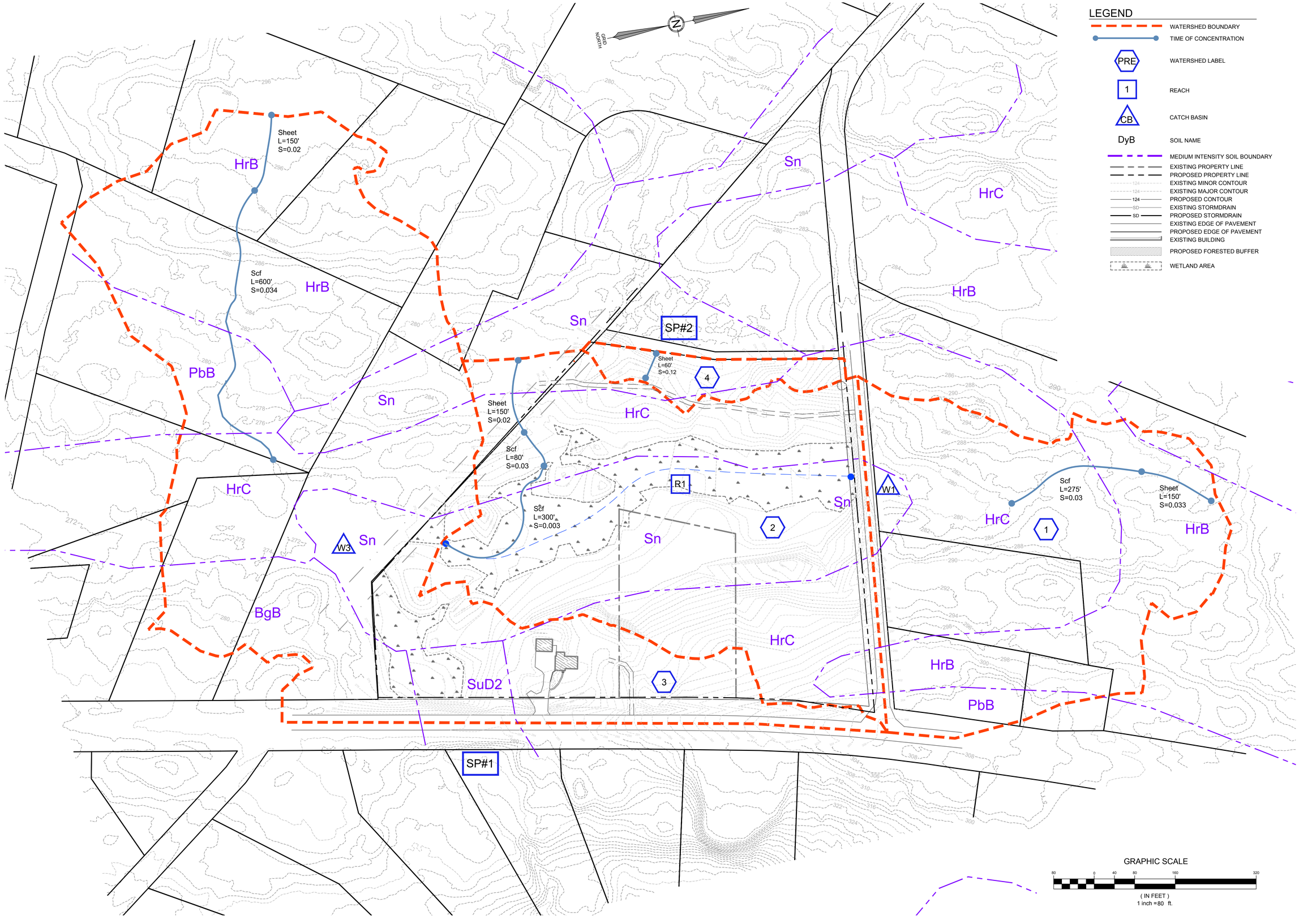
   Operations during wet months that experience tracking of mud off the site onto public roads should provide for sweeping of road areas at least once a week and prior to significant storm events. Where chronic mud tracking occurs, a stabilized construction entrance should be provided. Operations during dry months, that experience fugitive dust problems, should wet down the access roads once a week or more frequently as needed.
4. **Debris and other materials.** Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

   To prevent these materials from becoming a source of pollutants, construction and post-construction activities related to a project may be required to comply with applicable

provision of rules related to solid, universal, and hazardous waste, including, but not limited to, the Maine solid waste and hazardous waste management rules; Maine hazardous waste management rules; Maine oil conveyance and storage rules; and Maine pesticide requirements.

5. **Trench or foundation de-watering.** Trench de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the department.

6. **Non-stormwater discharges.** Identify and prevent contamination by non-stormwater discharges.



STATE OF MAINE
JEFFREY D. KAMOS
LICENSED PROFESSIONAL ENGINEER

NO.	DATE	REVISIONS	JDA APPRD BY

TERRADYN CONSULTANTS, LLC
41 Campus Dr. Suite 101
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
COOK ROAD RETIREMENT COMMUNITY
306 GRAY ROAD
PRE DEVELOPMENT WATERSHED MAP

PREPARED FOR
MR. JAMES CUMMINGS
P.O. BOX 457
WINDHAM, MAINE 04062

DATE:	10/25/2018
SCALE:	
DESIGNED:	
JOB NO:	1841
FILE: 1841 SK.DWG	
SHEET	C-6.0

Cook Road Retirement Community, Windham

Treatment Area Calculations

Total New Impervious Area Requiring Treatment (SF) =	118,030
Total Developed Area Requiring Treatment (SF) =	258,260

NEW Impervious and Developed Areas:

Watershed	Total Impervious Area (SF)	Total Impervious Area Treated (SF)	Total Landscaped Area	Total Landscaped Area Treated (SF)	Total Developed Area (SF)	Total Developed Area Treated (SF)	Incremental Treatment % (Impervious)	Incremental Treatment % (Developed)	BMP
21 *	5,825	3,524	5,000	0	17,249	3,524	2.99%	1.36%	Roof drain filters
22 **	3,524	3,524	10,000	0	14,836	3,524	2.99%	1.36%	Roof drain filters
23	9,290	5,640	11,732	5,000	21,022	10,640	4.78%	4.12%	None
24	44,934	44,934	32,300	32,300	77,234	77,234	38.07%	29.91%	Gravel Wetland #2
25 ***	25,964	30,839	37,000	41,875	57,964	72,714	26.13%	28.16%	Filter Basin #1
26	5,040	5,040	20,000	0	25,040	5,040	4.27%	1.95%	Roof drain filters
27	23,453	23,453	21,462	21,462	44,915	44,915	19.87%	17.39%	Gravel Wetland #2
40						0	0.00%	0.00%	No treatment
Total	118,030	116,954	137,494	100,637	258,260	217,591	99.09%	84.25%	
	8,564	8,564	30,000	0	39,876	8,564			
Total new imperv	113,155		132,619						

* Excludes 1,424 SF of new road draining off road at wetland crossing
** Excludes 1,312 SF draining off road at wetland crossing
*** Includes credit for half of Cook Rd from centerline to edge of pavement draining onto site (4,875 SF)

LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION
- PRE — WATERSHED LABEL
- 1 — REACH
- CB — CATCH BASIN
- DyB — SOIL NAME
- MEDIUM INTENSITY SOIL BOUNDARY
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED CONTOUR
- EXISTING STORMDRAIN
- PROPOSED STORMDRAIN
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- EXISTING BUILDING
- PROPOSED FORESTED BUFFER
- WETLAND AREA

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

PRELIMINARY - NOT FOR CONSTRUCTION

STATE OF MAINE — JEFFREY D. AMOS — 10161 — LICENSED PROFESSIONAL ENGINEER

DATE: 11-19-2018
P.E.: JEFFREY D. AMOS

NO.	DATE	REVISIONS	APP'D BY

TERRADYN CONSULTANTS, LLC
CIVIL ENGINEERING | LAND PLANNING | STORMWATER DESIGN | ENVIRONMENTAL PERMITTING
41 CAMPUS DRIVE, SUITE 101, NEW GLOUCESTER, ME 04260
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SHEET DESCRIPTION
COOK ROAD RETIREMENT COMMUNITY
306 GRAY ROAD
POST DEVELOPMENT WATERSHED MAP

PREPARED FOR
MR. JAMES CUMMINGS
P.O. BOX 957
WINDHAM, MAINE 04062

DATE:	11/18/2018
SCALE:	
DESIGNED:	LRB
JOB NO:	1841
FILE:	
SHEET	C-6.1