Section 6
Clearing Limits

6.0 CLEARING LIMITS

6.1 Clearing and Revegetation

6.1.1 Clearing

The Highland Wind Project will require clearing a portion of the Stewart Mountain, Witham Mountain, and Bald Mountain ridgeline, as well as the Burnt Hill and Briggs Hill ridgeline for construction of the wind turbine sites and connection roads. The project site is comprised of actively managed forest operations with ongoing timber harvesting activities. As a result, clearing activities on these mountains will not be nearly as extensive as what likely would be required in virgin or otherwise unmanaged forest areas.

Clearing will involve a mix of temporary and permanent impacts. Appropriate erosion control methods will be implemented prior to commencement of clearing operations. Stormwater buffer areas, as described in Section 10, will be maintained and will remain undisturbed. Construction of wind turbines and permanent access roads will require permanent clearing. Electrical collector lines will also require clearing for construction. Vegetation in these areas will be allowed to grow in, but the line corridor will be maintained periodically by cutting and removing trees to protect the electrical lines. In addition, the construction process will require temporary clearing impacts such as clearings for turbine rotor assembly areas and clearings for material/equipment laydown. These areas of temporary clearing will be allowed to revegetate following completion of construction and startup of commercial operations. Natural revegetation will be promoted through the use of native mulch/soil mixtures and erosion control mix. The Key Facts Table (Section 1) summarizes the permanent and temporary clearing impacts associated with this project. Wetland impacts were minimized to the greatest extent practicable, and the project was redesigned multiple times in order to minimize all impacts, including the extent of clearing necessary.

General descriptions of the clearing required in each portion of the development area are provided in Appendix 6-1. In addition, the Key Facts Table provided in Section 1 of this permit application provides a detailed breakdown of both temporary and permanent clearings required for each project component. A breakdown of impacts by mapped Land Use Regulation Commission (LURC) subdistrict is provided in Table 6-1. Proposed clearing limits are shown on the civil engineering plans for the project (Series 100, 200 and 300) and are depicted by the darker of the two treeline symbols.

Table 6-1: Impacts by mapped LURC subdistrict based upon temporary clearing calculations and the area of impact associated with the Operations and Maintenance building. The area of permanent clearings including structures is considerably less than the temporary clearing impacts. For a comparison of temporary and permanent clearing impacts, refer to the Key Facts Table in Section 1 of the permit application.

LURC Subdistrict	Area (acres)
Flood Prone Protection (P-FP)	6.2
Shoreland Protection (P-SL1)	0.4
Shoreland Protection (P-SL2)	9.6
Wetland Protection (P-WL1)	1.8
Wetland Protection (P-WL2)	0.1
Wetland Protection (P-WL3)	4.3
General Management (M-GN)	510.48
Total	532.88

6.2 Revegetation

Following construction, the lay down area and approximately 3.11 acres of the total 3.25 acre clearing for each circular turbine pad will be allowed to revegetate. In addition, 1.00 acre of the total 1.13-acre

clearing for each rectangular turbine pad will also be allowed to revegetate. To reduce the potential for erosion, topsoil material, previously stripped from the development areas and stockpiled, will be spread on these relatively flat areas. Erosion control mix, primarily comprised of stump grindings and shredded organic material generated during clearing, will be mixed and spread with the topsoil material and allowed to naturally revegetate.

Following completion of road construction and turbine erection activities, Highland Wind LLC will periodically inspect areas allowed to revegetate, for erosion. If erosion is noted, these areas will be further stabilized. Areas will continue to be inspected until a vegetative cover is established.

Topsoil stockpiles throughout the site will be protected from erosion and sedimentation through implementation of Best Management Practices. This will include encircling down-gradient sides of the stockpiles with silt fencing or erosion control mix berms. Slopes will be left in a roughened condition to help minimize runoff erosion.

Appendix 6-1

1.0 Clearing Areas

1.1 Turbine Clearings

There are 48 wind turbine sites proposed for the Highland Wind Project (Project; see Section 1). Both circular and rectangular turbine pads are proposed for this Project dependent on the potential turbine type to be erected at each location. The size of each turbine pad is determined principally by the minimum area required by the turbine manufacturer to allow for efficient erection.

The proposed clearing for each circular turbine pad site has a diameter of 332 feet. Some additional clearing around each turbine site will also be required to allow for site grading and leveling, but the extent necessary will vary depending on the existing grades in the area. The average circular clearing area is approximately 3.25 acres per turbine site, including an average analysis of site grading clearing. The proposed clearing for each rectangular turbine pad site is 150 x 200 feet. Similar to circular pads, additional clearing around each turbine site will be required to allow for site grading and leveling, but will vary depending on the existing grades in the area. The average rectangular clearing area, including site grading clearing, is approximately 1.13 acres per turbine site. The total clearing for all turbine sites based on the average clearing per turbine is approximately 117.8 acres.

Following completion of construction and startup of commercial operations, approximately 3.11 acres of the total 3.25-acre clearing for each circular turbine pad will be allowed to revegetate. In addition, 1.00 acre of the total 1.13-acre clearing for each rectangular turbine pad will also be allowed to revegetate. The only portions of each turbine site that will remain permanently cleared include an approximately 0.14-acre area consisting of a 20-foot radius circular area around the tower, a portion of the gravel crane pad, and a 12-foot wide access drive.

A crane in excess of 400 tons will be used to assemble the turbine rotors, erect the tower sections, and lift the nacelles and rotor assemblies onto the towers. These cranes are too large to be transported to the Project site in one piece, and therefore must be delivered in component sections and assembled on-site. Crane assembly will take place within the turbine pad clearings.

1.2 Road Clearings

The Project will include construction of two types of roads: 16-foot wide access roads that provide access to the turbine sites from Long Falls Dam Road and 34-foot wide crane path roads that provide crane travel access to turbine sites.

The total length of road to be utilized for this Project is approximately 22.5 miles. This will include 15.7 miles of 34-foot wide crane path and 6.8 miles of access road. Approximately 3.2 miles of access road is comprised of existing roads (see plans in Section 1). The average clearing width required for construction of the crane path roads is 95 feet. This clearing width includes the 34-foot wide road, associated stormwater ditching, grading side slopes, and the electrical collector system overhead lines and pole structures.

Approximately 47 percent (3.2 miles) of the proposed access roads (excluding crane paths) will be constructed over existing logging roads. These existing logging roads have an average cleared width of 45 feet. Approximately 25 feet of additional clearing will be required to accommodate the 16-foot wide access road, particularly in areas with proposed roadside collector lines. Proposed access roads have an average clearing width of 70 feet, and an average clearing width of 80 feet with proposed roadside overhead electrical lines.

1.3 Temporary Laydown Areas

Approximately 24.0 acres of temporary equipment/material laydown areas and/or landing yard areas have been designated for use along the access roads and crane paths (see Section 1). These areas will be

used frequently during project construction but will be allowed to completely revegetate following completion of construction activities.

1.4 Electrical Collector Line

The 34.5-kilovolt (kV) overhead electrical collector line will be constructed to interconnect the Project's 48 turbines. Portions of the 34.5-kV overhead line are designed for roadside installation; however, there are several cross-county sections of the 34.5-kV overhead line totaling approximately 19,000 linear feet. These cross-country lines have a required clearing width of 80 feet. Approximately 100 feet from both sides of stream crossings, the clearing width will be reduced to 40 feet for the single circuit lines and 50 feet for the double circuit line to reduce impacts within the stream buffer. In addition to the 34.5-kV collector lines, there will be a 115-kV overhead generator lead line built from the Highland Substation to the Central Maine Power Company Wyman Hydro Substation requiring approximately 46,280 linear feet of clearing to a width of 100 feet. Additional trees that pose a potential risk to the electrical infrastructure should they fall over will also be removed. The estimated clearing required for construction of all overhead electrical lines is 150.1 acres, which includes approximately 6.46 acres of clearing in forested wetlands.

Section 8
Lighting

8.0 LIGHTING

The Federal Aviation Administration (FAA) requires that all structures over 200 feet in height, including wind turbines, have obstruction lighting to ensure the safety of air traffic in the area. When wind turbines are installed in a wind farm, only select turbines need to be lit. A red blinking light will be required on top of approximately half of the wind turbines proposed for the Highland Wind Project (Project).

The Project filed a Notice of Proposed Construction or Alteration (Form 7460-1) with the FAA, and this notice was accepted by the FAA on January 8, 2010. Documentation related to the Applicant's submission and the FAA's acceptance of this notice is provided in Appendix 8-1. This notice includes a proposed lighting plan to be approved or altered by the FAA during their review. This plan will call for a single FAA L-864 aviation red-colored flashing light mounted on 27 of the 48 turbines in the Project area. Each light will be mounted on the turbine nacelle, and each light will be synchronized. Details related to each of the 27 turbines reviewed by the FAA are provided in Section 24 of this permit application. In addition, within the Project area, there will be up to four permanent 80-meter meteorological (met) towers installed that will likely need their own lighting.

This lighting plan was created to conform to the requirements set forth in FAA Advisory Circular AC 70/7460-2K, Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace, and AC 707460-1K, Obstruction Marking and Lighting. When turbines are arranged in a line, such as this Project along a ridge, the FAA requires the turbine at either end of the line to have a light. In addition, the turbines that are highest in elevation are required to have lights. Beyond this, additional turbines within the row are required to have lights so that there is no gap greater than half a mile between lights.

The light is required to be placed on top of the nacelle, the housing at the top of the tower that holds the generator, and must be an FAA L-864 aviation red-colored flashing light. The FAA requires that these red blinking lights be used at night for air traffic visibility. The lights will be synchronized to alternate being on for 1.5 seconds and off for 1.5 seconds. No lighting will be needed on the turbines during the daytime due to the white paint being used on the turbines.

These lights must be visible from 360 degrees horizontally around the turbine for air traffic safety from any direction. The beam of light must be at least 2,000 Candela, equivalent to approximately seventeen 100-watt light bulbs, when viewed directly at the level of the light. The lights are focused to provide the required level of light intensity at a horizontal angle while directing minimal light at angles below the horizontal. The obstruction lighting appears similar to a flashlight in that it looks very bright when you look directly into the flashlight beam but is quite dim if you look at it from an angle. The Project intends to select lighting that would have the lowest available brightness and visibility to project neighbors.

8.1 Permanent Meteorological Tower Lighting Plan

The Project proposes to install up to four permanent met towers along the ridge to monitor and assess wind conditions. These towers are proposed for locations near Turbines W1, W13, W14, E28, E40, or E41. The towers will be 80 meters in height and will be guyed for stability. Line drawings of a typical 80-meter guyed tower, along with construction notes, are attached as Appendix 8-2. Lighting for the permanent met towers will follow the FAA recommendations for aviation safety.

Applications for Determinations of No Hazard will be filed with the FAA for these towers. The FAA will determine the style of lighting and marking required for the permanent met towers during their review of this application. The most likely lighting will include a red flashing light at the top of the tower for nighttime visibility. This red light would be of the same type used on the lit wind turbines and would have a peak effective intensity of 2,000 candela. In addition, three steady burning red lights of a minimum intensity of 32.5 candela may be required at a lower level on the tower, likely at 200 feet elevation. For daytime visibility the FAA will likely require aviation orange and white paint. In rural areas such as Highland Plantation, the red lights at night have been found preferable to the alternative of white flashing lights 24 hours a day.

8.2 Construction Lighting

If needed during construction, lighting will comply with the Land Use Regulation Commission (LURC) Chapter 10 §10.25, F, 2.

8.3 Operational Facilities Lighting

The Operations and Maintenance building and the Project substation will each be equipped with motion-sensitive security lights. Lighting will be comparable to that found in residential yards and will comply with the Land Use Regulation Commission Chapter 10 §10.25, F, 2. All non-essential lighting will be turned off after business hours.

Appendix 8-1

Federal Aviation Administration

The system will be going offline at 8 am ET on Saturday, January 09, 2010 for upgrades. We apologize for any inconvenience.

« OE / AAA

Project Submission Success
Project Name: HIGHL-000136911-10

Project **HIGHL-000136911-10** has been submitted successfully to the FAA.

Please return to the system at a later date for status updates.

Federal Aviation Administration

The system will be going offline at 8 am ET on Saturday, January 09, 2010 for upgrades. We apologize for any inconvenience.

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Notice of Proposed Construction or Alteration - Off Airport

Project Name: HIGHL-000136911-10 Sponsor: Highland Wind LLC

Project Summary : HIGHL-000136911-10

Structure	City, State	Lat/Long	Map	Actions	Latest Letter
W1 Accepted 2010-WTE-162-OE	Highland Plantation, ME	45° 7' 11.54" N 70° 7' 22.21" W	Show Map	Create Fax Cover Upload a PDF	None
W2 Accepted 2010-WTE-207-OE	Highland Plantation, ME	45° 7' 0.77" N 70° 7' 15.67" W	Show Map	Create Fax Cover Upload a PDF	None
W3 Accepted 2010-WTE-206-OE	Highland Plantation, ME	45° 6' 50.40" N 70° 7' 11.15" W	Show Map	Create Fax Cover Upload a PDF	None
W4 Accepted 2010-WTE-205-OE	Highland Plantation, ME	45° 6' 39.47" N 70° 7' 5.62" W	Show Map	Create Fax Cover Upload a PDF	None
W5 Accepted 2010-WTE-204-OE	Highland Plantation, ME	45° 6' 30.76" N 70° 7' 6.61" W	Show Map	Create Fax Cover Upload a PDF	None
W6 Accepted 2010-WTE-203-OE	Highland Plantation, ME	45° 6' 21.21" N 70° 7' 6.15" W	Show Map	Create Fax Cover Upload a PDF	None
W7 Accepted 2010-WTE-202-OE	Highland Plantation, ME	45° 6' 13.08" N 70° 7' 2.12" W	Show Map	Create Fax Cover Upload a PDF	None
W8 Accepted 2010-WTE-201-OE	Highland Plantation, ME	45° 6' 2.35" N 70° 7' 6.37" W	Show Map	Create Fax Cover Upload a PDF	None
W9 Accepted 2010-WTE-200-OE	Highland Plantation, ME	45° 5' 48.27" N 70° 7' 10.88" W	Show Map	Create Fax Cover Upload a PDF	None
W10 Accepted 2010-WTE-199-OE	Highland Plantation, ME	45° 5' 39.70" N 70° 6' 48.89" W	Show Map	Create Fax Cover Upload a PDF	None
W11 Accepted 2010-WTE-198-OE	Highland Plantation, ME	45° 5' 33.59" N 70° 6' 55.45" W	Show Map	Create Fax Cover Upload a PDF	None
W12 Accepted 2010-WTE-197-OE	Highland Plantation, ME	45° 5' 26.53" N 70° 6' 57.56" W	Show Map	Create Fax Cover Upload a PDF	None
W13 Accepted 2010-WTE-196-OE	Highland Plantation, ME	45° 5' 18.62" N 70° 6' 57.27" W	Show Map	Create Fax Cover Upload a PDF	None
W14 Accepted 2010-WTE-195-OE	Highland Plantation, ME	45° 5' 10.66" N 70° 6' 55.97" W	Show Map	Create Fax Cover Upload a PDF	None
W15 Accepted 2010-WTE-194-OE	Highland Plantation, ME	45° 5' 3.25" N 70° 6' 55.50" W	Show Map	Create Fax Cover Upload a PDF	None
W16 Accepted 2010-WTE-193-OE	Highland Plantation, ME	45° 5' 9.24" N 70° 6' 36.22" W	Show Map	Create Fax Cover Upload a PDF	None
W17 Accepted 2010-WTE-192-OE	Highland Plantation, ME	45° 5' 0.02" N 70° 6' 17.90" W	Show Map	Create Fax Cover Upload a PDF	None
W18 Accepted 2010-WTE-191-OE	Highland Plantation, ME	45° 4' 50.53" N 70° 5' 36.76" W	Show Map	Create Fax Cover Upload a PDF	None
W19 Accepted 2010-WTE-190-OE	Highland Plantation, ME	45° 4' 49.83" N 70° 5' 24.09" W	Show Map	Create Fax Cover Upload a PDF	None
W20 Accepted 2010-WTE-189-OE	Highland Plantation, ME	45° 4' 45.56" N 70° 5' 0.73" W	Show Map	Create Fax Cover Upload a PDF	None
W21 Accepted 2010-WTE-188-OE	Highland Plantation, ME	45° 4' 46.52" N 70° 4' 48.30" W	Show Map	Create Fax Cover Upload a PDF	None
W22 Accepted 2010-WTE-187-OE	Highland Plantation, ME	45° 4' 43.47" N 70° 4' 30.35" W	Show Map	Create Fax Cover Upload a PDF	None
W23 Accepted 2010-WTE-186-OE	Highland Plantation, ME	45° 4' 44.51" N 70° 4' 21.55" W	Show Map	Create Fax Cover Upload a PDF	None
W24 Accepted 2010-WTE-185-OE	Highland Plantation, ME	45° 4' 45.75" N 70° 4' 12.75" W	Show Map	Create Fax Cover Upload a PDF	None
W25 Accepted 2010-WTE-184-OE	Highland Plantation, ME	45° 4' 36.93" N 70° 4' 0.23" W	Show Map	Create Fax Cover Upload a PDF	None
W26 Accepted 2010-WTE-183-OE	Highland Plantation, ME	45° 4' 27.68" N 70° 3' 44.43" W	Show Map	Create Fax Cover Upload a PDF	None
E27 Accepted 2010-WTE-182-OE	Highland Plantation, ME	45° 5' 46.14" N 70° 0' 52.94" W	Show Map	Create Fax Cover Upload a PDF	None
E28 Accepted 2010-WTE-181-OE	Highland Plantation, ME	45° 5' 43.67" N 70° 1' 6.39" W	Show Map	Create Fax Cover Upload a PDF	None

E29 Accepted 2010-WTE-180-OE	Highland Plantation, ME	45° 5' 38.62" N 70° 1' 15.56" W	Show Map	Create Fax Cover Upload a PDF	None
E30 Accepted 2010-WTE-179-OE	Highland Plantation, ME	45° 5' 32.85" N 70° 1' 23.97" W	Show Map	Create Fax Cover Upload a PDF	None
E31 Accepted 2010-WTE-178-OE	Highland Plantation, ME	45° 5' 27.01" N 70° 1' 32.53" W	Show Map	Create Fax Cover Upload a PDF	None
E32 Accepted 2010-WTE-177-OE	Highland Plantation, ME	45° 5' 20.99" N 70° 1' 40.83" W	Show Map	Create Fax Cover Upload a PDF	None
E33 Accepted 2010-WTE-176-OE	Highland Plantation, ME	45° 5' 12.97" N 70° 1' 44.95" W	Show Map	Create Fax Cover Upload a PDF	None
E34 Accepted 2010-WTE-175-OE	Highland Plantation, ME	45° 4' 58.04" N 70° 1' 34.14" W	Show Map	Create Fax Cover Upload a PDF	None
E35 Accepted 2010-WTE-174-OE	Highland Wind, ME	45° 4' 48.56" N 70° 1' 41.65" W	Show Map	Create Fax Cover Upload a PDF	None
E36 Accepted 2010-WTE-173-OE	Highland Plantation, ME	45° 4' 38.37" N 70° 1' 36.65" W	Show Map	Create Fax Cover Upload a PDF	None
E37 Accepted 2010-WTE-172-OE	Highland Plantation, ME	45° 4' 26.34" N 70° 1' 19.96" W	Show Map	Create Fax Cover Upload a PDF	None
E38 Accepted 2010-WTE-171-OE	Highland Plantation, ME	45° 4' 10.54" N 70° 1' 18.27" W	Show Map	Create Fax Cover Upload a PDF	None
E39 Accepted 2010-WTE-170-OE	Highland Plantation, ME	45° 4' 1.69" N 70° 1' 18.40" W	Show Map	Create Fax Cover Upload a PDF	None
E40 Accepted 2010-WTE-169-OE	Highland Plantation, ME	45° 3' 52.80" N 70° 1' 18.21" W	Show Map	Create Fax Cover Upload a PDF	None
E41 Accepted 2010-WTE-168-OE	Highland Plantation, ME	45° 3' 45.74" N 70° 1' 18.44" W	Show Map	Create Fax Cover Upload a PDF	None
E42 Accepted 2010-WTE-167-OE	Highland Plantation, ME	45° 3' 38.71" N 70° 1' 18.43" W	Show Map	Create Fax Cover Upload a PDF	None
E43 Accepted 2010-WTE-166-OE	Highland Plantation, ME	45° 3' 31.55" N 70° 1' 16.73" W	Show Map	Create Fax Cover Upload a PDF	None
E44 Accepted 2010-WTE-165-OE	Highland Plantation, ME	45° 3' 24.48" N 70° 0' 56.94" W	Show Map	Create Fax Cover Upload a PDF	None
E45 Accepted 2010-WTE-164-OE	Highland Plantation, ME	45° 3' 15.70" N 70° 1' 0.37" W	Show Map	Create Fax Cover Upload a PDF	None
E46 Accepted 2010-WTE-163-OE	Highland Plantation, ME	45° 3' 8.13" N 70° 1' 3.19" W	Show Map	Create Fax Cover Upload a PDF	None
E47 Accepted 2010-WTE-208-OE	Highland Plantation, ME	45° 3' 38.50" N 70° 0' 35.24" W	Show Map	Create Fax Cover Upload a PDF	None
E48 Accepted 2010-WTE-161-OE	Highland Plantation, ME	45° 3' 31.25" N 70° 0' 38.66" W	Show Map	Create Fax Cover Upload a PDF	None

Federal Aviation Administration

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Notice of Proposed Construction or Alteration - Off Airport

Project Name: HIGHL-000136911-10 Sponsor: Highland Wind LLC

Details for Case : W1

Show Project Summary

Case Status

ASN:	2010-WTE-162-OE	Date Accepted:	01/08/2010
Status:	Accepted	Date Determined:	
		Letters:	None
		Documents:	01/08/2010 2010-01-08 Mappin...

Construction / Alteration Information

Notice Of:	Construction
Duration:	Permanent
if Temporary :	Months: Days:
Work Schedule - Start:	05/01/2011
Work Schedule - End:	12/31/2011
State Filing:	Filed with State

Structure Summary

Structure Type:	Wind Turbine
Structure Name:	W1
FCC Number:	
Prior ASN:	

Structure Details

Latitude:	45° 7' 11.54'' N
Longitude:	70° 7' 22.21'' W
Horizontal Datum:	NAD83
Site Elevation (SE):	2184 (nearest foot)
Structure Height (AGL):	420 (nearest foot)
Requested Marking/Lighting:	White Paint Only
Other :	
Recommended Marking/Lighting:	
Current Marking/Lighting:	N/A New Structure
Other :	
Nearest City:	Highland Plantation
Nearest State:	Maine
Description of Location:	Stewart Mountain
Description of Proposal:	Wind turbine in string of turbines along ridgeline

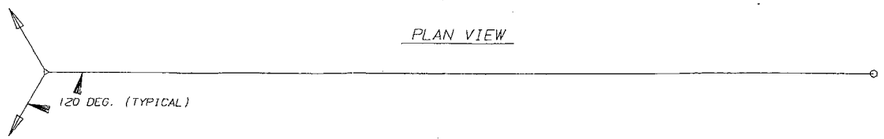
Common Frequency Bands

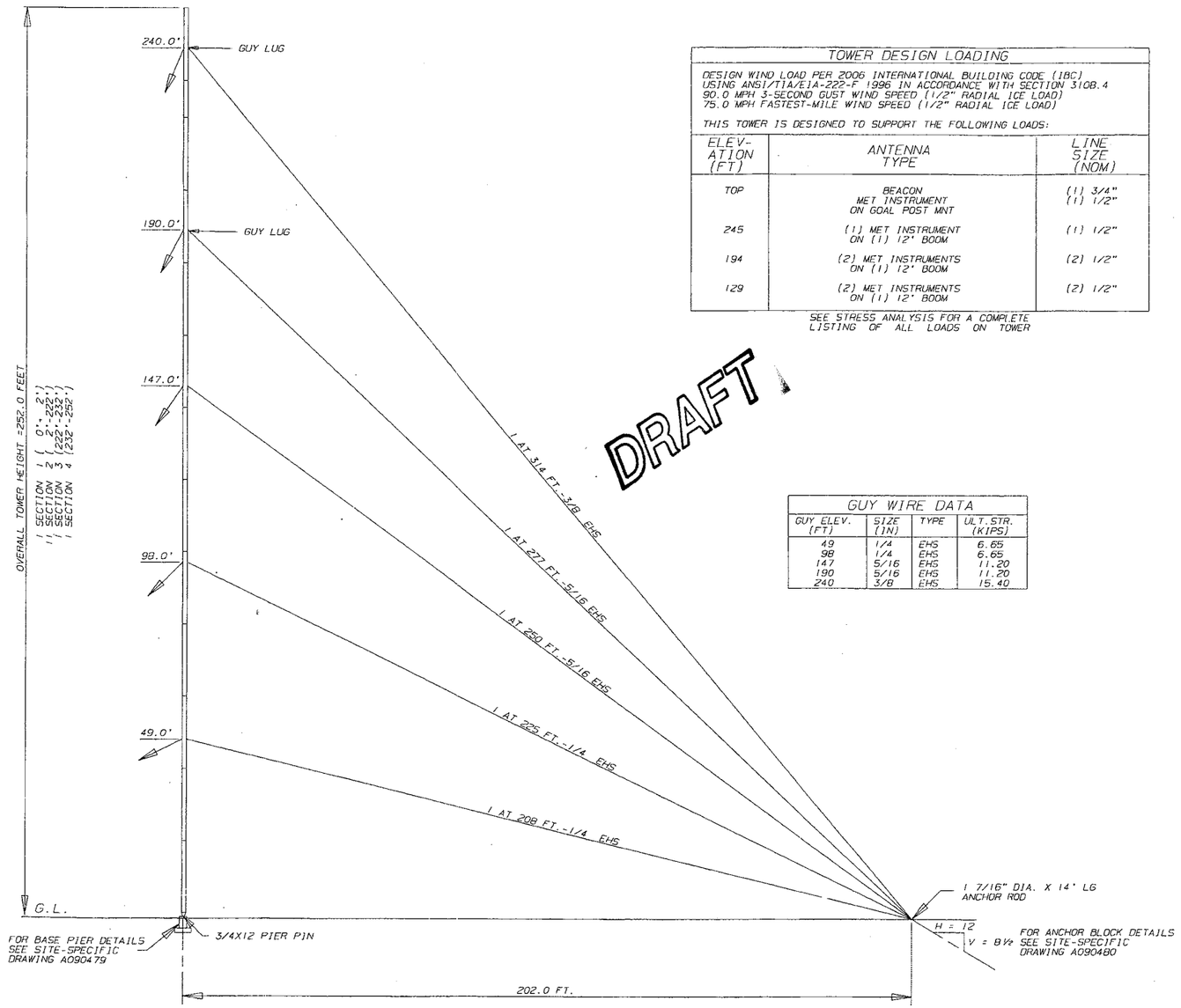
Low Freq	High Freq	Freq Unit	ERP	ERP Unit

Specific Frequencies

Appendix 8-2

PLAN VIEW





ELEVATION VIEW

DRAFT

TOWER DESIGN LOADING

DESIGN WIND LOAD PER 2006 INTERNATIONAL BUILDING CODE (IBC)
USING ANSI/TIA/EIA-222-F 1996 IN ACCORDANCE WITH SECTION 3108.4
90.0 MPH 3-SECOND GUST WIND SPEED (1/2" RADIAL ICE LOAD)
75.0 MPH FASTEST-MILE WIND SPEED (1/2" RADIAL ICE LOAD)

THIS TOWER IS DESIGNED TO SUPPORT THE FOLLOWING LOADS:

ELEV-ATION (FT)	ANTENNA TYPE	LINE SIZE (NOM.)
TOP	BEACON MET INSTRUMENT ON GOAL POST MNT	(1) 3/4" (1) 1/2"
245	(1) MET INSTRUMENT ON (1) 12' BOOM	(1) 1/2"
194	(2) MET INSTRUMENTS ON (1) 12' BOOM	(2) 1/2"
129	(2) MET INSTRUMENTS ON (1) 12' BOOM	(2) 1/2"

SEE STRESS ANALYSIS FOR A COMPLETE LISTING OF ALL LOADS ON TOWER

GUY WIRE DATA

GUY ELEV. (FT)	SIZE (IN)	TYPE	ULT.STR. (KIPS)
49	1/4	EHS	6.65
98	1/4	EHS	6.65
147	5/16	EHS	11.20
190	5/16	EHS	11.20
240	3/8	EHS	15.40

REACTIONS

AT	VERT. (+↓)	HORIZ. (+→)
BASE=0.0 FT	34.9 KIPS	N/A
202.0 FT	-11.8 KIPS	16.6 KIPS

SECTION MEMBER SCHEDULE

ELEVATION (FT)	SECTION	LEG SIZE	LEG BOLTED FLANGE CONNECTION NO.	LEG BOLTED FLANGE CONNECTION SIZE	BRACE SIZE	BRACE END CONNECTION
0 - 2	1	-	-	------	----------	------
2 - 222	2	1.250 SOLID	4	1/2	0.4375 SOLID	WELDED
222 - 232	3	1.250 SOLID	4	1/2	0.4375 SOLID	WELDED
232 - 252	4	1.250 SOLID	4	1/2	0.4375 SOLID	WELDED

NOTE: SECTION NUMBERS ARE FOR REFERENCE ONLY.
ALL SECTIONS ARE SINGLE BRACED
BRACING PATTERN: TENSION COMPRESSION SYSTEM WITH 1'-3 3/4" NOMINAL PANEL SPACING.
FACE WIDTH = 1'-4 3/4"

GENERAL NOTES

1. ROHN COMMUNICATION TOWER DESIGNS CONFORM TO ANSI/TIA/EIA-222-F UNLESS OTHERWISE SPECIFIED UNDER TOWER DESIGN LOADING.
2. THE DESIGN LOADING CRITERIA INDICATED HAS BEEN PROVIDED TO ROHN. THE DESIGN LOADING CRITERIA HAS BEEN ASSUMED TO BE BASED ON SITE-SPECIFIC DATA IN ACCORDANCE WITH ANSI/TIA/EIA-222-F AND MUST BE VERIFIED BY OTHERS PRIOR TO INSTALLATION.
3. MET INSTRUMENTS, MOUNTS, AND LINES LISTED IN TOWER DESIGN LOADING TABLE ARE PROVIDED BY OTHERS UNLESS OTHERWISE SPECIFIED.
4. TOWER MEMBER DESIGN DOES NOT INCLUDE STRESSES DUE TO ERECTION SINCE ERECTION EQUIPMENT AND CONDITIONS ARE UNKNOWN. DESIGN ASSUMES COMPETENT AND QUALIFIED PERSONNEL WILL ERECT THE TOWER.
5. WORK SHALL BE IN ACCORDANCE WITH ANSI/TIA/EIA-222-F, "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES".
6. THE MINIMUM YIELD STRENGTH OF STRUCTURAL STEEL MEMBERS SHALL BE 50 KSI, EXCEPT AS NOTED BELOW.
   SOLID BRACES SHALL BE 36 KSI.
   STRUCTURAL PLATES SHALL BE 36 KSI.
7. FIELD CONNECTIONS SHALL BE BOLTED. NO FIELD WELDS SHALL BE ALLOWED.
8. STRUCTURAL BOLTS SHALL CONFORM TO ASTM A-325, EXCEPT WHERE NOTED.
9. PAL NUTS SHALL BE PROVIDED FOR ALL TOWER BOLTS.
10. STRUCTURAL STEEL AND CONNECTION BOLTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION, IN ACCORDANCE WITH ANSI/TIA/EIA-222-F.
11. ALL HIGH STRENGTH BOLTS ARE TO BE TIGHTENED TO A "SNUG TIGHT CONDITION AS DEFINED IN THE NOVEMBER 13, 1985, AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS".
12. PURCHASER SHALL VERIFY THE INSTALLATION IS IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL REQUIREMENTS FOR OBSTRUCTION MARKING AND LIGHTING.
13. TOLERANCE ON TOWER STEEL HEIGHT IS EQUAL TO PLUS 1% OR MINUS 1/2%.
14. DESIGN ASSUMES THAT, AS A MINIMUM, MAINTENANCE AND INSPECTION WILL BE PERFORMED OVER THE LIFE OF THE STRUCTURE IN ACCORDANCE WITH ANSI/TIA/EIA-222-F.
15. DESIGN ASSUMES LEVEL GRADE AT TOWER SITE.
16. INITIAL TENSION OF GUY WIRES SHALL BE 10% OF THEIR ULTIMATE STRENGTHS.
17. THE FACTOR OF SAFETY OF GUYS AND THEIR CONNECTIONS SHALL NOT BE LESS THAN 2.0.
18. IT SHALL BE THE RESPONSIBILITY OF THE ERECTOR TO TEMPORARILY GUY THE STRUCTURE WHEN REQUIRED DURING ERECTION TO MAINTAIN THE STABILITY OF THE STRUCTURE AND TO PREVENT OVERLOADING ANY MEMBER OF THE STRUCTURE.
19. FOUNDATIONS SHALL BE DESIGNED TO SUPPORT THE REACTIONS SHOWN FOR THE CONDITIONS EXISTING AT THE SITE.

TOWER SITE:
COUNTY:

No.	Revision Description	Date	Rev By	Ckd By	Appd By

ROHN

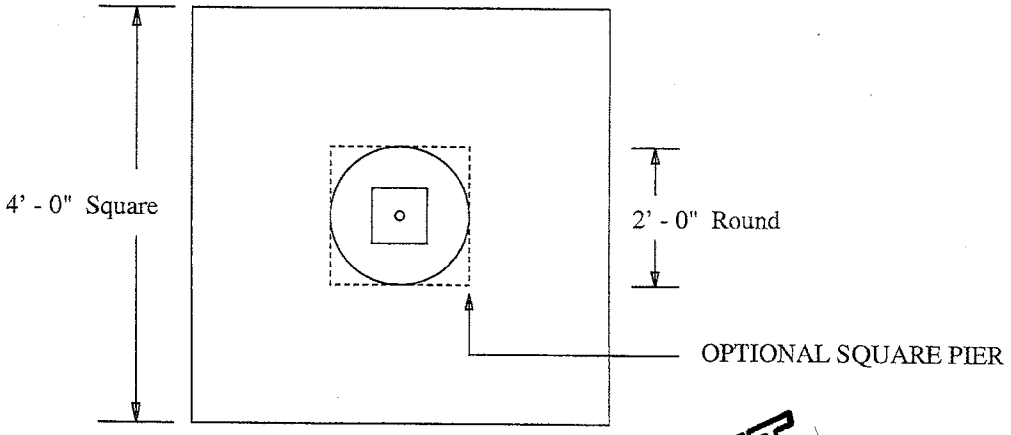
Scale: NONE	By	Date
Drawn:	FAD	06/10/09
Checked:		
App. Eng.:		
Parent File:		

252' 45GSR GUYED TOWER DESIGN FOR DNV GLOBAL ENERGY CONCEPTS

DWG. NO.: B090453

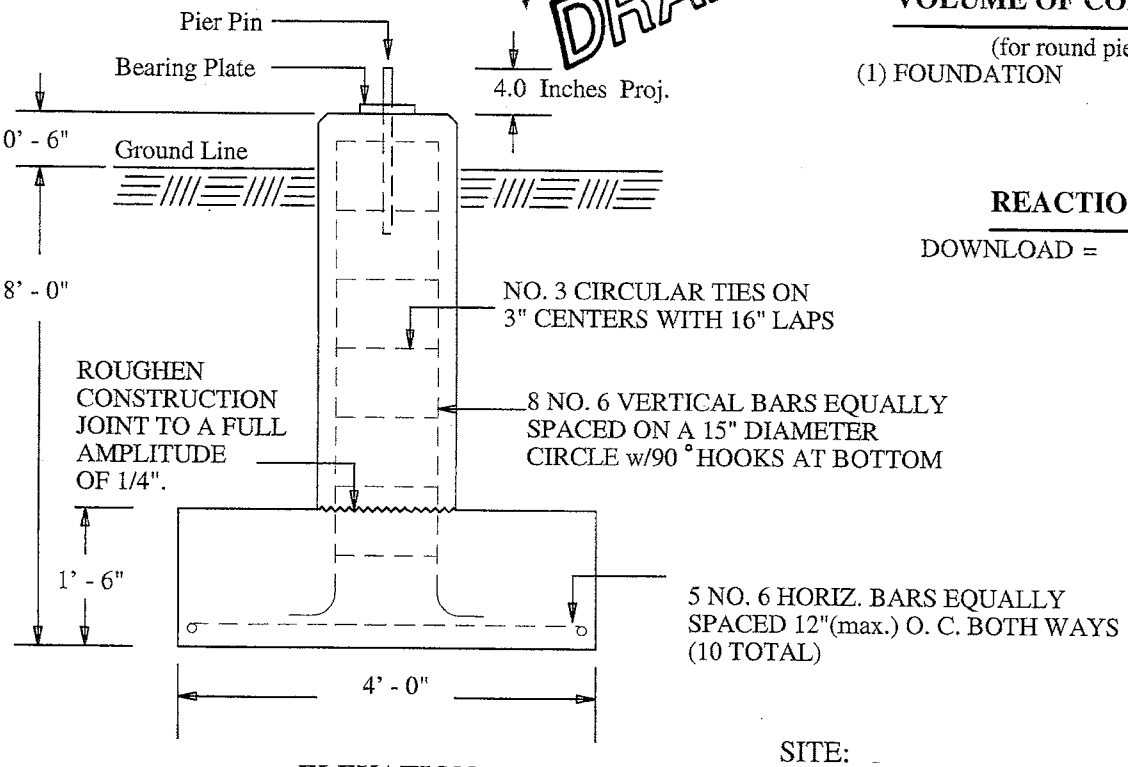
SHEET 1 OF 1 REV.

NOTE : SEE TOWER ASSEMBLY DRAWING FOR FOUNDATION LAYOUT AND PART NUMBERS FOR BEARING PLATE AND PIER PIN.



PLAN

DRAFT



ELEVATION

VOLUME OF CONCRETE

(for round pier)
(1) FOUNDATION 1.7 Cu. Yds.

REACTIONS

DOWNLOAD = 34.9 KIPS

SITE:

SHEET 1 OF 3

No.	Revision Description	Date	Rev By	Ckd By	Appd By

ROHN

Scale: NONE	By	Date
Drawn:	FAD	06/10/09
Checked:	HA	6/10/09
App. Eng.:	HA	6/10/09

Title: **Basepier Foundation Detail for DNV Global Energy Concepts**

ENG. FILE:

DRAWING NO.:

DRAFT

Foundation General Notes

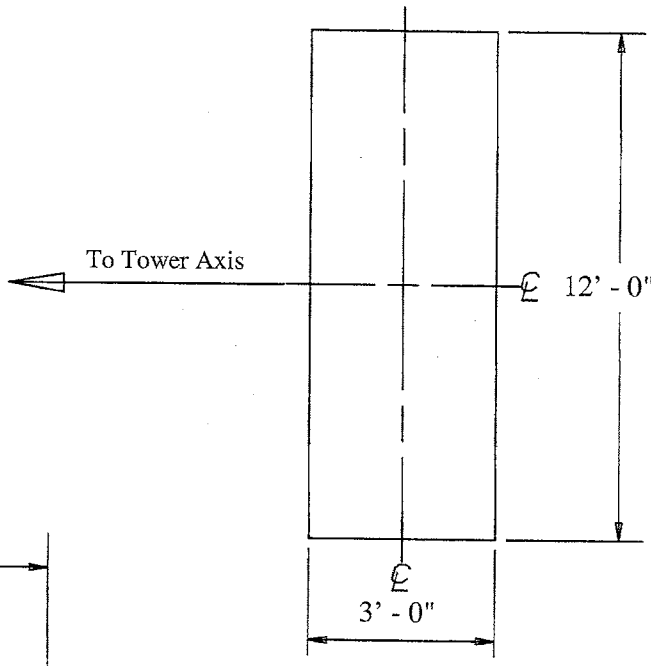
1. Foundation Design has been developed in accordance with generally accepted professional engineering principles and practices within the limits of the subsurface data provided. Foundation design modifications may be required in the event the following design parameters are not applicable for the subsurface conditions encountered.
    A. Allowable net bearing pressure at 8.0 foot depth = 4.0 ksf.
    B. Ground water table at or below depth of foundation.
    C. Maximum frost depth less than depth of foundation.
2. Work shall be in accordance with local codes, safety regulations and unless otherwise noted, the latest revision of ACI 318, "Building Code Requirements for Reinforced Concrete". Procedures for the protection of excavations, existing construction and utilities shall be established prior to foundation installation.
3. Concrete materials shall conform to the appropriate state requirements for exposed structural concrete.
4. Proportions of concrete materials shall be suitable for installation method utilized and shall result in durable concrete for resistance to local anticipated aggressive actions. The durability requirements of ACI 318 Chapter 4 shall be satisfied based on the conditions expected at the site. As a minimum, concrete shall develop a minimum compressive strength of 4000 psi (27.6 MPa) in 28 days.
5. Maximum size of aggregate shall not exceed size suitable for the installation method utilized or 1/3 clear distance behind or between reinforcing. Maximum size may be increased to 2/3 clear distance provided workability and methods of consolidation such as vibrating will prevent honeycombs or voids.
6. Reinforcement shall be deformed and conform to the requirements of ASTM A615 grade 60 unless otherwise noted. Splices in reinforcement shall not be allowed unless otherwise indicated.
7. Welding is prohibited on reinforcing steel and embedments.
8. Minimum concrete cover for reinforcement shall be 3 inches (76 mm) unless otherwise noted. Approved spacers shall be used to insure a 3 inch (76 mm) minimum cover on reinforcement.
9. Foundation design assumes structural backfill to be compacted in 8 inch (200 mm) maximum layers to 95% of maximum dry density at optimum moisture content in accordance with ASTM D698. Additionally, structural backfill must have a minimum compacted unit weight of 100 lb./cu.ft. (15.7 kn/m3)..
10. Foundation design has been based on geotechnical boring logs no.
11. Foundation depth indicated is based on the grade line described in the referenced boring log. Foundation modification may be required in the event cut or fill operations have taken place subsequent to the geotechnical investigation.
12. Foundation installation shall be supervised by personnel knowledgeable and experienced with the proposed foundation type. Construction shall be in accordance with generally accepted installation practices.
13. Foundation design assumes field inspections will be performed to verify that construction

DRAFT

materials, installation methods and assumed design parameters are acceptable based on conditions existing at the site.

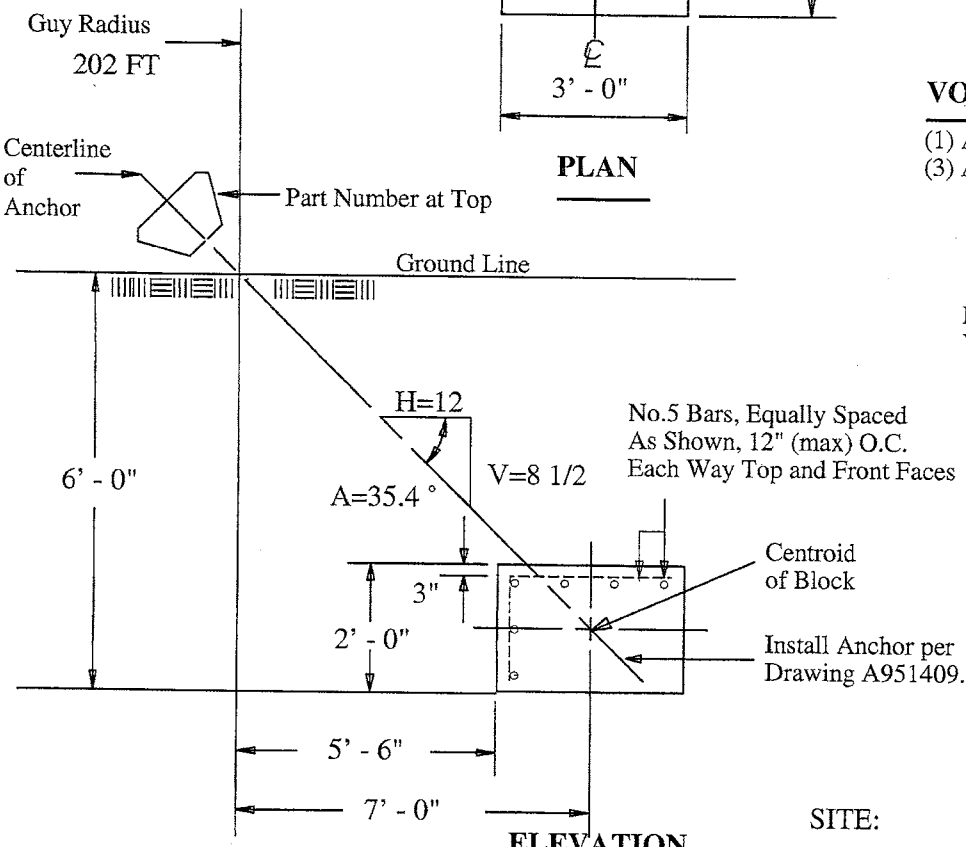
14. For foundation and anchor tolerances see structure assembly drawing.
15. Loose material shall be removed from bottom of excavation prior to concrete placement. Sides of excavation shall be rough and free of loose cuttings.
16. Concrete shall be placed in a manner that will prevent segregation of concrete materials, infiltration of water or soil and other occurrences which may decrease the strength or durability of the foundation.
17. Concrete preferably shall be placed against undisturbed soil. When forms are necessary, they shall be removed prior to placing structural backfill.
18. Construction joints, if required in piers, must be at least 12 inches (305 mm) below bottom of embedments and must be intentionally roughened to a full amplitude of 1/4 inch (6 mm). Foundation design assumes no other construction joints.
19. Exposed edges of concrete shall be chamfered 3/4" x 3/4" (19mm x 19mm) minimum.
20. Top of foundation outside limits of bearing plate shall be sloped to drain with a floated finish. Area inside limits of bearing plate shall be level.

NOTE : SEE TOWER ASSEMBLY DRAWING FOR FOUNDATION LAYOUT AND ANCHORAGE EMBEDMENT DRAWING NUMBER.



DRAFT

PLAN



ELEVATION

VOLUME OF CONCRETE

(1) Anchor Block	2.7	Cu. Yds.
(3) Anchor Blocks	8.1	Cu. Yds.

REACTIONS

Horizontal	= 16.6	KIPS
Vertical	= -11.8	KIPS

SITE:

SHEET 1 OF 3

No.	Revision Description	Date	Rev By	Ckd By	Appd By

ROHN

Scale: NONE	By	Date
Drawn:	FAD	06/10/2009
Checked:	HA	6/10/09
App. Eng.:	HA	6/10/09

Title: **ANCHOR BLOCK DETAIL at 202 Ft. Radius for DNV Global Energy Concepts**

ENG. FILE:

DRAWING NO.:

DRAFT

Foundation General Notes

1. Foundation Design has been developed in accordance with generally accepted professional engineering principles and practices within the limits of the subsurface data provided. Foundation design modifications may be required in the event the following design parameters are not applicable for the subsurface conditions encountered.
    A. Allowable net bearing pressure at 3.5 foot depth = 2.0 ksf.
    B. Maximum frost depth less than depth of foundation.
    C. Ground water table below depth of foundation.
2. Work shall be in accordance with local codes, safety regulations and unless otherwise noted, the latest revision of ACI 318, "Building Code Requirements for Reinforced Concrete". Procedures for the protection of excavations, existing construction and utilities shall be established prior to foundation installation.
3. Concrete materials shall conform to the appropriate state requirements for exposed structural concrete.
4. Proportions of concrete materials shall be suitable for installation method utilized and shall result in durable concrete for resistance to local anticipated aggressive actions. The durability requirements of ACI 318 Chapter 4 shall be satisfied based on the conditions expected at the site. As a minimum, concrete shall develop a minimum compressive strength of 4000 psi (27.6 MPa) in 28 days.
5. Maximum size of aggregate shall not exceed size suitable for the installation method utilized or 1/3 clear distance behind or between reinforcing. Maximum size may be increased to 2/3 clear distance provided workability and methods of consolidation such as vibrating will prevent honeycombs or voids.
6. Reinforcement shall be deformed and conform to the requirements of ASTM A615 grade 60 unless otherwise noted. Splices in reinforcement shall not be allowed unless otherwise indicated.
7. Welding is prohibited on reinforcing steel and embedments.
8. Minimum concrete cover for reinforcement shall be 3 inches (76 mm) unless otherwise noted. Approved spacers shall be used to insure a 3 inch (76 mm) minimum cover on reinforcement.
9. Foundation design assumes structural backfill to be compacted in 8 inch (200 mm) maximum layers to 95% of maximum dry density at optimum moisture content in accordance with ASTM D698. Additionally, structural backfill must have a minimum compacted unit weight of 100 lb./cu.ft. (15.7 kn/m3)..
10. Foundation design has been based on geotechnical boring logs no.
11. Foundation depth indicated is based on the grade line described in the referenced boring log. Foundation modification may be required in the event cut or fill operations have taken place subsequent to the geotechnical investigation.
12. Foundation design assumes level grade at site.
13. Foundation installation shall be supervised by personnel knowledgeable and experienced with the proposed foundation type. Construction shall be in accordance with generally accepted installation practices.

Engr File No.:

Drawing No.:

Foundation General Notes Continued

DRAFT

14. Foundation design assumes field inspections will be performed to verify that construction materials, installation methods and assumed design parameters are acceptable based on conditions existing at the site.
15. For foundation and anchor tolerances see structure assembly drawing.
16. Loose material shall be removed from bottom of excavation prior to concrete placement. Sides of excavation shall be rough and free of loose cuttings.
17. Concrete shall be placed in a manner that will prevent segregation of concrete materials, infiltration of water or soil and other occurrences which may decrease the strength or durability of the foundation.
18. Concrete preferably shall be placed against undisturbed soil. When forms are necessary, they shall be removed prior to placing structural backfill.
19. Foundation design assumes continuous concrete placement without construction joints.
20. Top of foundation outside limits of anchor bolts shall be sloped to drain with a floated finish. Area inside limits of anchor bolts shall be level with a scratched finish.
21. Exposed edges of concrete shall be chamfered 3/4" x 3/4" (19mm x 19mm) minimum.

DRAFT

Foundation General Notes

1. Foundation Design has been developed in accordance with generally accepted professional engineering principles and practices within the limits of the subsurface data provided. Foundation design modifications may be required in the event the following design parameters are not applicable for the subsurface conditions encountered.
    A. Uplift angle with vertical = 20.0 degrees.
    B. Allowable net horizontal pressure = 150 psf/ft.
    C. Ground water table below depth of foundation.
2. Work shall be in accordance with local codes, safety regulations and unless otherwise noted, the latest revision of ACI 318, "Building Code Requirements for Reinforced Concrete". Procedures for the protection of excavations, existing construction and utilities shall be established prior to foundation installation.
3. Concrete materials shall conform to the appropriate state requirements for exposed structural concrete.
4. Proportions of concrete materials shall be suitable for installation method utilized and shall result in durable concrete for resistance to local anticipated aggressive actions. The durability requirements of ACI 318 Chapter 4 shall be satisfied based on the conditions expected at the site. As a minimum, concrete shall develop a minimum compressive strength of 4000 psi (27.6 MPa) in 28 days.
5. Maximum size of aggregate shall not exceed size suitable for the installation method utilized or 1/3 clear distance behind or between reinforcing. Maximum size may be increased to 2/3 clear distance provided workability and methods of consolidation such as vibrating will prevent honeycombs or voids.
6. Reinforcement shall be deformed and conform to the requirements of ASTM A615 grade 60 unless otherwise noted. Splices in reinforcement shall not be allowed unless otherwise indicated.
7. Welding is prohibited on reinforcing steel and embedments.
8. Minimum concrete cover for reinforcement shall be 3 inches (76 mm) unless otherwise noted. Approved spacers shall be used to insure a 3 inch (76 mm) minimum cover on reinforcement.
9. Foundation design assumes structural backfill to be compacted in 8 inch (200 mm) maximum layers to 95% of maximum dry density at optimum moisture content in accordance with ASTM D698. Additionally, structural backfill must have a minimum compacted unit weight of 100 lb./cu.ft. (15.7 kn/m3)..
10. Foundation design has been based on geotechnical boring logs no.

11. Foundation depth indicated is based on the grade line described in the referenced boring log. Foundation modification may be required in the event cut or fill operations have taken place subsequent to the geotechnical investigation.
12. Foundation installation shall be supervised by personnel knowledgeable and experienced with the proposed foundation type. Construction shall be in accordance with generally accepted installation practices.
13. Foundation design assumes field inspections will be performed to verify that construction

materials, installation methods and assumed design parameters are acceptable based on conditions existing at the site.

14. For foundation and anchor tolerances see structure assembly drawing.
15. Loose material shall be removed from bottom of excavation prior to concrete placement. Sides of excavation shall be rough and free of loose cuttings.
16. Concrete shall be placed in a manner that will prevent segregation of concrete materials, infiltration of water or soil and other occurrences which may decrease the strength or durability of the foundation.
17. Foundation design assumes continuous concrete placement without construction joints.
18. The portion of all steel anchors, from top of anchor block to ground level, shall be coated with bitumen. Design assumes periodic inspections will be performed over the life of the structure to determine if additional anchor corrosion protection measures must be implemented based on observed site-specific conditions.
19. Grading may be required to provide proper drainage away from anchors and to maintain 6 inch (152mm) minimum clearance to equalizer plate.
20. Depth of anchor block shown on drawing must be maintained at all points within an area defined by the plan dimensions of the anchor block plus a horizontal distance in each direction equal to the specified anchor block depth below grade. Fill, when required, shall meet the compaction requirements specified for structural backfill.

Section 9
Services

9.0 SERVICES

9.1 Emergency Services

Current emergency services are adequate to meet the needs of the Highland Wind Project (Project). No additional emergency medical services will be necessary. Additionally, current police and fire services provided to the area are adequate for the project. The Somerset County Sheriff and Maine Forest Service were consulted, and each has provided confirmation that current services are adequate (Appendix 9-1). If emergency medical services are required during or after construction, a cellular phone will be used to call 911. Cellular phone service is generally good, and crews working within the project area will have two-way radios or other secondary communications systems available. The emergency dispatcher can connect to the Redington-Fairview General Hospital, which will be able to dispatch LifeFlight.

Based on our experience working with Reed and Reed on our Record Hill Project in Roxbury, our wind farm construction company will have in place an extensive safety program. This will include communications systems throughout the project area, safety training, medical emergency training, and drills to address medical, fire, or other safety concerns. Plans will include ambulance and helicopter emergency evacuations for medical emergencies. Our contractor will arrange training not only for construction crews but also for local fire and EMT services to be fully prepared for any emergencies.

The closest hospitals to the area are Franklin Memorial in Farmington and Redington Fairview in Skowhegan, both about 35 miles from Highland. Highland has a contract to provide emergency services with Northstar Ambulance Services, which is based in Farmington and has an additional base in Carrabassett Valley. LifeFlight Maine has an active base at Carrabassett Valley as well.

Highland owns four fire trucks, including two tankers and one truck designed to handle brush fires. Highland and Lexington Plantations work together to provide fire protection staffing, which is entirely volunteer. Highland has a mutual aid agreement with New Portland as well. Highland contracts with Somerset County for fire protection in adjoining portions of the unorganized territory. These services will be available to the project and will be supplemented to the extent necessary through our construction contractor's equipment, employees, and training programs.

9.2 Solid Waste

Construction of the Project will generate solid waste consisting of construction debris, packaging material, and associated construction wastes. Waste concrete will be incorporated into the sub-base for the proposed roadway and turbine pads. Concrete truck washdown will be contained and prohibited from flowing to waters of the state prior to appropriate treatment. Clearing of overstory vegetation along the proposed right-of-way will be required for construction of the collector line and the transmission line, but it will be harvested and removed as merchantable forest products or chipped or flailed on-site.

Marketable timber will be removed from the site for sale. Smaller woody debris will be mulched and used as a soil amendment or as an erosion control measure. In areas of fill around the turbine pads where trees need to be removed, stumps may be left in place and filled over to avoid unnecessary ground disturbance and minimize waste disposal of the grindings. Other stump grindings will be used to make erosion control mix berms, which will be used to augment or substitute for fabric silt fencing. Ultimately, some stumps and other organic debris may need to be disposed. This will be done in a single stump dump constructed in an upland area that will have a footprint area of less than one acre. The location will be determined by the applicant and the contractor during construction.

Any general construction debris associated with the Project, including packing or transportation materials, will be disposed of at appropriately licensed disposal facilities. Included in Appendix 9-2 is a capability letter from Crossroads Landfill in Norridgewock indicating capacity and willingness to take waste generated by the Project.

Following construction, any operational solid waste generated at the site will be collected at a dumpster located adjacent to the Operations and Maintenance (O&M) building. Such waste will be disposed of at a state-approved landfill or transfer station in conformance with Land Use Regulation Commission (LURC) Chapter 10.25,H.

9.3 Waste Water

During construction, portable toilets will be serviced and wastewater disposed of by contract with a service provider. They will be placed throughout the site as required, ensuring they are over 100 feet from streams or waterbodies.

The sewage disposal system will be sited on the Maintenance Facility Lot in a location with adequate soil drainage, a minimum of 100 feet from the water supply well. The proposed Site Plan is shown on the Maintenance Facility Site Plan (Appendix 9-3).

The wind turbines and electrical transmission system for the Project produce no wastewater. The only potential wastewater generation would be from the proposed O&M building from a staff of 9 employees or less (135 gallons/day). The proposed design includes a septic tank with a standard stone bed septic system that meets the standards of the State of Maine Subsurface Wastewater Disposal Rules, 10-144A CMR 241. The proposed septic system is on suitable soils, as classified by the State of Maine Subsurface Wastewater Disposal Rules.

Wastewater generation is limited to domestic quality wastewater (i.e., toilet, sink, shower). There will be no commercial or industrial wastewater generation associated with this Project.

9.4 Water Supply

A private water well will be drilled on-site to supply potable water to the O&M building. The well will be designed to provide sufficient healthful water supply so as not to impact nearby surface waters or other groundwater well users, in accordance with applicable LURC standards. The Maine Drinking Water Program will be consulted regarding any testing and monitoring requirements for this well.

During construction, Highland Wind LLC (or its contractors) will supply drinking water for workers and water for dust abatement on the gravel access roads. Bottled drinking water will be provided by the Project contractor. Dust abatement water will be drawn from off-site, non-potable water sources, and its use will not require withdrawals from any ground water source. A 4,000-gallon truck will be used with a maximum of 5 trips per day for a maximum of 20,000 gallons of water withdrawal a day. Note that the off-site water sources will include lake water but not water from streams or brooks.

Concrete required for construction will be trucked to the site from local concrete plants, and thus no batch plant is proposed.

Appendix 9-1

STATE OF MAINE
DEPARTMENT OF CONSERVATION
MAINE FOREST SERVICE
2870 NORTH BELFAST AVENUE
AUGUSTA, MAINE 04330

JOHN ELIAS BALDACCI
Governor

PATRICK K. McGOWAN
Commissioner

August 13, 2009

Land Use Regulation Commission
Attn: Marcia Spencer-Famous
22 State House Station
Augusta, ME 04333

Re: Impact of proposed Highland Plantation Wind Project on Local Wildland Fire Protection Services

Dear Ms. Spencer-Famous:

I have reviewed the proposed Highland Plantation wind power development project on Stewart Mountain, Witham Mountain, Bald Mountain, as well as Burnt Hill in Highland Plantation, Somerset County, Maine. The project is being proposed by Highland Wind LLC. The project will consist of 49 wind turbines and associated transmission lines.

I serve as the District Ranger who provides forest fire protection for this area on behalf of the Maine Forest Service. The Maine Forest Service is not a structural fire agency, but we would lend assistance to the level that we are trained and equipped. I have determined, based on my review of the Highland Plantation project and my discussions with their representative, that this project will be reasonably self-sufficient and will have little, if any, impact on the services that we provide to this region. The need for additional wildfire protection services should be minimal and will be consistent with the services currently provided.

With respect to the proposed Highland Plantation wind project, the appropriate wildfire protection services are available and no special circumstances or conditions will be required prior to the provisions of such services.

Please do not hesitate to contact me if you have any questions or concerns.

Sincerely,

Matthew Gomes

Matthew Gomes
District Forest Ranger
Rangeley District
Maine Forest Service

207-864-5545 office
207-624-3700 dispatch

MAINE FOREST SERVICE
Alec Giffen, Director

PHONE: (207) 624-3700 or 1-800-750-9777
FAX: (207) 287-8534
www.maineforestservice.org

SOMERSET COUNTY SHERIFF'S OFFICE

SHERIFF BARRY A. DELONG

Chief Deputy JOHN H. CARROLL

Marcia Spencer-Famous
110 Foreside Rd.
Cumberland, ME 04110

Dear Ms. Spencer-Famous:

This letter is in regards to the proposed Highland Wind Project in Somerset County. It is our understanding that the proposed project is to begin with an access road of the Long Falls Dam Road to the ridge just west of Witham Mountain. It will follow the ridgelines to Stewart and Bald Mountains, where turbines will be placed. The road will descend into the Sandy Stream Valley and then ascending again to Burnt and Briggs Hills where more turbines will be installed. We understand that there are a total of 49 turbines to be installed.

Overall, we expect that any services that the project will require will be consistent with the services that are currently provided in Somerset County and in the area that the Wind Project is being constructed. This project is likely to have little, if any, need for police services. There do not seem to be any unique safety risks that will need to be addressed and the police services currently provided will be adequate to ensure safety. If the need should arise and our services are required we will be readily available to assist in anyway we can.

The Somerset Sheriff's Office looks forward to working with the Highland Wind Project during the continued development and construction of this Project. If I can be of any further assistance, please do not hesitate to contact me.

Sincerely,

Barry A. DeLong

Sheriff Barry A. DeLong
Somerset County Sheriff's Office

131 EAST MADISON RD • MADISON, MAINE 04950 • (207) 474-9591

Appendix 9-2

WASTE MANAGEMENT

CROSSROADS LANDFILL
P.O. Box 629
357 Mercer Road
Norridgewock, ME 04957
(207) 634-2714
(207) 634-4519 Fax

October 21, 2009

Jeffrey Allen P.E., C.P.E.S.C.
Sewall Company
PO Box 433
136 Center Street
Old Town, ME 04468

RE: Crossroads Disposal Capacity

Dear Jeff:

Please be advised that Waste Management Disposal Services of Maine-Crossroads has a commercial solid waste disposal facility located in Norridgewock, Maine. At this time, we have approximately 4 million cubic yards of airspace remaining in our Phase 8 landfill cell.

This will be sufficient airspace to accommodate the construction waste generated from the proposed Highland Plantation wind farm project.

If I can be of further assistance please don't hesitate to contact me at 207-634-2714 x 219.

Sincerely,

Bryan Gordon
KF

Bryan Gordon
Construction Sales Specialist
Waste Management Disposal Services of Maine, Inc. - Cro ssroads

Appendix 9-3

Highland Wind Power Project

Section 9:Wastewater Disposal & Soils

Maintenance Building Site

NOVEMBER, 2009

Prepared by: Albert Frick

Albert Frick Associates, Inc.

95A County Road

Gorham, Maine 04038

(207) 839-5563

(207) 839-5564 (fax)

afa@maine.rr.com

Table of Contents

1.0 On-Site Subsurface Wastewater Disposal

The proposed Operations and Maintenance Building is the only component of the *Highland Wind Project* that produces wastewater. The proposed subsurface wastewater disposal design includes a standard septic system to process wastewater from the building. This system is sized slightly larger than the proposed long-term maintenance staff requires, so as to accommodate potential higher usage during construction phase and/or potential future site visitors. The proposed subsurface wastewater disposal system (HHE-200 form) is included in Appendix 9-1.

During the construction phase, Highland Wind Project (or their contractors) will supply temporary chemical toilets at convenient locations around the project site.

1.1 Site Plan

The proposed septic disposal system will be sited on the Maintenance Facility Lot in a location with adequate soil drainage, a minimum of 100' from the water supply well. The proposed Site Plan is shown on the Maintenance Facility Layout map, included in Figure 1.1 of this section. An on-site subsurface wastewater disposal evaluation and permit application has been completed by Albert Frick Associates, included in Appendix A. The proposed subsurface wastewater disposal system complies with the State of Maine Subsurface Wastewater Disposal Rules, and the soils for the proposed Maintenance Facility are suitable for development. The proposed septic design meets the LURC standards of Section 10.25 I.

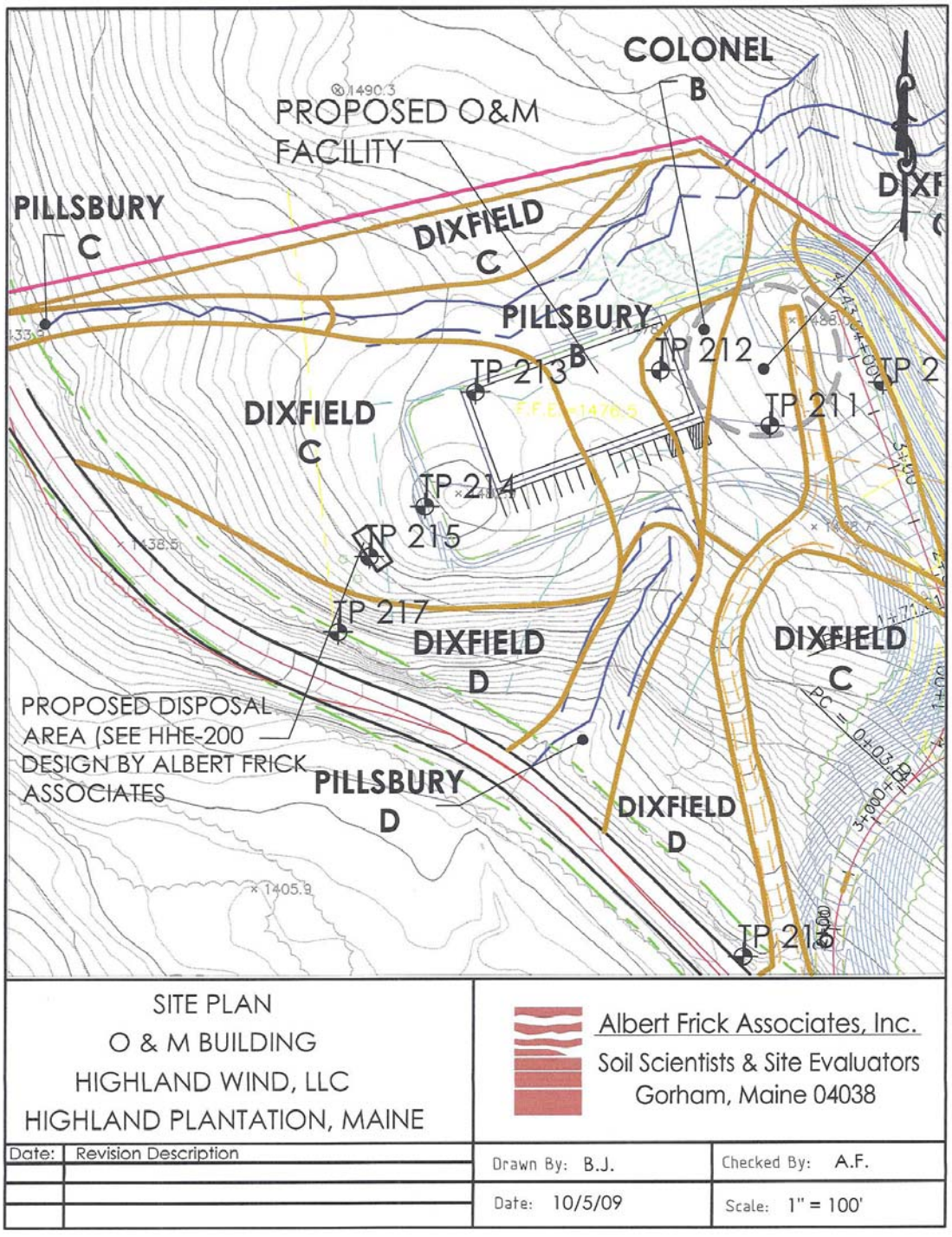


Figure 1.1 Site Plan and High Intensity Soil Map

1.2 Nitrate-Nitrogen Impact Assessment – Exempt

The sewage disposal system will be a conventional system disposing of less than 300 gallons per day of domestic wastewater (as defined in Maine Subsurface Wastewater Disposal Rules, 10-144A CMR 241). It will thus not require a Nitrate-Nitrogen impact assessment.

1.3 Soils Analysis of Maintenance Facility Lot

The proposed Maintenance Facility site is comprised of *Dixfield*, *Colonel* and *Pillsbury* soils, which are sandy loam textured soils derived form glacial till.

The *Dixfield* soil is moderately well drained, the *Colonel* soils is somewhat poorly drained, and *Pillsbury* soil is poorly drained.

Class B High Intensity Soils map is shown in Figure 1.1. The detailed Soil Narrative Report is included in Section 15, which describes the soil types in more detail.

2.0 Appendices

A. Proposed Septic System Design (HHE-200), by Albert Frick, Licensed Site Evaluator

APPENDIX A

Proposed Septic System Design (HHE-200), by Albert Frick, Licensed Site Evaluator

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health - SHS 11
(207) 287-5689 FAX (207) 287-3165

PROPERTY LOCATION

City, Town, or Plantation	HIGHLAND PLANTATION
Street or Road	LONG FALLS DAM ROAD
Subdivision, Lot #	

>> Caution: Permit Required – Attach In Space Below <<

The Subsurface Wastewater Disposal System ***must not*** be installed until a Permit is attached HERE by the Local Plumbing Inspector. The Permit will authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.

OWNER/APPLICANT INFORMATION

Name (last, first, MI)	HIGHLAND WIND, LLC
Owner / ~~Applicant~~	
Mailing Address of ■ Owner ☐ Applicant	C/O JONATHAN RYAN STANTEC 30 PARK DRIVE TOPSHAM, ME 04086
Daytime Tel. #	207-729-1199

Municipal Tax Map # _____ Lot # _____

Owner or Applicant Statement

I state and acknowledge that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a permit.

Signature of Owner/Applicant _____ Date _____

Caution: Inspections Required

I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application.

(1st) Date Approved _____

Local Plumbing Inspector Signature _____ (2nd) Date Approved _____

PERMIT INFORMATION

TYPE OF APPLICATION (Check only one item)

1. ■ First Time System
2. ☐ Replacement System
   Type Replaced: _____
   Year Installed: _____
3. ☐ Expanded System
4. ☐ Experimental System

THIS APPLICATION REQUIRES

1. ■ No Rule Variance
2. ☐ First Time System Variance
   a. ☐ Local Plumbing Inspector Approval
   b. ☐ State & Local Plumbing Inspector Approval
3. Replacement System Variance
   a. ☐ Local Plumbing Inspector Approval
   b. ☐ State & Local Plumbing Inspector Approval

DISPOSAL SYSTEM COMPONENTS

1. ■ Complete Non-Engineered System
2. ☐ Primitive System(graywater & alt toilet)
3. ☐ Pit Privy
5. ☐ Holding Tank, _____ Gallons
6. ☐ Non-Engineered Disposal Field (only)
7. ☐ Graywater System
8. ☐ Complete Engineered System(2000gpd+)
10. ☐ Engineered Disposal Field (only)
11. ☐ Pre-treatment, specify:

(item numbers are used for data entry purposes)

SIZE OF PROPERTY

1000+ ACRES ☐ sq. ft. ■ acres

SHORELAND ZONING

☐ Yes ■ No

DISPOSAL SYSTEM TO SERVE

1. ☐ Single Family Dwelling Unit, No. of Bedrooms: ____
2. ☐ Multiple Family Dwelling, No of Units: ____
3. ■ Other: OPERATION AND MAINTENANCE BUILDING (specify)

TYPE OF WATER SUPPLY

1. ■ Drilled Well 2. ☐ Dug Well 3. ☐ Spring
4. ☐ Public 5. ☐ Other:

DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)

TREATMENT TANK

1. ■ Concrete
   a. ☐ Regular
   b. ☐ Low Profile
2. ☐ Plastic
3. ☐ Other: _____
   CAPACITY 1000 gallons

DISPOSAL FIELD TYPE & SIZE

1. ☐ Stone Bed ☐ 2. Stone Trench
3. ■ Proprietary Device
   a. ☐ Cluster array c. ■ Linear
   b. ■ Regular d. ☐ H-20 loaded
4. ☐ Other:
   SIZE 900 ■ sq. ft. ☐ lin. ft.

18 HIGH CAPACITY PLASTIC CHAMBERS

GARBAGE DISPOSAL UNIT

1. ■ No 2. ☐ Yes

If Yes, Specify one below:

a. ☐ Multi-compartment tank
b. ☐ _____ tanks in series
c. ☐ Increase in tank capacity
d. ☐ Filter on tank outlet

DESIGN FLOW

270 gallons per day
BASED ON:
1. ☐ Table 501.1 (dwelling unit(s))
2. ■ Table 501.2 (other facilities)
   SHOW CALCULATIONS
   - for other facilities -

OPERATION AND MAINTENANCE BUILDING (18 EMPLOYEES)

3. ☐ Section 503.0 (meter readings)
   ATTACH WATER-METER DATA

SOIL DATA & DESIGN CLASS

PROFILE 3 / CONDITION C / DESIGN 1

AT Observation Hole # TP 215
Depth 15" Elevation -19"
OF MOST LIMITING SOIL FACTOR

DISPOSAL FIELD SIZING

2. ☐ Medium - 2.6 sq.ft./gpd
3. ■ Medium-Large - 3.3 sq.ft./gpd
4. ☐ Large - 4.1 sq.ft./gpd
5. ☐ Extra-Large - 5.0 sq.ft./gpd

(item numbers are used for data entry purposes)

EFFLUENT/EJECTOR PUMP

SEE SEPTIC TANK NOTE ON PAGE 3

1. ■ Not required
2. ☐ Required

Specify only for engineered systems:
DOSE: _____ Gallons

LATITUDE AND LONGITUDE

at center of disposal area
Lat. 45 d 4 m 40 s
Lon. 70 d 7 m 12 s
If g.p.s., state margin of error _____

SITE EVALUATOR STATEMENT

I Certify that on 10/13/09 (date) I completed a site evaluation on this property and state that the data reported is accurate and that the proposed system is in compliance with the Subsurface Wastewater Disposal Rules (10-144A CMR 241).

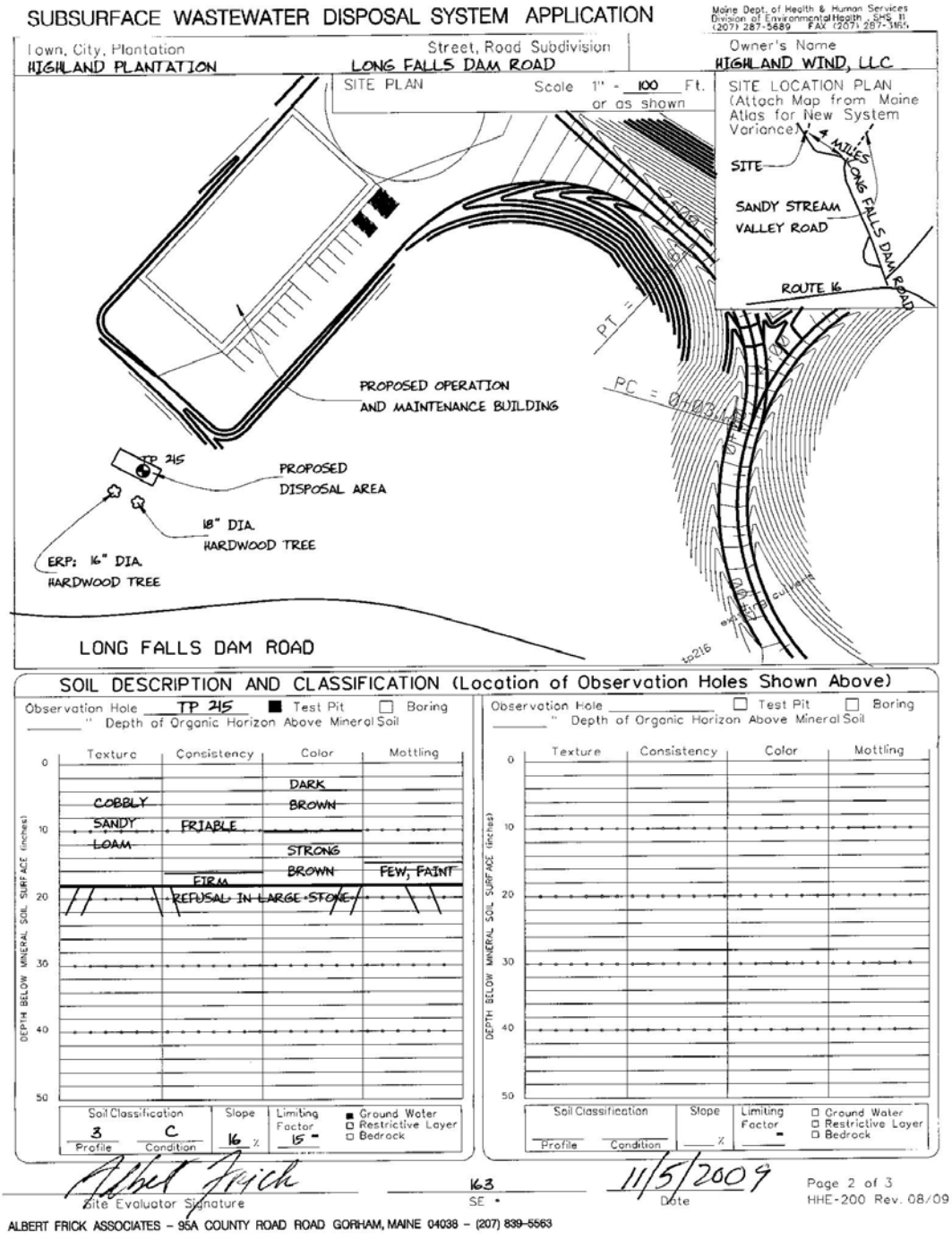
Albert Frick — Site Evaluator Signature
163 — SE #
11/5/2009 — Date

ALBERT FRICK — Site Evaluator Name Printed
(207) 839-5563 — Telephone Number
AFA@MAINERR.COM — E-mail Address

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD ROAD GORHAM, MAINE 04038 – (207) 839-5563

Note: Changes to or deviations from the design should be confirmed with the Site Evaluator

HHE-200 Rev. 08/09


SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION
Maine Dept. of Health & Human Services
Division of Environmental Health SHS 11
(207) 287-5689 FAX (207) 287-3165
Town, City, Plantation
HIGHLAND PLANTATION
Street, Road Subdivision
LONG FALLS DAM ROAD
Owner's Name
HIGHLAND WIND, LLC
SITE PLAN
Scale 1" = 100 Ft.
or as shown
SITE LOCATION PLAN
(Attach Map from Maine Atlas for New System Variance)
4 MILES
SITE
SANDY STREAM VALLEY ROAD
LONG FALLS DAM ROAD
ROUTE 16
PT =
PC = 0+03
PROPOSED OPERATION AND MAINTENANCE BUILDING
TP 215
PROPOSED DISPOSAL AREA
18" DIA. HARDWOOD TREE
ERP: 16" DIA. HARDWOOD TREE
LONG FALLS DAM ROAD
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)
Observation Hole TP 215 ■ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil
Texture
Consistency
Color
Mottling
COBBLY SANDY LOAM
FRIABLE
DARK BROWN
STRONG BROWN
FEW, FAINT
FIRM
REFUSAL IN LARGE STONE
DEPTH BELOW MINERAL SOIL SURFACE (inches)
0
10
20
30
40
50
Soil Classification
3 Profile
C Condition
Slope
16 %
Limiting Factor
15"
■ Ground Water
☐ Restrictive Layer
☐ Bedrock
Observation Hole ☐ Test Pit ☐ Boring
" Depth of Organic Horizon Above Mineral Soil
Soil Classification
Profile
Condition
Slope
%
Limiting Factor
"
☐ Ground Water
☐ Restrictive Layer
☐ Bedrock
Albert Frick
Site Evaluator Signature
163
SE #
11/5/2009
Date
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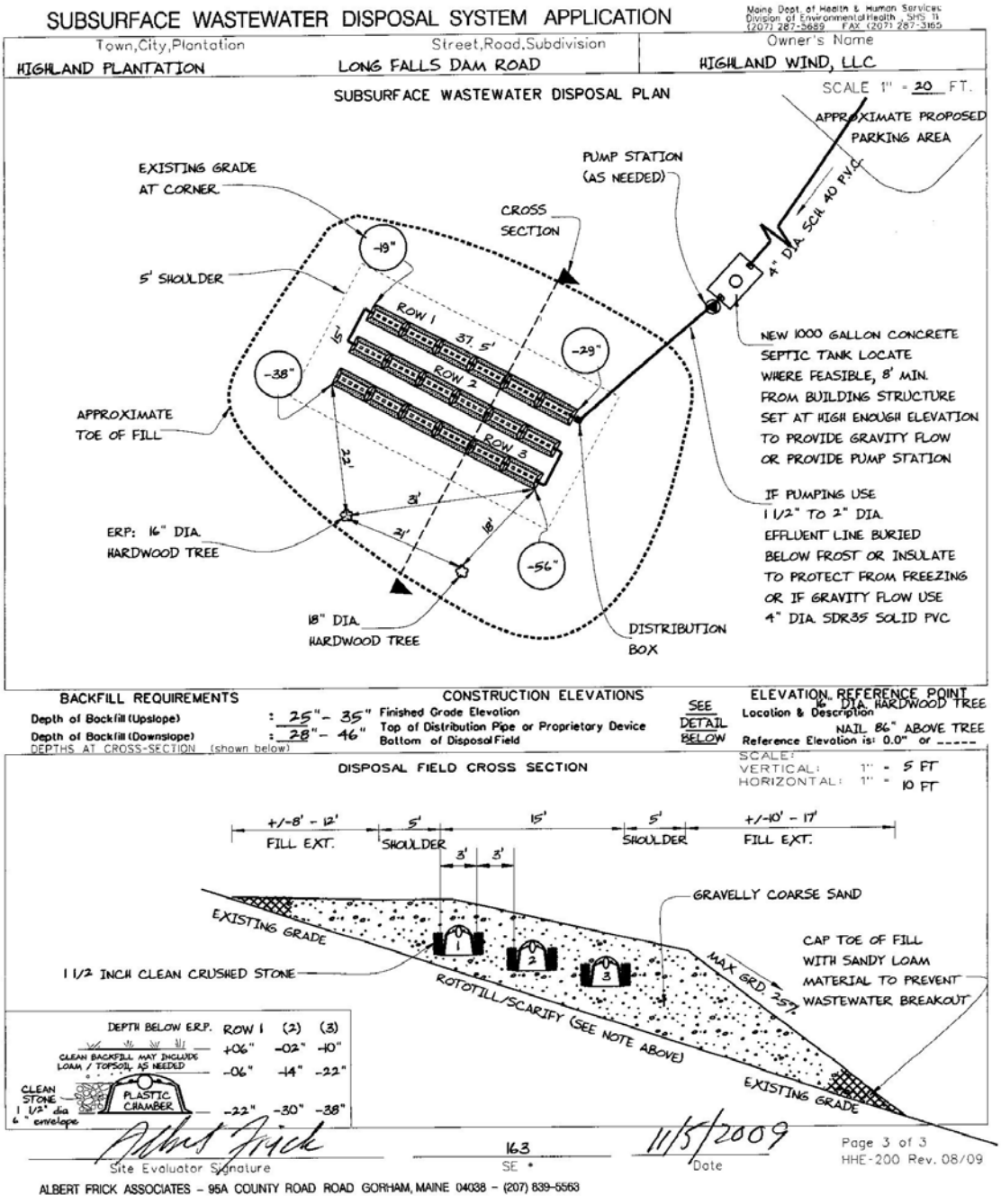
SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION
Maine Dept. of Health & Human Services
Division of Environmental Health, SHS 11
(207) 287-5689 FAX (207) 287-3165
Town, City, Plantation
HIGHLAND PLANTATION
Street, Road, Subdivision
LONG FALLS DAM ROAD
Owner's Name
HIGHLAND WIND, LLC
SUBSURFACE WASTEWATER DISPOSAL PLAN
SCALE 1" = 20 FT.
APPROXIMATE PROPOSED PARKING AREA
EXISTING GRADE AT CORNER
PUMP STATION (AS NEEDED)
CROSS SECTION
4" DIA. SCH. 40 P.V.C.
5' SHOULDER
-19"
ROW 1
ROW 2
ROW 3
37.5'
-29"
-38"
-56"
APPROXIMATE TOE OF FILL
NEW 1000 GALLON CONCRETE SEPTIC TANK LOCATE WHERE FEASIBLE, 8' MIN. FROM BUILDING STRUCTURE SET AT HIGH ENOUGH ELEVATION TO PROVIDE GRAVITY FLOW OR PROVIDE PUMP STATION
IF PUMPING USE 1 1/2" TO 2" DIA. EFFLUENT LINE BURIED BELOW FROST OR INSULATE TO PROTECT FROM FREEZING OR IF GRAVITY FLOW USE 4" DIA. SDR35 SOLID PVC
ERP: 16" DIA. HARDWOOD TREE
18" DIA. HARDWOOD TREE
DISTRIBUTION BOX
BACKFILL REQUIREMENTS
Depth of Backfill (Upslope) : 25" - 35"
Depth of Backfill (Downslope) : 28" - 46"
DEPTHS AT CROSS-SECTION (shown below)
CONSTRUCTION ELEVATIONS
Finished Grade Elevation
Top of Distribution Pipe or Proprietary Device
Bottom of Disposal Field
SEE DETAIL BELOW
ELEVATION REFERENCE POINT
Location & Description 16" DIA. HARDWOOD TREE
NAIL 86" ABOVE TREE
Reference Elevation is: 0.0" or _____
DISPOSAL FIELD CROSS SECTION
SCALE:
VERTICAL: 1" = 5 FT
HORIZONTAL: 1" = 10 FT
+/-8' - 12'
FILL EXT.
5'
SHOULDER
15'
5'
SHOULDER
+/-10' - 17'
FILL EXT.
3'
3'
GRAVELLY COARSE SAND
EXISTING GRADE
1 1/2 INCH CLEAN CRUSHED STONE
CAP TOE OF FILL WITH SANDY LOAM MATERIAL TO PREVENT WASTEWATER BREAKOUT
MAX GRD. 25%
ROTOTILL/SCARIFY (SEE NOTE ABOVE)
EXISTING GRADE
DEPTH BELOW E.R.P. ROW 1 (2) (3)
CLEAN BACKFILL MAY INCLUDE LOAM / TOPSOIL AS NEEDED
+06" -02" -10"
-06" -14" -22"
CLEAN STONE 1 1/2" dia & " envelope
PLASTIC CHAMBER
-22" -30" -38"
Site Evaluator Signature
163
SE #
11/5/2009
Date
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ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD ROAD GORHAM, MAINE 04038 – (207) 839-5563

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563

HIGHLAND PLANTATION	LONG FALLS DAM ROAD	HIGHLAND WIND, LLC
TOWN	LOCATION	APPLICANT'S NAME

1) The Plumbing and Subsurface Wastewater Disposal Rules adopted by the State of Maine, Department of Human Services pursuant to 22 M.R.S.A. § 42 (the "Rules") are incorporated herein by reference and made a part of this application and shall be consulted by the owner/applicant, the system installer and/or building contractor for further construction details and material specifications. The system Installer should contact Albert Frick Associates, Inc. 839-5563, if there are any questions concerning materials, procedures or designs. The system installer and/or building contractor installing the system shall be solely responsible for compliance with the Rules and with all state and municipal laws and ordinances pertaining to the permitting, inspection and construction of subsurface wastewater disposal systems.

2) This application is intended to represent facts pertinent to the Rules only. It shall be the responsibility of the owner/applicant, system Installer and/or building contractor to determine compliance with and to obtain permits under all applicable local, state and/or federal laws and regulations (including, without limitation, Natural Resources Protection Act, wetland regulations, zoning ordinances, subdivision regulations, Site Location of Development Act and minimum lot size laws) before installing this system or considering the property on which the system is to be installed a "buildable" lot. It is recommended that a wetland scientist be consulted regarding wetland regulations. Prior to the commencement of construction/installation, the local plumbing inspector or Code Enforcement Officer shall inform the owner/applicant and Albert Frick Associates, Inc of any local ordinances which are more restrictive than the Rules in order that the design may be amended. All designs are subject to review by local, state and/or federal authorities. Albert Frick Associates, Inc.'s liability shall be limited to revisions required by regulatory agencies pursuant to laws or regulations in effect at the time of preparation of this application.

3) All information shown on this application relating to property lines, well locations, subsurface structures and underground facilities (such as utility lines, drains, septic systems, water lines, etc.) are based solely upon information provided by the owner/applicant and has been relied upon by Albert Frick Associates, Inc. in preparing this application. The owner/applicant shall review this application prior to the start of construction and confirm this information. Well locations on abutting properties but not readily visible above grade should be confirmed by the owner/applicant prior to system installation to assure minimum setbacks.

4) Installation of a garbage (grinder) disposal is not recommended. If one is installed, an additional 1000 gallon septic tank or a septic tank filter shall be connected in series to the proposed septic tank. Risers and covers should be installed over the septic tank outlet to allow for easy maintenance.

5) The system user shall avoid introducing kitchen grease or fats into this system. Chemicals such as septic tank cleaners and/or chlorine (such as from water treatment units) and controlled or hazardous substances shall not be disposed of in this system. Additives such as yeast or enzymes are discouraged, since they have not been proven to extend system life.

6) The septic tank should be pumped within two years of installation and subsequently as recommended by the pump service, but in no event should the septic tank be pumped less often than every three years. All septic tanks, pump stations and additional treatment tanks shall be installed to prevent ground water and surface water infiltration. Risers and covers should be properly installed to provide access while preventing surface water intrusion.

ATTACHMENT TO SUBSURFACE WASTEWATER DISPOSAL APPLICATION

HIGHLAND PLANTATION	LONG FALLS DAM ROAD	HIGHLAND WIND, LLC
TOWN	LOCATION	APPLICANT'S NAME

7) The actual water flow or number of bedrooms shall not exceed the design criteria indicated on this application without a re-evaluation of the system as proposed. If the system is supplied by public water or a private service with a water meter, the water consumption per period should be divided by the number of days to calculate the average daily water consumption [water usage (cu. ft.) x 7.48 cu. ft. (gallons per cu. ft.) ÷ (# of days in period) = gals per day].

8) The general minimum setbacks between a well and septic system serving a single family residence is 100-300 feet, unless the local municipality has a more stringent requirement. A well installed by an abutter within the minimum setback distances prior to the issuance of a permit for the proposed disposal system may void this design.

9) When a gravity system is proposed: BEFORE CONSTRUCTION/INSTALLATION BEGINS, the system installer or building contractor shall review the elevations of all points given in this application and the elevation of the existing and/or proposed building drain and septic tank inverts for compatibility to minimum slope requirement. In gravity systems, the invert of the septic tank(s) outlet(s) shall be at least 4 inches above the invert of the distribution box outlet at the disposal area.

10) When an effluent pump is required: Provisions shall be made to make certain that surface and ground water does not enter the septic tank or pump station, by sealing/grouting all seams and connections, and by placement of a riser and lid at or above grade. An alarm device warning of a pump failure shall be installed. Also, when pumping is required of a chamber system, install a "T" connection in the distribution box and place 3 inches of stone or a splash plate in the first chamber. Insulate gravity pipes, pump lines and the distribution box as necessary to prevent freezing.

11) On all systems, remove the vegetation, organic duff and old fill material from under the disposal area and any fill extension. On sites where the proposed system is to be installed in natural soil, scarify the bottom and sides of the excavated disposal area with a rake. Do not use wheeled equipment on the scarified soil surface. For systems installed in fill, scarify the native soil by roto-tilling or scarifying with teeth of backhoe to a depth of at least 8 inches over the entire disposal and fill extension area to prevent glazing and to promote fill bonding. Place fill in loose layers no deeper that 8 inches and compact before placing more fill (this ensures that voids and loose pockets are eliminated to minimize the chance of leakage or differential setting). Do not use wheeled equipment on the scarified soil area until after 12 inches of fill is in place. Keep equipment off proprietary devices. Divert the surface water away from the disposal area by ditching or shallow landscape swales.

12) Unless noted otherwise, fill shall be gravelly coarse sand which contains no more that 5% fines (silt and clay). Crushed stone shall be clean and free of any rock dust from the crushing process.

13) Do not install systems on loamy, silty, or clayey soils during wet periods since soil smearing/glazing may seal off the soil interface.

14) Seed all filled and disturbed surfaces with perennial grass seed, then mulch with hay or equivalent material to prevent erosion. Alternatively, bark or permanent landscape mulch may be used to cover system. Woody trees or shrubs are not permitted on the disposal area or fill extensions.

15) If an advanced wastewater treatment unit is part of the design, the system shall be operated and maintained per manufacturer's specifications.

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563

APPENDIX B

Soils Report for Maintenance Building Site

See Colonel, Dixfield and Pillsbury

Soil map unit descriptions and

Soil Narrative Report in Section 15

Section 10
Stormwater Control and Phosphorus Analysis

10.0 STORMWATER CONTROL AND PHOSPHORUS ANALYSIS

The construction of gravel roads, tower foundations, turbine pads, and an operations and maintenance area may create stormwater runoff in excess of what the Highland Wind Project (Project) area presently generates. It is important to mitigate this increase in stormwater runoff to prevent erosion or damage to downgradient ecosystems. In general, the stormwater control plan is designed to minimize the concentration of stormwater flows off the Project site. The primary components of the plan include minimizing the permanently impacted areas of the project site and incorporating appropriate Best Management Practices (BMPs) in the Project design.

The primary effort in stormwater management will be to minimize the permanent impacts associated with the Project through a systematic revegetation program for disturbed areas. There will be some temporary impacts during construction of the Project. These impacts will be associated with the wider (i.e., 34-foot) roads needed for the erection crane to travel between turbine sites, and the approximately 332-foot diameter or 150 x 200-foot rectangular clearings required for assembly of the turbine rotors. In addition, with the exception of the turbine foundation, a 12-foot-wide driveway, a 70 x 50-foot parking area on the crane pads, and a small area around the base of the turbine foundation, the turbine clearing areas will be mulched and allowed to revegetate naturally.

The impacts to site hydrology from the proposed Project will also be minimized by the use of appropriate stormwater management BMPs such as culverts with outlet protection and level spreaders. The design contemplates the use of "rock sandwiches," which allow water presently flowing from uphill areas to continue flowing under the road via a layer of coarse rock. This technique is superior to culverts in some instances because the stormwater flows are distributed instead of concentrated, minimizing the potential for erosion. Rock sandwich construction will be used as appropriate in areas where there are groundwater seeps or other hydrologic conditions that warrant their application. In these areas, culverts will also be installed as a backup measure in the event that the rock sandwiches clog or are obstructed by snow. Culvert outlets will be protected by rip rap aprons and level spreaders to dissipate concentrated flows. Stormwater ditches will be outleted to ditch turnouts with level spreaders. Field determinations and changes may be necessary during construction depending on site conditions. A third-party inspector will be retained at the commencement of clearing to inspect clearing activities and ensure BMPs are implemented and erosion control requirements are being met.

10.1 Erosion and Sedimentation Control

An erosion and sedimentation plan has been developed and is included in Appendix 10-1. Erosion control measures are shown on the Project civil engineering plans: 400 Series, 500 Series and 600 Series. Wood waste berms are depicted on these plans by the letters WWB. For other details related to erosion control measures and explanation of how these measures are coded on the plans, refer to the Cover Series of the civil engineering plans provided with this permit submission and included on the CD of the application.

10.2 Phosphorus Analysis

The Project lies within the Gilman Pond, Flagstaff Lake, Carrabassett River, and Kennebec River Watersheds. Runoff from the Project has the potential to increase phosphorus within the Gilman Pond and Flagstaff Lake watersheds. Buffers will be used throughout the Project to reduce the phosphorus loading to meet the Maine Department of Environmental Protection (MDEP) standards in these areas. See the support documents for more detailed information in Appendix 10-2.

The phosphorus analysis is based on several assumptions listed in this narrative and specific analytical methods described in "Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development" published in January 2008 by the MDEP.

Gilman Pond's current calculated pound per acre phosphorus allocation is 0.038 pounds/acre. The Project area includes 21,470 acres that are within the direct watershed of Gilman Pond. The Small Watershed Threshold is 779 acres.

Flagstaff Lake's current calculated pound per acre phosphorus allocation is 0.046 pounds/acre. The Project area includes 1,865 acres that are within the direct watershed of Flagstaff Lake. The Small Watershed Threshold is 68 acres. On October 8, 2009, MDEP advised the applicant that the Project needs to address the phosphorus going to Flagstaff Lake due to the small amount of contributing area, but the Project does not need to be bound by the small watershed threshold limitation.

Linear portions of the Project are gravel or blast rock roadways. From the MDEP guidance documents, these portions have been assigned a phosphorus runoff coefficient of 1.75 pounds/acre/year. The permanent parking areas to remain at each turbine and the area around the base of the turbines have been assigned a coefficient of 1.25 pounds/acre/year. Using these methods, Highland Wind LLC has been able to treat runoff and meet the standards. Calculations demonstrating this analysis and indicating which buffers will treat each section of road are included Appendix 10-3.

Phosphorus treatment will be accomplished by extensive forested and roadside buffering. The Project roadways are being built on mountainous slopes, which in many cases exceed 15 percent in grade. MDEP has suggested additional BMP's that allow for a significant amount of additional roadway to be treated. Many roads will be super elevated to drain surface water from the road to the downhill ditch or fill slope. An 18-foot wide revegetated, mulched area will be located on the downhill side of the roadway, will function as a pre-filter for the road runoff, and will contribute to pretreatment of the water. This allows the road surface runoff to be treated either by sheet-flow roadside buffers, ditch turnouts, or buffers with stone bermed level lip spreaders. In buffer areas adjacent to roads where existing ground slopes are steeper than 15 percent, wood-waste berms will be utilized and located at the toe of the slope. The berm will reduce the likelihood that the flow from the road will concentrate. Rather, it will seep through the berm and be reintroduced to the mountainside as sheet flow. Where existing grades are steeper than 30 percent, no roadside, ditch turnout or stone bermed level lip spreader buffering is proposed because it is thought to be ineffective.

Phosphorus export from the Project has been calculated in both the Gilman Pond and Flagstaff Lakes watersheds and will be reduced by providing buffers and treatment where practical. Phosphorus Encumbrance Zones have been created based on the expected export associated with each watershed. These Zones are referred to as the total development areas in the phosphorus calculations. Due to the size of the Zones, the phosphorus export will be slightly less than that allowed in the phosphorus budget. Within these Zones, which are generally defined as a setback from the centerline of project roads, no additional development resulting in permanent impervious areas will be allowed.

10.3 Buffers

Buffers around the Project construction areas are vital to minimize construction-related impacts to existing wetlands, streams, and soils in the Project area. When developing the turbine site and road plans, the Project provided several types of buffers. These buffers include general stormwater buffers, wetland and stream buffers, and Significant Vernal Pool buffers.

The length and width of the proposed buffers will be based on site-specific conditions, including land slope and soil type, as defined by BMP Manual Chapter 500, Appendix F.

10.3.1 Stormwater Buffers

Three types of stormwater buffers are proposed for use on this Project. The first type of buffer would be used in areas adjacent to the downhill side of the road, in which the runoff from the road will sheet directly into a buffer. The second type is a ditch turn-out buffer, in which ditch runoff is diverted to a 30-foot-wide level spreader, then distributed into a buffer. The third type of buffer allows runoff to be diverted to a

stone bermed level lip spreader and distributed into a buffer. The level lip spreaders have been sized according to the most recent version of the Maine BMP Manual.

10.3.2 Wetland and Stream Buffers

The project also incorporates 75-foot-wide buffers around delineated wetlands and streams within the Project area, where practical. Several encroachments of these buffers were required as part of the Project. See Appendix 11-1 in Section 11 for stream and wetland locations.

10.3.3 Significant Vernal Pool Buffers

There are three Significant Vernal Pools (SVPs) within the Project area. A 250-foot-wide buffer, the equivalent of the critical terrestrial habitat as defined in Maine Natural Resources Protection Act Chapter 335 9-A(1), will be placed around the three vernal pools. Historic anthropogenic activity has disturbed the critical terrestrial habitat of each pool. Project design requires that some additional disturbance occur within each buffer area, but in each case, new disturbance will total less than 25 percent of the critical terrestrial habitat. Impacts within the buffers of these three SVPs are discussed in detail in Section 5.4.1 and Section 11.4 of this permit application.

10.3.4 Visual Buffers

The crane paths, access roads, and overhead electrical collector system will be visually buffered by trees and the elevation difference between the ridge and the lower surrounding topography. The Operations and Maintenance (O&M) building will be the Project component located closest to a public road, exclusive of overhead electrical lines that will cross public roads in Pleasant Ridge Plantation. The proposed gravel parking lot at the O&M building will be set back approximately 125 feet from the existing treeline along Long Falls Dam Road and the O&M building will be approximately 130 feet from this treeline. The existing wooded buffer between Long Falls Dam Road and the proposed site of the O&M building should screen this building from the road. In addition, the existing gravel access in this area will be abandoned and allowed to naturally revegetate, which should further enhance this visual buffer. See Section 17 for a full visual analysis.

Appendix 10-1

1.0 INTRODUCTION

This erosion and sedimentation control plan has been developed to (1) satisfy the requirements of the Land Use Regulation Commission (LURC) Chapter 10 Rules and Standards and (2) identify road construction and stormwater management techniques that will minimize unreasonable soil erosion and prevent potential reductions in the water storage capacity of existing soils. The plan identifies Best Management Practices (BMPs) that can be implemented during construction of the Highland Wind Project (Project) to minimize and control soil erosion. The plans, details, and specifications included in the plan identify appropriate BMPs for various soil and environmental conditions, explain the basis for their use, and provide details for their installation.

2.0 OVERVIEW OF EROSION AND SEDIMENTATION CONCERNS

Activities that may potentially cause erosion during Project construction primarily consist of clearing and grading of the access roads and crane paths and grading and site preparation for the wind turbine clearings (i.e., foundations, crane pads, and rotor assembly areas). See Section 6 for more detailed clearing information. The critical areas for this site during construction are the steep slopes and any disturbance near wetlands and streams.

3.0 EROSION AND SEDIMENTATION CONTROL MEASURES

The proposed erosion and sedimentation control plan includes installation of silt fencing, wood waste berms, erosion control mix, riprap slope protection, and rock sandwich road construction. These BMPs will be designed in accordance with the following standard references on erosion and sedimentation control in the State of Maine:

- Maine Erosion and Sedimentation Control Best Management Practices (Maine Department of Environmental Protection, 2003);
- Erosion and Sediment Control Handbook for Maine Timber Harvesting Operations – Best Management Practices (1991); and
- Land Use Handbook – Section 6 – Erosion Control on Logging Jobs and Revision (Supplement) (effective January 5, 1981).

Erosion and sedimentation control design plans, details, and specifications will be reviewed by a State of Maine licensed Professional Engineer and Certified Professional in Erosion and Sedimentation Control who specializes in design and implementation of erosion control methods.

If winter or early spring construction occurs, the recommended winter construction BMPs will be followed. These include application of hay mulch at twice the standard rate and installation of a double row of sediment barriers for areas within 75 feet of a wetland. Winter construction specifications are also provided in the Project plans.

Wood Waste Berms/Silt Fence

Wood waste berms, silt fence, or a combination of the two, will be installed down gradient of construction and clearing activities. In critical areas, particularly near wetlands, a double layer of silt fencing or wood waste berms may be installed. Multiple rows of wood waste berms/silt fencing may also be necessary in long areas of cut. The final layout will be prepared in accordance with typical design methods for these BMPs including in the above references. Silt fence should not be used in areas of concentrated stormwater runoff.

Erosion Control Mix

Erosion control mix (ECM) will be used to provide cover for denuded areas until vegetation is established for slope stabilization. ECM placed on particularly steep slopes may require the use of erosion control mesh or fabric netting anchored with staples as deemed necessary. Wood mulch generated by tree/stump grinding and other cleared woody vegetation will be used to provide cover material over bare slopes as an erosion control material. ECM should not be used in areas of concentrated stormwater runoff.

Riprap
Steeply sloped ditches along project roadways will be armored with approximately sized riprap or processed blast rock armoring to stabilize the ditch. Cross-culverts may also be necessary as part of this Project. Plunge pools, check dams, and level spreaders will be used to dissipate concentrated flows that might cause erosion and thereby protect culvert outlets.

Rock Sandwich Road Construction
The erosive potential of water that may be concentrated in ditches will be minimized by the use, where applicable, of "rock sandwich" road construction. They will be used in areas with high ground water or poor soils or other areas with sensitive hydrology to enable water to pass through the roadway subbase that would otherwise be intercepted by the project roadway. This will eliminate the concentration of flows in a ditch on the uphill side of the road and allow water from uphill areas to continue flowing under the road in a layer of coarse rock.

Ditch Turnouts and Level Lip Spreaders
Where ditches are necessary, primarily in cut sections of the roadway, appropriately sized and located cross-culverts and ditch turnouts will be used to dissipate collected stormwater runoff back to sheet flow. These ditches will be designed as suggested by the Maine Department of Environmental Protection (MDEP) and LURC Chapter 10 criteria, which requires a ditch turnout ending with a level spreader.

3.1 Site Plan

James W. Sewall Company prepared the road and turbine site design plans for this application that identify vegetation types and locations, slopes, and other nature features near the disturbed areas. The plans and accompanying details show and describe temporary and permanent erosion control measures.

3.2 Sequence of Construction

In general, erosion control measures will be implemented down-gradient of each work area before earthwork begins. Construction activities will be sequenced to minimize the Project area that is disturbed but un-stabilized at any point in time. Disturbed and stockpiled soil will be temporarily stabilized at the end of each workday. Temporary erosion control measures will be the first items installed and the last items to be removed after healthy vegetation is established.

After preliminary layout and staking/flagging of the new road segments and areas to be cleared, erosion control measures will be installed. As the roads are constructed and areas are cleared, additional measures will be implemented. As roads reach final grade, permanent measures, such as ditch turnouts and level spreaders, will be constructed.

Cleared areas will receive temporary mulching as required. Topsoil stockpiles will be protected by double measures such as temporary seeding and silt fences. After turbines are installed, a significant portion of each turbine clearing will be re-graded with ECM and stockpiled topsoil.

Because stabilization of areas following completion of final grading is very important to prevent erosion, areas will be stabilized within seven days of work completion. Final stabilization will primarily consist of coarse gravel or blast rock (project roadways), ECM (turbine clearings and portions of crane paths), erosion control mix/matting (less steep earth cut and fill slopes), and riprap or blast rock (steep cut/fill slopes, ditches and culvert outlets).

3.3 Maintenance and Inspection of Erosion Control Measures

Maintenance of erosion control measures is key to their successful operation. The entity responsible for ensuring that maintenance will be completed in a timely manner is the Owner. During construction, the prime contractor, who has yet to be determined, will have this responsibility. Erosion control measures will be inspected at least weekly and after any rainstorm greater than 0.5 inch by the project General Contractor, who will be certified in erosion control practices by the MDEP, and periodically by third-party

inspection personnel under direct supervision of a licensed Professional Engineer. Inspections will be documented in writing and be made available to LURC upon request. Workers on-site will be instructed to report problems as they occur so remedial action can be taken as soon as possible.

3.4 Maintenance Plan

Ditches

Rip-rap lined ditches

- Inspect semi-annually.
- Remove sediment buildup, leaves, litter or other debris from the bottom and side slopes.
- Reposition stones to restore channel to original dimensions.

Vegetated Ditches

- Inspect the ditch lining monthly for slumping of the lining, downcutting of the ditches base, or undercutting of the banks.
- Repair any damage immediately.
- Mow or brush-cut annually only as necessary to prevent the establishment of woody vegetation.

Culverts

- Inspect for sediment buildup.
- Flush pipes and remove sediment at which time the depth of sediment at any location in the pipe exceeds three inches.

Rip-Rap Aprons, Level Spreaders, and Ditch Turnouts

- Inspect semi-annually or after severe storms for dislodged stones or slumping of the stone lining.
- Inspect and verify that top of stone is level (+/-1").
- Repair level lip to distribute flows uniformly across the buffer
- Reposition stones to restore the pools original dimensions and a uniform surface.
- Clean any accumulated sediments and debris from the plunge pool.
- Cut and remove any woody vegetation growing within the pool.

Vegetation

- Inspect vegetated areas each spring.
- Rework and re-stabilize sparsely revegetated areas that show evidence of soil erosion.

Stones Check Dams

Prior to establishment of permanent vegetation

- Inspect check dams after each storm event until permanent vegetation is established.
- Remove sediment buildup behind check dams.

After establishment of permanent vegetation

- Inspect for sediment build-up in void space between stones and dislodged stones.
- Remove sediment build-up.
- Stabilize disturbed areas.
- Replace check dam if sediment is filling void space.
- Replace dislodged stones.

Road Grading

- Grade the road as necessary to maintain the proposed roadway crown or super elevation and to prevent the creation of berms or ruts that may channelize flow.

Side slopes of gravel surfaces:

- Inspect slopes for rill erosion due to concentrated flows.
- Restabilize eroded slopes with ECM or other approved BMP method.

Appendix 10-2

A Notice of Intent to Comply with the Maine Construction General Permit is provided in Section 24 of this permit application.

Appendix 10-3

1.0 STORMWATER SUMMARY

Due to its size and location, the Highland Wind Project (Project) is subject to the Best Management Practice (BMP) General and Phosphorus Standard. The purpose of the BMP standards is to include treatment measures that will mitigate for the increase of channel erosive flows and treat the pollutants effectively, and to mitigate for the potential temperature impacts due to the runoff from the proposed site. The Project also must meet the Flooding Standard for the 2, 10 and 25-year-storm event to prevent flooding down gradient of the site.

The applicant proposes to meet the required **BMP General Standard** by doing the following.

The applicant proposes to use a combination of underdrain soil filters and buffers to treat the runoff from the Project site. Per Maine Department of Environmental Protection (MDEP) regulations, at least 75 percent of the linear portion of the Project (the access roads, crane paths, and turbine pads) and at least 50 percent of the developed area of the linear portion of the Project (access road and crane paths, associated grading, and landscaped area) must be treated. The nonlinear impervious area of the Project (Operations and Maintenance [O&M] building and parking lot) must have 95 percent treatment and nonlinear developed area (O&M building and parking lot, grading and landscaping) must meet at least 80 percent treatment. Attached are the support documents that summarize the method of treatment, with their sizes, the contributing area of impervious surface and developed area, and the percentage of the project's treatment met with each treatment system.

The applicant proposes to meet the **BMP Phosphorus Standard** as follows.

The applicant proposes to use a combination of buffers to treat the phosphorus from the Project site. Per MDEP regulations, the phosphorus export for the post-development conditions must be less then the phosphorus budget determined by the State for the Project site. See the attached support documents that summarize the method of treatment, with their sizes, the contributing area of impervious surface, and the phosphorus export for both pre- and post-development conditions.

The applicant proposes to meet the **Flooding Standard** as follows.

As part of the flooding standard, runoff from the site must meet or be less than the pre-development flows or have an insignificant increase in flow off the site. Near the O&M building, the flooding standard will be addressed by storing runoff volume using soil filters. These structures are designed to collect, store, and control the stormwater runoff. To meet the quality standards, the soil filters were modeled to detain only the volume of water for which they were sized. The structures have been designed to accommodate the 2-, 10-, and 25-year storm events. The rest of the Project will use buffers with level spreaders to slow and return the runoff to sheet flow. The overall storm water management system has an insignificant increase in runoff and is designed to prohibit any adverse impact on areas downstream from the site.

See Pre- and Post-Development Watershed plans for illustrations of watershed areas, hydraulic lengths lines, and physical features. The attached support documents that summarize the method of treatment, with their sizes, the contributing area of impervious surface, and the calculations for both pre- and post-development conditions.

STORMWATER QUALITY SUMMARY BY WATERSHED

Carabassett Watershed (#7)				
West	Impervious Area	3.616878	Total Treatment=	**75.32%**
	%Treated	75.32%		

Gilman Pond Watershed (#2,3,4,5,6)			Phos Budget=	28.596 lb P/yr
Connector	Impervious Area	9.576758		
	%Treated	74.16%		
	Phos Export	10.31752		
East	Impervious Area	8.263157		
	%Treated	75.96%		
	Phos Export	7.278725		
West	Impervious Area	12.21485	Total Treatment=	**75.11%**
	%Treated	75.28%	Total WS Phos Ex=	28.49103
	Phos Export	10.89478		

Flagstaff Watershed (#8)			Phos Budget=	3.92 lb P/yr
West	Impervious Area	4.208563	Total Treatment=	**76.52%**
	%Treated	76.52%	Total WS Phos Ex=	3.91846
	Phos Export	3.91846		

Kennebec (#1)				
East	Impervious Area	7.464837	Total Treatment=	**75.07%**
	%Treated	75.07%		

Project Name **HIGHLAND PLANTATION**
Project Number **66060E**
Date 11/17/2009
Done by JAO

Pre & Post Development Summary

	Subcatchment		Flow (cfs) from Hydrocad		
	Property Line	#	2-year	10-year	25-year
PRE	SUM1 Flagstaff	8	131.46	304.75	385.78
POST	SUM1 Flagstaff	8	136.04	314.09	397.45
	CHANGE		4.58	9.34	11.67
	Percent Increase		3.48%	3.06%	3.03%
PRE	SUM2 Gilman	2,3,4,5,6	1669.56	3862.75	4889.94
POST	SUM2 Gilman	2,3,4,5,6,6A,6B,6C	1872.78	4297.36	5430.50
	CHANGE		203.22	434.61	540.56
	Percent Increase		12.17%	11.25%	11.05%
PRE	SUM3 Carabasset	7	159.81	367.78	465.04
POST	SUM3 Carabasset	7	171.37	394.20	498.13
	CHANGE		11.56	26.42	33.09
	Percent Increase		7.23%	7.18%	7.12%
PRE	SUM4 Kennebec	1	550.07	1227.69	1541.73
POST	SUM4 Kennebec	1	561.48	1251.55	1571.23
	CHANGE		11.41	23.86	29.50
	Percent Increase		2.07%	1.94%	1.91%

TOTAL PRE DEV. CONTRIBUTING WATERSHED AREA= 166528375 sf = 3822.97 acres
TOTAL POST DEV. CONTRIBUTING WATERSHED AREA= 166528374 sf = 3822.97 acres

Difference= 0.00 acres

Project Name	**HIGHLAND PLANTATION**	BA=Buffer Adjacent to Small Imp	BR=Roadside buffer
Project Number	**66060E**	BL=Buffer w/level spreader	DB=Detention basin
Date	10/13/2009	BD=Buffer w/ditch turnout	WP=Wet pond
Done by	JEC	USF=Underdrain Soil Filter	INF=Infiltration

QUALITY CALCULATIONS FOR NON LINEAR PORTION

Total NEW LINEAR impervious area for project=	2123213	sf	=	48.74	acres
Total NEW LINEAR landscaped area for project=	0	sf	=	0.00	acres
Total NEW LINEAR area of project=	2123213	sf	=	48.74	acres
Total NEW NONLIN impervious area for project=	52411	sf	=	1.20	acres
Total NEW NONLIN landscaped area for project=	17771	sf	=	0.41	acres
Total NEW NONLINEAR area of project=	70182	sf	=	1.61	acres

Total impervious area for project=	**2175624**	**sq ft**	**=**	**49.95**	**acres**	
Total developed area for project=	**2193395**	**sq ft**	**=**	**50.35**	**acres**	
Total imp+landscaped area=	**2193395**	**=Total linear+nonlinear area=**				**2193395 sq ft**

		NONLinear Area		
Subcatchment #	**BMP Type & #**	**Imp (sf)**	**Land (sf)**	**Description If Applicable**
6A	USF1	15457	11248	Back part of O&M (buildings)
6B	USF2	34313	2949	Front part of O&M (parking lot)
	TOTAL	***49770***	***14197***	

SUMMARY FOR THE NONLINEAR PORTION OF THE PROJECT

IMP Area Required area to be treated (sf)=	49790.45		
Total NONLIN IMP Area Being Treated (sf)=	**49770**	***95.0%***	**>=95%**
DEVEL Area Required area to be treated (sf)=	56145.60		
Total NONLIN DEVEL Area Being Treated (sf)=	**63967**	***91.14%***	**>=80%**
NONLinear Area Not Being Treated (sf)=	6215		

Project Name **HIGHLAND PLANTATION**
Project Number **66060E**
Date 10/13/2009
Done by JEC

BIORETENTION CELL OR UNDERDRAIN SOIL FILTER CALCULATIONS

USF1

Subcatchment #	BMP Type & #	Imp (sf)	Land (sf)
6A	USF1	26705	11248
	TOTAL	26705	11248

Volume req'd (cubic feet)	Pretreated (yes or no)	Vol req'd, 25% Red. For pretreat	Sediment Pre-Treat V(cft)	L of Pre Treat A*	Depth of Cell (in)	*Sizing Starting Point* Area of cell (sq ft)	L of Cell (ft)	W of Cell (ft)
2600.35	no	N/A	N/A	N/A	18	1733.57	40	43.34

*Length of pretreatment trough is based on an 8" deep trough with 3:1 side slopes (overall width 4')

SOIL FILTER ELEVATIONS

1476	*Top of Berm*
6	Spillway Height (6in min)
1475.50	Top of Spillway/Storage
1474.00	Top of Soil Filter Media
1472.50	Bottom Soil Filter Media
14	Depth of Gravel (in)
1471.33	Bottom of Gravel/USF
1471.67	*Underdrain Elevation*
6	Underdrain Diameter (in)
4	Underdrain Cover **(Min 4")**

STORAGE CALCULATIONS

Elevation	Area	Volume	
1474.00	1655	0	
1474.5	1824	869.75	
1475	2001	956.25	
1475.5	2185	1046.50	
			must be > or =
Cumm. Storage		**2872.50**	**2600**

USF2

Subcatchment #	BMP Type & #	Imp (sf)	Land (sf)
6B	USF2	37262	2949
	TOTAL	37262	2949

Sizing Starting Point

Volume req'd (cubic feet)	Pretreated (yes or no)	Vol req'd, 25% Red. For pretreat	Sediment Pre-Treat V(cft)	L of Pre Treat A*	Depth of Cell (in)	Area of cell (sq ft)	L of Cell (ft)	W of Cell (ft)
3203.47	no	N/A	N/A	N/A	18	2135.64	100	21.36

*Length of pretreatment trough is based on an 8" deep trough with 3:1 side slopes (overall width 4')

SOIL FILTER ELEVATIONS

1474	*Top of Berm*
6	Spillway Height (6in min)
1473.50	Top of Spillway/Storage
1472.00	Top of Soil Filter Media
1470.50	Bottom Soil Filter Media
14	Depth of Gravel (in)
1469.33	Bottom of Gravel/USF
1469.67	*Underdrain Elevation*
6	Underdrain Diameter (in)
4	Underdrain Cover **(Min 4")**

STORAGE CALCULATIONS

Elevation	Area	Volume	
1472.00	1879	0	
1472.5	2177	1014.00	
1473	2482	1164.75	
1473.5	2792	1318.50	
			must be > or =
Cumm. Storage		**3497.25**	**3203**

Project Name **HIGHLAND PLANTATION**
Project Number **66060E**
Date 9/17/2009
Done by JEC

BA=Buffer Adjacent to Small Imp
BL=Buffer w/level spreader
BD=Buffer w/ditch turnout
USF=Underdrain Soil Filter

BR=Roadside buffer
DB=Detention basin
WP=Wet pond
INF=Infiltration

BRS=Roadside Buffer with Rock Sandwich

Total Impervious Area for the Access Rd = 9.58 Acres
% of Project Treated for the Access Rd = **74.16%** >= 75%

Width of road during Construction (ft) = 16
Permanent width of road (ft)= 16

QUALITY CALCULATIONS FOR LINEAR PORTION-ACCESS RD

Gilman Pond (#3,#4,#5 &#6)
Phosphorous Requirement

Watershed per acre phosphorus budget (Appendix C):	PAPB	0.038	# P/acre/year	Total ac of devel. parcel:	TA	757.53	acres
Existing impervious area (Pre 1980)	EIA_B	0	acres	NWI wetland acreage:	WA	0	acres
Existing impervious area (post 1980)	EIA_A	5	acres	Steep slope acreage:	SA	0	acres
Project acreage: $A = TA - (WA + SA + EIA_B + EIA_A)$	A	752.53	acres	Project Phos Budget: $PPB = P \times A$	**PPB**	**28.596**	**lbs P/year**

1=no tx, 0.4=buffer

Roadway Alignment and/or Turbine Site	Station	to Station	Right (R) Left (L) Both (B)	BMP No.	Watershed	BMP type Forest/Meadow	Imp. Area (acres)	Treatment Factor	Export Coefficient	Pre-Treatment lbs P/Year	Post Treatment lbs P/year
CONNECTOR STUB	0	150	B	WBL39	5	MEADOW	0.055	0.4	1.75	0.096419	0.0385675
CONNECTOR	75	350	B	CBR25	5	MEADOW	0.101	0.4	1.75	0.176768	0.0707071
CONNECTOR	350	1340	B	CBR26	5	FOREST	0.364	0.4	1.75	0.636364	0.2545455
CONNECTOR	1340	1475	B		5	FOREST	0.050	1	1.75	0.086777	0.0867769
CONNECTOR	1475	1830	B	CBRS2	5	FOREST	0.130	0.4	1.75	0.228191	0.0912764
CONNECTOR	1830	1860	B		5	FOREST	0.011	1	1.75	0.019284	0.0192837
CONNECTOR	1860	2025	B	CBRS3	5	FOREST	0.061	0.4	1.75	0.106061	0.0424242
CONNECTOR	2025	2100	B		5	FOREST	0.028	1	1.75	0.048209	0.0482094
CONNECTOR	2100	2500	B	CBR4	4	FOREST	0.147	0.4	1.75	0.257117	0.1028466
CONNECTOR	2500	3000	B	CBR5	4	FOREST	0.184	0.4	1.75	0.321396	0.1285583
CONNECTOR	3000	3875	B	CBRS4	4	FOREST	0.321	0.4	1.75	0.562443	0.224977
CONNECTOR	3875	3925	B		4	FOREST	0.018	1	1.75	0.03214	0.0321396
CONNECTOR	3925	4100	B	CBRS5	4	FOREST	0.064	0.4	1.75	0.112489	0.0449954
CONNECTOR	4100	4125	B		4	FOREST	0.009	1	1.75	0.01607	0.0160698
CONNECTOR	4125	4610	B	CBR6	4	FOREST	0.178	0.4	1.75	0.311754	0.1247016
CONNECTOR	4610	4700	B		4	FOREST	0.033	1	1.75	0.057851	0.0578512
CONNECTOR	4700	4900	B	CBRS6	4	FOREST	0.073	0.4	1.75	0.128558	0.0514233
CONNECTOR	4900	5000	B		4	FOREST	0.037	1	1.75	0.064279	0.0642792
CONNECTOR	5000	5305	B	CBR7	4	FOREST	0.112	0.4	1.75	0.196051	0.0784206
CONNECTOR	5305	5355	B		4	FOREST	0.018	1	1.75	0.03214	0.0321396
CONNECTOR	5355	5390	B	CBR7	4	FOREST	0.013	0.4	1.75	0.022498	0.0089991
CONNECTOR	5390	5480	B		4	FOREST	0.033	1	1.75	0.057851	0.0578512
CONNECTOR	5480	5610	B	CBR25	4	FOREST	0.048	0.4	1.75	0.083563	0.0334252
CONNECTOR	5610	5685	B		4	FOREST	0.028	1	1.75	0.048209	0.0482094
CONNECTOR	5685	6100	B	CBR26	4	FOREST	0.152	0.4	1.75	0.266758	0.1067034

CONNECTOR	6100	6300	L	CBD5	4	FOREST	0.073	0.4	1.75	0.128558	0.0514233
CONNECTOR	6100	6300	R	CBD6	4	FOREST	0.073	0.4	1.75	0.128558	0.0514233
CONNECTOR	6300	6700	B	CBR8	4	FOREST	0.147	0.4	1.75	0.257117	0.1028466
CONNECTOR	6700	7150	B		4	FOREST	0.165	1	1.75	0.289256	0.2892562
CONNECTOR	7150	7350	B	CBD27	4	FOREST	0.073	0.4	1.75	0.128558	0.0514233
CONNECTOR	7350	7575	B	CBD28	4	FOREST	0.083	0.4	1.75	0.144628	0.0578512
CONNECTOR	7575	7900	L	CBD9	4	FOREST	0.119	0.4	1.75	0.208907	0.0835629
CONNECTOR	7575	7900	R	CBD8	4	FOREST	0.119	0.4	1.75	0.208907	0.0835629
CONNECTOR	7900	8000	B		4	FOREST	0.037	1	1.75	0.064279	0.0642792
CONNECTOR	8000	8400	B	CBD29	4	FOREST	0.147	0.4	1.75	0.257117	0.1028466
CONNECTOR	8400	8725	B	CBD31	4	FOREST	0.079	0.4	1.75	0.13825	0.0553
CONNECTOR	8725	8890	B	CBR10	4	FOREST	0.024	0.4	1.75	0.042	0.0168
CONNECTOR	8890	9600	B	CBD12	4	FOREST	0.075	0.4	1.75	0.13125	0.0525
CONNECTOR	9600	9900	B	CBD13	4	FOREST	0.053	0.4	1.75	0.09275	0.0371
CONNECTOR	9900	10200	b		4	FOREST	0.045	1	1.75	0.07875	0.07875
CONNECTOR	10200	10350	B	CBD32	4	FOREST	0.043	0.4	1.75	0.07525	0.0301
CONNECTOR	10350	10800	B	CBD14	4	FOREST	0.063	0.4	1.75	0.11025	0.0441
CONNECTOR	10800	11045	B	CBD15	4	FOREST	0.020	0.4	1.75	0.035	0.014
CONNECTOR	11045	11500	B		4	FOREST	0.074	1	1.75	0.1295	0.1295
CONNECTOR	11500	11870	B	CBD34	4	FOREST	0.107	0.4	1.75	0.18725	0.0749
CONNECTOR	11870	11950	B	CBR27	4	FOREST	0.009	0.4	1.75	0.01575	0.0063
CONNECTOR	11950	12300	B		4	FOREST	0.034	1	1.75	0.0595	0.0595
CONNECTOR	12300	12550	B	CBL12	4	FOREST	0.028	0.4	1.75	0.049	0.0196
CONNECTOR	12550	12700	B		4	FOREST	0.015	1	1.75	0.02625	0.02625
CONNECTOR	12700	12875	B	CBR28	4	MEADOW	0.024	0.4	1.75	0.042	0.0168
CONNECTOR	12875	13500	B	CBD17	4	FOREST	0.120	0.4	1.75	0.21	0.084
CONNECTOR	13500	14000	B	CBR29	4	FOREST	0.110	0.4	1.75	0.1925	0.077
CONNECTOR	14000	14110	B	CBD35	4	FOREST	0.015	0.4	1.75	0.02625	0.0105
CONNECTOR	14110	14175	B		4	FOREST	0.011	1	1.75	0.01925	0.01925
CONNECTOR	14175	14300	B	CBD36	4	FOREST	0.015	0.4	1.75	0.02625	0.0105
CONNECTOR	14300	14375	B		4	FOREST	0.006	1	1.75	0.0105	0.0105
CONNECTOR	14375	14475	B	CBR30	4	FOREST	0.017	0.4	1.75	0.02975	0.0119
CONNECTOR	14475	14775	B		4	FOREST	0.083	1	1.75	0.14525	0.14525
CONNECTOR	14775	15025	B	CBD37	4	FOREST	0.031	0.4	1.75	0.05425	0.0217
CONNECTOR	15025	15100	B		4	FOREST	0.008	1	1.75	0.014	0.014
CONNECTOR	15100	15600	B	CBR15	4	FOREST	0.156	0.4	1.75	0.273	0.1092
CONNECTOR	15600	15830	B	CBR16	4	FOREST	0.084	0.4	1.75	0.147842	0.0591368
CONNECTOR	15830	16150	B	CBD21	4	FOREST	0.132	0.4	1.75	0.231	0.0924
CONNECTOR	16150	17250	B		4	FOREST	0.317	1	1.75	0.55475	0.55475
CONNECTOR	17250	17450	B	CBR31	4	FOREST	0.064	0.4	1.75	0.112	0.0448
CONNECTOR	17450	17890	B	CBD24	4	FOREST	0.070	0.4	1.75	0.1225	0.049
CONNECTOR	17890	18575	B	CBR18	4	MEADOW	0.129	0.4	1.75	0.22575	0.0903
CONNECTOR	18575	18625	B		4	FOREST	0.008	1	1.75	0.014	0.014
CONNECTOR	18625	19050	B	CBR19	4	MEADOW	0.099	0.4	1.75	0.17325	0.0693
CONNECTOR	19050	20325	B	CBR20	4	MEADOW	0.452	0.4	1.75	0.791	0.3164
CONNECTOR	20325	20375	B		4	MEADOW	0.008	1	1.75	0.014	0.014

CONNECTOR	20375	20890	B	CBR21	3	MEADOW	0.083	0.4	1.75	0.14525	0.0581
CONNECTOR	20890	21075	B		3	MEADOW	0.003	1	1.75	0.00525	0.00525
CONNECTOR	21075	21925	B	CBR32	3	MEADOW	0.286	0.4	1.75	0.5005	0.2002
CONNECTOR	21925	22625	B	CBR22	3	FOREST	0.257	0.4	1.75	0.449954	0.1799816
CONNECTOR	22625	23125	B	CBRS7	3	FOREST	0.184	0.4	1.75	0.321396	0.1285583
CONNECTOR	23125	23180	B		3	FOREST	0.020	1	1.75	0.035354	0.0353535
CONNECTOR	23180	23325	B	CBRS7	3	FOREST	0.053	0.4	1.75	0.093205	0.0372819
CONNECTOR	23325	23360	B		3	FOREST	0.013	1	1.75	0.022498	0.0224977
CONNECTOR	23360	23680	B	CBRS7	3	FOREST	0.118	0.4	1.75	0.205693	0.0822773
CONNECTOR	23680	23700	B		3	FOREST	0.007	1	1.75	0.012856	0.0128558
CONNECTOR	23700	24400	B	CBRS7	3	FOREST	0.257	0.4	1.75	0.449954	0.1799816
CONNECTOR	24400	24500	B	CBR23	3	FOREST	0.037	0.4	1.75	0.064279	0.0257117
CONNECTOR	24500	24540	B		3	FOREST	0.015	1	1.75	0.025712	0.0257117
CONNECTOR	24540	24730	B	CBRS8	3	FOREST	0.070	0.4	1.75	0.12213	0.0488522
CONNECTOR	24730	24825	B		3	FOREST	0.035	1	1.75	0.061065	0.0610652
CONNECTOR	24825	25050	B	CBRS9	3	FOREST	0.083	0.4	1.75	0.144628	0.0578512
CONNECTOR	25050	25195	B		3	FOREST	0.053	1	1.75	0.093205	0.0932048
CONNECTOR	25195	25410	B	CBRS10	3	FOREST	0.079	0.4	1.75	0.1382	0.0552801
CONNECTOR	25410	25750	B	CBR24	3	FOREST	0.125	0.4	1.75	0.218549	0.0874197
CONNECTOR	25750	25780	B		3	FOREST	0.011	1	1.75	0.019284	0.0192837
CONNECTOR	25780	25930	B	CBRS11	3	FOREST	0.055	0.4	1.75	0.096419	0.0385675
CONNECTOR	25930	26090	B		3	FOREST	0.059	1	1.75	0.102847	0.1028466
CONNECTOR	26090	27425	B	CBRS12	3	FOREST	0.490	0.4	1.75	0.858127	0.3432507
CONNECTOR	27425	27475	Both (B)		3	FOREST	0.018	1	1.75	0.03214	0.0321396
CONNECTOR	27475	27590	Both (B)	CBRS13	3	FOREST	0.042	0.4	1.75	0.073921	0.0295684
CONNECTOR	27590	27700	Both (B)		3	FOREST	0.040	1	1.75	0.070707	0.0707071
CONNECTOR	27700	27750	Both (B)	CBRS14	3	FOREST	0.018	0.4	1.75	0.03214	0.0128558
CONNECTOR	27750	27960	Both (B)		3	FOREST	0.077	1	1.75	0.134986	0.1349862
CONNECTOR	27960	28030	Both (B)	CBRS15	3	FOREST	0.026	0.4	1.75	0.044995	0.0179982
CONNECTOR	28030	28100	Both (B)		3	FOREST	0.026	1	1.75	0.044995	0.0449954
CONNECTOR	28100	28185	Both (B)	CBRS16	3	FOREST	0.031	0.4	1.75	0.054637	0.0218549
CONNECTOR	28185	28325	Both (B)		3	FOREST	0.051	1	1.75	0.089991	0.0899908
CONNECTOR	28325	28500	Both (B)	CBRS17	3	FOREST	0.064	0.4	1.75	0.112489	0.0449954
Access	0	710	B		6	Forest	0.225	1	1.75	0.39375	0.39375
Access	710	875	B	ABRS1	6	FOREST	0.057	0.4	1.75	0.09975	0.0399
Access	875	1620	B		6	MEADOW	0.010	1	1.75	0.0175	0.0175
Access	1620	2000	B	ABR1	6	MEADOW	0.054	0.4	1.75	0.0945	0.0378
Access	2000	2175	B		6	FOREST	0.023	1	1.75	0.04025	0.04025
Access	2175	2610	B	ABRS2	6	MEADOW	0.121	0.4	1.75	0.21175	0.0847
Access	2610	2700	B		6	FOREST	0.033	1	1.75	0.057851	0.0578512
Access	2700	3200	B	ABR2	6	FOREST	0.184	0.4	1.75	0.321396	0.1285583
ACCESS	3200	3500	B		6	FOREST	0.110	1	1.75	0.192837	0.1928375
Access	3500	3800	B	ABRS5	6	FOREST	0.110	0.4	1.75	0.192837	0.077135
Access	3800	4000	B		6	FOREST	0.073	1	1.75	0.128558	0.1285583
Access	4000	4250	B	ABRS6	6	FOREST	0.092	0.4	1.75	0.160698	0.0642792
ACCESS	4250	4300	B	ABRS7	6	FOREST	0.018	0.4	1.75	0.03214	0.0128558
ACCESS	4300	5250	B		6	FOREST	0.349	1	1.75	0.610652	0.610652
ACCESS	5250	5450	B	ABD1	6	FOREST	0.073	0.4	1.75	0.128558	0.0514233

Access	5450	5810	B	ABR3	6	FOREST	0.132	0.4	1.75	0.231405	0.092562
Access	5810	5860	B		6	FOREST	0.018	1	1.75	0.03214	0.0321396
Access	5860	5950	B	ABRS8	6	FOREST	0.033	0.4	1.75	0.057851	0.0231405
Access	5950	6190	L	ABL4	6	FOREST	0.044	0.4	1.75	0.077135	0.030854
Access	5950	6100	R	ABL4	6	FOREST	0.028	0.4	1.75	0.048209	0.0192837
ACCESS TURN	100	300	B	ABL4	6	FOREST	0.073	0.4	1.75	0.128558	0.0514233
O&M Road	50	350	B		6	meadow	0.104	1	1.75	0.182	0.182
O&M Turn	0	65	B		6	MEADOW	0.024	1	1.75	0.041781	0.0417815
Substation Main	0	415	L	CBD26	4	Forest	0.076	0.4	1.75	0.133379	0.0533517
Substation Side	0	87	R	CBD26	4	Forest	0.016	0.4	1.75	0.027961	0.0111846
Substation Side	0	10	L	CBR5	4	FOREST	0.002	0.4	1.75	0.003214	0.0012856
Substation Side	10	49	L	CBD26	4	FOREST	0.007	0.4	1.75	0.012534	0.0050138
Substation Main	0	415	R	CBD25	4	FOREST	0.076	0.4	1.75	0.133379	0.0533517
MET TOWER E28	0	35	R	CBRS12	3	FOREST	0.010	0.4	1.75	0.016873	0.0067493
MET TOWER E28	35	505	R	CBR33	3	FOREST	0.129	0.4	1.75	0.226584	0.0906336
			= sections where existing gravel road was removed from road area								
						Total Impervious	**9.57675849**	acres		**19.29835**	**10.317524**

28.596 <= 10.317524
74.16% Treatment

Project Name	**HIGHLAND PLANTATION**	BR=Roadside Buffer	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	8/3/2009	C1=Loamy Sand or Sandy Loam	B=Buffer
Done by	JAO	C2=Silt Loam, Clay Loam or Silty Clay Loam	Land=Landscaped Area

REQUIRED BUFFER FLOW PATH LENGTHS
~BUFFER ADJACENT TO DOWN HILL SIDE OF ROAD~
ACCESS RD

# of Travel Ways to Buffer	Length of Flow Forest	Length of Flow Meadow
1	35	50
2	55	80

* Buffer slopes may not exceed 20%
** Buffers may not be located in a wetland
*** Roadside slopes may be included in a meadow buffer **if** the slope is less than 4:1 **and** if the soils allow infiltration

Alignment	BMP Type & # ("BR-52")	# of Travel Ways (1 or 2)	Buffer Type (Forest or Meadow)	Buffer Slope	Length of Buffer (ft)
CONNECTOR	CBR4	2	FOREST	16%	55
CONNECTOR	CBR5	2	FOREST	12%	55
CONNECTOR	CBR6	2	FOREST	14%	55
CONNECTOR	CBR7	2	FOREST	16%	55
CONNECTOR	CBR8	2	FOREST	8%	55
CONNECTOR	CBR10	2	FOREST	12%	55
CONNECTOR	CBR15	2	FOREST	4%	55
CONNECTOR	CBR16	2	FOREST	8%	55
CONNECTOR	CBR18	2	MEADOW	12%	80
CONNECTOR	CBR19	2	MEADOW	14%	80
CONNECTOR	CBR20	2	MEADOW	20%	80
CONNECTOR	CBR21	2	MEADOW	10%	80
CONNECTOR	CBR22	2	FOREST	16%	55
CONNECTOR	CBR23	2	FOREST	22%	55
CONNECTOR	CBR24	2	FOREST	18%	55
CONNECTOR	CBR25	2	MEADOW	8%	80
CONNECTOR	CBR26	2	FOREST	22%	55
CONNECTOR	CBR27	2	FOREST	10%	55
CONNECTOR	CBR28	2	MEADOW	8%	80
CONNECTOR	CBR29	2	FOREST	10%	55
CONNECTOR	CBR30	2	FOREST	18%	55
CONNECTOR	CBR31	2	FOREST	10%	55
CONNECTOR	CBR32	2	MEADOW	16%	80
Access	ABR1	2	MEADOW	16%	80
Access	ABR2	2	FOREST	13%	55
Access	ABR3	2	FOREST	3%	55
MET TOWER E28	CBR33	1	FOREST	22%	35

Project Name	**HIGHLAND PLANTATION**	BR=Roadside Buffer	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	8/3/2009	C1=Loamy Sand or Sandy Loam	B=Buffer
Done by	JAO	C2=Silt Loam, Clay Loam or Silty Clay Loam	Land=Landscaped Area

REQUIRED BUFFER FLOW PATH LENGTHS

~BUFFER ADJACENT TO DOWN HILL SIDE OF ROAD~

ACCESS RD

# of Travel Ways to Buffer	Length of Flow Forest	Length of Flow Meadow
1	35	50
2	55	80

* Buffer slopes may not exceed 20%

** Buffers may not be located in a wetland

*** Roadside slopes may be included in a meadow buffer **if** the slope is less than 4:1 **and** if the soils allow infiltration

Alignment	BMP Type & # ("BR-52")	# of Travel Ways (1 or 2)	Buffer Type (Forest or Meadow)	Buffer Slope	Length of Buffer (ft)
CONNECTOR	CBRS2	2	FOREST	17%	55
CONNECTOR	CBRS3	2	FOREST	18%	55
CONNECTOR	CBRS4	2	FOREST	18%	55
CONNECTOR	CBRS5	2	FOREST	17%	55
CONNECTOR	CBRS6	2	FOREST	18%	55
CONNECTOR	CBRS7	2	FOREST	19%	55
CONNECTOR	CBRS8	2	FOREST	23%	55
CONNECTOR	CBRS9	2	FOREST	22%	55
CONNECTOR	CBRS10	2	FOREST	18%	55
CONNECTOR	CBRS11	2	FOREST	20%	55
CONNECTOR	CBRS12	2	FOREST	19%	55
CONNECTOR	CBRS13	2	FOREST	26%	55
CONNECTOR	CBRS14	2	FOREST	19%	55
CONNECTOR	CBRS15	2	FOREST	26%	55
CONNECTOR	CBRS16	2	FOREST	20%	55
CONNECTOR	CBRS17	2	FOREST	22%	55
Access	ABRS1	2	FOREST	20%	55
Access	ABRS2	2	MEADOW	15%	80
Access	ABRS5	2	FOREST	20%	55
Access	ABRS6	2	FOREST	16%	55
ACCESS	ABRS7	2	FOREST	12%	55
Access	ABRS8	2	FOREST	18%	55

Project Name	**HIGHLAND PLANTATION**	BD=Buffer with Ditch Turnouts	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	11/19/2009	Land=Landscaped Area	B=Buffer
Done by	JAO	C1=Loamy Sand or Sandy Loam	C2=Silt Loam, Clay Loam or Silty Clay Loam

REQUIRED BUFFER FLOW PATH LENGTHS
~DITCH TURNOUTS TO BUFFERS~
ACCESS RD

		0-8% Buffer Slope		8-15% Buffer Slope	
Soils	**Length of Road and Ditch**	**ength of Flo Forest**	**ength of Flo Meadow**	**Length of Flow Forest**	**Length of Flow Meadow**
A	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
B	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
C1	200	60	100	72	120
	300	75	120	90	144
	400	100	N/A	120	N/A
C2	200	75	120	90	144
	300	100	N/A	120	N/A
	400				
D	200	100	150	120	180

Alignment	**BMP Type & # ("BD-52")**	**Station to Station**		**Length of Road (ft)**	**Buffer Type (forest or meadow)**	**Soil Type**	**Buffer Slope 0-15%**	**Length of Buffer (ft)**
CONNECTOR	CBD5	6100	6300	200	FOREST	D	12%	120
CONNECTOR	CBD6	6100	6300	200	FOREST	D	13%	120
ACCESS	ABD1	5250	5450	200	FOREST	D	12%	120
CONNECTOR	CBD35	14000	14110	110	FOREST	D	17%	120
CONNECTOR	CBD36	14175	14300	125	FOREST	D	12%	120
CONNECTOR	CBD27	7150	7350	200	FOREST	D	5%	100

Project Name	**HIGHLAND PLANTATION**	BL=Buffer with a Level Lip Spre	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	8/3/2009	Land=Landscaped Area	B=Buffer
Done by	JAO	C1=Loamy Sand or Sandy Loar	C2=Silt Loam, Clay Loam or Silty Clay Loam

REQUIRED BUFFER FLOW PATH LENGTHS

~BUFFERS WITH LEVEL LIP SPREADERS~

ACCESS RD

0-8% Buffer Slope

Soils	Length of Flow Thru Buffer (ft)	Berm L for Forested Buffer(ft)		Berm L for Meadow Buffer(ft)	
		Per acre Imp	Per acre Land	Per acre Imp	Per acre Land
A	75	75	25	125	35
	100	65	20	75	25
	150	50	15	60	20
B	75	100	30	150	45
	100	80	25	100	30
	150	65	20	75	25
C1	75	125	35	150	45
	100	100	30	125	35
	150	75	25	100	30
C2	100	150	45	200	60
	150	100	30	150	45
D	150	150	45	200	60

9-15% Buffer Slope

Soils	Length of Flow Thru Buffer (ft)	Berm L for Forested Buffer(ft)		Berm L for Meadow Buffer(ft)	
		Per acre Imp	Per acre Land	Per acre Imp	Per acre Land
A	75	90	30	150	42
	100	78	24	90	30

	150	60	18	72	24
B	75	120	36	180	54
	100	96	30	120	36
	150	78	24	90	30
C1	75	150	42	180	54
	100	120	36	150	42
	150	90	30	120	36
C2	100	180	54	240	72
	150	120	36	180	54
D	150	180	54	240	72

						from table	from table	
Alignment	**BMP Type & #** ("BL-52")	**Imp (acres)**	**Buffer Type** (forest/meadow)	**Soil Type**	**Buffer Slope**	**Length of Buffer (ft)**	**L of Berm per ac. imp**	**Length of Berm (ft)**
CONNECTOR	CBL12	0.028	FOREST	D	17%	150	180	5
Access	ABL4	0.044	FOREST	D	21%	150	180	8
CONNECTOR	CBD9	0.119	FOREST	D	10%	150	180	21
CONNECTOR	CBD8	0.119	FOREST	D	13%	150	180	21
CONNECTOR	CBD29	0.147	FOREST	D	7%	150	150	22
CONNECTOR	CBD12	0.075	FOREST	D	8%	150	150	11
CONNECTOR	CBD13	0.053	FOREST	D	4%	150	150	8
CONNECTOR	CBD32	0.043	FOREST	D	4%	150	150	6
CONNECTOR	CBD14	0.063	FOREST	D	5%	150	150	9
CONNECTOR	CBD15	0.020	FOREST	D	6%	150	150	3
CONNECTOR	CBD17	0.120	FOREST	D	8%	150	150	18
CONNECTOR	CBD21	0.132	FOREST	D	3%	150	150	20
CONNECTOR	CBD24	0.070	FOREST	D	11%	150	180	13
Substation Main	CBD25	0.076	FOREST	D	9%	150	180	14
Substation Main	CBD26	0.076	Forest	D	11%	150	180	14
CONNECTOR	CBD28	0.083	FOREST	D	8%	150	150	12
CONNECTOR	CBD31	0.079	FOREST	D	15%	150	180	14
CONNECTOR	CBD34	0.107	FOREST	D	15%	150	180	19
CONNECTOR	CBD37	0.031	FOREST	D	7%	150	150	5

Project Name	**HIGHLAND PLANTATION**	BA=Buffer Adjacent to Small Imp	BR=Roadside buffer	BRS=Roadside Buffer with Rock Sandv
Project Number	**66060E**	BL=Buffer w/level spreader	DB=Detention basin	
Date	9/3/2009	BD=Buffer w/ditch turnout	WP=Wet pond	
Done by	JEC	USF=Underdrain Soil Filter	INF=Infiltration	

Total Impervious Area for the East = 19.12 Acres
Percent of Project Treated for the East = **79.88%** >= 75%

Width of road during Construction (ft) = 34
Permanent width of road (ft)= 16

QUALITY CALCULATIONS FOR LINEAR PORTION-EAST

Gilman Pond (#2 &#3)

Phosphorous Requirement

Watershed per acre phosphorus budget (Appendix C):	PAPB	0.038	# P/acre/year	Total ac of devel. parcel:	TA	757.53	acres
Existing impervious area (Pre 1980)	EIA_B	0	acres	NWI wetland acreage:	WA	0	acres
Existing impervious area (post 1980)	EIA_A	5	acres	Steep slope acreage:	SA	0	acres
Project acreage: A = TA - (WA + SA + EIA_B + EIA_A)	A	752.53	acres	Project Phos Budget: PPB = P x A	**PPB**	**28.596**	**lbs P/year**

1=no tx, 0.4=buffer

Roadway Alignment and/or Turbine Site	Station to Station		Right (R) Left (L) Both (B)	BMP No.	Watershed	BMP type Forest/Meadow	Imp. Area (acres)	Treatment Factor	Export Coefficient	Pre-Treatment lbs P/Year	Post Treatment lbs P/year
TURBINE SITE E27			Both (B)	EBR1	3	FOREST	0.007	0.4	1.25	0.00875	0.0035
E31	1755	2250	Right (R)	EBL3	3	FOREST	0.182	0.4	1.75	0.318182	0.1272727
E31	2250	2300	Right (R)		3	FOREST	0.018	1	1.75	0.03214	0.0321396
E31	2300	2475	Right (R)	EBR5	3	FOREST	0.064	0.4	1.75	0.112489	0.0449954
TURBINE SITE E28			Both (B)	EBRS2	3	FOREST	0.140	0.4	1.25	0.175	0.07
E31	3100	3300	Right (R)	EBL6	3	FOREST	0.073	0.4	1.75	0.128558	0.0514233
E31	3300	3520	Left (L)		3	FOREST	0.081	1	1.75	0.141414	0.1414141
E31	3520	4000	Left (L)	EBRS5	3	FOREST	0.176	0.4	1.75	0.30854	0.123416
E31	4000	4350	Left (L)	EBR6	3	FOREST	0.129	0.4	1.75	0.224977	0.0899908
E31	4350	4500	Left (L)	EBRS6	3	FOREST	0.055	0.4	1.75	0.096419	0.0385675
E31	4500	4650	Left (L)		2	FOREST	0.055	1	1.75	0.096419	0.0964187
E31	4650	4850	Left (L)	EBRS7	2	FOREST	0.073	0.4	1.75	0.128558	0.0514233
E31	4850	5125	Left (L)		2	FOREST	0.101	1	1.75	0.176768	0.1767677

TURBINE SITE E30			Both (B)	EBR7	2	FOREST	0.070	0.4	1.25	0.0875	0.035
TURBINE SITE E30			Both (B)	EBRS8	2	FOREST	0.030	0.4	1.25	0.0375	0.015
TURBINE SITE E30			Both (B)		2	MEADOW	0.040	1	1.25	0.05	0.05
TURBINE SITE E31			Both (B)	EBR9	2	FOREST	0.140	0.4	1.25	0.175	0.07
TURBINE SITE E33			Both (B)		2	MEADOW	0.070	1	1.25	0.0875	0.0875
E36	0	800	Left (L)		2	FOREST	0.294	1	1.75	0.514233	0.5142332
E36	800	1400	Left (L)	EBL40	2	FOREST	0.220	0.4	1.75	0.385675	0.15427
E36	1400	2225	Left (L)		2	FOREST	0.303	1	1.75	0.530303	0.530303
E36	2225	3125	Left (L)	EBL16	2	FOREST	0.331	0.4	1.75	0.578512	0.231405
E36	3125	3350	Left (L)		2	MEADOW	0.083	1	1.75	0.144628	0.1446281
TURBINE SITE E34			Both (B)	EBR14	2	MEADOW	0.110	0.4	1.25	0.1375	0.055
E36	3350	3905	Left (L)	EBRS10	2	MEADOW	0.204	0.4	1.75	0.356749	0.1426997
E36	3905	4300	Left (L)	EBL20	2	FOREST	0.145	0.4	1.75	0.253903	0.1015611
TURBINE SITE E35			Both (B)	EBR15	2	MEADOW	0.140	0.4	1.25	0.175	0.07
E36	4300	4850	Right (R)	EBL43	2	FOREST	0.140	0.4	1.75	0.245	0.098
E36	4850	5105	Right (R)	EBL39	2	FOREST	0.094	0.4	1.75	0.163912	0.0655647
TURBINE SITE E36			Both (B)		2	MEADOW	0.003	1	1.25	0.00375	0.00375
TURBINE SITE E36			Both (B)	EBRS11	2	FOREST	0.137	0.4	1.25	0.17125	0.0685
E37	2600	2700	Left (L)	EBR19	2	FOREST	0.037	0.4	1.75	0.064279	0.0257117
TURBINE SITE E37			Both (B)		2	MEADOW	0.070	1	1.25	0.0875	0.0875
E43	400	600	Right (R)	EBL24	2	FOREST	0.073	0.4	1.75	0.128558	0.0514233
E43	600	950	Right (R)	EBL41	2	FOREST	0.129	0.4	1.75	0.224977	0.0899908
E43	950	1060	Right (R)		2	FOREST	0.040	1	1.75	0.070707	0.0707071
E43	1060	1450	Left (L)	EBRS16	2	FOREST	0.143	0.4	1.75	0.250689	0.1002755
E43	1450	1600	Left (L)		2	FOREST	0.055	1	1.75	0.096419	0.0964187
E43	1600	1800	Left (L)	EBRS17	2	FOREST	0.073	0.4	1.75	0.128558	0.0514233
E43	1800	2150	Left (L)		2	MEADOW	0.129	1	1.75	0.224977	0.224977
E43	2150	2525	Left (L)	EBRS18	2	MEADOW	0.138	0.4	1.75	0.241047	0.0964187
E43	2525	3615	Left (L)	EBR21	2	FOREST	0.400	0.4	1.75	0.700643	0.2802571
TURBINE SITE E38			Both (B)	EBR22	2	FOREST	0.070	0.4	1.25	0.0875	0.035
E43	3615	3650			2	FOREST	0.070	1	1.75	0.1225	0.1225
E43	3650	3900	Left (L)	EBD2	2	FOREST	0.092	0.4	1.75	0.160698	0.0642792
E43	3900	5050	Left (L)	EBR24	2	MEADOW	0.422	0.4	1.75	0.73921	0.2956841
TURBINE SITE E39			Both (B)		2	FOREST	0.060	1	1.25	0.075	0.075
TURBINE SITE E39			Both (B)		2	FOREST	0.060	1	1.25	0.075	0.075
TURBINE SITE E40			Both (B)		2	FOREST	0.070	1	1.25	0.0875	0.0875
TURBINE SITE E40			Both (B)		2	FOREST	0.050	1	1.25	0.0625	0.0625

TURBINE SITE E40			Both (B)		2	FOREST	0.020	1	1.25	0.025	0.025
E43	5800	6250	Right (R)	EBR27	2	FOREST	0.020	0.4	1.75	0.035	0.014
E43	6250	7525	Left (L)	EBRS21	2	FOREST	0.468	0.4	1.75	0.819559	0.3278237
E43	7525	7725	Left (L)		2	MEADOW	0.073	1	1.75	0.128558	0.1285583
E43	7725	8950	Left (L)	EBRS22	2	FOREST	0.450	0.4	1.75	0.78742	0.3149679
E43	8950	9007	Right (R)		2	MEADOW	0.021	1	1.75	0.036639	0.0366391
TURBINE SITE E42			Both (B)	EBRS23	2	MEADOW	0.140	0.4	1.25	0.175	0.07
E47	175	225	Right (R)	EBRS23	2	FOREST	0.018	0.4	1.75	0.03214	0.0128558
E47	225	800	Right (R)	EBR29	2	FOREST	0.211	0.4	1.75	0.369605	0.1478421
E47	800	900	Right (R)		2	FOREST	0.037	1	1.75	0.064279	0.0642792
E47	900	925	Right (R)	EBR30	2	FOREST	0.009	0.4	1.75	0.01607	0.0064279
E47	1950	2075	Left (L)	EBR31	2	FOREST	0.046	0.4	1.75	0.080349	0.0321396
TURBINE SITE E43			Both (B)	EBR29	2	FOREST	0.140	0.4	1.25	0.175	0.07
E46	2025	2250	Left (L)		2	FOREST	0.083	1	1.75	0.144628	0.1446281
E46	2250	2400	Left (L)	EBRS33	2	FOREST	0.055	0.4	1.75	0.096419	0.0385675
TURBINE SITE E45			Both (B)		2	MEADOW	0.035	1	1.25	0.04375	0.04375
E46	2400	2550	Left (L)		2	MEADOW	0.055	1	1.75	0.096419	0.0964187
E46	2550	2850	Left (L)	EBR41	2	FOREST	0.110	0.4	1.75	0.192837	0.077135
E46	2850	3025	Left (L)	EBD5	2	MEADOW	0.064	0.4	1.75	0.112489	0.0449954
TURBINE SITE E46			Both (B)	EBR42	2	MEADOW	0.070	0.4	1.25	0.0875	0.035
MET TOWER E40	0	40	Both (B)		2	FOREST	0.011	1	1.75	0.019284	0.0192837
MET TOWER E40	40	215	Both (B)	EBR53	2	FOREST	0.048	0.4	1.75	0.084366	0.0337466
MET TOWER E41	0	45	Both (B)	EBRS21	2	FOREST	0.012	0.4	1.75	0.021694	0.0086777
MET TOWER E41	45	680	Both (B)	EBR54	2	FOREST	0.175	0.4	1.75	0.021694	0.0086777
										0	0
						Total Impervious	**8.263**	acres		**13.34009**	**7.2787**

28.596 <= 7.2787
75.96% Treatment

Kennebec River (#1)

General Requirement (75% Treatment)

1=no tx, 0.4=buffer

Roadway Alignment and/or Turbine Site	Station to Station		Right (R) Left (L) Both (B)	BMP No.	Watershed	BMP type Forest/Meadow	Imp. Area (acres)	Treatment Factor
TURBINE SITE E27					1	FOREST	0.100	1
TURBINE SITE E27			Right (R)	EBR2	1	FOREST	0.033	0.4
E31	250	700	Right (R)	EBR2	1	FOREST	0.165	0.4
E31	700	900	Right (R)	EBRS1	1	FOREST	0.073	0.4
E31	900	950	Right (R)	EBR3	1	FOREST	0.018	0.4
E31	950	1025	Right (R)		1	FOREST	0.028	1
E31	1025	1125	Right (R)	EBR3	1	FOREST	0.037	0.4
E31	1125	1250	Right (R)		1	FOREST	0.046	1
E31	1250	1755	Right (R)	EBL3	1	FOREST	0.185	0.4
TURBINE SITE E29			Both (B)	EBR5	1	FOREST	0.140	0.4
E31	2475	3100	Right (R)	EBL6	1	FOREST	0.230	0.4
E33	150	200	Right (R)	EBRS8	1	FOREST	0.018	0.4
E33	200	350	Right (R)		1	FOREST	0.055	1
E33	350	800	Right (R)	EBRS9	1	FOREST	0.165	0.4
E33	800	1025	Right (R)	EBD3	1	FOREST	0.083	0.4
E33	1025	1125	Right (R)		1	FOREST	0.037	1
E33	1125	1500	Right (R)	EBR8	1	FOREST	0.138	0.4
E31	5125	5150	B	EBR10	1	FOREST	0.009	0.4
E33	1500	1800	Right (R)	EBR10	1	FOREST	0.110	0.4
E33	1800	2050	Right (R)	EBL15	1	FOREST	0.092	0.4
E33	2050	2240	Right (R)		1	FOREST	0.070	1
E33	2240	2380	Left (L)	EBR11	1	FOREST	0.051	0.4
TURBINE SITE E32			Both (B)	EBL15	1	FOREST	0.140	0.4
E33	2380	2400	Right (R)		1		0.007	1
E33	2400	2680	Right (R)	EBR12	1	FOREST	0.103	0.4
E33	2680	2750	Right (R)		1		0.026	1
E33	2750	2900	Right (R)	EBR13	1	FOREST	0.055	0.4
E33	2900	3050	Left (L)		1		0.055	1
TURBINE SITE E33			Both (B)		1	MEADOW	0.070	1
TURBINE SITE E34			Both (B)		1	MEADOW	0.019	1
TURBINE SITE E34			Both (B)		1	MEADOW	0.011	0.4

E36	5105	5400	Left (L)	EBL39	1	FOREST	0.108	0.4
E36	5400	5500	Left (L)		1	FOREST	0.037	1
E36	5500	5800	Right (R)	EBR16	1	MEADOW	0.110	0.4
E36	5800	5990	Right (R)	EBR17	1	MEADOW	0.070	0.4
E37	0	425	Left (L)		1		0.156	1
E37	425	550	Right (R)	EBR18	1	MEADOW	0.046	0.4
E37	550	700	Right (R)		1	FOREST	0.055	1
E37	700	850	Right (R)	EBRS12	1	FOREST	0.055	0.4
E37	850	1250	Right (R)		1	FOREST	0.147	1
E37	1250	1315	Right (R)	EBL24	1	FOREST	0.024	0.4
E43	0	400	Right (R)	EBL24	1	FOREST	0.147	0.4
E37	1315	2050	Right (R)	EBRS14	1	FOREST	0.270	0.4
E37	2050	2200	Right (R)		1		0.055	1
E37	2200	2600	Right (R)	EBR19	1	FOREST	0.147	0.4
TURBINE SITE E37			Both (B)		1	MEADOW	0.035	1
TURBINE SITE E37			Both (B)	EBR20	1	FOREST	0.035	0.4
TURBINE SITE E38			Both (B)	EBR22	1	FOREST	0.070	0.4
TURBINE SITE E39			Both (B)	EBR25	1	FOREST	0.020	0.4
E43	5050	5400	Right (R)	EBR26	1	MEADOW	0.129	0.4
E43	5400	5675	Right (R)		1	MEADOW	0.101	1
E43	5675	5800	Right (R)	EBR27	1	MEADOW	0.046	0.4
TURBINE SITE E41			Both (B)	EBR28	1	FOREST	0.140	0.4
E47	925	1025	Right (R)	EBR30	1	FOREST	0.037	0.4
E47	1025	1175	Right (R)	EBD6	1	FOREST	0.055	0.4
E47	1175	1475	Right (R)	EBRS24	1	FOREST	0.110	0.4
E47	1475	1750	Right (R)		1	MEADOW	0.101	1
E47	1750	1950	Right (R)	EBR31	1	MEADOW	0.073	0.4
E47	2075	2225	Right (R)	EBR31	1	FOREST	0.055	0.4
E47	2225	2775	Right (R)	EBRS26	1	MEADOW	0.202	0.4
E47	2775	3300	Right (R)	EBD4	1	FOREST	0.193	0.4
E47	3300	3400	Right (R)		1	FOREST	0.037	1
E47	3400	3750	Right (R)	EBRS28	1	FOREST	0.129	0.4
E47	3750	3850	Right (R)		1	FOREST	0.037	1
E47	3850	4300	Right (R)	EBRS29	1	FOREST	0.165	0.4
E47	4300	4600	Right (R)	EBR33	1	FOREST	0.110	0.4
E47	4600	4920	Right (R)		1	FOREST	0.118	1
E47	4920	5430	Right (R)	EBR34	1	FOREST	0.187	0.4

E47 STUB ROAD	100	400	Right (R)	EBL36	1	MEADOW	0.055	0.4
TURBINE SITE E48			Both (B)	EBR35	1	MEADOW	0.140	0.4
E47	5430	5875	Left (L)	EBL38	1	MEADOW	0.163	0.4
TURBINE SITE E47			Both (B)	EBR36	1	MEADOW	0.140	0.4
E46	0	350	Right (R)		1	MEADOW	0.129	1
E46	350	600	Right (R)	EBL36	1	MEADOW	0.092	0.4
E46	600	975	Right (R)	EBRS31	1	FOREST	0.138	0.4
E46	975	1150	Right (R)		1	FOREST	0.064	1
E46	1150	1250	Left (L)	EBR37	1	FOREST	0.037	0.4
TURBINE SITE E44			Both (B)	EBR37	1	FOREST	0.035	0.4
TURBINE SITE E44			Both (B)	EBR38	1	FOREST	0.050	0.4
TURBINE SITE E44			Both (B)		1	MEADOW	0.055	1
E46	1250	1600			1	MEADOW	0.055	1
E46	1600	1850	Left (L)	EBR39	1	FOREST	0.092	0.4
E46	1850	1950	Left (L)		1	FOREST	0.037	1
E46	1950	2025	Left (L)	EBRS32	1	FOREST	0.028	0.4
TURBINE SITE E45			Both (B)	EBR40	1	FOREST	0.035	0.4
TURBINE SITE E45			Both (B)		1	MEADOW	0.070	1
TURBINE SITE E46			Both (B)	EBR42	1	MEADOW	0.009	0.4
TURBINE SITE E46			Both (B)		1	MEADOW	0.061	1

Total Impervious **7.465** acres

75.07% Treatment >= 75%

Project Name	**HIGHLAND PLANTATION**	BR=Roadside Buffer	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	9/10/2009	C1=Loamy Sand or Sandy Loam	B=Buffer
Done by	JEC	C2=Silt Loam, Clay Loam or Silty Clay Loam	Land=Landscaped Area

REQUIRED BUFFER FLOW PATH LENGTHS
~BUFFER ADJACENT TO DOWN HILL SIDE OF ROAD~
EAST

# of Travel Ways to Buffer	Length of Flow Forest	Length of Flow Meadow
1	35	50
2	55	80

* Buffer slopes may not exceed 20%
** Buffers may not be located in a wetland
*** Roadside slopes may be included in a meadow buffer **if** the slope is less than 4:1 **and** if the soils allow infiltration

Alignment	BMP Type & # ("BR-52")	*# of Travel Ways (1 or 2)	Buffer Type (Forest or Meadow)	Buffer Slope	Length of Buffer (ft)
E3	EBR1	2	FOREST	15%	55
E31	EBR2	2	FOREST	15%	55
E31	EBR3	2	FOREST	15%	55
TURBINE SITE E29	EBR5	2	FOREST	15%	55
E31	EBR6	2	FOREST	15%	55
TURBINE SITE E30	EBR7	2	FOREST	15%	55
E33	EBR8	2	FOREST	15%	55
TURBINE SITE E31	EBR9	2	FOREST	15%	55
E31	EBR10	2	FOREST	15%	55
E33	EBR11	2	FOREST	15%	55
E33	EBR12	2	FOREST	15%	55
E33	EBR13	2	FOREST	15%	55
TURBINE SITE E34	EBR14	2	MEADOW	15%	80
TURBINE SITE E35	EBR15	2	MEADOW	15%	80
E36	EBR16	2	MEADOW	15%	80
E36	EBR17	2	MEADOW	15%	80
E37	EBR18	2	MEADOW	15%	80
E37	EBR19	2	FOREST	15%	55
TURBINE SITE E37	EBR20	2	FOREST	15%	55
E43	EBR21	2	FOREST	15%	55
TURBINE SITE E38	EBR22	2	FOREST	15%	55
E43	EBR24	2	MEADOW	15%	80
TURBINE SITE E39	EBR25	2	FOREST	15%	55
E43	EBR26	2	MEADOW	15%	80
E43	EBR27	2	FOREST	15%	55
TURBINE SITE E41	EBR28	2	FOREST	15%	55
E47	EBR29	2	FOREST	15%	55

E47	EBR30	2	FOREST	15%	55
E47	EBR33	2	FOREST	15%	55
E47	EBR34	2	FOREST	15%	55
TURBINE SITE E48	EBR35	2	MEADOW	15%	80
TURBINE SITE E47	EBR36	2	MEADOW	15%	80
E46	EBR37	2	FOREST	15%	55
TURBINE SITE E44	EBR38	2	FOREST	15%	55
E46	EBR39	2	FOREST	15%	55
TURBINE SITE E45	EBR40	2	FOREST	15%	55
E46	EBR41	2	FOREST	15%	55
TURBINE SITE E46	EBR42	2	MEADOW	15%	80
MET TOWER E40	EBR53	2	FOREST	14%	55

*2 in this column means that a total of 16 feet wide of road is being treated but in most instances this is one side of the road because the other side is being allowed to revegetate.

Project Name	**HIGHLAND PLANTATION**	BR=Roadside Buffer	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	9/10/2009	C1=Loamy Sand or Sandy Loam	B=Buffer
Done by	JEC	C2=Silt Loam, Clay Loam or Silty Clay Loam	Land=Landscaped Area

REQUIRED BUFFER FLOW PATH LENGTHS
~BUFFER ADJACENT TO DOWN HILL SIDE OF ROAD~
EAST

# of Travel Ways to Buffer	Length of Flow Forest	Length of Flow Meadow
1	35	50
2	55	80

* Buffer slopes may not exceed 20%
** Buffers may not be located in a wetland
*** Roadside slopes may be included in a meadow buffer **if** the slope is less than 4:1 **and** if the soils allow infiltration

Alignment	BMP Type & # ("BR-52")	*# of Travel Ways (1 or 2)	Buffer Type (Forest or Meadow)	Buffer Slope	Length of Buffer (ft)
E31	EBRS1	2	FOREST	8%	55
TURBINE SITE E28	EBRS2	2	FOREST	17%	55
E31	EBRS5	2	FOREST	13%	55
E31	EBRS6	2	FOREST	7%	55
E31	EBRS7	2	FOREST	24%	55
TURBINE SITE E30	EBRS8	2	FOREST	20%	55
E33	EBRS9	2	FOREST	24%	55
E36	EBRS10	2	MEADOW	13%	80
TURBINE SITE E36	EBRS11	2	FOREST	22%	55
E37	EBRS14	2	FOREST	23%	55
E43	EBRS16	2	FOREST	21%	55
E43	EBRS17	2	FOREST	14%	55
E43	EBRS18	2	MEADOW	13%	80
E43	EBRS21	2	FOREST	18%	55
E43	EBRS22	2	FOREST	22%	55
TURBINE SITE E42	EBRS23	2	MEADOW	21%	80
E47	EBRS24	2	FOREST	17%	55
E47	EBRS28	2	FOREST	21%	55
E47	EBRS29	2	FOREST	20%	55
E46	EBRS31	2	FOREST	9%	55
E46	EBRS32	2	FOREST	19%	55
E46	EBRS33	2	FOREST	10%	55

Project Name	**HIGHLAND PLANTATION**	BD=Buffer with Ditch Turnouts	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	9/10/2009	Land=Landscaped Area	B=Buffer
Done by	JEC	C1=Loamy Sand or Sandy Loam	C2=Silt Loam, Clay Loam or Silty Clay Loam

REQUIRED BUFFER FLOW PATH LENGTHS
~DITCH TURNOUTS TO BUFFERS~
EAST

		0-8% Buffer Slope		8-15% Buffer Slope	
Soils	**Length of Road and Ditch**	**ength of Flo Forest**	**ength of Flo Meadow**	**Length of Flow Forest**	**Length of Flow Meadow**
A	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
B	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
C1	200	60	100	72	120
	300	75	120	90	144
	400	100	N/A	120	N/A
C2	200	75	120	90	144
	300	100	N/A	120	N/A
	400				
D	200	100	150	120	180

from table

Alignment	**BMP Type & #** ("BD-52")	**Station**	**to Station**	**Length of Road** (ft)	**Buffer Type** (forest or meadow)	**Soil Type**	**Buffer Slope 0-15%**	**Length of Buffer (ft)**
E46	EBD5	2850	3025	175	MEADOW	D	18%	120
E47	EBD6	1025	1175	150	FOREST	D	28%	120

Project Name	**HIGHLAND PLANTATION**	BL=Buffer with a Level Lip Spre	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	9/10/2009	Land=Landscaped Area	B=Buffer
Done by	JEC	C1=Loamy Sand or Sandy Loar	C2=Silt Loam, Clay Loam or Silty Clay Loam

REQUIRED BUFFER FLOW PATH LENGTHS
~BUFFERS WITH LEVEL LIP SPREADERS~
EAST

0-8% Buffer Slope

Soils	Length of Flow Thru Buffer (ft)	Berm L for Forested Buffer(ft)		Berm L for Meadow Buffer(ft)	
		Per acre Imp	Per acre Land	Per acre Imp	Per acre Land
A	75	75	25	125	35
	100	65	20	75	25
	150	50	15	60	20
B	75	100	30	150	45
	100	80	25	100	30
	150	65	20	75	25
C1	75	125	35	150	45
	100	100	30	125	35
	150	75	25	100	30
C2	100	150	45	200	60
	150	100	30	150	45
D	150	150	45	200	60

9-15% Buffer Slope

Soils	Length of Flow Thru Buffer (ft)	Berm L for Forested Buffer(ft)		Berm L for Meadow Buffer(ft)	
		Per acre Imp	Per acre Land	Per acre Imp	Per acre Land
A	75	90	30	150	42
	100	78	24	90	30

	150	60	18	72	24
B	75	120	36	180	54
	100	96	30	120	36
	150	78	24	90	30
C1	75	150	42	180	54
	100	120	36	150	42
	150	90	30	120	36
C2	100	180	54	240	72
	150	120	36	180	54
D	150	180	54	240	72

						from table	from table	
Alignment	**BMP Type & #** ("BL-52")	**Imp (acres)**	**Buffer Type** (forest/meadow)	**Soil Type**	***Buffer Slope**	**Length of Buffer (ft)**	**L of Berm per ac. imp**	**Length of Berm (ft)**
E31	EBL3	0.349	FOREST	D	6%	150	150	52
E31	EBL6	0.303	FOREST	D	15%	150	180	55
E33	EBL15	0.232	FOREST	D	15%	150	180	42
E36	EBL16	0.331	FOREST	D	23%	150	180	60
E36	EBL20	0.145	FOREST	D	23%	150	180	26
E43	EBL24	0.220	FOREST	D	8%	150	180	40
E47 STUB ROAD	EBL36	0.146	MEADOW	D	19%	150	180	26
E47	EBL38	0.163	MEADOW	D	21%	150	240	39
E36	EBL39	0.202	FOREST	D	20%	150	180	36
E47	EBR31	0.174	FOREST	D	15%	150	180	31
E47	EBRS26	0.202	MEADOW	D	17%	150	180	36
E47	EBD4	0.193	FOREST	D	20%	150	180	35
E43	EBR27	0.066	FOREST	D	14%	150	180	12
E36	EBL40	0.220	FOREST	D	24%	150	180	40
E43	EBL41	0.129	FOREST	D	12%	150	180	23
E36	EBL43	0.140	FOREST	D	20%	150	180	25
E43	EBD2	0.092	FOREST	D	10%	150	180	17
E33	EBD3	0.083	FOREST	D	24%	150	180	15

Project Name **HIGHLAND PLANTATION**
Project Number **66060E**
Date 9/23/2009
Done by JEC

BA=Buffer Adjacent to Small Imp
BL=Buffer w/level spreader
BD=Buffer w/ditch turnout
USF=Underdrain Soil Filter

BR=Roadside buffer
DB=Detention basin
WP=Wet pond
INF=Infiltration

BRS=Roadside Buffer with Rock Sandwich

Total Impervious Area for the West = 20.04 Acres
Percent of Project Treated for the West = **75.55%** >= 75%

Width of road during Construction (ft) = 34
Permanent width of road (ft)= 16

QUALITY CALCULATIONS FOR LINEAR PORTION-WEST

Flagstaff Lake (# 8)
Phosphorous Requirement

Watershed per acre phosphorus budget (Appendix C):	PAPB	0.046	# P/acre/year	Total ac of devel. parcel:	TA	85.2	acres
Existing impervious area (Pre 1980)	EIA_B	0	acres	NWI wetland acreage:	WA	0	acres
Existing impervious area (post 1980)	EIA_A	0	acres	Steep slope acreage:	SA	0	acres
Project acreage: $A = TA - (WA + SA + EIA_B + EIA_A)$	A	85.2	acres	Project Phos Budget: PPB = P x A	**PPB**	**3.919**	**lbs P/year**

1=no tx, 0.4=buffer

Roadway Alignment and/or Turbine Site	Station to Station		Right (R) Left (L) Both (B)	BMP No.	Watershed	BMP type Forest/Meadow	Imp. Area (acres)	Treatment Factor	Export Coefficient	Pre-Treatment lbs P/Year	Post Treatment lbs P/year
W2	500	750	Right (R)	WBD16	8	MEADOW	0.092	0.4	1.75	0.1606979	0.06427916
W2	225	500	Right (R)	WBL37	8	Forest	0.101	0.4	1.75	0.1767677	0.07070707
W2	150	225	Right (R)		8	FOREST	0.028	1	1.75	0.0482094	0.04820937
W1	8125	8225	Right (R)		8	MEADOW	0.037	1	1.75	0.0642792	0.06427916
W1	8050	8125	Right (R)	WBR2	8	MEADOW	0.028	0.4	1.75	0.0482094	0.01928375
W1	7930	8050	Right (R)		8	MEADOW	0.044	1	1.75	0.077135	0.07713499
W1	7590	7930	Right (R)	WBRS19	8	FOREST	0.125	0.4	1.75	0.2185491	0.08741965
W1	7550	7590	Right (R)		8	FOREST	0.015	1	1.75	0.0257117	0.02571166
W1	7400	7550	Right (R)	WBRS18	8	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
W1	7300	7400	Right (R)		8	FOREST	0.037	1	1.75	0.0642792	0.06427916
W1	7150	7300	Right (R)	WBRS17	8	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
W1	6660	7150	Right (R)		8	FOREST	0.180	1	1.75	0.3149679	0.31496786
W1	6500	6660	Right (R)	WBL37	8	FOREST	0.059	0.4	1.75	0.1028466	0.04113866
W1	6325	6500	Right (R)	WBRS16	8	MEADOW	0.064	0.4	1.75	0.1124885	0.04499541
W1	6225	6325	Right (R)		8	MEADOW	0.037	1	1.75	0.0642792	0.06427916
W3	2200	2450	Right (R)		8	FOREST	0.092	1	1.75	0.1606979	0.16069789
W3	2025	2200	Right (R)	WBRS15	8	FOREST	0.064	0.4	1.75	0.1124885	0.04499541
W3	1700	2025	Right (R)		8	FOREST	0.119	1	1.75	0.2089073	0.20890725
W3	1550	1700	Right (R)	WBRS14	8	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
W3	1450	1550	Right (R)	WBD39	8	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W3	1425	1450	Right (R)		8	FOREST	0.009	1	1.75	0.0160698	0.01606979
W3	1150	1425	Right (R)	WBR4	8	FOREST	0.101	0.4	1.75	0.1767677	0.07070707
TURBINE SITE W4			Both (B)	WBR4	8	FOREST	0.065	0.4	1.25	0.08125	0.0325
W1	5850	6225	Right (R)	WBRS10	8	FOREST	0.138	0.4	1.75	0.2410468	0.09641873
W1	5700	5850	Right (R)	WBD23	8	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
W1	5500	5700	Right (R)	WBD22	8	FOREST	0.073	0.4	1.75	0.1285583	0.05142332
W1	5375	5500	Right (R)	WBRS9	8	FOREST	0.046	0.4	1.75	0.0803489	0.03213958
W1	5325	5375	Right (R)		8	FOREST	0.018	1	1.75	0.0321396	0.03213958
W1	4940	5325	Right (R)	WBRS8	8	FOREST	0.141	0.4	1.75	0.2474747	0.0989899
W1	4750	4940	Right (R)		8	FOREST	0.070	1	1.75	0.1221304	0.12213039

W1	4525	4750	Right (R)	WBRS7	8	FOREST	0.083	0.4	1.75	0.1446281	0.05785124
W1	4300	4525	Right (R)		8	FOREST	0.083	1	1.75	0.1446281	0.1446281
W1	3800	4300	Right (R)	WBRS6	8	FOREST	0.184	0.4	1.75	0.3213958	0.12855831
W1	3775	3800	Right (R)		8	FOREST	0.009	1	1.75	0.0160698	0.01606979
W1	3350	3775	Right (R)	WBR6	8	FOREST	0.156	0.4	1.75	0.2731864	0.10927456
W1	3175	3350	Right (R)	WBRS5	8	FOREST	0.064	0.4	1.75	0.1124885	0.04499541
W8	4700	5150	Right (R)	WBR41	8	FOREST	0.165	0.4	1.75	0.2892562	0.11570248
W8	5150	5275	Right (R)		8	FOREST	0.046	1	1.75	0.0803489	0.08034894
W8	5275	5468	Right (R)	WBR42	8	FOREST	0.071	0.4	1.75	0.1240588	0.04962351
W1	450	700	Left (L)		8	FOREST	0.092	1	1.75	0.1606979	0.16069789
W1	700	900	Left (L)	WBR42	8	FOREST	0.073	0.4	1.75	0.1285583	0.05142332
TURBINE SITE W7			Both (B)	WBRS1	8	FOREST	0.130	0.4	1.25	0.1625	0.065
W1	975	1275	Right (R)	WBD38	8	FOREST	0.110	0.4	1.75	0.1928375	0.07713499
W1	900	975	Left (L)		8	FOREST	0.028	1	1.75	0.0482094	0.04820937
W1	1275	1650	Right (R)	WBRS1	8	MEADOW	0.138	0.4	1.75	0.2410468	0.09641873
W1	1650	2025	Right (R)	WBRS3	8	FOREST	0.138	0.4	1.75	0.2410468	0.09641873
W1	2025	2475	Right (R)	WBR45	8	FOREST	0.165	0.4	1.75	0.2892562	0.11570248
W1	2475	2550	Right (R)		8	FOREST	0.028	1	1.75	0.0482094	0.04820937
TURBINE SITE W6			Both (B)	WBR45	8	FOREST	0.130	0.4	1.25	0.1625	0.065
W1	2550	2725	Right (R)	WBRS4	8	FOREST	0.064	0.4	1.75	0.1124885	0.04499541
W1	2725	2775	Right (R)		8	FOREST	0.018	1	1.75	0.0321396	0.03213958
W1	2775	3000	Right (R)	WBD21	8	FOREST	0.083	0.4	1.75	0.1446281	0.05785124
MET TOWER W1	215	520	Both (B)	WBR61	5	MEADOW	0.112	0.4	1.75	0.1960514	0.07842057
						Total Impervious	**4.209**	acres		**7.2025**	**3.9185**

3.919 <= 3.9185
76.52% Treatment

Gilman Pond (#4 ,#5, &#6)

Phosphorous Requirement

Watershed per acre phosphorus budget (Appendix C):	PAPB	0.038	# P/acre/year	Total ac of devel. parcel:	TA	757.53	acres
Existing impervious area (Pre 1980)	EIA_B	0	acres	NWI wetland acreage:	WA	0	acres
Existing impervious area (post 1980)	EIA_A	5	acres	Steep slope acreage:	SA	0	acres
Project acreage: A = TA - (WA + SA + EIA_B + EIA_A)	A	752.53	acres	Project Phos Budget: PPB = P x A	**PPB**	**28.596**	**lbs P/year**

1=no tx, 0.4=buffer

Roadway Alignment and/or Turbine Site	Station to Station		Right (R) Left (L) Both (B)	BMP No.	Watershed	BMP type Forest/Meadow	Imp. Area (acres)	Treatment Factor	Export Coefficient	Pre-Treatment lbs P/Year	Post Treatment lbs P/year
Turbine Site W2			Both (B)	WBR1	5	MEADOW	0.063	0.4	1.25	0.078125	0.03125
Turbine Site W2			Both (B)	WBD15	5	MEADOW	0.063	0.4	1.25	0.078125	0.03125
Turbine Site W1			Both (B)	WBR2	5	MEADOW	0.130	0.4	1.25	0.1625	0.065
W1	8225	8375	Right (R)	WBR2	5	MEADOW	0.055	0.4	1.75	0.0964187	0.03856749
TURBINE SITE W3			Both (B)	WBR3	5	FOREST	0.130	0.4	1.25	0.1625	0.065
W3	2450	2500	Left (L)		5	FOREST	0.018	1	1.75	0.0321396	0.03213958
W3	1100	1150	Right (R)	WBR5	5	FOREST	0.018	0.4	1.75	0.0321396	0.01285583
TURBINE SITE W4			Both (B)		5	FOREST	0.065	1	1.25	0.08125	0.08125
W3	1000	1100	Left (L)		5	FOREST	0.037	1	1.75	0.0642792	0.06427916
W3	900	1000	Left (L)	WBRS13	5	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W3	875	900	Left (L)		5	FOREST	0.009	1	1.75	0.0160698	0.01606979
W3	825	875	Left (L)	WBRS12	5	FOREST	0.018	0.4	1.75	0.0321396	0.01285583
W3	750	825	Left (L)		5	FOREST	0.028	1	1.75	0.0482094	0.04820937
W3	400	750	Left (L)	WBRS11	5	FOREST	0.129	0.4	1.75	0.224977	0.08999082
W3	350	400	Left (L)		5	FOREST	0.018	1	1.75	0.0321396	0.03213958
W3	50	350	Left (L)	WBD14	5	FOREST	0.110	0.4	1.75	0.1928375	0.07713499
W1	3000	3175	Left (L)		5	FOREST	0.064	1	1.75	0.1124885	0.11248852
WC	0	400	Right (R)	WBD28	6	FOREST	0.147	0.4	1.75	0.2571166	0.10284665
WC	675	910	Right (R)	WBR8	6	FOREST	0.086	0.4	1.75	0.151056	0.06042241
WC	910	1189	Right (R)	WBD17	5	FOREST	0.102	0.4	1.75	0.1793388	0.07173554
W19	0	75	Right (R)	WBD17	5	FOREST	0.028	0.4	1.75	0.0482094	0.01928375
W19	75	350	Right (R)	WBR9	5	FOREST	0.101	0.4	1.75	0.1767677	0.07070707
W19	350	425	Left (L)		5	FOREST	0.028	1	1.75	0.0482094	0.04820937
W19	425	775	Left (L)	WBL42	5	FOREST	0.129	0.4	1.75	0.224977	0.08999082
W19	775	1450	Right (R)	WBRS38	5	FOREST	0.248	0.4	1.75	0.4338843	0.17355372
W19	1450	1850	Right (R)	CBL16	5	FOREST	0.147	0.4	1.75	0.2571166	0.10284665
W19	1850	2400	Right (R)	WBRS39	4	FOREST	0.202	0.4	1.75	0.3535354	0.14141414
W19	2400	2500	Right (R)		4	MEADOW	0.037	0.4	1.75	0.0642792	0.02571166
W19	2500	2525	Right (R)	WBRS40	4	FOREST	0.009	0.4	1.75	0.0160698	0.00642792
W19	2525	2580	Right (R)		4	FOREST	0.020	1	1.75	0.0353535	0.03535354
W19	2580	2675	Right (R)	WBRS41	4	FOREST	0.035	0.4	1.75	0.0610652	0.02442608
W19	2675	2730	Right (R)		4	FOREST	0.020	1	1.75	0.0353535	0.03535354
W19	2730	2890	Right (R)	WBR10	4	FOREST	0.059	0.4	1.75	0.1028466	0.04113866
W19	2890	2915	RIGHT		4	FOREST	0.009	1	1.75	0.0160698	0.01606979
W19	2915	3350	RIGHT	WBR10	4	FOREST	0.160	0.4	1.75	0.2796143	0.11184573
W19	3350	3500	Right (R)	WBD30	4	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
W19	3500	3600	RIGHT	WBR11	4	FOREST	0.037	0.4	1.75	0.0642792	0.02571166

TURNAROUND W19			Both (B)	WBRS42	4	FOREST	0.140	0.4	1.25	0.175	0.07
W19	4050	4500	Left (L)	WBD19	4	FOREST	0.165	0.4	1.75	0.2892562	0.11570248
W19	4500	5100	Left (L)	WBRS45	4	FOREST	0.220	0.4	1.75	0.3856749	0.15426997
TURBINE SITE W19			Both (B)	WBRS46	4	FOREST	0.070	0.4	1.25	0.0875	0.035
W18	200	350	Left (L)		5	FOREST	0.055	1	1.75	0.0964187	0.09641873
W18	350	550	Left (L)	WBRS36	5	FOREST	0.073	0.4	1.75	0.1285583	0.05142332
W18	550	750	Left (L)		5	FOREST	0.073	1	1.75	0.1285583	0.12855831
TURBINE SITE W20			Both (B)	WBR13	4	FOREST	0.035	0.4	1.25	0.04375	0.0175
TURBINE SITE W20			Both (B)	WBR14	4	FOREST	0.035	0.4	1.25	0.04375	0.0175
W21	950	1100	RIGHT		4	FOREST	0.035	1	1.75	0.06125	0.06125
W21	1100	1250	Right (R)	WBR16	4	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
TURBINE SITE W21			Both (B)	WBR17	4	FOREST	0.070	0.4	1.25	0.0875	0.035
TURBINE SITE W21			Both (B)	WBR52	4	FOREST	0.070	0.4	1.25	0.0875	0.035
W21	1250	1500	Left (L)	WBD31	4	FOREST	0.092	0.4	1.75	0.1606979	0.06427916
W23	75	350	Right (R)		4	FOREST	0.101	1	1.75	0.1767677	0.17676768
W23	350	650	Right (R)	WBRS48	4	FOREST	0.110	0.4	1.75	0.1928375	0.07713499
W23	650	1000	Right (R)	WBD1	4	FOREST	0.129	0.4	1.75	0.224977	0.08999082
W23	1000	1060	RIGHT		4	FOREST	0.022	1	1.75	0.0385675	0.03856749
W23	1060	1125	Right (R)	WBRS49	4	FOREST	0.024	0.4	1.75	0.0417815	0.01671258
W23	1125	1250	Right (R)	WBD32	4	FOREST	0.046	0.4	1.75	0.0803489	0.03213958
W23	1250	1575	Right (R)	WBR18	4	FOREST	0.119	0.4	1.75	0.2089073	0.0835629
W23	1575	1625	Right (R)		4	FOREST	0.018	1	1.75	0.0321396	0.03213958
W23	1625	1725	Right (R)	WBRS50	4	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W23	1725	1925	Right (R)	WBR19	4	FOREST	0.073	0.4	1.75	0.1285583	0.05142332
W23	1925	2000	Right (R)		4	FOREST	0.028	1	1.75	0.0482094	0.04820937
TURBINE SITE W22			Both (B)		4	MEADOW	0.035	1	1.25	0.04375	0.04375
W23	2000	2300	Right (R)		4	FOREST	0.110	1	1.75	0.1928375	0.19283747
W23	2300	2400	Right (R)	WBRS51	4	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W23	2400	2610	Right (R)		4	FOREST	0.077	1	1.75	0.1349862	0.13498623
W23	2610	2900	Right (R)	WBRS52	4	FOREST	0.107	0.4	1.75	0.1864096	0.07456382
W23	2900	3150	Right (R)	WBD50	4	FOREST	0.092	0.4	1.75	0.1606979	0.06427916
W23	3150	3325	Right (R)	WBRS53	4	FOREST	0.064	0.4	1.75	0.1124885	0.04499541
W23	3325	3450	Right (R)	WBR21	4	FOREST	0.046	0.4	1.75	0.0803489	0.03213958
W26	0	25	Right (R)	WBR21	4	FOREST	0.009	0.4	1.75	0.0160698	0.00642792
W26	25	250	Right (R)	WBD3	4	FOREST	0.083	0.4	1.75	0.1446281	0.05785124
W26	250	325	Right (R)		4	FOREST	0.028	1	1.75	0.0482094	0.04820937
W26	325	825	Right (R)	WBR22	4	FOREST	0.184	0.4	1.75	0.3213958	0.12855831
TURBINE SITE W24			Both (B)		4	FOREST	0.065	1	1.25	0.08125	0.08125
TURBINE SITE W24			Both (B)		4	MEADOW	0.065	1	1.25	0.08125	0.08125
W26	825	1375	Right (R)	WBR23	4	FOREST	0.202	0.4	1.75	0.3535354	0.14141414
W26	1375	1525	RIGHT		4	FOREST	0.055	1	1.75	0.0964187	0.09641873
W26	1525	1825	Right (R)	WBL41	4	FOREST	0.110	0.4	1.75	0.1928375	0.07713499
W26	1825	1950	Right (R)	WBRS55	4	FOREST	0.046	0.4	1.75	0.0803489	0.03213958
TURBINE SITE W25			Both (B)	WBR24	4	FOREST	0.035	0.4	1.25	0.04375	0.0175
W26	1950	2175	Right (R)	WBR25	4	FOREST	0.083	0.4	1.75	0.1446281	0.05785124
W26	2175	2425	Right (R)	WBR26	4	FOREST	0.092	0.4	1.75	0.1606979	0.06427916
W26	3200	3250	Right (R)		4	FOREST	0.018	1	1.75	0.0321396	0.03213958
W26	3250	3350	Right (R)	WBRS58	4	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W26	3350	3725	Right (R)		4	FOREST	0.138	1	1.75	0.2410468	0.24104683
W26	3725	3825	Right (R)	WBRS59	4	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W26	3825	3925	Right (R)	WBD35	4	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W26	3925	3975	Right (R)	WBR27	4	FOREST	0.018	0.4	1.75	0.0321396	0.01285583

TURBINE SITE W26			Both (B)	WBD36	4	FOREST	0.070	0.4	1.25	0.0875	0.035
TURBINE SITE W26			Both (B)	WBR27	4	FOREST	0.070	0.4	1.25	0.0875	0.035
W10	0	100	Left (L)		5	FOREST	0.037	1	1.75	0.0642792	0.06427916
W10	100	250	Left (L)	WBRS22	5	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
W10	250	310	Left (L)		5	FOREST	0.022	1	1.75	0.0385675	0.03856749
W10	310	425	Left (L)	WBRS23	5	FOREST	0.042	0.4	1.75	0.073921	0.02956841
W10	425	650	Left (L)		5	FOREST	0.083	1	1.75	0.1446281	0.1446281
W10	650	750	Left (L)	WBRS24	5	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W10	750	875	Left (L)		5	FOREST	0.046	1	1.75	0.0803489	0.08034894
W10	875	915	Left (L)	WBRS25	5	FOREST	0.015	0.4	1.75	0.0257117	0.01028466
W10	915	1100	Left (L)		5	FOREST	0.068	1	1.75	0.1189164	0.11891644
W10	1100	1525	Right (R)	WBL27	5	FOREST	0.156	0.4	1.75	0.2731864	0.10927456
TURBINE SITE W17			Both (B)		5	MEADOW	0.140	1	1.25	0.175	0.175
W10	3000	3550	Left (L)	WBR29	5	FOREST	0.202	0.4	1.75	0.3535354	0.14141414
TURBINE SITE W16			Both (B)		5	MEADOW	0.140	1	1.25	0.175	0.175
W10	3550	3675	Left (L)		5	FOREST	0.046	1	1.75	0.0803489	0.08034894
W10	3675	4000	Left (L)	WBR30	5	FOREST	0.119	0.4	1.75	0.2089073	0.0835629
W10	4000	4225	Left (L)		5	FOREST	0.083	1	1.75	0.1446281	0.1446281
W10	4225	4350	Left (L)	WBR31	5	FOREST	0.046	0.4	1.75	0.0803489	0.03213958
W10	4350	4650	Left (L)	WBR46	5	FOREST	0.110	0.4	1.75	0.1928375	0.07713499
W10	4650	4700	Left (L)		5	FOREST	0.018	1	1.75	0.0321396	0.03213958
W10	4700	4850	Left (L)	WBRS29	5	FOREST	0.055	0.4	1.75	0.0964187	0.03856749
W10	4850	4900	Left (L)		5	FOREST	0.018	1	1.75	0.0321396	0.03213958
W10	4900	5250	Right (R)	WBR32	5	FOREST	0.129	0.4	1.75	0.224977	0.08999082
TURBINE SITE W12			Both (B)	WBR34	5	FOREST	0.130	0.4	1.25	0.1625	0.065
TURBINE SITE W11			Both (B)		5	MEADOW	0.130	1	1.25	0.1625	0.1625
W10	8400	8510	Right (R)	WBR37	5	FOREST	0.040	0.4	1.75	0.0707071	0.02828283
W10	8510	8550	Right (R)		5	FOREST	0.015	1	1.75	0.0257117	0.02571166
W10	8550	8900	Right (R)	WBRS33	5	FOREST	0.129	0.4	1.75	0.224977	0.08999082
TURBINE SITE W10			Both (B)	WBRS33	5	FOREST	0.065	0.4	1.25	0.08125	0.0325
TURBINE SITE W10			Both (B)		5	MEADOW	0.065	1	1.25	0.08125	0.08125
W8	650	1050	Left (L)		5	FOREST	0.147	1	1.75	0.2571166	0.25711662
W8	1050	1250	Left (L)	WBRS20	5	FOREST	0.073	0.4	1.75	0.1285583	0.05142332
W8	1250	1600	Right (R)	WBR38	5	FOREST	0.129	0.4	1.75	0.224977	0.08999082
W8	1600	1700	Right (R)		5	FOREST	0.037	1	1.75	0.0642792	0.06427916
W8	1700	1950	Right (R)	WBD10	5	FOREST	0.092	0.4	1.75	0.1606979	0.06427916
W8	1950	2500	Right (R)	WBL40	5	FOREST	0.202	0.4	1.75	0.3535354	0.14141414
W15	100	275	Left (L)		5	FOREST	0.064	1	1.75	0.1124885	0.11248852
W15	275	450	Left (L)	WBR44	5	FOREST	0.064	0.4	1.75	0.1124885	0.04499541
TURBINE SITE W5			Both (B)	WBD13	5	FOREST	0.100	0.4	1.25	0.125	0.05
TURBINE SITE W5			Both (B)	WBD14	5	FOREST	0.030	0.4	1.25	0.0375	0.015
WC	400	675	Right (R)		6	FOREST	0.101	1	1.75	0.1767677	0.17676768
W19	3600	3700	Right (R)	WBR11	6	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W19	3700	3800	Right (R)	WBR12	6	FOREST	0.037	0.4	1.75	0.0642792	0.02571166
W19	3800	4050	Right (R)	WBD19	6	FOREST	0.092	0.4	1.75	0.1606979	0.06427916
TURBINE SITE W19			Both (B)	WBRS47	6	FOREST	0.070	0.4	1.25	0.0875	0.035
TURBINE SITE W18			Both (B)		6	MEADOW	0.140	1	1.25	0.175	0.175
TURBINE SITE W20			Both (B)		6	MEADOW	0.035	1	1.25	0.04375	0.04375
TURBINE SITE W20			Both (B)	WBR11	6	FOREST	0.035	0.4	1.25	0.04375	0.0175
W20	100	175	Left (L)		6	FOREST	0.035	1	1.75	0.06125	0.06125
W21	175	350	Left (L)	WBR12	6	FOREST	0.064	0.4	1.75	0.1124885	0.04499541
W21	350	550	Left (L)	WBR15	6	FOREST	0.073	0.4	1.75	0.1285583	0.05142332
W21	550	950	Left (L)		6	FOREST	0.147	1	1.75	0.2571166	0.25711662
TURBINE SITE W22			Both (B)	WBD33	6	FOREST	0.070	0.4	1.25	0.0875	0.035

TURBINE SITE W22			Both (B)		6	MEADOW	0.035	1	1.25	0.04375	0.04375
TURBINE SITE W23			Both (B)	WBR20	6	FOREST	0.130	0.4	1.25	0.1625	0.065
TURBINE SITE W25			Both (B)	WBR24	6	FOREST	0.070	0.4	1.25	0.0875	0.035
TURBINE SITE W25			Both (B)	WBD34	6	FOREST	0.035	0.4	1.25	0.04375	0.0175
W26	2425	3000	Right (R)	WBRS56	6	FOREST	0.211	0.4	1.75	0.3696051	0.14784206
W26	3000	3200	Right (R)	WBRS57	6	FOREST	0.073	0.4	1.75	0.1285583	0.05142332
W10	1525	1800	Right (R)	WBR28	6	FOREST	0.101	0.4	1.75	0.1767677	0.07070707
W10	1800	1825	Right (R)		6	FOREST	0.009	1	1.75	0.0160698	0.01606979
W10	1825	2175	Right (R)	WBRS26	6	FOREST	0.129	0.4	1.75	0.224977	0.08999082
W10	2175	2400	Right (R)		6	FOREST	0.083	1	1.75	0.1446281	0.1446281
W10	2400	2975	Right (R)	WBRS27	6	FOREST	0.211	0.4	1.75	0.3696051	0.14784206
W10	2975	3000	Left (L)		6	FOREST	0.009	1	1.75	0.0160698	0.01606979
W15	1400	1925	Right (R)	WBR45	6	MEADOW	0.193	0.4	1.75	0.3374656	0.13498623
W15	1925	2000	Right (R)		6	MEADOW	0.028	1	1.75	0.0482094	0.04820937
TURBINE SITE W15			Both (B)	WBR45	6	MEADOW	0.130	0.4	1.25	0.1625	0.065
MET TOWER W1	0	100	Both (B)	WBR2	5	MEADOW	0.028	0.4	1.75	0.0482094	0.01928375
MET TOWER W1	100	215	Both (B)	WBR61	5	MEADOW	0.032	0.4	1.75	0.0554408	0.02217631
										19.9960	**10.8948**

Total Impervious **12.215** acres

28.5961 <= 10.8948
75.28% Treatment

Carrabassett River (# 7)
General Requirement (75% Treatment)

1=no tx, 0.4=buffer

Roadway Alignment and/or Turbine Site	Station to Station		Right (R) Left (L) Both (B)	BMP No.	Watershed	BMP type Forest/Meadow	Imp. Area (acres)	Treatment Factor
W9	300	675	Left (L)	WBD24	7	FOREST	0.138	0.4
W9	100	300	Right (R)	WBR39	7	FOREST	0.073	0.4
TURBINE SITE W9			Both (B)	WBR43	7	FOREST	0.130	0.4
W15	450	1200	Left (L)	WBR44	7	FOREST	0.275	0.4
TURBINE SITE W14			Both (B)		7	MEADOW	0.065	1
TURBINE SITE W14			Both (B)	WBL36	7	FOREST	0.065	0.4
W15	1200	1400	Left (L)	WBD27	7	FOREST	0.073	0.4
TURBINE SITE W8			Both (B)	WBD12	7	FOREST	0.098	0.4
TURBINE SITE W8			Both (B)		7	MEADOW	0.033	1
W1	125	375	Right (R)	WBD20	7	FOREST	0.092	0.4
W10	5250	5900	Right (R)	WBR47	7	MEADOW	0.239	0.4
TURBINE SITE W13			Both (B)	WBD7	7	FOREST	0.130	0.4
W10	5950	6175	Right (R)	WBR33	7	FOREST	0.083	0.4
W10	6175	6500	Right (R)	WBD26	7	FOREST	0.119	0.4
W10	6500	6790	Right (R)	WBR35	7	FOREST	0.107	0.4
W10	6790	6950	Right (R)	WBD8	7	FOREST	0.059	0.4
W10	6950	7150	Right (R)	WBR36	7	FOREST	0.073	0.4
W10	7150	7275	Right (R)	WBRS30	7	FOREST	0.046	0.4
W10	7275	7500	Right (R)	WBD40	7	FOREST	0.083	0.4
W10	7500	7600	Right (R)	WBRS31	7	FOREST	0.037	0.4
W10	7600	7700	Right (R)	WBR49	7	FOREST	0.037	0.4
W10	7700	7860	Right (R)	WBRS32	7	FOREST	0.059	0.4
W10	7860	8275	Right (R)		7	FOREST	0.152	1
W10	8275	8400	Left (L)	WBR37	7	FOREST	0.046	0.4

W8	100	175	Right (R)		7	FOREST	0.028	1
W8	175	300	Right (R)	WBRS34	7	FOREST	0.046	0.4
W8	300	375	Right (R)	WBRS35	7	FOREST	0.028	0.4
W8	375	450	RIGHT		7	FOREST	0.028	1
W8	450	600	RIGHT	WBRS60	7	FOREST	0.055	0.4
W8	600	650	RIGHT		7	FOREST	0.018	1
W8	2500	2725	Right (R)	WBR39	7	FOREST	0.083	0.4
W8	2725	3150	Right (R)	WBR40	7	FOREST	0.156	0.4
W8	3150	4700	Right (R)		7	FOREST	0.569	1
W1	375	450	Right (R)	WBD20	7	FOREST	0.028	0.4
MET TOWER W13	0	415	Both (B)	WBR62	7	FOREST	0.114	0.4
MET TOWER W14	0	260	B	WBD41	7	FOREST	0.072	0.4
MET TOWER W14	260	560	B	WBD42	7	FOREST	0.083	0.4
						Total Impervious	**3.617**	acres

75.32% Treatment >= 75%

Project Name	**HIGHLAND PLANTATION**	BR=Roadside Buffer	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	8/3/2009	C1=Loamy Sand or Sandy Loam	B=Buffer
Done by	JAO	C2=Silt Loam, Clay Loam or Silty Clay Loam	Land=Landscaped Area

REQUIRED BUFFER FLOW PATH LENGTHS
~BUFFER ADJACENT TO DOWN HILL SIDE OF ROAD~
WEST

# of Travel Ways to Buffer	Length of Flow Forest	Length of Flow Meadow
1	35	50
2	55	80

* Buffer slopes may not exceed 20%
** Buffers may not be located in a wetland
*** Roadside slopes may be included in a meadow buffer **if** the slope is less than 4:1 **and** if the soils allow infiltration

Alignment	BMP Type & # ("BR-52")	# of Travel Ways (1 or 2)	Buffer Type (Forest or Meadow)	Buffer Slope	Length of Buffer (ft)
Turbine Site W2	WBR1	2	MEADOW	12%	80
W1	WBR2	2	MEADOW	16%	80
TURBINE SITE W3	WBR3	2	FOREST	14%	55
W3	WBR5	2	FOREST	10%	55
W1	WBR6	2	FOREST	10%	55
WC	WBR8	2	FOREST	14%	55
W19	WBR9	2	FOREST	10%	55
W19	WBR10	2	FOREST	10%	55
W19	WBR11	2	FOREST	6%	55
W19	WBR12	2	FOREST	12%	55
TURBINE SITE W20	WBR13	2	FOREST	8%	55
TURBINE SITE W20	WBR14	2	FOREST	10%	55
W21	WBR15	2	FOREST	12%	55
W21	WBR16	2	FOREST	14%	55
TURBINE SITE W21	WBR17	2	FOREST	10%	55
W23	WBR18	2	FOREST	16%	55
TURBINE SITE W23	WBR20	2	FOREST	6%	55
W23	WBR21	2	FOREST	15%	55
W26	WBR22	2	FOREST	10%	55
W26	WBR23	2	FOREST	14%	55
TURBINE SITE W25	WBR24	2	FOREST	12%	55
W26	WBR25	2	FOREST	16%	55
W26	WBR26	2	FOREST	12%	55
W26	WBR27	2	FOREST	12%	55
W10	WBR28	2	FOREST	8%	55
W10	WBR29	2	FOREST	14%	55
W10	WBR30	2	FOREST	14%	55

W10	WBR31	2	FOREST	14%	55
W10	WBR32	2	FOREST	14%	55
W10	WBR33	2	FOREST	8%	55
TURBINE SITE W12	WBR34	2	FOREST	4%	55
W10	WBR35	2	FOREST	8%	55
W10	WBR36	2	FOREST	4%	55
W10	WBR37	2	FOREST	10%	55
W8	WBR38	2	FOREST	14%	55
W9	WBR39	2	FOREST	10%	55
W8	WBR40	2	FOREST	10%	55
W8	WBR41	2	FOREST	12%	55
W8	WBR42	2	FOREST	6%	55
TURBINE SITE W9	WBR43	2	FOREST	14%	55
W15	WBR44	2	FOREST	10%	55
W1	WBR45	2	FOREST	10%	55
W10	WBR46	2	FOREST	2%	55
W10	WBR49	2	FOREST	2%	55
TURBINE SITE W21	WBR52	2	FOREST	20%	55
MET TOWER W1	WBR61	2	MEADOW	14%	80
MET TOWER W13	WBR62	2	FOREST	20%	55

Project Name	**HIGHLAND PLANTATION**	BR=Roadside Buffer	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	8/3/2009	C1=Loamy Sand or Sandy Loam	B=Buffer
Done by	JAO	C2=Silt Loam, Clay Loam or Silty Clay Loam	Land=Landscaped Area

REQUIRED BUFFER FLOW PATH LENGTHS
~BUFFER ADJACENT TO DOWN HILL SIDE OF ROAD~
WEST

# of Travel Ways to Buffer	Length of Flow Forest	Length of Flow Meadow
1	35	50
2	55	80

* Buffer slopes may not exceed 20%
** Buffers may not be located in a wetland
*** Roadside slopes may be included in a meadow buffer **if** the slope is less than 4:1 **and** if the soils allow infiltration

Alignment	BMP Type & # ("BR-52")	# of Travel Ways (1 or 2)	Buffer Type (Forest or Meadow)	Buffer Slope	Length of Buffer (ft)
TURBINE SITE W7	WBRS1	2	FOREST	11%	55
W1	WBRS3	2	FOREST	24%	55
W1	WBRS4	2	FOREST	16%	55
W1	WBRS5	2	FOREST	23%	55
W1	WBRS6	2	FOREST	21%	55
W1	WBRS7	2	FOREST	16%	55
W1	WBRS8	2	FOREST	22%	55
W1	WBRS9	2	FOREST	26%	55
W1	WBRS10	2	FOREST	23%	55
W3	WBRS11	2	FOREST	15%	55
W3	WBRS12	2	FOREST	24%	55
W3	WBRS13	2	FOREST	20%	55
W3	WBRS14	2	FOREST	20%	55
W3	WBRS15	2	FOREST	24%	55
W1	WBRS16	2	MEADOW	16%	80
W1	WBRS17	2	FOREST	22%	55
W1	WBRS18	2	FOREST	23%	55
W1	WBRS19	2	FOREST	22%	55
W8	WBRS20	2	FOREST	19%	55
W10	WBRS22	2	FOREST	17%	55
W10	WBRS23	2	FOREST	26%	55
W10	WBRS24	2	FOREST	22%	55
W10	WBRS25	2	FOREST	28%	55
W10	WBRS29	2	FOREST	22%	55
W10	WBRS30	2	FOREST	6%	55
W10	WBRS31	2	FOREST	28%	55
W10	WBRS32	2	FOREST	22%	55

W10	WBRS33	2	FOREST	26%	55
W8	WBRS34	2	FOREST	7%	55
W8	WBRS35	2	FOREST	24%	55
W18	WBRS36	2	FOREST	16%	55
W19	WBRS38	2	FOREST	22%	55
W19	WBRS39	2	FOREST	23%	55
W19	WBRS40	2	FOREST	24%	55
W19	WBRS41	2	FOREST	17%	55
TURNAROUND W19	WBRS42	2	FOREST	14%	55
W19	WBRS45	2	FOREST	30%	55
TURBINE SITE W19	WBRS47	2	FOREST	26%	55
W23	WBRS48	2	FOREST	7%	55
W23	WBRS49	2	FOREST	20%	55
W23	WBRS50	2	FOREST	28%	55
W23	WBRS51	2	FOREST	22%	55
W23	WBRS52	2	FOREST	24%	55
W23	WBRS53	2	FOREST	22%	55
W26	WBRS55	2	FOREST	22%	55
W26	WBRS56	2	FOREST	18%	55
W26	WBRS57	2	FOREST	14%	55
W26	WBRS58	2	FOREST	22%	55
W26	WBRS59	2	FOREST	30%	55
W8	WBRS60	2	FOREST	10%	55

Project Name	**HIGHLAND PLANTATION**	BD=Buffer with Ditch Turnouts	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	11/9/2009	Land=Landscaped Area	B=Buffer
Done by	JAO	C1=Loamy Sand or Sandy Loam	C2=Silt Loam, Clay Loam or Silty Clay Loam

REQUIRED BUFFER FLOW PATH LENGTHS

~DITCH TURNOUTS TO BUFFERS~

WEST

		0-8% Buffer Slope		8-15% Buffer Slope	
Soils	**Length of Road and Ditch**	**ength of Flo Forest**	**ength of Flo Meadow**	**Length of Flow Forest**	**Length of Flow Meadow**
A	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
B	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
C1	200	60	100	72	120
	300	75	120	90	144
	400	100	N/A	120	N/A
C2	200	75	120	90	144
	300	100	N/A	120	N/A
	400				
D	200	100	150	120	180

from table

Alignment	BMP Type & # ("BD-52")	Station	to Station	Length of Road (ft)	Buffer Type (forest or meadow)	Soil Type	Buffer Slope 0-15%	Length of Buffer (ft)
TURBINE SITE W13	WBD7	0	0	0	FOREST	D	6%	100
W10	WBD8	6790	6950	160	FOREST	D	3%	100
TURBINE SITE W8	WBD12	0	0	0	FOREST	D	18%	120
TURBINE SITE W5	WBD13	0	0	0	FOREST	D	24%	120
Turbine Site W2	WBD15	0	0	0	MEADOW	D	24%	180
W1	WBD22	5500	5700	200	FOREST	D	26%	120
W1	WBD23	5700	5850	150	FOREST	D	24%	120
W15	WBD27	1200	1400	200	FOREST	D	11%	120
W19	WBD30	3350	3500	150	FOREST	D	12%	120
W23	WBD32	1125	1250	125	FOREST	D	22%	120
TURBINE SITE W22	WBD33	0	0	0	FOREST	D	28%	120
TURBINE SITE W25	WBD34	0	0	0	FOREST	D	8%	100
W26	WBD35	3825	3925	100	FOREST	D	30%	120
TURBINE SITE W26	WBD36	0	0	0	FOREST	D	20%	120
W3	WBD39	1450	1550	100	FOREST	D	10%	120
W10	WBR49	7600	7700	100	FOREST	D	20%	120
W23	WBR19	1725	1925	200	FOREST	D	16%	120

Project Name	**HIGHLAND PLANTATION**	BL=Buffer with a Level Lip Spre	L=Length
Project Number	**66060E**	Imp=Impervious area	W=Width
Date	8/3/2009	Land=Landscaped Area	B=Buffer
Done by	JAO	C1=Loamy Sand or Sandy Loar	C2=Silt Loam, Clay Loam or Silty Clay Loam

REQUIRED BUFFER FLOW PATH LENGTHS
~BUFFERS WITH LEVEL LIP SPREADERS~
WEST

0-8% Buffer Slope

Soils	Length of Flow Thru Buffer (ft)	Berm L for Forested Buffer(ft)		Berm L for Meadow Buffer(ft)	
		Per acre Imp	Per acre Land	Per acre Imp	Per acre Land
A	75	75	25	125	35
	100	65	20	75	25
	150	50	15	60	20
B	75	100	30	150	45
	100	80	25	100	30
	150	65	20	75	25
C1	75	125	35	150	45
	100	100	30	125	35
	150	75	25	100	30
C2	100	150	45	200	60
	150	100	30	150	45
D	150	150	45	200	60

9-15% Buffer Slope

Soils	Length of Flow Thru Buffer (ft)	Berm L for Forested Buffer(ft)		Berm L for Meadow Buffer(ft)	
		Per acre Imp	Per acre Land	Per acre Imp	Per acre Land
A	75	90	30	150	42
	100	78	24	90	30
	150	60	18	72	24

B	75	120	36	180	54
	100	96	30	120	36
	150	78	24	90	30
C1	75	150	42	180	54
	100	120	36	150	42
	150	90	30	120	36
C2	100	180	54	240	72
	150	120	36	180	54
D	150	180	54	240	72

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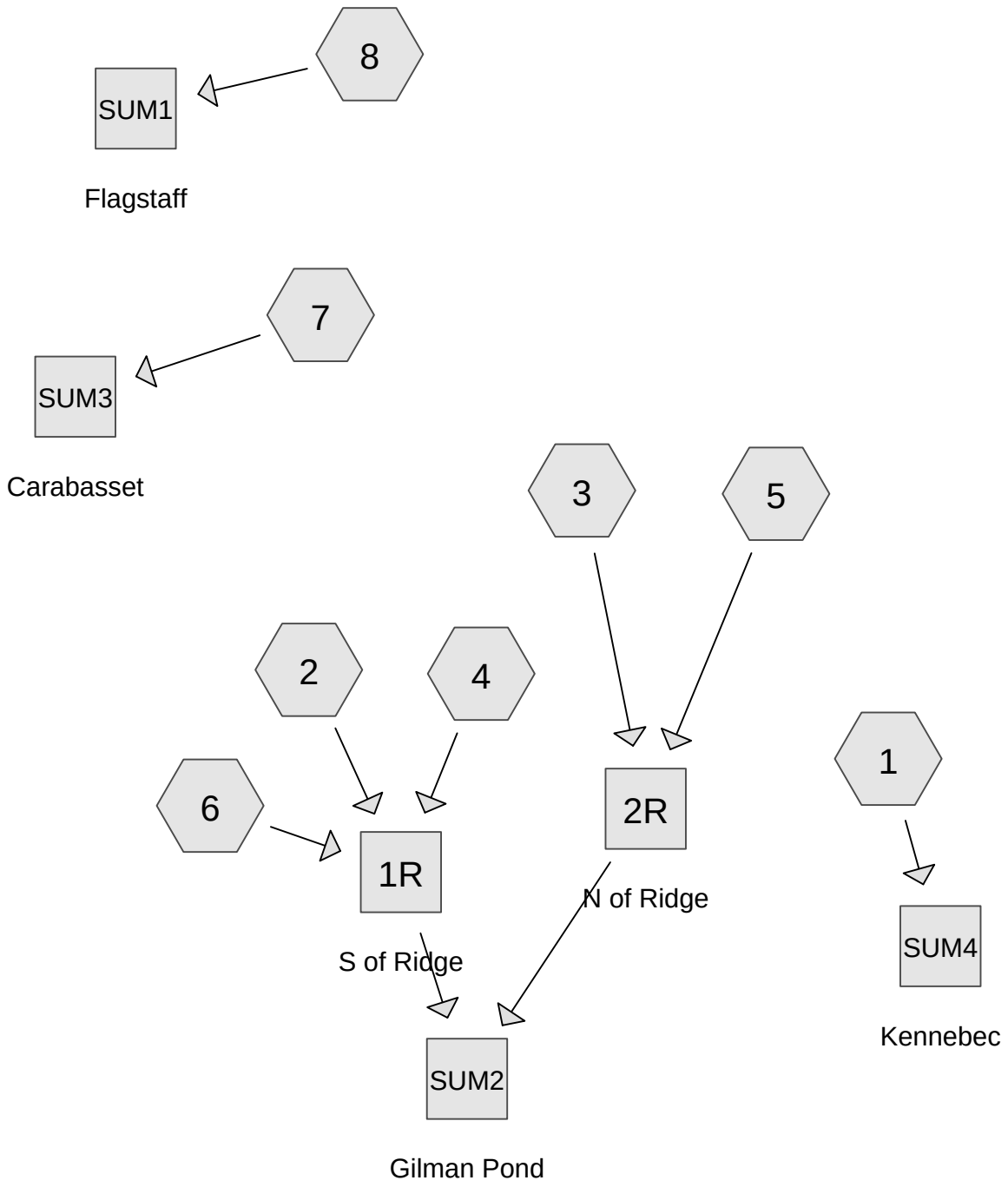
						from table	from table	
Alignment	**BMP Type & #** ("BL-52")	**Imp (acres)**	**Buffer Type** (forest/meadow)	**Soil Type**	**Buffer Slope**	**Length of Buffer (ft)**	**L of Berm per ac. imp**	**Length of Berm (ft)**
W10	WBL27	0.156	FOREST	D	22%	150	180	28
TURBINE SITE W14	WBL36	0.065	FOREST	D	22%	150	180	12
W2	WBL37	0.188	Forest	D	24%	150	180	34
W3	WBR4	0.166	FOREST	D	10%	150	180	30
W1	WBD38	0.110	FOREST	D	6%	150	150	17
TURBINE SITE W7	WBRS1	0.268	FOREST	D	10%	150	180	48
WC	WBD17	0.125	FOREST	D	18%	150	180	23
W19	WBD19	0.165	FOREST	D	20%	150	180	30
W19	WBRS45	0.220	FOREST	D	15%	150	180	40
W23	WBRS48	0.110	FOREST	D	8%	150	150	17
W23	WBD1	0.129	FOREST	D	16%	150	180	23
W10	WBR47	0.239	MEADOW	D	5%	150	200	48
W9	WBD24	0.138	FOREST	D	22%	150	180	25
W10	WBR46	0.110	FOREST	D	22%	150	180	20
W19	WBD19	0.257	FOREST	D	20%	150	180	46
W10	WBRS26	0.129	FOREST	D	22%	150	180	23
W10	WBRS27	0.211	FOREST	D	22%	150	180	38
WC	WBD28	0.147	FOREST	D	8%	150	150	22
W8	WBL40	0.202	FOREST	D	13%	150	180	36
W26	WBRS56	0.211	FOREST	D	8%	150	150	32
W26	WBL41	0.110	FOREST	D	17%	150	180	20
W19	WBL42	0.129	FOREST	D	14%	150	180	23

W26	WBD3	0.083	FOREST	D	10%	150	180	15
W8	WBD10	0.092	FOREST	D	14%	150	180	17
W3	WBD14	0.110	FOREST	D	18%	150	180	20
W2	WBD16	0.092	MEADOW	D	18%	150	180	17
W1	WBD20	0.092	FOREST	D	17%	150	180	17
W1	WBD21	0.083	FOREST	D	17%	150	180	15
W10	WBD26	0.119	FOREST	D	18%	150	180	21
W21	WBD31	0.092	FOREST	D	10%	150	180	17
W10	WBD40	0.083	FOREST	D	10%	150	180	15
MET TOWER W14	WBD41	0.072	FOREST	D	10%	150	180	13
MET TOWER W14	WBD42	0.083	FOREST	D	14%	150	180	15
W23	WBD50	0.092	FOREST	D	7%	150	150	14



Subcat Reach Pond Link

Drainage Diagram for 2009-10-13 Predev jao
Prepared by James Sewall Co., Printed 11/18/2009

Summary for Subcatchment 1:

Runoff = 550.07 cfs @ 12.17 hrs, Volume= 41.983 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
20,651,957	77	Woods, Good, HSG D
5,912,444	80	Pasture/grassland/range, Good, HSG D
26,564,401	78	Weighted Average
26,564,401		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
8.4	1,204	0.2300	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	380	0.1100	18.37	551.23	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040 Mountain streams
0.0	37	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	839	0.1600	22.16	664.81	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
22.7	2,560	Total			

Summary for Subcatchment 2:

Runoff = 420.43 cfs @ 12.17 hrs, Volume= 32.267 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
16,025,652	77	Woods, Good, HSG D
4,393,019	80	Pasture/grassland/range, Good, HSG D
20,418,671	78	Weighted Average
20,418,671		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
10.1	1,327	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	177	0.1500	16.92	338.40	**Parabolic Channel,** W=15.00' D=2.00' Area=20.0 sf Perim=15.7' n= 0.040
0.3	397	0.1900	19.46	778.60	**Parabolic Channel,** W=30.00' D=2.00' Area=40.0 sf Perim=30.4' n= 0.040
22.9	2,001	Total			

Summary for Subcatchment 3:

Runoff = 305.38 cfs @ 12.22 hrs, Volume= 26.153 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
17,171,473	77	Woods, Good, HSG D
451,393	80	Pasture/grassland/range, Good, HSG D
17,622,866	77	Weighted Average
17,622,866		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
13.2	1,721	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	1,852	0.1800	23.50	705.14	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
26.8	3,673	Total			

Summary for Subcatchment 4:

Runoff = 351.83 cfs @ 12.73 hrs, Volume= 55.057 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
36,544,807	77	Woods, Good, HSG D
1,269,597	80	Pasture/grassland/range, Good, HSG D
37,814,404	77	Weighted Average
37,814,404		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
9.6	1,316	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	1,760	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	2,278	0.1200	19.19	575.74	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
1.3	1,140	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
2.1	1,968	0.0500	15.32	1,021.44	**Parabolic Channel,** W=25.00' D=4.00' Area=66.7 sf Perim=26.6' n= 0.040
1.8	1,852	0.0500	17.41	1,451.17	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.9	1,594	0.1300	28.08	2,339.95	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
63.6	12,008	Total			

Summary for Subcatchment 5:

Runoff = 416.62 cfs @ 12.19 hrs, Volume= 33.026 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
21,236,803	77	Woods, Good, HSG D
984,488	80	Pasture/grassland/range, Good, HSG D
22,221,291	77	Weighted Average
22,221,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
11.0	1,400	0.1800	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	680	0.2800	29.32	879.46	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
23.7	2,180	Total			

Summary for Subcatchment 6:

Runoff = 425.72 cfs @ 12.22 hrs, Volume= 36.246 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
23,089,323	77	Woods, Good, HSG D
1,332,873	80	Pasture/grassland/range, Good, HSG D
24,422,196	77	Weighted Average
24,422,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
10.7	1,663	0.2700	2.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	1,016	0.1300	19.98	599.25	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
26.6	2,779	Total			

Summary for Subcatchment 7:

Runoff = 159.81 cfs @ 12.22 hrs, Volume= 13.427 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
8,892,859	77	Woods, Good, HSG D
151,166	80	Pasture/grassland/range, Good, HSG D
9,044,025	77	Weighted Average
9,044,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.1200	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
14.6	1,522	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.0	1,622	Total			

Summary for Subcatchment 8:

Runoff = 131.46 cfs @ 12.28 hrs, Volume= 12.470 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
7,491,685	77	Woods, Good, HSG D
928,836	80	Pasture/grassland/range, Good, HSG D
8,420,521	77	Weighted Average
8,420,521		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
14.9	1,668	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.1	1,768	Total			

Summary for Reach 1R: S of Ridge

Inflow Area = 1,897.504 ac, 0.00% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 953.32 cfs @ 12.22 hrs, Volume= 123.571 af
Outflow = 953.32 cfs @ 12.22 hrs, Volume= 123.571 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 2R: N of Ridge

Inflow Area = 914.696 ac, 0.00% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 718.18 cfs @ 12.20 hrs, Volume= 59.179 af
Outflow = 718.18 cfs @ 12.20 hrs, Volume= 59.179 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM1: Flagstaff

Inflow Area = 193.309 ac, 0.00% Impervious, Inflow Depth > 0.77" for 2 YR event
Inflow = 131.46 cfs @ 12.28 hrs, Volume= 12.470 af
Outflow = 131.46 cfs @ 12.28 hrs, Volume= 12.470 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM2: Gilman Pond

Inflow Area = 2,812.200 ac, 0.00% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 1,669.56 cfs @ 12.21 hrs, Volume= 182.749 af
Outflow = 1,669.56 cfs @ 12.21 hrs, Volume= 182.749 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM3: Carabasset

Inflow Area = 207.622 ac, 0.00% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 159.81 cfs @ 12.22 hrs, Volume= 13.427 af
Outflow = 159.81 cfs @ 12.22 hrs, Volume= 13.427 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM4: Kennebec

Inflow Area = 609.835 ac, 0.00% Impervious, Inflow Depth > 0.83" for 2 YR event
Inflow = 550.07 cfs @ 12.17 hrs, Volume= 41.983 af
Outflow = 550.07 cfs @ 12.17 hrs, Volume= 41.983 af, Atten= 0%, Lag= 0.0 min

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

Summary for Subcatchment 1:

Runoff = 1,227.69 cfs @ 12.16 hrs, Volume= 91.265 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
20,651,957	77	Woods, Good, HSG D
5,912,444	80	Pasture/grassland/range, Good, HSG D
26,564,401	78	Weighted Average
26,564,401		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
8.4	1,204	0.2300	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	380	0.1100	18.37	551.23	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040 Mountain streams
0.0	37	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	839	0.1600	22.16	664.81	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
22.7	2,560	Total			

Summary for Subcatchment 2:

Runoff = 938.67 cfs @ 12.16 hrs, Volume= 70.145 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
16,025,652	77	Woods, Good, HSG D
4,393,019	80	Pasture/grassland/range, Good, HSG D
20,418,671	78	Weighted Average
20,418,671		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
10.1	1,327	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	177	0.1500	16.92	338.40	**Parabolic Channel,** W=15.00' D=2.00' Area=20.0 sf Perim=15.7' n= 0.040
0.3	397	0.1900	19.46	778.60	**Parabolic Channel,** W=30.00' D=2.00' Area=40.0 sf Perim=30.4' n= 0.040
22.9	2,001	Total			

Summary for Subcatchment 3:

Runoff = 703.55 cfs @ 12.21 hrs, Volume= 57.982 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
17,171,473	77	Woods, Good, HSG D
451,393	80	Pasture/grassland/range, Good, HSG D
17,622,866	77	Weighted Average
17,622,866		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
13.2	1,721	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	1,852	0.1800	23.50	705.14	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
26.8	3,673	Total			

Summary for Subcatchment 4:

Runoff = 821.62 cfs @ 12.68 hrs, Volume= 122.453 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
36,544,807	77	Woods, Good, HSG D
1,269,597	80	Pasture/grassland/range, Good, HSG D
37,814,404	77	Weighted Average
37,814,404		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
9.6	1,316	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	1,760	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	2,278	0.1200	19.19	575.74	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
1.3	1,140	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
2.1	1,968	0.0500	15.32	1,021.44	**Parabolic Channel,** W=25.00' D=4.00' Area=66.7 sf Perim=26.6' n= 0.040
1.8	1,852	0.0500	17.41	1,451.17	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.9	1,594	0.1300	28.08	2,339.95	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
63.6	12,008	Total			

Summary for Subcatchment 5:

Runoff = 958.20 cfs @ 12.17 hrs, Volume= 73.203 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
21,236,803	77	Woods, Good, HSG D
984,488	80	Pasture/grassland/range, Good, HSG D
22,221,291	77	Weighted Average
22,221,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
11.0	1,400	0.1800	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	680	0.2800	29.32	879.46	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
23.7	2,180	Total			

Summary for Subcatchment 6:

Runoff = 980.37 cfs @ 12.21 hrs, Volume= 80.359 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
23,089,323	77	Woods, Good, HSG D
1,332,873	80	Pasture/grassland/range, Good, HSG D
24,422,196	77	Weighted Average
24,422,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
10.7	1,663	0.2700	2.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	1,016	0.1300	19.98	599.25	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
26.6	2,779	Total			

Summary for Subcatchment 7:

Runoff = 367.78 cfs @ 12.20 hrs, Volume= 29.766 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
8,892,859	77	Woods, Good, HSG D
151,166	80	Pasture/grassland/range, Good, HSG D
9,044,025	77	Weighted Average
9,044,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.1200	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
14.6	1,522	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.0	1,622	Total			

Summary for Subcatchment 8:

Runoff = 304.75 cfs @ 12.26 hrs, Volume= 27.656 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
7,491,685	77	Woods, Good, HSG D
928,836	80	Pasture/grassland/range, Good, HSG D
8,420,521	77	Weighted Average
8,420,521		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
14.9	1,668	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.1	1,768	Total			

Summary for Reach 1R: S of Ridge

Inflow Area = 1,897.504 ac, 0.00% Impervious, Inflow Depth > 1.73" for 10 YR event
Inflow = 2,216.97 cfs @ 12.21 hrs, Volume= 272.957 af
Outflow = 2,216.97 cfs @ 12.21 hrs, Volume= 272.957 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 2R: N of Ridge

Inflow Area = 914.696 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 YR event
Inflow = 1,651.05 cfs @ 12.19 hrs, Volume= 131.184 af
Outflow = 1,651.05 cfs @ 12.19 hrs, Volume= 131.184 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM1: Flagstaff

Inflow Area = 193.309 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 YR event
Inflow = 304.75 cfs @ 12.26 hrs, Volume= 27.656 af
Outflow = 304.75 cfs @ 12.26 hrs, Volume= 27.656 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM2: Gilman Pond

Inflow Area = 2,812.200 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 YR event
Inflow = 3,862.75 cfs @ 12.20 hrs, Volume= 404.141 af
Outflow = 3,862.75 cfs @ 12.20 hrs, Volume= 404.141 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM3: Carabasset

Inflow Area = 207.622 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 YR event
Inflow = 367.78 cfs @ 12.20 hrs, Volume= 29.766 af
Outflow = 367.78 cfs @ 12.20 hrs, Volume= 29.766 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM4: Kennebec

Inflow Area = 609.835 ac, 0.00% Impervious, Inflow Depth > 1.80" for 10 YR event
Inflow = 1,227.69 cfs @ 12.16 hrs, Volume= 91.265 af
Outflow = 1,227.69 cfs @ 12.16 hrs, Volume= 91.265 af, Atten= 0%, Lag= 0.0 min

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

Summary for Subcatchment 1:

Runoff = 1,541.73 cfs @ 12.16 hrs, Volume= 114.581 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
20,651,957	77	Woods, Good, HSG D
5,912,444	80	Pasture/grassland/range, Good, HSG D
26,564,401	78	Weighted Average
26,564,401		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
8.4	1,204	0.2300	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	380	0.1100	18.37	551.23	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040 Mountain streams
0.0	37	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	839	0.1600	22.16	664.81	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
22.7	2,560	Total			

Summary for Subcatchment 2:

Runoff = 1,178.88 cfs @ 12.16 hrs, Volume= 88.066 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
16,025,652	77	Woods, Good, HSG D
4,393,019	80	Pasture/grassland/range, Good, HSG D
20,418,671	78	Weighted Average
20,418,671		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
10.1	1,327	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	177	0.1500	16.92	338.40	**Parabolic Channel,** W=15.00' D=2.00' Area=20.0 sf Perim=15.7' n= 0.040
0.3	397	0.1900	19.46	778.60	**Parabolic Channel,** W=30.00' D=2.00' Area=40.0 sf Perim=30.4' n= 0.040
22.9	2,001	Total			

Summary for Subcatchment 3:

Runoff = 889.79 cfs @ 12.21 hrs, Volume= 73.148 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
17,171,473	77	Woods, Good, HSG D
451,393	80	Pasture/grassland/range, Good, HSG D
17,622,866	77	Weighted Average
17,622,866		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
13.2	1,721	0.1900	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	1,852	0.1800	23.50	705.14	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
26.8	3,673	Total			

Summary for Subcatchment 4:

Runoff = 1,044.34 cfs @ 12.67 hrs, Volume= 154.603 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
36,544,807	77	Woods, Good, HSG D
1,269,597	80	Pasture/grassland/range, Good, HSG D
37,814,404	77	Weighted Average
37,814,404		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
9.6	1,316	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	1,760	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	2,278	0.1200	19.19	575.74	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
1.3	1,140	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
2.1	1,968	0.0500	15.32	1,021.44	**Parabolic Channel,** W=25.00' D=4.00' Area=66.7 sf Perim=26.6' n= 0.040
1.8	1,852	0.0500	17.41	1,451.17	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.9	1,594	0.1300	28.08	2,339.95	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
63.6	12,008	Total			

Summary for Subcatchment 5:

Runoff = 1,211.00 cfs @ 12.17 hrs, Volume= 92.344 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
21,236,803	77	Woods, Good, HSG D
984,488	80	Pasture/grassland/range, Good, HSG D
22,221,291	77	Weighted Average
22,221,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
11.0	1,400	0.1800	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	680	0.2800	29.32	879.46	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
23.7	2,180	Total			

Summary for Subcatchment 6:

Runoff = 1,239.77 cfs @ 12.21 hrs, Volume= 101.378 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
23,089,323	77	Woods, Good, HSG D
1,332,873	80	Pasture/grassland/range, Good, HSG D
24,422,196	77	Weighted Average
24,422,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
10.7	1,663	0.2700	2.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	1,016	0.1300	19.98	599.25	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
26.6	2,779	Total			

Summary for Subcatchment 7:

Runoff = 465.04 cfs @ 12.20 hrs, Volume= 37.551 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
8,892,859	77	Woods, Good, HSG D
151,166	80	Pasture/grassland/range, Good, HSG D
9,044,025	77	Weighted Average
9,044,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.1200	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
14.6	1,522	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.0	1,622	Total			

Summary for Subcatchment 8:

Runoff = 385.78 cfs @ 12.26 hrs, Volume= 34.893 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
7,491,685	77	Woods, Good, HSG D
928,836	80	Pasture/grassland/range, Good, HSG D
8,420,521	77	Weighted Average
8,420,521		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
14.9	1,668	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.1	1,768	Total			

Summary for Reach 1R: S of Ridge

Inflow Area = 1,897.504 ac, 0.00% Impervious, Inflow Depth > 2.18" for 25 YR event
Inflow = 2,809.61 cfs @ 12.21 hrs, Volume= 344.047 af
Outflow = 2,809.61 cfs @ 12.21 hrs, Volume= 344.047 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 2R: N of Ridge

Inflow Area = 914.696 ac, 0.00% Impervious, Inflow Depth > 2.17" for 25 YR event
Inflow = 2,087.22 cfs @ 12.19 hrs, Volume= 165.493 af
Outflow = 2,087.22 cfs @ 12.19 hrs, Volume= 165.493 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM1: Flagstaff

Inflow Area = 193.309 ac, 0.00% Impervious, Inflow Depth > 2.17" for 25 YR event
Inflow = 385.78 cfs @ 12.26 hrs, Volume= 34.893 af
Outflow = 385.78 cfs @ 12.26 hrs, Volume= 34.893 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM2: Gilman Pond

Inflow Area = 2,812.200 ac, 0.00% Impervious, Inflow Depth > 2.17" for 25 YR event
Inflow = 4,889.94 cfs @ 12.20 hrs, Volume= 509.539 af
Outflow = 4,889.94 cfs @ 12.20 hrs, Volume= 509.539 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM3: Carabasset

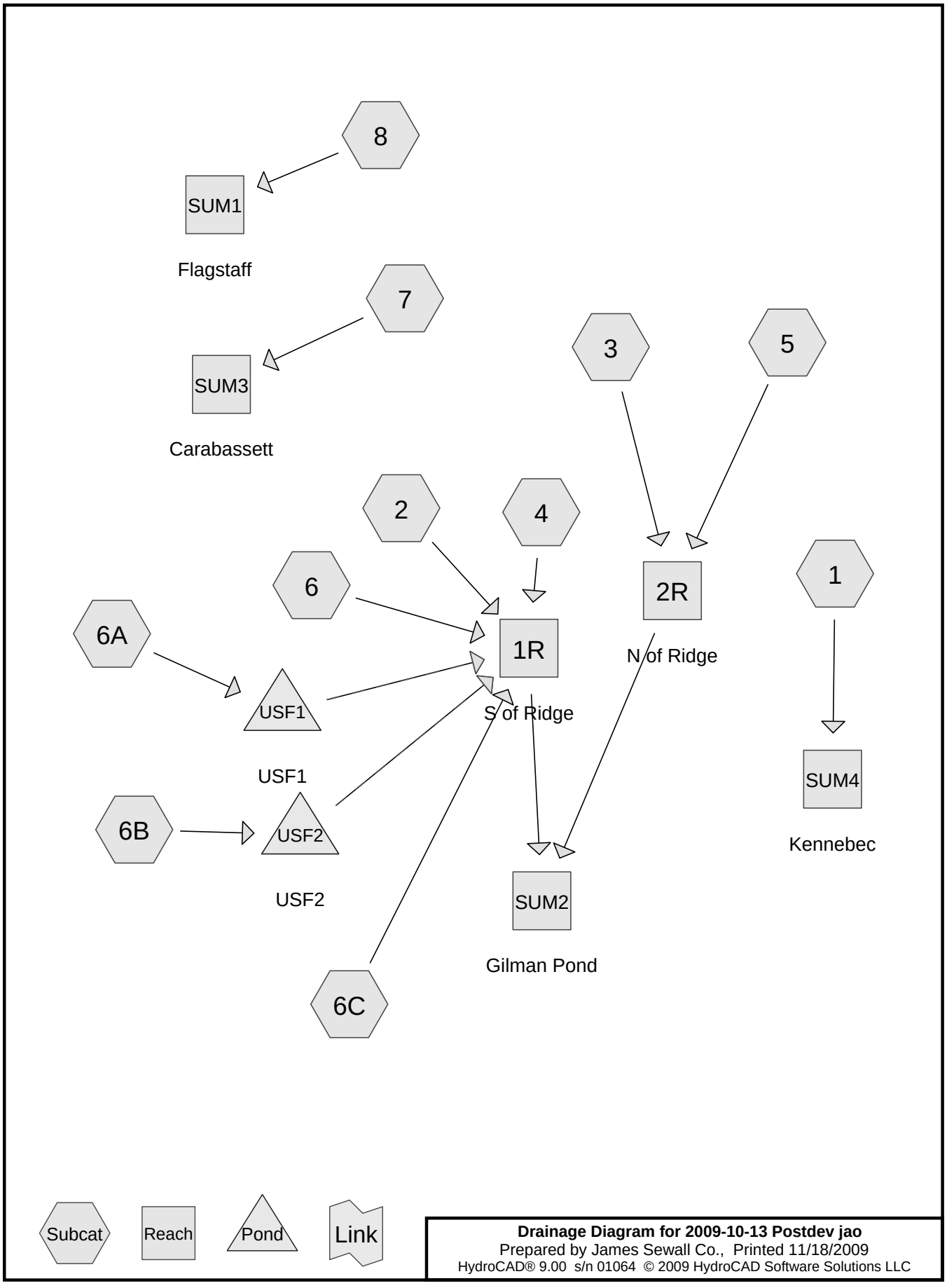
Inflow Area = 207.622 ac, 0.00% Impervious, Inflow Depth > 2.17" for 25 YR event
Inflow = 465.04 cfs @ 12.20 hrs, Volume= 37.551 af
Outflow = 465.04 cfs @ 12.20 hrs, Volume= 37.551 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM4: Kennebec

Inflow Area = 609.835 ac, 0.00% Impervious, Inflow Depth > 2.25" for 25 YR event
Inflow = 1,541.73 cfs @ 12.16 hrs, Volume= 114.581 af
Outflow = 1,541.73 cfs @ 12.16 hrs, Volume= 114.581 af, Atten= 0%, Lag= 0.0 min

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



Drainage Diagram for 2009-10-13 Postdev jao
Prepared by James Sewall Co., Printed 11/18/2009

Summary for Subcatchment 1:

Runoff = 561.48 cfs @ 12.16 hrs, Volume= 41.996 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
18,261,262	77	Woods, Good, HSG D
8,063,939	80	Pasture/grassland/range, Good, HSG D
239,200	91	Gravel roads, HSG D
26,564,401	78	Weighted Average
26,564,401		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
7.7	1,107	0.2300	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	380	0.1100	18.37	551.23	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040 Mountain streams
0.0	37	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	839	0.1600	22.16	664.81	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
22.0	2,463	Total			

Summary for Subcatchment 2:

Runoff = 496.50 cfs @ 12.11 hrs, Volume= 32.349 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
11,753,294	77	Woods, Good, HSG D
5,671,078	80	Pasture/grassland/range, Good, HSG D
471,225	91	Gravel roads, HSG D
2,523,074	73	Brush, Good, HSG D
20,418,671	78	Weighted Average
20,418,671		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.1300	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.4	426	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	55	0.0700	0.80	7.99	**Channel Flow,** Area= 10.0 sf Perim= 21.0' r= 0.48' n= 0.300
0.3	363	0.2200	20.49	409.82	**Parabolic Channel,** W=15.00' D=2.00' Area=20.0 sf Perim=15.7' n= 0.040
0.6	458	0.1200	12.92	129.17	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040 Earth, cobble bottom, clean sides
0.0	75	0.2000	28.80	50.89	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	884	0.1400	16.71	668.34	**Parabolic Channel,** W=30.00' D=2.00' Area=40.0 sf Perim=30.4' n= 0.040
17.4	2,361	Total			

Summary for Subcatchment 3:

Runoff = 354.45 cfs @ 12.16 hrs, Volume= 26.222 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
15,146,426	77	Woods, Good, HSG D
440,366	80	Pasture/grassland/range, Good, HSG D
211,820	91	Gravel roads, HSG D
1,824,254	73	Brush, Good, HSG D
17,622,866	77	Weighted Average
17,622,866		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
6.6	816	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	227	0.1100	12.37	123.67	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040
0.1	90	0.0400	12.88	22.76	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.7	196	0.0700	4.72	62.99	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.6	887	0.2300	26.57	797.08	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.1	65	0.1200	19.75	24.24	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.6	900	0.2100	25.39	761.64	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
21.3	3,281	Total			

Summary for Subcatchment 4:

Runoff = 347.95 cfs @ 12.72 hrs, Volume= 55.027 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
32,546,920	77	Woods, Good, HSG D
1,235,533	80	Pasture/grassland/range, Good, HSG D
482,992	91	Gravel roads, HSG D
3,548,856	73	Brush, Good, HSG D
37,814,301	77	Weighted Average
37,814,301		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
9.6	1,316	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.5	1,686	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	50	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.4	1,315	0.0800	15.67	470.09	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.0	50	0.1200	22.31	39.42	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	936	0.1000	17.52	525.58	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.2	131	0.0200	9.49	506.20	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
1.0	36	0.0400	0.60	6.04	**Channel Flow,** Area= 10.0 sf Perim= 21.0' r= 0.48' n= 0.300
1.1	969	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
0.0	60	0.1000	20.36	35.99	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
2.0	1,817	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
0.1	50	0.0400	12.88	22.76	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.8	1,880	0.0500	17.41	1,451.17	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.2	159	0.0400	15.58	1,297.97	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.1	80	0.1000	20.36	35.99	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	1,356	0.1000	24.63	2,052.27	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
64.6	11,991	Total			

Summary for Subcatchment 5:

Runoff = 473.32 cfs @ 12.13 hrs, Volume= 33.095 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
19,035,013	77	Woods, Good, HSG D
991,684	80	Pasture/grassland/range, Good, HSG D
227,124	91	Gravel roads, HSG D
1,967,577	73	Brush, Good, HSG D
22,221,398	77	Weighted Average
22,221,398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.7	509	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	62	0.0600	15.77	27.87	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	100	0.0700	4.72	62.99	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
1.4	725	0.2400	8.75	116.63	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.4	680	0.2800	29.32	879.46	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
19.3	2,176	Total			

Summary for Subcatchment 6:

Runoff = 490.93 cfs @ 12.16 hrs, Volume= 36.225 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
20,988,878	77	Woods, Good, HSG D
1,323,336	80	Pasture/grassland/range, Good, HSG D
197,632	91	Gravel roads, HSG D
1,834,763	73	Brush, Good, HSG D
24,344,609	77	Weighted Average
24,344,609		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	300	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	70	0.0600	15.77	27.87	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	100	0.2600	11.93	238.67	**Channel Flow,** Area= 20.0 sf Perim= 40.0' r= 0.50' n= 0.040
1.5	952	0.3600	10.71	142.84	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.1	76	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	82	0.2700	9.28	123.70	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.9	1,032	0.1300	19.98	599.25	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
21.2	2,712	Total			

Summary for Subcatchment 6A:

Runoff = 2.08 cfs @ 11.95 hrs, Volume= 0.092 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
9,053	98	Roofs, HSG D
6,404	91	Gravel roads, HSG D
11,248	80	>75% Grass cover, Good, HSG D
3,423	98	Water Surface, 0% imp, HSG D
30,128	90	Weighted Average
21,075		69.95% Pervious Area
9,053		30.05% Impervious Area

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

Summary for Subcatchment 6B:

Runoff = 2.97 cfs @ 11.95 hrs, Volume= 0.132 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
34,313	91	Gravel roads, HSG D
2,949	80	>75% Grass cover, Good, HSG D
3,977	98	Water Surface, HSG D
41,239	91	Weighted Average
37,262		90.36% Pervious Area
3,977		9.64% Impervious Area

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

Summary for Subcatchment 6C:

Runoff = 0.34 cfs @ 11.96 hrs, Volume= 0.015 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
2,641	91	Gravel roads, HSG D
3,574	80	>75% Grass cover, Good, HSG D
6,215	85	Weighted Average
6,215		100.00% Pervious Area

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

Summary for Subcatchment 7:

Runoff = 171.37 cfs @ 12.18 hrs, Volume= 13.444 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
7,713,535	77	Woods, Good, HSG D
151,166	80	Pasture/grassland/range, Good, HSG D
139,044	91	Gravel roads, HSG D
1,040,280	73	Brush, Good, HSG D
9,044,025	77	Weighted Average
9,044,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
8.2	740	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	840	Total			

Summary for Subcatchment 8:

Runoff = 136.04 cfs @ 12.26 hrs, Volume= 12.478 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.70"

Area (sf)	CN	Description
6,554,029	77	Woods, Good, HSG D
763,982	80	Pasture/grassland/range, Good, HSG D
154,176	91	Gravel roads, HSG D
948,334	73	Brush, Good, HSG D
8,420,521	77	Weighted Average
8,420,521		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
12.0	1,389	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.7	1,489	Total			

Summary for Reach 1R: S of Ridge

Inflow Area = 1,897.501 ac, 0.02% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 1,047.71 cfs @ 12.14 hrs, Volume= 123.825 af
Outflow = 1,047.71 cfs @ 12.14 hrs, Volume= 123.825 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 2R: N of Ridge

Inflow Area = 914.698 ac, 0.00% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 825.15 cfs @ 12.14 hrs, Volume= 59.317 af
Outflow = 825.15 cfs @ 12.14 hrs, Volume= 59.317 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM1: Flagstaff

Inflow Area = 193.309 ac, 0.00% Impervious, Inflow Depth > 0.77" for 2 YR event
Inflow = 136.04 cfs @ 12.26 hrs, Volume= 12.478 af
Outflow = 136.04 cfs @ 12.26 hrs, Volume= 12.478 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM2: Gilman Pond

Inflow Area = 2,812.200 ac, 0.01% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 1,872.78 cfs @ 12.14 hrs, Volume= 183.142 af
Outflow = 1,872.78 cfs @ 12.14 hrs, Volume= 183.142 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM3: Carabassett

Inflow Area = 207.622 ac, 0.00% Impervious, Inflow Depth > 0.78" for 2 YR event
Inflow = 171.37 cfs @ 12.18 hrs, Volume= 13.444 af
Outflow = 171.37 cfs @ 12.18 hrs, Volume= 13.444 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM4: Kennebec

Inflow Area = 609.835 ac, 0.00% Impervious, Inflow Depth > 0.83" for 2 YR event
Inflow = 561.48 cfs @ 12.16 hrs, Volume= 41.996 af
Outflow = 561.48 cfs @ 12.16 hrs, Volume= 41.996 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond USF1: USF1

Inflow Area = 0.692 ac, 30.05% Impervious, Inflow Depth > 1.59" for 2 YR event
Inflow = 2.08 cfs @ 11.95 hrs, Volume= 0.092 af
Outflow = 1.11 cfs @ 12.05 hrs, Volume= 0.085 af, Atten= 47%, Lag= 5.5 min
Primary = 1.11 cfs @ 12.05 hrs, Volume= 0.085 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,473.30' @ 12.05 hrs Surf.Area= 1,655 sf Storage= 1,170 cf

Plug-Flow detention time= 49.0 min calculated for 0.085 af (93% of inflow)
Center-of-Mass det. time= 23.9 min (795.6 - 771.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,471.33'	4,402 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,471.33	1,655	0.0	0	0
1,472.49	1,655	40.0	768	768
1,472.50	1,655	30.0	5	773
1,473.99	1,655	30.0	740	1,513
1,474.00	1,655	100.0	17	1,529
1,474.50	1,824	100.0	870	2,399
1,475.00	2,001	100.0	956	3,355
1,475.50	2,185	100.0	1,047	4,402

Device	Routing	Invert	Outlet Devices
#1	Primary	1,471.67'	**6.0" Round Culvert** L= 84.0' CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,469.67' S= 0.0238 '/' Cc= 0.900 n= 0.010
#2	Secondary	1,475.50'	**20.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.11 cfs @ 12.05 hrs HW=1,473.29' (Free Discharge)
1=Culvert (Inlet Controls 1.11 cfs @ 5.64 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,471.33' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond USF2: USF2

Inflow Area = 0.947 ac, 9.64% Impervious, Inflow Depth > 1.67" for 2 YR event
Inflow = 2.97 cfs @ 11.95 hrs, Volume= 0.132 af
Outflow = 1.37 cfs @ 12.06 hrs, Volume= 0.124 af, Atten= 54%, Lag= 6.3 min
Primary = 1.37 cfs @ 12.06 hrs, Volume= 0.124 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,472.01' @ 12.06 hrs Surf.Area= 1,886 sf Storage= 1,759 cf

Plug-Flow detention time= 46.2 min calculated for 0.124 af (94% of inflow)
Center-of-Mass det. time= 24.6 min (792.5 - 767.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,469.33'	5,233 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,469.33	1,879	0.0	0	0
1,470.49	1,879	40.0	872	872
1,470.50	1,879	30.0	6	877
1,471.99	1,879	30.0	840	1,717
1,472.00	1,879	100.0	19	1,736
1,472.50	2,177	100.0	1,014	2,750
1,473.00	2,482	100.0	1,165	3,915
1,473.50	2,792	100.0	1,319	5,233

Device	Routing	Invert	Outlet Devices
#1	Primary	1,469.67'	**6.0" Round Culvert** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,467.00' S= 0.0607 '/' Cc= 0.900 n= 0.010
#2	Secondary	1,473.50'	**20.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.36 cfs @ 12.06 hrs HW=1,472.00' (Free Discharge)
1=Culvert (Inlet Controls 1.36 cfs @ 6.94 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,469.33' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment 1:

Runoff = 1,251.55 cfs @ 12.15 hrs, Volume= 91.289 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
18,261,262	77	Woods, Good, HSG D
8,063,939	80	Pasture/grassland/range, Good, HSG D
239,200	91	Gravel roads, HSG D
26,564,401	78	Weighted Average
26,564,401		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
7.7	1,107	0.2300	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	380	0.1100	18.37	551.23	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040 Mountain streams
0.0	37	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	839	0.1600	22.16	664.81	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
22.0	2,463	Total			

Summary for Subcatchment 2:

Runoff = 1,098.96 cfs @ 12.10 hrs, Volume= 70.294 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
11,753,294	77	Woods, Good, HSG D
5,671,078	80	Pasture/grassland/range, Good, HSG D
471,225	91	Gravel roads, HSG D
2,523,074	73	Brush, Good, HSG D
20,418,671	78	Weighted Average
20,418,671		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.1300	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.4	426	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	55	0.0700	0.80	7.99	**Channel Flow,** Area= 10.0 sf Perim= 21.0' r= 0.48' n= 0.300
0.3	363	0.2200	20.49	409.82	**Parabolic Channel,** W=15.00' D=2.00' Area=20.0 sf Perim=15.7' n= 0.040
0.6	458	0.1200	12.92	129.17	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040 Earth, cobble bottom, clean sides
0.0	75	0.2000	28.80	50.89	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	884	0.1400	16.71	668.34	**Parabolic Channel,** W=30.00' D=2.00' Area=40.0 sf Perim=30.4' n= 0.040
17.4	2,361	Total			

Summary for Subcatchment 3:

Runoff = 810.56 cfs @ 12.15 hrs, Volume= 58.110 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
15,146,426	77	Woods, Good, HSG D
440,366	80	Pasture/grassland/range, Good, HSG D
211,820	91	Gravel roads, HSG D
1,824,254	73	Brush, Good, HSG D
17,622,866	77	Weighted Average
17,622,866		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
6.6	816	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	227	0.1100	12.37	123.67	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040
0.1	90	0.0400	12.88	22.76	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.7	196	0.0700	4.72	62.99	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.6	887	0.2300	26.57	797.08	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.1	65	0.1200	19.75	24.24	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.6	900	0.2100	25.39	761.64	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
21.3	3,281	Total			

Summary for Subcatchment 4:

Runoff = 813.38 cfs @ 12.70 hrs, Volume= 122.396 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
32,546,920	77	Woods, Good, HSG D
1,235,533	80	Pasture/grassland/range, Good, HSG D
482,992	91	Gravel roads, HSG D
3,548,856	73	Brush, Good, HSG D
37,814,301	77	Weighted Average
37,814,301		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
9.6	1,316	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.5	1,686	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	50	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.4	1,315	0.0800	15.67	470.09	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.0	50	0.1200	22.31	39.42	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	936	0.1000	17.52	525.58	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.2	131	0.0200	9.49	506.20	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
1.0	36	0.0400	0.60	6.04	**Channel Flow,** Area= 10.0 sf Perim= 21.0' r= 0.48' n= 0.300
1.1	969	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
0.0	60	0.1000	20.36	35.99	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
2.0	1,817	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
0.1	50	0.0400	12.88	22.76	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.8	1,880	0.0500	17.41	1,451.17	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.2	159	0.0400	15.58	1,297.97	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.1	80	0.1000	20.36	35.99	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	1,356	0.1000	24.63	2,052.27	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
64.6	11,991	Total			

Summary for Subcatchment 5:

Runoff = 1,082.10 cfs @ 12.12 hrs, Volume= 73.331 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
19,035,013	77	Woods, Good, HSG D
991,684	80	Pasture/grassland/range, Good, HSG D
227,124	91	Gravel roads, HSG D
1,967,577	73	Brush, Good, HSG D
22,221,398	77	Weighted Average
22,221,398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.7	509	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	62	0.0600	15.77	27.87	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	100	0.0700	4.72	62.99	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
1.4	725	0.2400	8.75	116.63	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.4	680	0.2800	29.32	879.46	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
19.3	2,176	Total			

Summary for Subcatchment 6:

Runoff = 1,122.53 cfs @ 12.15 hrs, Volume= 80.277 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
20,988,878	77	Woods, Good, HSG D
1,323,336	80	Pasture/grassland/range, Good, HSG D
197,632	91	Gravel roads, HSG D
1,834,763	73	Brush, Good, HSG D
24,344,609	77	Weighted Average
24,344,609		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	300	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	70	0.0600	15.77	27.87	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	100	0.2600	11.93	238.67	**Channel Flow,** Area= 20.0 sf Perim= 40.0' r= 0.50' n= 0.040
1.5	952	0.3600	10.71	142.84	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.1	76	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	82	0.2700	9.28	123.70	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.9	1,032	0.1300	19.98	599.25	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
21.2	2,712	Total			

Summary for Subcatchment 6A:

Runoff = 3.56 cfs @ 11.95 hrs, Volume= 0.163 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
9,053	98	Roofs, HSG D
6,404	91	Gravel roads, HSG D
11,248	80	>75% Grass cover, Good, HSG D
3,423	98	Water Surface, 0% imp, HSG D
30,128	90	Weighted Average
21,075		69.95% Pervious Area
9,053		30.05% Impervious Area

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

Summary for Subcatchment 6B:

Runoff = 4.99 cfs @ 11.95 hrs, Volume= 0.230 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
34,313	91	Gravel roads, HSG D
2,949	80	>75% Grass cover, Good, HSG D
3,977	98	Water Surface, HSG D
41,239	91	Weighted Average
37,262		90.36% Pervious Area
3,977		9.64% Impervious Area

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

Summary for Subcatchment 6C:

Runoff = 0.64 cfs @ 11.96 hrs, Volume= 0.028 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
2,641	91	Gravel roads, HSG D
3,574	80	>75% Grass cover, Good, HSG D
6,215	85	Weighted Average
6,215		100.00% Pervious Area

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

Summary for Subcatchment 7:

Runoff = 394.20 cfs @ 12.17 hrs, Volume= 29.798 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
7,713,535	77	Woods, Good, HSG D
151,166	80	Pasture/grassland/range, Good, HSG D
139,044	91	Gravel roads, HSG D
1,040,280	73	Brush, Good, HSG D
9,044,025	77	Weighted Average
9,044,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
8.2	740	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	840	Total			

Summary for Subcatchment 8:

Runoff = 314.09 cfs @ 12.25 hrs, Volume= 27.672 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
6,554,029	77	Woods, Good, HSG D
763,982	80	Pasture/grassland/range, Good, HSG D
154,176	91	Gravel roads, HSG D
948,334	73	Brush, Good, HSG D
8,420,521	77	Weighted Average
8,420,521		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
12.0	1,389	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.7	1,489	Total			

Summary for Reach 1R: S of Ridge

Inflow Area = 1,897.501 ac, 0.02% Impervious, Inflow Depth > 1.73" for 10 YR event
Inflow = 2,413.61 cfs @ 12.13 hrs, Volume= 273.374 af
Outflow = 2,413.61 cfs @ 12.13 hrs, Volume= 273.374 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 2R: N of Ridge

Inflow Area = 914.698 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 YR event
Inflow = 1,883.81 cfs @ 12.13 hrs, Volume= 131.440 af
Outflow = 1,883.81 cfs @ 12.13 hrs, Volume= 131.440 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM1: Flagstaff

Inflow Area = 193.309 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 YR event
Inflow = 314.09 cfs @ 12.25 hrs, Volume= 27.672 af
Outflow = 314.09 cfs @ 12.25 hrs, Volume= 27.672 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM2: Gilman Pond

Inflow Area = 2,812.200 ac, 0.01% Impervious, Inflow Depth > 1.73" for 10 YR event
Inflow = 4,297.36 cfs @ 12.13 hrs, Volume= 404.814 af
Outflow = 4,297.36 cfs @ 12.13 hrs, Volume= 404.814 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM3: Carabassett

Inflow Area = 207.622 ac, 0.00% Impervious, Inflow Depth > 1.72" for 10 YR event
Inflow = 394.20 cfs @ 12.17 hrs, Volume= 29.798 af
Outflow = 394.20 cfs @ 12.17 hrs, Volume= 29.798 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM4: Kennebec

Inflow Area = 609.835 ac, 0.00% Impervious, Inflow Depth > 1.80" for 10 YR event
Inflow = 1,251.55 cfs @ 12.15 hrs, Volume= 91.289 af
Outflow = 1,251.55 cfs @ 12.15 hrs, Volume= 91.289 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond USF1: USF1

Inflow Area = 0.692 ac, 30.05% Impervious, Inflow Depth > 2.82" for 10 YR event
Inflow = 3.56 cfs @ 11.95 hrs, Volume= 0.163 af
Outflow = 1.38 cfs @ 12.07 hrs, Volume= 0.156 af, Atten= 61%, Lag= 6.9 min
Primary = 1.38 cfs @ 12.07 hrs, Volume= 0.156 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,474.33' @ 12.07 hrs Surf.Area= 1,765 sf Storage= 2,087 cf

Plug-Flow detention time= 40.3 min calculated for 0.155 af (95% of inflow)
Center-of-Mass det. time= 23.7 min (782.2 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,471.33'	4,402 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,471.33	1,655	0.0	0	0
1,472.49	1,655	40.0	768	768
1,472.50	1,655	30.0	5	773
1,473.99	1,655	30.0	740	1,513
1,474.00	1,655	100.0	17	1,529
1,474.50	1,824	100.0	870	2,399
1,475.00	2,001	100.0	956	3,355
1,475.50	2,185	100.0	1,047	4,402

Device	Routing	Invert	Outlet Devices
#1	Primary	1,471.67'	**6.0" Round Culvert** L= 84.0' CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,469.67' S= 0.0238 '/' Cc= 0.900 n= 0.010
#2	Secondary	1,475.50'	**20.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.38 cfs @ 12.07 hrs HW=1,474.31' (Free Discharge)
1=Culvert (Barrel Controls 1.38 cfs @ 7.01 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,471.33' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond USF2: USF2

Inflow Area = 0.947 ac, 9.64% Impervious, Inflow Depth > 2.92" for 10 YR event
Inflow = 4.99 cfs @ 11.95 hrs, Volume= 0.230 af
Outflow = 1.58 cfs @ 12.08 hrs, Volume= 0.222 af, Atten= 68%, Lag= 7.8 min
Primary = 1.58 cfs @ 12.08 hrs, Volume= 0.222 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,472.70' @ 12.08 hrs Surf.Area= 2,296 sf Storage= 3,188 cf

Plug-Flow detention time= 40.2 min calculated for 0.222 af (96% of inflow)
Center-of-Mass det. time= 25.9 min (781.1 - 755.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,469.33'	5,233 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,469.33	1,879	0.0	0	0
1,470.49	1,879	40.0	872	872
1,470.50	1,879	30.0	6	877
1,471.99	1,879	30.0	840	1,717
1,472.00	1,879	100.0	19	1,736
1,472.50	2,177	100.0	1,014	2,750
1,473.00	2,482	100.0	1,165	3,915
1,473.50	2,792	100.0	1,319	5,233

Device	Routing	Invert	Outlet Devices
#1	Primary	1,469.67'	**6.0" Round Culvert** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,467.00' S= 0.0607 '/' Cc= 0.900 n= 0.010
#2	Secondary	1,473.50'	**20.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.57 cfs @ 12.08 hrs HW=1,472.69' (Free Discharge)
1=Culvert (Inlet Controls 1.57 cfs @ 8.01 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,469.33' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment 1:

Runoff = 1,571.23 cfs @ 12.15 hrs, Volume= 114.610 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
18,261,262	77	Woods, Good, HSG D
8,063,939	80	Pasture/grassland/range, Good, HSG D
239,200	91	Gravel roads, HSG D
26,564,401	78	Weighted Average
26,564,401		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
7.7	1,107	0.2300	2.40		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	380	0.1100	18.37	551.23	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040 Mountain streams
0.0	37	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	839	0.1600	22.16	664.81	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
22.0	2,463	Total			

Summary for Subcatchment 2:

Runoff = 1,377.40 cfs @ 12.10 hrs, Volume= 88.244 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
11,753,294	77	Woods, Good, HSG D
5,671,078	80	Pasture/grassland/range, Good, HSG D
471,225	91	Gravel roads, HSG D
2,523,074	73	Brush, Good, HSG D
20,418,671	78	Weighted Average
20,418,671		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.1300	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.4	426	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	55	0.0700	0.80	7.99	**Channel Flow,** Area= 10.0 sf Perim= 21.0' r= 0.48' n= 0.300
0.3	363	0.2200	20.49	409.82	**Parabolic Channel,** W=15.00' D=2.00' Area=20.0 sf Perim=15.7' n= 0.040
0.6	458	0.1200	12.92	129.17	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040 Earth, cobble bottom, clean sides
0.0	75	0.2000	28.80	50.89	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	884	0.1400	16.71	668.34	**Parabolic Channel,** W=30.00' D=2.00' Area=40.0 sf Perim=30.4' n= 0.040
17.4	2,361	Total			

Summary for Subcatchment 3:

Runoff = 1,023.42 cfs @ 12.15 hrs, Volume= 73.302 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
15,146,426	77	Woods, Good, HSG D
440,366	80	Pasture/grassland/range, Good, HSG D
211,820	91	Gravel roads, HSG D
1,824,254	73	Brush, Good, HSG D
17,622,866	77	Weighted Average
17,622,866		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
6.6	816	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	227	0.1100	12.37	123.67	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=2.00' Z= 2.0 '/' Top.W=9.00' n= 0.040
0.1	90	0.0400	12.88	22.76	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.7	196	0.0700	4.72	62.99	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.6	887	0.2300	26.57	797.08	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.1	65	0.1200	19.75	24.24	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.6	900	0.2100	25.39	761.64	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
21.3	3,281	Total			

Summary for Subcatchment 4:

Runoff = 1,032.16 cfs @ 12.70 hrs, Volume= 154.535 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
32,546,920	77	Woods, Good, HSG D
1,235,533	80	Pasture/grassland/range, Good, HSG D
482,992	91	Gravel roads, HSG D
3,548,856	73	Brush, Good, HSG D
37,814,301	77	Weighted Average
37,814,301		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.8	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
9.6	1,316	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.5	1,686	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	50	0.0800	18.21	32.19	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.4	1,315	0.0800	15.67	470.09	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.0	50	0.1200	22.31	39.42	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	936	0.1000	17.52	525.58	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
0.2	131	0.0200	9.49	506.20	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
1.0	36	0.0400	0.60	6.04	**Channel Flow,** Area= 10.0 sf Perim= 21.0' r= 0.48' n= 0.300
1.1	969	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
0.0	60	0.1000	20.36	35.99	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
2.0	1,817	0.0500	15.01	800.37	**Parabolic Channel,** W=20.00' D=4.00' Area=53.3 sf Perim=22.0' n= 0.040
0.1	50	0.0400	12.88	22.76	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.8	1,880	0.0500	17.41	1,451.17	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.2	159	0.0400	15.58	1,297.97	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
0.1	80	0.1000	20.36	35.99	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	1,356	0.1000	24.63	2,052.27	**Parabolic Channel,** W=25.00' D=5.00' Area=83.3 sf Perim=27.5' n= 0.040
64.6	11,991	Total			

Summary for Subcatchment 5:

Runoff = 1,365.64 cfs @ 12.12 hrs, Volume= 92.498 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
19,035,013	77	Woods, Good, HSG D
991,684	80	Pasture/grassland/range, Good, HSG D
227,124	91	Gravel roads, HSG D
1,967,577	73	Brush, Good, HSG D
22,221,398	77	Weighted Average
22,221,398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.7	509	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	62	0.0600	15.77	27.87	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	100	0.0700	4.72	62.99	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
1.4	725	0.2400	8.75	116.63	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.4	680	0.2800	29.32	879.46	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
19.3	2,176	Total			

Summary for Subcatchment 6:

Runoff = 1,417.28 cfs @ 12.14 hrs, Volume= 101.264 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
20,988,878	77	Woods, Good, HSG D
1,323,336	80	Pasture/grassland/range, Good, HSG D
197,632	91	Gravel roads, HSG D
1,834,763	73	Brush, Good, HSG D
24,344,609	77	Weighted Average
24,344,609		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	300	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	70	0.0600	15.77	27.87	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	100	0.2600	11.93	238.67	**Channel Flow,** Area= 20.0 sf Perim= 40.0' r= 0.50' n= 0.040
1.5	952	0.3600	10.71	142.84	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.1	76	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	82	0.2700	9.28	123.70	**Parabolic Channel,** W=40.00' D=0.50' Area=13.3 sf Perim=40.0' n= 0.040
0.9	1,032	0.1300	19.98	599.25	**Parabolic Channel,** W=15.00' D=3.00' Area=30.0 sf Perim=16.5' n= 0.040
21.2	2,712	Total			

Summary for Subcatchment 6A:

Runoff = 4.19 cfs @ 11.95 hrs, Volume= 0.194 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
9,053	98	Roofs, HSG D
6,404	91	Gravel roads, HSG D
11,248	80	>75% Grass cover, Good, HSG D
3,423	98	Water Surface, 0% imp, HSG D
30,128	90	Weighted Average
21,075		69.95% Pervious Area
9,053		30.05% Impervious Area

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

Summary for Subcatchment 6B:

Runoff = 5.85 cfs @ 11.95 hrs, Volume= 0.273 af, Depth> 3.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
34,313	91	Gravel roads, HSG D
2,949	80	>75% Grass cover, Good, HSG D
3,977	98	Water Surface, HSG D
41,239	91	Weighted Average
37,262		90.36% Pervious Area
3,977		9.64% Impervious Area

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

Summary for Subcatchment 6C:

Runoff = 0.77 cfs @ 11.95 hrs, Volume= 0.034 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
2,641	91	Gravel roads, HSG D
3,574	80	>75% Grass cover, Good, HSG D
6,215	85	Weighted Average
6,215		100.00% Pervious Area

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

Summary for Subcatchment 7:

Runoff = 498.13 cfs @ 12.17 hrs, Volume= 37.590 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
7,713,535	77	Woods, Good, HSG D
151,166	80	Pasture/grassland/range, Good, HSG D
139,044	91	Gravel roads, HSG D
1,040,280	73	Brush, Good, HSG D
9,044,025	77	Weighted Average
9,044,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
8.2	740	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	840	Total			

Summary for Subcatchment 8:

Runoff = 397.45 cfs @ 12.25 hrs, Volume= 34.912 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.70"

Area (sf)	CN	Description
6,554,029	77	Woods, Good, HSG D
763,982	80	Pasture/grassland/range, Good, HSG D
154,176	91	Gravel roads, HSG D
948,334	73	Brush, Good, HSG D
8,420,521	77	Weighted Average
8,420,521		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
12.0	1,389	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.7	1,489	Total			

Summary for Reach 1R: S of Ridge

Inflow Area = 1,897.501 ac, 0.02% Impervious, Inflow Depth > 2.18" for 25 YR event
Inflow = 3,052.80 cfs @ 12.13 hrs, Volume= 344.529 af
Outflow = 3,052.80 cfs @ 12.13 hrs, Volume= 344.529 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 2R: N of Ridge

Inflow Area = 914.698 ac, 0.00% Impervious, Inflow Depth > 2.18" for 25 YR event
Inflow = 2,377.75 cfs @ 12.13 hrs, Volume= 165.800 af
Outflow = 2,377.75 cfs @ 12.13 hrs, Volume= 165.800 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM1: Flagstaff

Inflow Area = 193.309 ac, 0.00% Impervious, Inflow Depth > 2.17" for 25 YR event
Inflow = 397.45 cfs @ 12.25 hrs, Volume= 34.912 af
Outflow = 397.45 cfs @ 12.25 hrs, Volume= 34.912 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM2: Gilman Pond

Inflow Area = 2,812.200 ac, 0.01% Impervious, Inflow Depth > 2.18" for 25 YR event
Inflow = 5,430.50 cfs @ 12.13 hrs, Volume= 510.329 af
Outflow = 5,430.50 cfs @ 12.13 hrs, Volume= 510.329 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM3: Carabassett

Inflow Area = 207.622 ac, 0.00% Impervious, Inflow Depth > 2.17" for 25 YR event
Inflow = 498.13 cfs @ 12.17 hrs, Volume= 37.590 af
Outflow = 498.13 cfs @ 12.17 hrs, Volume= 37.590 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SUM4: Kennebec

Inflow Area = 609.835 ac, 0.00% Impervious, Inflow Depth > 2.26" for 25 YR event
Inflow = 1,571.23 cfs @ 12.15 hrs, Volume= 114.610 af
Outflow = 1,571.23 cfs @ 12.15 hrs, Volume= 114.610 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond USF1: USF1

Inflow Area = 0.692 ac, 30.05% Impervious, Inflow Depth > 3.36" for 25 YR event
Inflow = 4.19 cfs @ 11.95 hrs, Volume= 0.194 af
Outflow = 1.42 cfs @ 12.07 hrs, Volume= 0.187 af, Atten= 66%, Lag= 7.3 min
Primary = 1.42 cfs @ 12.07 hrs, Volume= 0.187 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,474.59' @ 12.07 hrs Surf.Area= 1,855 sf Storage= 2,559 cf

Plug-Flow detention time= 38.8 min calculated for 0.187 af (96% of inflow)
Center-of-Mass det. time= 24.2 min (778.8 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,471.33'	4,402 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,471.33	1,655	0.0	0	0
1,472.49	1,655	40.0	768	768
1,472.50	1,655	30.0	5	773
1,473.99	1,655	30.0	740	1,513
1,474.00	1,655	100.0	17	1,529
1,474.50	1,824	100.0	870	2,399
1,475.00	2,001	100.0	956	3,355
1,475.50	2,185	100.0	1,047	4,402

Device	Routing	Invert	Outlet Devices
#1	Primary	1,471.67'	**6.0" Round Culvert** L= 84.0' CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,469.67' S= 0.0238 '/' Cc= 0.900 n= 0.010
#2	Secondary	1,475.50'	**20.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.42 cfs @ 12.07 hrs HW=1,474.57' (Free Discharge)
1=Culvert (Barrel Controls 1.42 cfs @ 7.22 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,471.33' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond USF2: USF2

Inflow Area = 0.947 ac, 9.64% Impervious, Inflow Depth > 3.46" for 25 YR event
Inflow = 5.85 cfs @ 11.95 hrs, Volume= 0.273 af
Outflow = 1.65 cfs @ 12.09 hrs, Volume= 0.265 af, Atten= 72%, Lag= 8.4 min
Primary = 1.65 cfs @ 12.09 hrs, Volume= 0.265 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,472.98' @ 12.09 hrs Surf.Area= 2,472 sf Storage= 3,875 cf

Plug-Flow detention time= 39.4 min calculated for 0.264 af (97% of inflow)
Center-of-Mass det. time= 26.9 min (778.6 - 751.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,469.33'	5,233 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,469.33	1,879	0.0	0	0
1,470.49	1,879	40.0	872	872
1,470.50	1,879	30.0	6	877
1,471.99	1,879	30.0	840	1,717
1,472.00	1,879	100.0	19	1,736
1,472.50	2,177	100.0	1,014	2,750
1,473.00	2,482	100.0	1,165	3,915
1,473.50	2,792	100.0	1,319	5,233

Device	Routing	Invert	Outlet Devices
#1	Primary	1,469.67'	**6.0" Round Culvert** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,467.00' S= 0.0607 '/' Cc= 0.900 n= 0.010
#2	Secondary	1,473.50'	**20.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.65 cfs @ 12.09 hrs HW=1,472.98' (Free Discharge)
1=Culvert (Inlet Controls 1.65 cfs @ 8.42 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,469.33' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Section 13
Rare Plants and Natural Areas

13.0 RARE PLANTS AND NATURAL AREAS

In advance of permitting for the proposed Highland Wind Project (Project) in Highland Plantation and Pleasant Ridge Plantation, Somerset County, Maine, Stantec Consulting (Stantec) consulted the Land Use Regulation Commission (LURC) *Land Use Guidance Maps* and contacted the Maine Natural Areas Program (MNAP) to determine if there were any known occurrences of rare, threatened or endangered plants, as well as rare or exemplary natural communities within the Project area. In addition to the MNAP database inquiry, Stantec field botanists and ecologists completed a series of ecological field surveys and evaluations in 2008 and 2009. Investigations of the occurrences of unusual botanical resources, including rare and exemplary natural communities present within the Project area, were completed concurrently with these field surveys. These surveys included:

- Summer and fall 2008 wetland and stream delineations;
- Spring 2009 vernal pool surveys;
- Summer and fall 2009 wetland and stream delineations; and
- Summer 2009 rare wildlife surveys.

The field surveys were completed throughout the Project area, including both the summit area and proposed generator lead corridor. The following discusses the results of these field efforts relative to rare, threatened, and endangered plants and rare and exemplary natural communities.

13.1 Results and Discussion

According to LURC *Land Use Guidance Maps* for Highland Plantation and Pleasant Ridge Plantation, there are no Unusual Area Protection Subdistricts,[1] which would include unique natural areas, mapped within the Project area. The response from MNAP indicated that there were no rare, threatened, or endangered plant species documented within the Project area. However, MNAP did indicate that the forests on Witham Mountain were identified in a landscape analysis as a potential exemplary natural community (see Appendix 13-1). MNAP recommended a field survey be conducted to determine if the forests on Witham Mountain meet the criteria of an exemplary natural community.

In response to MNAP's recommendations, Stantec field botanists and ecologists completed rare plant surveys and natural community evaluations of the Project area in late summer and fall of 2008, as well as the spring, summer, and fall of 2009. Field surveys were conducted concurrently with additional field evaluations, including wetland and stream delineations, vernal pool surveys, and rare wildlife surveys. Field surveys were systematically conducted throughout the Project area by walking evenly-spaced transects approximately 75 to 150 feet apart to provide thorough coverage of the Project area.

As a result of Stantec's field surveys, no rare, threatened, or endangered plants or natural communities were identified within the Project area, including the summit areas or the proposed generator lead corridor. The dominant matrix forest communities within the Project area are characterized as a Spruce-Northern Hardwoods Forest and Beech-Birch-Maple Forests present within the mid and lower slopes of the ridgeline and generator lead alignment. Spruce-Fir-Broom-moss/Spruce-Fir-Wood-sorrel-Feather-moss transitional forests are present on the summits of Witham Mountain, Stewart Mountain, and Bald Mountain. These forested communities are considered common in Maine by MNAP. Furthermore, most of the forested communities within the Project area are second or third-growth forests that have been harvested for timber in the past.

The Beech-Birch-Maple matrix forest is characterized by sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*) in the forest canopy with an understory typically dominated by hobblebush (*Viburnum lantanoides*), starflower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), wild oats (*Uvularia sessilifolia*), and

[1] Unusual Area Protection Subdistricts include, but are not limited to historic or archeological sites or structures, scientific phenomena, natural areas, or important water supply sources.

evergreen wood fern (*Dryopteris intermedia*). Recent and historic timber harvests have occurred throughout these communities within the Project area.

The Spruce-Northern Hardwoods matrix forest is present throughout the Project area, including along the ridgeline and the lower elevations along the proposed transmission line. This forest is dominated by red spruce (*Picea rubens*), yellow birch, sugar maple, and balsam fir in the canopy with an understory generally dominated by evergreen wood fern, mountain wood fern (*Dryopteris campyloptera*), mountain wood-sorrel (*Oxalis montana*), hobblebush, wild sarsaparilla, starflower, Canada mayflower, whorled aster (*Oclemena acuminata*), large-leaved goldenrod (*Solidago macrophylla*), and shining firmoss (*Huperzia lucidula*). Recent and historic timber harvests have occurred within most of these communities within the Project area.

The Spruce-Fir matrix forests are present along the Witham, Bald, and Stewart Mountain summit areas. These forests generally represent a transition between Spruce-Fir-Broom-moss Forests and Spruce-Fir-Wood-sorrel-Feather-moss Forests. Species diversity is typically low within these forests. The canopy is dominated by red spruce and balsam fir trees with regenerating balsam fir and red spruce in the understory. Additional understory plants include mountain wood-sorrel, mountain wood fern, evergreen wood fern, starflower, and wild sarsaparilla. Historic timber harvests have generally occurred throughout these forested areas. However, portions of the forests on Stewart Mountain, as well as the steeper slopes of Bald and Witham Mountains, are generally intact with limited visible evidence of past timber harvests. Several red spruce trees on Stewart Mountain had ages between 80 and 103 years.

Regenerating forest stands resulting from recent timber harvests are present within the saddle between Stewart Mountain and Witham Mountain, as well as along the Burnt Hill and Briggs Hill ridgeline. Active timber harvests in 2009 were occurring around Witham Mountain and Burnt Hill. As a result of the historic and recent timber harvests throughout the Project area, these forested communities are not considered exemplary.

The summit area around Witham Mountain and Bald Mountain contain inclusions of Red Spruce-Mixed Conifer Woodlands within the larger (i.e., approximately 350-acre) Spruce-Fir matrix forest along this ridgeline. The Red Spruce-Mixed Conifer Woodland is a small-patch community that typically occurs in low-elevation summits with shallow soils and exposed bedrock. This community is dominated by scattered red spruce tress interspersed amongst lichen-covered ledges and outcrops. Species diversity is generally low within this community with lowbush blueberry (*Vaccinium angustifolium*) and bunchberry (*Cornus canadensis*) dominating the understory along with several moss and lichen species, including three-lobed bazzania (*Bazzania trilobata*), broom-moss (*Dicranum scoparium*), red-stemmed moss (*Pleurozium schreberi*), and *Cladonia* lichens (*Cladonia* spp.). This community is considered apparently secure (state rarity rank of S4) in Maine. The community covers approximately 40 acres on the summit of Witham Mountain and approximately 50 acres on the steep south and east facing slopes of Bald Mountain. Although the community covers a relatively large area for a small-patch community, the presence of recent timber harvests on the summit of Witham Mountain adjacent to this community, as well as historic harvests in and around it, do not support characterizing it as exemplary. The occurrence of the Red Spruce-Mixed Conifer Woodland on Bald Mountain largely occurs outside of the Project area on the steep east and south facing slopes that will not be impacted as a result of the proposed development.

Several small wetland communities are included within the larger matrix forest landscape. These typically include scrub-shrub wetlands dominated by speckled alder (*Alnus incana*), as well as forested wetlands dominated by balsam fir, yellow birch, and northern white cedar (*Thuja occidentalis*). Section 11 of this application details the results of the wetland field delineations within the Project area. None of the wetlands identified within the Project area are considered rare or exemplary. Most wetlands are small and have been impacted as a result of past timber harvests or other land use activities. However, three small but largely intact forested wetlands along the Witham and Stewart Mountain ridgeline were determined to support bog lemmings (*Synaptomys* spp.). The suspected occurrences of the state-endangered northern bog lemming (*Synaptomys borealis*) in these wetlands are further discussed in Section 12. Although not considered rare or exemplary based on their overall size and landscape

position, the potential presence of a state-endangered species of wildlife characterizes these wetland areas as unusual natural areas.

13.2 Summary

In summary, no rare, threatened, or endangered plant species were documented within the Project area as a result of a series of field surveys of the Project area. Furthermore, the natural communities present within the Project area are common within the northern Maine landscape and have been largely impacted as a result of past and present timber harvests. Targeted evaluations by Stantec ecologists of the Red Spruce-Mixed Conifer Woodland natural community on Witham and Bald Mountain did not characterize the community as exemplary based on historic timber harvests within and adjacent to these communities.

Appendix 13-1

STATE OF MAINE
DEPARTMENT OF CONSERVATION
93 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0093

JOHN ELIAS BALDACCI
GOVERNOR

PATRICK K. MCGOWAN
COMMISSIONER

August 27, 2008

Lisa MacDonald
Stantec Consulting
30 Park Drive
Topsham, ME 04086

Re: Rare and exemplary botanical features, Proposed Highland Wind Project, Highland Plantation, Maine.

Dear Ms. MacDonald:

I have searched the Natural Areas Program's digital, manual and map files in response to your request of August 13, 2008 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in the Town of Highlands Plantation, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to Steve Timpano, Environmental Coordinator, Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project areas. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. Note also, that Witham Mountain has been identified through landscape analysis as having the potential to support exemplary natural habitat. We recommend that a survey be conducted to determine if the forest on the ridge tops and upper slopes of the mountain meet the criteria for designation as an exemplary forest type.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project sites. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

MAINE NATURAL AREAS PROGRAM
MOLLY DOCHERTY, DIRECTOR

PHONE: (207) 287-8044
FAX: (207) 287-8040
TTY: (207) 287-2213

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $75.00 for our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Douglas Suitor
Associate Information Manager
Maine Natural Areas Program
207-287-8044
douglas.suitor@maine.gov

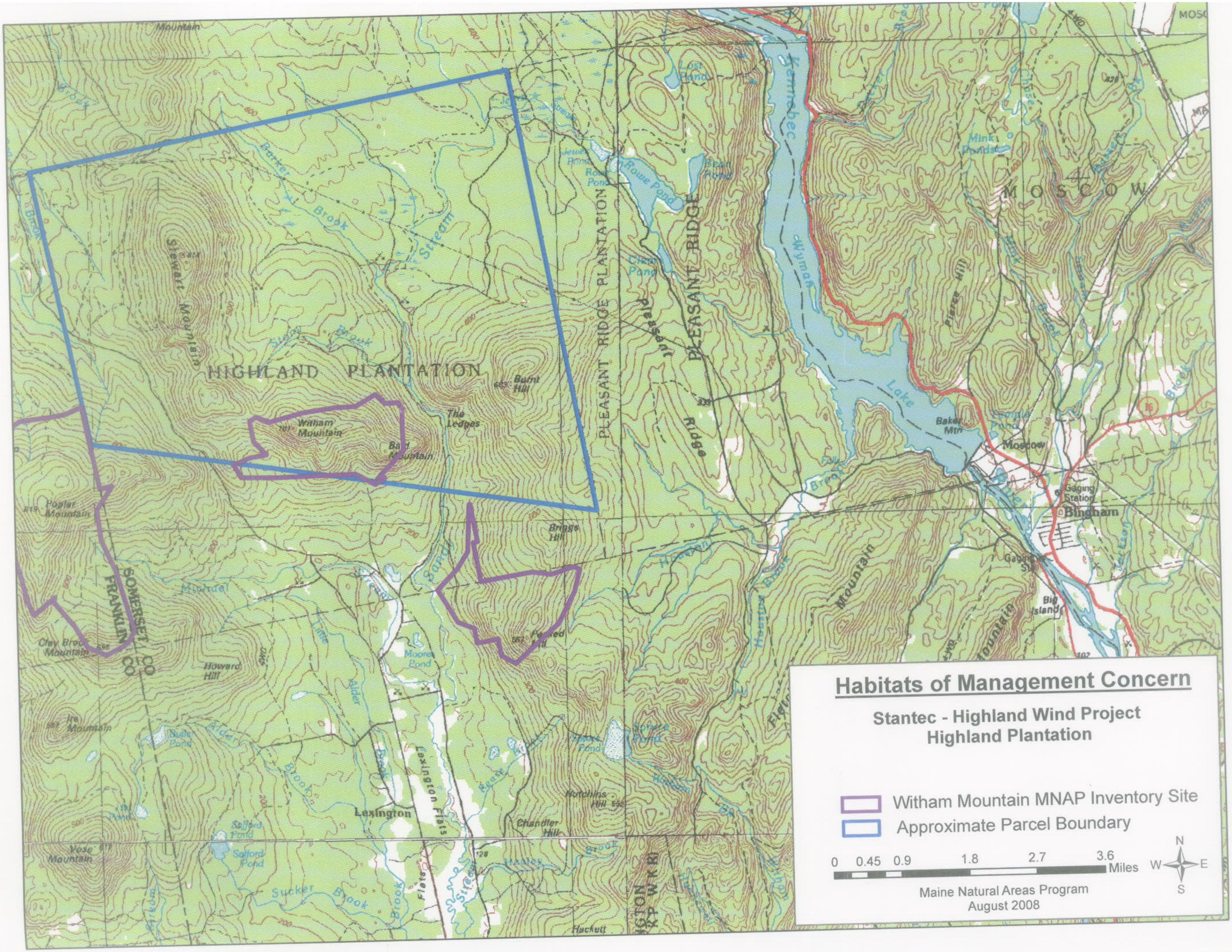
Enclosures

Rare and Exemplary Botanical Features in the Project Vicinity

8/27/2008

Documented within a Four-Mile Radius of the Proposed Highland Wind Project, Highland Plantation, Maine.

Scientific Name / Common Name	Last Seen	Global Rarity Rank	State Rarity Rank	State Protection Status	Habitat Description
Listera auriculata Auricled Twayblade	1896-08-20	G3G4	S2	T	Alluvial banks, calcareous silts or crevices, alder-thickets, and swamps.
Listera auriculata Auricled Twayblade	1978	G3G4	S2	T	Alluvial banks, calcareous silts or crevices, alder-thickets, and swamps.
Erigeron hyssopifolius Hyssop-leaved Fleabane	1906-07	G5	S2	SC	Calcareous rocks, talus and gravels.
Arnica lanceolata Hairy Arnica	1919-07-09	G3	S2	T	Ledgy or gravelly shores or wet cliffs, often subalpine.


Habitats of Management Concern
Stantec - Highland Wind Project
Highland Plantation
Witham Mountain MNAP Inventory Site
Approximate Parcel Boundary
0 0.45 0.9 1.8 2.7 3.6 Miles
N
E
S
W
Maine Natural Areas Program
August 2008
HIGHLAND PLANTATION
PLEASANT RIDGE PLANTATION
PLEASANT RIDGE
MOSCOW
Witham Mountain
Bald Mountain
The Ledges
Burnt Hill
Briggs Hill
Stewart Mountain
Barker Brook
Stream
Kennebec
Wyman
Lake
Rowe Pond
Lost Pond
Bingham
Moscow
Baker Mtn
Lexington
Lexington Flats
SOMERSET CO
FRANKLIN CO
Howard Hill
Poplar Mountain
Vose Mountain
Chandler Hill
Hutchins Hill
Sucker Brook
Gaging Station
Big Island

STATE RARITY RANKS

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.

S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

S3 Rare in Maine (20-100 occurrences).

S4 Apparently secure in Maine.

S5 Demonstrably secure in Maine.

SH Known historically from the state, not verified in the past 20 years.

SX Apparently extirpated from the state, loss of last known occurrence has been documented.

SU Under consideration for assigning rarity status; more information needed on threats or distribution.

S#? Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program.

GLOBAL RARITY RANKS

G1 Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.

G2 Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

G3 Globally rare (20-100 occurrences).

G4 Apparently secure globally.

G5 Demonstrably secure globally.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

E ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.

T THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

SC SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.

PE Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

Visit our website for more information on rare, threatened, and endangered species!
http://www.mainenaturalareas.org/docs/rare_plants/factsheets.php