MAINE POWER RELIABILITY PROGRAM

A CENTRAL MAINE POWER COMPANY PROGRAM

CUMBERLAND, MAINE

APPLICATION FOR SITE PLAN REVIEW

Raven Farm Substation

Prepared for:

Central Maine Power Company
Maine Power Reliability Program
25 Pearl Street, Suite 2
Portland, Maine 04101

Prepared by:

TRC Engineers, LLC
400 Southborough Drive
South Portland, ME 04106

August 2010

MAINE POWER
RELIABILITY PROGRAM
A CENTRAL MAINE POWER COMPANY PROGRAM
WWW.MAINEPOWER.COM

August 31, 2010

Mr. William Ward, Chairman
Planning Board
Town of Cumberland
290 Tuttle Road
Cumberland, ME 04021

RE: Application for Site Plan Review – Raven Farm Substation
Central Maine Power Company - Maine Power Reliability Program

Dear Mr. Ward:

The Maine Power Reliability Program (MPRP) is a project by Central Maine Power Company (CMP) to upgrade Maine's bulk power transmission system. In Cumberland, CMP proposes to construct a new substation (Raven Farm Substation) and realign and rebuild portions of existing 345 kV, 115 kV and 34.5 kV transmission lines leading into the substation site. The construction of these facilities in Cumberland will improve the reliability, safety, and security of the overall bulk power transmission system in Maine, while at the same time meet the increasing demands for electrical power for CMP's customers.

CMP is seeking Site Plan Review approval from the Cumberland Planning Board (Board) for the proposed Raven Farm Substation in Cumberland. This Site Plan Review Application covers the following activities:

- construction of the new Raven Farm Substation;
- realignment and reconstruction of short segments of existing 345 kV, 115 kV, and 34.5 kV transmission lines at the Raven Farm Substation site; and
- Connection of the 345 kV - Section 3020 transmission line at the substation site.

CMP also will propose at a later date to construct a new 345 kV transmission line (Section 3020) from Pownal to Cumberland within CMP's Segment 19 corridor as part of the MPRP. However, the local permitting of this transmission line has been delayed pending final approval by the PUC. The PUC has deferred construction of Section 3020 to further address design alternatives within the Segment 19 corridor. Once the PUC's analysis is complete and approval is issued, CMP will submit a separate Site Plan Review application to the Cumberland Planning Board for the portions of the proposed Section 3020 transmission line located in Cumberland. However, given the construction duration (12-18 months) and complexities of substation construction (i.e., power grid outages), CMP must file the substation Site Plan Review Application with the Board at this time. This is the purpose for submitting two separate applications to the Board;

one for the Raven Farm Substation site and a second for the Section 3020 transmission line in the Segment 19 corridor. CMP anticipates the PUC review will be completed by December 2010 and a Site Plan Review Application would be filed shortly thereafter with the Planning Board. Given the current MPRP schedule, project activities are scheduled to begin in Cumberland in January 2011.

All state and federal permits have been obtained for the Raven Farm Substation including approvals from the Maine Public Utilities Commission (PUC), Maine Department of Environmental Protection (MDEP), and U.S. Army Corps of Engineers. Electronic copies of these three permits are included on a compact disc filed with this Site Plan Review Application.

As required, we have enclosed 11 copies of the application package as well as the $2,100 application fee payable to the Town of Cumberland. In addition, we have also included a separate package that includes the following information discussed at the pre-application meeting held on August 17, 2010:

- August 10, 2010 Neighborhood Meeting Notes.
- Cumberland MPRP Communications Package – This package documents CMP's public outreach efforts for the MPRP in Cumberland.
- Copy of August 17, 2010 Pre-application Meeting Presentation

If you or any members of the Board have any questions regarding this application, please contact me at 879-1930 ext. 126 or rpaquette@trcsolutions.com.

Sincerely,

Richard C. Paquette Jr.

Richard C. Paquette, Jr., PWS
Senior Environmental Scientist

TABLE OF CONTENTS

SECTION 1.0

APPLICATION FORM

CHECKLIST

WAIVER REQUEST

Site Plan Application Form

APPLICANT INFORMATION

Applicant's Name: *Central Maine Power Company, Douglas Herling*
Applicant's Mailing Address: *83 Edison Drive, Augusta, ME 04336*
Phone: Home: *N/A* Work: *(207) 253-4094* Cell: *(207) 242-9205*
Email Address: *Douglas.Herling@cmpco.com* Fax #: *(207) 253-4079*
Interest in Property: Own: X Lease: Lease Agreement: ____ Purchase & Sale ____
Interest in Abutting Property (if any): X

PROJECT INFORMATION

Name of Project: *Maine Power Reliability Program*
Address of Project: *Raven Farm Substation, Greely Road, Cumberland, ME*
Tax Map # ____ Lot # ____ Deed Book #: ____ Deed Page #:
Multiple tax map/ lot numbers and deed references. See Section 4.0 and Section 8.0.
Zoning District: *RR2/RI* Overlay District (if any) *No* Size of Parcel: *74.4 acres*
Existing Buildings on Site: Yes: X No: ____ To be removed? Yes: X No: ____
Is the parcel in an approved or proposed subdivision? If so, provide name of subdivision: *No*

Is Board of Appeals Approval Required? (Required if proposed use is a special exception)
Yes: ____ No: X
Check all outside agency approvals required for this project:
Wetlands: MDEP X Tier 1 ___ Tier 2 ____ Army Corp of Engineers: X
Stormwater: MDEP General Construction ___ X ____
Traffic: MDOT Traffic Movement ____ MDOT Entrance Permit: X
Other outside agency approvals required (list): *Maine Public Utilities Commission*

CLASSIFICATION OF PROJECT

Major Site Plan ____ X ____ Minor Site Plan ____ Staff Review Minor Site Plan: ____

You must review the plan with the town planner or code enforcement officer to receive correct classification prior to submission of application.

Application Fees per Town's Fee Ordinance:	$500
Application Fee:	$100
Advertising and Abutter Notice Fee:	
Staff Review Fee:	
Outside Review Fee:	$1,500
TOTAL FEES:	***$2,100***

This application form along with the fee payment, submission checklist and all other supporting materials must be submitted to the Town Planner at least 21 days prior to the Planning Board meeting at which it will be considered.

The undersigned, being the applicant, owner or legally authorized representative, states that all information contained in this application is true and correct to the best of his/her knowledge and hereby does submit the information for review by the Town and in accordance with applicable ordinances, statutes and regulation of the Town, State and Federal governments:

Richard C Pagnotta — 8/30/2010
Signature of Applicant/Owner/Representative — Date

SITE PLAN SUBMISSION CHECKLISTS

FOR ALL PROJECTS:

Submission Requirement	**Provide Location in Application Packet (e.g., plan sheet number, binder section, narrative**	**If requesting a waiver, indicate below:**
General Information:		
Completed Site Plan Application Form	Section 1.0	
Names and addresses of all consultants	Section 12.0	
Narrative describing existing conditions and the proposed project	Section 4.0 – Project Description	
Evidence of right, title or interest (deed, option, etc.)	Section 8.0	
Names and Addresses of all property owners within 200 feet	Section 13.0	
Boundaries of all contiguous property under control of owner	Section 6.0 Section 16.0	
Tax map and lot numbers	Section 4.0 – Project Description Section 6.0 - Maps 1, 2, 3 and 4 Section 16.0 – Site Plan	
Area of the parcel	Section 4.0 – Project Description	
FEMA Floodplain designation & map #	Section 7.0 (Standard 16) Section 5.0 (Figure 3)	
Zoning classification	Section 7.0 (Page 1) Section 5.0 – Figure 3	
Evidence of technical and financial capability to carry out the project	Section 12.0	
Boundary survey	Section 16.0 – See Boundary Survey and Topographic Survey in Site Plan	
List of waiver requests on separate sheet with reason for request.	Section 1.0	
Proposed solid waste disposal plan	Section 18.0	
Existing Conditions Plan showing:		
Name, registration number and seal of person who prepared plan	Section 16.0 (Sheet C-1 and C-2)	
North arrow, date, scale, legend	Section 16.0 (Sheet C-1 and C-2)	
Area of the parcel	Section 16.0 (Sheet C-1 and C-2)	
Setbacks and building envelope	Section 16.0 (Sheet C-1 and C-2)	
Utilities, including sewer & water, culverts & drains, on-site sewage	Section 16.0 (Sheet C-1 and C-2)	
Location of any septic systems	Section 16.0 (Sheet C-1 and C-2)	
Location, names, widths of existing public or private streets ROW's	Section 16.0 (Sheet C-1 and C-2)	

Location, dimension of ground floor elevation of all existing buildings	N/A	X
Location, dimension of existing driveways, parking, loading, walkways	Section 16.0 (Sheet C-1 and C-2)	
Location of intersecting roads & driveways within 200 feet of the site	Section 16.0 (Sheet C-1 and C-2)	
Wetland areas	Section 16.0 (Sheet C-1 and C-2)	
Natural and historic features such as water bodies, stands of trees, streams, graveyards, stonewalls, floodplains	Section 16.0 (Sheet C-1 and C-2)	
Direction of existing surface water drainage across the site & off site	Section 16.0 (Sheet C-1 and C-2)	
Location, front view, dimensions and lighting of existing signs	N/A - There are no existing signs at the substation site other than transmission line identification signs. .	
Location and dimensions of existing easements & copies of documents	Section 16.0 (Sheet C-1 and C-2)	
Location of nearest fire hydrant or water supply for fire protection	Section 16.0 (Sheet C-1 and C-2)	
Proposed Development Site Plan showing:		
Name of development	Section 16.0 (Sheets C-3, C-4, & C-5)	
Date	Section 16.0 (Sheets C-3, C-4, & C-5)	
North arrow	Section 16.0 (Sheets C-3, C-4, & C-5)	
Scale	Section 16.0 (Sheets C-3, C-4, & C-5)	
Legend	Section 16.0 (Sheets C-3, C-4, & C-5)	
Landscape plan	Section 14.0 (Landscape Buffer Plan and Narrative) Section 15.0 (Substation Photosimulations)	
Stormwater management	Section 17.0 (under separate cover)	
Wetland delineation	Section 16.0 (Sheets C-3, C-4, & C-5)	
Current & proposed stands of trees	Section 16.0 Existing (Sheets C-1 & C-2) Proposed (Sheets C-3, C-4, & C-5)	
Erosion control plan	Section 16.0 (Sheets C-7, C-8, & C-9) Section 10.0	
Lighting/photometric plan	Section 9.0	
Location and dimensions of all proposed buildings	Section 16.0 (Sheets C-3, C-4, & C-5)	
Location and size of utilities, including sewer, water, culverts and drains	Section 16.0 (Sheets C-3, C-4, & C-5)	
Location and dimension of proposed on-site septic system; test pit locations and nitrate plumes	Section 16.0 (Sheets C-3, C-4, & C-5)	
Location of wells on subject property and within 200’ of the site	Section 16.0 (Sheets C-3, C-4, & C-5)	

Location, names and widths of existing and proposed streets and ROW's	Section 16.0 (Sheets C-3, C-4, & C-5)	
Location and dimensions of all accessways and loading and unloading facilities	Section 16.0 (Sheets C-3, C-4, & C-5)	
Location and dimension of all existing and proposed pedestrian ways	N/A - There may be some informal trails located within the existing corridor. However, there are no proposed pedestrian ways.	
Location, dimension and # of spaces of proposed parking areas, including handicapped spaces	N/A	X
Total floor area and ground coverage of each proposed building and structure	Section 16.0 (Sheets C-3, C-4, & C-5)	
Proposed sign location and sign lighting	N/A - There are no proposed signs requiring lighting.	
Proposed lighting location and details	Section 9.0	
Covenants and deed restrictions proposed	N/A - No additional covenants or deed restrictions are proposed.	
Snow storage location	N/A	X
Solid waste storage location and fencing/buffering	N/A	X
Location of all fire protection	N/A	X
Location of all temporary & permanent monuments	Section 16.0 (see Boundary Survey)	
Street plans and profiles	Section 16.0 (Sheet C-6)	

ADDITIONAL REQUIREMENTS FOR MAJOR SITE PLAN PROJECTS:

Submission Requirement	**Provide Location in Application Packet (e.g., plan sheet number, binder section, narrative**	**If requesting a waiver, indicate below:**
High intensity soils survey	Section 16.0 (Sheet C-2)	
Hydro geologic evaluation	Section 4.0	
Traffic Study	N/A	X
Market Study	N/A	X
Location of proposed recreation areas (parks, playgrounds, other public areas)	N/A - No recreation areas are proposed	
Location and type of outdoor furniture and features such as benches, fountains.	N/A - No outdoor furniture or other amenities designed for public use are proposed.	

Site Plan Review
Request for Waiver of Submission Requirements

Site Plan Review Submission Requirement	**Reason for Waiver Request**
Location, dimension of ground floor elevation of all existing buildings	Not applicable. Two existing residential homes have been purchased and will be removed as part of the substation development. These homes are shown on the site plan. However, the ground floor elevations of these homes are not shown.
Location, dimension and # of spaces of proposed parking areas, including handicapped spaces	Not applicable. The proposed substation does not include established parking spaces. Informal parking for emergency and maintenance personnel and vehicles will be provided within the fenced substation.
Snow storage location	The substation yard will be cleared of snow to provide vehicle access. Typical practice is to push the snow to the perimeter of the yard. Snow plowing for the access road will deposit it on either side of the road. There are no designated snow storage locations shown on the Site Plan.
Solid waste storage location and fencing/buffering	Not applicable. There is no permanent solid waste storage area proposed at the substation yard. Once the substation is built, the only solid waste generated will be within the control building (primarily office waste).
Location of all fire protection	Not applicable. The substation will be designed and constructed to meet National Fire Protection Association code requirements and will have smoke and heat detectors in the control building that will be connected directly to the CMP dispatch center. This fire protection equipment is not shown on the site plan. CMP will meet with the Fire Chief to explain fire safety procedures.
Traffic Study	Not applicable. The substation is not a staffed facility and will generate only occasional and infrequent vehicle trips for operations and maintenance activities. Site distances on Greely Road are adequate in both directions. The access road, berms, and plantings have all been planned to maintain visibility at the intersection with Greely Road. CMP will coordinate with the Police Chief prior to the start of construction.
Market Study	Not applicable. The MPRP Project has received a certification of public and convenience from the Maine Public Utilities Commission confirming the need of the proposed facilities.

SECTION 2.0

EVIDENCE OF FEE PAYMENT

SECTION 3.0

AGENT AUTHORIZATION LETTER

SECTION 4.0

PROJECT DESCRIPTION

INTRODUCTION

The Maine Power Reliability Program (MPRP) is a project by Central Maine Power Company (CMP) to upgrade Maine's bulk power transmission system. The overall project consists of a network of 345 kV and 115 kV transmission lines and associated substations to be constructed throughout CMP's service territory where particular needs have been identified. In Cumberland, CMP proposes to construct a new substation (Raven Farm Substation) and realign and rebuild portions of existing 345 kV, 115 kV and 34.5 kV transmission lines leading into the substation site. The construction of these facilities in Cumberland will improve the reliability, safety, and security of the overall bulk power transmission system in Maine, while at the same time meet the increasing demands for electrical power for CMP's customers.

CMP is seeking Site Plan Review approval from the Cumberland Planning Board (Board) for the proposed Raven Farm Substation in Cumberland. This Site Plan Review Application covers the following activities:

- construction of the new Raven Farm Substation;
- realignment and reconstruction of short segments of existing 345 kV, 115 kV, and 34.5 kV transmission lines at the Raven Farm Substation site; and
- Connection of the 345 kV - Section 3020 transmission line at the substation site.

All state and federal permits have been obtained for the Raven Farm Substation including approvals from the Maine Public Utilities Commission (PUC), Maine Department of Environmental Protection (MDEP), and U.S. Army Corps of Engineers. Electronic copies of these three permits are included on a compact disc filed with this Site Plan Review Application.

CMP also will propose at a later date to construct a new 345 kV transmission line (Section 3020) from Pownal to Cumberland within CMP's Segment 19 corridor as part of the MPRP. However, the local permitting of this transmission line has been delayed pending final approval by the PUC. The PUC has deferred construction of Section 3020 to further address design alternatives within the Segment 19 corridor. Once the PUC's analysis is complete and approval is issued, CMP will submit a separate Site Plan Review application to the Cumberland Planning Board for the portions of the proposed Section 3020 transmission line located in Cumberland. However, given the construction duration (12-18 months) and complexities of substation construction (i.e., power grid outages), CMP must file the substation Site Plan Review Application with the Board at this time. This is the purpose for submitting two separate applications to the Board; one for the Raven Farm Substation site and a second for the Section 3020 transmission line in the Segment 19 corridor. CMP anticipates the PUC review will be completed by December 2010 and a Site Plan Review Application would be filed shortly thereafter with the Planning Board.

For completeness purposes, CMP has included the portion of the proposed Section 3020 transmission line that connects to the proposed Raven Farm Substation in this application for the substation site. The PUC design analysis is focused on the Section 3020 transmission line in the Segment 19 corridor, which enters the substation site from Yarmouth on the north. As

such, CMP does not anticipate that the portion of the Section 3020 transmission within the Raven Farm Substation site will change as a result of the additional PUC design analysis.

MPRP OVERVIEW

The vast majority of Maine's bulk power transmission system was placed into service in the early 1970s and is now reaching the limits of its ability to meet the growing electrical demand of Maine customers. Since the last major transmission infrastructure improvement was completed more than 30 years ago, the patterns of both available generation and customer load have shifted significantly. For example, population has become more concentrated in the southern part of the state, while the generation needed to serve that load is now more distant and dispersed. When these pattern changes are combined with the increasing peak demand, the current transmission infrastructure in Maine will, in very few years, become inadequate. In addition, the reliability and security standards mandated by law and administered by the North American Electric Reliability Corporation (NERC), the Northeast Power Coordinating Council, Inc. (NPCC), and ISO New England (ISO-NE) have changed significantly in recent years. CMP must upgrade its bulk power system with this proposed project to meet the mandatory standards and to provide reliable electric service to Maine customers into the future.

CMP's power system consists of both "transmission" and "distribution" lines. Transmission lines function as the highway system of the electrical grid by feeding electricity from where it is generated (such as at hydro, gas, or wind facilities) to substations. From there, the distribution system takes over by carrying the electricity from substations to customers. Transmission lines in Maine are typically operated at one of two levels – 115,000 volts, also expressed as 115 kilovolts ("kV") and 345,000 volts, often referred to as 345 kV.

CMP's 345 kV transmission system was built and put into service in 1971. Since then power consumption has more than doubled. In recent years, both CMP and ISO-NE have identified reliability issues with the 345 kV system that need to be addressed.

In January of 2007, CMP initiated the MPRP and began a comprehensive needs assessment of its bulk power transmission system. The study included a 10-year forecast to evaluate the system in Maine, including a review of system reliability and performance under various system conditions and operating scenarios, as well as a needs assessment to ensure a reliable transmission system in the most cost-effective manner possible. The study identified a number of significant reliability issues with Maine's bulk transmission system, including insufficient 345 kV transmission capacity, insufficient 115/345 kV transformation capacity, and insufficient transmission support and/or infrastructure in all regions served by CMP.

After completing the needs assessment, the MPRP team studied possible solutions. This included both transmission and non-transmission alternatives, including energy efficiency. CMP ultimately selected a primarily transmission solution based on a number of factors, including electrical performance, cost effectiveness, impacts to landowners, and Maine's environment under various forecasts of future conditions. The proposed solution consists of a network of 345 kV and 115 kV transmission lines and associated substations throughout CMP's service

territory where particular needs were identified (see Figure 1 in Section 5.0). (A small geographic area known as the South Portland loop will be addressed through non-transmission alternatives)

The proposed transmission solution ranges from Eliot in the south, Rumford in the west, Prospect and Searsport in the east, and Orrington and Pittsfield to the north. In all, the MPRP will encompass 75 Maine communities.

RAVEN FARM SUBSTATION SITE

Electrical substations are an integral part of the power grid system; they serve as connections between transmission line segments, and are the sites at which bulk power (345 kV and 115 kV) is stepped down to lower voltages for further transmission or distribution. Substations also serve as switches that allow the segregation and isolation of transmission lines for maintenance work and line outages.

The Raven Farm Substation site is located at an existing electrical node in CMP's bulk power system. More specifically, the substation site is located within an existing 450-foot wide CMP transmission line corridor situated northeast of Greely Road and northwest of Middle Road in Cumberland (see Figure 2 in Section 5.0). This corridor contains two 115 kV lines and one 345 kV line. There are also four 34.5 kV lines converging to the north of this area as well as CMP's Elm Street Substation located to the north in Yarmouth.

The Raven Farm Substation will upgrade the reliability of the CMP system by providing additional 345 kV switching capability at this site. This will be accomplished by connecting the new substation with the proposed 345 kV transmission line running from the Surowiec Substation in Pownal (Section 3020) and the existing 345 kV line (Section 3040) that runs to CMP's South Gorham Substation.

As described in the PUC Certificate of Public Convenience and Necessity (CPCN) for the MPRP, the two existing 115 kV lines will not be connected to the 345 kV system at the Raven Farm Substation with an autotransformer at this time. However, the two 115 kV lines will be constructed on two A-frame dead end supports within the graded substation yard to accommodate future 345 kV to 115 kV transformation.

The land area of the existing corridor between Greely Road and Cumberland/Yarmouth Town line is approximately 30 acres. However, given the additional land area required for the Raven Farm Substation development, CMP purchased properties beyond its existing corridor to support the proposed Raven Farm Substation, access road and transmission lines.

To ensure adequate room for the substation site, CMP obtained rights to five parcels located to the north and west of the transmission line corridor and three parcels abutting the southeast side of the corridor. Parcels R2-34C and R2-34E along Greely Road were purchased as part of a negotiated deal to acquire the larger parcel R2-34B for the substation site. Similarly, parcel R2-35B was purchased to allow for the construction of the new 345 kV transmission line across the

northeastern corner of the property, and parcel R2-34D was purchased to accommodate substation site grading and the re-located alignment of the existing 115 kV transmission lines at the site. Parcels R2-38E, R2-30 and a portion of R2-38F were purchased to accommodate the southern and eastern limits of the substation yard site grading and the temporary location of the existing 345 kV transmission line. All necessary land area has been obtained to construct and operate the Raven Farm Substation and associated transmission lines. The parcel data is shown on Map 4 in Section 6.0. Please note that Parcel R2-30 was recently acquired by CMP and, as such, is not shown yet on the project mapping or incorporated in the parcel area calculations for the substation site. CMP will update the mapping in a supplemental filing.

The total substation site is approximately 74.4 acres with the inclusion of these additional parcels. The site is located within the Rural Residential 2 and Rural Industrial zoning districts (see Figure 3 in Section 5.0). Refer to Table 4-1 below for Cumberland tax map and parcel data at the substation site.

Table 4-1:
Raven Farm Substation Site
Tax Map and Parcel Information

Cumberland Tax Map No.	Cumberland Parcel No.
R02	31 (Existing CMP Corridor)
R02	34B
R02	34C
R02	34E
R02	34D
R02	38E
R02	30
R02	38F
R02	35B

Evidence of right, title or interest for the substation site is provided in Section 8.0 of the application.

EXISTING CONDITIONS AT SUBSTATION SITE

Abutting Land Use

There are currently two existing 115 kV transmission lines (Section 164 and 165) and one 345 kV transmission line (Section 3040) within the existing 450-foot wide corridor running from the northeast to the southwest at the Raven Farm Substation site (see Map 1 in Section 6.0). This existing CMP corridor abuts two residential parcels to the west (R2-34B and R2-34D), one residential parcel to the southeast (R2-30), one undeveloped parcel to the east (R2-38E), and one commercial property to the east (R2-45). The existing land use across Greely Road to the south of the site includes the continuation of CMP's existing transmission line corridor and residential properties at parcels R2-33A, R2-29, R2-28 and R2-2A. The abutting properties along Middle Road include a mix of residential and commercial land uses.

Topography

The topography of the land surface at the substation site slopes gradually (approximately 3 percent) in an easterly or southeasterly direction, generally parallel to Greely Road. Higher elevations, with a maximum of 137 feet (plan datum), occur along the west side of the substation work area and lowest elevations on the east side of the work area are approximately 107 feet above mean sea level (see Sheets C-1 and C-2 in Section 16.0). The proposed base elevation for the substation is elevation 120, which was selected to balance cuts and fills.

Vegetation

The existing vegetation at the substation site consists of primarily low growing shrubs within the maintained transmission line corridor and mixed white pine-oak woodland located to the east and west of the cleared corridor. An existing path currently used by CMP maintenance vehicles runs along the approximate center of the existing CMP corridor through the proposed substation location.

Soils and Geology

Subsurface conditions at the Raven Farm Substation site were investigated and documented relative to foundation design and earthwork associated with the proposed construction. In general, the soils at the substation site consist of loose to medium dense silt with varying amounts of sand overlying bedrock. A high intensity soil survey was completed for the site and is included on Sheet C-2 of the Site Plan (Section 16.0).

Bedrock, or ledge, outcropping at several locations within the substation work area is generally confined to several small scattered knobs that are less than 10 feet in height. Bedrock beneath the substation site is mapped by the Maine Geological Survey (MGS) as the Silurian-Ordovician age Hutchins Corner Formation (SOhc), a granofels or a medium to coarse grained metamorphic rock with little foliation (MGS Open-file No. 98-1, 1998).

Eleven geotechnical borings generally laid out on a 200 foot grid within the substation footprint have also been drilled approximately 5 feet into bedrock for total depths 10–20 feet below the ground surface. Information from the geotechnical drillers logs relevant to depth and elevations of bedrock encountered in these borings is summarized below.

Geotechnical Boring #	**2**	**3**	**4**	**6**	**7**	**8**	**9**	**10**	**12**	**13**	**14**
Ground Surface Elevation	122	120	116	124	123	118	117	112	127	116	112
Depth to Bedrock	2.0	5.4	6.3	2.0	4.6	8.4	4.9	14.8	4.9	6.9	9.9
Bedrock Surface Elevation	120	115	110	122	118	110	112	97.2	122	109	102
Above Elevation 117 ft	Yes			Yes	Yes				Yes		

Wetlands and Wildlife Habitat

There are generally five wetland complexes that drain the substation site in a west to east direction. These wetlands are composed of primarily scrub-shrub and emergent habitat within

the maintained corridor and along Greely Road and forested wetlands to the east and west within the wooded portions of the site. The hydrology in the southeast portion of the site has been altered by prior agricultural activities. No water bodies are located within the substation yard area. There is an unnamed, perennial stream that flows west to east across the corridor approximately 300 feet north of the fenced substation yard. Five USACE-regulated amphibian breeding areas (vernal pools) were identified on the site. Three of these are located adjacent to Greely Road and two other are located on Parcel R2-34C in the southwest corner of the site. There are no designated significant wildlife habitats at the Raven Farm Substation including deer wintering areas, bald eagle habitat, wading bird and waterfowl habitats, MDEP significant vernal pools, and rare species habitat.

Floodplain

The Raven Farm Substation is not located within a 100-year flood zone, based on Q3 flood data derived from the Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) for the Town of Cumberland (Panel Number 2301620016C, dated October 15, 1985). FEMA FIRM data for Cumberland is shown on Figure 3 in Section 5.0 of this application.

The existing site conditions are summarized in Table 4-2 below.

Table 4-2:
Raven Farm Substation Site – Existing Conditions Summary

- Existing CMP corridor width is approximately 450 feet wide and contains two 115 kV lines and one 345 kV line.
- The CMP corridor is bordered by Greely Road to the south, woodland to the west and east, and additional transmission line corridor to the north in Yarmouth.
- Existing CMP transmission line corridor is vegetated with low growing shrubs and herbaceous plants.
- Five wetland complexes occupy the substation site and one unnamed perennial stream is located approximately 300 feet away from the fenced yard.
- Five USACE-regulated amphibian breeding areas (vernal pools) were identified on the site.
- Existing corridor area between Greely Road and Cumberland/Yarmouth town boundary is about 30 acres.
- An existing path currently used by CMP maintenance vehicles runs along the approximate center of the existing CMP corridor through the proposed substation location.
- The substation site is located primarily within the Rural Residential 2 District. The eastern edge of the substation site is located in the Rural Industrial District.

PROPOSED SUBSTATION SITE ACTIVITIES

Substation Site Development

Construction of the Raven Farm Substation yard will disturb about 25.1 acres of land. Following construction, the graded substation site will occupy approximately 15.4 acres of land. This developed area will consist of a fenced, finished yard and un-fenced graded area as described below.

The 345 kV section of the yard is located on the east and measures approximately 440 feet x 850 feet (8.6 acres) in area. This area will be fenced and constructed with a finish base of crushed stone and gravel approximately 1.5 to 2 feet in depth. The remaining, unfenced 115 kV portion of the graded yard will not be constructed to match the elevation of the fenced, 345kV side of the yard at this time. Instead, this 350 foot x 850 foot (6.8-acre) area will be brought up to an elevation approximately 1.5 feet below the proposed finish yard elevation and will be stabilized with topsoil, seed, and mulch.

The proposed base elevation for the fenced substation is elevation 120, which was selected to balance cuts and fills. The yard will slope to the rear or northeast for runoff to be collected in a stormwater management basin at the back-right (northeast) corner.

To accommodate the 1.5 to 2 feet of gravel, subgrades at the front and rear of the substation will need to be prepared to elevations of approximately 118 and 116 feet respectively. Based on existing surface elevations throughout the substation work area, additional fill will be required along the east side of the substation and existing grades will need to lowered or cut by typically 8 to 10 vertical feet along the west side of substation. The few scattered knobs will need to be lowered by approximately 18 to 20 feet to achieve the required subgrade elevations.

Conventional construction equipment such as tracked excavators and bulldozers will be used to cut and fill grades in the work area to grades proposed for the substation, access road and stormwater management basins. Rock removal will be accomplished using typical excavation equipment, rock hammering, and blasting. Blasting will be necessary at locations where elevations of bedrock exceeding 116 to 118 ft (plan datum) cannot be lowered by conventional excavation equipment or rock hammering. In addition to outcroppings along and north of the existing transmission line, bedrock was encountered at an elevation above 117 feet in four of the 11 geotechnical borings. All four of these borings are also located in or north of the existing transmission line corridor. Blasting will be conducted by a licensed commercial blaster in accordance with State and Federal requirements.

The fenced in portion of the yard will contain electrical substation infrastructure including three 345 kV A-frame dead end structures, a one-story 40'x90' control house building approximately 20 feet in height, breakers, switches, and buswork. Other features of the substation yard include an underground wastewater holding tank, a potable well, and stormwater management structures. The security fencing surrounding the 345 kV substation yard will consist of 8-foot tall galvanized metal chain-link fence with three strand barbed wire on the top. The unfenced, graded portion of the yard will contain two A-frame dead end structures to support the two existing 115 kV transmission lines.

Basis for Substation Yard Size

The Raven Farm Substation and the four other new MPRP substations will be significantly larger than the existing substations in CMP's bulk power system. The larger size of the proposed new MPRP substations is a result of new planning procedures and guidelines that have been

established by the Independent System Operator of New England (ISO-NE) and Northeast Power Coordinating Council (NERC) since the existing substations were developed. The ISO New England Planning Procedure No. 9, Major Substation Bus Arrangement Application Guidelines (May 12, 2008) (PP9), is the current industry standard for design of major substation bus arrangements connecting 115 kV and higher voltages within the New England power transmission system. PP9 is based on the findings of a working group of industry experts that evaluated possible transmission substation arrangements to best serve current and future needs of the New England power transmission system.

PP9 identifies the "breaker-and-a-half" bus arrangement as the optimal standard for new major substations connecting voltages of 115 kV or higher. The breaker-and-a-half bus arrangement is a more space consumptive breaker configuration than has been utilized in the past, but provides better reliability; is a readily expandable design for future improvements; simplifies switching capacity while minimizing adverse impacts on power flows; provides operating flexibility; allows for efficient and effective maintenance of substation equipment; maintains a safer working environment for employees by providing greater clearances between equipment for employees; and is cost-effective.

Compliance with PP9 is an important consideration in determining whether the MPRP substations are treated as part of a regional reliability project, and thus eligible for socialization of costs throughout all of New England through the regional transmission tariff. If a proposed substation is to be built out of compliance with PP9, and ISO-NE determines that it does not qualify as a reliability project, the costs of the substation would be substantially greater for Maine customers. Maine ratepayers could potentially assume 100 percent of the facility costs, as compared to 8 percent when costs are socialized to the maximum extent. This is a significant economic consideration for the MPRP, as the cost of constructing the MPRP Raven Farm Substation is estimated at $24 million.

In light of the technical and economic considerations related to PP9, non-PP9 compliant major substation designs were eliminated as a practicable alternative, given that the purpose of the MPRP is for CMP to make the necessary improvements to its bulk power transmission system to ensure compliance with federally mandated power transmission system standards, and to continue to provide safe, cost-effective, and reliable service to its customers.

The substation yard size has been selected to comply with PP9, which will safely accommodate the proposed substation equipment while allowing for vehicle access in and around the station as well as installation of future equipment. Developing the site for future equipment now, is a lower cost, lower impact option than requiring future expansion of the site at some future date. Although the PUC did not approve the 115 kV yard and the 345/115 kV autotransformer, it is anticipated that these facilities will be required in the not too distant future. Furthermore, by developing the site for a footprint that can accommodate these facilities now, there are significant efficiencies and benefits, including reuse of the cut material as fill, avoiding future rock removal in the vicinity of an energized substation and avoiding disruption to vegetation, soil and abutting property owners a second time in the future.

Substation Access

A new gravel driveway with a paved apron at Greely Road will be constructed to provide access to the substation yard. The access road will originate from the Greely Road at an elevation of approximately 113 feet and the ground surface elevation in the front and rear of the substation will be approximately 120 and 118 feet respectively. The driveway is generally 20 feet in width and approximately 750 feet long. The driveway will provide access to two substation yard entrances along the southwesterly fence line. An additional, 80-foot x 15 foot gravel access path will be constructed from the northeasterly side of the proposed substation to provide access onto the existing transmission line corridor.

Wetland Impact

Three wetlands were identified, delineated and mapped within the footprint of the proposed Raven Farm Substation. No other sensitive natural resources, such as streams or vernal pools, were identified within the proposed substation yard boundary. Construction of the substation will result in the permanent filling of approximately 3.3 acres of on-site wetlands including both forested and scrub-shrub wetland types. The overall drainage pattern and direction will not change significantly due to the pervious nature of the crushed stone and gravel substation yard, which promotes infiltration of runoff. In addition, approximately 0.44 acres of terrestrial habitat within 250 feet of the three USACE-regulated vernal pools along Greely Road will be impacted by the construction of the substation site. CMP has obtained all of the necessary state and federal permits from the MDEP and USACE approving these wetland and vernal pool impacts.

Groundwater Impact

A variety of data resources published by the MGS have been reviewed to evaluate potential impacts to groundwater during substation construction. Significant sand and gravel aquifers are not mapped to occur at the proposed substation site or in the immediate vicinity and ground water yields for the glaciomarine surficial deposits in this area are rated as less than 10 gpm (MGS Open-File Report No. 99-28, 1999). Hydraulic conductivity of the fine grained glaciomarine deposits in the vicinity of the substation tend to be lower than those of sand and gravel deposits, resulting in the relatively lower water supply yields identified on the Significant Sand and Gravel Aquifers map.

In areas where the surficial deposits are comprised of glaciomarine sediments, water supply wells for residential use are typically drilled into the underlying bedrock. Pore space, weathering, fractures, joints and/or faults in the bedrock of the Hutchins Corner Formation serve as conduits and reservoirs for such water supply wells.

Bedrock Ground-Water Resources Maps prepared by MGS for the 30 x 60 minute Portland Quadrangle provide information about yield, depth, and estimated overburden thickness for bedrock wells near the substation (MGS Open-File Report Nos. 07-88 2007, 07-89 2007, and 07-90 2007). MGS prepared these maps from information provided by commercial well drillers.

Well information related to depth and yield from 10 wells located within 200 feet of the substation site is displayed on these MGS maps.

Five to six of these wells are located along Middle Road and the remainder occurs along Greely Road. The shallowest of the ten wells is reported to be 50 to 100 ft in depth and the deepest well reaches between 400 and 500 ft below the surface. Seven of the 10 wells were drilled to depths exceeding 150 feet. Bedrock was encountered within 30 feet of the surface in all 10 wells which would be encased through the overlying unconsolidated overburden. With 103 feet and 115 feet (plan datum) respectively being conservatively representative of elevations of residential properties along Middle Road and the Greely Road, the bottom of the shallowest wells would therefore be at elevations of approximately 53 feet and the bottom of the deepest wells would be at elevations of approximately (-) 400 feet plan datum. Correspondingly, based on these representative elevations and as much as 30 feet of overburden reported for the wells, bedrock encountered in the wells would be at elevations ranging between approximately 70 and 110 feet.

The 116-118 feet base elevation of limited preparatory rock removal (includes typical excavation equipment, rock hammering, and blasting) for the Raven Farm substation will therefore be more than approximately 6 vertical feet above the reported depths at which bedrock was encountered in the wells and more than 65 feet above the bottom of the shallowest reported well. The horizontal distance between the closest location where rock removal could be necessary and the nearest reported residential well exceeds 650 feet. Based on the intervening vertical and horizontal separation between residential wells on properties along Middle Road and the Greely Road within 200 feet of the Raven Farm substation site and where rock removal could be necessary, it is unlikely that rock removal conducted in accordance with State and Federal requirement will have a detrimental impact on the operation or yields reported for the ten wells.

House Demolition

There are six existing houses on the eight land parcels purchased by CMP. Two of the houses on Greely Road closest to the proposed substation development area will be demolished (Lots 34B and 34D) and one other house on Greely Road is being considered for demolition (Lot 30). CMP plans on reselling the other three houses (Lots 34C, 34E, and 35B) after the MPRP is completed.

TRANSMISSION LINE ACTIVITIES AT THE SUBSTATION SITE

Temporary Construction Realignment of Existing Transmission Lines

During the substation construction process, there will be a large number of workers, vehicles and other equipment at the site. In order to create a safe working environment during this time, the two existing 115kV lines (Section 164 and Section 165) and one 345kV line (Section 3040) are proposed to be temporarily relocated to move them away from the active

construction site (see Map 3 in Section 6.0 and Figure 2 in Section 16.0). The 115 kV lines will be moved to the west and the 345 kV line will be moved to the east.

There will be 16 temporary transmission line structures erected for this temporary line routing. The 4 temporary 345 kV structures will range from 88 feet to 97 feet in height and the 12 temporary 115 kV structures will range from 52 feet to 84 feet in height.

These temporary relocations require that the existing vegetation below and adjacent to the line be removed in order for the lines to continue to provide reliable electric service to both the Maine and New England. Moving the temporary lines closer to the limits of the substation construction to reduce tree clearing would adversely impact the working conditions at the site, potentially creating an unsafe working environment. In addition, allowing taller vegetation to exist beneath the temporary lines to enhance buffering would increase the likelihood of interruptions to electrical service resulting from tree contacts with the energized wires.

Following completion of the substation, the temporary transmission lines and poles will be removed and the lines will be permanently routed directly into the substation. The area that is cleared to the east and west of the substation development area for the temporary transmission line routing will be allowed to revegetate naturally once construction is complete. In addition, a mixture of evergreen tree seedlings and 3-8 foot trees will be installed throughout the temporary transmission lines to provide long-term forest cover. CMP is also working with the owners of Parcel R2-38C (Burr) to develop a plan to provide screening between their home / rear yard and the proposed substation. A number of options are actively being examined. The final design will likely include evergreen tree plantings and earth mounds, avoiding wetlands and a drainageway. Further information will be presented at the next Planning Board meeting. The landscape buffer plan and narrative is provided in Section 14.0 of this application.

Permanent Transmission Lines

Following construction of the MPRP, the substation site will have a total of 39 permanent transmission lines structures and 5 substation A-frame dead end structures, an overall increase of 8 from the existing number of transmission line structures currently at the site (36). The permanent 345 kV transmission structures in the vicinity of the substation will range from approximately 100 to 110 feet in height while the permanent 115 kV structures will range from 43 to 79 feet in height.

The existing 34.5 kV line (Section 180) that runs along the eastern edge of the substation property will be slightly realigned into the Elm Street Substation in Yarmouth to accommodate the new alignment of the existing 345 kV line at the substation site. This will involve work on 9 transmission line structures ranging in height from 30 feet to 52 feet.

The new Section 3020 345 kV transmission line will also eventually connect with the other 345 kV lines at the substation. This will involve the construction of 4 H-frame transmission line structures at the site and one A-frame dead end within the substation yard. As noted above,

the remaining portion of Section 3020 within the Segment 19 corridor in Cumberland will be permitted in a separate Site Plan Review Application following authorization from the MPUC.

CONSTRUCTION SEQUENCE

The following major items define the construction sequence at the proposed Raven Farm Substation site:

1. Tree Clearing
2. Temporary relocation of existing 115kV and 345kV transmission lines
3. Site Development
4. Substation Construction
5. Permanent relocation of transmission lines
6. Site restoration and vegetative buffer planting

Table 4-3 provides a summary of the proposed MPRP activities at the substation site.

Table 4-3:
Raven Farm Substation Site – Proposed Conditions Summary

- CMP acquired 8 parcels of land around existing transmission line corridor.
- Total Raven Farm Substation Site Project Area = approximately 74.4 acres
    - Substation construction area = approximately 25.1 acres
- Clear about 28 acres of forested land adjacent to existing corridor in Cumberland.
- Fill approximately 3.3 acres of wetland.
- Total Graded Raven Farm Substation yard = approximately 15.4 acres.
- Completed 345 kV fenced substation yard = 8.6 acres
- Proposed Substation yard will include the following (not all of these are within the yard, e.g., access road, stormwater basins, 115 kV A-frame, etc.):
    - Breakers and Switches;
    - Buswork;
    - Site lighting;
    - Site gates and fencing;
    - Three A-frame dead end structures within substation yard for 345 kV connections;
    - Two A-frame dead end structures within unfenced portion of the substation site for 115 kV connections;
    - Control house building (3,600 square feet);
    - Underground wastewater holding tank and potable well;
    - Permanent gravel driveway and paved apron (approximate length = 750 feet, Typical width = 20 feet);
    - 80-foot gravel access path on northeast side of substation yard;
    - Stormwater management structures including:
        - Two underdrain soil filter fields with catch basins and outlets; and
        - Diversion berm and check dams.
- Demolish two houses (Lots 34B, 34D) within substation work area located on abutting parcels acquired by CMP for the MPRP. A third house at Lot 30 may also be demolished.
- Temporarily reroute two existing 115 kV transmission line (Section 164 and 165) around substation site to the west during construction. Following completion of the substation, the temporary structures will be removed and the 115 kV lines will be routed through the unfenced portion of the substation yard.
- Temporary reroute of existing 345 kV transmission line around substation site during construction. Following completion of the substation, the temporary structures will be removed and the 345 kV line will be connected to the substation.
- Realign and rebuild existing 34.5 kV transmission line (Section 180) at Elm Street Substation in Yarmouth.

SECTION 5.0

PROJECT FIGURES

Figure 1 – MPRP Scope

Figure 2 – Project Location

Figure 3 – Cumberland Zoning Information

SECTION 6.0

AERIAL PHOTO PROJECT MAPS

Map 1 - Existing Conditions

Map 2 - Proposed Conditions

Map 3 - Temporary Transmission Line Configuration

Map 4 – Property Acquisition

SECTION 7.0

COMPLIANCE WITH SITE PLAN REVIEW STANDARDS

INTRODUCTION

The MPRP Raven Farm Substation site is located in two Cumberland Zoning Districts: Rural Industrial (RI) and Rural Residential 2 (RR2) (see Figure 3 in Section 3.0 and Sheet C-1 in Section 16.0). The majority of the Raven Farm Substation site is located within the RR2 District. However, the southeastern side of the substation yard is situated within the RI District. Pursuant to Sections 419.3 and 419.4 of the Cumberland Zoning Ordinance (amended June 21, 2010) the proposed MPRP Raven Farm Substation in Cumberland is classified as a public utility and is a permitted use within the aforementioned zoning districts.

The substation site meets the applicable setback and frontage requirements for the RR2 and RI districts. The substation site has approximately 450 feet of frontage on Greely Road. The substation control house building is setback approximately 600 feet from the nearest site property boundary and will be located approximately 900 feet from Greely Road. The site will also comply with the RI District 25-foot buffer requirements in Section 204.15.5 of the Zoning Ordinance.

The following section in these application materials describes the MPRP Project's compliance with the applicable Site Plan Review Ordinance standards (7/21/2010 amended effective) identified in Section 206.8.

SECTION 206.8.1

1. Utilization of the Site

The MPRP substations (including the Raven Farm Substation) must be located at or near places where existing transmission lines intersect and where there is significant load on the system. As such, the proposed Raven Farm Substation site is strategically located at the intersection of three transmission line corridors that currently support one 345 kV line, two 115 kV lines, four 34.5 kV lines, and a 115 kV – 34.5 kV substation (Elm Street Substation). CMP proposes to expand upon the existing public utility use of the site.

The substation was sited to the maximum extent practicable within CMP's existing transmission line corridor and set back from Greely Road by approximately 500 feet to screen the public's view of the substation yard. The land for the existing CMP transmission line corridor was originally purchased and transmission lines were constructed by CMP in 1955 and 1956, respectively. Two additional transmission lines were added in 1975. CMP's existing transmission line property at the substation site is approximately 30 acres in size. CMP has also purchased the necessary properties beyond its existing corridor to support the proposed Raven Farm Substation, access road and transmission lines bringing the total substation parcel size to approximately 74.4 acres.

There are currently four transmission lines crossing the substation site including one 345 kV line, two 115 kV lines, and one 34.5 kV line. These four lines are supported by 36 existing transmission line structures on the substation site. The majority of these supports consist of either wooden H-frames associated with the 115 kV (Sections 164 and 165) and 345 kV (Section 3040) transmission lines or wooden single poles associated with the 34.5 kV line

(Section 180). The majority of the transmission line supports range from 35 to 60 feet in height.

CMP has sited the substation yard to minimize impacts to wetlands, vernal pools and a perennial stream on the property. Although permanent impacts to the stream have been avoided there will be approximately 3.3 acres of permanent wetland fill at the site. CMP will also impact approximately 0.44 acres of terrestrial habitat associated with three USACE-regulated vernal pools located along Greely Road. These wetland and terrestrial habitat impacts has been reviewed and approved by the MDEP and USACE.

The substation site exhibits physical conditions typical of other development sites in southern Maine and will not result in any unusual erosion or sedimentation problems. There are no physical characteristics at the substation site or the transmission corridor that would preclude it from serving its proposed use or result in adverse environmental impacts on surrounding properties.

There are no designated significant wildlife habitats at the Raven Farm Substation such as deer wintering areas, wading bird and waterfowl habitats, and MDEP significant vernal pools. The substation site does not lie within a 100 year floodplain as shown on the FEMA maps for the Town of Cumberland. CMP has also addressed offsite drainage issues by positioning the substation to avoid impacts to an on-site stream and developing a stormwater management plan for the substation that meets MDEP and Town of Cumberland requirements (see Section 17.0).

CMP conducted an on-site geotechnical engineering analysis of the substation site that included exploratory borings and testing to assess surface and subsurface conditions. Based on this analysis, CMP has determined that rock removal will be required at the site during the site preparation phase of construction. As a part of CMP's community relations process for Raven Farm, all landowners will be notified, two weeks prior to all aspects of the construction process, including blasting if and when it is necessary. CMP will conduct a pre-blast survey to include all areas within 300 feet of the blast site. Those residences along the substation property or transmission line corridor that could be affected by blasting will be given notice of the pending work. CMP will be responsible for mitigating any impacts within the survey area as a result of blasting.

Construction of the MPRP will be performed in such a manner that natural resources will be protected to the greatest extent practicable, construction crews can safely install the transmission lines and build the substation, and erosion will be minimized. In summary, the proposed substation site has no physical characteristics due to its size, shape, topography, or soils that will create or aggravate adverse environmental impacts on surrounding properties.

2. Traffic Access and Parking

During construction, vehicles and equipment will access the substation site via the proposed permanent driveway off of Greely Road. CMP and its contractors will comply with all applicable federal, state and local road safety and transportation regulations. A pre-

construction meeting will be held with CMP's contractor, the Police Chief, Town Manager, Public Works Director, and other town staff to review all aspects of the construction process including access to the site.

The substation will be accessed by the permanent driveway off of Greely Road during operations and maintenance activities. Operation of the Raven Farm Substation will generate little vehicle traffic and have no impact on the Town's transportation facilities, including vehicular and pedestrian traffic. The substation is an unmanned facility and will generate only minimal vehicle trips on an infrequent basis during routine operations and maintenance activities by CMP personnel. The substation driveway has been designed to comply with the Maine Department of Transportation standards for minimum sight distance and Town of Cumberland requirements. The substation driveway was originally proposed farther to the west. However, the driveway was relocated to the east to avoid vernal pools identified along Greely Road and to keep the road from being located between the transmission line poles. This is necessary to ensure vehicles, equipment, and materials can safely enter and exit the substation.

3. Accessway Location and Spacing

The Raven Farm Substation will have one approximately 20-foot wide permanent driveway to access the substation yard including a wider, paved apron at the entrance to Greely Road. This driveway entrance is located approximately 1,320 feet from the intersection of Greely Road and Edes Road and approximately 1,200 feet from the intersection of Greely Road and Middle Road. These are the closest unsignalized intersections to the proposed permanent substation access road. This driveway complies with the Site Plan Review spacing standard.

4. Internal Vehicular Circulation

The permanent driveway and Raven Farm Substation yard have been designed to permit the safe movement of CMP vehicles and equipment to and from the substation yard.

5. Parking Layout and Design

Sufficient space has been maintained within the substation yard for CMP vehicle and equipment parking. The number of vehicles requiring parking at any one time will be limited to occasional visits by CMP operations and maintenance personnel. All vehicles would be parked within the fenced substation yard. Access to the substation will be restricted to CMP personnel and contractors.

6. Pedestrian Circulation

Although CMP does permit access on its transmission line corridors, the substation will be a fenced, restricted access facility. As such, no pedestrian ways are proposed or permitted at this facility.

7. Stormwater Management

CMP has developed a stormwater management plan for the Raven Farm Substation that meets the basic, general, and flooding standards of the MDEP Chapter 500 rules for

stormwater management and the Town of Cumberland Stormwater Management standards in Section 8.7 of the Site Plan Review Ordinance. CMP's stormwater management plan evaluated and quantified the pre- and post-development stormwater characteristics of the full build-out of the proposed substation facilities to ensure that surface water runoff will not adversely affect neighboring properties, downstream conditions, or any public storm drainage system. The stormwater management design for the Raven Farm Substation has been reviewed and approved by the MDEP as part of the MPRP Site Location of Development Act/Natural Resources Protection Act Permit.

Section 17.0 contains the stormwater management plans, narrative, and calculations, for the substation that were developed by a Maine-licensed Professional Engineer and approved by the MDEP. We have also provided MDEP's technical review memorandum in Section 16.0 as additional background information on the stormwater management review. This application package is provided under separate cover.

8. Erosion Control

Construction of the Raven Farm Substation will require a substantial cut and fill operation to develop the site. The proposed construction plan includes the use of the cut material from the western side of the site to be used to the extent practicable as fill material on the eastern side of the site. Given the required earth work, soil constraints within the substation site and transmission line corridor will be managed and mitigated through implementation of erosion and sediment control measures, proper site and project design, and special construction procedures.

CMP has developed a standard manual, "Environmental Guidelines for Construction and Maintenance Activities on Transmission Line and Substation Projects" (2010), which it uses as a routine part of all transmission and substation projects. A copy of the manual is provided in Section 10.0 of this application. This manual contains erosion and sedimentation control requirements, standards, and methods that will be used to protect soil and water resources during construction of the various MPRP components. The manual was developed in consultation with the Maine DEP and is based on the Maine Erosion and Sediment Control BMPs *(*March 2003) and MDEP's Chapter 500 rules. CMP's manual contains specific Best Management Practices appropriate for electric transmission line and substation construction. These guidelines will be followed in the construction of the Raven Farm Substation and the construction of the proposed transmission lines in Cumberland.

The erosion and sediment (E&S) control plan for the substation site will protect wetlands and streams from eroded soils during construction (see Sheets C-7, C-8, and C-9 in Section 16.0). The following are examples of E&S measures to be used at the site:

- sediment barriers will be installed along the downhill limits of the construction site prior to soil disturbance;
- exposed soils within 100 feet of the wetlands will be mulched within 7 days or prior to any storm event;
- areas of exposed soils not to be worked in the next 30 days will be mulched;

- stone check dams will be installed within newly constructed ditches to reduce flow velocities and trap sediments; and
- groundwater or collected surface water pumped from the construction area will be filtered in a "Dirtbag" sediment filter and straw bale containment area prior to its discharge to vegetated buffer areas.

9. Water Supply Provisions

Water will be supplied to the substation site by a new subsurface well to be drilled along the southern substation fence line. This well will provide a potable water supply for the control house building.

10. Sewage Disposal Provisions

CMP determined that it is not practical to install a leachfield at the substation site in accordance with the State of Maine Subsurface Wastewater Disposal Rules due to engineering constraints including the presence of underground conduit banks controlling the substation infrastructure, extensive regrading and earthwork within the site, and the risk of septic system effluent short circuiting a conduit. In addition the soils at the substation site in the vicinity of the control house are poor and do not comply with code requirements for leachfields (very shallow ledge and/or water tables/ wetlands).

Given these site constraints, CMP proposes to install a holding tank for wastewater. The State Division of Health Engineering and the Cumberland Code Enforcement Officer (CEO) confirmed that installation of a holding tank is allowable under both state and local laws/ordinances. Under the State of Maine Subsurface Wastewater Disposal Rules a holding tank is allowable as a first time system for non-residential uses, provided there is no practical alternative and it does not violate local ordinances. CMP contacted the Cumberland CEO in 2009 confirming that a holding tank at the Raven Farm substation would also be allowable under local ordinances.

CMP will file a wastewater permit application (HHE-200/HHE-233) with the Cumberland CEO. The HHE-200 includes a requirement for a water meter to be installed on the well so that water inputs can be evaluated against pumping records, which CMP must maintain and have available at the request of the town. This allows confirmation that all water entering the tank is pumped out and disposed of properly.

11. Utilities

CMP will install the required overhead electrical, telephone, and telecommunication service for the operation of the Raven Farm Substation.

12. Groundwater Protection

The substation yard is not a permanent staffed facility so water needs will be limited to occasional employee use of drinking water and the wastewater disposal system at the control house. As such, given the minimal water use the substation will not adversely impact the quantity of groundwater available to abutting properties or to public water supply systems. CMP has designed the substation in compliance with MDEP stormwater

standards. The proposed stormwater management structures will promote the protection of groundwater in the project area.

As previously mentioned in Section 4.0, based on the intervening vertical and horizontal separation between the 10 residential wells on properties along Middle Road and the Greely Road within 200 feet of the Raven Farm substation site and where blasting could be necessary, it is unlikely that blasting conducted in accordance with State and Federal requirement will have a detrimental impact on the operation or yields reported for these wells.

CMP also has a number of procedures in place to protect surface water and groundwater quality in the project area. These procedures are described in Section 13 below.

13. Water Quality Protection

The multiple methods, plans, and procedures to prevent water quality degradation during construction, operation, and maintenance of the proposed Raven Farm Substation are incorporated in CMP's Environmental Control Requirements for Contractors and Subcontractors - Oil and Hazardous Material Contingency Plan (see Section 11.0). These procedures establish a set of minimum requirements for spill prevention and response. The procedures incorporated into the plan have proven successful for preventing spills and for addressing spills if they occur. CMP's environmental inspectors will ensure that all personnel working on the site follow these procedures. No hazardous materials will be installed at the proposed substation.

In addition, CMP employees follow the procedures outlined in CMP's Spill Management and Prevention section of its Environmental Procedures Manual for response to any spills of oil, gasoline, hydraulic oil, or other similar substance. These procedures are similar to those outlined in Section 11.0 for contractors, and cover reporting, immediate response, cleanup and documentation. Employees operating construction vehicles will be trained to promptly contain, report and clean up any spill in accordance with standard procedures. To minimize spill potential during construction, no fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 100 feet of a protected wetland and within 200 feet of a private water supply without special exception approval from the MDEP.

Herbicides used by CMP for Vegetation Management

CMP manages the vegetation in its corridors to ensure the safe, reliable flow of electricity on the transmission system. Trees and tall-growing shrubs are removed from within the corridor and the corridor edges are trimmed on a four-year cycle. Trees and tall-growing shrubs are removed from within the corridor and the corridor edges are trimmed on a four-year cycle. Within the corridor, CMP's practices allow for the growth of dense, low vegetation to stabilize the soil, protect streams and wetlands, and provide good habitat for birds and wildlife, and discourage inappropriate or destructive activities. CMP uses mechanical cutting or hand cutting to clear the trees from corridors and along corridor edges. In addition, limited herbicide applications are used to control re-sprouting and some tall-growing shrubs.

Hardwood species are cut in the spring and early summer and the stumps are treated with herbicides to prevent re-sprouting. The herbicides used are registered by the Maine Board of Pesticide Control and approved by the U.S. Environmental Protection Agency. They are applied directly to each stump by trained individuals carrying backpack sprayers. The crew foreman and another crewmember of each herbicide application crew must have a Maine Pesticide Applicator license. By Maine law, all herbicide applicators must be continually supervised on-site by someone possessing a Maine Pesticide license. Herbicides are not used within 25 feet of streams or open water. CMP does not use herbicides within 100 feet of identified wells or drinking water sources. In addition, CMP offers landowners and abutting landowners a "No Spray Agreement," if they object to the use of herbicide on the transmission corridor. Landowners have the option of agreeing to maintain, at their cost and to CMP's specifications, the vegetation in the corridor.

Herbicides are also used as a low-volume spray on foliage to control tall-growing shrubs. This technique uses 3-5 gallon, non-motorized backpack sprayers to selectively apply the herbicides to certain shrub species (alder, buckhorn, etc.) to maintain open access to the corridor. Foliar spraying is stopped when wind speeds are capable of carrying the spray mixture off the corridor. Spray pressure will be kept as low as possible to reduce drift. Maine drift regulations prohibit spraying when the wind speed is over 15 mph. All herbicide applications will be stopped during rainfall or when rain is imminent. CMP avoids using foliar herbicide applications near yards, gardens, pools, and where humans or animals are congregating. These situations will require manual cutting and stump treatments where appropriate. CMP sends a letter in January to each town where foliar herbicide work is planned for the up-coming year.

14. Capacity of the Applicant

See Section 12.0 for a description of CMP's financial and technical capacity for the MPRP.

15. Historic and Archaeological Resources

During the past several years, CMP has engaged in extensive consultation with the Maine Historic Preservation Commission (MHPC) regarding the investigation of precontact archaeological, postcontact archaeological, and historic architectural resources within the MPRP area of potential effect (APE) that are listed on or eligible for listing on the National Register of Historic Places (NRHP).

During the period 2008-2009, CMP's consultants conducted reconnaissance level precontact and postcontact cultural resource surveys to identify resources that might be impacted by project related activities within the MPRP APE. After consultation with the MHPC regarding the results of the reconnaissance level surveys, CMP conducted more intensive level surveys to determine site significance (eligibility for listing in the National Register of Historic Places) on a number of potentially eligible archaeological sites within the APE. Similarly, during the period 2008-2009, CMP's consultants conducted architectural surveys in accordance with MHPC guidelines to identify any potential historic above-ground structures that are listed

on or eligible for listing on the NRHP that are located within the APE and to determine any adverse impacts on those properties from MPRP.

As a result of these surveys, the MHPC determined that there are no eligible or potentially eligible precontact or postcontact archaeological sites in Cumberland that would be adversely impacted by the Raven Farm Substation. The MHPC also determined that there are no eligible or potentially eligible historic architectural structures in Cumberland that would be adversely impacted by the construction and operation of the substation.

Subsequent to the completion of the 2008-2009 surveys, CMP acquired an additional parcel of land (Lot R2-35B) that it proposes to clear in connection with the proposed substation work. Thus, in 2010, CMP's consultants conducted follow up surveys of the additional parcel. The MHPC determined that no eligible or potentially eligible historic architectural structures or postcontact archaeological resources would be adversely impacted by the proposed clearing. We anticipate that the survey and consultation with the MHPC regarding precontact archaeological resources should be completed prior to September 1, 2010.

16. Floodplain Management

The Raven Farm Substation is not located within a 100-year flood zone, based on Q3 flood data derived from the Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) for the Town of Cumberland (Panel Number 2301620016C, dated October 15, 1985). FEMA FIRM data for Cumberland is shown on Figure 3 in Section 5.0 of this application.

17. Exterior Lighting

The substation is designed with three levels of lighting, but only level one is used as a matter of routine operation:

- Level 1 (Exterior Control House Lights): A small (70 watt) entry light will be located over each of the two control house doors that will be operated on a dusk-to-dawn mode. These light fixtures will be wall mounted, full cut-off – down luminaires. Full cutoff luminaires is a Holophane® lighting term for a "dark sky friendly lighting" design approach.
- Level 2 (Outdoor Perimeter Lights): Yard perimeter lighting will consist of pole-mounted, full-cutoff, downward-directed lights located around the perimeter of the substation fence. These lights are typically off and are used for maintenance activities only, unless there is a security need (vandalism, copper theft, the request of law enforcement, heightened national security, etc.). If there is a security need, these lights may be operated dusk-to-dawn.
- Level 3 (Outdoor Work Lights): Structure-mounted flood lights mounted high on substation structures will provide additional lighting for maintenance purposes only. These flood lights are normally off, except where there are nighttime maintenance or outage restoration activities, which is rare.

Under normal operating conditions (i.e., control house lights) there would be no noticeable change in the lighting at most nearby residences, given the distance from the station yard and control house, buffering vegetation, and topography. However, it is possible that the substation lights may be noticeable from one property located along Middle Road at Parcel R2-38C. CMP is working to install a vegetated buffer along this portion of the substation yard to address visual and lighting impacts to this property. Based on this the proposed lighting system should not adversely impact neighboring properties nor cause glare or distraction to vehicles operating on public roads. Section 9.0 provides CMP's yard lighting specifications for the Raven Farm Substation and a typical lighting plan. The substation lighting will be constructed in accordance with these standards.

18. Buffering of Adjacent Uses

The MPRP substations (including the Raven Farm Substation) must be located at or near places where existing transmission lines intersect and where there is significant load on the system. As such, the proposed Raven Farm Substation site is strategically located at the intersection of three transmission line corridors that currently support one 345 kV line, two 115 kV lines, four 34.5 kV lines, and a 115 kV – 34.5 kV substation (Elm Street Substation).

The substation was sited to the maximum extent practicable within CMP's existing corridor and set back from Greely Road by approximately 500 feet to screen the public's view of the substation yard. However, given the additional land area required for the Raven Farm substation, CMP purchased the necessary properties beyond its existing corridor to support the proposed Raven Farm Substation, access road and transmission lines bringing the total substation parcel size to approximately 74.4 acres. More specifically, CMP obtained rights to five parcels abutting the north and west sides of the transmission line corridor and three parcels abutting the south side of the corridor. These additional parcels provide the necessary land area for the substation development. The wooded site (with the exception of the existing transmission line corridor) provides the opportunity to screen the majority of the substation from Greely Road and Middle Road.

A 34.5 kV transmission line running northeast/southwest from the Elm Street Substation is located at the rear of nine Middle Road properties. Two of these nine properties on the west side of Middle Road have maintained thin vegetated buffers at the rear of their properties and will have filtered views of the taller substation components (A-frame dead end structures).

CMP's visual resources consultant, Terrence J. DeWan & Associates (TJD&A), has prepared a landscape buffer plan and photo simulations for the Raven Farm Substation (see Sections 14.0 and 15.0). This buffer plan includes a number of mitigation measures to reduce visual impacts including the construction of berms to shield views of the substation from Greely Road, planting of buffer vegetation at key locations, and the natural restoration of vegetation with temporary construction areas. The Landscape Plan for Raven Farm addresses a number of specific issues throughout the site as follows:

Greely Road Buffer: A low (2-4-foot) earth berm approximately 200 feet in length will be installed immediately adjacent to Greely Road (avoiding wetlands, vernal pools, and line-of-sight corridors). This mound will be used as the base for shrub planting to provide a visual screen for motorists and walkers passing through the transmission corridor. Plantings selected are non-capable species, i.e., they will not grow to a height that would interfere with the electrical conductors.

Secondary Earth Mound: The existing mound near the substation will be expanded to the north and used as a base for additional non-capable plantings. This 10-13-foot high mound should provide a very solid means of screening much of the substation from public view.

Entrance Road Plantings: Additional non-capable species will be installed on either side of the proposed driveway to minimize the view down the transmission corridor. Adequate setbacks will be observed to retain sight distance for vehicles entering Greely Road from the access drive.

Temporary Transmission Line Treatments: A mixture of evergreen tree seedlings and 3-8 foot trees will be installed throughout the temporary transmission lines to provide long-term forest cover.

Parcel R2-38C (Burr) Buffer: CMP and TJD&A are working with the Burrs to develop a plan to provide screening between their home / rear yard and the proposed substation. A number of options are actively being examined. The final design will likely include evergreen tree plantings and earth mounds, avoiding wetlands and a drainageway. Further information will be presented at the next Planning Board meeting.

19. Noise

The Raven Farm Substation does not include the installation of any significant noise-generating equipment such as new autotransformers or reactors. Switches and other minor equipment will be added to the substation. This type of electrical equipment can emit a loud pop sound when activated. This situation would occur on an infrequent basis only during operations and maintenance activities. As such, sound generated by this new substation will not create a nuisance for neighboring properties. Construction and operation of the proposed Raven Farm Substation will be in compliance with all applicable Town of Cumberland and MDEP sound level standards.

20. Storage of Materials

Any equipment or materials stored at the substation will be kept within the secured, fenced-in substation yard. This area is setback approximately 550-700 feet from the nearest public way (Greely Road) and 140 feet from the nearest resident (Parcel R2-38C). CMP does not intend to have any dumpsters or large waste collection receptacles stored in the substation yard. As such, the proposed project complies with this standard.

21. Landscaping

CMP's visual resources consultant, Terrence J. DeWan & Associates (TJD&A), has prepared a landscape buffer plan and photo simulations for the Raven Farm Substation. This information is provided in Sections 14.0 and 15.0 of this application.

22. Building and Parking Placement

The edge of the substation yard has been positioned approximately 550-700 feet from Greely Road and the control house building will be located within the fenced-in area, approximately 950 feet from Greely Road. Mitigation measures have been incorporated into the substation design to ensure that the rural character of the area is maintained. These include the preservation and augmentation of an existing earthen berm near Greely Road and landscape buffer plantings.

As previously mentioned, sufficient space has been maintained within the substation yard for CMP vehicle and equipment parking. The number of vehicles requiring parking at any one time will be limited to occasional visits by CMP operations and maintenance personnel. All vehicles would be parked within the fenced substation yard. Access to the substation will be restricted to CMP personnel and contractors.

23. Fire Protection

The proposed substation will comply with the Town's Fire Protection Ordinance. The substation will be equipped with smoke and heat detection alarms, which will be interconnected with CMP's dispatch center via their communication system. The substation control building will be constructed and equipped in accordance with the National Fire Protection Association (NFPA) requirements. The project team has been, and will continue to coordinate with local emergency response personnel throughout construction to ensure a plan is in place to allow timely response to emergency situations during construction. Prior to completion of the substation, and before it is placed into service, local emergency response personnel will receive training from CMP regarding the facility and any special emergency response procedures required to safely respond to the site.

24. Aquifer Protection

Not applicable.

25. Route 100 Design Standards

Not applicable.

26. Route 1 Design Guidelines

Not applicable.

SECTION 8.0

EVIDENCE OF RIGHT, TITLE OR INTEREST

MPRP Right, Title, or Interest
Raven Farm Substation Site
Town of Cumberland

Parcel #	Municipality	County	Grantor	Grantee	Date	Book/Page	Type	Dimensions
Additional Properties Purchased for Substation Development								
R2-35B	Cumberland	Cumberland	Greenwood, Paul	CMP	15-Oct-09	27604 / 150-152	Option-Fee	irregular
R2-38F	Cumberland	Cumberland	Burr, Peter	CMP	15-Apr-09	26801 / 36-37	Option-Fee	irregular
R2-34B	Cumberland	Cumberland	Raven, Darryl & Jean	CMP	15-Apr-09	26801 / 28-30	Option-Fee	irregular
R2-34C	Cumberland	Cumberland	Raven, John	CMP	22-Jun-10	27872 / 139-141	Fee	irregular
R2-34E	Cumberland	Cumberland	White, Ritchie & Karen	CMP	22-Jun-10	27872 / 142-144	Fee	irregular
R2-34D	Cumberland	Cumberland	Schaefer, Arthur	CMP	27-Apr-10	27737 / 321-322	Fee	irregular
R2-38E	Cumberland	Cumberland	Burr, Christopher	CMP	23-Jun-10	27875 / 260-261	Fee	irregular
Existing CMP Deeds for Transmission Line Corridor								
R2-31	Cumberland	Cumberland	Burr, Harlton	CMP	28-Jun-56	2289/370	Fee	450'
R2-31	Cumberland	Cumberland	Raven, John	CMP	21-Jun-56	2294/ 407	Fee	450'
R2-31	Cumberland	Cumberland	Turner, Marshall	CMP	13-Jun-56	2293/237	Fee	450'

Existing 345 kV/115kV CMP Corridor

Additional Substation Parcels

CENTRAL MAINE POWER COMPANY

DESIGN BASIS MANUAL

YARD LIGHTING
SPECIFICATION 1000-A7-S01

REVISION 0
FEBRUARY 19, 2010

REVISION INDEX

Revision	Date	Description
0	2/19/2010	Issued for Maine Power Reliability Program (MPRP).

TABLE OF CONTENTS

PART 1 GENERAL

1.1. The approach to the lighting design is to achieve an average of 2 foot-candles at grade level throughout substation with all proposed perimeter, work lights, and exterior luminaires on, to the extent practical.

1.2. In most cases, an average of 2 foot-candles (fc) is desirable and usually considered practical for outdoor substation use. This value includes the complete surface of a typical large Substation yard. CMP has determined that a "flat average" of 2fc is practical without imposing excessive lighting in several areas of the substation. It is common that some areas can maintain higher foot-candle values but it should be noted that these foot-candle patterns will be with all the luminaires energized at the same time including the perimeter lights, working lights and exterior control house lights. This is a rare scenario which would only happen in an emergency or maintenance situation.

1.3. The 2fc design is the ultimate lighting of a typical large substation yard. When the working lights are off, the center of the yard and associated equipment and bus would be dimly lit. Adequate dusk-to-dawn lighting shall be provided to access the control house for facilitating the means to illuminate the substation, for supporting normal operations, and to otherwise support a more light-friendly environment.

1.4. Several factors must be considered in the substation yard lighting design. These include: public opinion, local ordinances, security, maintenance, light pollution, spillage, and lighting system control. These considerations affect not only greenfield sites, but expansion and upgrade projects as well.

1.5. Any substation expansion project will typically require additional outdoor yard lighting as the footprint of the substation is being expanded. In certain cases, even though portions of the substation will not be physically expanded, the existing yard lighting fixtures will need to be replaced to conform to the standards of this specification. With consideration to these specifications, the ultimate criteria for lighting design shall be fully determined on a project-specific basis and as part of the permitting process.

1.6. The lighting design shall utilize "full cutoff" perimeter luminaires. "Full cutoff" luminaires is a Holophane® lighting term for a "dark sky friendly lighting" design approach. Also, flexible lighting control options of the lighting subsystems should be used as described in more detail in this document.

1.7. Contractor shall provide a Substation Yard Lighting Plan and fixture mounting details as required for construction purposes, as well as supporting calculations from a lighting calculation software program to verify that the average illuminance of 2fc is met. Please refer to drawing 1000A7-6-D01 – Yard Lighting Typical Plan and Details for an example.

1.8. Conduit and raceway design for the complete substation yard lighting system shall be in accordance with CMP Design Basis Manual Specification 1000-A4-S01 – "Conduit & Cable Trench System". All wiring methods shall comply with standard CMP practices and applicable provisions of the National Electrical Code (NEC).

1.9. Yard lighting fixtures shall be capable of operating on AC station service power available at the specific Site. Refer to Design Basis Manual specification 1000-B2-S01 – "AC Station Service"

for available voltages depending on the Site. Fixtures shall be grouped in AC circuits by area, and circuits should be loaded to allow room for expansion where applicable.

PART 2 EXTERIOR “CONTROL HOUSE LIGHTS” LIGHTING SYSTEM

2.1. Exterior Control House lights shall be Holophane® H-810 series wall mounted 70W HPS exterior, “full cut off – down luminaire”, or CMP approved equal. One fixture should be mounted above each Control House entry.

2.2. Controls for wall mounted luminaires will be designed such that they are selectable to be manually turned on and off or placed in an “Auto” mode via a control switch. The “Auto” position would allow Central Maine Power to select a continuous “Dusk to Dawn” operation as controlled by a photo eye. “Auto” may be considered the normal mode of operation, depending on the Site and local requirements.

2.3. The primary function of the Control House mounted exterior luminaires is for maintenance (night time visibility to the Control House for utility workers) as well as overall station and Control House security and efforts to deter vandalism.

PART 3 OUTDOOR “PERIMETER LIGHTS” LIGHTING SYSTEM

3.1. As part of substation yard expansions, renovations, and new construction, HPS Holophane Mongoose® “full cutoff” perimeter luminaires, or CMP approved equal, will be installed along interior fence lines in areas that are susceptible to vehicular maintenance traffic. These down-lights can also be utilized for security and general lighting. The actual number of perimeter lights, wattage, locations, height, etc. will be determined on a project-specific basis.

3.2. The down light type luminaires will be installed on wooden Class 4 distribution poles, illuminating the area below for maintenance traffic. The luminaires will be installed in serviceable locations and away from live substation conductors and equipment. Poles will be placed at a minimum of 5 feet on the inside of the perimeter fence for security reasons.

3.3. The controls for the perimeter luminaires will be designed such that they are selectable to be manually turned on and off or placed in an “Auto” mode via a control switch. The “Auto” position would allow Central Maine Power to select a continuous “Dusk to Dawn” operation, as controlled by a photo eye, when the selector switch is placed in that position.

3.4. The normal operation would be to place the perimeter lights in an "Off" position which would not allow them to operate automatically. Certain operational or security requirements may warrant operating these lights in the "Auto" mode.

PART 4 OUTDOOR “WORK LIGHTS” LIGHTING SYSTEM

4.1. Outdoor “work lights” will be HPS Holophane Predator® work luminaires, or CMP approved equivalent, which will be installed on appropriate structures such as steel lightning masts and other existing structures, or new structures as required throughout the substation yard for maintenance and operation purposes.

4.2. These flood type luminaires will be directed to areas common for maintenance and switching but operated so as not to contribute to light pollution. The luminaires will be installed at a tilt

determined by the lighting design such that the aiming point is directed to high voltage equipment at the standard bus heights.

4.3. The work light controls will be designed such that they are selectable to be manually turned on and off only, with no "Auto" mode, as the intended use is for occasional and specific night time use only and not for security or general lighting. This lighting system should not be designed to operate on timers or photo eyes due to safety considerations of unexpected operation while work is being performed.

4.4. The normal operation would be to place the work lights in an "off" position as not to disrupt the members of the local community.

PART 5 REFERENCES

5.1. Illuminating Engineering Society of North America – IESNA Lighting Handbook, 9th ed.

5.2. National Fire Protection Association (NFPA) 70 – National Electrical Code (NEC).

5.3. For additional information, refer to the following documents in the CMP Design Basis Manual:

5.3.1. Specification 1000-A4-S01 – Conduit & Cable Trench.

5.3.2. Specification 1000-B2-S01 – AC Station Service.

5.3.3. Drawing 1000A7-6-D01 – Yard Lighting Typical Plan and Details.

END OF DOCUMENT

SECTION 10.0

EROSION AND SEDIMENTATION CONTROL PLAN

Central Maine Power Company

Environmental Guidelines For Construction and Maintenance Activities on Transmission Line And Substation Projects

Prepared for:

Central Maine Power Company
83 Edison Drive
Augusta, Maine 04336

Prepared by:

TRC Engineering, LLC
249 Western Avenue
Augusta, Maine 04330

December 2007

2nd Edition

Revised for MPRP January 2010

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

CENTRAL MAINE POWER COMPANY

Environmental Guidelines for Construction and Maintenance Activities on Transmission Line And Substation Projects

1.0 INTRODUCTION

These guidelines contain standards and methods used to protect soil and water resources during construction, reconstruction, and maintenance of transmission lines and substations. They are based on practical methods developed for construction in utility corridors and their use is enforced by both State of Maine and Federal regulatory agencies. The construction practices described in this manual are typically required by the regulatory agencies for all projects. These practices are commonly referred to as Best Management Practices (BMPs). Illustrations have been provided as part of this manual (Appendix D) which demonstrate both the proper and improper techniques used for the more common construction activities.

All contracts for work performed on Central Maine Power Company (CMP) transmission line rights-of-way and substation sites will include these specific guidelines to ensure the project is constructed in an environmentally conscious manner. CMP personnel or their designated representatives will ensure that the guidelines are followed by inspecting all work and prescribing corrective steps to be taken where necessary. While this manual takes into consideration legal requirements, project personnel are still responsible for compliance with all federal, state, and local requirements.

This guide uses a number of scientific and technical terms. Definitions of these terms are provided in Appendix A.

2.0 PLANNING AND DESIGN CONSIDERATIONS

Planning is an important practice that will reduce the risk of erosion on a construction site, saving both time and money for Central Maine Power Company and its contractors. An erosion control plan should be prepared during project planning and design phases. It will likely be required for any Maine Department of Environmental Protection and/or local permits.

The erosion control plan should consist of:

- A narrative.
- A map.
- Plan details.

The narrative should describe the proposed project, existing site conditions, adjacent land uses, and any natural resources or properties that might be affected by the project. Other important details to include are descriptions of critical areas, proposed construction start and end dates, construction sequence, and brief descriptions of erosion and sedimentation control measures,

inspections and maintenance programs, and other clearing or construction that has taken place on the site in the last five years.

The map should include pre-development site contours at a scale to identify runoff patterns (minimum 5-foot contour interval), final contours, limits of clearing and grading, existing buffers, critical areas, natural resources, erosion control measures, and other clearing or construction that has taken place on the site in the last five years.

The plan details should include drawing of the erosion control structures and measures, design criteria and calculations, seeding specifications, and inspection and maintenance notes.

Key considerations include resource identification, familiarizing all parties with the construction site and limitations, and construction sequence.

2.1 Resource Identification

Sensitive natural areas which will receive priority treatment include:

- Streams and rivers.
- Great ponds.
- Wetlands.
- Steep slopes.
- Unstable soil conditions.

Sensitive natural areas which may receive priority treatment, depending upon the specifics of the project, include:

- Stream, river, pond, and wetland buffers.
- Significant wildlife habitats.
- Habitat for rare species.
- Historic and prehistoric sites.

During the planning phase, all sensitive natural areas that require priority treatment will be identified. The method of avoiding or crossing the sensitive natural areas to minimize impacts will be identified and incorporated into the project plans. Project plans should be designed and drawn to provide contractors and inspectors with a comprehensive reference guide that include, but is not limited to, locations of sensitive natural areas, access, and abutter and landowner issues. If modifications to the plans need to be made in the field, a designated person shall make necessary changes and shall notify all necessary personnel promptly. Copies of these plans should be provided and explained to equipment operators to assure that construction practices meet the intent of avoiding or minimizing impacts to the identified sensitive natural areas. In addition to the plans, the proposed access ways and water/wetland crossing locations, as well as other environmentally sensitive areas where activities will be restricted or prohibited, will be flagged and/or have signs posted.

Prior to crossings or construction in or near any sensitive natural areas, a "walk-through" will be conducted. Attendees at the walk-through will include: 1) the contractor, 2) CMP and/or any designated representative, and may include 3) any assigned Third Party Inspector. The purpose of the walk-through is to establish the following objectives, **prior to any clearing or construction work**:

- Identify available or alternate points of access to the project site.
- Identify sensitive natural areas.
- Identify future "No-Access" areas.
- Review color designation for all flagging used.
- Establish the Communication Chain of Command (Contact Point).
- Identify and flag access/construction roads within the ROW and/or project area.
- Establish methods of access over water resource areas (mats, timber corduroy, frozen ground, tracked equipment).

In order to minimize impacts to sensitive natural areas, the above objectives will continually be evaluated throughout the construction process. Project superintendents, foremen, and inspectors should also monitor weather conditions and reports on an on-going basis. Knowledge of changing or anticipated wet weather will allow time to address erosion control needs. In this way, CMP and its contractors will be prepared to respond to changing environmental conditions (e.g., unusually wet or dry weather) and other unknowns that are inherent in the construction and maintenance of transmission lines.

2.2 "Walk-Through" Mechanics

2.2.1 Use of Flagging and Signs

Flagging will be conducted at the time of the walk-through in order to visually identify select features or construction methods to be used. Wetlands may be flagged earlier as part of project permitting. Signs may also be installed following the walk-through to direct construction to approved access routes and away from "no access" areas. The CMP flagging color-code is as follows:

- ***Glow-pink*** with the printed words "Wetland Delineation", "Wetland Boundary" or "Wetlands". This flagging denotes the edge of wetlands.
- ***Red*** with or without the printed words – "Do Not Cross". This flagging denotes a No-Access area where no equipment is allowed.
- ***Yellow*** – no printed words. This flagging denotes the location of an environmental measure such as a waterbar, hay bale barrier, or silt fence.
- ***Blue*** – no printed words. This flagging denotes approved travel ways. This is typically flagged on each side of the access-way to denote the designated travel lane for all access.
- ***Glow-pink with black stripes*** or otherwise printed with the words Buffer or Wetland Buffer. This denotes a setback from a water resource and should be treated the same as No-Access area.

2.2.2 Identification and Use of Existing Roads

Available logging, farm, or access roads, as well as other existing rights-of-way, will be utilized for access to and from transmission line rights-of-way with permission of the respective landowners. In order to minimize ground disturbance, existing roads within the right-of-way and wetland/stream crossing areas will be used whenever possible for travel during construction, unless a better route is agreed upon during the walk-through. The movement of equipment and materials within the transmission line right-of-way will be confined as much as possible to a single road or travel path.

For example, it may be better to construct new access roads in order to: (1) minimize the span of a wetland or stream crossing, or (2) avoid the more environmentally sensitive or "wetter" portions of a wetland or stream crossing.

In all cases, CMP and its contractors will attempt to avoid and minimize impacts to sensitive natural areas. As a result of this procedure, wetland and stream crossings, steep slopes, unstable soils, and other sensitive natural areas will be avoided and adverse impacts minimized whenever practicable.

2.3 Construction Sequencing

Although a "Project Plan" may be specific in identifying the *locations* of water resource areas (wetlands, streams, etc), and the *methods* of access over water resource areas (crane mats, frozen ground, etc) it should not dictate *when* construction activities should occur. It would be impractical to include day to day activities in the "Project Plan" such as, 'pole X will be installed on Y date'. However, including environmental considerations in the daily and weekly project planning is very important. Factors such as the project schedule and weather often determine where and when construction activities occur; environmental impacts should also be considered. Below are some guidelines:

- Work closely with the individual(s) in charge of environmental compliance to plan project activities.
- Construction activities that cause soil disturbance should not occur during or just prior to forecast heavy rain events.
- Coordinate access planning with all of the contractors on the project. Often temporary access roads are used by several different contractors and the construction and use of temporary access roads can cause significant soil disturbance. Minimize equipment and vehicle travel on temporary access ways.
- Stabilize/restore disturbed areas as soon as possible, preferably while equipment is on site. Additional trips with equipment can create more soil disturbance which will need to be stabilized. Often a site can and should be stabilized within hours of when the soil disturbance occurred.
- Use frozen conditions to your advantage. There may be instances where water resource areas can be crossed during frozen conditions in lieu of installing crane mats. Before using this technique consult with the project environmental inspector.

- Crane mats should be removed as soon as they are no longer needed and/or when conditions are favorable.

3.0 STANDARDS FOR CONSTRUCTION

3.1 Road Construction

The following five standards apply to the construction and/or upgrade of all roads, skid trails, yarding areas, or work pads whether temporary or permanent.

1. Where construction will be located near water resources, such that material or soil may be washed into them, these disturbances will be set back from the edge of the water resource to maximize the amount of undisturbed filtering area between the disturbed area and the resource. These "filter strips" will consist of an area of undisturbed vegetation between the edge of disturbed area and/or silt fence/hay bale barriers placed to intercept any sediment load in runoff water before it can enter the resource area. In order to maintain the integrity and effectiveness of filter strips, sediment barriers should be installed very early in the construction sequence, and they need to be monitored to make sure they are functional. Effective filter strip widths may vary from only a few feet in relatively well drained flat areas to as much as several hundred feet in steeper areas with more impermeable soils. The minimum width of the buffer strip shall be 25 feet or in accordance with local CEO or DEP regulations. The width of the filter strip shall be increased proportionately for slopes longer than 150 feet or for higher sediment concentrations. **Table 1** below provides the recommended widths for the filter strips according to the slope of land between the edge of the resource and any exposed soil.

Table 1
Recommended Widths For Filter Strips Between Disturbed Areas And Water Resources

Slope of Land Between Disturbance and the Resource (Percent)	Width of Filter Strip* (Feet)
0	25
10	45
20	65
30	85
40	105
50	125
60	145
70	165
*Measured along surface of the ground	

2. Wherever possible, construction equipment will either avoid steep slopes or proceed across the slope in a safe manner to avoid excessive disturbance of vegetation and soils. Equipment will not travel straight up or down any slopes with a grade steeper than 10 percent, except where necessary due to safety concerns and/or terrain constraints.

3. Where access roads or construction areas are to be built across the slope, the area will be properly sloped, slanting away from the cut bank to the outside edge of the roadbed in order to facilitate road surface drainage.
4. Slopes of cut-and-fill banks will be no steeper than 1 horizontal to 1 vertical. If located within 100 feet of water resources, the slopes will be no steeper than 2 horizontal to 1 vertical.
5. Rivers, streams, and wetland areas will be crossed, where necessary, at right angles to the channel and/or at points of minimum impact. To insure that natural drainage patterns will not be altered or restricted as a result of construction activities, crossings will be designed and constructed according to specific standards outlined below.

3.2 Stream or Wetland Crossings

The following standards apply to all unavoidable stream, drainage way, or wetland crossings encountered while accessing the project site or on the project site itself.

3.2.1 Types of Crossings Used

The type of crossing used for access is dependent on: the purpose and use of the crossing, the nature of the resource being crossed, ground conditions present at the time of construction, and construction materials available. Some planning guidance is provided below. The appropriate means and location of the crossing will be determined at the time of the formal walk-through. It is important to consult with the project environmental inspector prior to installing any crossing.

- Permanent culverts and bridges will be used only where long-term, continued, and frequent access is required (such as substation access roads).
- Temporary crossings will be used at all other locations. Temporary bridges, culverts, or crane mats must be used to cross any streams, drainage ways, or wetland swales that contain: (1) flowing water, (2) standing water, (3) saturated soils, or (4) organic/mucky soils.
- The use of corduroy as crossing material will be limited to wetlands which are not anticipated to have flowing or standing water during the construction period.
- In certain cases, no crossing material will be required if the stream bottom or drainage way is dry and contains a gravel or solid rock bottom (a “ford”). Fords can only be used if they will cause no unreasonable sedimentation of the stream and no unreasonable alteration of the stream banks and bottom.
- All crossings should include water bars or broad based dips or turn outs on the access, approximately 50 feet from each side of the crossing, to promote filter-strip treatment of runoff.
- All temporary crossings must be stabilized within seven (7) days of its removal, unless specified otherwise.

3.3 Construction in Wetlands

Where structures are to be placed in wetlands, topsoil must be excavated first, and stockpiled separate from subsoil. Be sure that stockpile soils are placed in such a manner that they are readily replaced into the excavated area. Soils shall be replaced into the excavated area in the

opposite order they were removed. Excavation and pole placement in wetland areas should be completed within the same day. After pole installation, topsoil must be restored to the original surface grade, except where mounding around a structure is necessary for structure stability.

4.0 INSTALLATION OF CROSSINGS

4.1 Bridges

Bridges are a preferred method for temporary access waterway crossings. Normally, bridge construction causes the least disturbance to the waterway bed and banks when compared to the other waterway crossing methods. Most bridges can be quickly removed and reused without significantly affecting the stream or its banks and without interfering with fish migration.

Materials
Access bridge construction typically entails the use of log stringers as construction materials.

Sizing
Table 2 below illustrates the log sizing requirements depending on the span and anticipated loads.

Table 2
Log Bridge Stringer Requirements

Span	Minimum Log Diameter* (80,000 lb. Load)	(40,000 lb. Load)
8 ft.	16 in.	12 in.
12 ft.	18 in.	14 in.
16 ft.	20 in.	16 in.

Wheel guards: 10" diameter
- Size of deck planks: 4" x 12" x 12'
* Assume 6 stringers at 24" centers

Positioning
The following is guidance for the positioning and installation for all permanent and temporary bridges:

- Access roads will cross streams at right angles to the channel at a location with firm banks and level approaches whenever possible.
- Bridge piers and abutments will be aligned parallel to the stream flow so that the original direction of stream flow is not altered.
- Piers and abutments will be imbedded in good foundation material. The grade of the bridge should coincide with that of the road wherever practicable.

For additional specifications on bridge construction, refer to section F-2 of the Maine Erosion and Sediment Control BMPs (see full citation in Appendix C).

4.2 Culverts

Materials
Permanent culverts will be either corrugated metal or plastic pipe. Temporary culverts will be corrugated metal, plastic pipe, or lumber ties. Chemically-treated wood will be not used.

Sizing
Permanent culverts will be sized to have a diameter of at least 3 times the cross-sectional area of the stream channel or will be designed to accommodate 25-year frequency flows. Multiple culverts may be used in place of one large culvert if they have the equivalent capacity of a larger one. A culvert sizing criteria table (3x Rule) produced by the MDEP can be found in Appendix G. However, it is recommended that an engineer be consulted when installing any permanent culvert.

Temporary culverts will also be sized to provide an opening at least 3 times the cross-sectional area of the stream channel and sized to accommodate a 25-year frequency storm flow. The stream channel cross-section will be determined at highest flows or will be approximated during periods of lower flows using the apparent natural high water marks remaining on the stream banks. For small intermittent streams, drainage ways or wetland crossings, the minimum sized culvert that may be used is 18 inches. Multiple culverts may be used in place of one larger culvert if they have the equivalent capacity of a larger one.

Positioning
The following is guidance for the positioning of all permanent and temporary culverts:

- Culverts should be placed to allow for the crossing to take place at right angles to the channel to assure that natural drainage patterns will not be altered.
- Culverts should be placed at the point of narrowest crossing and where firm banks and level approach slopes are available. Slopes should be no greater than 1.5 to 1.

Installation
The following is guidance for the installation of all permanent and temporary culverts:

- Culverts should be of sufficient length to allow both ends to extend at least one foot beyond the toe of any fill used to cover the culvert.
- Inlet and outlet armoring shall extend at least one pipe diameter beyond the upstream and downstream end of the culvert. See Table 3 below for outlet protection in erodible areas.
- Culverts should be bedded on firm ground. Supplemental use of geotextile with gravel can be used to create this firm base. Permanent culvert installation should include firm compaction of the foundation and the fill around the sides of the culvert. Compaction should be done in no less than 8-inch lifts.
- Both the inlet and outlet ends of the culverts will be set at or slightly below the natural stream bottom to allow passage of fish and other aquatic life at all levels of flow. At no point should either end of an installed culvert be positioned in the air out of the water.
- Multiple culverts must be offset in order to concentrate low flows into the culvert within the natural channel.

- When working in and around a perennial stream, temporary stream diversion may be necessary to avoid creating turbidity in the stream water. This type of work requires a permit from Maine DEP, and must be coordinated with the project environmental inspector.
- Fill used to bury the culvert will be compacted at least half-way up the side of the culvert for its full length in insure that flowing water will not undermine the culvert.
- Culverts will be covered with fill to a depth of at least one foot or one and a half times the culvert diameter, whichever is greater.
- Road fill at the upstream (headwall) and downstream (out-fall) ends of culverts will be armored with either rock rip rap or logs to protect the road fill from being eroded by the action of water or road traffic. This material will be installed up to the level of anticipated high water.
- In areas where the streambed appears highly erodible, the streambed at the outlet end of the culvert will be lined with riprap to prevent erosion and potential stream bed scour. Table 3 below indicates the distances away from the culvert to install such riprap.

Table 3
Culvert Size - Length of Rock Protection

Culvert Diameter (Inches)	Length of Rock Protection From Culvert (Feet)
12 – 20	7
21 – 24	9
30	11
36	13
42 – 48	18
54 – 60	24
66 – 78	32

Removal

Temporary culverts will be removed once their use is no longer necessary. The fill material can be redistributed and spread out on the nearby uplands at a distance sufficient to prevent its reentry into the resource. Silt fence/hay bales, seeding, and mulching may be necessary to stabilize this material. The banks and bottoms of the stream, drainage way, or wetland should be restored to original conditions. Exposed soils on the banks and within 100 feet of the crossing should be stabilized using seed and mulch. Some banks and steep slopes adjacent to streams may require stabilization with curlex or jute matting in combination with seed and mulch.

4.3 Mats (Crane or Swamp Mats)

CMP construction projects require that adequate mats are present at the project site prior to construction. A readily accessible source of mats should also be available in case construction conditions change and necessitate the need for more mats.

Materials

A number of different sized and constructed crane mats are typically available. CMP requires that the appropriate mats be used for the appropriate crossing. For example:

- Longer mats should be used for the longer crossing spans. This practice avoids the need to install additional mats within the crossing area in order to support the "span" mats.
- Mats should be in good condition to allow for their "clean" installation. Having mats in good condition prevents them from being dragged in versus them being carried in due to broken hitching cables, breaking apart on the job site, or becoming imbedded in mud due to their inability to support the required weight.
- Mats with partial/short timbers joined end to end should generally not be used to cross stream channels.

Installation

- Whenever possible, mats should be carried and not dragged. Dragging mats creates more soil disturbance which requires additional erosion control or final restoration work.
- At the crossing location, the ends of the crane mats should extend at least two feet onto firm banks or several feet into the upland edge of a wetland to assure a dry, firm approach onto the mats.
- At crossings which contain open or flowing water, the mats should be supported within the span using cross mats as abutments in order to prevent the impoundment of water or having water flow over the mats.
- At "dry" crossings where no water is present or anticipated during project construction, the mats may be placed directly onto the sensitive natural area in order to prevent excessive rutting, provided stream banks and bottoms are not altered.

Maintenance

Matted crossings should be continually monitored to assure their correct functioning. Mats which become covered with dirt should be kept clean and the material removed must be disposed of in an upland location. The material must not be scraped and shoveled into the water resource. Mats which become imbedded must be reset or layered to prevent mud from covering them or water passing over them.

Removal

Mats should not be removed until their use is absolutely no longer necessary. Specifically, all final restoration work should be completed prior to the mats being removed from the crossings. The planned removal of mats should be coordinated with CMP (or designated representative), the project environmental inspector, and any Third Party Inspector. As temporary structures, they should be removed within one year from the date of installation. All areas disturbed during ford removal shall be stabilized with seed and mulch.

4.4 Corduroy

Materials

Corduroy material will consist of de-limbed trees or logs. The logs must have a diameter greater than three inches at the small end and lengths greater than 18 feet. Shorter length material may be used only as described in the Installation section below.

Positioning
Corduroy should be placed perpendicular to the direction of travel. Corduroy should be placed at the point of narrowest crossing and where firm banks and level approach slopes are available.

Installation
The corduroy should be placed with the longer length pieces laid down first. The bed of corduroy should not only be placed within the low portions of the crossing but also for at least three feet up the sides of any upland side slopes in order to prevent rutting and sedimentation from the approaches to the crossing.

Once a thick base of corduroy has been laid, pieces shorter than 18 feet can be used to fill gaps and raise the elevation of the corduroy to provide for a more stable crossing.

Removal
Removal is the reverse of installation. Once the corduroy has been removed from the crossing, it may be moved off the right-of-way, burned, or chipped. The material may also be spread and distributed on the ROW over the nearby upland if in accordance with the Maine Slash Law (see Appendix E) and approved by a CMP representative. The banks of streams and drainage ways must be graded back to original conditions. Exposed soils on the banks and within 100 feet of the crossing must be stabilized using seed and mulch. Banks of drainage ways that are expected to receive high flows should be stabilized with seed and curlex or jute matting.

5.0 SURFACE WATER DIVERSION STRUCTURES (WATER BARS)

A number of above-ground structures or techniques are available to divert water out of travel ways and work areas in order to prevent subsequent runoff and erosion. The terminology and definitions for these techniques (i.e., broad-based dips, water bars, skid humps, water turnouts, and cross-drainage box culvert) vary, but the purpose of all is to redirect water moving down a slope into adjacent vegetated areas (filter strips). Any activities that involve land grading have the potential to cause sedimentation. Their use and installation needs to be carefully planned. Planning for these techniques must include timing, use of natural buffers (filter strips), mulching, and temporary and permanent seeding. Minimizing the area of soil exposed at one time is a key component of ensuring that surface water diversion structures function effectively. General standards for their construction are as follows.

Materials
Most of these structures are constructed by excavating or moving and shaping earth from within the access way or work area. The cross-drainage culvert structure typically uses logs or timber to form a box-like structure to catch water from travel ways or side ditches in order to direct it across the travel way and away from disturbed areas.

Positioning
These structures should be installed immediately above and along steep pitches in the road and below seepage areas on natural or cut banks. They should be sited to take advantage of existing vegetation for filtering and slope away from the travel surface. The interval for installing these diversion structures depends on the slope of the road, as well as the nature of the road surface, soils, and wetness. Generally speaking, steeper slopes require shorter distances between

diversion structures. The following table contains recommended distances between installed structures depending on slope.

Table 4
Recommended Distances Between Water Diversion Structures

Slope (Percent)	Spacing (Feet)
0 – 2	500 – 300
3 – 5	250 – 180
6 – 10	167 – 140
11 – 15	136 – 127
16 – 20	125 – 120
21+	100

All of these structures should be sized in anticipation of greater flows resulting from snow melt, spring runoff, and storm rains.

Installation

These structures should be installed at 30-degrees angled down grade. The shape of the backside portion of the structure should have a reverse slope of about 3 percent. Use of a pop-level is recommended to ensure that drainage is away from the road. Structures should be constructed with rounded (not vertical) mounds and dips to allow for firm compaction and to allow re-vegetation.

In the case of the cross-drainage culvert, the minimum width of the open face of the culvert should be 18 inches. The travel surface should consist of at least 12 inches of gravel or soil over the culvert. The slope of the culvert should be a drop of at least 5 inches in every 10 feet of length to ensure proper drainage.

The inlet end of all structures should extend beyond the edge of the access road so that it fully intercepts water flows that may flow onto the access road. The outlet end of the structure should extend out enough to prevent water from flowing around and re-entering the road or work area.

The discharge ends of any of these diversion structures should outlet into a vegetated filter strip. Where heavy flows are encountered or anticipated, the outlet end of the structures should incorporate an apron of rock, gravel, or brush to reduce water velocities. If construction will extend into fall and winter months, be sure to upgrade to meet winter standards all erosion control measures (e.g., increase amount of mulch, etc.), to protect the site from spring runoff.

Where the structure is within 100 feet of a stream or wetland, the incorporation of a small, excavated settling basin or ditch turnout to reduce the velocity of flows and the continued movement of sediment downslope should be considered. In addition, some type of sediment barrier (silt fencing or staked hay bales) will be installed at the outlet of the diversion structure, where vegetated filter strips are narrow or sparsely vegetated, in order to prevent sediment from eroding into water resources.

Maintenance
Due to repeated travel over these structures, maintenance is critical to their effective functioning. As the structure becomes flattened or rutted, it needs to be re-excavated or graded to ensure the interception and redirection of water runoff. The ends of any cross-drainage culverts should be maintained by clearing away any potential blockages.

Removal
After the completion of the construction project, removal of these structures is not a requirement, with the exception of the cross-drainage culvert. The structures can be left in place provided they have been suitably stabilized with seed and mulch. Any hay bale barriers or silt fence at the outlet end should be removed when the site has a healthy vegetative cover.

6.0 SEDIMENT BARRIERS (STRUCTURAL MEASURES)

6.1 Introduction

The use of properly installed erosion and sediment control barriers is a fundamental and critical component for preventing erosion at CMP construction projects. Erosion control barriers include silt fence, hay bales, and/or erosion control mix berms. In some cases, these barriers may be deemed unnecessary by CMP, its representatives, or a Third Party Inspector due to factors including slope and filter strip width within project boundaries. A typical CMP construction project will use a combination of barriers to effectively control erosion near water resources. Installation and diligent maintenance of these barriers serves the following purposes:

- Assures the environmental integrity of those upland and water resource areas not designated or permitted for disturbance. Specifically, it maintains the onsite vegetative community and water quality of the surface water within the watershed.
- Assures compliance with all applicable federal, state, and local environmental and land use regulations or permit conditions.

Generally, silt fence is the preferred barrier because: it traps a much higher percentage of suspended sediments than hay bales; it can be easier to install, obtain, and transport; and is less costly. In addition, the structural longevity of silt fence is 60 days or longer unlike straw or hay bales' longevity which is 60 days or less.

The standards and procedures outlined in this section of the manual are meant to address a majority of the situations encountered during transmission line and substation construction activities. For additional information on sediment and erosion control methods and techniques, or to address a particularly problematic situation, this manual should be used in conjunction with and supplemented by the Maine Erosion and Sediment Control BMPs. For other recommended references, see Appendix C.

6.2 Silt Fence

Materials

Silt fence is provided by a number of manufacturers and is generally a synthetic fabric pre-attached to wooden staking. The fabric should be pervious to water allowing a flow through rate of 0.3 gallon per square foot per minute. The fabric should contain stabilizers and ultraviolet ray inhibitors to allow it to sustain exposure of a minimum of 6 months. The height of the filter fabric should not exceed 4 feet in height.

Placement

Silt fence is to be utilized at the edge of any planned work area or area which will cause the disturbance of soil. It will be installed to intercept any sheet flow of water and detain sediment from entering water resources or leaving the project site. It should be installed prior to starting work. Given the expansiveness of CMP transmission line projects in particular, the amount of silt fence placement must be selective; however, it should still be used in amounts sufficient to meet potential changing conditions in a pro-active manner. After the primary stabilization measures (temporary and permanent) have been implemented, silt fence use is encouraged in the following selected locations, as appropriate:

- Around all substation project sites.
- Along all access roads or work areas that are within 100 feet of water resources.
- Along all access roads or work areas in upland settings that encounter seepage moving across slope.
- Around all stockpiled soils.

In general, the placement of silt fence is appropriate when:

- Serving a drainage area of no more than .25 acre per 100 feet of silt fence length.
- The maximum slope length behind the fence is 100 feet or less.
- The maximum gradient behind the fence is 50% or 2:1 horizontal/vertical.
- Where the filter strip is not of an adequate width (see Table 1).

Installation

The following installation guidelines are the minimum which should be implemented; however, appropriate changes to silt fence installation should be made as conditions change during the construction operation.

Silt fence will be placed an adequate distance (6-10 feet) beyond the toe of the slope (if there is sufficient room) to allow for sediment accumulation between the disturbed area and the down-gradient water resources. If there is not sufficient room to place the silt fence an adequate distance beyond the toe of the slope, CMP, a representative of CMP, or the Third Party Inspector should be consulted. The barrier should be installed along the contour, within reason. The goal is to slow and pool the sediment-laden runoff to allow fine sediments to settle-out before the runoff enters the water resource. The ends of the barrier should be up-turned to maintain the pool volume.

A trench shall be excavated approximately 6 inches wide and 6 inches deep on the up-slope side of the silt fence alignment. The lower edge of the silt fence fabric should be entrenched for a distance of at least 4 inches up-slope and then back-filled. Should frozen or rocky ground conditions prevent the effective or practical use of trenching, materials such as bark/wood chips, wood fiber mulch, or a soil erosion control mixture can be used. This material is to be mounded on top of at least 4 inches of filter fabric which would otherwise be trenched.
Silt fence should be installed in a continuous roll to avoid the need of a joint between different pieces of fence. If joints are necessary, filter fabric shall be "spliced" together at a support post, securely sealed, and with a minimum of 6 inches of overlap. Splicing rolls of silt fence entails twisting end posts together, creating a continuous section of silt fence.

Support posts should be placed on the down-slope side or the side closest to or facing the water resource. The posts should be placed 6 feet apart (a maximum of 10 feet may be acceptable in some locations) and driven securely into the ground, typically about one foot deep. Silt fence usually has posts pre-attached.

Silt fence should not be installed in streams or drainage ways where concentrated water flow is present or concentrated flows are anticipated.

Maintenance
Once a week, or after rainstorms producing at least ½ inch of rainfall, whichever is more frequent, the contractor is responsible for inspecting all temporary erosion and sediment control barriers. Such inspection is necessary to assure that the barriers are functioning properly as well as identifying new areas requiring installation. A maintenance log should be kept of all erosion control changes, improvements, and maintenance performed.

If any barriers are not functioning properly, they will be repaired or replaced. A sediment control barrier is not functioning if:

1. Water is flowing around the sides or under the barrier.
2. Soil has built up behind the barrier to the point more than half-way up the fence.
3. There is excessive sag in the fence.
4. There is evidence of sedimentation such as gully erosion, slumping of banks, or the discoloration of water outside of the perimeter silt fence.

Corrective measures include removing accumulated sediment from behind the barrier, restaking, extending the ends of the fence, or installing another fence further upslope.

Removal
Installed silt fence will be removed once it is evident that the soils have become stabilized and the potential for erosion no longer exists. In most cases, the silt fence will not be removed until at least one growing season has past. Removal of silt fence should be coordinated with CMP or their designated representative.

Any ridges or mounds of soil or caught sediment remaining in place after the silt fence has been removed, must be leveled-off to conform to the existing grade. Any newly exposed soil that may erode must be seeded and mulched.

All removed silt fence must be properly disposed of off the project area.

6.3 Hay Bales

Placement

Like silt fence, hay bale barriers can be utilized at the edge of any planned work area or areas where soil disturbance has occurred or will occur. Barriers are installed to intercept sheet flow of water and detain sediment from entering water resources or leaving the project site. Given the expansiveness of CMP transmission line projects in particular, the amount of hay bale barrier placement must be selective, but still in amounts sufficient to meet potential changing conditions in a pro-active manner. Hay bale barriers will be used, as appropriate, in the following locations:

- Around all substation project sites.
- Along all access roads or work areas that are within 100 feet of a water resource area.
- Along all access roads or work areas in upland settings that encounter seepage moving across slope.
- Around all stockpiled soils.

In general, the placement of hay bales is appropriate when:

- Serving a drainage area of no more than .25 acre per 100 feet of barrier length.
- The maximum slope length behind the barrier is 100 feet or less.
- The maximum gradient behind the barrier of 50% or 2:1 horizontal/vertical.
- Where the filter strip is not of an adequate width (see Table 1).

Installation

The following installation guidelines are the minimum which should be implemented; however, appropriate changes to hay bale installation should be made as conditions change during the construction operation.

The barrier will be placed an adequate distance (6-10 feet) beyond the toe of the slope (if there is sufficient room) to allow for sediment accumulation between the disturbed area and the down-gradient sensitive areas. If there is not sufficient room to place the hay bales an adequate distance beyond the toe of the slope, CMP, a representative of CMP, the project environmental inspector, or the Third Party Inspector should be consulted. Within reason, the barrier should be installed along the contour. The goal is to slow and pool the sediment-laden runoff to allow fine sediments to settle-out before the runoff enters the water resource. The ends of the barrier should be up-turned to maintain the pool volume.

A shallow trench shall be excavated the width of the bale and to a minimum depth of 4 inches in which to bed the bale. The excavated soils are then used to seal the lower inside (up-slope) edge of the barrier. The bales should be set tightly together and entrenched with the baling string oriented on the sides (i.e., not touching the ground) in order to prevent deterioration of the string.

Every bale should be staked using 2 stakes per bale. The stakes should be driven in at angles such that it binds and forces abutting hay bales together.

Gaps between bales shall be packed with loose hay to prevent water from escaping between the bales.

Hay bales will not be placed in streams where flow is present or anticipated.

Maintenance
Once a week, or after rainstorms producing at least ½ inch of rainfall, whichever is more frequent, the contractor is responsible for inspecting all temporary erosion and sediment control barriers. Such inspection is necessary to ensure the structures are functioning properly as well as identifying new areas requiring installation. A maintenance log should be kept of all erosion control changes, improvements, and maintenance performed.

If any barriers are not functioning properly, they must be repaired or replaced. A sediment barrier is not functioning if:

- Water is flowing around the sides or under the barrier.
- Soil has built up behind the barrier to the point more than half-way up the hay bale or where there is excessive lean to the barrier.
- There is evidence of sedimentation such as gully erosion, slumping of banks, or the discoloration of water outside of the hay bale barrier.

Corrective measures include removing accumulated sediment from behind the barrier, re-staking, extending the barrier at the ends, or installing another barrier further up-slope.

It is not recommended that straw or hay bales be used for periods greater than 60 days.

Removal
Installed hay bales will be removed once it is evident that the soils have become stabilized and the potential for erosion no longer exists. In most cases, the hay bale barrier will not be removed until at least a healthy growth of vegetation is established on the disturbed site. Removal of hay bale barriers should be coordinated with CMP or their designated representative.

Any ridges, mounds of soil, or caught sediment remaining in place after the hay bales have been removed, must be leveled-off to conform to the existing grade. Any newly exposed soil that may erode must be seeded and mulched.

All removed hay bales must be properly disposed of, or broken up and used as mulch on the bare soils near the barrier.

6.3.1 Problems With Straw or Hay Bale Barriers

There are several situations where straw or hay bale barriers may be ineffective or cause problems:

1. When improperly placed and installed (such as staking the bales directly to the ground with no soil seal or entrenchment), hay bales allow undercutting and end flow.

2. When used in streams and drainage ways, high water velocities and volumes destroy or impair their effectiveness.
3. When bales are not inspected and maintained adequately.
4. When hay bale barriers are removed before up-slope areas have been permanently stabilized.
5. When hay bale barriers have not been removed after they have served their usefulness.

6.4 Erosion Control Mix Berms

Composition

Erosion control mix berms are made up of shredded bark, stump grindings, and composted bark. It may be made on a project site if adequate materials are available, however its composition needs to be a well-graded mix of different particle sizes. Wood chips, bark chips, ground construction debris and processed wood cannot make up the organic component of the mix. Be sure to consult with the project environmental inspector regarding the suitability of any erosion control mix material proposed for use.

Installation

Erosion control mix berms are simply placed on the surface of the ground and do not require any soil disturbance. The berm should be located in a similar manner to other sediment control barriers along contour, downslope of disturbed soils. Also similar to other sediment barriers, they should not be placed in areas of concentrated runoff, below culvert outlets, around catch basins, or at the bottom of a large contributing subwatershed. At the toe of shallow slopes less than 20 feet long, at a minimum berms should be 12" high and a minimum of 2 feet wide at their base. For longer or steeper slopes, the berms should be wider to accommodate additional runoff. They are ideal for installation on frozen ground, on shallow to bedrock soils, outcrops of bedrock, and heavily rooted forested areas (i.e., those areas where other barriers are difficult to install).

Erosion control mix can also be placed in a synthetic "sock" to create a contained stable sediment barrier. This is especially useful in areas where trenching is not feasible, such as frozen ground, across pavement, or compacted gravel. When in a sock, erosion control mix can staked in an area of concentrated flow (i.e., ditch or swale) as the netting prevents movement of the mulch mixture.

Maintenance

As with other barriers, inspection should be performed after each rainfall or daily during prolonged periods of rain. Accumulations of sediment should be removed when they reach half the height of the barrier, and the berms can be reshaped and new material can be added as needed.

Removal

In most cases, erosion control mix berms do not need to be removed. They will continue to function as they decompose, become part of the soil on the site and will naturally revegetate. If synthetic socks are used, the erosion control mix can be emptied from the sock and the socks can be disposed of off site.

7.0 NONSTRUCTURAL EROSION CONTROL MEASURES

7.1 Nonstructural Measures Defined

Nonstructural measures are temporary or permanent methods used to cover exposed soil areas to prevent erosion from occurring. Their purpose is to cover whole areas of exposed soil to prevent initial erosion of soil from a construction site.

Examples of nonstructural measures include hay or straw mulch, erosion control mix, matting, or seeding.

7.2 Importance of Nonstructural Measures

Nonstructural measures are important because they provide both temporary and permanent protective cover to exposed soils. Generally, they provide the first line of protection against erosion, and can be the most effective means of preventing erosion. This protection is important because exposed soils are easily eroded by wind or water. Some soils such as silts can easily be removed from a construction site by rainwater. The impact of individual raindrops on exposed soils can loosen soil particles, and these particles can then be carried off the work site by runoff and deposited into water resources including streams, rivers, wetlands, ponds, and lakes. Silt particles don't settle out of water easily, and water siltation can pollute surface waters and harm aquatic creatures such as insects and fish. For example, brook trout, one of Maine's premier game fish species, requires clear, high quality water in order to survive. Silty water can reduce spawning habitat, irritate fish gills, lower oxygen content in water, and make fish susceptible to diseases.

Dry soil conditions and high winds can also cause siltation. When small particle soils such as silts become dry, they have a baby powder-like texture and can easily be swept away by winds. Nonstructural measures help prevent wind erosion because they hold moisture next to the soil, keep the soil from drying out due to wind exposure, and prevent winds from carrying away dry soil particles. Keep in mind, however, that proper construction sequencing is invaluable (See Section 2.3).

7.3 Placement of Nonstructural Measures

Nonstructural measures should be used whenever there is a possibility that exposed soils on a construction site could wash into adjacent sensitive water resources. Temporary nonstructural measures such as hay or straw mulch should be spread on exposed soils within 100-feet of water resources within 48 hours of initial soil disturbance, or before any predicted storm event. There are two types of nonstructural measures: temporary and permanent. Temporary measures are typically used <u>during</u> construction, while permanent measures are usually applied <u>after</u> construction is complete (i.e., restoration). Provided below are general discussions and explanations of the common nonstructural measures that are used on CMP construction sites.

7.3.1 Temporary Measures

- Hay or straw mulch (unanchored on slopes less than 8%, anchored on slopes greater than 8%) on exposed soil areas and soil stockpiles in the construction area.
- Temporary seeding covered by hay or straw mulch on soil stockpiles or areas of exposed soil next to sensitive resources that are not scheduled for final restoration for 30 days (this only applies between the dates of April 16 to October 31 of any given year). Temporary seeding is not required during the Winter Construction Season.
- Erosion control mix can be used as a stand-alone temporary mulch on slopes that are 2 horizontal to 1 vertical, or less, on frozen ground, in forested areas, or at the edge of gravel parking and areas under construction. It should be applied at a thickness of 4 to 6 inches.
- Rolled Erosion Control Products (RECP's) such as Curlex or Jute matting, can be used on areas of high wind exposure, steep slopes (steeper than 8% grade), unstable soils, and stream/river bank restoration areas. Matting is typically anchored (usually with large staples, as recommended by the manufacturer). Although this type of material is usually used during final restoration, it is considered a temporary measure because it generally deteriorates within two years.

Table 5
Temporary Seeding Rates and Dates

Seed	Lb./Ac	Seeding Depth	Recommended Seeding Dates	Remarks
Winter Rye	112(2.0 bu)	1-1.5 in.	8/15-10/1	Good for fall seeding. Select a hardy species, such as Aroostook Rye.
Oats	80 (2.5 bu)	1-1.5 in.	4/1-7/1 8/15-9/15	Best for spring seeding. Early fall seeding will die when winter weather moves in, but mulch will provide protection.
Annual Ryegrass	40	.25 in.	4/1-7/1	Grows quickly but is of short duration. Use where appearance is important. With mulch, seeding may be done throughout growing season.
Sudangrass Perennial	40 (1.0 bu) 40 (2.0 bu)	.5-1 in. .25 in.	5/15-8/15 8/15-9/15	Good growth during hot summer periods. Good cover, longer lasting than Annual Ryegrass. Mulching will allow seeding throughout growing season.
Temporary mulch with or without dormant seeding			10/1-4/1	Refer to TEMPORARY MULCHING BMP and/or PERMANENT VEGETATION BMP.

Proper application rates, location, and seasonal consideration are provided in Table 6 on page 22 of this manual.

7.3.2 Permanent Measures

Uplands

- Permanent grass and legume seeding covered by hay or straw mulch on all areas that have been restored to final grade (this seeding generally applies between the dates of April 16 to October 31 of any given year). This is required to establish permanent, perennial, vegetative cover on exposed soils. Permanent seeding is not required during the Winter Construction Season, although dormant seeding may be performed. (See Section 8.0 for details on winter construction.)
- Seeds covered by anchored (usually with large staples) Curlex or jute matting in areas of high wind exposure, on steep slopes (steeper than 8% grade), unstable soils, and stream/river bank restoration areas.
- The soil may need to be properly prepared before any seeds are placed on the ground. This preparation may include addition of fertilizer (only in designated upland areas not adjacent to, or near waterbodies or wetlands, if in doubt ask the environmental or construction inspector) in areas that have been tested, and are found to be deficient in plant nutrients.
- Erosion control mix can also be used as a permanent mulch to provide a buffer around disturbed areas. It can be left in place to decompose and naturalize. It will eventually support vegetation, which should be promoted. If vegetation is desired in the short-term, legumes and woody vegetation can be planted, which will create additional stability.

Wetlands

- Wetland areas are to be seeded only with resource agency approved wetland seed mixes. If it is decided that wetlands will not be seeded, disturbed wetland will be graded to original contours, mulched with straw, and allowed to revegetate naturally.

As with the Temporary Measures, refer to Table 6 on page 22 for proper application rates, locations, and seasonal considerations.

For permanent seeding mixtures refer to Appendix A of the Maine Erosion and Sediment Control BMPs.

8.0 WINTER CONSTRUCTION CONSIDERATIONS

If a project is actively being constructed between November 1 and April 15 of any given year, sediment and erosion control guidelines developed by the Maine Department of Environmental Protection for projects occurring during the winter months must be followed.

Of course, nothing can replace good common sense. These guidelines may not be necessary at all times during the winter construction dates for several reasons. For example, if there is no snow on the ground or the ground isn't frozen by November 1, only the standard BMPs must be followed. Also, if the ground thaws and all the snow is gone before April 15, the standard BMPs may be appropriate. Nothing substitutes good judgment, being familiar with the construction site, and being aware of the site-specific conditions. Proper construction sequencing (Section 2.3) can greatly minimize environmental impact during winter construction. When in doubt, contact the project construction manager or environmental inspector with any questions.

Table 6 on page 22 highlights some of the major differences between the winter construction guidelines and normal BMPs used during construction and for temporary stabilization. The table presents differences for temporary measures that should be used during construction, and permanent measures when construction is completely done.

Table 6
Nonstructural Erosion Control Measures (Seasonal Differences in Construction BMP Requirements)

Dates	General Construction April 16 through October 31 of every year	Winter Construction November 1 through April 15 of every year
Mulch on slopes less than 8%	Within 100-feet of sensitive water resources apply hay and/or straw mulch at a minimum of 70 lbs./1000 square feet of exposed soil (about 2 bales). Must be done within 7 days of initial soil disturbance and before storm forecasted events, unless specified otherwise.	Within 100-feet of sensitive water resources apply and maintain properly anchored hay and/or straw mulch at a minimum of 150 lbs./1000 square feet of exposed soil (about 5 bales) at all times. (double the April 16 – October 31 rate)
Mulch on slopes greater than 8%	Hay or straw mulch can be applied without being anchored, though specific site conditions may require use of anchoring.	Apply mulch as specified above. Properly anchor with Curlex, jute matting, or similar mulch netting on upland slopes exceeding 8% and within 100 feet of streams if no construction activities are anticipated for 7 or more days.
Area of exposed soils allowed at any one time	No restriction on area exposed, but contractor must attempt to minimize amount of exposed soil at any one time, especially next to water resources.	Not more than one (1) acre of exposed (not mulched or otherwise devoid of vegetative cover) soil.
Sediment barriers	A single line of sediment barriers including silt fence, hay bales, or wood waste filter berms must be installed between water resources and disturbed soils.	If soil is frozen, wood waste filter berms **or** 2 lines of sediment barriers (including hay bales and silt fence) must be placed between water resources and disturbed soils.
Temporary seeding in uplands	If required, apply at the rate specified by the supplier, CMP Environmental Department, or Environmental Inspector. Cover with mulch.	Not required, but if temporary seeding is desired, it must be applied at a rate 3 times higher than the General Construction Season, and covered with mulch.
Temporary seeding in wetlands	Wetlands are not to be seeded unless done so with an agency approved seed mix. Annual Rye Grass is not acceptable and shall not be used. Disturbed wetland areas will be mulched exclusively with straw.	Wetlands are not to be seeded unless done so with an agency approved seed mix. Annual Rye Grass is not acceptable and shall not be used. Disturbed wetland areas will be mulched exclusively with straw.
Permanent seeding in uplands	Site must be seeded at rate specified by the supplier and covered with hay or straw mulch. If needed, the site can be limed and fertilized.	Not required before April 16, but if dormant seeding is desired, the site should receive an adequate cover of loam, if necessary, be seeded at a rate 3 times higher than the General Construction Season, and covered with mulch at a minimum of 150 lbs./1000 square feet.
Permanent seeding in wetlands	Do not apply permanent seed mixes to wetland areas unless they are specially designated wetland seed mixes approved by a resource agency.	Do not apply permanent seed mixes to wetland areas unless they are specially designated wetland seed mixes approved by a resource agency.
Temporary seedbed preparation	Apply limestone and fertilizer (uplands only) according to soil test data. If soil test is not possible, 10-10-10 fertilizer may be applied at a rate of 600 lbs./acre and limestone at 3 tons/acre.	Not required, but seedbed can be prepared according to General Construction requirements.
Permanent seedbed preparation	Apply limestone and fertilizer (uplands only) according to soil test data. If soil test is not possible, 10-20-20 fertilizer may be applied at a rate of 800 lbs./acre and limestone at 3 tons/acre.	Not required before April 16, but if dormant seeding is desired, the seedbed can be prepared according to the General Construction requirements.

Dates	General Construction April 16 through October 31 of every year	Winter Construction November 1 through April 15 of every year
Temporary slope stabilization	Same as winter construction season, but mulch does not need to be anchored.	Anchored hay or straw mulch on slopes greater than 8% and drainage ways with greater than 3% slope as necessary. Wood waste mix can be used on slopes in place of anchored hay or straw mulch.
Maintenance of erosion controls	Same as winter construction guidelines.	All erosion controls should be inspected periodically to ensure proper function. If any evidence of erosion or sedimentation is evident, repairs should be made to existing controls or other methods should be used.
Inspection and monitoring	Monitoring should be performed as needed until a new, healthy vegetative cover is attained on the site. This applies to both temporary and permanent seeding.	Monitoring should be performed as needed to ensure proper stabilization and re-vegetation (both temporary and permanent). Starting in the spring following completion of the project, inspections should be performed until new, healthy vegetative cover is attained.

9.0 SITE RESTORATION STANDARDS

Following completion of the construction work, the contractor will be responsible for conducting site restoration work. The following guidelines will apply to all activities, including temporary and permanent roads, stream/wetland crossings, staging and work areas, and substation sites.

9.1 Procedure

At the completion of project construction in an area or at the end of the construction, CMP or their designated representative, the contractor, and any Third Party Inspector will review the project's restoration needs and prioritize the areas. This prioritization should consider time of year, ground conditions, re-vegetation probabilities, and equipment availability. A restoration "walk-through" is strongly recommended.

In many cases a site can and should be restored within hours of when the soil disturbance occurred. Often getting the equipment to a site that needs to be restored only creates more disturbed area to restore. It is important to "restore as you go" to reduce the equipment travel on temporary access roads. It can be particularly difficult to restore an area that was disturbed during winter construction activities in the spring or summer.

Likely areas of restoration include, but are not limited to:

- Around substation construction areas.
- Around pole and anchor pole placement.
- All wetland, stream, or brook crossings, particularly the approaches and any stream banks.
- Drainage ways or ditches.
- All temporary or permanent constructed roads, yarding, and staging areas.
- Cut banks.
- Steep slopes (over 8%).

9.2 Methods for Restoration

There are several methods of restoration for different areas.

1. All soil that is excavated, mounded, or deposited during construction will be re-graded or removed from the site as directed by CMP. All re-grading and redistribution of soil will be done to match existing grade. Wherever practicable, to facilitate the regeneration of natural vegetation within and adjacent to protected natural resources, during the construction of substations, pull sites, and roads that causes soil disturbance, topsoil will be separated from the mineral soil when excavating and stockpiled outside areas of concentrated flow and areas prone to flooding, and handled in accordance with Section 3.3 Construction in Wetlands of CMP's Environmental Guidelines for Construction and Maintenance Activities on Transmission Line and Substation Projects. The excavated topsoil will be replaced in close proximity to its origin and to a depth sufficient to support vegetative growth.
2. The banks and bottoms of brooks, streams, and rivers will be restored to natural

conditions. In general, any material or structure used at temporary crossings will be removed, and the bank and bottoms restored to their original depth and contour.

3. On permanent access roads, stream culverts and bridges will be left intact and in good repair to remain available for maintenance operations and/or public access (woods roads, camp roads, etc.).
4. On those construction roads to be closed to future vehicle traffic (as determined by CMP), bridges, culverts, and other temporary crossing or water diversion structures will be removed and the banks and bottoms restored to original conditions.
5. Previously installed water bars may remain or new ones will be installed at locations designated by CMP or their designated representative. To prevent accelerated soil erosion, such water bars will be installed on all access and construction roads to be closed to vehicle traffic and on steep sections of permanent roads. Permanent water bars will be constructed to a sufficient height and width to divert the amount of water anticipated at each location as well as to provide some post-project permanence to the site. Water bars on permanent roads will be constructed in such a manner that they will remain effective and require minimal maintenance, and will be permanently seeded to ensure their long-term stability.
6. All areas severely rutted by construction equipment will be re-graded and permanently revegetated.
7. Upon completion of the project, all disturbed areas will be permanently revegetated or otherwise permanently stabilized. This includes the restoration of all areas disturbed by pole installation efforts, temporary access roadways, permanent access roadways, substation construction efforts, and resource crossings. Restoration is generally assumed to be to a well-established vegetative cover. All cut and fill slopes must be revegetated, stabilized with riprap, or stabilized with erosion control mix, as appropriate to the slope conditions.
8. Liming, fertilizing, and seeding requirements for permanent re-vegetation will depend upon the soil type and drainage condition of the site. In the absence of soil tests, permanent seeding will generally be done in accordance with “Procedures for Permanent Seeding for Erosion Control” found in Table 6 on page 22.
9. The contractor will be responsible for the proper maintenance of all revegetated areas until the project has been completed and accepted. Where seed areas have become eroded or damaged by construction operations, the affected areas will be promptly re-graded, limed, fertilized, and re-seeded as originally required.
10. The contractor will perform all erosion control work to the complete satisfaction of Central Maine Power Company before the work is accepted. Central Maine Power Company will base acceptance of the erosion control and stabilization work on a final inspection.

APPENDIX A

DEFINITION OF TERMS

APPENDIX A
DEFINITION OF TERMS

Adjacent to a natural resource: Within 75 feet of, or in a position to wash into, a water resource (river, stream, brook, pond, wetland, or tidal area).
Annual seed mix: Seed mixture largely made up of plants that only persist one growing season.
Brook: Essentially the same as a stream, a water course that has a defined channel, a gravel, sand, rock or clay base, and flows at least part of the year. It may be a dry channel part of the year.
Corduroy: Logs greater than 3 inches in diameter at the small end and at least 18 feet long that are placed perpendicular to travel direction, on approaches to and in wetlands for crossings. The purpose of the logs is to prevent rutting and preserve vegetation root integrity in and adjacent to wetland areas. May also be used on approaches to mats or bridge stream crossings.
Crossing: Any activity extending from one side to the opposite side of a sensitive natural resource whether under, through, or over that resource. Such activities include, but are not limited to, roads, fords, bridges, culverts, utility lines, water lines, sewer lines, and cables, as well as maintenance work on these crossings. Crossings should be done to minimize impact. For example, crossing at a right angle to the resource and finding the driest or narrowest spot is one method for minimizing impact.
Cross-sectional area: The cross-sectional area of a stream channel is determined by multiplying the stream channel width by the average stream channel depth. The stream channel width is the straight-line distance from the normal high water line on one side of the channel to the normal high water line on the opposite side of the channel. The average stream channel depth is the average of the vertical distances from a straight line between the normal high water marks of the stream channel to the bottom of the channel.
Culvert: A pipe or box structure of wood, metal, plastic, or concrete used to convey water.
Erosion: Movement of earthen material by water or wind.
Erosion control blanket (matting): Manufactured material made out of natural or synthetic fiber designed to control movement of earthen material when installed properly.
Erosion control mix: Erosion control mix consists primarily of organic materials such as shredded bark, wood chips, stump grindings, composted bark, or similar materials. Ground construction debris or reprocessed wood products are not acceptable for use in erosion control mix. It contains a well-graded mix of particle sizes and may contain rocks up to 4 inches in diameter. Properly manufactured mix will have organic matter content between 80 and 100 percent (dry weight), 100 percent of particles must pass a 6-inch screen, the organic portion needs to be fibrous and elongated, it may contain only small proportions of silts, clays, or fine sand, and its pH should be between 5.0 and 8.0. Its applications include erosion control berms and mulch.
Erosion control plans: Written guidelines specific to a project or activity, describing various techniques and methods to control erosion for specific construction activities.
Fill: Any earth, rock, gravel, sand, silt, clay, peat, or debris that is put into or upon, supplied to, or allowed to enter a water body or wetland. Material, other than structures, placed in or adjacent to a water body or wetland.
Filter strip: Undisturbed areas of ground consisting of natural vegetation and natural litter such as leaves, brush, and branches, located between a water resource and access road, skid road or trail, or other area of disturbed soil.

Ford: A permanent crossing of a stream utilizing an area of existing, non-erodible substrate of the stream, such as ledge or cobble, or by placing non-erodible material such as stone or geotextile on the stream bottom.
Geotextile, Non-woven: Synthetic material made of spun polypropylene fiber used to support wetland fill or stabilize soils.
Geotextile, Woven: Synthetic material of woven polypropylene used to stabilize soils and make sediment barriers (silt fence).
Great pond: An inland water body which in a natural state has a surface area in excess of 10 acres, and any inland water body which is artificially formed or increased which has a surface area in excess of 30 acres.
Intermittent watercourse: Water course that has water in it only part of the year. It is still considered a natural resource.
Mats: Pre-constructed, portable, timber platforms used to support equipment or travel in or over wetlands or water bodies.
Mulch: Temporary erosion control such as hay, bark, or some similar natural material utilized to stabilize disturbed soil.
Perennial seed mix: Seed mixture made up of seeds from plants that persist for several years.
Perennial watercourse: A river, stream, or brook depicted as a solid blue line on the most recent edition of a United States Geological Survey 7.5 minute series topographic map. Typically has water in it year round.
Permanent access road: Project access road that is not restored after project construction completion. Permanent access roads should be designed and constructed so they are not an erosion problem.
Permanent stabilization: Establishment of a permanent vegetative cover on exposed soils where perennial vegetation is needed for long-term protection.
Permanent vegetative cover: Perennial seed stock, including but not limited to grasses and legumes that persist for more than several growing seasons.
Protected Natural Resource: Coastal sand dune system, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, community public water system primary protection areas, great ponds or rivers, streams, or brooks. (From the Maine Natural Resources Protection Act, 38 M.R.S.A. Section 480-B., revised 2007).
Riprap: Heavy, irregular-shaped rocks that are fit into place, usually without mortar, on a slope in order to stabilize and prevent soil erosion.
Sediment barrier: Staked hay bales, silt fence, or similar materials placed in a manner to intercept silt and sediment laden water runoff.
Sedimentation: Deposition of earthen material in a water body or wetland.
Sensitive Natural Resource: Area that deserves special attention because it is significant wildlife habitat, fisheries habitat, or has other natural resource values. These areas may require the use of minimum impact construction techniques such as use of mats, leaving vegetation intact for buffers, special timing of construction, or other specific techniques.
Settling basin (sediment/catch basin): Excavated pit placed to intercept water running off disturbed soils or dirt road bed. Usually used only where filter strip is inadequate to protect a stream, pond, or wetland from silt and sediment.
Silt fence: Woven geotextile sediment barrier. Proper installation requires placement on-contour and keying the fabric in at ground level.
Steep slopes: Slopes in excess of eight (8) percent.

Stone check dam: A small, temporary dam constructed across a swale or drainage ditch. The purpose is to reduce the velocity of concentrated flows, reducing erosion and trapping sediment generated in the ditch.
Stream: Generally, a channel between defined banks with a gravel, sand, rock, or clay base that flows at least part of the year. It may be a dry channel part of the year. The Maine Natural Resources Protection Act contains a more detailed definition.
Structure: Anything built for the support, shelter, or enclosure of persons, animals, goods, or property of any kind, together with anything constructed or erected with a fixed location on or in the ground. Examples of structures include buildings, utility lines, and roads.
Temporary access road: Road constructed solely for project access which is restored to original grade upon project completion, if not sooner. All areas disturbed by the access road's construction and use will be stabilized including the road's ditches, travel way, and slopes back to vegetated conditions. In most cases, any roadway ditches associated with the temporary access road should be refilled to re-establish the pre-development drainage conditions.
Temporary stabilization: Mulch, matting, or seed, or a combination thereof, utilized to stabilize soil. Soil stockpiles left in place longer than 14 days must have temporary stabilization.
Temporary vegetative cover: An annual seed mixture, typically annual rye and oats.
Topography: The contour and elevation of the surface of the ground.
Turn out: Water diversion that directs water out of a ditch or off a travel-way and into a vegetated buffer.
Upland edge: The area of uplands alongside a wetland, stream, or water body.
Wastes requiring special handling: Wastes generated from construction activity including engine oil, hydraulic oil, gear oil, diesel, gasoline, or coolants.
Water bar: Constructed bar across an access road or skid trail that directs surface water off the road or trail into a stable vegetated surface or filter strip. They are used as a temporary measure on active roads or when closing roads permanently to prevent erosion.
Water body: River, stream, brook, pond, wetland, or tidal area.
Water resource: River, stream, brook, pond, wetland, or tidal area.
Wetland: An area that is inundated or saturated by surface or groundwater at a frequency and for a duration sufficient to support, and which under normal circumstance do support, a prevalence of wetland vegetation typically adapted for life in saturated soils. The Maine Natural Resources Protection Act contains a more detailed definition.

APPENDIX B

CONSTRUCTION MATERIALS SOURCE LIST

APPENDIX B

CONSTRUCTION MATERIALS SOURCE LIST

The following list of vendors has been selected given the wide variety of construction materials they offer. The list is not meant to be all-inclusive or an indication of favored vendors.

W.H. Shurtleff Company (Culverts, Geotextiles)

One Runway Road
Suite 8
South Portland, Maine 04106-6169
1-800-633-6149
www.whshurtleff.com

A. H. Harris (Geotextiles, i.e. Curlex Excelsior Blankets)

22 Leighton Road
Augusta, Maine 04332
(207) 622-0821
www.ahharris.com

585 Riverside Street
Portland, Maine 04103
(207) 775-5764

North American Green (Erosion control materials)

Maine Distributor:
E.J. Prescott
P.O. Box 600
32 Prescott Street, Libby Hill Business Park
Gardiner, Maine 04345
(207) 582-1851
www.ejprescott.com

New England Organics (Erosion Control Mulch)

135 Presumpscot Street, Unit 1
Portland, ME 04103
1-800-933-6474
www.newenglandorganics.com

APPENDIX C

OTHER RECOMMENDED REFERENCE MANUALS

APPENDIX C

OTHER RECOMMENDED REFERENCE MANUALS

Maine Erosion and Sediment Control BMPs. Bureau of Land and Water Quality, Maine Department of Environmental Protection, Augusta, Maine. March 2003. DEPLW0588.

Best Management Practices for Forestry: Protecting Maine's Water Quality. Maine Forest Service, Augusta, Maine. 2004. www.maine.gov/doc/mfs/pubs/bmp_manual.htm

Forest Transportation Systems: Roads and Structures Manual. Seven Islands Land Company, Bangor, Maine. Third Edition, 1999.

APPENDIX D

CONSTRUCTION TECHNIQUE ILLUSTRATIONS

APPENDIX E

EROSION AND SEDIMENTATION CONTROL LAW* 38 M.R.S.A. § 420-C

APPENDIX E

EROSION AND SEDIMENTATION CONTROL LAW*

38 M.R.S.A. § 420-C

A person who conducts, or causes to be conducted, an activity that involves filling, displacing or exposing soil or other earthen materials shall take measures to prevent unreasonable erosion of soil or sediment beyond the project site or into a protected natural resource as defined in section 480-B. Erosion control measures must be in place before the activity begins. Measures must remain in place and functional until the site is permanently stabilized. Adequate and timely temporary and permanent stabilization measures must be taken and the site must be maintained to prevent unreasonable erosion and sedimentation.

This section applies to a project or any portion of a project located within and organized area of this State. This section does not apply to agriculture fields. Forest management activities, including associated road construction or maintenance, conducted in accordance with applicable standards of the Maine Land Use Regulation Commission, are deemed to comply with this section. This section may not be construed to limit a municipality's authority under home rule to adopt ordinances containing stricter standards than those contained in this section.

* The Erosion and Sedimentation Control Law is administered by the Maine Department of Environmental Protection (MDEP), Augusta, Maine. Please contact the MDEP with specific questions regarding this law.

APPENDIX F

MAINE SLASH LAW* 12 M.R.S.A. § 9333

APPENDIX F

MAINE SLASH LAW*

12 M.R.S.A § 9333

§9333. Disposal along railroad and utility lines

*1. **Stumpage owner**. A stumpage owner, operator, landowner or agent who cuts or causes or permits to be cut any forest growth on lands that are within or border the right-of-way of a railroad, a pipeline, or an electric power, telegraph, telephone or cable line may not place slash or allow it to remain on the ground within the right-of-way or within 25 feet of the nearer side of the right-of-way.*

*2. **Construction**. Slash accumulated by the construction and maintenance of a railroad, a highway, a pipeline or electric power, telegraph, telephone or cable line may not be left on the ground but must be hauled away, burned or chipped. Slash may not be left or place within the right-of-way or within 25 feet of the nearer side of the right-of-way. If a burning permit is denied or revoked under this chapter, the director may allow logs that are too large to be chipped to remain in the right-of-way until the director determines that their removal is economically feasible.*

*3. **Utility line maintenance**. Slash accumulated by the periodic maintenance of a pipeline or an electric power, telegraph, telephone or cable line may be disposed of in the following manner.*

- *A. Slash with a diameter of 3 inches or less may be left in piles on the ground within the maintained portion of the right-of-way. A pile may not be higher than 18 inches from the ground or longer than 50 feet and must be separated from other piles by a minimum of 25 feet in every direction. A buffer strip with a minimum width of 10% of the total width of the maintained right-of-way must be kept totally free of slash with a diameter of 3 inches or less.*
- *B. Slash with a diameter of more than 3 inches must be removed, chipped or limbed and placed on the ground surface. The pieces must be separated and may not be piled one piece over another. Slash of this size may be left within the maintained buffer strips.*
- *C. If a utility line right-of-way is adjacent to a road, slash that is 3 inches or less in diameter must be removed, burned or chipped. Slash with a diameter of more than 3 inches may be left on the ground within the right-of-way and must not be limbed and separated and may not be piled one piece over another. Usable timber products generated from the maintenance of a utility right-of-way may be piled within the right-of-way but must be removed within 30 days.*

* Note that this is an excerpt from the full text of the law. Please contact the Maine Forest Service, Augusta, Maine, for the full text of the law or with specific questions regarding the Slash Law.

APPENDIX G

CULVERT SIZES FOR STREAM CROSSINGS

(3X RULE)

CULVERT SIZES (ROUND) FOR STREAM CROSSINGS (3x RULE)

AVERAGE STREAM WIDTH

Take two measurements across the stream from bank to bank where you intend to place the culvert. Measurements should be taken at the normal high water line (NHWL). To find the NHWL during low flow periods look for water stains on rocks or a debris line along the bank. Add the first measurement to the second and divide this number by 2. This equals the average stream width.
Example: 36in. + 47 in. = 83in. 83÷2 = avg. stream width of 41.5 inches. (Round up to 42in.)

AVERAGE STREAM DEPTH

Take 3 measurements from the bottom of the stream to the NHWL.
Add the measurements together and divide this number by 3. This equals the avg. stream depth.
Example: 12in. + 16in. + 14in. = 42in. 42÷3 = average stream depth of 14 inches.

USING THE TABLE

Take the average width and depth figures and determine where they intersect on the table above.
*For example, for an average stream width of 42 inches (on the left side of the table), and an average stream depth of 14 inches (along the top of the table), the intersect shows a culvert diameter of 48 inches.

Average Stream Width		Average Stream Depth (Inches)														
Feet	Inches	2	4	6	8	10	12	**14***	16	18	20	22	24	26	28	30
1	12	12	15	18	21	21	24	30	30	30	30	36	36	36	36	42
1.5	18	12	18	21	24	30	30	36	36	36	42	42	42	42	48	48
2	24	15	21	24	30	30	36	36	42	42	48	48	48	54	54	54
2.5	30	15	21	30	30	36	42	42	48	48	48	54	54	60	60	60
3	36	18	24	30	36	42	42	48	48	54	54	60	60	60	66	66
3.5	**42***	18	30	36	36	42	48	**48**	54	54	60	60	66	66	72	72
4	48	21	30	36	42	48	48	54	54	60	66	66	66	72	72	78
4.5	54	21	30	36	42	48	54	54	60	66	66	72	72	78	78	84
5	60	21	30	42	48	48	54	60	66	66	72	72	78	78	84	84
5.5	66	24	36	42	48	54	60	60	66	72	72	78	78	84	84	90
6	72	24	36	42	48	54	60	66	66	72	78	78	84	90	90	96
6.0	78	24	36	42	54	60	60	66	72	78	78	84	90	90	96	96
7	84	30	36	48	54	60	66	72	72	78	84	84	90	96	96	102
7.5	90	30	42	48	54	60	66	72	78	84	84	90	96	96	102	102
8	96	30	42	48	54	66	66	72	78	84	90	90	96	102	102	108
8.5	102	30	42	48	60	66	72	78	84	84	90	96	102	102	108	108
9	108	30	42	54	60	66	72	78	84	90	96	96	102	108	108	114
9.5	114	30	42	54	60	66	72	78	84	90	96	102	102	108	114	114
10	120	30	48	54	66	72	78	84	90	96	96	102	108	114	114	120
10.5	126	36	48	54	66	72	78	84	90	96	102	108	108	114	120	120
11	132	36	48	60	66	72	78	84	90	96	102	108	114	114	120	126
11.5	138	36	48	60	66	78	84	90	96	102	108	108	114	120	126	126
12	144	36	48	60	66	78	84	90	96	102	108	114	120	120	126	132
12.5	150	36	48	60	72	78	84	90	96	102	108	114	120	126	132	132
13	156	36	54	60	72	78	90	96	102	108	114	114	120	126	132	138
13.5	162	36	54	66	72	84	90	96	102	108	114	120	126	132	132	138
14	168	36	54	66	72	84	90	96	102	108	114	120	126	132	138	144
14.5	174	36	54	66	78	84	90	96	108	114	120	126	126	132	138	144
15	180	42	54	66	78	84	96	102	108	114	120	126	132	138	144	144

SECTION 11.0

CMP CONTRACTOR OIL AND HAZARDOUS MATERIALS REQUIREMENTS

ENVIRONMENTAL CONTROL REQUIREMENTS FOR CONTRACTORS AND SUBCONTRACTORS OF CENTRAL MAINE POWER COMPANY - OIL AND HAZARDOUS MATERIAL

The criteria listed in Section I below are the requirements for oil and hazardous material use compliance by contractors and subcontractors of Central Maine Power Company (CMP). All contractors and subcontractors are required to comply with these requirements while working for or on behalf of CMP.

Penalties: Failure to abide by these requirements will constitute grounds for termination of contractor/subcontractor services.

Section I

General Requirements:

• Contractors/subcontractors will store, transport, and use oil, hazardous materials and wastes in accordance with all applicable local, state, and federal regulations and these requirements.

• At a minimum, contractors/subcontractors will follow best management practices when storing, transporting or using oil, hazardous materials, and wastes.

• Contractors/subcontractors, at all times, will take care not to cause an uncontrolled spill or release of oil or hazardous materials to the environment.

• Contractors/subcontractors will provide and maintain on-site sufficient spill cleanup and containment supplies (absorbent pads, containment booms, protective clothing, debris containers. etc.) to control releases of oil, hazardous materials or wastes.

• Contractors/subcontractors will remove all oils, hazardous materials, wastes and unused materials from the work site at the completion of the job. This includes full and partially full containers of waste material such as, but not limited to, rags, gloves, trash, scrap material, and empty containers.

NOTE: If large quantities of oil or hazardous materials are involved, written agreements with emergency response contractors may be required.

Storage and Handling Requirements:

• Contractors/subcontractors will store only the minimal amount of material (at each work-site) necessary to complete the work.

• Handling and application of pesticides and herbicides shall only be in accordance with regulations under the Maine Pesticide Control Act of 1975, as amended. Title 7M.R.S.A. Section 601.

• Materials will be stored in D.O.T. approved containers or approved tanks in areas not considered to be environmentally sensitive.

• Containers will be kept closed unless material is being transferred.

• Contractors/subcontractors will ensure that all transferring operations are monitored and not left unattended.

• Containers will not be stored on the ground, but will be stored in cabinets or on a firm working surface such as a portable trailer bed or other secure decking.

• If at any time a contractor/subcontractor needs to store oil including, but not limited to, fuel oil, petroleum products, sludge, and oil refuse in excess of an aggregate amount of 1,320 gallons (excluding 55-gallon or less containers) that is located near a pathway to navigable waters, the Federal requirements for oil pollution prevention (40 CFR Part 112) must be met. Contractor/Subcontractor Spill Prevention Control and Countermeasure (SPCC) plans will be approved by a licensed, professional engineer and a copy will be sent to CMP no later than one week prior to the commencement of the oil storage activities.

• Storage and handling of flammable and combustible liquids including gasoline and diesel fuel will be in accordance with rules developed under Title 25 M.R.S.A. Section 2441 (Fire Prevention and Fire Protection), as amended (See also Code of Maine Rules 16-219 Chapter 317). These regulations include, but are not limited to, bonding and grounding during transfer operations, fire protection requirements, storage quantity limitations, and spacing and location requirements.

• All gasoline and fuel storage tanks must have secondary containment constructed of an impervious material and be capable of holding 110% of tank capacity.

• Handling and disposal of hazardous wastes will be in accordance with Maine Department of Environmental Protection (DEP) Hazardous Waste Management rules (06-096 Chapters 853 through 857) developed pursuant to Title 38 M.R.S.A., Section 1301 et. seq. and U.S. Environmental Protection Agency regulations (40 CFR 260 through 272). Handling and disposal of waste oil will be in accordance with Maine Department of Environmental Protection Waste Oil Management Rules (06-096 Chapter 860) and U.S. Environmental Protection Agency regulations (40 CFR 279).

Spill Reporting Requirements:

All spill reporting requirements are the responsibility of the contractor/subcontractor. As required by Title 38 M.R.S.A., Section 543 and Department of Environmental Protection regulations (06-096 Chapters 600 4.B and 8004.1), spills of oil or hazardous materials in any amount and under any circumstances must be reported to the Department within two hours from the time the spill was discovered at 1-800-482-0777.

As required by the Federal Clean Water Act (40 CFR Part 110.4), a discharge of oil "which causes a sheen upon the surface of the water or adjoining shore line or oily sludge deposits beneath the surface of the water" must be reported within 24 hours to the National Response Center at 1-800-424-8802.

The need to report spills to the National Response Center of hazardous materials other than oil will be determined by the contractor/subcontractor by consulting the CERCLA list of hazardous substances and reportable quantities (40 CFR Table 302.4). Any spills that involve a reportable quantity of any hazardous substance must be reported to the National Response Center by the contractor/subcontractor. The contractor/subcontractor must also report all spills immediately to CMP.

Setbacks:

The following setbacks will be used by the contractor unless the contractor can demonstrate that, due to special circumstances at specified locations, these setbacks are impractical at those locations and the MDEP approves the modification to the plan.

(a) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 100 feet of a protected wetland or other waterbody.
(b) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 200 feet of a private water supply.
(c) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 400 feet of a public water supply.
(d) No fuel storage, vehicle/equipment parking and maintenance and refueling activity may occur within 25 feet minimum of the following:

(i) An area listed in Maine's biological conservation data system, Biotics, of the Maine Natural Areas Program, including rare natural communities and ecosystems (state rarity rank of S1 through S3 and habitats supporting Endangered or Threatened plant species). Boundaries and locations are as determined by the Maine Natural Areas Program of the Department of Conservation.
(ii) Habitat of any species declared rare, threatened or endangered by the Maine Department of Inland Fisheries and Wildlife, Maine Department of Marine Resources, or the Director of the U.S. Fish and Wildlife Service.

The setbacks from areas listed in (i) and (ii) above may be increased by the MDEP upon the recommendation of one or more of the agencies listed in those provisions.

Spill Cleanup Requirements:

It is the contractor's/subcontractor's responsibility to ensure and oversee immediate and complete cleanup of all spills involving oil or hazardous materials. The contractor/subcontractor is also responsible for all health and safety issues related to the cleanup of oil or hazardous materials. The contractor/subcontractor is also responsible for expediting the disposal of spill debris waste and restoring the site to its original condition.

Special Exceptions:

The 100-foot buffer restriction for refueling near sensitive environmental resources, such as wetlands, streams, vernal pool habitat, etc., may be waived by the MDEP on a case-specific basis only. It is anticipated the vast majority of approved waivers will be for refueling adjacent to an existing asphalt or concrete topped road. In those instances where a waiver is granted the following protocol will be used.

Refueling activity – During refueling of equipment within the 100-foot buffer, the fueling nozzle will be wrapped with an absorbent pad (also commonly referred to as a spill diaper) and placed in an appropriate container with handle to transport the nozzle to the equipment being fueled. Prior to fueling, a secondary containment basin must be place under the equipment and beneath the filler spout. Examples of typical secondary containment range from plastic wading pools to more specifically designed collapsible berms. One example is provided at the following link. (http://www.basicconcepts.com/products/products_sentrylite.asp). Absorbent pads will be placed in the floor of the secondary containment to contain any spilled fuel. After fueling, the nozzle will again be wrapped in an absorbent pad and placed in an appropriate container with handle for transport back to the fuel truck.

Vehicles involved in the refueling, such as the fuel truck and equipment fueled, will vacate the area immediately on cessation of fueling activities.

Clean-up activity – If any fuel is released to the ground during fueling it must be cleaned immediately and reported to the DEP. At the cessation of fueling the secondary containment will be cleaned so that no material may be released by moving the containment. All soiled material from the fueling operation will be placed in a sealed container and disposed of at an appropriate and approved receiving facility.

Maine's Solid Waste Management Regulations (Chapter 400) define ***special waste***, in relevant part, as "Debris from nonhazardous chemical spills and cleanup of those spills". Therefore debris contaminated with oils such as diesel, motor oil, and hydraulic fluid would qualify as special waste. As such, a landfill in Maine licensed to receive special waste/debris contaminated with the specific oil type may receive it for disposal. CMP has taken such material to Waste Management's Crossroads Landfill (Norridgewock, ME), or to Waste Management's Turnkey Landfill (Rochester, NH) from similar accidental releases. Note that gasoline-contaminated waste is classified as hazardous, and will need to be managed and manifested as such.

SECTION 12.0

FINANCIAL AND TECHNICAL CAPACITY

FINANCIAL CAPACITY

INTRODUCTION

The total cost of the Maine Power Reliability Program (MPRP) is estimated at $1.4 billion and the cost of the proposed Raven Farm Substation in the Town of Cumberland is estimated at $24 million. This is based on costs associated with construction of new transmission lines and substations, upgrades and renovations to existing transmission lines and substations, and transmission line corridor and land acquisitions. Also included in the estimate are costs incurred relative to erosion and sedimentation controls as well as site restoration expenses. Budgeted total costs on MPRP for pollution controls are in excess of $110,000,000.

The MPRP will be financed by Central Maine Power (CMP). As owner of the improvements contemplated under the MPRP, CMP will be fiscally responsible for all improvements included in the MPRP.

CMP FINANCIAL CAPACITY

CMP is a subsidiary of Energy East Corporation (Energy East), a public holding company (symbol: EAS). On December 31, 2007 Energy East had book equity capital of $3.2 billion and assets of $11.9 billion on a consolidated basis. On September 17, 2008, Energy East became a wholly-owned subsidiary of Iberdrola, S.A., one of the four largest energy companies in the world by market capitalization.

CMP has direct access to the debt capital markets through its Medium-term Notes program (MTNs), under which it issues unsecured long-term debt. There are $331 million in MTNs currently outstanding at an average coupon of 5.9 percent. All of the currently outstanding long-term debt has been issued since 2001. CMP's MTNs are rated BBB+ by S&P, A3 by Moody's, A- by Fitch.

CMP is a party to a joint revolving credit facility along with five other Energy East regulated affiliate companies. CMP has access to up to $100 million in short-term credit through this facility and is able to borrow at 19 basis points over the London Inter-Bank Offer Rate (LIBOR). LIBOR is a daily reference rate based on the interest rates banks offer to lend unsecured funds to other banks. LIBOR rates are widely used as a reference rate for financial instruments such as forward rate agreements, short-term interest rate futures, interest rate swaps and syndicated loans. This agreement currently has an expiration date in June 2012. CMP had outstanding balances under the revolving credit agreement of $24 million and $99 million on December 31, 2007 and December 31, 2008, respectively.

CMP has access to equity capital through the retention of earnings and from equity capital infusions from Iberdrola through Energy East. As one of the largest energy companies in the world, Iberdrola has broad access to European and U.S. capital markets (a copy of the Iberdrola 2008 Annual Report is available upon request).

MPRP will be funded by CMP using a combination of debt and equity. Equity will come from retained earnings and equity infusions from the corporate parent. Short-term debt from the syndicated revolver and/or a commercial paper program will be used on a temporary basis to bridge to periodic long-term debt financings. Long-term debt will be raised through offerings of debt securities similar in nature to CMP's currently outstanding MTNs. The MTNs will be underwritten or sold by investment banks, most likely under SEC's Rule 144A. Rule 144A provides a safe harbor from the registration requirements of the Securities Act of 1933 for certain private resale of restricted securities to qualified institutional buyers (QIB), which generally are large institutional investors with over $100 million in investable assets. When brokers are selling securities in reliance on Rule 144A, it is subject to the condition that they may not make offers to persons other than those it reasonably believes to be QIBs.

ISO COST SHARING

CMP estimates the MPRP will cost approximately $1.4 billion, but expects that Maine utility customers will only pay a small portion of that.

CMP is a member of ISO New England (ISO-NE), which operates the region's bulk power system and oversees the regional bulk power marketplace. Under the ISO-NE tariff agreement, most bulk transmission projects are considered regional investments and, accordingly, are designated Pool Transmission Facilities (PTFs). The costs of construction and maintenance of PTFs are shared with other participating New England utilities and their customers. Under the current ISO-NE formula, CMP customers would bear approximately 8 percent of eligible program costs. Assuming there are no "localized costs," the remaining 92 percent will be borne by ratepayers in the other five New England states. Special conditions imposed by State and local agencies that are determined by ISO-NE to be localized costs (e.g., underground lines or excessive mitigation/compensation) will be borne solely by Maine ratepayers.

TECHNICAL CAPACITY

Applicant
Douglas Herling
Central Maine Power Company
25 Pearl Street, Suite 2
Portland, ME 04101

MPRP Program Manager
Ed Beene, Environmental Manager
Mark Goodwin, Environmental Construction Manager
Burns & McDonnell
25 Pearl Street, Suite 2
Portland, ME 04101

Project Engineering
Steven Walker, P.E.
Transmission Line Project Engineer
POWER Engineers Inc.
303 US Route 1, Suite 2A
Freeport, ME 04032

Daniel Butler, P.E.
TRC Engineers LLC
249 Western Avenue
Augusta, ME 04330

Environmental Consultant
Richard C. Paquette, Jr., PWS
TRC Engineers LLC
400 Southborough Drive
South Portland, ME 04106

Surveyor
Owen Haskell, Inc.
390 U.S. Route 1 - Unit 10
Falmouth, ME 04105

Landscape Architect
Terrence DeWan, RLA
Terrence J. DeWan & Associates
121 West Main Street
Yarmouth, ME 04096

SECTION 13.0

LIST OF PROPERTY OWNERS WITHIN 200 FEET OF SITE

SECTION 14.0

LANDSCAPE BUFFER PLAN

Raven Farm Substation
Landscape Considerations

August 31, 2010

Prepared for:
Central Maine Power Company
Maine Power Reliability Program

Prepared by:
Terrence J. DeWan & Associates
Landscape Architects and Planners
121 West Main Street
Yarmouth, ME 04096

EXISTING CONDITIONS

As noted on the existing conditions photograph of the substation site taken during the leaf-off season from Greely Road, the vegetation within the transmission corridor consists primarily of low growing shrubs and herbaceous plants. Since much of the area falls within the existing 345/115 kV transmission line corridor that runs from northeast to southwest through the site, vegetation is maintained at a relatively low height. There are also wooded areas located to the west and east of the maintained corridor within the substation site that provide a sense of scale to the existing transmission structures. An existing dirt road used for CMP maintenance is located in the approximate center of the existing corridor.

A prominent earth mound, 10 to 13 feet in height and approximately 100 feet in width, is located near the middle of the corridor, 150 feet from the edge of Greely Road. While the origin of the mound is unknown, in its present condition and location it effectively screens a portion of the transmission line from view.

The photograph also shows several stumps immediately adjacent to Greely Road that are remnants from a group of evergreen trees (most likely white pines) that had been planted a number of years ago to screen the transmission line. Central Maine Power no longer uses evergreens in this manner, since they required high level of maintenance (i.e., pruning the leader and other top branches) to keep the upper branches a safe distance from the transmission line conductors and thus avoid safety and reliability problems. In addition, as pines age they start to lose their lower limbs and their effectiveness as buffers after they achieve a certain size. The combination of pruned tops and bare lower limbs presents an appearance that is certainly not natural, and usually quite unsightly.

Uncontrolled vegetation within transmission line corridors can cause serious problems if contact is made with conductors (by trees touching the conductors or falling onto the transmission line) or by flashovers (electrical arcing between the conductors and nearby trees). These occurrences can lead to system-wide failures and widespread blackouts.

New standards[1] established the North American Electric Reliability Council (NERC) now require a Transmission Vegetation Management Program (TVMP) for all transmission operators (such as CMP).[2] Heavy fines may be levied by NERC if electrical transmission companies are found to be negligent in their vegetation management practices or if problems arise from lack of transmission corridor maintenance.

---

[1] Standard FAC-00301 Transmission Vegetation Management Program, North American Electric Reliability Council, Effective April 7, 2006.

[2] The stated purpose of the TVMP is "To improve the reliability of the electric transmission systems by preventing outages from vegetation located on transmission rights-of-way (ROW) and minimizing outages from vegetation located adjacent to ROW, maintaining clearances between transmission lines and vegetation on and along transmission ROW, and reporting vegetation-related outages of the transmission systems to the respective Regional Reliability Organizations (RRO) and the North American Electric Reliability Council (NERC)."

The existing transmission line corridor at the substation site is currently cleared to approximately 300 feet in width. Motorists traveling on Greely Road at 35 MPH would take less than 6 seconds to pass through the corridor. Since the transmission corridor intersects Greely Road at a 73º± angle, the proposed substation will be more visible to motorists traveling northwest (toward Cumberland Center).

PROPOSED CONDITIONS

As noted in the application, construction of the Raven Farm Substation will disturb about 25.1 acres of land. Following construction, the graded substation site will occupy approximately 15.4 acres of land. However, only the 345 kV section of the yard (approximately 8.6 acres) located on the east will be fenced and constructed with a finish base of crushed stone and gravel at this time. The fenced-in portion of the yard will contain typical electrical substation infrastructure including three 345 kV dead end A-frame structures, a 40'x90' control house building, breakers, switches, and buswork.

The remaining, un-fenced portion of the graded yard will not be constructed to match the elevation of the fenced, 345 kV side of the yard at this time. This 6.8-acre area will be brought up to an elevation slightly below the original proposed finish yard elevation and will be stabilized with topsoil, seed, and mulch. Two proposed A-frame dead end supports for the two existing 115 kV transmission lines will be installed in this area.

The tallest components in the substation are the 345 kV A-frame dead end structures, which will be approximately 125 feet in height to the very top of the lightning mast on the structure. The 115 kV A-frame dead end structures will be approximately 65 feet tall. The majority of the electrical equipment will be approximately 25 feet tall.

Access to the new substation will be from a new gravel access road off Greely Road. The road will provide access to two substation yard entrances along its southwesterly fence line.

Approximately 28 acres of forested land will be cleared adjacent to the existing transmission corridor in order to accommodate the substation and the temporary rerouting of transmission lines. The eastern edge of the corridor, as seen from Greely Road, will be widened by approximately 75 feet for the first 450 feet of the corridor. Beyond that point the eastern edge of the corridor will be widened by approximately 400 feet.

On the western side of the corridor, the proposed clearing will remove a 34º wedge of vegetation, starting at Greely Road. At its widest point (approximately 1,200 feet from Greely Road), the western edge of the clearing will be widened to approximately 500 feet.

From Greely Road, the width of the cleared transmission corridor will increase from 300 feet to approximately 425 feet. Motorists traveling on Greely Road at 35 MPH would take 8.3 seconds to pass through the cleared corridor following the widening of the transmission line corridor and the construction of the substation.

LANDSCAPE TREATMENT

The Landscape Plan for Raven Farm addresses a number of specific issues throughout the site:

- Greely Road Buffer. A low (2-4-foot) earth berm approximately 200 feet in length will be installed immediately adjacent to Greely Road (avoiding wetlands, vernal pools, and line-of-sight corridors). This mound will be used as the base for shrub planting to provide a visual screen for motorists and walkers passing through the transmission corridor. Plantings will be non-capable species, i.e., they will not grow to a height that would interfere with the electrical conductors.

- Secondary Earth Mound. The existing mound near the substation will be expanded to the north and used as a base for additional non-capable plantings. This 10-13-foot high mound should provide a very solid means of screening much of the substation from public view.

- Entrance Road Plantings. Additional non-capable species will be installed on either side of the proposed driveway to minimize the view down the transmission corridor. Adequate setbacks will be observed to retain sight distance for vehicles entering Greely Road from the access drive.

- Temporary Transmission Line Treatments. A mixture of evergreen tree seedlings and 3-8 foot trees will be installed throughout the temporary transmission lines to provide long-term forest cover.

- Burr Property Buffer. CMP and TJD&A are working with the Burrs to develop a plan to provide screening between their home / rear yard and the proposed substation. A number of options are actively being examined. The final design will likely include evergreen tree plantings and earth mounds, avoiding wetlands and a drainageway. Further information will be presented at the next Planning Board meeting.

PHOTOSIMULATION A

CMP has prepared photosimulations (computer-altered photographs) to show the anticipated changes to the landscape that will result from the construction of the Raven Farm Substation and related MPRP activities. The images are based upon the existing conditions photograph, which is a composite of several photographs taken from Greely Road near the approximate center of the proposed transmission corridor.

Photosimulation A depicts the construction activity at the conclusion of the project, i.e., removal of existing forest cover on both sides of the transmission corridor, installation of new transmission structures, construction of the Raven Farm Substation as described above. The temporary transmission structures that would be used to reroute the existing

115 kV and 345 kV transmission lines around the construction site are not shown in this image.

Burns & McDonnell, TRC, and Power Engineering provided the location and specifications of all transmission structures and substation components. Terrence J. DeWan & Associates (TJD&A) developed a computer model (using SketchUp software) that locates both the existing transmission structures as well as all the proposed components. The photosimulation was created in Photoshop, using photographs of similar components matched to the dimensions and locations shown on the SketchUp model.

Photosimulation A shows that the eastern portion of the substation (the 345 kV side) will be partially screened by the existing earthen mound and the native vegetation that is growing on it. On the western portion of the substation (the 115 kV side) the A-frame dead-end structures will be visible above the 3-5 foot tall shrub vegetation that covers the transmission corridor.

PHOTOSIMULATION B

As noted in the application, CMP intends to use a number of mitigation strategies to minimize potential visual impacts from the substation. Photosimulation B illustrates the proposed secondary earth mound, described above, that will extend the existing mound by an additional 200 feet to the northwest.

Native vegetation, using species that will attain a height of 4-10 feet will be planted on the side of the mound facing Greely Road and on the top of the mound to provide additional screening. The plantings have been selected to assure that a minimum of 20 feet of clearance is maintained between the top of the new shrub masses and the electrical conductors.

Visual buffer plantings will also be installed near Greely Road, in the vicinity of the stumps that marked the location of the evergreen trees noted above, to minimize visual impacts to the scenic character of the surrounding area.

A transmission structure that had been located on top of the mound has been relocated to the north side of it to minimize disturbance to the mound and preserve existing vegetation.

SECTION 15.0

SUBSTATION PHOTO SIMULATIONS

SECTION 16.0

RAVEN FARM SUBSTATION
SITE PLAN

Sheet C-1: Existing Conditions
Sheet C-2: Existing Conditions High Intensity Soil Survey
Sheet C-3: Overall Site Plan
Sheet C-4: Site Plan #1
Sheet C-5: Site Plan #2
Sheet C-6: Construction Details
Sheet C-7: Erosion Control Notes & Details #1
Sheet C-8: Erosion Control Notes & Details #2
Sheet C-9: Erosion Control Notes & Details #3

Figure 1: Existing Site Vegetation
Figure 2: Proposed Clearing Limits

SECTION 17.0

RAVEN FARM SUBSTATION

STORMWATER MANAGEMENT PLAN

(Provided Under Separate Cover)

SECTION 18.0

SOLID WASTE DISPOSAL PLAN

CMP anticipates that solid waste generated from construction and demolition activities associated with the MPRP will be limited to minimal land clearing and construction debris. This debris is inert, non-hazardous material that will be handled in accordance with MDEP requirements. It is CMP's priority to minimize solid waste generation by implementing and utilizing environmentally responsible construction management practices. All personnel and affiliates contracted for work as part of the MPRP will utilize best management practices (BMPs) and CMP protocol. CMP will monitor the disposal of all solid waste material, including paper documentation of waste streams. CMP will contract with a licensed waste hauler and solid waste will be managed at an appropriate and licensed facility. Table 18-1 describes the various types and the disposition of solid waste generated by the project. CMP encourages and recognizes recycling and reuse of materials generated as waste product.

Transmission line structures will be removed in Cumberland as part of the proposed project. Removed poles and crossarms may be transferred to private entities for reuse, returned to the manufacturer for recycling, or shipped to an approved special waste landfill for disposal. If surplus treated wood is to be used, CMP requires a Pole Transfer Agreement be signed, in which the transferee agrees to utilize the treated wood as a utility pole or beneficially in accordance with Maine Department of Environmental Protection Rules, Chapter 418 (Beneficial Reuse), as well as any other applicable federal, state, and local laws.

Trees will be cleared at the substation site in Cumberland as a result of the proposed MPRP project. Vegetation cut and cleared from the CMP corridors will be limited to capable species (i.e., tree species that are capable of growing into the safety zone beneath conductors). All merchantable wood will be removed from the service corridor and sold for lumber or firewood. All other woody material will be managed in compliance with the Maine Slash Law (12 M.R.S.A. §§ 9331-9338). All other wood waste generated in the process of vegetation clearing will be shipped off-site to be used as fuel at an appropriate licensed boiler, provided to a licensed chip processing plant, or donated to a facility to be utilized in the production of erosion control mulch.

Construction operations will also result in various types of construction debris including waste electrical system and construction process components such as scraps of cable, wooden cable spools, and wooden insulator crates. Maintenance of construction equipment will produce small amounts of waste plastic containers for oils and lubricants, broken filters and belts, and damaged tires. Construction and managerial staff will generate some waste such as paper, bottles, cans, plastics, and food scraps.

Clearing operations and transmission line construction may occasionally encounter waste materials previously dumped by others on properties acquired as part of the MPRP. These materials will be collected and disposed of according to applicable state and local laws.

Table 18-1: Generated Construction Waste Material and Proposed Management Method	
Material	**Management Method**
*Wood (timber, slash, stumps, etc.)	Chipped on-site or hauled off-site to boiler, chip plant, private entity or mulch production facility
*Treated wood (poles, crossarms)	Donated or landfilled in licensed special waste landfill or reused by CMP as the opportunity avails itself
*Metals (Ferrous and Non-Ferrous)	Maine Metals Recycling (Auburn) or a similar company will be utilized to assist with recycling
*Porcelain Insulators	Commercial Paving & Recycling Corporation (CPRC) (Scarborough) or a similar company will crush the insulators to be used as road sub-base material
Food waste, plastics, common trash	Shipped to licensed Municipal Solid Waste (MSW) landfill, transfer station, or incinerator
*Redeemable drink containers	Redeemed for recycling
*Wooden Cable Spools & Pallets	Stuart C. Irby Company (Waterville) or a similar company will be utilized to assist with management
Wooden Insulator Crates	Recycled or shipped to licensed MSW landfill, transfer station, or incinerator
*Paper	Recycled via FCR Goodman (various Maine locations)
*Concrete Debris	CPRC or a similar company will use concrete debris as road sub-base
Housing Demolition Debris (asphalt roofing, painted wood and plywood, junk /abandoned cars, special or hazardous waste)	Waste will be managed on a case specific basis depending on the type of waste and the location of the waste within the state.

***Waste material to be processed at a recycling facility and converted into usable product.**

In summary, no materials or wastes will be deposited in such form or manner that they may be transferred beyond the lot boundaries by regularly recurring natural causes or forces, and all materials which cause fumes or dust, constitute a fire hazard, or are edible or otherwise attractive to rodents or insects if stored out-of-doors will be in closed containers.