DOE/EA-1824

FINAL ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT FOR DEPARTMENT OF ENERGY LOAN GUARANTEE TO RECORD HILL WIND LLC FOR CONSTRUCTION OF A WIND ENERGY PROJECT IN ROXBURY, MAINE

U.S. Department of Energy
Loan Guarantee Program Office
Washington, DC 20585

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EXECUTIVE SUMMARY

INTRODUCTION

The U.S. Department of Energy (DOE) is proposing to issue a loan guarantee to Record Hill Wind LLC (Record Hill) for the construction of a 50.6 megawatt (MW) wind energy project located in Roxbury, Maine.[1]

DOE has prepared this Final Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321, et. seq.) Council on Environmental Quality regulations for implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508) and DOE NEPA regulations (10 CFR Part 1021). The EA examines the potential environmental impacts associated with the proposed action, as well as alternatives considered prior to application, and determines whether the proposed action has the potential for significant environmental impacts. The information contained in the EA would enable DOE to fully consider the potential environmental impacts of issuing a loan guarantee for the Record Hill project.

PURPOSE AND NEED

The Energy Policy Act of 2005 (EPAct 2005), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009 (ARRA), established a Federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII of EPAct 2005 authorizes the Secretary of Energy to make loan guarantees to eligible projects that "(1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of green house gases; and (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." (42 USC 16513). The two principal goals of the loan guarantee program are to encourage commercial use of new or significantly improved energy-related technologies in the United States and thereby achieve substantial environmental benefits. EPAct 2005 was amended by the Recovery Act to create Section 1705 authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, electric power transmission projects, and leading edge biofuels projects. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and State and local fiscal stabilization. The Section 1705 Program is designed to address the current economic conditions of the nation, in part, through renewable energy, transmission and leading edge biofuels projects. The purpose and need for agency action is to comply with the DOE's mandate under EPAct 2005 by selecting eligible projects that meet these goals. The DOE is using the NEPA process to assist in determining whether to issue a loan guarantee to Record Hill to support the proposed project.

Turbine Load Control technology would be utilized to increase the productivity of the wind farm by reducing the amount of curtailment (turbine shut downs) in this region where trees and other objects that increase turbulence are present. The decrease in curtailment results in an increase of annual energy production when compared to other commercial technologies in the United States that need to stop generating electricity in certain wind conditions where the loads in the wind turbine exceed their design limits.

The Record Hill project anticipates generating approximately 1115,000 megawatt hours (MWh) of clean energy annually during the expected operational life of the project. Over its estimated 20-year projected life, Record Hill expects the proposed wind energy facility to produce approximately 2.3 million MWh of electricity under peak conditions. Assuming that this capacity

[1] The amount requested for the loan guarantee is not being disclosed at this time because it is business sensitive. Moreover, should the DOE approve a loan guarantee; the amount may differ from the original request.

displaces electricity produced by conventional power plants and combined-heat-and-power plants, DOE estimates that the proposed development would reduce greenhouse gasses (carbon dioxide and nitrogen oxides) and other air pollutants on an annual basis by approximately:

- 58,710 tons of carbon dioxide;
- 97 tons of sulfur dioxide; and
- 82 tons of nitrogen oxides

PROPOSED ACTION AND ALTERNATIVES

The DOE's proposed action is to issue a loan guarantee to Record Hill to support the construction of the proposed wind energy project, and an associated Central Maine Power Company (CMP) substation and transmission line upgrade. The Record Hill project would consist of an array of 22 Siemens SWT-2.3-93 wind turbines and associated electrical interconnection infrastructure located along approximately 3.5 miles of ridgeline. Also located on the ridgeline would be two permanent 80-meter meteorological towers. Power generated by the turbine array would be collected by two 34.5-kilovolt (kV) lines and carried approximately 2.9 miles southeast to a 20,700 square foot project collector substation. There the voltage would be increased to 115 kV and then transferred to an adjacent CMP system and ultimately delivered to the New England grid. The site of the project collector substation also would include a project office located in an existing 2,700-square foot home and a proposed 7,200-square foot project Operations and Maintenance building. The total nameplate capacity of the project would be 50.6 MW.

An initial phase of construction for the wind energy project on the ridgeline began in September 2009 and included the marking of sensitive natural resources, installation of erosion control measures, clearing of turbine sites, and initiation of access road construction.

To provide electrical transmission service for the project and to meet potential future regional transmission needs beyond this project, CMP would construct a new substation adjacent to the collector substation to supplement the existing Frye Substation, replace the existing 8-mile Section 59 transmission line (CMP refers to the replacement line as Section 270), and construct a new crossover transmission line of approximately 1,000 feet.

In addition to the proposed action of issuing the loan guarantee to Record Hill for the proposed project, a No Action Alternative also was evaluated in the EA. Under the No Action Alternative, DOE would not issue the loan guarantee to Record Hill for the project. Without the DOE loan, Record Hill would not implement the project unless it was able to acquire alternative commercial financing.

The decision for DOE's consideration as presented in this EA is whether to approve the loan guarantee for the proposed Record Hill project. Prior to submitting its application Record Hill considered alternative sites throughout the state of Maine. Record Hill determined that the proposed site was the most viable location for the proposed project based on the existing needs for renewable energy, evaluation of wind resources in the area, and a thorough consideration of alternative sites.

SUMMARY OF RESOURCE AREAS EXAMINED

The EA evaluates the potential environmental effects that could result from implementing the Proposed Action and No Action Alternative. Table S.1 provides a summary of the potential environmental consequences that could result from implementing the Proposed Action and from the No Action Alternative.

Table S.1 Summary of Impacts

Area of Concern	No Action Alternative	Proposed Action
Climate	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: Construction of the facility would result in a slight increase in greenhouse gas emissions; however this would be temporary and insignificant. Operational Period: There would be some emissions associated with operation of the facility such as heating of the office and O&M building; however these would be insignificant and would be more than offset by the reduction in fossil fuel consumption and greenhouse gas emissions from the displacement of electricity produced by conventional power plants.
Topography	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: The completed cut and fill activities conducted during access road construction and future planned activities have caused or would cause minor alterations of local topography, but would not alter major topographic features. Operational Period: Activities affecting topography are not anticipated during operations, but if needed would be minor.
Geology, Soils and Geologic Hazards	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: The completed cut and fill activities conducted during access road construction and future planned activities have altered or would alter existing soils, but an erosion control plan developed using Best Management Practices (BMPs) would control and minimize soil erosion. No geologic hazards are known to occur in the area. Operational Period: Activities affecting geology, soils, and geologic hazards are not anticipated during operations.

Area of Concern	No Action Alternative	Proposed Action
Water Resources	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: A total of 13,564 square feet of wetlands would be permanently filled. To date, approximately 10,689 square feet of permitted wetland fill has been completed for construction of the access roads and turbine pads. Approximately 66,197 square feet of forested wetlands would be converted to shrub and/or herbaceous communities. Another 4,300 square feet of temporary wetland impacts from the use of construction mats would occur. The U.S. Army Corps of Engineers has issued Section 404 permits and the State of Maine Department of Environmental Protection (DEP) has issued land use permits for these wetland impacts. In addition, approximately 20,652 square feet of Maine designated critical terrestrial habitat associated with a significant vernal pool would be cleared. The State of Maine DEP has issued a permit for this impact. Operational Period: Potential impacts to surface water and groundwater resources would be avoided and minimized through the use of BMPs to control and minimize runoff and soil erosion. Stormwater modeling completed for the project indicates that there would be no significant increase in discharge rate from the site following construction, and that there should be no adverse impacts to adjacent waterbodies or properties if the stormwater management plan is properly implemented.
Air Quality	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: Construction of the project would result in minor emissions of air pollutants from construction and employee vehicles. Because these would be temporary and in small quantities, impacts to air quality would be minimal. Operational Period: The proposed project would result in minor emissions of air pollutants related to employee vehicles and other equipment needed for maintenance as well as heating of the project office and O&M building. These emissions would be low and would not result in adverse long-term impacts to air quality. The project would benefit air quality by reducing air pollutants that

Area of Concern	No Action Alternative	Proposed Action
		would otherwise be produced by fossil fuel consumption typically used to produce power.
Noise	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: Construction of the project would produce short-term noise within the project area that would be similar to noise produced when commercial timber harvesting is occurring on the property. Noise produced by construction would adhere to established state requirements. Operational Period: Sound from the project is not expected to result in a significant impact to the surrounding community. Results of this analysis indicate that sound levels at full sound power production would be below the nighttime state-established sound level limits at the nine nearest receiver points. Post-construction monitoring would be required to determine if noise models adhere to state-established sound level limits.
Historic, Archaeological and Cultural Resources	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Three National Register eligible properties are located within the Area of Potential Affect that was surveyed for the project. Two of the properties (Austin Farmstead and Knapp Farmstead) located on Swift River Road in Byron would have views of approximately 14 turbines at distances ranging between 1.7 and 3.3 miles. The third property, the Mitchell Farmstead, located on Roxbury Road in Mexico would have views of most of the 22 turbines at distances ranging between 3.7 and 5.9 miles. Maine Historic Preservation Commission (MHPC) determined that the wind energy project would have an adverse effect on these properties. Under the terms of a Memorandum of Agreement between MHPC, DOE, and the U.S. Army Corps of Engineers, the three properties must be documented to the standards of the Maine Historic Building Report.
Visual Resources	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: During construction, visual affects of the project would be limited to construction vehicles traveling to and from the site and to cranes used to construct the turbines. Operational Period: The project turbines and met towers would introduce new

Area of Concern	No Action Alternative	Proposed Action
		vertical elements into the landscape and other project components including the electrical lines, O&M building and substation would be visible from some locations. The turbines would be visible from Old Blue Mountain on the Appalachian Trail, but otherwise would be screened by intervening topography and vegetation.
Shadow Flicker	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Shadow flicker analysis determined that no nearby receptors would be affected.
Public Health and Safety	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: During construction there would be limited use or storage of materials considered hazardous such as antifreeze. Other hazards would be related to holes, uneven surfaces and active construction areas. The risk of harm would be minimized by employing BMPs. Operational Period: Twenty of the 22 proposed turbines would be located more than the required minimum setback distance of 622.5 feet (1.5x maximum blade height) from residences. Two parcels are located at less than this setback distance, however neither parcel is currently used for residential purposes and neither property owner has posed objections. For the limited hazardous materials that would be stored at the project O&M building, a Spill Prevention, Countermeasure and Control Plan would be developed.
Land Use	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: The project would not limit access to the remaining property, which would continue to be used for commercial timber production. Operational Period: The project would not limit access to the remaining property, which would continue to be used for commercial timber production.
Biological Resources	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: Approximately 19 acres of vegetation would be cleared on the ridgeline for the wind turbines and associated infrastructure; and 49 acres of vegetation would be cleared for the Section 270 transmission line. There would be no effect on the Atlantic salmon and no impact on its designated essential fish habitat. The construction phase is not

Area of Concern	No Action Alternative	Proposed Action
		expected to significantly impact bird and bat species, although breeding songbirds may be temporarily displaced depending upon the timing of activities. Operational Period: Wind turbines pose a threat to migratory birds and bats. However, based upon surveys conducted on the project ridgeline, this threat is not expected to be significant. Record Hill Wind will prepare an Eagle Risk Minimization Plan 60 days prior to commencement of operations. Post-construction monitoring would be employed to assess mortality resulting from collisions with wind turbines.
Socioeconomics	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: Short-term impacts would include temporary construction employment opportunities as well as increased activity at local businesses such as hotels and restaurants during construction of the proposed project. Operational Period: Long-term benefits would include three to five full-time jobs for employees to operate the facilities as well as seasonal work associated with road maintenance. The project also would provide long-term tax benefits and would offer local residents energy assistance.
Environmental Justice	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: No disproportionate high and adverse human health or environmental impacts are expected on minority and low income populations and no impacts on children. Operational Period: No disproportionate high and adverse human health or environmental impacts on minority and low income populations and no impacts on children are expected.
Transportation	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: No significant impacts are expected to existing traffic patterns or public roads. Operational Period: No significant impacts are expected to existing traffic patterns or public roads.
Utilities	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	Construction Period: No significant impacts to public utilities are expected. During construction, water would be provided by the contractor. Operational Period: No significant

Area of Concern	No Action Alternative	Proposed Action
		impacts to public utilities are expected. Water for the project office would be provided by a private well and an on-site septic system would handle wastewater. A licensed waste hauler would periodically collect and transport waste to a licensed waste disposal facility
Cumulative Impacts	The impacts associated with the proposed action would not occur unless alternative financing was obtained.	The project area is subject to periodic timber harvesting. Potential cumulative impacts to vegetation and soil erosion could occur during the construction phase of the wind energy project if it overlaps with timber harvesting. There would be no potential incremental contribution to other cumulative environmental impacts.

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ACRONYMS AND ABBREVIATIONS	Full Phrase
ACHP	Advisory Council on Historic Preservation
AMSL	Above Mean Sea Level
APE	Area of Potential Effect
AT	Appalachian National Scenic Trail
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CAA	Clean Air Act
CMP	Central Maine Power Company
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
dBA	Decibel
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPAct 2005	Energy Policy Act of 2005
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
FSC	Forest Stewardship Council
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organization
ISO-NE	ISO New England
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
MDEP	Maine Department of Environmental Protection
MDIFW	Maine Department of Inland Fisheries and Wildlife
MHBR	Maine Historic Building Record
MHPC	Maine Historic Preservation Commission
MMBC	Maine Model Building Code

MNAP	Maine Natural Areas Program
M.R.S.A.	Maine Revised Statues Annotated
MW	Megawatt
NMFS	National Marine Fisheries Service
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NHPA	National Historic Preservation Act of 1966
NOI	Notice of Intent
NPCC	Northeast Power Coordinating Council, Inc.
NRPA	Natural Resource Protection Act
OSHA	Occupational Safety and Health Administration
O&M	Operations and Maintenance
PBR	Permit By Rule
RGGI	Regional Greenhouse Gas Initiative
ROI	Region of Influence
SDR	Short Duration Repetitive Sounds
SFI	Sustainable Forestry Initiative
SPCC Plan	Spill Prevention, Control and Countermeasures Plan
TDML	Total Daily Maximum Loads
USC	United States Code
USF	Underdrain Soil Filters
USFWS	U.S. Fish and Wildlife Service

Scientific Names for Animals and Plants that appear in this Environmental Assessment

Fish	
long-nose dace	*Rhinichthys cataractea*
brook trout	*Salmo trutta*
rainbow trout	*Oncorhynchus mykiss*
slimy sculpin	*Cottus cognatus*
Atlantic salmon	*Salmo salar*
Birds	
ovenbird	*Seiurus aurocapillus*
dark-eyed junco	*Junco hyemalis*
chestnut-sided warbler	*Dendroica pensylvanica*
white-breasted nuthatch	*Sitta carolinensis*
golden-crowned kinglet	*Regulus satrapa*
rose-breasted grosbeak	*Pheucticus ludovicianus*
American robin	*Turdus migratorius*
blue jay	*Cyanocitta cristata*
black-capped chickadee	*Poecile atricapillus*
hairy woodpecker	*Picoides villosus*
northern flicker	*Colaptes auratus*
American redstart	*Setophaga ruticilla*
black-throated green warbler	*Dendroica virens*
red-eyed vireo	*Vireo olivaceus*
black-and-white warbler	*Mniotilta varia*
eastern wood-pewee	*Contopus virens*
tree swallow	*Tachycineta bicolor*
veery	*Catharus fuscescens*
white-throated sparrow	*Zonotrichia albicollis*
American kestrel	*Falco sparverius*
bald eagle	*Haliaeetus leucocephalus*
broad-winged hawk	*Buteo platypterus*
Cooper's hawk	*Accipiter cooperii*
merlin	*Falco columbarius*
northern goshawk	*Accipiter gentilis*
northern harrier	*Circus cyaneus*
osprey	*Pandion haliaetus*
peregrine falcon	*Falco peregrinus*
sharp-shinned hawk	*Accipiter striatus*
red-shouldered hawk	*Buteo lineatus*
red-tailed hawk	*Buteo jamaicensis*
turkey vulture	*Cathartes aura*
roseate tern	*Sterna dougallii*
least tern	*Sterna antillarum*
piping plover	*Charadrius melodus*
Mammals	
white-tailed deer	*Odocoileus virginianus*
moose	*Alces alces*
black bear	*Ursus americanus*
coyote	*Canis latrans*
bobcat	*Lynx rufus*
red squirrel	*Tamiasciurus hudsonicus*
eastern chipmunk	*Tamias striatus*
snowshoe hare	*Lepus americanus*
deer mouse	*Peromyscus maniculatus*
porcupine	*Erethizon dorsatum*

short-tailed shrew	*Blarina brevicauda*
Canada lynx	*Lynx canadensis*
little brown bat (little brown myotis)	*Myotis lucifugus*
northern myotis (northern long-eared bat)	*Myotis septentrionalis*
eastern small-footed bat	*Myotis leibii*
silver-haired bat	*Lasionycteris noctivagans*
big brown bat	*Eptesicus fuscus*
eastern red bat	*Lasiurus borealis*
hoary bat	*Lasiurus cinereus*
eastern pipistrelle (tricolored bat)	*Pipistrellus subflavus* (*Perimyotis subflavus*)
Amphibians and reptiles	
spotted salamander	*Ambystoma maculatum*
red-back salamander	*Plethodon cinereus*
wood frog	*Rana sylvatica*
American toad	*Bufo americanus*
spring peeper	*Pseudacris crucifer*
eastern garter snake	*Thamnophis sirtalis*
eastern milk snake	*Lampropeltis t. triangulum*
Plants	
northern white cedar	*Thuja occidentalis*
witherod	*Viburnum nudum*
winterberry	*Ilex verticillata*
cinnamon fern	*Osmunda cinnamomea*
sensitive fern	*Onoclea sensibilis*
northeastern mannagrass	*Glyceria melicaria*
fowl mannagrass	*Glyceria striata*
fringed sedge	*Carex crinita*
red raspberry	*Rubus idaeus*
rough-stemmed goldenrod	*Solidago rugosa*
bluejoint	*Calamagrostis canadensis*
swamp dewberry	*Rubus hispidus*
pointed broom sedge	*Carex scoparia*
steeple-bush	*Spiraea tomentosa*
red spruce	*Picea rubens*
balsam fir	*Abies balsamea*
sugar maple	*Acer saccharum*
yellow birch	*Betula alleghaniensis*
American beech	*Fagus grandifolia*
paper birch	*Betula papyrifera*
eastern hophornbeam	*Ostrya virginiana*
eastern hemlock	*Tsuga canadensis*
gray birch	*Betula populifolia*
striped maple	*Acer pensylvanicum*
hobblebush	*Viburnum lantanoides*
bracken fern	*Pteridium aquilinum*
bunchberry	*Cornus canadensis*
evergreen wood fern	*Dryopteris intermedia*
beaked hazelnut	*Corylus cornuta*
shining clubmoss	*Huperzia lucidula*
red maple	*Acer rubrum*
green ash	*Fraxinus pennsylvanica*
meadowsweet	*Spiraea alba* var. *latifolia*
sallow sedge	*Carex lurida*

jewelweed	*Impatiens capensis*
small whorled pogonia	*Isotria medeoloides*
Japanese barberry	*Berberis thunburgii*
Honeysuckle	*Lonicera* sp.
Asiatic bittersweet	*Celastrus orbicaulatis*
Common buckthorn	*Rhamnus carthatica*
Glossy buckthorn	*Frangula alnus*
Autumn olive	*Elaeagnus umbellata*

CHAPTER 1.0: PURPOSE AND NEED

1.1 PURPOSE AND NEED FOR ACTION

The Energy Policy Act of 2005 (EPAct 2005), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009 (ARRA), established a Federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII of EPAct 2005 authorizes the Secretary of Energy to make loan guarantees to eligible projects that "(1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued" (42 United States Code [USC] 16513). The two principal goals of the loan guarantee program are to encourage commercial use of new or significantly improved energy-related technologies in the United States and thereby achieve substantial environmental benefits. EPAct 2005 was amended by the Recovery Act to create Section 1705 authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, electric power transmission projects, and leading edge biofuels projects. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and State and local fiscal stabilization. The Section 1705 Program is designed to address the current economic conditions of the nation, in part, through renewable energy, transmission and leading edge biofuels projects. The U.S. Department of Energy (DOE) believes that commercial use of these technologies would help sustain and promote economic growth, produce a more stable and secure energy supply and economy for the United States, and improve the environment. The purpose and need for agency action is to comply with the DOE's mandate under EPAct 2005, as amended by ARRA, in selecting eligible projects that meet these goals.

The DOE's proposed action is to issue a loan guarantee to Record Hill Wind LLC (Record Hill) that would be used to construct a 50.6-megawatt (MW) wind energy project and an associated Central Maine Power Company (CMP) substation and transmission line upgrade located in Roxbury, Maine. The proposed facility would consist of an array of twenty two 2.3 megawatt (MW) Siemens SWT-2.3-93 wind turbines, two permanent 260-foot meteorological towers (met towers) and a network of unpaved access roads on the ridgeline, and a project collector substation, office and Operations & Maintenance (O&M) building located at a separate location. The Record Hill project would make 115,000 megawatt-hours of clean energy available to the local energy market and would avoid the emission of air pollutants and anthropogenic greenhouse gases that would be produced using nonrenewable energy sources.

Over its estimated 20-year projected life, Record Hill expects the proposed wind energy facility to produce approximately 2.3 million megawatt-hours of electricity under peak conditions. Assuming that this capacity displaces electricity produced by conventional power plants and combined-heat-and-power plants, DOE estimates that the proposed development would reduce greenhouse gasses (carbon dioxide and nitrogen oxides) and other air pollutants (sulfur dioxide) on an annual basis by approximately:

- 58,710 tons of carbon dioxide;
- 97 tons of sulfur dioxide; and
- 82 tons of nitrogen oxides.

As required by EPAct 2005, the Record Hill project would avoid and reduce air pollutants and anthropogenic emissions of greenhouse gases.

DOE is using the National Environmental Policy Act (NEPA) process to assist in determining whether to issue a loan guarantee to Record Hill in support of the proposed project.

1.2 BACKGROUND

Title XVII of EPAct 2005 provides the basis of DOE's Loan Guarantee Program. This title provides broad authority to DOE to guarantee loans that support early commercial use of advanced technologies, if "there is reasonable prospect of repayment of the principal and interest on the obligation by the borrower." Loan guarantees are one way in which DOE promotes commercial use of innovative technologies. This tool is targeted at early commercial use only, rather than energy research, development, and demonstration programs. Accelerated commercial use of new or improved technologies will help sustain economic growth, yield environmental benefits, and produce a more stable and secure energy supply.

DOE published a Final Rule that established the policies, procedure, and requirements for the loan guarantee program (10 Code of Federal Regulations [CFR] Part 609). In July 2009, the DOE issued a solicitation announcement inviting interested parties to submit proposals for projects that employ energy efficiency, renewable energy, and advanced transmission and distribution technologies that constitute New or Significantly Improved Technologies (as defined in 10 CFR Part 609). Record Hill submitted an application to the DOE for a loan guarantee in December 2009. The NEPA review process was undertaken to assist DOE in deciding whether to issue the loan guarantee to Record Hill.

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA presents information on the potential impacts associated with guaranteeing a loan to Record Hill and covers the construction and operation of the 50.6-MW wind energy project. The DOE has prepared this EA in accordance with NEPA, Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Parts 1500–1508), and DOE NEPA Implementing Procedures (10 CFR 1021). No significant impacts were identified during preparation of this EA, thus DOE is issuing a Finding of No Significant Impact (FONSI).

This EA: (1) describes the affected environment and human resources that could be affected by the Proposed Action, No Action Alternative, and Alternatives Considered but Eliminated by the Applicant; (2) describes the Proposed Action; (3) analyzes potential impacts that could result from the Proposed Action and No Action Alternative; and (4) identifies and characterizes cumulative impacts that could result from the Proposed Action in relation to other ongoing or proposed activities within the surrounding area.

CHAPTER 2.0: PROPOSED ACTION AND ALTERNATIVES

This chapter provides information on Record Hill's project and discusses the Proposed Action, No Action Alternative, and Alternatives Considered But Eliminated the Applicant. Rather than being directly responsible for the siting, construction, and operation of projects selected in response to projects applying under EPAct 2005 solicitations, DOE's action is limited to guaranteeing public financing for the project they have proposed in their application. Therefore, DOE's overall decision will be to either provide a loan guarantee or to decline to provide a loan guarantee. Alternatives eliminated from consideration by Record Hill prior to applying are discussed in Section 2.3.

2.1 PROPOSED ACTION

The DOE's Proposed Action is to issue a loan guarantee to Record Hill Wind to support construction of the proposed wind energy project, and the associated CMP substation and transmission line upgrade. Record Hill Wind LLC is a limited liability company in the State of Delaware with a presence in the State of Maine.

The wind energy project would consist of an array of twenty two Siemens 2.3 MW SWT-2.3-93 wind turbines and associated electrical interconnection infrastructure located along approximately 3.5 miles of ridgeline near Roxbury, Maine. Also located on the ridgeline would be two permanent 260-foot meteorological (met) towers. Power generated by the turbine array would be collected by 34.5-kilovolt (kV) lines and carried approximately 2.9 miles southeast to a 20,700-square foot project collector substation located on Route 120 in Roxbury. At the collector substation, the voltage would be increased to 115 kV and then transferred to the adjacent Central Maine Power Company (CMP) system and ultimately delivered to the New England grid. The site of the project collector substation also would include a project office located in an existing 2,700-square foot home and a proposed 7,200-square foot project Operations & Maintenance (O&M) building. The total nameplate capacity of the project would be 50.6 MW. These project elements are described in Section 2.1.1.

To provide electrical transmission service for the project and to meet potential future regional transmission needs beyond this project, CMP would construct a new substation to replace the existing Frye Substation, replace the existing 8-mile Section 59 transmission line, and construct a new crossover transmission line of approximately 1,000 feet. CMP refers to the proposed Section 59 transmission line replacement as Section 270. These project elements are described in Section 2.1.2.

2.1.1 WIND TURBINES AND ASSOCIATED INFRASTRUCTURE

The proposed site for the Record Hill project is a ridgeline located north of Route 120 (also known as Roxbury Notch Road) in the town of Roxbury, Maine (See Figure 2-1). The project site, which is leased from the landowner under a wind energy ground lease agreement, is part of a larger property that is managed for commercial timber production. The wind turbines and infrastructure would occupy approximately 18.8 acres of new developed area, which would include 18.4 acres of new impervious surface, in addition to 0.7 acre of developed area in the form of existing logging roads. The new development would directly impact approximately one percent of the 1,568 acre ridgeline that was assessed by Record Hill's surveyors during the planning phase of development. The remainder of the ridgeline would not be developed, but would continue to be managed for commercial timber production.

2.1.1.1 Wind Turbines

The 22 Siemens SWT-2.3-93 wind turbines would be arranged in a single array separated into two sections by a topographic drainage referred to as Mine Notch. Seventeen turbines would be

aligned along the ridgelines of Record Hill and Flathead Mountain and five turbines would be located along the ridgeline of Partridge Peak. Each turbine site would consist of a turbine pad, pad-mounted transformer, power distribution panel, turbine tower, turbine rotor, and a nacelle. Some turbines would be located directly along the primary project access roads and others would be accessed from small access drives extending from the primary access roads. For construction, each turbine site would be approximately 1.6 acres in size and consist of the construction laydown area, crane pad and turbine foundation. Following construction the construction laydown area would be allowed to revegetate. The crane pad and turbine foundation totaling approximately 0.15 acres would remain as impervious area. The turbines would be constructed in a north-south orientation along the ridgelines of Record Hill, Flathead Mountain, and Partridge Peak. Each SWT-2.3-93 turbine measures approximately 262 feet in height from the ground to the center of the hub; the total height from the ground to the tip of a fully extended turbine blade is approximately 415 feet. Each crane pad would measure 70 feet by 83 feet and require a graded laydown area that would measure 315 feet in diameter. The crane pads would be constructed with approximately 16 inches of compacted gravel or processed rock. Impervious area associated with each crane pad is 6,170 square feet. The total amount of impervious area of the (22) crane pads is 3.2 acres.

Approximately 6.1 miles of new access roads and crane path would be constructed for the project. The primary access to the ridgeline for component delivery, operations, and maintenance would be Mine Notch Road. Approximately 0.5 miles of Mine Notch Road would be upgraded to 16 feet wide; and the road would be extended by 1.1 miles to fully access the ridgeline. Portions of this access road would be widened to 29 feet to allow component delivery vehicles to negotiate sharp turns and to act as pull-off areas.

In addition to the primary access road, the project would include 5.0 miles of supplemental access road referred to as a crane path. The crane path would allow the assembly crane to access the individual turbine sites for the purpose of erecting the turbines. The crane path would be located along the ridgeline and would connect all of the turbine pads. Initially the crane path would be constructed to a width of 32 feet. Once assembly of the turbines is completed the crane path would be allowed to re-vegetate to a width of 16 feet. There would be approximately 12.7 acres of area associated with the access road and crane path.

2.1.1.2 Meteorological Monitoring Towers

Meteorological (met) monitoring towers are tubular or lattice towers that contain sensors to measure wind speed and direction at a site. These towers can be secured to the ground with tensioned cable referred to as guy wires (guyed met tower) or free standing without the use of guy wires (unguyed met tower).

In August 2007, two temporary met towers were installed to collect wind resource data. One tower was installed on Record Hill and one on Flathead Mountain. These temporary met towers would be dismantled during the initial phase of construction to allow for construction of wind turbines. The project would include two permanent 260-foot unguyed met towers, which would be installed prior to the start of project operation. Proposed locations of met towers are shown in Figure 2-1.

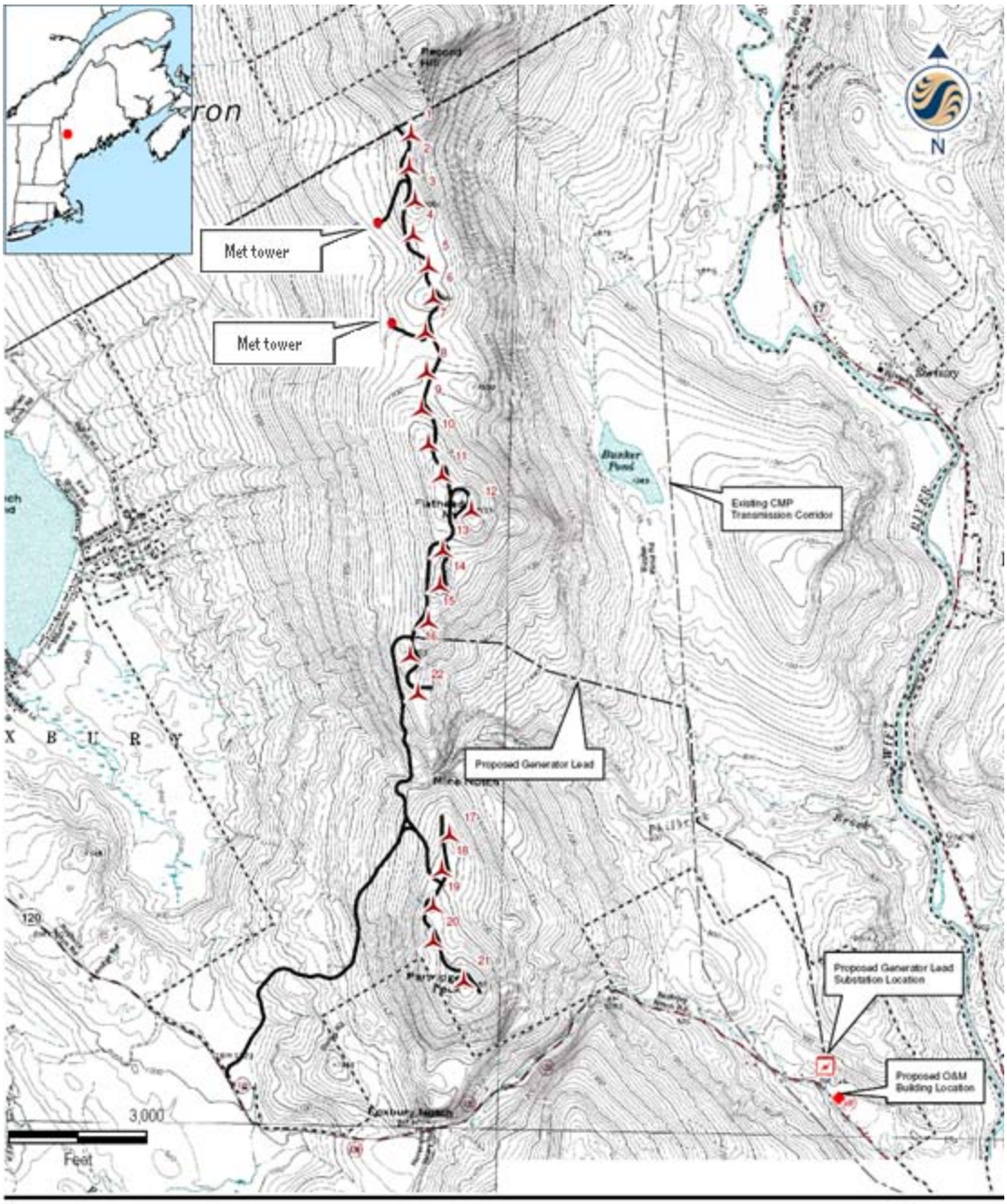

Figure 2-1 Wind Turbines and Associated Infrastructure

2.1.1.3 Electrical Collection System

Electrical power generated by the turbines would be transformed and collected through a network of underground and overhead collection circuits. The pad-mounted transformers located at the base of each turbine would increase the voltage of electricity generated by each turbine to 34.5-kV. Power generated by the turbine array would be collected by a system of 34.5-kilovolt (kV) lines. Along the ridgeline approximately 4,500 linear feet of collector lines would be installed underground in the shoulder of the access roads. Overhead lines would then carry the electricity approximately 2.9 miles southeast to the project collector substation located on Route 120 in Roxbury. There the voltage would be increased to 115 kV and then transferred to the adjacent CMP system and ultimately delivered to the New England grid.

2.1.1.4 Collector Substation

The collector substation would be constructed on the east side of Route 120 (also known as Roxbury Notch Road) in Roxbury, on the same property where the project office and O&M building would be located. The substation would increase the voltage of the electricity collected from the project and transfer the electricity to the CMP system. The 20,700 square foot substation, which would be enclosed by a fence, would include a grounding transformer, circuit breakers, a transformer, bus support, take-off tower and oil/water separator.

2.1.1.5 Office and Operations and Maintenance (O&M) Building

The proposed project also would include an office that would be located in an existing single-family residence and the construction of a single-story 7,200-square foot O&M building to house maintenance equipment and other materials. A gravel parking lot would be constructed at the O&M building. Both of these buildings would be located on the same parcel of land as the collector substation on the east side of Route 120 (also known as Roxbury Notch Road) in Roxbury.

2.1.2 CMP Transmission Line and Substation

To provide electrical transmission service for the project and to meet potential future regional transmission needs beyond this project, Central Maine Power Company (CMP) will improve the existing Section 59 transmission line and expand its substation capacity in the area. These improvements are part of CMP's responsibility as the chief electric transmission entity to provide service in conformance with the reliability and security standards mandated and administered by the North American Electric Reliability Corporation (NERC), the Northeast Power Coordinating Council, Inc. (NPCC) and ISO New England (ISO-NE).

As permitted, the CMP improvement and expansion essentially is a replacement project as it will involve construction of a new substation to replace the existing Frye Substation in Roxbury and construction of a new transmission line to replace the existing Section 59 transmission line. Section 59 is the only transmission line serving the Frye substation where two transmission lines that serve the Andover and Rangeley areas originate.

2.1.2.1 CMP Roxbury Substation

The existing Frye Substation is located on the southwest side of Route 120 approximately 0.3 miles northwest of the proposed substation, and would remain in operation.

The proposed CMP Roxbury substation would be constructed on the same parcel as the project O&M building, office and collection substation. The full graded area for this substation would be approximately 2.4 acres with the substation components occupying approximately 1.15 acres of

this graded area. The substation would be enclosed by a fence and would include typical components such as a control house, transformers, and circuit breakers.

2.1.2.2 CMP Section 270 Transmission Line

Currently, the Section 59 transmission line has a capacity of 34.5 kilovolts (kV). The eight mile line extends from the Frye 34.5 kV Substation on Route 120 in Roxbury south and southeast to the Rumford 115 kV Substation on Route 2 near Rumford Falls. The line was constructed in the 1960s and is comprised of single 30 to 40 foot tall pole structures with cross arms. Generally speaking, the corridor is 100 feet wide, although the clearing limits are variable. Many of the poles along this line are not in correct horizontal and vertical alignment or plumb, a situation that does not meet the current CMP requirements for transmission design. Overall the line is substandard relative to newer lines and those being rebuilt.

The replacement line for the existing Section 59 transmission line, identified as the new Section 270 by CMP, will extend approximately eight miles from the new CMP substation to the existing Rumford Substation on Route 2 near Rumford Falls (see Figure 2-2a and 2-2b). The Section 270 line will parallel the existing Section 59 transmission line for its length with the exception of a new crossover line from the new substation to the existing Section 59 transmission line near Pole 134. The new Section 270 will be 50 foot expansion of the existing line corridor, meaning that the existing corridor will be expanded to a total corridor width of 150 feet to meet current CMP standards. Section 270 will involve the installation of 121 new wooden single-pole structures to carry the transmission lines. The poles would be approximately 70 feet tall. At the new substation, two new lines will be installed; one line will be the terminus of the existing Section 59 from the Frye Substation and the other will be the terminus of Section 270.

The new crossover line corridor will be 250 feet wide to accommodate two electrical lines running to and from the substation. Beyond the crossover line, the new line will be an expansion of the existing transmission line corridor and will occur on the west side of the existing line until it reaches Pole 8 in Rumford near the Rumford Substation. Near Pole 8 the corridor expansion will occur on the north and east sides of the existing Section 59 transmission line. Developing the new line will include adjusting the alignment of the transmission line corridor and providing consistent clearing limits. Once the Section 270 line is energized and providing service, the poles and other materials associated with the Section 59 line will be removed. A 150 foot wide corridor will be maintained along the Section 270 line once this line is operational.

For construction, temporary light-duty construction access paths will be established along the existing transmission line corridor to provide access to the new Section 270. To reach the existing transmission line corridor, access will come either directly from public roads or across private land where permission can be attained (Refer to the Maine Natural Resource Protection Act permit application submitted for the Section 270 Transmission Line Upgrade). Establishment of the access path will be an ongoing process conducted throughout the course of the Section 270 construction. Access will be established to areas undergoing immediate construction and as construction progresses, new access paths will be established and paths that are no longer needed will be closed.

The new Section 270 line will require an additional 50 feet of vegetation clearing in areas supporting woody vegetation. This will result in approximately 49-acres of vegetation clearing. As with the existing clear corridor, the additionally cleared area will be maintained to remove trees capable of growing into the conductor safety zone during the four to five year maintenance cycle and that are greater than 8 to 10 feet tall. In general, it is unlikely that extensive grading will be necessary within the newly cleared area. Grading may be required for stabilizing access roads, excavation sites, and pull-pad sites where terrain is uneven such that construction equipment access would not be safe without grading. Conductor pull-pad setup locations may require leveling by limited grading in an approximately 100-foot by 75-foot area to assure equipment

stability. Pole placement will disturb a 10 foot by 10 foot area, although these areas will be allowed to restore naturally.

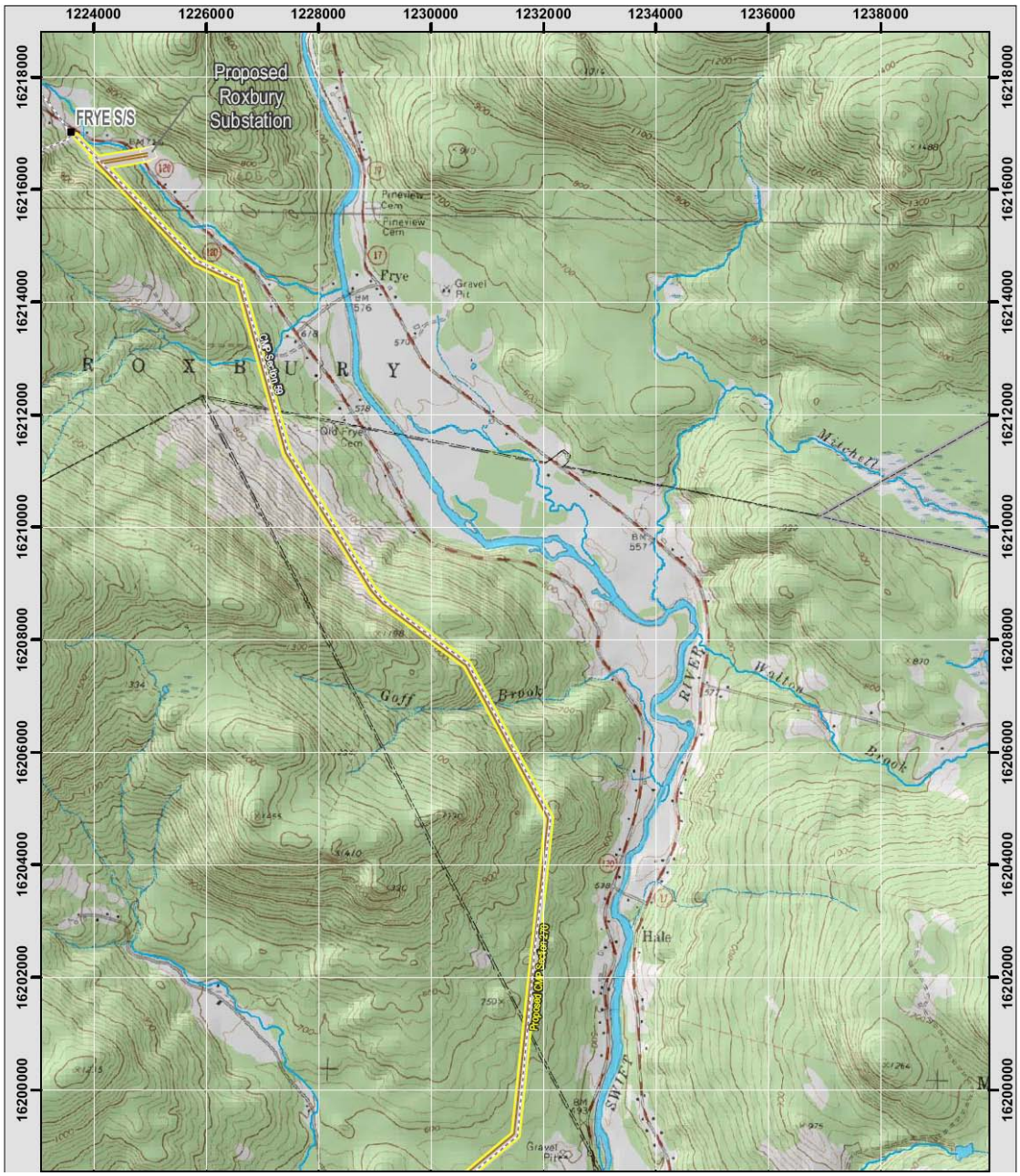

Figure 2-2a CMP Section 270 Transmission Line

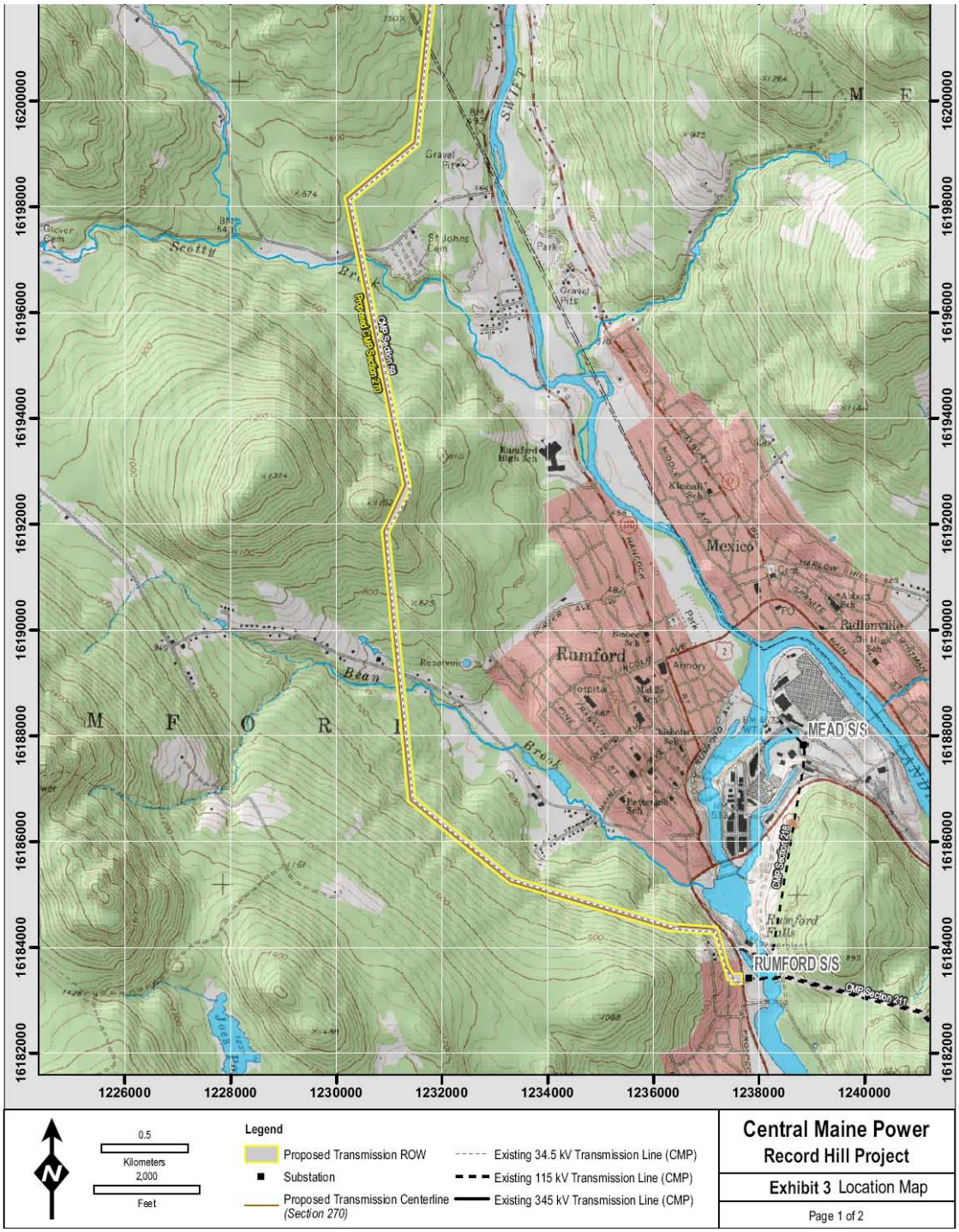

Figure 2-2b CMP Section 270 Transmission Line

2.1.3 CONSTRUCTION SCHEDULE

Construction of the Record Hill project would take approximately eight months and would occur in two phases, with the project fully operational in late 2011. The two-phased approach allows a construction schedule that maximizes the use of dry construction seasons and minimizes environmental impacts associated with spring-time construction. Phase 1 began in September 2009 and included the marking of sensitive natural resources, installation of erosion control measures, clearing of turbine sites, and initiation of access road construction.

Initial work efforts focused only on development of the access roads and crane path portions of the generating facility. Prior to commencing work on the site, the project contractor divided the access road, crane path, and turbine pad portions of the project into six distinct work areas. Such a division allowed for easy planning, and also allowed simple staging of the various construction steps. The first step in construction was clearing the site for earthwork. Following a plan that generally had work starting at the base of the access road and working up the ridge and then split north and south along the ridge, this clearing effort was substantially completed by the end of October 2009. By the end of 2009, the full turbine corridor had been cleared.

Site grubbing, road subbase establishment, and rough grading followed the site clearing. This effort progressed from the base of the access road up to the ridgeline. The crane path and turbine pads from Turbine 15 through Turbine 22 also were roughly graded to a point that would allow passenger vehicle traffic. No grading has taken place north of Turbine 15. During the subbase establishment and grading process the project was visited regularly by an independent, state-required, third-party inspector. Shortly following the completion of the grading effort described above, the contractor installed permanent erosion and sedimentation controls from the project entrance all the way up to the ridgeline, and then along the crane path from turbine 16 south through turbine 22. This effort was completed in late December 2009. After the site was closed for the winter the project area was again visited by the third-party inspector to confirm the adequacy and integrity of the erosion and sedimentation controls installed at the site. Periodic visits from the third-party inspector have continued since site closure to monitor the long-term effectiveness of the erosion control measures. As of January 2010, the access road and crane path had been cleared of timber and approximately 3.7 of those 6.1 miles also had the sub-grade completed (see Figure 2.3, Activities Completed at Record Hill Wind Project).

Record Hill Wind has not yet begun work on the generator lead, project substation, or transmission line upgrade portions of the project. No turbine components or electrical infrastructure have been purchased or delivered to the site. Under Phase 2 beginning in April 2011, all remaining elements of the project would be constructed. Table 2-1 displays the anticipated schedule for the project.

It is estimated that construction of the Section 270 transmission line will take about four to five months to complete. CMP anticipates beginning construction in February 2011 and completing the work in the second half of 2011.

Figure 2-3, Activities Completed at Record Hill Wind Project

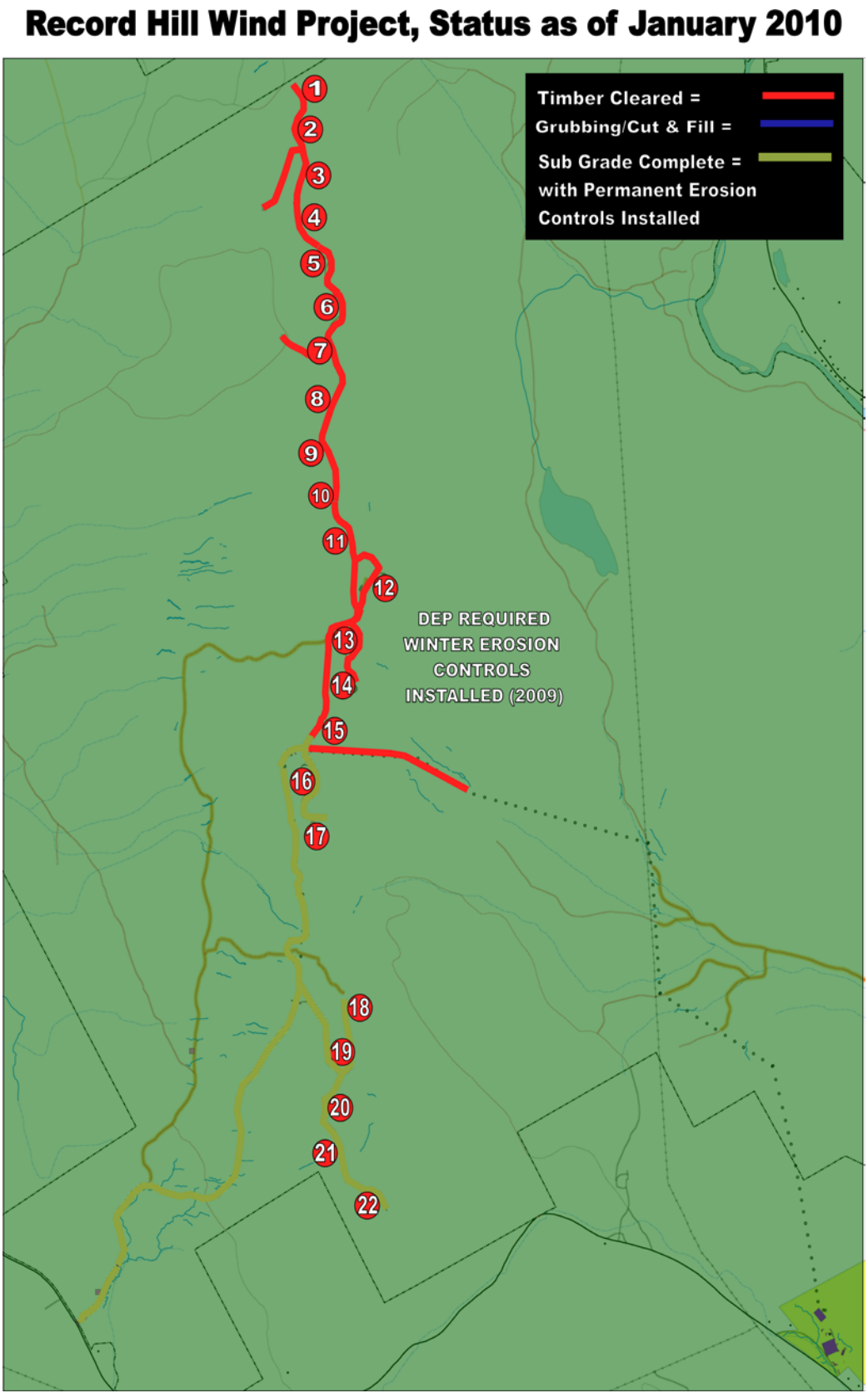

Table 2-1: Construction schedule for the Record Hill project including tasks completed under Phase 1 and tasks scheduled under Phase 2.

Activity	Date Completed	Scheduled Completion
Phase 1		
Marking of sensitive resources	October 2009	
Installation of erosion control	November 2009	
Initial construction of access roads	January 2010	
Phase 2		
Installation of ridgeline electrical collector system		Second Quarter of 2011: April to June
Final grading for access roads and turbine areas		Third Quarter of 2011 July to September
Construction of turbine foundations		Third Quarter of 2011 July to September
Turbine component delivery		Third Quarter of 2011 July to September
Installation of collector system from ridgeline to substation		Third Quarter of 2011 July to September
Construction of collector substation and O&M building		Third Quarter of 2011 July to September
Energization of substation and collector system		Third Quarter of 2011 July to September
Assembly of turbines		Fourth Quarter of 2011 October to December
System testing		Fourth Quarter of 2011 October to December
Start of Commercial operations		Fourth Quarter of 2011 October to December

2.1.4 PERMITS AND AUTHORIZATIONS

The permits and approvals listed below were required before beginning construction of the Record Hill project. Note that the State of Maine has two separate authorities that review development projects in organized versus unorganized areas; therefore, there is some distinction in the regulations and rules that apply to development projects. Because the proposed project is located in an organized town, all details related to State permitting reflect the regulations and rules administered by the Maine Department of Environmental Protection (MDEP). State and federal permits and authorizations are further addressed in Section 3 under the respective affected resources.

State of Maine MDEP Natural Resource Protection Act

The State of Maine MDEP Natural Resource Protection Act (NRPA) [38 M.R.S.A. §§ 480–A et seq.] requires a permit for any activity located in, on, or over any protected natural resource or for any activity located adjacent to a coastal wetland, great pond, river, stream or brook or significant wildlife habitat contained within a freshwater wetland or certain freshwater wetlands. Two types of permits can be issued under the NRPA: an NRPA Tier Permit and an NRPA Permit By Rule (PBR). For this project, three separate NRPA permits were issued. One PBR was issued for activity within the Maine designated critical habitat of a Significant Vernal Pool, a type of significant wildlife habitat. A second PBR was issued for activity within the critical habitat of a Significant Vernal Pool and for four separate stream crossings. These PBR approval numbers are #47468 and #47469, respectively. A Tier 2 NRPA permit, combined with a Site Location and Development Permit (see below) was issued for impacts involving fill within freshwater wetlands

and vegetation removal (conversion) within freshwater wetlands. To date, permitted wetland fill has been completed for construction of the access roads and turbine pads. In addition, at two of the significant vernal pools, permitted impacts have already occurred within the protected portion of the critical terrestrial habitat, which is the area surrounding the actual vernal pool.

State of Maine MDEP Site Location of Development Law

This law [38 M.R.S.A. §§ 481– et seq.] requires review of developments that may have a substantial effect upon the environment. This includes, but is not limited to, developments occupying more than 20 acres, metallic mineral and advanced exploration projects, large structures and subdivisions, and oil terminal facilities. A permit is issued if the project meets applicable standards addressing potential resource impacts such as stormwater management, groundwater protection, infrastructure, wildlife and fisheries, noise, and unusual natural areas. The combined Site Location of Development/NRPA permit number for this project is L-24441-24-A-N/L-24441-TF-B-N. CMP received a Site Location of Development permit and an NRPA permit for the Section 270 transmission line and associated substation: L-24663-24-A-N, L-24663-TF-B-N, and L-24663-VP-C-N.

State of Maine Water Quality Certification following Section 401 of the Federal Water Pollution Control Act

Maine's Stormwater Management Law [38 M.R.S.A. §420-D] provides stormwater standards for projects located in organized areas that include one acre or more of disturbed area. For this project, water quality certification was provided concurrently with the combined Site Location of Development/NRPA permit.

Section 404 of the Federal Clean Water Act

Section 404 of the Clean Water act regulates the discharge of dredge or fill material into waters of the United States, including wetlands. An Individual Permit is required for potentially significant impacts, and a General Permit is issued for projects that would have only minimal adverse effects. In the state of Maine, the US Army Corps of Engineers (Corps) works under a Section 404 Programmatic General Permit (PGP), which was developed in conjunction with state and federal regulatory and review agencies. The purpose of the PGP is to expedite the Corps' review of minimal impact work in coastal and inland waters and wetlands. Activities with minimal impacts as defined in the PGP are either:

- Category 1, Non-reporting, which are projects eligible without screening by the Corps provided necessary state authorization and permits are received; or
- Category 2, Reporting, which are projects that require screening and written determination of eligibility by the Corps after coordination with the U. S. Fish and Wildlife Service (USFWS), the U. S. Environmental Protection Agency (EPA) and the National Marine Fisheries Service (NMFS).

In order for a PGP authorization to be valid, all required state permits and approvals also must be obtained.

For the construction of the wind turbines and associated infrastructure, Record Hill was issued a PGP (Section 404 Permit #NAE-2008-03763). For the Section 270 transmission line upgrade and new electrical substation, CMP was issued a PGP (Section 404 Permit #NAE-2009-1866). These two PGP permits (copies of the permits are in Appendix A) cover all wetland and Waters of the U.S. impacts for the entire project, and NEPA review has been completed by the Corps for these impacts through the Section 404 permitting process.

Federal Aviation Administration Determination of No Hazard to Air Navigation

The Federal Aviation Administration (FAA) conducted an aeronautical study under the provisions of 49 U.S.C. 44718 for the wind turbine structures. Record Hill received Determinations of No Hazard to Air Navigation for the wind turbines under the condition that the structures are marked and lighted in accordance with FAA Advisory Circular 70/7460-1 K Change 2, Obstruction Marking and Lighting. FAA requires that the structures be painted white and be fitted with synchronized red lights.

2.1.5 DECOMMISSIONING

MW-scale wind turbines, including the Siemens SWT-2.3-93 selected for this project, are designed and certified by independent agencies for a minimum expected operational life of 20 years. Record Hill intends to maximize the operational lifespan of the wind turbine generators by employing a proactive maintenance regimen to ensure turbines are in good repair for at least the 20 years of expected life. As the wind turbines approach the anticipated end of life, it is expected that technological advances will economically drive the replacement of existing turbines with newer models.

If decommissioning is required, Record Hill will follow standards set by the MDEP. Currently, these standards dictate that decommissioning will be required if the project has not generated electricity for a period of 12 continuous months, unless the company produces evidence of mitigating circumstances. Such evidence may include delays surrounding long lead time for spare part procurement, or a force majeure event that interrupts the generation of electricity. As used here, a “force majeure” event means instances such as fire, earthquake, flood, tornado, or other acts of God and natural disasters; strikes or labor disputes; war; any law, order, proclamation, regulation, ordinance, action, demand or requirement of any government agency; suspension of operations of all or a portion of the project for routine maintenance, overhaul, upgrade, or reconditioning; or any other act or condition beyond the reasonable control of Record Hill. DOE conducted an independent evaluation of Record Hill’s decommissioning and financing plans and found the plans to be adequate to accomplish decommissioning in the event that it is needed. Decommissioning would be financed and executed by Record Hill as stipulated in the Maine DEP permit. In the event that ownership of the project is transferred to DOE or any other entity, they would be responsible for decommissioning activities.

At decommissioning, the turbines will be dismantled in the reverse of the erection sequence, following standard Best Management Practices (BMPs). Turbine components will be removed from the site and transported to appropriate facilities for reconditioning, salvage, recycling, or disposal. Depending upon the ultimate destination, some components may need to be disassembled on-site to maximize reuse or ensure compliance with applicable disposal regulations.

Decommissioning of the non-turbine aspects of the project will follow MDEP permitting guidelines. Currently, these provisions call for foundations, anchor bolts, rebar, conduit, and other subsurface components to be removed to a minimum of 24 inches below grade. Items not known to be harmful to the environment and that are buried greater than 24 inches below grade may be left in place, at the sole discretion of Record Hill. Once removal is complete, the excavation will be backfilled with material of quality comparable to the immediate surrounding area. Unless specifically requested in writing by the landowner, the disturbed soils of the site will be rehabilitated, including appropriate grading and re-seeding using native grasses.

Following applicable regulations, the project collector system, substation, and interconnection facilities will be removed and salvaged, recycled, or repurposed to the maximum amount economically practical. Any other components will be transported to approved disposal sites. Any trenches or holes that remain after removal will be backfilled, and the surface areas will be restored. Restoration shall include, as reasonably required, leveling, terracing, mulching, and

other necessary steps to prevent soil erosion to ensure establishment of suitable grasses and forbs and to control noxious weeds and pests. Road improvements and stream crossings will not be removed. Improvements to town and county roads that were not removed after construction at the request of the Town or County will remain in place.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the DOE would not issue a loan guarantee for the proposed Record Hill project. Without the DOE loan the final construction and operation of the proposed project would likely be delayed until Record Hill is able to obtain alternative financing, thereby delaying the reduction in air emissions that Record Hill has the potential to provide.

The decision for the DOE's consideration covered by this NEPA review is whether to approve the loan guarantee for the Record Hill project. Record Hill's decision process in selecting the chosen site is described in Section 2.3 and supported by state and federal approvals (see Section 2.1.4). Further, there are no unresolved conflicts concerning alternative uses of available resources associated with the project area that would suggest the need for other alternatives (40 CFR 1508.9(b)).

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED BY THE APPLICANT

2.3.1 SITE SELECTION

Record Hill conducted a site selection analysis to identify the appropriate location for the Project. The project site was selected by Record Hill Wind because it best meets the company's goal of establishing an environmentally acceptable, commercial scale wind energy project in Maine that would deliver inflation-resistant, clean, renewable energy to customers in Maine and New England. Record Hill examined practical alternatives in selecting the site for the project. The objective of this analysis was to select a facility location that would avoid and minimize environmental impacts to the most practicable extent. The factors included in this analysis were wind quality, proximity to transmission infrastructure, general site topography and accessibility, land use compatibility, and overall environmental impacts. Initially, over 20 sites were screened. The geographic scope of this survey covered the entire State of Maine, although the survey focused principally on portions of Maine south of Aroostook County because of the extreme transmission capacity limits in northern Maine. Some wind energy developments in Maine have involved the construction of over 20 miles of new transmission lines, the cost and environmental impact of which Record Hill sought to avoid. Roxbury is one of the few places in Maine where robust infrastructure meets strong wind characteristics. The project site has the benefit of an existing CMP-owned transmission line that passes through the project area and heads south to a nearby power distribution center. As a result, only an approximately 2.9-mile electrical generator lead will be required to connect to a CMP substation.

2.3.2 ALTERNATIVE SITE LAYOUTS

2.3.2.1 Turbine Siting

Record Hill determined the optimum configuration for the turbine layout based on met data collected in the project area and on an analysis of the wind resources in the area. Wind turbines were sited where they would produce the most energy based upon the wind resources and topography, and where possible avoiding impacts to sensitive resources such as wetlands and streams. An area much larger than was needed (approximately 1,568 acres on the project ridgelines) for the proposed development was surveyed to identify wetland and stream resources, which allowed much of this avoidance to occur early in the project planning phase. The general layout of the turbines changed little during the conceptual development of the project, although some turbines were shifted to reduce natural resource impacts. For example, the five northern

most turbine pads were shifted to reduce impacts to a wetland and its associated vernal pool. The access road design was altered during the course of planning. Initially the project access road followed Mine Notch Road and then split into two distinct segments, one to Record Hill and Flathead Mountain and one to Partridge Peak. This design alternative required seven stream crossings, required cutting over two miles of new road, and passed immediately adjacent to a complex of high functioning vernal pools. The selected design required only one perennial and three intermittent stream crossings, reduced the length of new road needed and does not impact any significant vernal pools.

The locations of the project collector substation and O&M building changed from initial to final design. Originally the project collector substation was going to be located adjacent to Bunker Pond Road to the east of the project ridgelines and the O&M building was going to be located northwest of Mine Notch Road near the intersection with Route 120. Under the final design a single parcel was selected where the project collector substation, project O&M building, project office, and CMP substation would all be located. This design change avoided impacts to vernal pool critical terrestrial habitat that would have been associated with the original O&M building location. The relocation of the project collector substation also necessitated a change in the electrical collector system. Four potential routes that would extend from the down-mountain side of the project ridgelines to the collector substation location were selected for investigation. Each of these routes was co-located with an existing CMP-owned transmission line for a distance before diverging. Two of the routes were eliminated from consideration because of potential impacts to natural resources and/or construction constraints. Of the remaining two corridors, Record Hill chose the alternative where wetland fill impacts associated with pole placement could be avoided.

2.3.2.2 Transmission Line Corridor

CMP considered two possible transmission alternatives. One alternative involved establishing a new 100-foot wide corridor (i.e., greenfield line). The second alternative involved expanding the width of the existing corridor from 100 feet to 150 feet. Developing a greenfield line would have required obtaining rights to the necessary transmission line right-of-way, and then designing and constructing the new line. Because a greenfield line would create a new corridor in the landscape, it likely would have changed existing habitats and land uses, and would have altered wetlands, streams and other sensitive resources not otherwise impacted by this or similar development. The chosen alternative will be an expansion of an existing transmission line corridor. The amount of clearing required will be less than for a new corridor and impacts to natural resources will, for the most part, affect resources already altered for the existing corridor. In addition, the existing Section 59 line that parallels the new transmission line will be removed thereby allowing for future improvements/expansions without having to construct a new corridor. The cost of constructing a new line would have been significantly more, would have taken more time, and would have resulted in greater impacts to protected natural resources. Therefore, the greenfield line alternative was determined to be the less desirable alternative both from an economic perspective and from an environmental perspective.

CMP considered and evaluated two principal options for the substation:

- Expand the existing Frye Substation; or
- Build a new substation at a different location.

The existing Frye Substation has the capacity to serve the three existing 34.5 kV transmission lines (section 52, 54, and 59), but does not have room for expansion within the developed fenced footprint due to the surrounding topographic conditions (step slopes) and proximity to the existing road. Topographic conditions at the Frye Substation would require extensive excavation, blasting, and removal of soil and rock. Combined with extensive fill and grading requirements, these conditions make expansion of this site expensive and impractical. Expansion would have required filling a minimum of approximately 0.2 acre of wetlands and one stream. For these two

reasons CMP eliminated this alternative from consideration and chose to review options for building a new substation.

Four potential sites were assessed to select the location for the new substation, known as the "Roxbury Substation."

1. Bunker Pond Road site;
2. Bayroot/Wagner site;
3. Sutton parcel, Lot 2-42; and
4. Haseltine parcel, Lot 12-18.

The Bunker Pond Road site is located on Bunker Pond Road approximately two miles north of Frye Crossover Road, the nearest paved road. Because of its proximity to the project generator facility, the Bunker Pond Road site initially was considered a good candidate site; however, limitation on site access, security, and operation and maintenance eliminated it from further consideration. Three existing bridges on Bunker Pond Road were inspected during the site evaluation and abutments on each bridge appeared unable to support crossings by oversized vehicles. CMP also determined that access along Bunker Pond Road would be limited from fall to early spring because of the distance to the nearest paved road, which negatively affected maintenance and security of the substation.

The Bayroot/Wagner site is located on the west side of Bunker Pond Road approximately one-half mile north of the Frye Crossing Road. Only one of the three bridges referenced above would need to be crossed to reach the site, but the condition of the bridge would affect access by oversized vehicles. In addition, topography of this site is steep and it includes several wetlands, streams and potential vernal pool habitats. The steep site topography would have necessitated significant blasting, filling and grading, which would make developing the site cost prohibitive. Finally, a longer crossover line from the substation to Section 270 would be required, which would include additional wetland clearing and crossings. Because issues related to access, cost for site development, and impacts to natural resources, this site was eliminated from further consideration.

The Sutton parcel, Lot 2-42, is located northwest of the existing Frye Substation. The Sutton parcel contains several wetlands and a coldwater stream. Development of this site would involve wetland fill, and either direct impacts to the stream and its buffer, or a bridge crossing with some permanent conversion. For these reasons the parcel was eliminated from further consideration.

The Haseltine parcel, Lot 12-18, the chosen substation location, is located on Route 120 on the same parcel as the project collector substation, office and O&M building. The parcel includes a single family home with outbuildings and open lawns as well as wetlands and streams. Development for the substation will not involve any direct wetland or stream impacts, and the crossover line to Section 270 will require only one stream crossing and some clearing along a small tributary stream. Site access, security, and operation and maintenance associated with this site are all acceptable, and impacts to natural resources are less than the other evaluated sites, therefore it was selected by CMP.

CHAPTER 3.0: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes the existing physical, biological, and socioeconomic conditions of the project area and the potential environmental effects that could result from implementation of the proposed action or No Action Alternative described in Chapter 2. A discussion of potential cumulative effects also is provided in this Chapter.

3.2 CLIMATE

3.2.1 REGULATORY FRAMEWORK

In 2004, the Maine State Legislature enacted legislation designed to encourage low-emission power production facilities. The Electric Restructuring Act includes a renewable portfolio standard, which requires retail power suppliers to include 30 percent of renewable or efficient sources in their portfolios. In 2007, the Legislature enacted an Act to Stimulate Demand for Renewable Energy, which added the requirement that retail power suppliers include certain percentages of new renewable resources. The requirement begins with 1 percent in 2008 and increases by 1 percent per year to 10 percent in 2017 (Maine Public Utilities Commission 2005, 2008). Through this legislation, Maine's goal was to return greenhouse gases to 1990 levels by 2010 and reduce these levels by an additional 10 percent by 2020. To achieve this goal, the combined legislation was intended to foster an environment conducive to development and use of an energy portfolio that includes more environmentally favorable sources and to encourage development of such sources by requiring suppliers to include this power in their portfolios. Additional legislation passed in 2009, the Act Regarding Maine's Energy Future, P.L. 2009, ch. 372 (M.R.S.A. 35-A Chapter 97), furthered the intent to reduce greenhouse gases by setting a goal to cut consumption of liquid fossil fuels by 30 percent by 2030.

In 2008, the Maine Legislature made a significant statement of its preference and desire to attract wind power in the State through its adoption of recommendations of the wind power task force. This emergency legislation, An Act to Implement the Recommendations of the Governor's Task Force in Wind Power Development, P.L. 2007, ch. 661 (M.R.S.A. 35-A Chapter 34), referred to loosely as the "Maine Wind Energy Act" (the Act), mandated the State to "take every reasonable action to encourage the attraction of appropriately sited development related to wind development" and includes measures designed to streamline and standardize the regulatory process for wind farm development. It was deemed to be "immediately necessary for the preservation of the public peace, health and safety." (M.R.S.A. 35-A Chapter 34). The Act goes further to state that the encouragement of wind energy may displace power generation through fossil fuels and thus "improve environmental quality (M.R.S.A. 35-A Chapter 34)." In addition to specific provisions governing the permitting of wind power in Maine, the Act establishes a goal of developing at least 2,000 MW of installed wind power capacity in Maine by 2015, and 3,000 MW of installed capacity by 2020. Currently, there is 99 MW of installed commercial wind power capacity operating in Maine, although there is an additional 208 MW of wind power capacity that has been permitted and is currently under construction.

3.2.2 PROJECT SETTING

Maine has been characterized as having 15 biophysical regions (also known as ecoregions) based upon common climatic conditions, surficial geology and soils, and woody vegetation (McMahon 1990). The Record Hill project area lies within the Western Mountains Region. The Western Mountain Region is characterized by cool summer temperatures, low annual precipitation, and high snowfall. This region has an average maximum July temperature of 75° F, which is lower than the rest of the state with the exception of one coastal region. The region's

average minimum temperature in January is -1° F, which is comparable to that of northern Maine (McMahon 1990). The average annual precipitation is generally low at 39 inches, although some of the higher mountains produce a rain shadow effect with precipitation as high as 50 inches on windward slopes and less than 35 inches on the leeward side. The average annual snowfall in the Western Mountain Region is 110 inches (McMahon 1990).

3.2.3 POTENTIAL IMPACTS OF THE PROPOSED ACTION

The proposed Record Hill project does not have the potential to affect regional temperatures, rainfall, or other meteorological parameters. The wind turbines used for the project would extract some energy from winds passing over the ridgelines, but any changes in wind speed and/or velocity are expected to be limited and should not affect existing uses of the surrounding area.

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) stated that warming of Earth's climate system is unequivocal, and that warming is very likely due to anthropogenic greenhouse gas concentrations (IPCC 2007). DOE is not aware of any methods to correlate exclusively the carbon dioxide emissions resulting from the proposed project to any specific impact to global warming; however, studies such as the IPCC report support the premise that carbon dioxide emissions from the project, together with global greenhouse gas emissions, would likely result in a cumulative impact to global warming. Although the project would result in some greenhouse gases emissions and related climate change when combined with other projects globally through the emissions described in Section 3.6.2, greenhouse gas emissions from the project would be minimal and limited to increases in carbon dioxide and nitrogen oxides, with overall beneficial impacts from low pollution wind energy.

In 2009, approximately 70 percent of New England's installed generator capacity was fossil fuel-based (i.e., natural gas, oil and coal), and only about 14 percent of electricity was generated by renewable resources such as hydro-and wind-power (ISO New England 2009). The actual generation of electricity in 2008 utilized fossil fuels for approximately 57 percent of the electrical energy produced. In the past decade, Maine and New England have set statewide and regional goals and policies designed to address greenhouse gas emission concerns. The primary policy designed to address these concerns is the Regional Greenhouse Gas Initiative (RGGI). The RGGI is designed to help cap and control carbon dioxide emissions from power production facilities without increasing the energy cost passed onto consumers. The RGGI meets these goals by setting a cap on total emissions. Unlike fossil fuel-based power production facilities, wind power projects can provide power without any carbon dioxide emissions, or acid-rain producing sulfur dioxide, and therefore provide a means for meeting increasing energy demands consistent with the goals and objectives of the RGGI.

The proposed Record Hill project is expected to have a beneficial impact on the climate by decreasing fossil fuel consumption and decreasing emissions of greenhouse gases. Over the estimated projected life, Record Hill expects the proposed wind energy facility to produce approximately 2.3 million megawatt-hours of electricity under peak conditions. Assuming that this capacity displaces electricity produced by conventional power plants and combined-heat-and-power plants, Record Hill estimates that the proposed development would reduce greenhouse gasses (carbon dioxide and nitrogen oxides) and other air pollutants (sulfur dioxide) on an annual basis by approximately: 58,710 tons of carbon dioxide; 97 tons of sulfur dioxide; and 82 tons of nitrogen oxides. Table 3-1 displays the emissions that would result from the Record Hill project.

Table 3-1 Lifetime (25-year) Carbon Dioxide Equivalent Emissions from Construction, Operation, and Transportation

Activity	Lifetime Carbon Dioxide Equivalent (CO_2e) Emissions.				
	Type (Unit)	Quantity (units)	lb CO_2e per unit	Total (lb)	Total (tonnes)
Transportation	Diesel Fuel	8,008	22.33	178.819	81

	(Gallons)				
Support Vehicles	Diesel Fuel (Gallons)	2,669	22.33	59,606	27
Construction – Utilities	Electricity (MWh)	40	1,004	40,160	18
Construction Vehicles	Fuel (Gallon)	135,000	22.33	3,014,550	1,367
Operations – Utilities	Electricity (MWh)	1,200	N/A	N/A	N/A
Maintenance Fleet	Fuel (Gallon)	14,600	17.56	256,318	116
Total CO_2e Emissions				**3,549,453**	**1,609**

3.2.3 POTENTIAL IMPACTS OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.3 TOPOGRAPHY

3.3.1 PROJECT SETTING

The Record Hill project area is located within the Western Mountains Region of Maine, which extends from Bald Mountain near the Canadian border, to the Mahoosuc Range in southwestern Maine (McMahon 1990). This region includes the Boundary Mountains in the northern portion of the region and the Longfellow Mountains in the southern portion of the region. Located between these mountains are large lakes, including Lake Umbagog, Upper and Lower Richardson lakes, Rangely, Lake and Flagstaff Lake. Topography in this region averages between 1,000 feet to 2,000 feet (305 to 610 meters).

The project area ridgelines, which include Record Hill, Flathead Mountain and Partridge Peak, range in elevation from 1,900 ft to 2,400 feet (580 to 731 meters) above mean sea level (AMSL), while the bases of the mountains are at elevations of approximately 800 feet (244 meters) to the west along Ellis Pond and 700 feet (213 meters) to the east along the Swift River. The actual peak of Record Hill, which is located north of the project area, is approximately 2,410 feet (732 meters) in elevation. The portion of Record Hill within the project area reaches 2,000 (+/-) feet (610 meters) at its highest point. The peak of Flathead Mountain occurs at approximately 2,155 feet (657 meters) and Partridge Peak at approximately 1,985 feet (605 meter) in elevation. The Record Hill ridgeline within the project area forms a relatively flat and broad plateau that rises gradually south to Flathead Mountain. The ridgeline of Flathead Mountain has a narrower plateau that slopes south to Mine Notch, a topographic drainage that extends east from the project ridgeline. Partridge Peak rises south from Mine Notch and forms a short plateau before descending south toward Route 120 (also known as Roxbury Road). Topography of Record Hill and Flathead Mountain generally slopes gradually west, but descends more steeply to the east. In contrast, topography of Partridge Peak slopes more gradually to the east and drops steeply to the west and south. Based upon the site specific soil surveys, slope gradient ranges on the ridgelines included areas from 0-3 percent slope to areas of more than 20 percent slope.

Slope gradient ranges for the property where the project office, O&M building, and collector substation would be located include areas from 0-3 percent slope to areas of more than 15 percent slope. However, proposed buildings/facilities would be located in areas that are relatively flat. This site occurs at an elevation of approximately 700 feet (213 meters).

Topography along the proposed Section 270 is variable ranging from relatively flat immediately north of Isthmus Road to relatively steep along the outer edges of North Twin and South Twin mountains.

3.3.2 POTENTIAL IMPACTS OF THE PROPOSED ACTION

Construction of the turbine pads and access roads on the project ridgelines would require changes in the existing topography including both cuts and fills depending upon site conditions. Work on constructing access roads began in the fall of 2009. During this initial phase of construction, the sub-grade was completed along about 3.7 of the 6.1 miles of proposed access roads. This work as well as future construction of these project components would cause minor alteration of local topography, but would not alter major topographic features. Therefore, the project is not expected to significantly alter the site's natural topography.

Site grading would be required to construct the project O&M building and collector; however because of the relatively flat topography that exist changes in topography should be limited. For the construction of the Section 270 transmission line, it is unlikely that extensive grading would be required. Grading may be required for stabilizing access roads, excavation sites, and pull-pad sites where terrain is uneven such that construction equipment access would not be safe without grading. Conductor pull-pad setup locations may require leveling in an approximately 100-foot by 75-foot area to assure equipment stability.

3.3.3 POTENTIAL IMPACTS OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.4 GEOLOGY, SOILS AND GEOLOGIC HAZARDS

3.4.1 REGULATORY FRAMEWORK

Geologic resources and hazards are governed primarily by state and local jurisdictions. Seismic hazards are addressed by state and local requirements for identifying and avoiding faults when considering new development.

Maine Public Law 2003, Chapter 580: Maine Model Building Code
In 2004, the Maine Model Building Code (MMBC) was adopted under Maine Public Law 2003, Chapter 580. Under this law, if towns, cities and municipalities in Maine choose to adopt a residential building code or non-residential building code, it must be the MMBC. Adoption of the MMBC is a voluntary decision and is not required as part of this law. The MMBC is composed of the International Residential Code and the International Building Code, and within these codes are standards related to seismic design.

MDEP Site Location of Development statute (38 M.R.S.A. § 484 et seq)
The MDEP Site Location of Development statute (38 M.R.S.A § 484 et seq) does not specifically address geology and seismicity except as these relate specifically to metallic mineral mining or advanced exploration activity. The standards of this statute do require that any proposed development be constructed on suitable soils.

3.4.2 PROJECT SETTING

In the Western Mountain Region of Maine the underlying bedrock is variable and complex with numerous intrusions of igneous rock (plutons) of differing ages and composition. At elevations above 2,500 feet, soils are generally cold, acidic, and well-drained. Mineral soils are derived from mica schist and phyllite with some granite and gneiss. There also are some areas of thin organic soil present. Soils at mid-slope are typically deep, somewhat poorly drained coarse loamy sands. Valleys tend to include ice-contact glaciofluvial deposits and stream alluvium.

According to site-specific soil surveys conducted for the project, the ridgeline portion of the project area generally consists of glaciated uplands with areas that are shallow to bedrock and well to excessively well drained at the highest elevation. The side slopes consist of shallow to bedrock areas and include areas of moderately well drained to somewhat poorly drained soils in locations. Soil series encountered during the survey included Becket, Brayton-Peacham Association, Dixfield-Colonel Complex, Dixfield-Marlow Association, Hermon-Monadnock, Lyman-Turnbridge Complex, Lyman-Turnbridge-Becket Complex, Lyman-Turnbridge-Monadnock Complex, Lyman-Turnbridge-Skerry Complex, Mahoosuc, Naskeag, Naumburg, Ricker, Skerry, and Skerry-Colonel Association.

For the property where the project office, O&M building, collector substation, and CMP substation would be located, soil series included Colton, Lyme, Lyman, Naskeag, Skerry, Turnbridge with some Udorthents (fill) and Rock Outcrops (Statewide Surveys, Inc. 2009) . These soils were of variable depths and ranged from “very deep” (>60” over bedrock) to “shallow” (<10 to 20” over bedrock), and drainage classes ranged from somewhat excessively drained to poorly drained. The results of the Class B High Intensity Soil Survey conducted for this site can be found in Section 11 of the MDEP NRPA-Site Location Supplement (July 2009) that was submitted for this project.

Maine is located near the middle of the North American tectonic plate (Maine Geological Survey 2008). Although there are numerous old faults present in the rocks of New England, seismologists have not found a correlation between these old faults and modern day earthquakes (Maine Geological Survey 2008). None of the historic faults in Maine have been identified as active. For many of these faults, there has been no significant motion since about 20,000 years ago, and some appear to have been inactive since the formation of the Appalachian Mountains over 300,000,000 years ago (Maine Geological Survey 2008). In Maine, there is a low but steady occurrence of earthquakes. These earthquakes are typically of small magnitude and are often too small to be felt. Based upon current records, no earthquake in Maine has caused significant damage, and the largest accurately recorded earthquake had a Richter magnitude of 4.8. Based upon available data, there does not appear to be a notable geologic hazard present in the project area.

For the Section 270 transmission line, soil series include Croghan, Hermon, Monadnock, Rumney and Skerry as well as multiple associations and complexes (Refer to the Maine Site Location of Development Act permit application submitted for the Section 270 Transmission Line Upgrade). Many of these soils are characterized as potentially highly erodible or highly erodible, with drainage classes ranging from somewhat excessively drained to poorly drained.

3.4.3 Potential Impacts of the Proposed Action

Because there are no active fault lines in Maine and recorded earthquakes have produced only minimal damage, there is no significant geological or seismic risk associated with the proposed project. High Intensity Soils Surveys conducted for the project indicated that soils are generally appropriate for the proposed construction activities, and any limitation related to soils can be compensated for using standard engineering practices. During construction ground vibration resulting from blasting for turbine foundations, roads and underground power line trenches would conform to U.S. Bureau of Mines Report of Investigations 8501 [U.S. Department of Interior Rules 816.61-68 and 81 7.61-68, and the Blasting Guidance Manual, Office of Surface Mining, Reclamation and Enforcement, U.S. Department of Interior], standards to limit vibrations at inhabitable structures in the area.

An Erosion and Sedimentation Control Plan was developed for the project based upon the *Maine Erosion and Sediment Control BMPS Manual (MDEP 2003)*. This plan defines the various erosion control measures to be employed, when and where these measures should be installed, how they are to be maintained, and when they are to be removed. Details include, but are not limited to, the following:

- Install erosion control measures (i.e., silt fence, straw bales, erosion control mix berm) prior to soil disturbance.
- Conduct weekly inspection of the site until surfaces are stabilized.
- Complete visual inspections of erosion control measures as needed, including after each rainfall event and prior to predicted rainfall events expected to exceed one inch.
- Treat, re-vegetate or otherwise stabilize all areas not under active construction.
- Protect all soil stockpiles expected to remain for more than 15 days from potential erosion using hay bales or other appropriate measures.
- Remove hay bales and silt fencing once up-stream areas are stabilized. This includes removal or redistribution of all sediment trapped by these measures in a manner that would not result in erosion to adjacent areas.

CMP has developed standard manual, Environmental Guidelines *for Construction and Maintenance Activities on Transmission line and Substation Projects,* that it uses as a routine part of all transmission and substation projects. The manual is largely based on *Maine Erosion and Sediment Control BMPS Manual* (MDEP 2003), and Chapter 500, Stormwater Management. It contains erosion and sedimentation control requirements, standards, and methods that would be used to protect soil and water resources during construction of the substation and Section 270 transmission line.

3.4.4 POTENTIAL IMPACTS OF NO ACTION ALTERNATIVE

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.5 WATER RESOURCES

3.5.1 REGULATORY FRAMEWORK

3.5.1.1 Applicable Federal Plans, Policies, and Regulations

The Clean Water Act, as amended (33 USC §1251 et seq.), regulates surface water quality in Waters of the Unites States. The CWA gave the EPA authority to set standards for discharge of point source pollutants, as well as set water quality standards for all contaminants in surface waters. The EPA publishes surface water quality standards and toxic pollutant criteria at 40 CFR Part 131. Under Section 404 of the CWA, entities, including federal agencies, must apply for and receive a permit from the Corps to conduct dredge or fill activities within waters of the U.S. Under Executive Order 11990, Protection of Wetlands, all federal agencies are directed to the extent practicable to avoid adverse impacts associated with the destruction or modification of wetlands. Similarly under Executive Order 11988, Floodplain Management and Protection, federal agencies are required to evaluate potential effects of any project conducted within a floodplain. This includes, where possible, avoiding activity within a floodplain and avoiding and minimizing adverse impacts for projects sited within a floodplain. In addition, DOE's wetland and floodplain review requirements outlined in 10 CFR Parts 1021 and 1022 ensure that the requirements of the Executive Orders are implemented.

The CWA mandates water quality-based control measures. Water quality standards define the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect waterbodies from pollutants (EPA 2008). Water quality standards are set by states, territories and authorized tribes. Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop lists of impaired waters that do not meet water quality standards and establish total daily maximum loads (TDML) for specific pollutants.

The Wild and Scenic Rivers Act (16 USC 1271 et seq.) was created to identify and preserve rivers that possess outstanding scenic, recreational, geological, fish and wildlife, historic, and cultural attributes. Rivers designated under this Act are protected to enhance the value for which they were designated. In Maine only the Allagash River is designated under this Act. The Allagash River is located approximately 120 miles northeast of the proposed project and is not expected to be impacted.

3.5.1.2 State Water Quality Standards

The MDEP Bureau of Water Quality is responsible for the regulation of activities that may affect the quality of state waters (38 M.R.S.A. § 464).

3.5.2 PROJECT SETTING – SURFACE WATER AND WETLANDS

Seventy-seven small intermittent and perennial streams were identified within the ridgeline portion of the project area and along the electrical generator lead. See Appendix A for maps. Those streams on the western side of the ridge are part of the Ellis Pond watershed, and those on the eastern portion of the ridge are part of the Swift River watershed. Five streams occur on the property that would include the O&M building, project office and collector substation.

There are approximately 245 delineated jurisdictional wetlands (see Appendix A) on the ridgeline, including those wetlands within the down-mountain electrical generator lead, proposed electrical line corridor that would extend from a point near the summit of Flathead Mountain down its eastern slope. Wetlands on the ridgeline include primarily forested, scrub-shrub, and emergent wetlands. These wetlands are generally small and in most cases have been altered by activities associated with timber harvesting. In general, the scrub-shrub and emergent wetlands are previously forested areas where the canopy was removed during timber harvesting. In the forested wetlands, commonly occurring tree species include yellow birch, balsam fir, red maple, green ash, northern white cedar, and eastern hemlock. The shrub layer consists primarily of these same tree species with a limited presence of shrub species such as hobblebush, witherod, and winterberry. Commonly occurring herbaceous species include cinnamon fern, evergreen wood fern, sensitive fern, northeastern mannagrass, fowl mannagrass, and fringed sedge.

Scrub-shrub wetlands are present in scattered locations throughout the project area and often appear in conjunction with either forested or emergent wetland communities. The shrub layer is dominated by tree species such as red maple, yellow birch, gray birch, and striped maple. Red raspberry, a common early successional species, also is present in many of these wetlands. The herbaceous layer includes species such as sensitive fern, cinnamon fern, rough-stemmed goldenrod, fowl mannagrass, northeastern mannagrass, bluejoint and swamp dewberry. The emergent wetlands, which are common throughout the project area, are typically referred to as wet meadows. Wet meadows are dominated by herbaceous species that are adapted to saturated soil conditions but not adapted to long periods of inundations as would be common in marsh habitats. The emergent wetlands within the project area are typically dominated by herbaceous species such as wool-grass, fowl mannagrass, bluejoint, sallow sedge, fringed sedge, pointed broom sedge, sensitive fern, jewelweed, and rough-stemmed goldenrod. These wetlands also support red raspberry, steeple-bush, and seedlings of the tree species mentioned above.

Surveys conducted on the ridgeline and at the property where the project facilities would be located identified a total of 32 vernal pools. Of these pools, 14 were man-made and occurred within either a roadside ditch or a rut created by heavy equipment. The remaining 18 pools were naturally occurring and supported breeding activity by wood frogs and/or spotted salamanders. Five pools met the criteria to be considered significant vernal pools based upon the level of amphibian breeding activity.

The property where the O&M building, project office, collector substation, and CMP substation would be located includes areas of forested and shrub uplands, as well as areas of upland field/maintained lawn. Wetlands present on this property included forested, scrub-shrub, and emergent communities. Vegetation species present in both uplands and wetland are the same as those identified on the ridgeline. There are seven delineated wetlands on the property where the project facilities would be located. These wetlands are generally small in size and have been altered by existing residential development and associated land management (i.e., mowing).

Seventy one wetlands were identified within the existing transmission line corridor, and the adjacent Section 270 expansion area. Forty small intermittent and perennial streams were identified within the Section 270 transmission line corridor, including two of the five streams present on the project O&M building, office and collector substation. Three of the perennial streams are named resources: Bean Brook, Scotty Brook, and Goff Brook. Surveys conducted along the proposed Section 270 identified one significant vernal pool and associated critical terrestrial habitat (forested wetlands and upland areas).

3.5.2.1 Potential Impacts of the Proposed Action

Construction Phase

Clearing and grading during project construction could temporarily expose soil to erosive forces such as rain and surface runoff, which could affect water quality of wetlands and other surface waters in the project area. Common impacts to water quality could include nutrient loading with sediments that could alter water quality, and small petrochemical spills and leaks from construction equipment. Wetlands and other surface waters adjacent to clearing and grading would be at a higher risk from these potential impacts. To protect water quality during construction, an Erosion and Sedimentation Control Plan was developed for the project. This plan was developed following the *Maine Erosion and Sediment Control BMPS Manual* (MDEP 2003). This plan defines the various erosion control measures to be employed, when and where these measures should be installed, how they are to be maintained, and when they are to be removed. Erosion control details are included on the final construction plans to aid the construction contractor. In addition, the project would employee a third party inspector to monitor compliance with permit conditions during construction including ensuring that the implementation of the Erosion and Sedimentation Control Plan.

Wind Turbines and Associated Infrastructure

There are approximately 245 delineated wetlands in the ridgeline project area, including those wetlands within the down-mountain electrical generator lead, and there are 7 delineated wetlands on the property where the project facilities would be located. To avoid wetland impacts, a large area was delineated (approximately 1,568 acres on the project ridgelines) so that to the extent practicable, the project could be designed around existing resources. A total of 17 wetlands, 15 on the ridgeline and 2 at the project facilities location, would be directly impacted by fill. See Appendix A for maps. The areas of the individual fills range from approximately 40 square feet to 3,600 square feet, and the total area of permanent wetland fill is approximately 13,364 square feet. These impacts include a few scattered fills associated with the access road and fills associated with five turbines and the O&M building. Impacts would occur as a result of upgrades to the existing access road, as well as construction of new access roads. Existing roads were utilized where practicable. Where new roads were necessary, large higher functioning wetlands were avoided. The unavoidable impacts generally affect small, isolated, and relatively low-functioning resources. Similarly, impacts associated with the turbines also affect small, low-functioning wetlands. The wetlands that are filled would have a reduced functional capacity, but on a landscape level, there should not be a significant change in wetland functions or values. To date, approximately 10,689 square feet of permitted wetland fill has been completed for construction of the access roads and turbine pads.

Impacts to wetlands along the proposed collector lines corridor and generator lead would consist primarily of a change in cover type. There would be approximately 30,172 square feet of vegetation clearing within wetlands. No permanent fill would occur within wetlands in association with the poles. The primary cover change would result from clearing forested wetlands. In time, these forested wetlands would convert to an early successional stage scrub-shrub wetland. This cover type change would not significantly change the overall functions and values of the impacted wetlands, with the exception of a change in wildlife habitat. Other wetlands that would be crossed by the collector lines are either scrub-shrub or emergent, so there should be no change in cover type. In general, there should be only limited change in the functions provided by these wetlands.

One perennial stream and three intermittent streams would be crossed by the new portion of the access road which would impact 392 square feet of streams as a result of culvert installations. The other streams within the project area were avoided in an effort to minimize impacts. Impacts to streams along the proposed electrical generator lead would be minimal. The generator lead would cross one intermittent stream and six small perennial streams, and as a result, there would be clearing of vegetation at these points. The clearing, however, should not impact the overall character of the streams. There also would be a temporary bridge crossing of one of the perennial streams to allow for construction access. A minimum 75-foot buffer would be established on each side of the perennial streams crossed by the electrical generator lead and those adjacent to new access roads.

As previously mentioned, Record Hill was issued a PGP (Section 404 Corps Permit #NAE-2008-03763) for the wetland and stream impacts described above that would result from the construction of the wind turbines and associated infrastructure. Mitigation required as part of permitting these impacts consists of In-Lieu-Fee Mitigation where Record Hill will pay $15,025.66 to the Natural Resource Mitigation Fund. The Corps has satisfied its NEPA requirements through the Section 404 permitting process.

The project avoided direct impacts to all of the identified vernal pools, including the significant vernal pools. At two of the significant vernal pools, permitted impacts have already occurred within the protected portion of the critical terrestrial habitat, which is the area surrounding the actual vernal pool. At one of these significant vernal pools, the impact to the critical terrestrial habitat was *de minimus* and was associated with the upgrade of Mine Notch Road. At the second significant vernal pool, approximately 18 percent of the critical terrestrial habitat was altered to construct the ridgeline access road and one of the turbine pads. In their review of the project, the MDIFW found that based upon the established purpose of the project, the proposed design represents the least environmentally damaging alternative and that the project would not "*degrade any significant wildlife habitat, unreasonably disturb the subject wildlife*, or *unreasonably affect use of the site by the subject wildlife…*"

Section 270 Transmission Line and Substation

Construction of the Section 270 transmission line would involve 200 square feet of permanent wetland fill affecting two wetlands. Wetland 59-133-1, a wet meadow, would be impacted by the installation of new Pole 112 and its associated guy wire anchors. Wetland 59-112-1, also a wet meadow, would be impacted for the installation of guy wire anchors for Pole 95. Placement of all other poles would avoid direct wetland impacts. Construction also would involve temporary wetland fill to allow access for construction vehicles. This would be accomplished using construction mats of either fiberglass composite or timber composition. An estimate of 4,300 square feet (0.01 acres) of temporary impacts would occur from the use of construction mats. In addition to permanent and temporary fill placement, expanding the width of the existing transmission line corridor would require the conversion of 35 to 50 feet of forested areas to shrub and herbaceous communities along the length of the corridor. An estimated 36,025 square feet (0.83 acres) of forested wetlands would be converted to shrub and/or herbaceous communities. The wet meadow communities impacted by the permanent fill would have a slight reduction in their functional capacity and those wetlands impacted by temporary fill would have a short-term

change in their functional capacity. In general, there should be only limited change in the functions provided those forested wetlands that undergo conversion.

Thirty-two streams would be crossed using temporary bridges made of construction mats. At these temporary bridges, supporting mats would not be placed below the normal high water and would not impact the stream banks. This technique allows water to flow freely under the temporary crossings and limits adverse effects to the streams. Crossings of Bean Brook and Scotty Brook would be accomplished using existing permanent bridges or crossings of these streams would be avoided. After construction, vegetation management within the corridor would maintain a 100-foot buffer on six of the perennial streams identified within the corridor and a 50-foot buffer on each of the other streams (Refer to NRPA/Site Location permit issued for the Section 270 Line Upgrade). Within this buffer, only capable tree species would be removed and all other vegetation would remain uncut.

The MDEP determined that the design of the Section 270 line and associated substation avoided and minimized wetland impacts to the greatest extent practicable, and that it represents the least environmentally damaging alternative that meets the overall purpose. The Maine designated critical terrestrial habitat associated with the SVP along Section 270 would be impacted under the proposed action. Approximately 7,248 square feet of forested wetlands and 13,404 square feet of forested uplands, totaling 20,652 square feet of critical terrestrial habitat would be cleared. Mitigation required as part of permitting these impacts consists of In-Lieu-Fee Mitigation, where CMP will pay $104,110.16 to the Natural Resources Mitigation Fund.

As previously mentioned, CMP was issued a PGP (Section 404 Corps Permit #NAE-2009-1866) for the wetland impacts described above that would result from the construction of the Section 270 transmission line and substation. Mitigation required as part of permitting these impacts consists of In-Lieu-Fee Mitigation where CMP will pay $119,130.71 to the Natural Resource Mitigation Fund. The Corps has satisfied its NEPA requirements through the Section 404 permitting process.

Operation Phase

During project operations, storm water discharges from new impervious surfaces and other developed areas could convey storm water with low levels of pollutants to adjacent wetlands and other surface waters. Typical pollutants could include sediment, petrochemicals, and heavy metals. The proposed project would include approximately 18.4 acres of new impervious area and 18.8 acres of new developed areas, in addition to 0.7 acres of developed area in the form of existing logging roads. As part of the MDEP Site Location of Development (38 M.R.S.A. §§ 481–490) permit, Record Hill developed a comprehensive stormwater management and control plan for the project ridgeline. This plan was developed in conjunction with concurrent filing of a Notice of Intent (NOI) for coverage under the Maine Construction General Permit. In general, the stormwater control plan is designed to minimize the concentration of stormwater flows off the project site. The primary components of the plan include minimizing the permanently impacted areas of the project site and incorporating appropriate BMPs in the project design. The primary effort in stormwater management would be minimizing the permanent impacts associated with the project through a systematic re-vegetation program for disturbed areas. The impacts to site hydrology from the proposed project also would be minimized by the use of appropriate stormwater management BMPs such as culverts with outlet protection and level spreaders. In addition, the use of a “rock sandwich” design would be employed. The “rock sandwich” design allows water presently flowing from uphill areas to continue flowing under the road in a thin layer of coarse rock. This technique is preferred over culverts in some instances because the flows are distributed instead of concentrated, minimizing the potential for erosion. Rock sandwich construction would be used as appropriate in areas where there are seeps or other hydrologic conditions warrant this application.

In general, the stormwater management plan was intended to maintain existing flow paths and discharge points to the extent possible; to cause no adverse impact to peak runoff flow rates beyond the property line; to provide MDEP prescribed levels of water quality treatment for a minimum of 75 percent of the roadway and developed area; and to avoid disturbance of existing wetlands to the maximum extent possible. Stormwater modeling completed for the project indicates that there would be no significant increase in discharge rate from the site following construction, and that there should be no adverse impacts to adjacent waterbodies or properties if the stormwater management plan is properly implemented. In addition to the stormwater management plan, a phosphorous control plan was developed for the project, as required by Maine's Site Law. This plan was developed using the MDEP's *Phosphorus Control in Lake Watersheds: A Technical Guide for Evaluating New Development*. Methods proposed to control stormwater would help remove phosphorous from runoff, and the Phosphorous Restriction Zone, totaling 155 acres, also would help control phosphorous in stormwater runoff. The Phosphorous Restriction Zone would consist of a 100-foot wide maintained vegetative buffer along some of the project roads where no grubbing or soil disturbance would be permitted. The Permitted Phosphorus Export for this project is 6.37 pounds of phosphorus per year. In their review of the project, the MDEP determined that the proposed stormwater management plan is designed in accordance with the General Standards of Chapter 500, Stormwater Management, rules.

A combined stormwater management and control plan was developed for the site where the O&M building, on-site office, project collector substation and CMP substation would be located. This plan includes detention basins, as well as underdrain soil filters (USF) to treat the runoff. The USF should provide both water quality treatment and temperature control of the runoff. These BMPs would control runoff from 96 percent of the impervious area and 95 percent of the developed area.

Following a review of these plans, the Division of Watershed Management within the MDEP determined that the plans provide adequate provisions to meet the General Standards established in MDEP's Chapter 500, Stormwater Management Rules.

3.5.2.2 Potential Impacts of No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.5.3 PROJECT SETTING - FLOODPLAINS

Although most typically associated with streams and rivers, floodplains or flood-prone areas are defined as "any land area susceptible to being inundated by waters from any source" (44 CFR Part 59). In the United States, the National Flood Insurance Program, which is a series of local and federal laws, regulates development in mapped 100-year floodplains. The 100-year floodplain or Special Flood Hazard Areas as depicted on national Flood Insurance Rate Maps (FIRM) define those areas that would be inundated by a flood event having a one percent chance of being equaled or exceeded in any given year.

Based upon FIRM maps for the town of Roxbury, there are no mapped flood zones within the proposed project area, including the electrical generator lead and the property where the O&M building, project office, and collector substation and CMP substation would be located. The Federal Emergency Management Agency's (FEMA) mapped floodplains for the region surrounding the project area are shown in Figure 3-1.

The only component of the Section 270 line upgrade that is located in proximity to a mapped 100-year floodplain is Pole 27. A detailed assessment was completed using two-foot contour elevations at Pole 27 to determine if it was located within the 100-year floodplain of Bean Brook. Based upon this assessment, it was determined that Pole 27 would be located approximately 15 feet in elevation above this projected floodplain. Typically pole installation does not increase ground elevations and would not affect any flood elevations. Construction and maintenance of

the proposed transmission line would not cause or increase flooding or cause a flood hazard to any neighboring structures.

3.5.3.1 Potential Impacts of the Proposed Action

No mapped FEMA flood zones are crossed by the project, so there should be no adverse impact to floodplain resources. In their review of the project, the MDEP found that the project is "*unlikely to cause or increase flooding or to cause an unreasonable flood hazard to any structure.*"

Based upon its review, the MDEP determined that the proposed Section 270 line upgrade would be unlikely to cause or increase flooding or cause an unreasonable flood hazard to any structure.

3.5.3.2 Potential Impacts of No Action Alternative

Because there are no mapped FEMA flood zones crossed by the project, the No Action Alternative would have the same effect as the proposed action.

3.5.4 PROJECT SETTING - GROUNDWATER

No groundwater wells occur within the ridgeline portion of the project area, and there are no known public drinking water supply wells within 100 feet of the proposed transmission line or turbine locations. In addition, there are no EPA-designated sole source aquifers located in the project area (EPA 2008). There is currently one residential groundwater well at the site of the proposed project office. Use of this well would be discontinued, and a new bedrock well would be drilled to serve site facilities. The nearest mapped groundwater aquifer is located near the Swift River more than a mile east of the ridgeline project area (Maine Geological Survey 2008). Based upon site specific soil surveys, groundwater depths on the ridgeline portion of the project area are highly variable and range from at or just below the surface in poorly drained soils to depths of greater than six feet below the surface in better drained soils. Groundwater conditions are similar at the site of the proposed O&M building, project office, and substation where depths range from at or near the surface in poorly drained soils to within five feet of the surface in better drained soils. The State of Maine receives an average of 41.21 inches of precipitation annually (U.S. Department of the Interior, U.S. Geological Survey 2009).

There is a mapped Significant Groundwater Aquifer in proximity to the Section 270 line that is associated with Scotty Brook and the Swift River; however, the transmission line corridor is

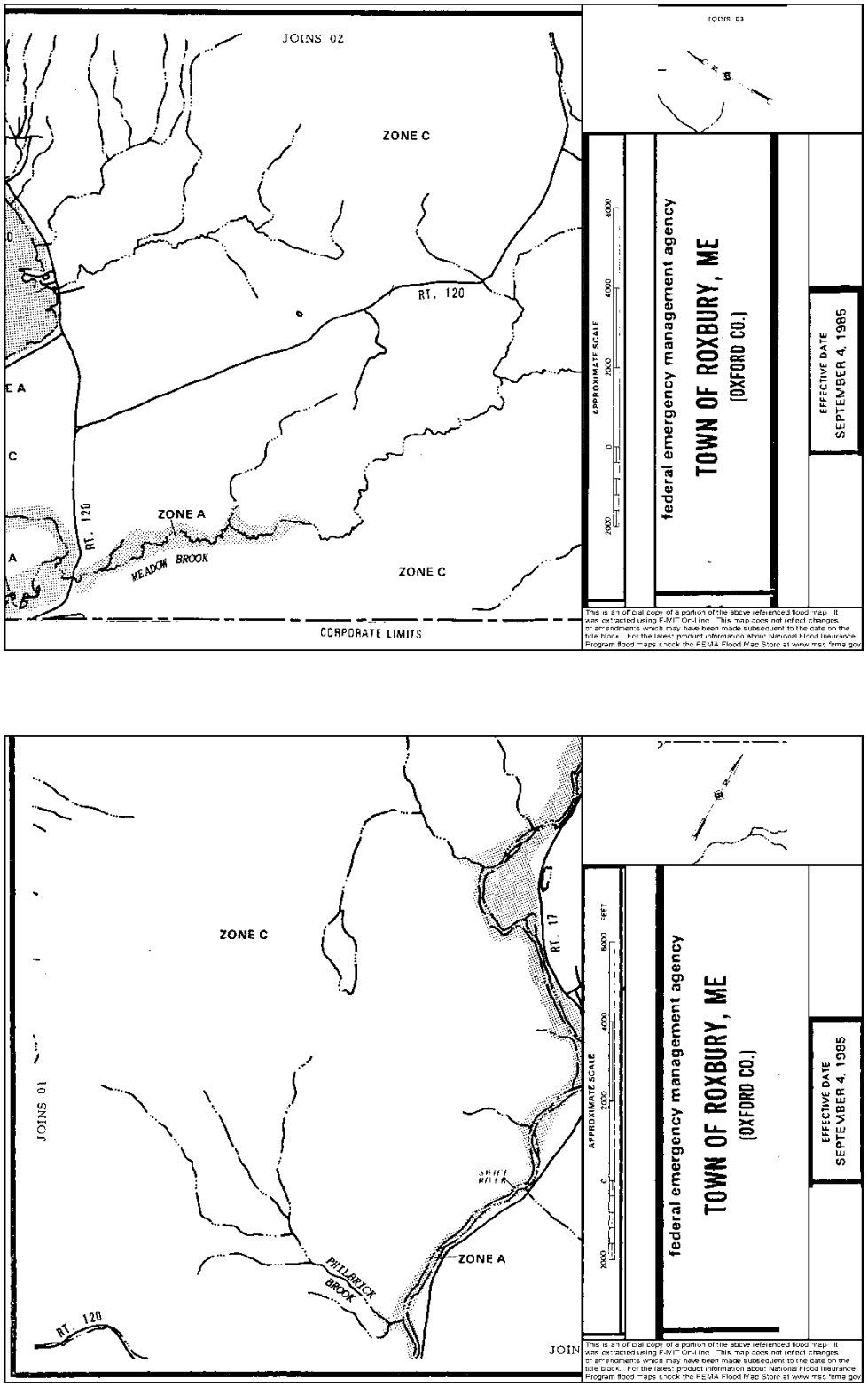

Figure 3-1. FEMA Floodplain Maps for Record Hill Project Area

located outside of the footprint of this aquifer (Refer to Section 15 of the Site Location of Development permit application submitted for the Section 270 Transmission Line Upgrade). No private water wells or septic systems occur within the existing or proposed up-grade of the transmission line.

3.5.4.1 Potential Impacts of the Proposed Action

Non-potable water used in the construction of the wind turbines and associated infrastructure (e.g. dust abatement) would not be withdrawn from ground water sources, rivers, or streams, rather it would be withdrawn from local lakes in accordance with Maine law (Maine DEP rules, Chap. 587(6), available at http://www.maine.gov/sos/cec/rules/06/chaps06.htm). Up to 20,000 gallons of water per day would be withdrawn from the local lakes using a 4,000 gallon tanker truck. The tanker truck would access the lakes via existing municipal boat ramps. Given the limited volume of this withdrawal relative to the size of the local lakes, the water withdrawal would not change the naturally occurring water levels of the surrounding lakes. Potable water (drinking water) during construction of the wind turbines and associated infrastructure would be provided by the contractors (e.g. bottled water or in water coolers).

The only water supply required during operation of the facility would be potable water for the project office and O&M building. This would be supplied by a single bedrock well that would be drilled near the project office. This well would not affect any significant sand and gravel aquifers and the MDEP's Division of Environmental Assessment determined that there are adequate groundwater resources for the proposed project. A septic system including a septic tank with standard stone bed was designed to handle wastewater disposal at the project facilities (office and O&M building). Based on the maximum number of employees likely to be working at the project facilities, there would be approximately 135 gallons of wastewater generated daily. A review conducted by the MDEP's Division of Environmental Assessment determined that soils are appropriate for the proposed wastewater disposal system.

Work on constructing access roads for the turbine site began in the fall of 2009. During this initial phase of construction, the sub-grade was completed along about 3.7 of the 6.1 miles of proposed access roads. Construction and operation of the new Section 270 line would not require the use of groundwater. To date, approximately 10,689 square feet of permitted wetland fill has been completed for construction of the access roads and turbine pads, as verified by ACOE.

During the construction phase, potential sources of groundwater contamination would be limited to fuel, and hydraulic and lubrication oils used in the operation of vehicles and construction equipment. To minimize spill potential, no fueling or vehicle maintenance would be performed within 100 feet of wetlands, streams or other sensitive natural resources. The procedures to prevent groundwater degradation during construction, operation, and maintenance of the proposed line are provided in CMP's *Environmental Control Requirements for Contractors and Subcontractors* (Refer to Section 15 of the Site Location of Development permit application submitted for the Section 270 Transmission Line Upgrade), and CMP's oil and hazardous material contingency plan. These procedures establish a set of minimum requirements for spill prevention and response. For example, employees operating construction vehicles are trained to promptly contain, report, and clean up any spill in accordance with standard procedures. As a standard operating procedure, all operational vehicles carry an oil spill kit that contains materials for conducting initial containment and clean-up of spills. In the event of a spill of oil or hazardous material, on-site personnel would immediately invoke standard spill reporting and clean-up procedures. Spills that are properly cleaned-up should not pose any risk to groundwater quality.

Maintenance of the Section 270 line would involve selective herbicide application to control the growth of capable tree species. CMP follows a program whereby herbicide application occurs in an area once every four years. Herbicide is selectively applied using a backpack applicator to treat individual plants. Herbicides are applied by applicators certified by the Maine Pesticide

Control Board, and no herbicides are used within 25 feet of any waterbody or wetland with standing water.

In their review, the MDEP found that the proposed Section 270 line upgrade would not have an unreasonable adverse effect on groundwater quality or quantity.

3.5.4.2 Potential Impacts of No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.5.5 Potential Impacts of the Proposed Action

The potential impacts of the proposed action are presented above as a subsection under each specific water resource (Surface Water and Wetlands, Floodplains, and Groundwater).

3.5.6 Potential Impacts of the No Action Alternative

The potential impacts of the no action alternative are presented above as a subsection under each specific water resource (Surface Water and Wetlands, Floodplains, and Groundwater).

3.6 Air Quality

The region of influence (ROI) for air quality varies according to the type of air pollutant being discussed. Pollutants such as carbon monoxide and directly emitted particulate matter have a localized region of effects that are generally restricted to the immediate vicinity of the emission source. Other pollutants such as NO_2, a precursor to ozone, have a broader region of effects. This section presents general air quality information and regional air quality information.

3.6.1 Regulatory Framework and Project Setting

Clean Air Act

The Clean Air Act (CAA) of 1970, as amended (42 United States Code [USC] §§ 7401 et seq.), regulates emissions from stationary, mobile, and area sources and established National Ambient Air Quality Standards for pollutants that can harm human health or the environment. Under the CAA, the EPA is responsible for revising these standards when necessary as new data on air quality and related impacts on the human environment become available.

National Ambient Air Quality Standards

EPA has adopted National Ambient Air Quality Standards for six “criteria” pollutants (pollutants for which EPA has documented the health and welfare impacts as the "criteria" for inclusion in the regulatory regime): ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter (PM_{10} and $PM_{2.5}$), and airborne lead. Some National Ambient Air Quality Standards include both primary and secondary standards, and others only include a primary standard. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The average time periods specified in the National Ambient Air Quality Standards vary by criteria pollutants based on potential health and welfare effects of each pollutant. The National Ambient Air Quality Standards are enforced by the states via local air quality agencies. States may choose to adopt their own air quality standards, but state standards must at least meet federal minimum standards. Table 3-2, National Ambient Air Quality Standards, lists the National Ambient Air Quality Standards.

Table 3-2: National Ambient Air Quality Standards

Pollutant	Averaging Times	Ambient Concentration Standard[1]	Primary (P) or Secondary (S) Standard[2]
Ozone	8 hours	0.075 ppm (147 μg/m^3)	P, S
Carbon monoxide	1 hour	35 ppm (40 mg/m^3)	P
	8 hours	9 ppm (10 mg/m^3)	P
PM_{10}	24 hours	150 μg/m^3	P, S
$PM_{2.5}$	24 hours	35 μg/m^3	P, S
	Annual	15 μg/m^3	P, S
Nitrogen dioxide	1 Hour	0.100 ppm (190 μg/m^3)	P
	Annual	0.053 ppm (100 μg/m^3)	P, S
Sulfur dioxide	1 Hour	0.075 ppm (200 μg/m^3)	P
	3 hours	0.5 ppm (1,300 μg/m^3)	S
Lead Lead	Rolling 3-Month Average	0.15 μg/m^3	P, S
	Quarterly Average	1.5 μg/m^3	P, S

[1] ppm = parts per million; mg/m^3= milligrams per cubic meter; μg/ m^3= micrograms per cubic meter
[2] P = primary standard (health-based); S = secondary standard (welfare-based)
[3] On January 6, 2010 USEPA proposed to reduce the 8-hour ozone standard to a level within the range of 0.060 to 0.070 ppm. The proposed rule is pending.
[4] EPA has revoked the quarterly average lead standard except in areas that have not demonstrated compliance with the quarterly average lead standard.

Source: 40 CFR Part 50

The EPA evaluates whether the criteria air pollutants levels within a geographic area meet National Ambient Air Quality Standards. Areas that violate air quality standards are designated as nonattainment areas for the relevant pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe, and extreme for ozone, and moderate and serious for carbon monoxide and PM_{10}). Areas that comply with air quality standards are designated as attainment areas for the relevant pollutants. Areas that have been redesignated from nonattainment to attainment are considered maintenance areas. Areas of uncertain status due to insufficient air quality monitoring data are generally designated as unclassifiable, but are treated as attainment areas for regulatory purposes.

Federal law requires states to develop plans, known as state implementation plans, describing how they would attain National Ambient Air Quality Standards. State implementation plans are approved by the EPA and are federally enforceable.

Clean Air Act Conformity Regulations

Section 176(c) of the federal CAA contains requirements that apply specifically to federal agency actions, including actions involving federal funding. This section of the CAA requires federal agencies to ensure that their actions are consistent with the CAA and with applicable state air quality management plans. Federal agencies are required to evaluate their proposed actions to ensure that they would not cause or contribute to new violations of any federal ambient air quality standards, that they would not increase the frequency or severity of any existing violations of federal ambient air quality standards, and that they would not delay the timely attainment of federal ambient air quality standards.

The EPA has announced separate rules that establish conformity analysis procedures for transportation-related actions and for other (general) federal agency actions. The general conformity rule requires a formal conformity determination document for federally sponsored or funded actions in nonattainment or maintenance areas when the net increase in direct and indirect emissions of nonattainment or maintenance pollutants exceeds specific *de minimis*

thresholds. The conformity rules apply only in nonattainment and maintenance areas. Because the project is located in an attainment area the conformity rules do not apply to the project.

State Plans and Ambient Air Quality Standards
Maine has an approved State Implementation Plan for air quality management. The Maine Ambient Air Quality Standards are equal to or more stringent than the comparable federal standards. In addition to the six criteria pollutants designated under the CAA, Maine also has established a standard for chromium.

Currently, there are no designated nonattainment areas in Maine, and the project site is located in an area that meets Maine Ambient Air Quality Standards. Two regions in Maine, Portland and the Midcoast, are designated as maintenance areas for 8-hour ozone and one small area, downtown Presque Isle in Aroostook County, is designated as maintenance for PM10 (Maine Department of Transportation 2009). The Record Hill project area does not occur in or in proximity to any of these maintenance areas.

The Maine Ambient Air Quality Standards are presented in Table 3-3, Maine Ambient Air Quality Standards.

Table 3-3: Maine Ambient Air Quality Standards

Pollutant	**Averaging Times**	**Ambient Concentration Standard**[1]
Photochemical oxidant (ozone)	1 hour	160 $\mu g/m^3$
Hydrocarbon (ozone)	3 hour	160 $\mu g/m^3$
Carbon monoxide	1 hour	40 mg/m^3
	8 hours	10 mg/m^3
PM_{10}	24 hours	150 $\mu g/m^3$
	Annual	40 $\mu g/m^3$
Nitrogen dioxide	Annual	100 $\mu g/m^3$
Sulfur dioxide	3 hours	1,150 $\mu g/m^3$
	24 hours	230 $\mu g/m^3$
	Annual	57 $\mu g/m^3$
Lead	24 hours	1.5 $\mu g/m^3$
Total Chromium	24 hours	0.3 $\mu g/m^3$
	Annual	0.05 $\mu g/m^3$

[1] ppm = parts per million; mg/m^3= milligrams per cubic meter; $\mu g/ m^3$= micrograms per cubic meter
Source: MDEP, Bureau of Air Quality Control, Chapter 110 – Ambient Air Quality Standards

3.6.2 POTENTIAL IMPACTS OF THE PROPOSED ACTION

Construction Phase of Turbine Installation
Grading and other construction activities would result in short-term adverse air quality impacts such as dust generated by clearing and grading, exhaust emissions from gas- and diesel-powered construction equipment, vehicular emissions associated with delivery of the turbine components and commuting construction workers. These effects would be minimal because the project is located in a rural area where there are relatively few other sources producing emissions and because the construction is only expected to last eight months. As stated in the NRPA-Site Location permit issued for the Record Hill project, the MDEP identified no significant source of air emissions associated with the construction of this project, although dust from construction vehicles traveling along unpaved logging roads is mentioned as a potential source of air emissions. Production of fugitive dust would depend on such factors as soil properties (*e.g.*, moisture content, volume of spoils, and soil fines content), meteorological variables, and construction practices employed. Since grading activity would be limited during the construction

of the transmission line, fugitive dust would be likely to occur only at the substation construction site. Best management construction practices would be employed to minimize emissions of fugitive dust, including:

- Use of water or other wetting agents on areas of exposed and dry soils;
- Use of covered trucks for transport of soils or other dry materials;
- Controlled storage of spoils on the construction site, which may include mulching storage piles with hay or covering with tarps in concert with containing the piles with erosion control mix and or silt fencing; and
- Final grading and landscaping of exposed areas as soon as practical.

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No license for air emissions is required for the project.

Operation Phase of Turbines and Associated Facilities

During operation, emissions would include vehicles used by the three or four staff members and operation of the project office (a converted single-family home) and the O&M building.

Gasoline- and diesel-powered vehicles that would be used by employees to commute to the site and to check operations of the facility would emit several criteria pollutants and greenhouse gases. The project is located in an area that meets National Ambient Air Quality standards, and the limited vehicle use associated with operation of the facility is not expected to result in non-attainment status.

Operation of the project office and O&M building would involve the use of fossil fuel energy (i.e., electricity and heating); however, this would not have a significant impact on greenhouse gas emissions. The emissions from the operation of these two buildings would be offset by the clean renewable energy produced by the wind power generating component of the project.

Over its estimated 20-year projected life, Record Hill expects the proposed wind energy facility to produce 2.3 million megawatt-hours of electricity under peak conditions. Assuming that this capacity displaces electricity produced by conventional power plants and combined-heat-and-power plants, Record Hill estimates that the proposed development would reduce greenhouse gasses (carbon dioxide and nitrogen oxides) and other air pollutants (sulfur dioxide) on an annual basis by:

- 58,710 tons of carbon dioxide;
- 97 tons of sulfur dioxide; and
- 82 tons of nitrogen oxides.

As stated in the NRPA-Site Location permit issued for this project, the MDEP identified no significant source of air emissions associated with the operation of this project.

Construction Phase of Section 270 Transmission Line

Construction of the Section 270 line and substation would result in short-term emissions such as dust generated by clearing and grading, exhaust emissions from gas- and diesel-powered construction equipment, vehicular emissions associated with delivery of components and commuting construction workers. These effects would be minimal because the Section 270 line and substation are located in a rural area where there are relatively few other sources producing emissions and because of the short duration of construction. Best management construction practices would be employed to minimize emissions of fugitive dust, as discussed for the construction phase of turbine installation.

Operation Phase of Section 270 Transmission Line

During operation, emissions would be limited principally to vehicles used by CMP employees/contractors to conduct maintenance and safety checks at the substation and along the Section 270 line. The substation and transmission line are located in an area that meets National Ambient Air Quality Standards, and the limited vehicle use associated with operation is not expected to result in non-attainment status.

As stated in the NRPA-Site Location permit issued for this project, the MDEP identified no significant air quality impacts from the proposed substation or line upgrade.

3.6.3 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.7 Noise

Noise is defined by the American National Standards Institute as any unwanted sound. Sound may consist of a single frequency known as a pure tone, but is generally a disorderly mixture of many frequencies. When measuring sound, the A-weighted sound levels are typically used in order to simulate the hearing response of the human ear to varying sound level frequencies. A-weighted sound levels are expressed as dBA. Figure 3-2 shows a comparison of sound pressure and decibel levels for some typical sound environments.

3.7.1 Regulatory Framework

The Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978 (42 USC 4901–4918), delegates to the states the authority to regulate environmental noise. It also directs government agencies to comply with local community noise statutes and regulations and to conduct their programs to promote an environment free of any noise that could jeopardize public health or welfare. In Maine, the MDEP Site Location of Development statute (38 M.R.S.A. § 484 et seq) is intended to insure that developments, which substantially affect the environment, would have a minimal adverse impact on the natural environment within the development site and the surrounding area, and to protect the health, safety and general welfare of people. During the review of a Site Location of Development permit application, the affect of noise from a commercial or industrial development on both the natural environment and the health and welfare of nearby residents is taken into consideration. The Site Location of Development rules (Chapter 375) set sound level limits for the routine operation of developments, for the construction of developments, for site maintenance activities, and for blasting activities. Table 3-4 provides a summary of sound level limits as established by MDEP.

Table 3-4: Summary of MDEP Sound Level Limits. Resource Systems Engineering. 2008. Sound Level Assessment: Record Hill Wind LLC, Record Hill Wind Project, Oxford County, Roxbury, Maine

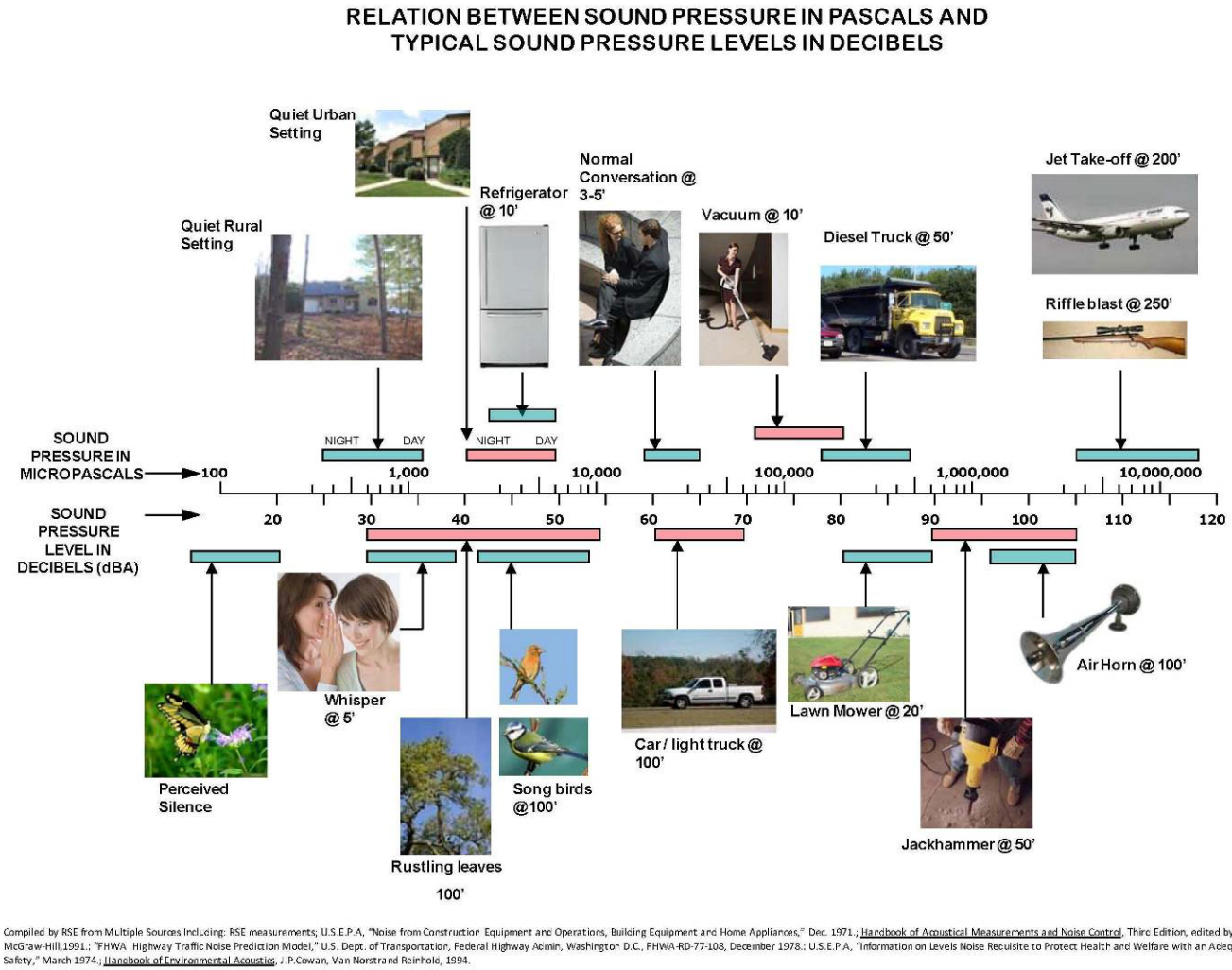
Location	Daytime Limit (Hourly L_{Aeq})	Nighttime Limit (Hourly L_{Aeq})	Total Sounds	Short Duration Repetitive Sounds (SDRS)
Facility Property Line	75 dBA	75 dBA	No 5 dBA assessment	No 5 dBA assessment or L_{Amax} limit
Protected Location Zoned: Commercial, Industrial or Transportation	70 dBA	60 dBA within 500 feet of sleeping quarters otherwise 70 dBA	5 dBA assessment applies to Tonal Sounds	5 dBA assessment and possible L_{Amax} limit for SDRS
Protected Location Zoned: Residential, Rural or Similar Land Use	60 dBA	50 dBA within 500 feet of sleeping quarters otherwise 60 dBA	5 dBA assessment applies to Tonal Sounds	5 dBA assessment and possible L_{Amax} limit for SDRS
Quiet Area –	55 dBA	45 dBA within	5 dBA	5 dBA

Location	Daytime Limit (Hourly L_{Aeq})	Nighttime Limit (Hourly L_{Aeq})	Total Sounds	Short Duration Repetitive Sounds (SDRS)
Protected Location where existing daytime sound level is ≤45 dBA and nighttime sound level is ≤35 dBA		500 feet of sleeping quarters otherwise 60 dBA	assessment applies to Tonal Sounds	assessment and possible L_{Amax} limit for SDRS
Noisy Area – Protected Location where existing daytime or nighttime sound level exceeds standard daytime and/or nighttime limits	Pre-development daytime sound level minus 5 dBA (per election of applicant)	Pre-development nighttime sound level minus 5 dBA (per election of applicant)	5 dBA assessment applies to Tonal Sounds	5 dBA assessment and possible L_{Amax} limit for SDRS
L_{Aeq} = Equivalent Sound Level				
L_{Amax} = Maximum Sound Level				

3.7.2 PROJECT SETTING

Existing sources of on-site noise would be limited to commercial timber harvesting operations, which occur periodically as timber stands reach harvestable size. Typical earth moving equipment and cranes generate sound levels of 75 to 88 decibels (dBA) at a distance of 50 feet, which would be comparable to equipment used during harvesting operations. Record Hill conducted pre-construction noise surveys. The nearest sensitive receptors to the proposed wind turbine locations include the property line for an occupied residential parcel located 3,100 feet south along Route 120 and the property line for a residential parcel located 6,000 feet to the east along Route 17. In both instances, the location of the actual residence was further from the turbine location than the property line. On July 7 to 10, 2008 and then again on August 5 to 13, 2008, Resources Systems Engineering simultaneously measured existing ambient sound levels at five monitoring positions (RH 1 to 5) in the vicinity of the Record Hill project. The locations of the monitoring positions are shown on Figure 3-3 and Tables 3-5 through 3-7 provide the results of the existing ambient sound levels.

An ambient noise monitoring survey was conducted at the site of the proposed CMP and project collector substations. The primary source of man-made noise in the area is occasional vehicular traffic on Roxbury Notch Road. Natural sounds included birds and some wind noise, as well as continuous water noise from two brooks that run parallel to the road. Noise levels were measured continuously over two periods: a three day period between June 5, 2009 through June 7, 2009, and a six day period from July 2, 2009 to July 7, 2009. The hourly average daytime noise levels were 48.9 dBA and 53.0 dBA for the June and July periods, respectively. The nighttime average levels were 47.3 dBA and 52.0 dBA, respectively.



Compiled by RSE from Multiple Sources Including: RSE measurements; U.S.E.P.A, "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," Dec. 1971.; Handbook of Acoustical Measurements and Noise Control, Third Edition, edited by C.M. Harris, McGraw-Hill,1991.; "FHWA Highway Traffic Noise Prediction Model," U.S. Dept. of Transportation, Federal Highway Admin, Washington D.C., FHWA-RD-77-108, December 1978.; U.S.E.P.A, "Information on Levels Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety," March 1974.; Handbook of Environmental Acoustics, J.P.Cowan, Van Norstrand Reinhold, 1994.

Figure 3-2: A comparison of sound pressure and decibel levels for some typical sound environments. Resource Systems Engineering. 2008. *Sound Level Assessment*: *Record Hill Wind LLC, Record Hill Wind Project, Oxford County, Roxbury, Maine*

Table 3-5: Ambient daytime and nighttime sound levels (dBA), July 7 to 10, 2008. Resource Systems Engineering. 2008. *Sound Level Assessment*: *Record Hill Wind LLC, Record Hill Wind Project, Oxford County, Roxbury, Maine*

Monitoring Position	Range of Hourly L_{Aeq}s		Average Hourly L_{Aeq}	
	Daytime 7 am to 7pm	Nighttime 7 pm to 7 am	Daytime 7 am to 7pm	Nighttime 7 pm to 7 am
RH-1	42 to 61	36 to 56	49	45
RH-2	34 to 51	28 to 48	41	36
RH-3	38 to 62	34 to 58	43	40
RH-4	39 to 87	26 to 53	52	39
RH-5	35 to 47	30 to 50	40	36

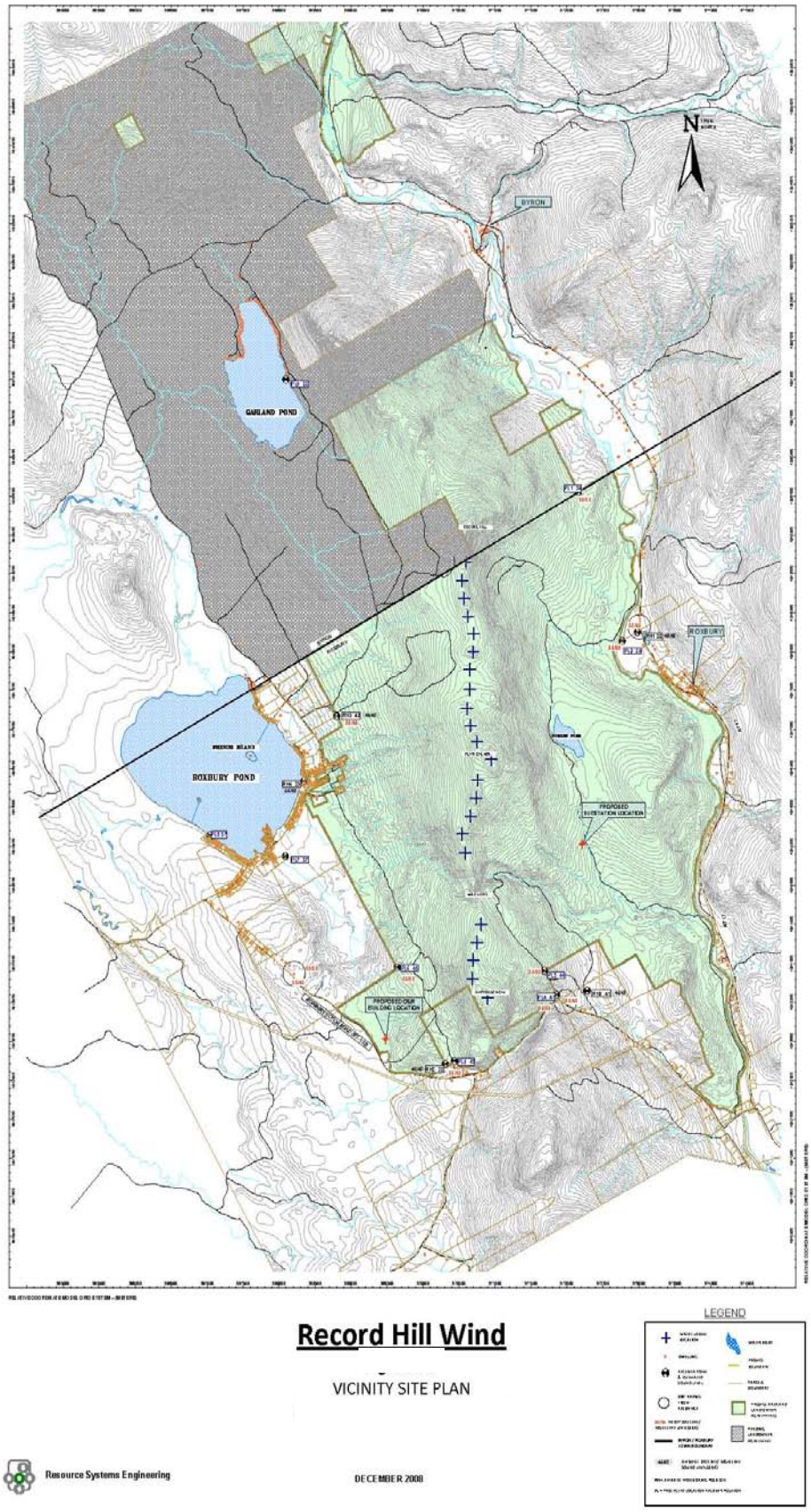
Table 3-6: Ambient daytime and nighttime sound levels (dBA), August 5 to 13, 2008. Resource Systems Engineering. 2008. *Sound Level Assessment*: *Record Hill Wind LLC, Record Hill Wind Project, Oxford County, Roxbury, Maine*

Monitoring Position	Range of Hourly L_{Aeq}s		Average Hourly L_{Aeq}	
	Daytime 7 am to 7pm	Nighttime 7 pm to 7 am	Daytime 7 am to 7pm	Nighttime 7 pm to 7 am
RH-1	44 to 71	36 to 46	49	41
RH-2	38 to 84	37 to 70	48	45
RH-3	40 to 60	41 to 48	44	44
RH-4	41 to 68	34 to 61	56	46
RH-5	38 to 60	36 to 52	45	43

Table 3-7: Ambient daytime and nighttime sound levels (dBA), July 7 to 10 and August 5 to 13, 2008 (~211 hours). Resource Systems Engineering. 2008. *Sound Level Assessment*: *Record Hill Wind LLC, Record Hill Wind Project, Oxford County, Roxbury, Maine*

Monitoring Position	Range of Hourly L_{Aeq}s		Average Hourly L_{Aeq}	
	Daytime 7 am to 7pm	Nighttime 7 pm to 7 am	Daytime 7 am to 7pm	Nighttime 7 pm to 7 am
RH-1	42 to 71	36 to 56	49	42
RH-2	34 to 84	28 to 70	45	42
RH-3	38 to 62	34 to 58	43	42
RH-4	39 to 87	26 to 61	54	43
RH-5	35 to 60	30 to 52	44	42

Figure 3-3: Sound monitoring locations (RH 1 to 5) and residential receiver points (PL1 to 9).



3.7.3 POTENTIAL IMPACTS OF THE PROPOSED ACTION

Construction – Turbine Installation

Construction activities would generate temporary increases in ambient noise levels, which would vary depending upon the phase of construction and the equipment involved. Most construction equipment operates intermittently, and the type of equipment varies with each construction phase. A variety of construction equipment would be used to build the wind project, including earth-moving equipment for land clearing, excavation, and site grading and cranes to erect the wind turbines. Typical earth moving equipment and cranes generate sound levels of 75 to 88 dBA at a distance of 50 feet. Construction of this project would conform to Chapter 375 of the Site Location of Development law, which sets limits on sound related to construction activities. Daytime construction (7 am to 7 pm) has established sound level limits for specific durations, which cannot be exceeded at any protection location. For example, the hourly sound level limit for a 12-hour activity period is 87 dBA. Because development in proximity to the ridgeline is relatively limited, it is unlikely that typical construction activities would significantly impact adjacent properties. The nearest residential property lines are 3,100 feet and 6,000 feet from a proposed turbine location with the actual residences further away.

In addition to noise associated with construction equipment, there also would be periodic noise associated with blasting activities. Construction of this project would conform to Chapter 375 of the Site Location of Development law, which sets limits on when blasting can occur, the number of blasting events that can occur per day, and the sound levels associated with blasting. In all cases, blasting would be conducted in general conformance with the U.S. Department of Interior Rules 816.61-68 and 817.61-68, and the Blasting Guidance Manual, Office of Surface Mining, Reclamation and Enforcement, U.S. Department of Interior. Noise and air blast effects would be mitigated using proper stemming techniques.

Operation of Turbines

A predictive sound level model was developed for the project to estimate sound levels from the operation of the wind energy generating portion of the project. The acoustic model was developed using the CADNA/A software program in accordance with the generally recognized standard for estimating the propagation of sound in the environment as put forth by the International Organization of Standardization (ISO) as Chapter 9613-2, Attenuation of Sound During Propagation Outdoors. The CADNA/A program uses three dimensional terrain, characteristics of the proposed turbines, and environmental factors to calculate outdoor sound propagation from the operation of the turbines. The sound levels for the simultaneous operation of the wind turbines were calculated for all of the 22 proposed turbine locations. Calculations were based on the apparent sound spectrum produced at full sound power.

Sound levels from wind turbine operation were modeled at nine residential receiver points in the vicinity of the proposed project. These receiver points were located closest to the wind turbines in the various directions where sound levels have the greatest potential to exceed sound limits. These points also were considered representative of locations where the most stringent nighttime sound limits would apply. Results of this analysis indicate that sound levels at full sound power production would be between 5 to 11 dBA below the nighttime sound level limit of 45 dBA at the nine receiver points. In addition, results of this analysis indicate that sound levels at full sound power production would be between 12 to 20 dBA below the daytime sound level limit of 55 dBA for these locations. Table 3-8 provides the results of estimated (modeled) sound levels for nine residential receiver points (PL1 to PL9) in the vicinity of the proposed project. The predictive sound level contours for the vicinity of project area are shown in Figure 3-5.

The proposed wind turbines also were analyzed for their potential to generate regulated tonal sounds. The results of this analysis indicated that tonal thresholds are not likely to be exceeded.

Following a review of the noise modeling conducted for the project by both the MDEP and a third party noise consultant chosen by MDEP, a sound compliance assessment plan was developed for the operation of the project to monitor short duration repetitive sounds (SDR). SDRs are a sequence of sound events, each of which is clearly discernible, that cause an increase of six dBA or more in the sound level detected before and after such an event. An SDR sound event typically lasts less than 10 seconds and occurs more than once an hour. During the operation of the wind turbines, SDR sound is related to the thumping noise produced by the turning blades. The sound compliance assessment plan would monitor sound levels at representative protected locations under conditions that are most favorable to the propagation of sound and maximum amplitude modulation. The intent of this monitoring is to ensure that the project would operate in compliance with the terms of the Site Location of Development/NRPA permit issues for the project. A similar approach was followed for the operational Stetson Wind Project located in northern Maine. Based upon post-construction monitoring conducted for the Stetson Wind Project, the noise model developed by the same consultants used on the Record Hill project was found to be conservative.

Construction of Transmission Line Upgrade

As with construction of the generating facility, construction activities at the substation site and along the Section 270 line would generate temporary increases in ambient noise levels, which would vary depending upon the phase of construction and the equipment involved. Most construction equipment operates intermittently, and the type of equipment varies with each construction phase. CMP does not anticipate the need for nighttime construction. If nighttime construction activity becomes essential to comply with outage sequencing or other external factors, CMP would meet the standards for nighttime construction under MDEP Site Location of Development regulations, Chapter 375(10) and any applicable municipal standards.

Operation of Transmission Line Upgrade

Noise produced at the new CMP substation would result principally from the operation of the transformers and fans. As seen in Figure 3-4 and Table 3-9, noise modeling indicates that noise levels from the operation of the substation would be below the MDEP noise standard ranging from 40.2 to 47.8 dBA. For the transmission line, noise would be limited to that produced by conductors, which would emit a slight crackling sound during very humid or stormy weather. Under these weather conditions, the sound produced by the conductors would be minimal and, in stormy conditions, is likely to be exceeded by the sound of the storm itself. Based on its review of the materials submitted during the permit application process, the MDEP determined that adequate provision for the control of noise was made for the Section 270 line upgrade.

3.7.4 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the noise impacts associated with the Record Hill project would not occur unless alternative financing were realized.

Table 3-8: Estimated (modeled) sound level from wind turbine operation. Resource Systems Engineering. 2009. Supplement to *Sound Level Assessment*: *Record Hill Wind LLC, Record Hill Wind Project, Oxford County, Roxbury, Maine*

Residential Receiver Position	Distance to Nearest Wind Turbine, Feet	Estimated Hourly Sound Level, L_{Aeq-Hr}		DEP Nighttime Limit, dBA	Difference between WTG Estimated Hourly Sound Level and DEP Nighttime Limit (dBA)	
		Siemens MK II	Clipper C96		Siemens MK II	Clipper C96
PL1	6,000	35	36	55	-20	-19
PL2	6,800	38	39	55	-17	-16
PL3	2,800	43	44	55	-12	-11
PL4	3,100	40	41	45	-15	-14
PL5	3,100	40	43	45	-5	-2
PL6	3,500	43	45	55	-12	-10
PL7	8,100	37	37	45	-8	-8
PL8	11,500	37	37	45	-8	-8
PL9	11,000	34	33	45	-11	-12

Table 3-9: Noise Modeling Results. TRC. 2009. Roxbury and Collector Substation, Application for Site Location of Development Act/Natural Resource Protection Act Permit. Prepared for Central Maine Power.

Noise Modeling Results		
Protected Area Location	**Calculated Project Sound Level**	**Most Restrictive Hourly Noise Standard**
1 – Residence 1 (Property Line) (R1)	44.0	50
2 – Residence 2 (Property Line) (R2)	47.8	50
3 – Residence 3 (Property Line) (R3)	43.3	50
4 – Residence 4 (Property Line) (R4)	40.2	50

Figure 3-4: Operational Noise Contour Map. TRC. 2009. Roxbury and Collector Substation, Application for Site Location of Development Act/Natural Resource Protection Act Permit. Prepared for Central Maine Power.

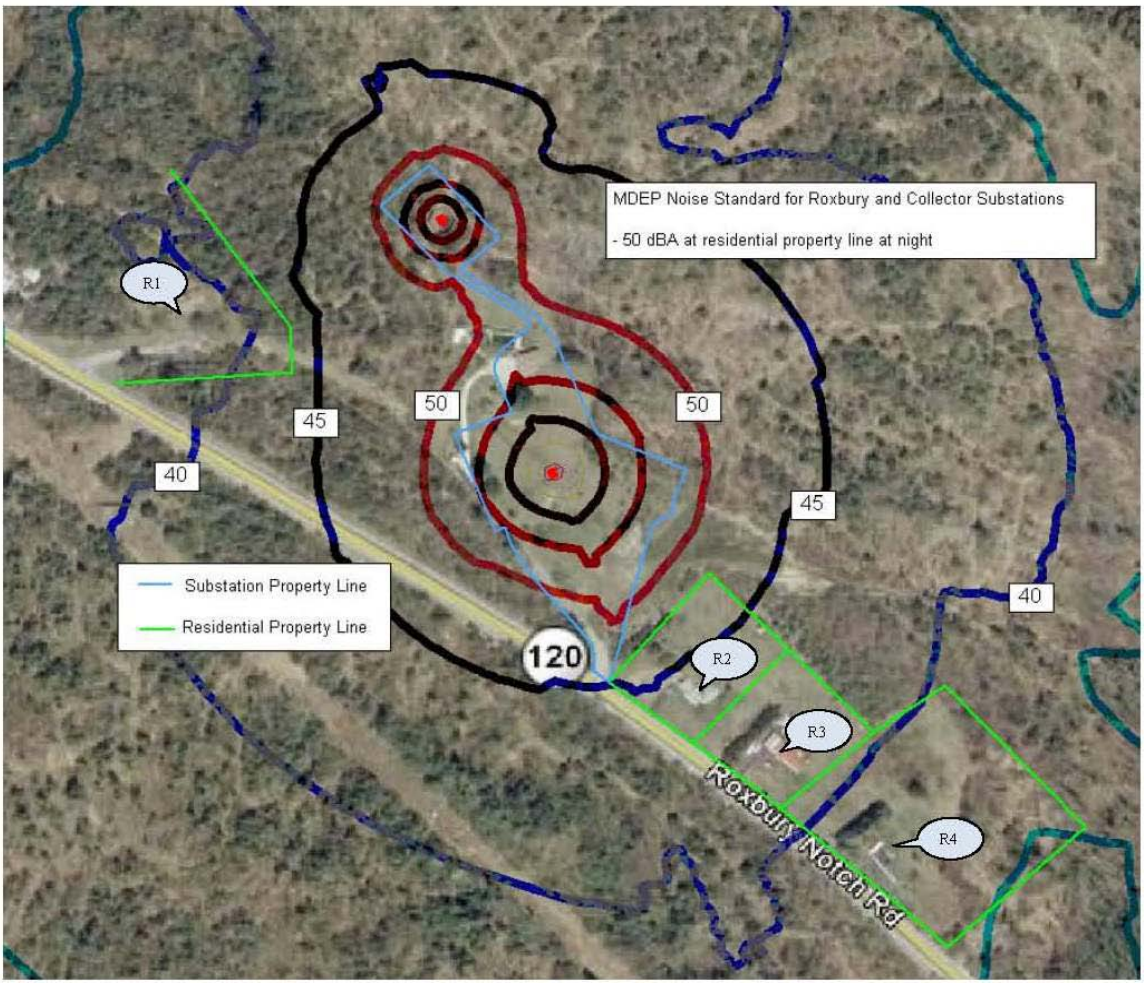
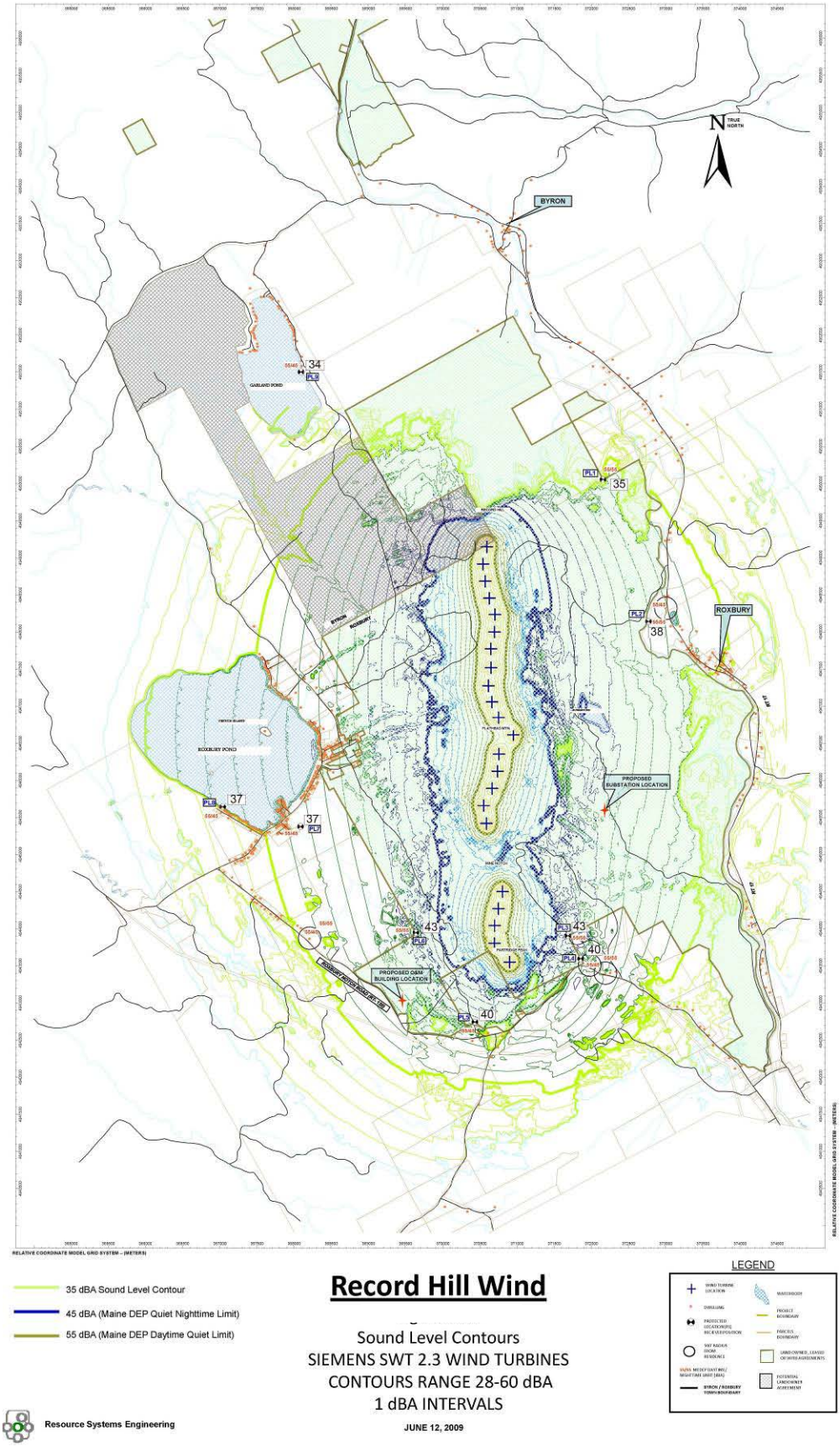


Figure 3-5: Sound Contour Levels for the Record Hill Project



3.8 HISTORIC, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

3.8.1 REGULATORY FRAMEWORK

3.8.1.1 NEPA

The National Environmental Policy Act of 1969 as amended (NEPA)[2] establishes a Federal policy of preserving important historic, cultural, and natural aspects of our national heritage during Federal project planning.

According to the Council on Environmental Quality (CEQ) NEPA regulations, in considering whether an action may significantly affect the quality of the human environment an agency should consider, among other things, unique characteristics of the geographic area such as proximity to historic or cultural resources[3] and the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP).[4]

The CEQ NEPA regulations also require that to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related surveys and studies required by the National Historic Preservation Act (NHPA).[5]

3.8.1.2 Section 106 of the National Historic Preservation Act

The NHPA establishes the federal government policy on historic preservation and the programs, including the NRHP, through which this policy is implemented. Under the NHPA, historic properties include any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP.[6] Section 106 requires that impacts on significant cultural resources, hereafter called historic properties, be taken into consideration in any federal undertaking. "Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the NRHP criteria."[7]

The Section 106 process contains five steps including:

- Initiate Section 106 process;
- Identify historic properties;
- Assess adverse effects;
- Resolve adverse effects; and
- Implement project.

3.8.1.3 Historic Property Criteria

NEPA and NHPA require federal agencies to consider the effect of their undertakings on historic properties. The criteria for listing a potentially historic property (archaeological site or an architectural resource) are defined by the NRHP. These criteria, defined in 36 CFR § 60.4, state

[2] 42 U.S.C. 4321-4347.
[3] 40 CFR 1508.27(b)(3).
[4] 40 CFR § 1508.27(b)(8).
[5] 40 CFR § 1502.25(a).
[6] 16 U.S.C. 470w (5).
[7] 36 CFR § 800.16(l).

that a resource must be at least 50 years old (unless meeting exceptional criteria) and possess the quality of significance in American history, architecture, archaeology, engineering, and culture and is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

A. Is associated with events that have made a significant contribution to the broad patterns of history;
B. Is associated with the lives of persons significant in the past;
C. Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or
D. Has yielded, or may be likely to yield, information important in prehistory or history.

If a particular resource meets one of these criteria and retains integrity, it is considered as an eligible "historic property" for listing in the NRHP.

3.8.1.4 Application of the Criteria of Adverse Effect

To comply with Section 106 of the NHPA, any effects of the proposed undertaking on properties listed in or determined eligible for inclusion in the NRHP must be analyzed by applying the Criteria of Adverse Effect,[8] as follows:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long term preservation of the property's historic significance.

When Section 106 and NEPA are integrated, project impacts that cause adverse effects under Section 106 are usually considered to be significant.

In Maine, the NHPA is administered by the Maine Historic Preservation Commission (MHPC). Prior to applying for the DOE Loan Guarantee program, the applicant obtained permits (NAE-

[8] 36 CFR § 800.5(a).

2008-03763 and NAE-2009-01866) from the US Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act. As part of the permitting process, the Corps consulted with the MHPC regarding the eligibility of resources that would be adversely affected by the project, and executed a Memorandum of Agreement (MOA) (see Appendix A) that addressed the adverse effects on historic properties. These effect determinations and stipulations are being implemented. DOE reviewed the executed MOA and concurs with its findings and stipulations. Because DOE was not a signatory to the MOA, DOE has consulted with the ACHP, SHPO, and the Corps and has prepared a First Amendment, which amends the executed MOA to include DOE as a signatory. DOE has submitted the First Amendment to the executed MOA to the Corps, the SHPO, and ACHP for review and signature.

3.8.2 PROJECT SETTING - PREHISTORIC AND EUROAMERICAN ARCHAEOLOGICAL RESOURCES

The project's area of potential effect (APE) for archaeology was established to include the area of direct impact for the wind farm development area and the Section 270 transmission line and at the proposed substation location as well as all ancillary facilities. Initial research conducted at the MHPC indicated that no prehistoric or archaeological sites are located within one mile of the project area. A survey was conducted to assess the archaeological sensitivity of the project ridgeline and along the Section 270 line. Additionally, seventy test holes located along nine transects were surveyed and none produced evidence of prehistoric or historic period archaeological resources.

Prehistoric settlements within the interior of Maine typically have been associated with streams and rivers, or adjacent to lakes, ponds, and wetlands. Because the project ridgeline is an upland ridge that is far removed from any major water resource, it is unlikely that it was used for settlement. The most likely use by prehistoric peoples would be the procurement of quality stone for the manufacture of stone tools, or possibly mortuary sites. The types of stones used for tools generally had predictable fracture patterns when chipped or reduced. Exposed bedrock at the test location consisted of phyllite grading to phyllite schist with local intrusions of granitic rock and quartz. Although some quartz was present, inspection of the test site did not reveal any stone that might have been useful to prehistoric inhabitants for the manufacture of stone tools.

To assess the sensitivity of the APE for historic period archaeological sites, background research was conducted (a site file review of the known inventory of sites in the project area was conducted that included cartographic analysis and review of primary and secondary sources), and the development of a sensitivity model pertinent to the project environment was developed. This was followed by a site inspection to confirm the presence or absence of potential archaeological resources. The assessment was completed in late October and early November 2007 through map research and a visual inspection of portions of the project area. No indications were found that Euroamerican archaeological resources exist in the APE.

This area had a relatively low likelihood for Euroamerican archaeological resources because the land-use suggests that this corridor was not developed or settled in the nineteenth or twentieth centuries. Based upon a review of historic maps and a field assessment, it was determined that there were very few historic roads or other transportation corridors where settlement would have occurred. Based upon environmental conditions and the lack of known archaeological sites in the area, no additional archaeological investigations were recommended.

The MHPC reviewed the results of this survey and agreed with its findings that no archaeological properties would be affected by the proposed project. As documented in the ACOE wetland permit, the Maine SHPO concurred.

3.8.3 PROJECT SETTING - HISTORIC ARCHITECTURAL RESOURCES

A historic architectural reconnaissance survey was conducted to identify historic architectural properties within the project's APE. The APE for the built environment included the area of direct

impact, as well as an indirect APE extending five miles from the ridgeline where there could potentially be indirect impact to properties, primarily in the form of visual effects. No historic properties were identified within the direct impact APE. Therefore, the project would have no direct effects on historic aboveground resources.

The five-mile radius survey area of the wind farm did not include any properties that are listed on or have been formally determined eligible for listing in the National Register. A total of 289 individual structures determined to be at least 50 years old were identified within the 5-mile survey area. The majority of these properties were determined to be ineligible for listing in the National Register either individually or as contributing resources within a historic district. In general, the individual properties characterized as ineligible for the National Register are common, vernacular structures that lack architectural significance or apparent significant historical associations. A large number of the properties have lost architectural integrity due to alterations, including additions, removal of original architectural ornament, replacement of original materials, and replacement of original windows and doors.

An architectural survey was also conducted for the Section 270 line to identify properties listed in the NRHP and those that may be eligible for listing in the NRHP. The APE for direct effects of the Section 270 line was defined as the area of construction for the power line including the area of clearing. For indirect effects, the APE was defined as any area within 0.5 miles of the segment center line. The APE for indirect effects was expanded beyond 0.5 miles for those areas where it was reasonably expected that the transmission line would be visible because of limited intervening topography or tree cover. Four properties in Rumford located on either Congress Street or Hartford Street are listed in the NRHP. In addition, seven historic resources were previously determined to be eligible for listing. These seven resources include three bridges, a paper mill plant and office, an abandoned store, all of which are located in Rumford, and the Mitchell Farmstead, which is located in Mexico and is discussed above. The architectural survey conducted for the Section 270 line identified eight additional individual properties, and the Rumford Downtown Commercial Historic District as potentially eligible for listing in the NRHP. The individual properties that were identified included six homes, a fire station and a church. In their review the MHPC agreed with the eligibility of all the individual properties, but concluded that the buildings within the Rumford Downtown Commercial Historic District did not retain the architectural integrity needed for listing. The MHPC requested additional information on properties listed on Prospect Avenue to determine their potential eligibility, as well as additional information on the abandoned store, which is located within approximately 20 feet of the Section 270 line corridor. Based upon modifications or deteriorated conditions, the other properties on Prospect Avenue were determined not to be eligible for listing. Similarly, it was determined that the abandoned store was not eligible for listing in the NRHP because of the deteriorated condition of the building and because the building was likely not as old as originally estimated and many of the other associated buildings had previously been razed. The MHPC concurred with these findings.

3.8.4 Potential Impacts of the Proposed Action

Nine properties identified during the project historic architectural survey were recommended as potentially eligible for listing in the National Register. Eight of these properties appear to be eligible at the local level as representative examples of local architectural types and for associations with rural agricultural and residential land uses. In addition, the Andover Earth Station may be eligible at the national level based on its historical association with the operation of the Telstar satellite. This list of potentially eligible sites was provided to the MHPC for their review, and the MHPC concurred with the eligibility findings.

Four of the nine properties evaluated as eligible for listing in the National Register have no potential for views of the project, and a determination of "*no effect"* was made for these properties. The Andover Earth Station may have views of the project at a distance of approximately 3.4 miles to the east, but the views would likely be substantially filtered by tall

vegetation on and around the property. Since the significance of the Andover Earth Station stems from innovations in communications and satellite engineering technology and the location of the property as a prime site to receive signals, the project should have no effect on the characteristics that qualify the property for National Register listing. On their review, the MHPC concurred with the finding of "*no effec*t" for these five properties. A finding of "*no adverse impact*" was made for a sixth property where turbines would be visible, but the view would be screened by an intervening mountain. The MHPC also concurred with this finding.

The remaining three National Register eligible properties are nineteenth-century farmsteads that retain clusters of historic agricultural buildings set within rural landscapes defined by open fields bordered by mature natural forest. Two of the properties (Austin Farmstead and Knapp Farmstead) located on Swift River Road in Byron would have views of approximately 14 turbines at distances ranging between 1.7 and 3.3 miles. The third property, the Mitchell Farmstead, located on Roxbury Road in Mexico would have views of most of the 22 turbines at distances ranging between 3.7 and 5.9 miles. Figures 3-6 through 3-13 provide existing views and photo simulations of the project area from these properties. Based upon this information, the MHPC determined that the proposed project would have an "adverse effect" on these three properties. The Advisory Council on Historic Preservation (ACHP) chose not to participate in consultations related to the finding of "adverse effect", and the MHPC and the Corps entered into a MOA in regard to the proposed project. Under the MOA, these three properties must be documented to the standards of the Maine Historic Building Record (MHBR). Record Hill LLC has submitted the documentation to the MHPC.

In addition to the historic architectural resources discussed here, the AT, which has been identified as eligible for listing in the National Register, is located within eight miles of the project area. The Old Blue Mountain viewpoint on the Appalachian National Scenic Trail is located 7.8 miles from the nearest turbine. A two-mile section of the AT is located within eight miles of the project, but there would be few views of the project from this section of trail because of intervening topography, including other mountain ridgelines. The turbines should have a minor impact on the view from Old Blue Mountain, but the rest of the trail is in forested land and would not have a view of the project. Due to their distance and relatively small apparent size, the turbines would not dominate the landscape or create an obvious contrast in scale. Correspondence between the Maine SHPO, the Corps, and the Applicant reviewed the potential effects on the AT, but due to the distance and limited views from the AT to the proposed project, no mitigation measures were required or incorporated into the MOA.

No Euroamerican archaeological resources or precontact archaeological sites (i.e., Native American resources) were identified in the APE; therefore, there would be no effect on these resources.

Based upon a review of the U.S. Department of Housing and Urban Development's Tribal Directory Assessment Tool[9], there are no Native American tribes/bands with an interest in the project area.

[9] http://www.hud.gov/offices/cpd/environment/tribal/

Figure 3-6: Existing panoramic view of project area from Austin Farmstead. July 2009. Terrence J. DeWan & Associates

Figure 3-7: Photosimulation of project area from Austin Farmstead. July 2009. Terrence J. DeWan & Associates

Figure 3-8: Photosimulation [normal view] of project area from Austin Farmstead. July 2009. Terrence J. DeWan & Associates

Figure 3-9: Existing panoramic view of project area from Knapp Farmstead. July 2009. Terrence J. DeWan & Associates

Figure 3-10: Photosimulation of project area from Knapp Farmstead. July 2009. Terrence J. DeWan & Associates

Figure 3-11: Photosimulation [normal view] of project area from Knapp Farmstead. July 2009. Terrence J. DeWan & Associates

Figure 3-12: Photosimulation of project area from Mitchell Farmstead. July 2009. Terrence J. DeWan & Associates

Figure 3-13: Photosimulation of project area from Mitchell Farmstead. Because of cloud cover the model was superimposed over the photo. July 2009. Terrence J. DeWan & Associates

3.8.5 POTENTIAL IMPACTS OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.9 AESTHETICS AND VISUAL RESOURCES

The term aesthetics typically refers to the perceived visual impression of an area, such as of a scenic view, open space, or architectural interest. The aesthetic value of an area is a measure of its visual character and *visual quality* combined with *viewer response* (Federal Highway Administration 1988). This combination may be affected by the components of a project (e.g., buildings constructed at a height that obstructs views, hillsides cut and graded, open space changed to an urban setting), as well as changing elements, such as light, weather, and the length and frequency of viewer exposure to the setting. Aesthetic impacts are thus defined as changes in viewer response as a result of project construction and operation. As described below, visual character, visual quality, and viewer response are key aspects used in the visual impact assessment process.

Visual character is the appearance of the physical form of the landscape, composed of natural and human-made elements, including topography, water, vegetation, structures, roads, infrastructure, and utilities; and the relationships of these elements in terms of form, line, color, and texture (U.S. Forest Service 1995; Federal Highway Administration 1988).

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity as modified by its visual sensitivity (Federal Highway Administration 1988; Jones et. al. 1975).

- *Vividness* is the visual power or memorability of landscape components as they combine in striking or distinctive visual patterns.
- *Intactness* is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as natural settings.
- *Unity* is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the artificial landscape.

High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

Viewer response is the psychological reaction of a person to visible changes in the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., roadway or trail) (Federal Highway Administration 1988). The measure of the quality of a view must be tempered with the overall sensitivity of the viewer and viewer response. Viewer sensitivity is dependent on the number and type of viewers and the frequency (e.g., daily or seasonally) and duration of views (i.e., how long a scene is viewed). Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and the viewing duration. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in a viewshed may vary between different geographic region or types of terrain, the standard foreground zone is 0.25–0.5 mile from the viewer, the middleground zone from the foreground zone to 3–5 miles from the viewer, and the background zone from the middleground to infinity (Jones et. al. 1975).

The concepts presented above are combined in a visual impact assessment process, which involves identification of the following:

- Visual character and quality of the project area,
- Relevant policies and concerns for protection of visual resources,

- General visibility of the project area within an eight mile area surrounding the proposed project area and site using descriptions and photographs, and
- Viewer response and potential impacts.

3.9.1 REGULATORY FRAMEWORK

3.9.1.1 Federal

National Historic Preservation Act
Under Section 106 of the National Historic Preservation Act of 1966 (NHPA) (36 CFR Part 800), federal agencies are required to take into account the effect that projects they undertake might have on historic properties. This includes both direct effects in the form of the taking or modification of an historic property, as well as indirect effects that might result from the project. There are nine structures eligible for listing on the National Register of Historic Places (National Register) within eight miles of the project area, refer to Section 3.8, Historic, Archaeological, and Cultural Resources. As structures eligible for or listed on the National Register, these are considered scenic resources of state or national significance under Maine Wind Power Development Law and are described in further detail below.

Appalachian National Scenic Trail
The Appalachian National Scenic Trail (AT) is a designated national scenic trail under P.L. 90-543, SEC. 5. [16 U.S.C. 1244] (a) of the National Trails System Act and is protected under this Act. Under the Act, a national scenic trail is established for "extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass. National scenic trails may be located so as to represent desert, marsh, grassland, mountain, canyon, river, forest, and other areas, as well as landforms which exhibit significant characteristics of the physiographic regions of the Nation" [P.L. 90-543, SEC. 3. [16 U.S.C. 1242] (a)].

3.9.1.2 State

Maine Wind Power Development Law
Under the Maine Wind Power Development Law (S.P. 908), Public Law Chapter 661, the MDEP must determine if a proposed wind energy development project would "significantly compromise view from a scenic resource of state or national significance such that the development has an unreasonable adverse effect on the scenic character or existing uses related to scenic character of the scenic resource of state or national significance" [Sec. A-5. 35-A MRSA § 3402(2)(C)]. As defined in Sec. A-7. 35-A MRSA c. 34-A § 3451(9) scenic resources of state or national significance include:

- A national natural landmark, federally designated wilderness area or other comparable outstanding natural and cultural features, such as the Orono Bog or Meddybemps Heath;
- A property listed on the National Register of Historic Places pursuant to the National Historic Preservation Act of 1966, as amended;
- A national or state park;
- A great pond that is identified as one of the 66 great ponds having outstanding or significant scenic quality in the *Maine's Finest Lakes* (Maine State Planning Office 1989) study published by the State Planning Office or one of the 280 great ponds that are designated as outstanding or significant from a scenic perspective in the *Maine Wildland Lakes Assessment* (Maine Department of Conservation 1987) published by the Maine Land Use Regulation Commission;
- A segment of scenic river or stream identified as having unique or outstanding attributes listed in Appendix G of the *Maine Rivers Study* (Maine Department of Conservation 1982)

- A scenic viewpoint located on sate public reserve land or on a trail that is used exclusively for pedestrian use, such as the Appalachian Trail, that the Maine Department of Conservation designates by rule adopted in accordance with § 3457;
- A scenic turnout constructed by the Maine Department of Transportation pursuant to Title 23 § 954 on a public road that has been designated by the Commissioner of Transportation pursuant to Title 23 § 4206(1)(G) as a scenic highway; or
- Scenic viewpoints located in the coast area as defined by Title 38§1802(1) that are ranked as having state or nation significance in terms of scenic quality.

3.9.2 PROJECT SETTING

The general visibility of the proposed wind energy project lies within a surrounding eight mile area. This area is comprised of gently rolling forested terrain. Views of the project area are generally provided from local roadways, including the Rangeley Lakes Scenic Byway (SR17) that travels along the Swift River valley. Views along SR17, south of Roxbury, are most often limited to the roadway corridor by forested lands lining the roadway and two hills that parallel the roadway to the west. North of Roxbury, there are no intervening hills, the landform slopes gently up to Record Hill, and there are several wider floodplain areas that are in agricultural production. These flat, open portions of land allow views up to the Record Hill ridgeline and to the mountains and ridgelines east of the roadway.

The project area is a mix of pastoral and natural landscapes, and development is not a dominant visual feature. Dark green evergreen trees contrast against lighter green deciduous trees and understory shrubs that give way to hues of yellow, orange, red, and brown in the fall. Seasonal interest such as wildflowers in the spring, deciduous fall colors, and snow covered ground and mountains transform viewsheds throughout the year. The vividness, intactness, and unity of the project area moderately high due to the combination of mainly undeveloped, natural landscapes combined with developed areas that do not dominate the landscape. The project area landscape is scenic, as are areas surrounding the project area, and the presence of human activity upon the landscape does not greatly detract from the natural character, is generally centralized in specific areas, and does not dominate or greatly segment natural areas throughout the project area.

Table 3-10 summarizes the presence or absence of state or national scenic resources within eight miles of the proposed project.

Table 3-10 Presence of State or National Scenic Resources within Eight Miles of the Proposed Project

State or National Scenic Resource	Feature	Location
National Natural Landmarks	None	n/a
Historic Resources	Andover Earth Station	3.4 miles west of the proposed turbines, off Roxbury Notch Road
	Austin Farmstead	1.7 miles northeast of the proposed turbines, on Swift River Road in Byron
	Knapp Farmstead	1.8 miles northeast of the proposed turbines, on Swift River Road in Byron
	Mitchell Farmstead	3.7 miles southeast of the proposed turbines, on Roxbury Road in Mexico
National or State Park	Mount Blue State Park	over eight miles northeast from the closest turbine
	Appalachian Trail	7.8 miles west of the proposed turbines
Great Ponds	None	n/a
Scenic Rivers	Swift River	Between 1 and 2 miles east of the proposed turbines
	West Branch of the Ellis River	5.5 miles west of the proposed turbines
Scenic Viewpoints or Trails	Appalachian Trail at Old Blue Mountain	7.8 miles northwest of the proposed turbines
	Tumbledown Mountain and trails	6.4 miles northeast of the proposed turbines
	Little Jackson Mountain and trails	7 miles northeast of the proposed turbines
	Rangeley Lakes Scenic Byway, Height of Land turnout	State Route 17 in project area is part of Rangeley Lakes Scenic Byway. Height of Land Turnout is 11.5 miles northwest of proposed turbines.

Of the nine properties within eight miles of the wind energy project that are eligible for listing on the National Register, only four properties would have views of the project area, which are the Andover Earth Station, Austin Farmstead, Knapp Farmstead, and Mitchell Farmstead. These properties are described in detail in Section 3.8.

The closest unit of the National Park Service is the AT, which is located approximately 7.8 miles west of the nearest turbine. However, there would be few views of the project from this section of trail because of intervening topography, including other mountain ridgelines. The turbines would be visible from Old Blue Mountain, but the rest of the trail is in forested land and would not have a view of the project. In addition to the AT, scenic viewpoints from trails include trails near the summits of Tumbledown Mountain and Little Jackson Mountain.

While there are no great ponds in the project area, there are three ponds that occur in the project area that possess high quality scenic values. These include Ellis Pond (also known as Roxbury Pond or Silver Lake) and Little Ellis Pond (also known as Garland Pond) to the west of the proposed turbines and Bunker Pond to the east of the turbines. There are no camps on Bunker

Pond, but there are camps on both Ellis and Little Ellis Ponds. Camps on Ellis Pond are located on the eastern, southern, southwestern sides of the pond, and most camps are oriented inward toward the pond. The nearest homes are approximately one mile from the nearest turbine, along the eastern side of the pond, where camps are orientated with their backs toward the project area. Homes with the most direct views to the Record Hill ridgeline are on the southwestern side of the pond, where camps face the project area that is located two to three miles to the east. These views cross the pond surface to the rising, forested mountains in the middleground. For Little Ellis Pond, camps on the east side of the pond are generally orientated to the west away from the project and camps along the northwest have views toward the project area, in the middleground, through the shoreline buffer. All of the ponds are used for recreation and include passive recreational uses such as fishing, boating, and nature viewing. Views from the ponds are picturesque and include the ponds' water surface back dropped by the surrounding rising mountains. These scenes transform throughout the day, from sunrise to sunset; seasonally; and with weather conditions such as a clear versus foggy conditions. The project would be visible from the pond itself as viewers take in their surroundings when using the ponds.

The Swift River and the West Branch of the Ellis River are noted for their scenic value by the *Maine Rivers Study* (Maine Department of Conservation 1982). Both of these rivers are categorized by the study as "C" rivers, meaning that they are rivers that "possess natural and recreational values with regional significance." The Swift River parallels SR17 on the east side of the project area and is also noted for geologic-hydrologic features (e.g., waterfalls and rock formations) and whitewater boating. The Swift River Falls are located less than 2 miles south of Roxbury, 1 mile northeast of the proposed Roxbury Substation and approximately 2 miles east of the proposed turbines. Two of the most notable sections of the Swift River are the Coos Canyon section and Swift River Falls (also known as Three Falls). Dense riparian vegetation and intervening micro-topography limit views to the immediate river corridor; however, some views to areas beyond the immediate river corridor are available from Swift River Falls where there are gaps in vegetation. These views would be most open during the fall and winter months when deciduous trees drop their leaves; however, there would be fewer viewers during this time because of limited recreational use of the river in fall and winter. The existing transmission line is not visible from the falls and the Section 270 transmission line would not be visible. The West Branch of the Ellis River in Andover is also noted for geologic-hydrologic features.

The 42-mile section of the Androscoggin River between Rumford and the New Hampshire state line is rated as a “Class C’ river by the Maine Rivers Study for its Critical/Ecologic and Canoe Touring resources. Under this study, the scenic resources of this section of the river were not considered unique or significant. Parts of the CMP Section 270 transmission line would be visible from the Androscoggin River.

The nearest scenic turnout constructed by the Maine Department of Transportation along a public road is the Height of Land on the Rangeley Lake Scenic Byway (Route 17), which is 11.5 miles north of the project. There would be no views of the project from this turnout therefore there is no expected visual impact.

Memorial Park is located on the south side of Route 108, at the end of Congress Street, and the Rumford (Pennacook) Falls overlook park is located below the Information Center on the west side of the Androscoggin River on Bridge Street. Memorial Park has foreground and mid-ground views that include the wooded hillside, power plant on the Androscoggin River, gaging station, several transmission lines, concrete abutments from the outflow channel, and buildings in downtown Rumford. Chain link fencing blocks most Androscoggin River views from inside the park.

3.9.3 POTENTIAL IMPACTS OF THE PROPOSED ACTION

Wind Turbines and Associated Infrastructure

Construction of the proposed project would create temporary changes in views of the project area. Construction activities would introduce heavy equipment and associated vehicles, including bulldozers, excavators, and trucks. Cranes would be used to erect the turbines and meteorological towers, and viewer groups would be able to see the turbines being raised by the cranes. Travelers on State Route 17 would not be accustomed to seeing construction activities of the cranes erecting the turbines; however, much of their focus is on driving and roadway conditions, and their sensitivity to such impacts would be moderately low. Impacts of construction on other viewer groups are not considered adverse because construction would take 6–12 months, and they would only experience a short-term change in the visual character.

In its review of the project, the MDEP found that the wind generating facilities (wind turbines) and associated facilities would not have "an unreasonable adverse effect on the scenic character or existing uses related to scenic character of scenic resources of state or national significance". The project would, however, alter the existing visual environment and views within the project area. In their general review, the MDEP noted that although some of the turbines and the permanent meteorological towers would have nighttime safety lighting, no scenic resources of state or national significance within eight miles of the project are expected to have viewers after dark and would, therefore, not be affected by FAA hazard lighting. The MDEP also noted that the ridgeline access road, Mine Notch Road, would only be visible to the general public from the intersection of Mine Notch Road with SR120. Similarly, the crane paths that provide access along the ridgeline would be screened from most views by vegetation. The project meteorological towers would have limited visibility beyond one mile because of their profile and color. Finally, the electrical collector substation and O&M building would be visible from SR120 (the project office would be located in an existing single-family home, which also is visible from SR120).

The proposed project involves installing wind turbines along the ridgeline of Partridge Peak, Flathead Mountain, and Record Hill. It would introduce large, vertical, artificial structures with revolving turbine blades into the viewshed and would change the ridgeline from one that is predominantly natural to one with distinct artificial features that would be highly visible to residents and businesses, roadway travelers, and recreationists on the pond or on hiking trails. Relative to baseline conditions, these turbines would substantially alter the existing visual character and quality of views toward the ridge. As shown in the simulation for Ellis Pond (Figure 3-14), at close distances the turbines would be noticeable. The turbines become prominent visual features on the ridgeline and alter the visual character and quality for all viewer groups. In addition, movement of the turbines from this vantage would be fairly noticeable due to close proximity, and this motion would likely draw more focused viewer attention toward the structures than would stationary structures of equal size and visual mass. However, as shown in other simulations (Figures 3-6 to 3-13) the turbines would not be very noticeable from farther vantage points (e.g., Byron or Mexico) and would not affect the existing visual character. Moreover, movement of the turbines from this vantage would not be very noticeable due to distance.

Of the nine properties eligible for listing on the National Register, only four properties would have views of the project area, which are the Andover Earth Station, Austin Farmstead, Knapp Farmstead, and Mitchell Farmstead. The Andover Earth Station may have views of the project at a distance of approximately 3.4 miles to the east, but the views would likely be substantially filtered by tall vegetation on and around the property. The remaining three National Register eligible properties are nineteenth-century farmsteads that retain clusters of historic agricultural buildings set within rural landscapes defined by open fields bordered by mature natural forest. As shown in Figures 3-6 to 3-11, respectively, the Austin and Knapp Farmsteads that are located on Swift River Road in Byron would have views of approximately 14 turbines at distances ranging between 1.7 and 3.3 miles. The Mitchell Farmstead, located on Roxbury Road in Mexico, would

have views of most of the 22 turbines at distances ranging between 3.7 and 5.9 miles, as shown in Figures 3-12 to 3-13. Because of the impacts to visual resources from these vantage points, the MHPC determined that the proposed project would have an "*adverse effect"* on these three properties. The Army Corps of Engineers (ACOE) determined and the MHPC agreed that there were "*no prudent or feasible alternatives to avoid the adverse effect*" on these properties. The MHPC and the Corps entered into a Memorandum of Agreement (MOA) in regard to the proposed project. Under the MOA, these three properties must be documented to the standards of the Maine Historic Building Record (MHBR) and submitted into the MHBR on or before November of 2010.

The Swift River and West Branch of the Ellis River, are rivers identified in the *Maine Rivers Study* as having unique/significant scenic resource values that would be affected by the proposed project. The turbines would be visible from some section of this river. The turbines would not be visible from Coos Canyon and only limited views are likely from Swift River Falls because of dense vegetation and intervening micro-topography. While views from Swift River Falls would be more prevalent during the fall and winter when deciduous trees are bare, there are fewer recreational viewers on the river at this time of year. For these reasons, there is expected to be very limited visual impact on the Swift River as a result of the project.

Three scenic viewpoints or trails, including the AT, Tumbledown Mountain and its associated trails, and Little Jackson Mountain and its associated trails would have views of the proposed project. A two-mile section of the AT is located within eight miles of the project, but there would be few views of the project from this section of trail because of intervening topography, including other mountain ridgelines. The turbines should have a minor impact on the view from Old Blue Mountain, but the rest of the AT is in forested land and would not have a view of the project. Due to the distance from the AT and their relatively small apparent size, the turbines would not dominate the landscape or create an obvious contrast in scale. The maximum view of the project from Tumbledown Mountain would occur from the mountain's west peak. This viewpoint would be approximately 5.7 miles from at nearest turbine, and all of the project turbines would be visible. Views from the summit of Little Jackson Mountain would be similar to the West Peak of Tumbledown Mountain although the turbines would appear small since Little Jackson Mountain is further from the project area.

Views from Ellis, Little Ellis, and Bunker Ponds would be affected by the proposed project. As describe above, most of the camps on Ellis Pond are located on the east side of the pond and therefore are orientated away from the project, but the project would be visible from the pond itself. The nearest homes are approximately one mile from the nearest turbine and those homes with the most direct view are on the west side of the pond where turbines would be seen at distances of two to three miles. For Little Ellis Pond, camps on the east side of the pond are generally orientated to the west away from the project and for camps along the northwest shoreline turbines would be seen through the shoreline buffer at distances of two-and-a-half to five miles. As with Ellis Pond, the project would be visible from the pond itself. Figure 3-14 provides a photo simulation of the project from Ellis Pond.

CMP Section 270 Transmission Line

The Section 270 line upgrade includes removing existing vegetation and widening the existing transmission line corridor from 100 feet to 150 feet and constructing a new transmission line parallel to the existing Section 59 transmission line that has wooden utility poles. The transmission line would visible from the following scenic resources:

- Memorial Park in Rumford and Rumford (Pennacook) Falls overlook park located below the River Valley Chamber of Commerce Information Center (Information Center) in Rumford;
- Bean Brook and Scotty Brook in Rumford;
- Swift River in Rumford, Mexico, and Roxbury and Swift River Falls;

- SR17, part of the state-designated Rangeley Lakes Scenic Byway in Roxbury; and
- One residential property in Mexico and one in Roxbury that are eligible properties for the National Register of Historic Places.

The new transmission line should have a relatively minor visual impact on the view from the Androscoggin River, because the current viewshed contains multiple transmission lines, a gaging station, a hydroelectric powerhouse, and the Route 2 substation near Rumford Falls where the new transmission line ends and the new transmission lines are in keeping with this existing visual character.

Memorial Park is located on the south side of Route 108, at the end of Congress Street, and the Rumford (Pennacook) Falls overlook park is located below the Information Center on the west side of the Androscoggin River on Bridge Street. Memorial Park has foreground and mid-ground views that include the wooded hillside, power plant on the Androscoggin River, gaging station, several transmission lines, concrete abutments from the outflow channel, and buildings in downtown Rumford. Chain link fencing blocks most Androscoggin River views from inside the park. From the east side of Memorial Park, two transmission structures (70-100' tall) and the conductors would be visible on the wooded hillside above Prospect Avenue at a distance of 0.25 miles. The addition of two transmission structures should have a minor visual impact on the view from the park and the surrounding area, because of similarity to existing structures in the area. The Rumford Falls overlook is located below the Information Center and is oriented to the south-southeast, facing the falls. The transmission corridor is located south of the overlook, and would be partially blocked by riverside trees from most locations. Where the new transmission structures are visible, they would be seen in the context of the power plant, the gauging station, and the other transmission lines that are located in the vicinity of the falls. Therefore, the transmission line would only be partially visible from these locations and there would not be a significant visual impact on either location. The visual impact on the view from the overlook area would be slight to moderate, depending upon the viewer's location.

Bean Brook is located south of Swain Road near the proposed Pole 26. An existing snowmobile bridge, the Ivan M. Churchill Memorial Snowmobile Bridge, crosses this stream within the cleared transmission line corridor. The proposed corridor clearing would occur on the west side of the existing corridor and away from the snowmobile bridge. Because trail users are accustomed to the existing cleared corridor, additional widening of the corridor and structure replacement would have a minimal visual impact. Scotty Brook is located south of Isthmus Road near the proposed Pole 49. The stream is located at the base of a steep grade and is generally not visible to people passing by on Isthmus Road. The additional clearing proposed for the upgrade would have minimal visual impact at Scotty Brook.

The Roxbury section of Route 17 is the southernmost extent of the State-designated Rangeley Lake Scenic Byway. The byway becomes a National Scenic Byway at the Byron/Township D line, north of the Section 270 line upgrade. There are no official pull-offs or scenic overlooks along Route 17. The existing transmission corridor is primarily located on the east side of a series of pronounced hills / small mountains. Despite its elevated location, it is barely visible in the middleground from Route 17 throughout its length, primarily due to the density of the surrounding forestland and an alignment that avoids the steepest topography. To someone who is looking for it, the existing transmission corridor may be seen as a subtle change in the color of the vegetation in a few locations on Route 17 on the east side of the Swift River in Mexico and Roxbury. The existing transmission structures are very difficult to see due to their color and limited height, especially in leaf-on conditions. The additional corridor width and taller structures for the Section 270 line would increase the corridor visibility somewhat, but views would still be intermittent from Route 17. Due to the limited visibility of the transmission line outside of the transmission corridor, there would be relatively minor contrasts in line from Section 270 to the scenic byway.

The two homesteads noted as eligible by the National Register of Historic Places that would have views of the Section 270 transmission line are the Mitchell Farmstead in Mexico and a farmstead

located at 1805 Roxbury Road in Roxbury. At its closest point, the Mitchell Farmstead is located approximately 0.75 miles east of the transmission line on Route 17. From Route 17 near the Mitchell Farmstead, the existing transmission line is visible as a faint line on the hills on the west side of the Swift River. Several of the existing transmission structures are visible, but blend in well with the surrounding trees because they are wooden and none of the structures break the horizon line. Section 270 would be slightly more visible due to the additional cleared width of the transmission corridor and the additional height of the transmission structures. With time, the contrasts in color, line, and texture would diminish as the transmission structures weather and the vegetation on the upper edge of the transmission corridor starts to fill in. Views looking west from the Mitchell Farmstead toward the transmission corridor are presently screened by stands of deciduous trees on the west side of Route 17 and as such the proposed transmission corridor upgrade would have a minimal visual impact. There would be no visual impact on the farmstead located at 1805 Roxbury Road. This farmstead is located 2.8 miles from the transmission line corridor and visibility would be screened by vegetation and intervening topography.

In addition to potential impacts to scenic resources, the visual analysis reviewed potential impacts at road crossings and to nearby residences. The Section 270 transmission line corridor would cross four public roads: Route 2 in Rumford, Swain Road in Rumford, Isthmus Road in Rumford, and Route 120 in Roxbury. The Route 2 crossing would connect Section 270 to the Route 2 substation. No visible changes are anticipated at the substation other than the installation of conductors between the substation and the Pole 1. It is likely that an unoccupied house and attached shed on Route 2 would be removed to accommodate this crossing. Other homes in-town Rumford would see little impact. The tops of one transmission structure and its associated conductors may be visible from one home at the northern end of High Street. Other homes at the north end of High Street are elevated above the existing transmission line corridor and views would be screened by dense vegetation surrounding the homes. The existing transmission line corridor crosses both Swain Road and Isthmus Road. The proposed widening and use of taller structures would have little affect along Isthmus Road because the crossing occurs at a sharp reverse curve, making the corridor only briefly visible to passing motorists. There are no homes with the view of the transmission line corridor on Isthmus Road. The changes associated with the upgrade would be more visible from Swain Road since the crossing occurs along a straightaway; however the overall effect would not be significant. There are two homes on Swain Road near the transmission line crossing. Existing vegetation that screens both of these homes would remain undisturbed by the proposed widening. The Route 120 crossing would be the new crossover line. The crossover line would be visible from Route 120 and the new substation would be visible to motorist traveling southeast at this crossing. The new substation would also be visible to northbound motorist along the site access drive. The site would be generally well-screened from Route 120 by existing vegetation, and plantings would be installed at the entrance to restore any vegetative buffer that is cleared for construction. The three homes west of the substation may have views of the substation from their backyards, but an existing buffer along the western boundary of the substation provides a relatively dense vegetative screen for the homes and portions of their backyards. However, some additional plantings may be needed to further minimize visual impacts.

3.9.4 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

Figure 3-14: Photosimulation from Ellis Pond. Terrence J. DeWan and Associates

3.10 SHADOW FLICKER

3.10.1 PROJECT SETTING

According to the Maine Site Location of Development Act, a proposed wind energy development must demonstrate that it has been designed to avoid unreasonable adverse shadow flicker effects. Shadow flicker caused by wind turbines is defined as alternating changes in light intensity caused by the moving blade casting shadows on the ground and stationary objects.

Shadow flicker from wind turbines is the effect resulting from the shadows cast by the rotating blades of the turbine on sunny days. Shadow flicker is generally experienced in areas near wind turbines where the distance between the viewer and blade is short enough that the glare from the sunlight is insufficient to conceal the blade. When the blades rotate, this shadow creates a visual pulsing effect with the sun known as shadow flicker. From longer distances, however, the wind turbine covers an increasingly smaller portion of the sun and light rays would "recombine" to eliminate the shadow flicker effect. Shadow flicker is greatest in the winter months as the angle of the sun is low and casts a longer shadow. The effect may be more or less pronounced depending on the intensity of the sun/shadow contrast and the distance from the turbines to a receptor. The effect is most pronounced during sunrise and sunset on clear days, and on receptors closer than 1,000 feet to a turbine.[10] At distances of 3,280 feet (1,000 meters) from turbines, the results of shadow flicker become unperceivable.

3.10.2 POTENTIAL IMPACTS OF THE PROPOSED ACTION

The 22 potential turbine sites were modeled using the WindPRO software model (EAPC 2008). This software is designed to simulate the path of the sun over the course of a year in order to predict the area where shadow flicker is likely to occur. It is a worst case prediction, assuming the sun is shining each day, and does not take into account vegetation screening between a turbine and a receptor. It also assumes that the turbines are always operating and facing perpendicular to the receptor. The project is situated such that no structures are located within 1,000 feet of a turbine with the nearest structure located approximately 2,345 feet from the turbine string. This nearest structure is abandoned and is not habitable. The shadow flicker analysis was designed to assess any potential impact to residences in the vicinity of the project; Figure 3-15 displays the results. This analysis quantified impacts out to 3,280 feet (1,000 meters). Based upon this analysis four potential receptors were identified. Each of these receptors is located south of the turbine string. Of the four potential shadow flicker receptors analyzed using the WindPRO software, none showed a possibility of any shadow flicker impact.

3.10.3 POTENTIAL IMPACTS OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

[10] Environmental Impacts of Wind Energy Projects, National Academies Press, 2007, p. 160.

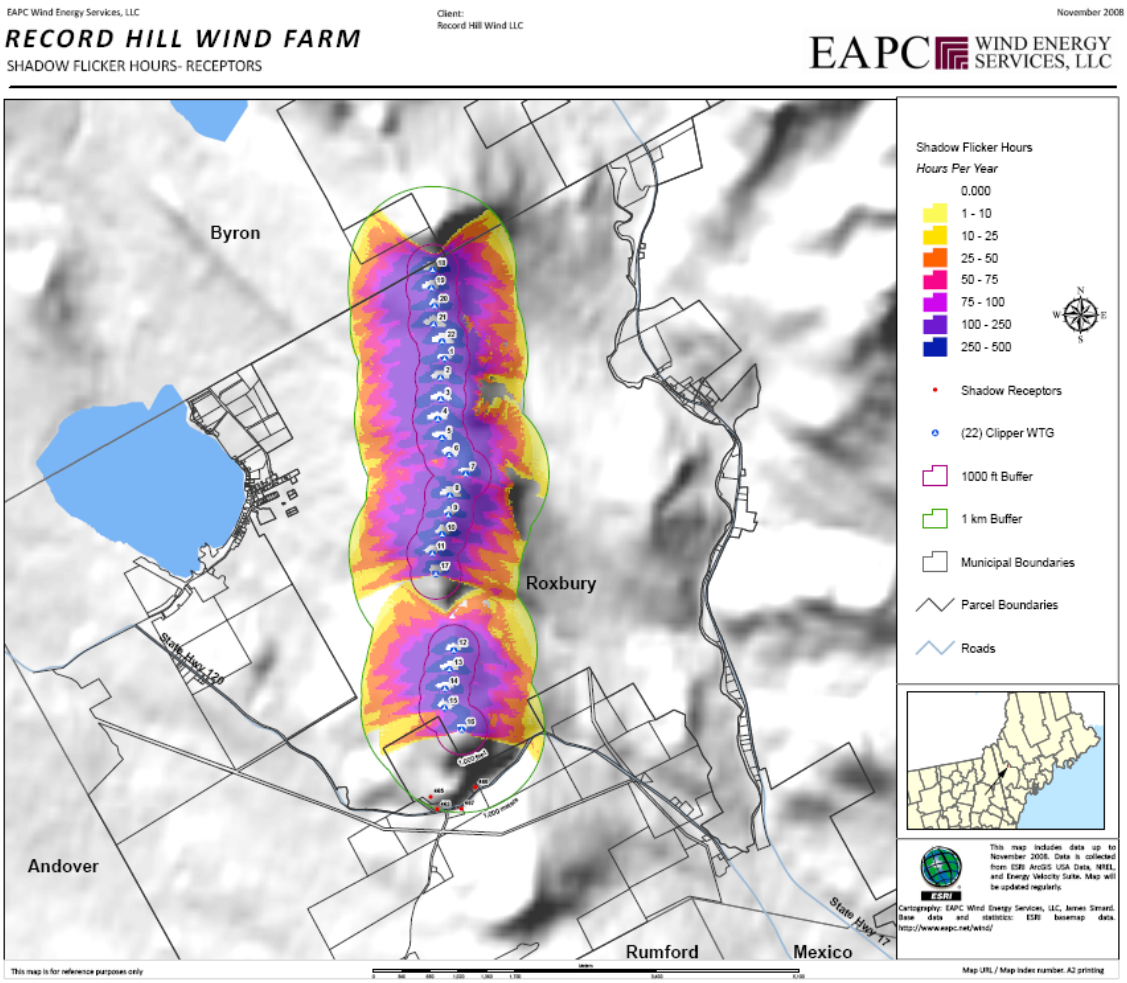


Figure 3-15 Shadow Flicker Map

3.11 OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY

This section describes concerns related to the health and safety of the public, of construction workers building the wind power generation facility and associated components, and workers who would operate the facility once it is operational.

3.11.1 REGULATORY FRAMEWORK

Occupational health and safety rights for both construction workers and workers at the completed wind generating facility are protected through the federal Occupational Safety and Health Act of 1970 (29 USC 651 et seq). Under this act, the U.S. Congress created the Occupational Safety and Health Administration (OSHA), an agency of the U.S. Department of Labor. OSHA's mission is to assure the safety and health of American's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. States may have additional laws and regulations that build on the Occupational Safety and Health Act.

In regard to commercial wind power development in Maine, the MDEP has specific set back recommendations related to the placement of wind turbines. For public safety, wind turbines should be set back a minimum of 1.5 times the maximum blade height of the wind turbine from any property line, occupied structure, or public areas.

3.11.2 PROJECT SETTING

Construction sites can be high-risk environments with the potential for falls, trips, impacts, exposure to hazardous materials, and other injuries. The disturbance of contaminated soils introduces an additional risk of hazardous material exposure, which could lead to various medical conditions depending upon the contaminant, the level of exposure, and the individual exposed to the contaminant. These medical conditions include, but are not limited to, headaches, nausea, respiratory illness, skin reactions, and increased risk of cancer. A search of the EPA's EnviroMapper website indicates that there is no documented contamination at the project ridgeline or the property where the office, O&M building, and collector substation would be located.

Construction sites also can pose a safety hazard for the general public who access the site without authorization. These sites may have open holes in the ground into which an individual could fall, and structures in various stages of completion that could pose a fall hazard if used for climbing. Workers at the Record Hill facility would be using very few products that would be characterized as hazardous materials. These materials include antifreeze, various petroleum products, and non-lead based paint. Relatively small amounts of these various materials would be stored at the project O&M building. All workers with the potential for exposure to hazardous materials would be trained as to proper handling procedures and would be provided with the appropriate personal protective equipment, as needed.

3.11.3 POTENTIAL IMPACTS OF THE PROPOSED ACTION

All project activities during construction, operation and decommissioning would be carried out in compliance with applicable OSHA requirements, which should reduce potential negative effects on workers. Access to the ridgeline portion of the project area would occur primarily from a single access point, Mine Notch Road, which should limit the likelihood of the general public being exposed to health and safety hazards during construction.

Since there is no contamination documented in the project area, the potential for construction workers to be exposed to contaminated soils is minimal.

Daily operations of the project would involve minimal storage and use of hazardous materials. Storage and handling of materials is addressed in the project SPCC Plan, which would be developed prior to initial operation.

The MDEP guidance recommends that turbines be setback 1.5 times the maximum blade height from any property line, occupied structure, or public areas. Based upon the blade height of the Siemens SWT 2.3-93 turbine, the setback for these structures should be 622.5 feet. Twenty of the 22 proposed turbines would be located more than this minimum setback distance of 622.5 feet. Two parcels are located at less than this setback distance, although neither parcel is currently used for residential purposes. One turbine would be located at 175 feet from a property boundary and one would be located approximately 450 feet from a property boundary. Both of the affected property owners provided waivers stating that they had no objections with the proposed location of these turbines.

3.11.4 INTENTIONALLY DESTRUCTIVE ACTS

Wind generation projects can be the subject of intentional destructive acts ranging from random vandalism and theft to sabotage and acts of terrorism intended to disable the facility. Acts of vandalism and theft are far more likely to occur than sabotage or terrorism. Theft usually involves equipment at substations and switchyards that contain salvageable metal when metal prices are high. Vandalism usually occurs in remote areas and is more likely to involve spontaneous acts such as shooting at equipment.

Protections against theft include fencing, warning signs, lighting, locks, and alarm systems around substations where material and equipment is housed. The presence of workers, security guards, or local residents also discourages theft, but substations, wind generators, and other equipment are increasingly remotely controlled and are unmanned. The presence of high-voltage electricity also presents a certain deterrent to theft. Prosecution of thieves and monitoring of metal recycling operations also may deter theft of metals and equipment. Similarly, prosecution of vandals damaging transmission system equipment may discourage vandalism if it should become a problem.

The risk of damage to the proposed Project from intentional destructive acts would be considered very low, in line with or less than the risk to similar generation facilities in the U.S. Theft or opportunistic vandalism is more likely than sabotage or terrorist acts, which are considered to be a negligible risk. The results of any such acts could be expensive to repair, but no substantial impacts to continued electrical service would be anticipated. No significant environmental impacts would be expected from physical damage to the proposed Project or from loss of power delivery.

3.11.5 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.12 Land Use

3.12.1 Project Setting

The Record Hill project area is located within a large undeveloped property managed for commercial timber production. The property is located north of Route 120 (also known as Roxbury Notch Road), a paved two lane road, and west of the Swift River and Route 17 (also known as Roxbury Road). Prior to initiation of the Record Hill project, the area was undeveloped with the exception of gravel logging roads used for timber harvesting activities and a CMP transmission corridor that bisects the property from north to south. Access to the Record Hill project area occurs from Route 120 via Mine Notch Road. The project area includes the ridgelines of Partridge Peak, Flathead Mountain, Record Hill, and portions of the surrounding side slopes and valleys. Elevations of these mountains are generally less than 2,200 feet. Evidence of past and present timber management occurs on most of the ridgeline and side slopes. The project area includes forested uplands, forested wetlands, scrub-shrub wetlands, emergent wetlands, and streams. Other land uses within the surrounding project area include agriculture, rural residential, and recreation.

The approximately 8 mile Section 270 transmission line upgrade would be an expansion of an existing transmission line corridor. The line would extend from the new Roxbury substation on the northeast side of Route 120 in Roxbury south and southeast through Mexico to the existing Route 2 substation in Rumford. The expansion area would include forested uplands, forested wetlands, scrub-shrub wetlands, emergent wetlands, and streams as well as limited areas of residential, commercial and industrial development. The existing transmission line corridor receives limited recreational use by all-terrain vehicle and snowmobile riders, and hikers. The Interconnected Trail System (ITS) 82 snowmobile trail is co-located within the existing corridor near Swain Road in Rumford.

The property where the new Roxbury substation, project O&M building, office and collector substation would be located includes an existing single-family residence, associated outbuildings, gravel driveway and maintained lawn. Undeveloped areas on the property consist of forested and shrub uplands, upland fields, wetlands, including forested, scrub-shrub, and emergent communities, and small streams.

3.12.2 POTENTIAL IMPACTS OF THE PROPOSED ACTION

The project encompasses the ridgeline between Partridge Peak, Flathead and a portion of Record Hill in Roxbury, Maine. Forest types are primarily northern hardwoods with dispersed small pockets of White Pine-Mixed Conifer Forest and Spruce-Northern Hardwoods Forest Red spruce and Balsam fir. The ridgeline is predominately forested and historically accessible for forest management. Due to predominately shallow soils and exposure, the growth potential and timber quality of this area must be considered slightly below average. Regardless, this forest has been managed for decades. Prior to this project, the area had been harvested utilizing skidders skidder trails and logging roads that were within 0.5 to 0-.75 miles of the ridgeline on both the east and western side of the ridge. The flatter northern portion of the ridge between Flathead Mountain and Record Hill has signs of an old truck road from the 19050s or 1960s, but since the advent of skidders, truck road access has been maintained further down slope.

Work on constructing access roads for the turbine site began in the fall of 2009. During this initial phase of construction, the sub-grade was completed along about 3.7 of the 6.1 miles of proposed access roads.

The project area encompasses approximately 175 acres within a larger forested tract of approximately 7,000 acres. Therefore, even assuming if all of this area was were taken out of timber production, the project would have a relatively minor impact to forest management of this larger tract (2.5% percent of the area). While there are some acres that would become non-forested developed acres, a significant portion of the 175 acres must remain in a forested condition per permit conditions. Once the project is completed, the entire ridgeline would be accessible and the remaining forest within the project area itself would be available for low impact forest management and a suite of silvicultural prescriptions. Additionally, forest management would benefit from improved access to areas near the ridge that are outside of the project area. While there is a small net loss of forested land associated due to project activities, this loss would be mitigated somewhat by making formerly inaccessible acres available for forest management.

The most significant recreational activity in the project area has been hunting for large game, such as black bear, moose and white-tail deer. There are no hiking trails within or near the project. Streams are generally too small in the project area to provide brook trout recreational fishing opportunities.

The Bunker Pond Road on the eastern slope of the project area is a popular designated snowmobile trail in the winter. Current safety practices require that snowmobile trails are closed when there is active trucking on the road. In the summer and fall the road is open to the public for hunting and touring. The northern section of the road is also a designated ATV trail.
The Bunker Pond Road on the eastern slope of the project area is a popular designated snowmobile trail in the winter. Current safety practices require that snowmobile trails are closed when there is active trucking on the road. In the summer and fall the road is open to the public for hunting and touring. The northern section of the road is also a designated ATV trail.

On the western side of the project there is a designated ATV trail that crosses the Access Road to the project. The Mine Notch Road has provided hunting and vehicle access to the western slopes. There also has been a designated snowmobile trail on the Yellow Gate road on the lower slopes of the northern portion of Flathead Mountain. While there was a snowmobile trail connecting the Bunker Pond trail with the Yellow Gate trail in the 1980s, it has not been a designated trail since that time.

The project's impact to recreation would be relatively minor. Hunting would continue to be allowed on the lower slopes but not where people are working on the ridgeline. This is consistent with historic and current policies on these lands. Brook fishing opportunities would remain as they are now. Erosion control methods would ensure that stream quality is maintained (or

possibly improved) in all streams. Snowmobile access on the Yellow Gate Rd. and Bunker Pond Rd. would remain unchanged. The Bunker Pond Rd. summer and fall usage for vehicles and ATVs would also not be changed due to the project. During construction vehicle access on the Mine Notch would be restricted. The ATV trail which crosses the access road has been relocated for reasons not related to the project. The trail followed an old discontinued county road which inappropriately crossed some forested wetlands. In addition, the trail was closed by an adjacent landowner. A new location has been approved on this tract that restores the connection with the existing trail network, avoids crossing the access road and is more environmentally acceptable.

The Segment 270 transmission line upgrade should not result in a significant adverse impact to existing or nearby land uses. The property where the new substation would be located would be converted from residential use to commercial use.

3.12.3 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.13 Biological Resources

Biological resources, as described in this section, include native or naturalized plants, invasive plant species, wildlife, and avian species, as well as such species that are protected under Federal or State laws. Protected biological resources include plants and animals listed as threatened or endangered by the USFWS, or otherwise protected under federal or state law, and designated critical habitat.

The following sections briefly review the regulatory framework associated with biological resources, presents a description of the affected environment to include biological survey results, and presents the impacts on the biological resources that would occur under the proposed action and no action alternative.

3.13.1 Regulatory Framework

The principal federal statutes pertaining to the protection of plants and animals include the Endangered Species Act (ESA), the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA), and the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and the principal state statutes include the State of Maine's Endangered Species Act (Maine ESA) and the Maine's NRPA.

3.13.1.1 Federal Statutes

The ESA of 1973 (12 USC Sections 1531-1534) establishes protection and conservation of threatened and endangered species and the ecosystems upon which they depend. USFWS and the National Marine Fisheries Service (NMFS) administer the ESA and designate critical habitat for each species protected under the ESA. Section 7 of the ESA requires all federal agencies to consult with USFWS or NMFS, as applicable, before initiating any action that may affect a listed species or designated Critical Habitat.

The BGEPA of 1940, as amended, (16 USC 668-668c) prohibits any form of possession or taking of both bald and golden eagles without a permit from the Secretary of the Interior. Pursuant to the BGEPA, take is defined as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle; 2) a decrease in its productivity by substantially interfering with normal breeding, feeding,

or sheltering behavior, or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (72 Federal Register 31332).

The MBTA of 1918 implemented the 1916 convention between the U.S. and Great Britain to protect birds that migrated between the U.S. and Canada. Subsequent conventions were held between the U.S. and Mexico, Japan and Russia and were incorporated in the MBTA to protect birds that migrate within or across international boundaries at some point in their life cycle. Under the MBTA, it is illegal to "take" any migratory bird, its eggs, feathers or nest without a permit. A permit is not required to dislodge or destroy migratory bird nests that are not occupied by juveniles or eggs (with the exception of eagles and federally-listed threatened and endangered species).

The MSA was originally enacted as the Fishery Conservation and Management Act of 1976, and has been amended several times over the years, most notably with the Sustainable Fisheries Act in 1996, and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. The MSA calls for direct action to stop or reverse the continued loss of fish habitats. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. Under the MSA, Congress directs NMFS and the eight regional Fishery Management Councils, under the authority of the Secretary of Commerce, to describe and identify essential fish habitat (EFH) in fishery management plans; minimize, to the extent practicable, the adverse effects of fishing on EFH; and identify other actions to encourage the conservation and enhancement of EFH.

3.13.1.2 State Statutes

The Maine ESA (12 M.R.S.A Part 13), as amended, is intended to protect those species of fish and wildlife designated at threatened or endangered in the state. The Maine ESA does not apply to plant species. The purpose of Maine's ESA is to maintain and enhance populations of threatened and endangered animal species and to protect the ecosystems on which these species rely. The Maine ESA is administered by the MDIFW. Under the Maine ESA, MDIFW can designate areas as Essential Habitat for species listed as endangered or threatened, and develop protection guidelines for these Essential Habitats. Essential Habitats are defined "*as areas currently or historically providing physical or biological features essential to the conservation of an endangered or threatened species in Maine, and which may require special management considerations*". In addition, the MDIFW and the Maine Department of Conservation, Maine Natural Areas Program (MNAP) maintain lists of Species of Special Concern in Maine. Species of Special Concern are not protected under the Maine ESA or other legislation. The MDIFW views Species of Special Concern as potentially vulnerable to reaching either threatened or endangered status because of restricted distribution, low or declining numbers, specialized habitat needs or limits, or other factors. The list of Species of Special Concern include those species thought to be rare in Maine, and species suspected of being threatened or endangered or likely to become so, but because of insufficient data, an official determination cannot be made.

The Maine NRPA, specifically Chapter 335, regulates activities that take place in, on, or over a significant wildlife habitat, or adjacent to a significant wildlife habitat located within a freshwater wetland. Under this chapter, regulated activities must be reviewed and approved by the MDEP. Significant wildlife habitats as defined and protected in this chapter are limited to significant vernal pools, high and moderate value waterfowl and wading bird habitat, and shorebird nesting, feeding, and staging areas.

The Maine Department of Conservation considers twenty four plant species to be invasive, whose introduction does or is likely to cause economic or environmental harm or harm to human health. Of these species, there are a few of particular concern in and around forested areas, and include Japanese barberry, honeysuckle, Asiatic bittersweet, common buckthorn, glossy buckthorn, and autumn olive. While an invasive plant species inventory or survey was not completed, it is likely

that some could exist in areas of the project that have been previously disturbed by clearing and development.

3.13.2 PROJECT SETTING

The following sections discuss the existing vegetation and wildlife within the project area, reviews the protected species, and provides a summary of the biological field survey results conducted within the project area.

3.13.2.1 Vegetation and Wildlife

The project area lies within the Western Mountains Region ecoregion, which extends from Bald Mountain near the Canadian border, to the Mahoosuc Range in southwestern Maine (McMahon 1990). This region includes the Boundary Mountains in the northern portion of the region and the Longfellow Mountains in the southern portion of the region. Located between these mountains are large lakes, including Lake Umbagog, Upper and Lower Richardson lakes, Rangely Lake, and Flagstaff Lake. Topography in this region averages between 1,000 feet to 2,000 feet (305 to 610 meters). Stands dominated by red spruce and balsam fir are common on the tops of ridges whereas hardwood species such as sugar maple, yellow birch, and American beech are more common in the valley areas.

The project area consists principally of undeveloped upland forests, which are in various stages of regeneration following timber management activities. Other cover types within or in proximity to the project area include wetlands and developed areas (residential, commercial and industrial). The majority of the lands adjacent to the existing transmission line corridor where the Section 270 corridor upgrade would occur are upland forests. These upland forests are generally described as northern hardwoods, conifers, or mixed hardwood and conifers. Most have been altered by timber harvesting and they are in various stages of regeneration. Most of the forested wetlands in the proposed corridor are classified as a mixture of broadleaved deciduous and needle-leaved evergreens. Scrub-shrub wetlands are typically dominated by shrubs and young trees, but may also include older trees that are stunted due to environmental conditions. Scrub-shrub wetlands within the existing transmission line corridor are moderately vegetated with species such as speckled alders, meadowsweet and steeple-bush. These communities area associated with seepages and with the floodplains of larger streams. Emergent wetlands found within the existing transmission line corridor are typically referred to as wet meadows. These wetlands are very similar in composition and include common species such as bluejoint, sensitive fern, and cinnamon fern.

The ridgeline portion of the project area (turbine area) includes forested uplands and various freshwater wetland communities. The forested uplands occur in various stages of succession following timber harvesting activities. The canopy of these uplands is dominated by a combination of American beech, yellow birch, and sugar maple. Additional tree species include paper birch, eastern hophornbeam, red spruce, balsam fir, and eastern hemlock. The shrub layer includes the above mentioned tree species, along with striped maple, hobblebush, and beaked hazelnut. Dominant herbaceous species include bracken fern, bunchberry, evergreen wood fern, and shining clubmoss.

In the forested wetlands, commonly occurring tree species include yellow birch, balsam fir, red maple, green ash, northern white cedar, and eastern hemlock. The shrub layer consists primarily of these same tree species with a limited presence of shrub species such as hobblebush, witherod, and winterberry. Commonly occurring herbaceous species include cinnamon fern, evergreen wood fern, sensitive fern, northeastern mannagrass, fowl mannagrass, and fringed sedge.

Scrub-shrub wetlands are present in scattered locations throughout the project area and often appear in conjunction with either forested or emergent wetland communities. The shrub layer is

dominated by tree species such as red maple, yellow birch, gray birch, and striped maple. Red raspberry, a common early successional species, also is present in many of these wetlands. The herbaceous layer includes species such as sensitive fern, cinnamon fern, rough-stemmed goldenrod, fowl mannagrass, northeastern mannagrass, bluejoint and swamp dewberry. *The* emergent wetlands, which are common throughout the project area, are typically referred to as wet meadows. Wet meadows are dominated by herbaceous species that are adapted to saturated soil conditions but not adapted to long periods of inundations as would be common in marsh habitats. The emergent wetlands within the project area are typically dominated by herbaceous species such as wool-grass, fowl mannagrass, bluejoint, sallow sedge, fringed sedge, pointed broom sedge, sensitive fern, jewelweed, and rough-stemmed goldenrod. These wetlands also support red raspberry, steeple-bush, and seedlings of the tree species mentioned above.

The property where the O&M building, project office, and collector substation would be located includes areas of forested and shrub uplands, as well as areas of upland field/maintained lawn. Wetlands present on this property included forested, scrub-shrub, and emergent communities. Vegetation species present in both uplands and wetland are the same as those identified on the ridgeline. There are seven delineated wetlands on the property where the project facilities would be located. These wetlands are generally small in size and have been altered by existing residential development and associated land management (i.e., mowing).

The project area including the ridgeline, electrical generator lead, O&M property and Section 270 corridor, totals approximately 1,628 acres. Forested uplands, in various stages of succession due to forestry management practices, represent over 90 percent of the surveyed area. The dominant upland forest community is Beech-Birch-Maple Forest as defined by the MNAP. Wetlands, principally forested communities or formerly forested communities that have undergone timber harvesting, represent less than 10 percent of the project area. Existing development within the project area is limited (less than 1 percent of the area) occurring at the proposed O&M site and at few other locations. At the proposed O&M site approximately 25 percent of the property consists of development in the form of an existing residence, out buildings, driveway and upland field/maintained lawn.

Fish and wildlife resources in the project area include resident and migratory animal species. These resources include individuals and populations. Although active timber harvesting alters the habitat, the early successional and mixed growth forests present on the ridgeline can support a variety of wildlife species. Mammals that were observed or that may be present on the ridgeline based upon available habitat include white-tailed deer, moose, black bear, coyote, bobcat, red squirrel, eastern chipmunk, snowshoe hare, deer mouse, porcupine and short-tailed shrew. Based upon their normal geographical range, the following species of bat could be present in the project area: little brown bat, northern myotis, eastern small-footed bat, silver-haired bat, big brown bat, eastern red bat, hoary bat, and eastern pipistrelle. There is a documented bald eagle nest approximately one mile west of the project area on an island in Ellis Pond. Additional information on bats and avian species in the project area is presented in Section 3.11.2.3, Biological Survey Results. Herptiles (i.e., amphibians and reptiles) that were either observed or could be present based upon available habitat include spotted salamander, red-back salamander, wood frog, American toad, spring peeper, eastern garter snake, and eastern milk snake.

Seventy-seven small intermittent and perennial streams were identified within the ridgeline portion of the project area and along the electrical generator lead. The streams that would be impacted on the ridgeline include a small perennial stream and three first order intermittent streams. The three intermittent streams would be unlikely to support fish, and the small perennial stream would most likely only support small non-game species such as longnose dace. No fish were observed during the field surveys in the project area and no adverse impacts to fisheries are expected on the ridgeline. The electrical generator lead would cross one first order intermittent stream and six small perennial streams. No fish were observed in the intermittent stream during the course of the resource delineation, and it is unlikely that it is capable of supporting fish. Fish

were observed in one of the perennial streams and the five other perennial streams may support at least limited fisheries.

The available wildlife habitat identified along the Section 270 line upgrade corridor is similar to those habitats identified on the project ridgelines with the exception of developed residential, commercial and industrial areas. Because available habitat is similar, wildlife species utilizing these areas also is similar. Many of the bird species that would commonly utilize the habitats present along the Section 270 line are migratory species. It is likely that some bats forage along the Section 270 line corridor, particularly along the existing maintained corridor, and it is possible that some species could roost in existing forested areas. Thirty-two streams transect the proposed Section 270 line upgrade corridor. Based on correspondence from the MDIFW, Scotty Brook provides habitat for brook trout, rainbow trout, slimy sculpins, and cyprinids including the longnose dace. The MDIFW fishery biologist also indicated that other streams in the area likely provide habitat for a similar assemblage of fish species.

3.13.2.2 Protected Species and Habitat

Table 3-11 presents the Federally-listed species that occur in Oxford County, Maine.

Table 3-11 Federally Listed Species in Oxford County, Maine

Group	Name	Status
Birds	Arctic peregrine Falcon (*Falco peregrinus tundrius*)	Recovery
Fish	Gulf of Maine, Distinct Population Segment Atlantic Salmon (*Salmo salar*)	Endangered
Flowering Plants	Small whorled pogonia (*Isotria medeoloides*)	Threatened
Mammals	Canada Lynx (*Lynx canadensis*)	Threatened

Source: http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=23017

The project area is not within NMFS Designated Critical Habitat for the Atlantic Salmon (74 FR 29300) or in USFWS Designated Critical Habitat for the Canada lynx (74 FR 8616). FWS has not designated any critical habitat for the small whorled pogonia. NMFS has designated essential fish habitat (EFH) for Atlantic salmon includes that includes all water currently or historically accessible to Atlantic salmon within the streams, rivers, lakes, ponds, wetlands and other water bodies of Maine. The Androscoggin River and its associated tributaries are designated as EFH for Atlantic salmon.

Correspondence from the USFWS identified that the proposed project occurs within the range of the federally endangered Gulf of Maine Distinct Population Segment of Atlantic Salmon and that the federally-threatened Canada lynx occurs throughout Maine and could occur in the project area; however, Roxbury, Maine is outside of the Canada lynx critical habitat and outside the area the USFWS normally reviews for potential lynx related impacts (USFWS, 2009). No other federally threatened or endangered species under USFWS or NMFS jurisdiction are known to occur in the project area. Correspondence from the MDIFW indicated that there are no documented occurrences of state-listed threatened or endangered wildlife species or their habitats within the project area. Additionally, MDIFW had no documented occurrences of Species of Special Concern within the project area (Letter dated September 14, 2007 from Bob Cordes, MDIFW Assistant Regional Wildlife Biologist, to Adam Gravel, Stantec Consultant - formerly Woodlot Alternatives - Biologist). The MNAP Biological and Conservation Data System documented only two rare plants within a four-mile radius of the ridgeline project area and one rare plant within a four-mile radius of the Section 270 corridor; and no rare botanical features were documented within the project area.

A bald eagle nest occurs on French Island in Ellis Pond, approximately 1.8 miles from the closest proposed turbine locations on Flathead Mountain, and FWS noted that other nests could be in the vicinity of the project area (USFWS 2009). The nest on French Island fledged two young in 2009. Bald eagles primarily fly along river corridors at varying heights in pursuit of prey, during aerial displays, and during daily movements. However, they also often expand their feeding grounds for many miles to lakes, ponds, and other waterbodies.

Maine protected wildlife habitats include essential habitats and significant wildlife habitats. According to the MDIFW, there are no Essential Habitats (roseate tern, least tern and piping plover nest sites) known to occur within the proposed turbine site project area. The MDEP has indicated that no significant wildlife habitat is known to be present within the project area; however, site-specific surveys identified a total of 5 Significant Vernal Pools on the ridgeline or in proximity to the access road to the ridgeline. No Significant Vernal Pools were identified with the electrical generator lead corridor or on the property where the O&M building and substation would be located. One Significant Vernal Pool was identified within the Section 270 line upgrade corridor (see Section 3.5 for a complete analysis of the Significant Vernal Pools). In addition, MDIFW has no record of Deer Wintering Areas in the project area.

3.13.2.3 Biological Surveys and Results

The applicant initiated a series of ecological field surveys, including migrating and breeding bird and raptor surveys, acoustic bat surveys, vernal pool surveys, wetland delineations, and rare, threatened, and endangered (RTE) species surveys. Surveys were targeted to provide data to help assess the project's potential to impact birds and bats, RTE plants and animals, breeding amphibians, and wetlands. The scope of the surveys was based upon guidelines outlined by USFWS and MDIFW. The following surveys were conducted by the applicant:

- RTE surveys and nocturnal radar surveys were conducted on the ridgeline in both the spring and fall of 2007, and acoustic bat surveys in the fall of 2007 and spring of 2008
- RTE and diurnal raptor surveys on the ridgeline were conducted in the fall of 2007 and the spring of 2008
- Breeding bird surveys were conducted in spring 2008, and bald eagle use survey in late summer and early fall of 2009.
- Sensitive Species surveys were conducted along the proposed Section 270 line upgrade

The 2007 nocturnal radar surveys conducted on the ridgeline in both the spring and fall, documented the passage rates of nocturnal migrating animals, which would include birds (primarily passerines [song birds]) and bats. This technology does not distinguish birds and bats therefore observations are described as targets. The animals [targets] documented during the nocturnal radar surveys were not necessarily utilizing the ridgeline itself, but they were passing through the airspace above the ridgeline. Of the avian species identified during the diurnal raptor surveys and the breeding bird surveys, nearly all of the raptors and many of the passerines are migratory.

The acoustic bat surveys were completed to document bat activity patterns in the proposed project area, including within the air space of the rotor-swept zone of the proposed wind turbines. Anabat II detectors (Titley Electronics Pty Ltd.) were used for the surveys, which record and convert the ultrasonic calls made by bats so that they can be heard by humans. These calls were then analyzed and compared to available libraries of known bat calls, and were grouped into four guilds/groups representing bats with similar calls. Calls that could not be identified to guild because of the call quality or duration were placed in a group referred to as unknown. A total of 2,619 bat call sequences were recorded during the fall 2007 sampling period. The overall mean detection rate for all four detectors was 10.7 calls/detector night. Many of the recorded call sequences (28%) were labeled as unknown due to very short call sequences (less than five pulses) or poor call signature formation (probably due to a bat flying at the edge of the detection

zone of the detector or flying away from the microphone). Of the calls that were identified to species or guild, those of the *Myotis* guild were the most common (66% of all call sequences) with the majority detected during the time period when the detectors were in trees at low heights (62% of all *Myotis*). The big brown/silver-haired/hoary bat guild was the next most common, but far less than *Myotis*, and made up approximately six percent of all call sequences.

During the 2007 and 2008 surveys, raptors that were identified during the diurnal raptor surveys most likely were not breeding on the ridgeline, but were migrating through the area or if they were resident birds they were hunting in the area. Thirteen species were observed during these surveys, including American kestrel, bald eagle, broad-winged hawk, Cooper's hawk, merlin, northern goshawk, northern harrier, osprey, peregrine falcon, sharp-shinned hawk, red-shouldered hawk, red-tailed hawk and turkey vulture. During the 2008 diurnal raptor survey, a single peregrine falcon was observed flying through the project area. The breeding population of peregrine falcons is listed as endangered by the state of Maine. Two state-listed Species of Special Concern were documented during the 2007 and 2008 diurnal raptor surveys: bald eagle and northern harrier.

During the spring 2008 acoustic surveys, a total of 2,361 bat call sequences were recorded from all detectors combined. During the spring sampling period, approximately 96 percent of these calls were detected during the month of June from two tree detectors. The majority of these calls were from the *Myotis* guild. The mean detection rate of all detectors was 11 detections per detector-night. The majority of calls (45%) were identified as *Myotis* spp., with the majority detected by tree detectors during the month of June. This is expected as *Myotis* tend to forage at lower heights than other species. The big brown/silver-haired/hoary bat guild was the next most common and made up approximately 38 percent of all call sequences. Only 12 calls from the eastern red bat/eastern pipistrelle guild were detected during the entire season. This trend in species composition is similar to that of other studies in the region.

The 2008 breeding bird surveys conducted on the ridgeline in the spring identified 44 species of birds, most of which potentially could have been breeding at some location on the ridgeline. Some of the species observed included ovenbird, dark-eyed junco, chestnut-sided warbler, white-breasted nuthatch, golden-crowned kinglet, rose-breasted grosbeak, American robin, blue jay, black-capped chickadee, hairy woodpecker, northern flicker, American redstart, black-throated green warbler, and red-eyed vireo. Of the species identified during the 2008 breeding bird surveys, seven Species of Special Concern: American redstart, black-and-white warbler, chestnut-sided warbler, eastern wood-pewee, tree swallow, veery, and white-throated sparrow. These species are on conservation watch lists because of recent declines in their regional population trends, mainly due to loss of habitat. These species are known to occur in disturbed habitats as a result of industrial and commercial timber harvests and were found to be common in the project area. In addition, seven bat species listed as Species of Special Concern, little brown bat, northern myotis, eastern small-footed bat, silver-haired bat, eastern red bat, hoary bat, and eastern pipistrelle, could be present based upon acoustic surveys conducted on the project ridgeline.

A flora and fauna survey conducted on the along the proposed Section 270 line upgrade, did not identify any listed federally-threatened or endangered species. In addition, no plant species tracked as rare by the MNAP were observed. The survey found no state- or federally-listed rare plant or plants tracked as rare by MNAP and did not identify any significant natural communities.

The RTE surveys that were completed in 2007 and 2008 did not identify or document any resident federal or state listed RTE species or Species of Special Concern in the project area. However as noted above, one peregrine falcon (breeding population only - State Endangered), one bald eagle (State Species of Special Concern and protected under the BGEPA), one red-shouldered hawk (State Special Concern species), one Cooper's hawk (State Special Concern species), and one Northern goshawk (State Special Concern species) were observed passing through the area during the raptor migration surveys.

In addition, the surveys conducted in May 2008 and May 2009 identified 32 vernal pools. Of these pools, fourteen did not meet MDIFW criteria for significant vernal pools pursuant to Chapter 335, Significant Wildlife Habitat because they were man-made and occurred within either a roadside ditch or a rut created by heavy equipment. The remaining 18 pools were naturally occurring and supported breeding activity by wood frogs and/or spotted salamanders. Of the 18 pools, five pools met the criteria to be considered Significant Vernal Pools based upon the level of amphibian breeding activity. One Significant Vernal Pool was identified within the Section 270 line upgrade corridor.

3.13.3 POTENTIAL IMPACTS OF THE PROPOSED ACTION

The following sections discuss the potential impacts of the proposed action and no action alternative on the existing vegetation and wildlife within the project area and on the protected species and their associated habitat. It should be noted that Record Hill followed many USFWS recommendations during the design and location of the wind turbines, which included avoidance and minimization measures found in the *Guidelines for Building and Operating Wind Energy Facilities in Maine Compatible with Federal Fish* and *Wildlife Regulations and Interim Guidance on Avoiding and Minimizing Impacts from Wind Turbines*.

3.13.3.1 Impacts on Vegetation and Wildlife

Work on constructing access roads for the turbine site began in the fall of 2009. During this initial phase of construction, the sub-grade was completed along about 3.7 of the 6.1 miles of proposed access roads. At completion, approximately seven percent of the project area would initially be altered by the proposed project with approximately 90 percent of each turbine site and 50 percent of the crane paths allowed to naturally revegetate following construction. Actual development would occupy approximately one percent of the project area. Forested uplands, which represent a majority of the project area, would be the principal habitats altered by the proposed development. Approximately two acres of forested wetlands would be converted from forested communities to shrub and/or herbaceous communities. An additional 0.3 acres of wetland would be permanently filled and 1.5 acres of forested wetlands would be converted to emergent or scrub/shrub wetlands. The proposed project would occupy approximately 5 acres of existing development at the proposed O&M site. The project would result in a total of 18.4 acres of new impervious area and 18.8 acres of new developed areas, in addition to 0.7 acre of developed area in the form of existing logging roads.

Project construction could introduce or increase the spread of invasive species through construction equipment carrying seeds or propagative plant parts, or from seed mixtures that contain invasive plant seeds used to revegetate exposed soils. These potential impacts can be minimized through best management practices such as pressure washing construction equipment before entering construction areas, and using certified weed free seed mixtures.

The removal of 19 acres and the clearing of 49 acres of vegetative habitat within the project area would adversely impact resident wildlife species that currently utilize the project area. The temporary and permanent changes on vegetation and the habitat conditions would impact wildlife that are present in the area. Direct and indirect impacts to wildlife include injury, mortality, and displacement; however, the impacts are not considered significant as suitable wildlife habitat is available in the immediate vicinity of the proposed action that the displaced wildlife could utilize. In addition, because the existing powerline right-of-way would only be expanded by 50 feet, wildlife use of the corridor would not be expected to notably change following the completion of construction. Resident bird species that currently utilize the project area would be expected to continue their use with potential temporary displacement during the actual construction phase. Based on the results of the nocturnal radar surveys, raptor surveys, and acoustic bat surveys in 2007 and 2008, the operation of the wind turbines would not pose a significant threat to birds or bats. The radar surveys indicate that passage rates at the project are comparable to other turbine

sites in the state. Flight height and flight direction data indicate that the majority of targets or animals are flying at a height sufficient to avoid the proposed turbines and blades. Raptor surveys indicate that passage rates of raptors is low in the project area, which is due to the lack of large landscape features that would concentrate raptor activity and migration.

The streams on the project area ridgeline that would be impacted by the project include a small perennial stream and three first order intermittent streams. The three intermittent streams would be unlikely to support fish, and the small perennial stream would most likely only support small non-game species such as longnose dace. Because of the stream protection measures discussed under the proposed action, no notable adverse impacts to fisheries would be expected in the streams along the ridgeline or downstream of the ridgeline streams. The electrical generator lead would cross one first order intermittent stream and six small perennial streams. No fish were observed in the first order intermittent stream during the course of the resource delineation, and it is unlikely that it is capable of supporting fish. Fish were observed in one of the perennial streams and the five other perennial streams may support at least limited fisheries. As described under the proposed action, buffers would be maintained on these streams to reduce potential thermal impacts that would affect fisheries and temporary bridges would be used to cross the streams.

Along the proposed Section 270 line upgrade corridor, a total of 32 streams would be crossed using temporary bridges made of construction mats. At each temporary bridge, supporting mats would not be placed below the normal high water and would not impact the stream banks. This technique allows water to flow freely under the temporary crossings and limits adverse effects to the streams. Crossings of Bean Brook and Scotty Brook would be accomplished using existing permanent bridges or crossings of these streams would be avoided. This approach would reduce potential sedimentation of the streams, which could adversely affect fisheries habitat. After construction of the proposed Section 270 line upgrade and removal of the Section 59 poles and associated materials, vegetation management within the corridor would maintain a 100-foot buffer on six of the perennial streams that were identified by MDIFW as providing coldwater fishery habitat. A 50-foot buffer would be maintained on each of the other streams identified within the corridor. Within this buffer, only capable species (i.e., species capable of growing into the conductor safety zone during the typical four to five year vegetation management schedule) would be removed and all other vegetation would remain uncut. Removal of capable species within these buffers would be done principally using chainsaws or other hand-held equipment such as brush hooks or handsaws. Access to the buffers for maintenance activities would involve minimal trimming or clearing of non-capable species. Use of herbicides within waterbody buffers would be prohibited. These buffers would help reduce potential thermal impacts that could affect fisheries. Therefore, the proposed Project would not be not expected to notably alter existing fisheries habitat and would have negligible impacts on fisheries.

3.13.3.2 Impacts on Protected Species and Habitat

Endangered Species Act (ESA) and Essential Fish Habitat (EFH) and State-protected Areas

The proposed action would have no impact (a no effect determination pursuant to Section 7 of the ESA) on small whorled pagonia as it is not present within the project area, and no impact on designated critical habitat as none has been designated by FWS. The proposed action would have no impact (a no effect determination pursuant to Section 7 of the ESA) on the Canada lynx or its designated critical habitat. No Canada lynx or evidence of Canada lynx were identified during the RTE surveys of the project area, and its preferred habitat (regenerating spruce-fir habitats with high stem densities) is not within the project area. No designated critical habitat for the Canada lynx is within or adjacent to the project area (no critical habitat is present in Roxbury, Maine).

DOE has reviewed the measures to protect the habitat associated with the Gulf of Maine Distinct Population Segment of the Atlantic salmon that are incorporated in proposed action (see below),

and the findings of the USACE Section 404 permits (USACE Permit Numbers NAE-2008-03763 and NAE-2009-01866), and has concluded that the proposed action would have no impact (a no effect determination pursuant to Section 7 of the ESA) on the Atlantic salmon, and no impact on its designated essential fish habitat. In addition, the proposed action would have no impact on designated critical habitat for the salmon, as none is located in the project area. The following measures have been incorporated as part of the proposed action for the protection of streams and wetlands in the project area:

- Temporary bridges for 32 of the stream crossings that would not require construction work below the normal high water line of the streams and would not impact the stream banks.
- Crossing of Bean Brook and Scotty Brook would be done using existing permanent bridges or crossings of these streams would be avoided.
- After construction vegetation management within the transmission corridor would maintain a 100-foot buffer on six of the perennial streams that were identified by MDIFW as providing coldwater fishery habitat to reduce potential thermal impacts. A 50-foot buffer would be maintained on each of the other streams identified within the corridor to reduce potential thermal impacts.
- Within this buffer, only capable species (i.e., species capable of growing into the conductor safety zone during the typical four to five year vegetation management schedule) would be removed and all other vegetation would remain uncut. Removal of capable species within these buffers would be done principally using chainsaws or other hand-held equipment such as brush hooks or handsaws.
- Use of herbicides within waterbody buffers would be prohibited.

In addition, USACE consulted with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service during the Section 404 permit process and determined that the wetland and stream impacts would have no impact, and therefore no effect (pursuant to Section 7 of ESA), on the Gulf of Maine Distinct Population Segment of the Atlantic salmon, and its essential fish habitat.

Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA)

Clearing activities completed on the ridgeline were conducted during the winter (January 2010) and so avoided the migratory bird season. Remaining clearing activities would be associated with the electrical generator lead, facilities at the O&M site and Segment 207 line corridor. The majority of work at the O&M site would occur in already developed/altered areas so clearing would be limited. Remaining clearing would occur principally along the two electrical corridors. The preferred time of year to conduct these activities is under frozen ground conditions and Record Hill anticipates conducting clearing for the generator lead during the winter months. Record does not have control over CMPs construction schedule, but it appears that CMP also intends to take advantage of the winter months (2010) with completion in June or July. Following the CMP construction sequence, clearing would occur as one of the early steps suggesting this would be substantively completed prior to the migratory bird breeding season.

Although wind turbines pose a threat to migratory birds and bats, based upon surveys conducted on the project ridgeline, this threat would be not expected to be significant. The nocturnal radar surveys indicate that the majority of migrants are flying at a height sufficient to avoid the proposed turbines and blades [415 feet (126.5 meters)]. The diurnal raptor surveys indicate many of the raptors flying through the project area passed below the maximum height of the turbines. Because the passage rates of raptors in the project area are relatively low compared to other sites and because diurnal raptors have been documented to avoid modern wind turbines, there would not be a significant impact on these populations. In addition, flight height and flight direction data collected from the surveys indicate that the majority of migratory birds are flying at a height sufficient to avoid the proposed turbines and blades. Migratory species that currently utilize the project area would be expected to continue their use with potential temporary

displacement during the actual construction phase. In collaboration with the MDIFW, post-construction monitoring would be implemented to track mortality that may occur at the project turbines. This information would be used to help ensure that unreasonable adverse impacts to populations are avoided and minimized to the extent practical.

The USFWS made a determination that additional consultation under Section 7 was not required, but as is stated in the PGP issued for the project, a final Eagle Risk Minimization Plan must be developed by Record Hill and submitted to the Corps, USFWS and the Maine Department of Inland Fisheries and Wildlife. This plan has not yet been developed. The permit condition requires that this plan be submitted "at least 60 days prior to commencement of commercial operations."

Raptor mortality documented from developed wind energy projects across the country has shown that diurnally migrating species are at low risk of collision with wind turbines (only 0 to 0.07 fatalities per turbine per year), as recorded from other developed wind projects in the United States outside of California (GAO 2005). In addition, bald eagle mortality from collisions with turbines would not be expected due to the location of the turbines on upland ridgelines, as bald eagles tend to hunt on bodies of water. Pursuant to BGEPA, based upon results of the surveys and other raptor studies, the proposed Project would not have an adverse impact on bald eagles.

3.13.4 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.14 Socioeconomics

The socioeconomic resources that influence the quality of the human environment include demographic information on populations and housing and economic figures such as employment, income, and earnings. Population is the number of residents in the area and the recent changes in population growth. Housing includes numbers of units, ownership, and vacancy rate. Employment data include labor sectors, labor force, and statistics on unemployment. Income information is provided as per capita income. The present day socioeconomic setting is described using the most recently available U.S. Census Bureau data from 2000, unless otherwise noted.

3.14.1 Project Setting

The ROI for the proposed action is principally the Town of Roxbury (Roxbury) and secondarily Oxford County, Maine. Selected economic indicators for the ROI and comparative data for the state are presented in Table 3-12, Selected Socioeconomic Indicators for the Region of Influence and State of Maine.

Based upon the most currently available data from the U. S. Census Bureau data, in 2000 the population of the Town of Roxbury was 384. In 2000, the population of Oxford County was 54,755. The 2006-2008 American County Survey data shows that the population of Oxford County is relatively stable with less than a one percent growth since 2000.

In Roxbury there were 457 housing units in 2000 with a 63.9 percent vacancy rate (significantly higher than the national average of 9 percent). Nearly 90 percent (88.5 percent) of the housing units were owner-occupied, and just over 10 percent (11.5 percent) were renter-occupied. The median value of a single-family home in Roxbury was $80,500, compared to a national average price of $119,600. In Oxford County in 2000, there were 32,295 housing units with a 30.9 percent vacancy rate. More than half of the housing units were owner-occupied (77 percent) and less than half were renter-occupied (23 percent). The median value of a single-family home in Oxford County was $82,800. The 2006-2008 data for Oxford County shows less than a one percent

increase in the number of housing units, as well as less than a one percent increase in the housing vacancy rate.

In 2000, the average per capita income in Roxbury was $18,615 compared to $16,945 for Oxford County. The two primary employment sectors in Roxbury were production, transportation, and material moving occupations (28.5 percent), and management, professional, and related occupations (23.9 percent). The primary employments sectors for Oxford County were somewhat similar with 26.6 percent of people employed in management, professional, and related occupations, 21.3 percent in the sales and office occupations, and 20.1 percent in the production, transportation, and material moving occupations. The primary employment sectors to Oxford County during this time were management, professional, and related occupations (24.6 percent), service occupations (21.1 percent) and sales and office occupations (21.0 percent).

Table 3-12 Selected Socioeconomic Indicators for the Region of Influence and the State of Maine (2000)

Geographic Area	Population	Labor Force	Housing Units	Housing Vacancy Rate (percent)	Median Home Price
Town of Roxbury	384	216	457	63.9	80,500
Oxford County	54,755 (56,608)	27,137 (28,700)	32,295 (34,514)	30.9 (33)	82,800 (144,300)
Maine	1,274,923 (1,315,069)	659,360 (705,001)	651,901 (696,079)	21.8 (20.5)	98,700 (175,200)

Source U.S. Census Bureau 2000 and 2006-2008.
Because the most current census data for the Town of Roxbury is from 2000, the 2000 census data was used at the town, county and state level to allow better direct comparison. To show changing trends, the 2006-2008 American Community Survey data for Oxford County and the State of Maine are provided in parentheses.

3.14.2 Potential Impacts of the Proposed Action

Construction Phase
Under the proposed action, direct and indirect beneficial impacts on socioeconomic resources would occur as a result of up to 200 additional job opportunities. Short-term impacts would include employment opportunities (i.e., timber harvesters and equipment operators) as well as increased activity at local businesses such as hotels and restaurants during construction of the proposed project.

Operational Phase
Long-term benefits would include three to five full-time jobs for employees to operate the facilities as well as seasonal work associated with road maintenance.

The project also would provide long-term tax benefits. Currently Roxbury's total assessed property value is approximately $33 million. The project is expected to be assessed at approximately $100 million and is expected to pay 75 percent of all taxes in the town. At this value, the project would result in a 66 percent reduction in local property taxes. This reduction takes into account adjustments to county taxes, state education subsidy, and municipal revenue sharing that would occur as a result of the new assessment. Current estimates of property taxes on the project are over $700,000 per year. Currently, a residence in Roxbury that is assessed at $120,000 has a $2,305 annual property tax. In a typical year after the project begins operation that tax should drop to $775, a savings to the owner of $1,530 per year.

Finally, the project would offer local residents energy assistance. The project developers would pay the first 500 kilowatt hours of electricity generation charges for every current residence in the

Roxbury for each month over the next 20 years (or the life of the project, whichever comes first). Assuming that there were about 220 year-round residences and about 180 seasonal residences in Roxbury at the time of this offer (September 1, 2008), and that the cost of the electricity generation charge on CMP bills was about $0.10 per kilowatt hour, this benefit would be worth about $600 annually to each year-round residence and about $200,000 annually to all residents collectively.

3.14.3 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.15 Environmental Justice

3.15.1 Regulatory Framework

In February 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This states that "*each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities, on minority populations and low-income populations"* (Executive Order 12898, 59 Federal Register 7629 [Section 1-201]).

Under DOE guidance, consideration is given to pathways or uses of resources that are unique to a minority or low-income community before determining that there are no disproportionately high and adverse impacts on the minority or low-income population (*Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*, U.S. Department of Energy 2004).

Executive Order, Protection of Children from Environmental Health Risks and Safety Risks (Executive Order 13045, 62 Federal Register 19885), states that each federal agency must make a high priority the identification and assessment of environmental health risks and safety risks that may disproportionately affect children. As part of this process, federal agencies must ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Environmental health risks and safety risks are those risks that are attributable to products or substances that children are likely to come into contact with or to ingest.

3.15.2 Project Setting

3.15.2.1 Demographics

Racial and ethnic data for Roxbury, Oxford County and the State of Maine are presented in Table 3-13, Population by Race/Ethnicity. The proposed action would be located within census tract 9954. Census tract 9954 has a slightly higher Asian population than adjacent census tracts including 9951 and 9956, but otherwise these tracts have comparable levels of ethnic minorities.

Table 3-13 Population by Race/Ethnicity

Geographic Area	White	Black, African American	American Indian, Alaskan Native	Asian	Native Hawaiian, Other Pacific Islander	Some Other Race
Census Tract 9954	3,393	7	1	31	1	0
Town of	382	0	1	0	1	0

Roxbury						
Oxford County	53,797 (55,452)	95 (240)	151 (302)	201 (235)	12 (0)	59 (36)
Maine	1,236,014 (1,253,397)	6,760 (14,899)	7,098 (6,785)	9,111 (11,922)	382 (350)	2,911 (4,504)

Source U.S. Census Bureau 2000 and 2006-2008.
Because the most current census data for the Town of Roxbury is from 2000, the 2000 census data was used at the town, county and state level to allow better direct comparison. To show changing trends, the 2006-2008 American Community Survey data for Oxford County and the State of Maine are provided in parentheses.

3.15.2.2 Income and Poverty Level

Income statistics for geographic areas within the ROI and comparative data for the state are presented in Table 3-14, Income and Poverty Level.

In 2000, the median household income for the Roxbury ($41,750) was higher than the county ($33,435) and state ($37,240), but the median household income for census tract 9945 ($29,348) was lower than all of these other geographic areas. The per capita income for Roxbury was slightly above that of the county, but slightly below that of the state. In 2000, Roxbury (0.9 percent) had an unemployment rate below that of the county (3.3 percent) and the state (3.1 percent).

In 2000, the percentage of individuals in Roxbury living in poverty was 9.2 percent, slightly below both county (11.8 percent) and state (10.9 percent) levels.

Table 3-14 Income and Poverty Level

Geographic Area	**Median Household Income**	**Per Capita Income**	**Percentage of Individuals Living in Poverty (2006)**	**Percentage of Individuals Living in Poverty (2000)**
Town of Roxbury	41,750	18,615	—	9.2
Oxford County	33,435 (47,679)	16,945 (21,164)	14.3	11.8
Maine	37,240 (46,807)	19,533 (25,264)	12.6	10.9

Source U.S. Census Bureau 2000 and 2006-2008.
Because the most current census data for the Town of Roxbury is from 2000, the 2000 census data was used at the town, county and state level to allow better direct comparison. To show changing trends, the 2006-2008 American Community Survey data for Oxford County and the State of Maine are provided in parentheses.

3.15.2.3 Protection of Children

In 2000, 20.1 percent of the population of Roxbury was less than 18 years of age and 3.1 percent were less than 5 years of age. There are no schools located in Roxbury or the Town of Byron, located immediately north of the project area. The nearest schools are approximately six miles to the south in the Towns of Rumford and Mexico and six miles to the west in the Town of Andover.

3.15.3 POTENTIAL IMPACTS OF THE PROPOSED ACTION

The project would result in no disproportionate high and adverse human health or environmental impacts on minority or low income populations and no impacts on children.

3.15.4 POTENTIAL IMPACTS OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.16 TRANSPORTATION

This section presents parking and access for the proposed project, and existing transportation routes and traffic conditions on these roadways and the intersections around the proposed project.

3.16.1 REGULATORY FRAMEWORK

The Maine Department of Transportation holds regulatory authority over Maine's public roadways. The project would present minimal additional traffic to the project area, with between one and three vehicles likely to be utilizing the area during typical operations.

3.16.2 PROJECT SETTING

3.16.2.1 Roadway Network

The only access to the ridgeline portion of the project area is from Route 120 (also known as Roxbury Notch Road). The ridgeline portion of the project area is located north of Route 120, and the actual ridgeline is accessed by a gravel road known as Mine Notch Road. The property where the office, O&M building, and collector substation would be located also is accessed from Route 120. An existing residential driveway provides access to this site.

The project anticipates delivery of turbines at Searsport, Maine, which has served as the point for offloading turbines from ships to land transportation for other wind developers in Maine. The road network from Searsport to Farmington has already been modified to accommodate loads for turbines as part of prior projects that have been constructed. The road from Farmington to Route 120 in Roxbury has been studied, and no notable physical improvements are required.

For construction, temporary light-duty construction access paths would be established along the existing transmission line corridor to provide access to the new Section 270 line. To reach the existing transmission line corridor, access would occur either directly from public roads or across private land where permission can be attained (Refer to the Maine Natural Resource Protection Act permit application submitted for the Section 270 Transmission Line Upgrade). Where access occurs across private property, existing trails would be used. Establishment of the access path would be an ongoing process conducted throughout the course of the Section 270 line construction. Access would be established to areas undergoing immediate construction and as construction progresses, new access paths would be established and paths that are no longer needed would be closed. Maintenance activities would involve limited use of motorized equipment in areas that are directly accessible from public or private access roads or existing pathways.

The new substation would be accessed from Route 120. An existing residential driveway provides access to this site. The entrance to this driveway would remain essentially the same, but its route would be changed to provide access to all of the buildings/facilities that would be present on site.

3.16.2.2 Parking Supply and Demand

The ridgeline portion of the project area is essentially undeveloped with the exception of Mine Notch Road and unimproved roads/trails created for timber harvesting. There are no parking

facilities and no need for parking facilities. The O&M building would have a small gravel parking lot with six designated parking spaces. Parking for the office would be available in the existing residential driveway.

There are no parking facilities and no need for parking facilities for the Section 270 line. Parking at the new substation would be available within the fenced enclosure surrounding the substation or if needed in the gravel parking lot at the adjacent project O&M building.

3.16.2.3 Bikeways and Pedestrian Facilities

There are no designated Class I, II or III bikeways within the project area.

3.16.2.4 Transit

There are no established public transportation services within the project area.

3.16.3 Potential Impacts of the Proposed Action

Access to the ridgeline project areas would occur from Mine Notch Road. Mine Notch Road is a private gravel road that has been up-graded to provide access to the project area. This road would service both the proposed wind power development as well as provide access during future timber harvesting activities on the property surrounding the proposed development. Mine Notch Road is accessed from Route 120, a public two-lane asphalt road. The property where the project facilities would be located would be accessed from an existing residential driveway that would be up-graded as necessary to service these facilities. This driveway would provide access to the project facilities as well as to a proposed CMP substation. This property also is accessed from Route 120.

Access to the Section 270 line corridor would occur either directly from public roads or across private property where CMP is granted access. Where access occurs across private property, existing trails would be used. Temporary light-duty access paths would be used during construction and these would be closed as construction is completed and they are no longer needed. During construction all woody vegetation would be cut to the ground in non-buffer areas and within buffers only capable species would be cut. Once construction is complete vegetation would be allowed to reestablish, but capable species would be controlled during regular maintenance. Crossings of wetlands and streams would be accomplished using construction mats, which would be removed as construction is completed. Any impacts resulting from construction should be temporary in nature.

3.16.4 Potential Impacts of the No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee and the impacts associated with the Record Hill project would not occur unless alternative financing were realized.

3.17 Utilities

3.17.1 Energy Consumption

Construction Phase – Turbine Installation
Construction of the project is expected to take approximately eight months. Primary energy sources necessary for the construction of the project are light fuel (diesel) and electricity. It is expected that construction of the project would require approximately 135,000 gallons of diesel fuel and roughly 40,000 kilowatt/hours of electricity.

Operational Phase of Turbines

The on-site office would be heated through the use of fuel oil. It is expected that the building would operate much like a single-family home in terms of typical heat demands, and thus is likely to require somewhere around 400 gallons of fuel oil each year. The electricity demand of the office and O&M building is projected to be approximately 1,000 kilowatt hours per month or approximately 12,000 kilowatt hours per year.[11]

Construction Phase of Transmission Line Upgrade
It is estimated that construction of the Section 270 transmission line would take about four to five months to complete. Primary energy sources necessary for the construction is light fuel (diesel).

Operational Phase of Transmission Line Upgrade
The operational phase of the Section 270 transmission line is not expected to involve energy consumption other than fuel used during safety checks and maintenance activities.

3.17.2 WATER USE

Construction Phase – Turbine Installation

During construction, Record Hill (or its contractors) would supply drinking water for workers from an existing public water supply or by bottled or other bulk water resource. Dust abatement during construction would involve the use of up to 20,000 gallons of water per day, depending upon conditions. Water for dust abatement would be withdrawn from the boat ramp at Ellis Pond Village using an approximately 4,000 gallon tanker truck. Given the limited volume of this withdrawal, this activity would not change the naturally occurring water levels of Ellis Pond or the surrounding lakes (see MDEP Rules, 06-096 Chapter 587(6)). No water for concrete production would be required, as any necessary concrete would be produced at existing facilities.

Operational Phase of Turbines

Water supply would not be required for the operation of the wind turbines or the electrical equipment at the Record Hill project. The O&M building and the on-site office, which are located on the same parcel, would be the only project components that would have an on-going demand for water. The on-site office would have drinking water, bathroom facilities and a shower for the staff. There also would be hose bibs (exterior faucets) for routine maintenance needs. An existing residential well would be discontinued to allow for development of an electrical substation, and a new private water well would be drilled to supply potable water to the O&M building. The new well would be located near the on-site office and would be a small, residential-scale deep rock well, similar to the existing on-site well.

Construction Phase of Transmission Line Upgrade
Water use during construction would be limited to potential dust abatement. Dust abatement is not expected to be needed during construction of the Section 270 transmission line, but could possibly be required during construction of the new substation depending upon conditions.

Operational Phase of Transmission Line Upgrade
Water supply would not be required for the operation of the CMP substation or Section 270 transmission line.

3.17.3 WASTE TREATMENT AND DISPOSAL

During operation of the project, solid waste would consist of domestic waste produced at the office and O&M building. A dumpster maintained on site would be used to hold this waste. A licensed waste hauler would periodically collect and transport this waste to a licensed waste

[11] Electricity demand determined using the home energy calculator available from the CMP web site http://www2.cmpco.com/EnergyCalculator/default.jsp.

disposal facility. In addition, the O&M building would handle materials that, when spent, constitute universal wastes. Among these materials are cathode ray tubes, florescent bulbs, and batteries.

No commercial or industrial wastewater would be generated with the project; therefore, there should be no release of liquid waste to the environment. Wastewater from the on-site office (approximately 135 gallons/day) would be handled by a subsurface wastewater system. This system that includes a septic tank with a standard stone bed septic was designed to meet Maine Subsurface Wastewater Disposal Rules. The system would be built on suitable soils located adjacent to the on-site office. The Division of Environmental Assessment, part of MDEP's Bureau of Land and Water Quality, reviewed and approved the soil survey used to develop the subsurface wastewater plan.

3.17.3.1 Hazardous Materials Use and Storage

Storage of materials at the project O&M building would be addressed in the final SPCC Plan for operation of the facility. The SPCC Plan must be submitted and approved by the MDEP prior to the start of operations.

A representative list of liquids and solids to be handled at the O&M building includes:

- Gear oils;
- Antifreeze;
- Hydraulic fluid;
- Greases;
- Non-lead based paint;
- Gasoline and/or diesel fuel; and
- Various cleaners.

CMP's Environmental Control Requirements for Contractors and Subcontractors and CMP's oil and hazardous material contingency plan establish minimum requirements for spill prevention and response. Employees operating construction vehicles are trained to promptly contain, report, and clean up any spill in accordance with standard procedures. As a standard operating procedure, all operational vehicles carry an oil spill kit that contains materials for conducting initial containment and clean-up of spills. In the event of a spill of oil or hazardous material, on-site personnel would immediately follow standard spill reporting and clean-up procedures. CMP also has specific standards related to refueling and herbicide use in proximity to waterbodies and sensitive natural resources. These standards include:

1. Refueling and maintenance of vehicles and equipment is prohibited within 25 feet of all waterbodies and sensitive natural resources;
2. Herbicide application is prohibited within 25 feet of all waterbodies and wetlands with standing water;
3. Mixing, transfer and storage of herbicides are prohibited within 50 feet of all waterbodies and wetlands with standing water; and
4. Mixing, transfer and storage of herbicides are prohibited within 100 feet from any known well or spring used as a drinking water supply [Note no well or spring used as drinking water supply occur within or near the Section 270 line].

There is an existing auto salvage yard in the town of Mexico, which is crossed by the Section 270 transmission line. Pole 97 would be installed in the vicinity of this auto salvage yard. An area of approximately 100 square feet would be excavated to a depth of 10 to 12 inches at this location. Soil would be backfilled into the hole once the pole is placed. Excess soil would be placed around the base of the pole and compacted with the excavator bucket. Because of the distance of Pole 97 from the auto salvage yard, CMP does not anticipate encountering contaminated soil or hazardous waste. If such material were encountered, it would be managed based on the nature and extent of the potential contaminant.

3.18 CUMULATIVE EFFECTS

A cumulative effect is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other action (40 CFR Part 1508.7). This discussion is limited to recent past, present, and reasonably foreseeable future actions within the project area and the immediate vicinity (defined as the town of Roxbury).

The project area is located in an area historically and currently used for industrial timber production. The development of the proposed wind energy project would occur in the same time and space as ongoing timber management activities. Lands owned by Bayroot, LLC, and managed by Wagner Forest Management, Ltd., in the Roxbury area are routinely harvested. This property is enrolled in both the Forest Stewardship Council (FSC) program, as well as the Sustainable Forestry Initiative (SFI) program. Timber harvesting activities have occurred to the west of the project area within the past 10 years, and this area would likely be re-entered sometime in the next 10 to 15 years. Areas to the east of the project site would likely see activity within the next 5 years since this area has not been harvested recently. All harvesting will be done in accordance with the Maine Forest Practices Act and MDEP Shoreland Zoning regulations. Maine's BMPs for timber harvesting will be followed during harvesting activities. Harvesting activity within the project area is limited by the terms of Record Hill Wind's DEP permit. These restrictions generally prohibit removal of more than 40 percent of timber volume within a 10 year period. Potential cumulative impacts to vegetation and soil erosion could occur during the construction phase of the wind energy project if it overlaps with timber harvesting. However, these impacts would be limited through the implementation of BMPs. There would be no cumulative impacts during the operational phase of the wind energy project.

The surrounding area is rural and land uses include agriculture, rural residential, and recreation. Publicly available aerial photographs show no other large-scale commercial development in the area. No future development projects are anticipated for the project area, although this land would continue to be managed for timber production.

Growth in the town of Roxbury appears to be relatively low based upon the number building permits issued for the new construction of single-family homes (City-Data.com 2010). Between 1996 and 2009, an average of 3 permits was issued per year with two years in which no permits were issued.

Based upon a review of publicly available information, there are no developments in proximity to the Record Hill project to include in a cumulative effect analysis. In regard to other commercial-scale wind energy developments, the proposed Spruce Mountain Wind project is the nearest publicly presented project. The Spruce Mountain Wind project is located in the town of Woodstock in Oxford County, approximately 16 miles south of the Record Hill project. The nearest operational wind energy developments are located on Kibby Mountain in the town of Eustis and Beaver Ridge in the town of Freedom. The Kibby Mountain project is located approximately 54 miles north of the Record Hill project, and the Beaver Ridge project is located approximately 64 miles to the east. Because the Record Hill project is located in an area of both limited existing and proposed development, an analysis of cumulative effects would have to extend well beyond the area immediately influenced by the proposed development and beyond the scope of this EA.

Growth in the towns of Mexico and Rumford appears to be relatively low based upon the number building permits issued for the new construction of single-family homes (City-Data.com 2010). Between 1996 and 2009, an average of three building permits was issued per year in Mexico with three years in which no permits were issued. According to Census Bureau data, no housing units were built in Mexico from 1990 to 1994, 29 were built from 1995 to 1998, and no housing units

were built between 1999 and 2000. In Rumford, an average of five building permits was issued between 1996 and 2009 with two years in which only one permit was issued. According to Census Bureau data, 86 housing units were built in Rumford from 1990 to 1994, 23 from 1995 to 1998 and 10 from 1999 to 2000. Based on this information, no adverse cumulative impacts are expected to result from the project.

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CHAPTER 6.0: REFERENCES

Advisory Council on Historic Preservation. 2002. Section 106 Regulations Summary. http://www.achp.gov/106summary.html. Accessed February 23, 2010.

Appalachian Trail Project Office. 1987. *Comprehensive Plan for the Protection, Management, Development and Use of the Appalachian National Scenic Trail*. Appalachian Trail Project Office, National Park Service. Harpers Ferry, WV.

City-Data.com. 2010. Roxbury, Maine. Available at http://www.city-data.com/city/Roxbury-Maine.html. Last accessed on August 25, 2010.

Chamberlain, D.E., M.R. Rehfisch, A.D. Fox, M. Desholm, and S.J. Anthony. 2006. The effect of avoidance rates on bird mortality predictions made by wind turbine collision risk models. Ibis: 148, pp. 198-202.

Committee on Environmental Impacts of Wind-Energy Projects, National Research Council of the National Academies. 2007. The National Academies Press, Washington, DC.

EAPC Wind Energy Services, LLC. November 6, 2008. Shadow Flicker Analysis – Record Hill Wind Energy Project.

EPA, Designated Sole Source Aquifers in EPA Region 1. [Online] URL: http://www.epa.gov/region01/eco/drinkwater/pc_solesource_aquifer.html. (Accessed June 27, 2008).

Federal Highway Administration. 1988. *Visual impact assessment for highway projects*. (FHWA-HI-88-054.) USDOT (US Department of Transportation), 1988.

GAO (Government Accountability Office). 2005. Wind Power: Impacts on wildlife and government responsibilities for regulating development and protecting wildlife. Report to congressional requesters, September 2005.

ISO New England, Inc. October 15, 2009. *2009 Regional System Plan.* Available at: http://www.iso-ne.com/trans/rsp/2009/rsp09_final.pdf. Last accessed November 13, 2009.

Jones, G. R., J. Jones, B. A. Gray, B. Parker, J. C. Coe, J. B. Burnham, and N. M. Geitner. 1975. *A method for the quantification of aesthetic values for environmental decision making*. Nuclear Technology 25(4): 682–713.

Maine Appalachian Trail Club. 2009. *Policy on Wind Power Development along the Appalachian Trail in Maine.* Maine Appalachian Trail Club. Augusta, ME.

Maine Department of Conservation. 1987. *Maine Wildlands Lake Assessment*. Maine Department of Conservation, Augusta, Maine.

Maine Department of Conservation. 1982. *Maine Rivers Study*. Maine Department of Conservation, National Park Service Mid-Atlantic Regional Office, Augusta, Maine.

Maine Department of Environmental Protection (MDEP). 2003. *Maine Erosion and Sediment Control BMPS Manual*. Bureau of Land and Water Quality, MDEP, Augusta, Maine.

Maine Department of Transportation (MDOT). 2009. *Air Quality Conformity Analysis for the 2010-2013 Statewide Transportation Improvement Program.* Bureau of Planning, MDOT, Augusta, Maine.

Maine Geological Survey, Online Significant Sand and Gravel Aquifers Maps. [Online] URL: http://www.maine.gov/doc/nrimc/mgs/pubs/online/aquifers/aquifers-ad.htm. (Accessed June 27, 2008)

Maine Public Utilities Commission Review of Emerging Technologies as Eligible Resources under State's Portfolio Requirement, Feb. 10, 2005. Available at: http://www.maine.gov/mpuc/staying_informed/legislative/2005legislation/emerging_tech_rpt.htm). Annual Report on the New Renewable Resource Portfolio Requirement, Maine Public Utilities Commission, March 31, 2008. Available at: www.maine.gov/mpuc/legislative/archive/2006legislation/RPSreport.doc

Maine State Planning Office. 1989. Maine's Finest Lakes: The Results of the Maine Lakes Study. Critical Areas Program, Augusta, Maine.

McMahon, J. S. 1990. The biophysical regions of Maine: patterns in the landscape and vegetation. M.S. Thesis, Univ. of Maine, Orono. 120 pp.

Statewide Surveys, Inc. 2009. Class B High-Intensity Soil Survey, Proposed Roxbury Substation, Route 120, Roxbury, Maine. Prepared for TRC.

Stantec Consulting. December 2008. Maine Department of Environmental Protection Natural Resources Protection Act and Site Location of Development Combined Application, Record Hill Wind Project, Oxford County. Prepared for Record Hill Wind LLC

U.S.D.A. Forest Service. 1995. *Landscape aesthetics: A handbook for scenery management*. (Agriculture Handbook Number 701).

U.S. Energy Information Administration, Independent Statistics and Analysis. 2009. Energy Explained – Your Guide to Understanding Energy. Last accessed February 12, 2010. http://tonto.eia.doe.gov/energyexplained/index.cfm.

U.S. Fish and Wildlife Service. 2008. Migratory Bird Management Program. http://www.fws.gov/migratorybirds/dmbmdbhc.html. Accessed February 24, 2010.

U.S. Department of the Interior, U.S. Geological Survey. 2009. Last accessed February 23, 2010. http://www.nationalatlas.gov/printable.html.

Whitfield, D.P. and M. Madders. 2006. A review of the impacts of wind farms on hen harriers (*Circus cyaneus*) and an estimation of collision avoidance rates. Natural Research, LTD, Natural Research Information Note 1 (Revised).