

Redington Wind Farm
Section 6
Visual Impact Assessment

Prepared by
Terrence J. DeWan & Associates
Landscape Architects
Yarmouth, Maine

Section 6. Visual Impact Assessment

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1.0 Introduction

The Redington Wind Farm (RWF) is a utility scale wind farm being developed by Redington Mountain Windpower, LLC (RMW), managed by Endless Energy Corporation (EEC). The design of the wind farm is the result of a collaborative effort between engineers, meteorologists with a specialty in wind energy, biologists, soils scientists, construction specialists, landscape architects, and other professionals experienced in wind energy development. It also involved considerable discussions with regulatory agencies and local officials, all who had substantial input into the design of the project.

The methodology used in the visual impact assessment (VIA) of the Redington Wind Farm is based upon a thorough understanding of the existing visual environment and the sensitivity level of people who live in and visit the area. Many of the concepts developed by the USDA Forest Service, the Bureau of Land Management, the State of New York, and visual impact specialists at the State University of New York School of Landscape Architecture, College of Environmental Science and Forestry, have been incorporated in the evaluation methodology.

The methodology for assessing the visual impacts of the wind farm employs both a professional and a public approach. The professional approach involved the judgment of experienced landscape architects in the selection of factors chosen to evaluate scenic quality and determine the magnitude of visual impact. This approach, widely used in permitting work in Maine and elsewhere throughout the country, is based upon current studies of what constitutes scenic landscapes and visual impacts. The public approach involved professionally developed intercept surveys of hikers (1994, 2003, and 2004) and local hunters, snowmobilers, skiers, and residents (1994) to gain an understanding of their attitudes toward wind energy in Maine and the use of this site for a wind farm.

The Maine Land Use Regulation Commission (LURC) will be the lead reviewing agency, since the majority of the land utilized by the project lies within Maine's unorganized territories subject to LURC review. A small portion of the project (a section of the transmission line) falls within the town of Carrabassett Valley and will be subject to the Maine Department of Environmental Protection (MDEP) review.

LURC's regulations (Subchapter III, Section 10.24 General Criteria for Approval of Permit Applications) require that applicants demonstrate that:

Adequate provision has been made for fitting the proposal harmoniously into the existing natural environment in order to assure there will be no undue adverse effect on existing uses, scenic character, and natural and historic resources in the area likely to be affected by the proposal.

Section 10.25 Development Standards contain review standards for structures and uses that will be reviewed by LURC. Section 10.25.E provides review standards for Scenic Character, Natural and Historic Features. The following standards apply to the visual impacts of the RWF:

1. Scenic Character

- a. The design of a proposed development shall take into account the scenic character of the surrounding area. Structures shall be located, designed and landscaped to reasonably minimize their visual impact on the surrounding area, particularly when viewed from existing roadways or shorelines.*

- b. To the extent practicable, proposed structures and other visually intrusive development shall be placed in locations least likely to block or interrupt scenic views as seen from traveled ways, water bodies, or public property.*

- c. If a site includes a ridge elevated above surrounding areas, the design of the development shall preserve the natural character of the ridgeline.*

In the absence of an accepted methodology for performing a visual impact assessment within LURC's jurisdiction, EEC has elected to use the methodology described in the Maine Department of Environmental Protection's Natural Resource Protection Act (NRPA) Chapter 315 Regulations. Chapter 315 requires an applicant to demonstrate that a proposed activity will not unreasonably interfere with existing scenic and aesthetic uses of a scenic resource. A *scenic resource* is defined as "Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment, and appreciation of natural or cultural visual qualities". A scenic resource is the typical point from which an activity in, on, over, or adjacent to a protected natural resource is viewed. A *viewshed* is defined as "the geographic area as viewed from a scenic resource, which includes the proposed activity." For purposes of this assessment, the study area (the limits of the project viewshed) extends 15 miles from the proposed wind farm. (See Section 6.4.3 for a description of the limits of the project study area.)

This VIA describes the location and visual characteristics of the RWF facilities and provides an inventory of scenic resources within the RWF viewshed. The MDEP Visual Evaluation Field Survey Checklist (see Figure 6-3 in Section 5: Scenic Resources Within the Viewshed) is included to summarize the visual impacts of the project on the identified scenic resources. These resources include the following locations of national, state, and local scenic significance (lettering is taken from the Field Survey Checklist):

- B. State Preserves
- C. A State or Federal trail.
- D. A property on or eligible for inclusion in the National Register of Historic Places
- E. A State Park
- F. Public natural resources or public lands

Section 3, Project Study Area, describe all known resources within this 15-mile area and demonstrates that the RWF will not be visible from the majority of the scenic resources. Section 8, Visual Impact Assessment, describes how the proposed wind farm will comply with the LURC standards for Scenic Character. Section 9, Mitigation Strategies, describes the mitigation strategies that have been take to minimize potential visual impacts.

Since the terminology used in the report is specific to VIA's, a glossary of terms is provided in Appendix G. A listing of references is also provided at the end of the report in Section 10.

2.0 Data Collection

Terrence J DeWan & Associates (“TJD&A”) staff collected field data during the course of this study by a variety of means:

- Visiting and photographing the study area during leaf-off and leaf-on seasons on foot and by automobile. (July 5 and 6, 1998, September 5, 1998, October 11, 2003, March 27, 2004, May 17, 2004).
- Hiking the surrounding mountains and hills that may have a view of the RWF, the collection or transmission lines, or the access roads: North and South Crocker Mountains (July 6, 1998), Mount Abraham (September 5, 1998), Eustis Ridge and Bald Mountain (October 10, 2003), and Rangeley Lakes State Park and Sandy River Plantation (March 11, 2004).
- Touring the project area on Black Nubble and Mount Redington with LURC personnel (September 15, 2003).
- Hiking the Appalachian Trail from Caribou Valley Road (on the south side of Route 27) to Route 4 (on the south side of Saddleback Mountain) on August 4-6, 2004 to photograph the views from the trail and record where vegetation will obscure views of the wind farm.

Extensive photographic documentation was made, using Nikon digital cameras. For most photographs the camera was set to record at a ‘normal’ focal length, i.e., equivalent to that found on a 50mm SLR camera. A selection of representative views within the study area is included in Appendix C Photography. These photographs were also used as the basis for the visualizations (photosimulations) provided in Appendix B. Copies of all photographs, as well as all visualizations, are available on CD.

Photographs were also supplied by Endless Energy (Saddleback: Gilbert and Harley Lee, August 7, 2002) and Greg Thomas (Bald Mountain and Eustis Ridge, Summer 2003).

This report is based upon design plans for the proposed Redington Wind Farm prepared by DeLuca-Hoffman Associates, with input from many other professional members of the design team. As is the case in most complex projects, this application is the result of a collaborative effort among all team members, with substantial input from the Land Use Regulation Commission, the Department of Environmental Protection, the Department of Inland Fisheries and Wildlife, and other state and federal agencies.

3.0 Project Study Area

3.1 Introduction

Visual assessments determine whether the action proposed is in the foreground, midground, or background. The concept of distance zones is based upon the U.S. Forest Service visual analysis criteria for forested landscapes, and is based upon the amount of detail that an observer can differentiate at varying distances. The distance zones used for the study of the Redington Wind Farm are defined as:

- **Foreground: 0 to 1/2 mile in distance.** Within the foreground the observer will be able to detect surface textures, details, and a full spectrum of color. For example, the shape of the blades on the wind turbines or the transmission line conductors will be readily apparent within the foreground viewing distance. It should be noted that there are currently no scenic resources (as defined by Chapter 315 regulations) or any other locations where the casual observer will be able to see any of the proposed turbines in the foreground. (Access footpaths have been cut by the applicant to gain access to the project area, but they are not designed for public use.) When the project is completed, interested parties who wish to see the RWF will be able to use the proposed access roads to get a closer view of the turbines.
- **Midground: 1/2 mile to 3-5 miles in distance.** The midground is a critical part of the natural landscape. Within this zone the details found in the landscape become subordinate to the whole: individual trees lose their identities and become forests; buildings are seen as simple geometric forms; roads and rivers become lines. Edges define patterns on the ground and hillsides. Patterns of cultural modifications (paved roads, timber haul roads, transmission lines, clearcuts) are readily apparent, especially where there is noticeable contrast in scale, form, or line. Colors of new structures become somewhat muted and the details become

subordinate to the whole. In panoramic views, the midground landscape is the most important element in the composition in determining visual impact. To give a sense of relativity, Rangeley Lake is approximately five miles in length, measured from the eastern foot of Bald Mountain to Rangeley Village.

The RWF will be visible in the midground from three types of publicly accessible viewpoints:

- hiking trails (including sections of the Appalachian Trail)
- Sugarloaf Mountain ski area
- a short section of Route 16 between Stratton and Rangeley.

Important considerations in determining visual impact will be the patterns and rhythm formed by the wind turbines, the lines and contrast created by the access roads and transmission lines, and the scale of the project relative to the larger landscape.

- **Background:** greater than 3-5 miles. Most views in Maine are limited to midground distances by topography and vegetation. The background distance zone provides the setting for panoramic views. Many of the mountains of western Maine offer significant panoramas where the views extend for five miles or greater. When seen at a distance of greater than five miles, the effects of distance and atmospheric perspective often will obliterate the surface textures, detailing, and form of any project components. The appearance of the RWF turbines will be reduced to neutral shades of gray. Objects seen at this distance will be highly visible only if they present a noticeable contrast in form or line.¹ Based upon observations in various sites in California, Vermont, Maine, and elsewhere, wind

¹ The reflection of sunlight off moving wind turbine blades may also be noticeable in the background viewing distance, even though the turbines themselves may not be visible due to distance and/or atmospheric perspective,

turbines are barely visible at distances greater than 15-20 miles under typical atmospheric conditions.

3.2 Regional Description

In The Natural Regions of Maine, Paul Adamus divided the state into distinct geographic areas – relatively homogeneous in nature – based primarily on the physical characteristics of landform (relief, elevations, surficial geology, wetlands) and major plant communities. Maine is composed of five regions and 17 subregions, as shown in Figure 6-1, The Natural Regions of Maine. The RWF is located in the Alpine Subregion of the Mountains Region. Much of the wind farm’s viewshed extends out to the Rangeley Lakes Subregion.

The Mountains Region is characterized by its relatively high elevation and significant topographic relief. Average elevation is 1,500–2,000 feet above mean sea level.

To describe the climate of the Mountains Region, Adamus quotes from T. Hanstedt²

The climate of the mountain environment is generally more severe than the surrounding lowlands. It becomes increasingly severe in the higher elevations to a point where altitudes over 2,500 feet in Maine generally experience a subarctic climate...

While the average temperature and number of annual frost-free days are reduced with elevation, precipitation increases substantially. Studies in Vermont have found an increase of thirty percent more annual precipitation on the mountain summits than on the lowlands. Fog and low lying clouds frequent the mountain tops, increasing the humidity...

² T. Hanstedt, Mountain Areas in Maine: Report No. 1 – Background and work program. Maine State Planning Office, Augusta. 1975

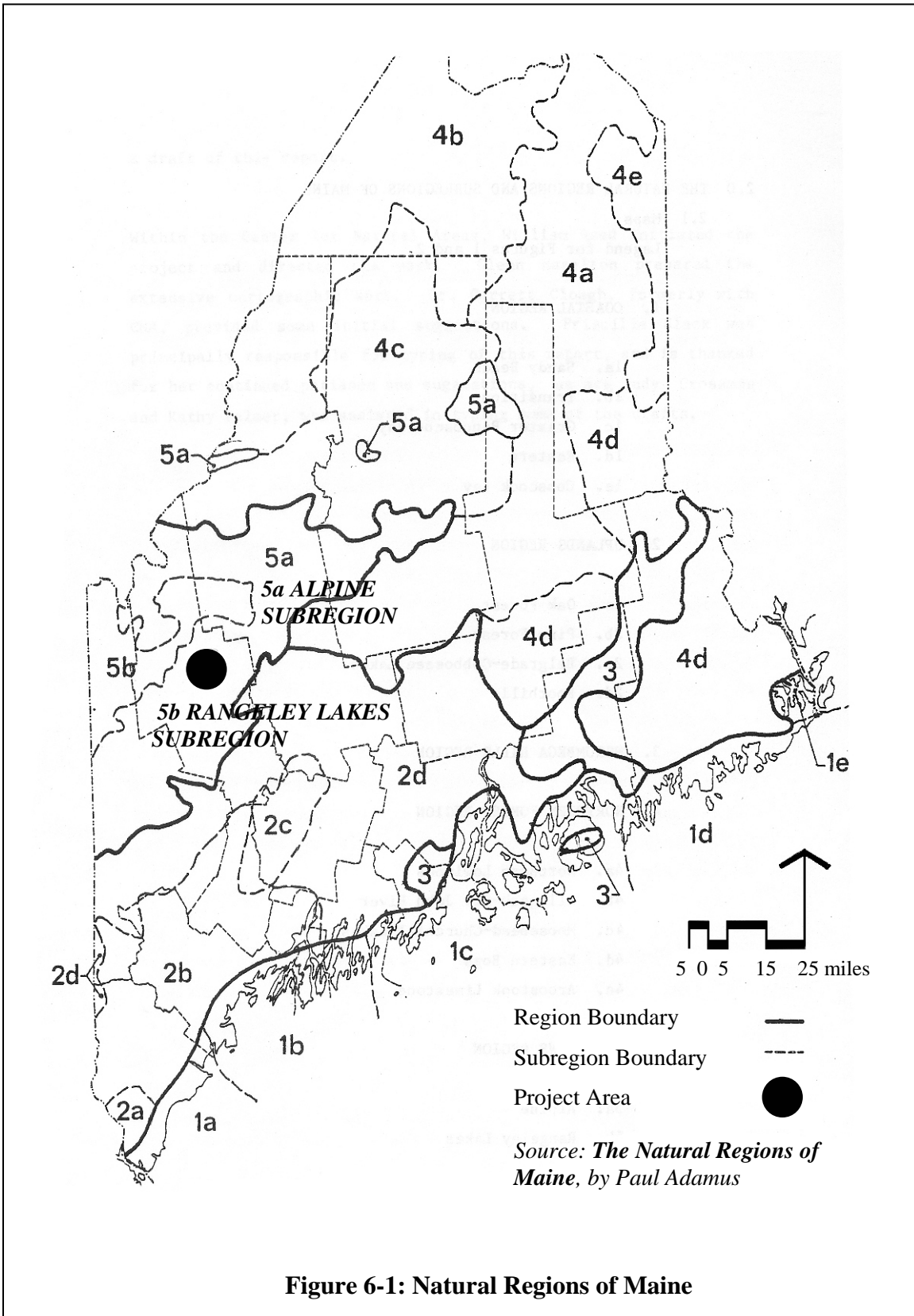


Figure 6-1: Natural Regions of Maine

In addition to the low temperatures, high precipitation levels and the frequency of fog, strong surface winds are often found in the mountain regions.... Wind velocities exceeding 100 miles per hour are not uncommon on the summits of many Maine mountains.³

The Alpine Subregion has relatively few wetlands, rivers, or lakes. Water-bodies found here are primarily small mountain ponds and tributaries of larger rivers. The few wetlands that are found are usually associated with streams. Vegetation is primarily spruce-fir near the summits of the mountains, with northern hardwoods typically occurring at lower elevations, often mixed with spruce-fir. Logging operations are common throughout the subregion, especially at the lower elevations. Patterns of clearcuts, along with gravel access roads, are evident from most of the major peaks within view of the project area. Land use activities include small scale residential development, scattered villages, major ski areas, golf courses, other recreational development, and large scale timber harvesting operations.

The Rangeley Lakes Subregion, to the southnorth and west of the proposed RWF, is characterized by its abundance of lakes and ponds, generally lower elevations, and less dramatic relief. The most significant water bodies include Rangeley Lake, Moselookmeguntic Lake, Cupsuptic Lake, and Flagstaff Lake.

3.3 Landscape within Fifteen Miles of the Project

The fifteen-mile radius represents the outer limit of the area that was studied in the assessment of visual impacts (See Figure 6-2, Study Area). Most visual impact assessments typically extend out at least five miles, which is considered the start of the

³ There does not seem to be any accurate data on the percentage of days that will afford clear views of the wind farm from either the mountaintops (hiking trails and ski areas) or the valley below (local roads, scenic byway, lake and ponds, and other areas).

background distance zone. Fifteen miles was used as the study area in recognition of the size and scope of this proposal, the sensitivity of the resource, and expressed public sentiment. The study area does not extend the full fifteen miles to the east due to the presence of Sugarloaf Mountain, Spaulding Mountain, and Mount Abraham that will block the view of the wind farm.

The following section describes the landscape within the study area in terms of its physical characteristics: landforms, water bodies, vegetation patterns, and cultural modifications.

3.3.1 Landform

RWF will be set among a group of prominent mountains that help define the Mountains Region of western Maine. The following is a listing of peaks in excess of 3,000 feet found within the study area (listed in order of descending height):

Within five miles (foreground and midground)

- Sugarloaf Mountain (el. 4237)
- North Crocker Mountain (el. 4228)
- The Horn (Saddleback) (el. 4073)
- South Crocker Mountain (el. 4040)
- Mount Redington (el. 4000)
- Spaulding Mountain (el. 3986)
- Black Nubble (el. 3670)
- Saddleback Junior (el. 3640)
- Potato Nubble (el. 3029)



Source: Sherbrooke and Lewiston USGS Quads 1:250,000

Figure 6-2: Study Area

Within ten miles (background)

- West Peak (el. 4150)
- Saddleback Mountain (el. 4116)
- South Horn (el. 3805)
- East Kennebago Mountain (el. 3791)
- Burnt Hill (el. 3595)
- Cranberry Peak (el. 3213)
- Farmer Mountain (el. 3201)

Within fifteen miles (background)

- Myron H. Avery Peak (el. 4088)
- Spotted Mountain (el. 3268)
- Beaver Mountain (el. 3160)

3.3.2 Water Bodies

The presence of water – either in the form of lakes, ponds, rivers, and streams – is an important indicator of visual quality in the landscape. Water bodies add contrast in color, form, and texture to the landscape. Water reflects surrounding landforms, creating a sense of depth and variety.

3.3.2.1 Lakes and Ponds

The characteristic landscape of this part of Western Maine includes a scattering of small ponds and large lakes, surrounded by mountains (see Maps 6-1 through 6-4 in Appendix A). Most of the lakes have varying amounts of development activity on their shoreline. Table 6-1, Waterbody Chart, summarizes the physical characteristics of the lakes and ponds within a fifteen mile radius of the RWF, as inventoried in the Maine Wildlands Lake Assessment and the Maine Lakes Study. The scenic quality of five of the lakes and ponds within the study area (Kennebago Lake, Rangeley Lake, Stratton Brook Pond, The

Horns Pond, and Tim Pond) has been rated ‘Outstanding’. The scenic quality of four lakes and ponds (Beal Pond, Beaver Mountain Pond, Flagstaff Lake, and Redington Pond in Redington Township) has been rated as ‘Significant’.

Table 6-1, Lake and Ponds within the Study Area, shows which lakes and ponds are within the viewshed of the RWF (VIS) and the distance to the closest turbine (DIS). An ‘X’ in the ‘VIS’ column indicates that some or all of the RWF will be visible. Section 6.9, Visual Impact Assessment, provides a description of how the lakes and ponds will be affected by the presence of the wind farm. Appendix D provides a series of cross-sections that illustrate the relationship between the RWF and a representative sample of local lakes.

3.3.2.2 River and Streams

Most of the flowing water in the study area is in the form of small mountain streams bordered by densely vegetated riparian zones. The streams tend to be relatively small in size and are generally not dominant visual features.

Three rivers flow through the study area. The South Branch Dead River is a meandering stream that parallels Route 16 between Rangeley and Stratton, emptying into Flagstaff Lake. The North Branch Dead River follows Route 27 from Chain of Ponds down to Flagstaff Lake. In Eustis the North Branch widens out and becomes part of Flagstaff Lake, affording a partial view of the RWF from a few locations. The Carrabassett River starts at Caribou Pond just east of Mount Redington and flows to the north until it reaches Route 27 in Carrabassett Valley. It then parallels Route 27 through Carrabassett and Kingfield. With the exception of the section of the North Branch described above, the RWF will not be visible from the rivers due to the surrounding topography and dense stream-side vegetation.

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Table 6-1: Lakes and Ponds within the Study Area

WATERBODY	LOCATION	VIS	DIST (Mi)	SIZE (Ac)	RESOURCE RATINGS							RES CLASS	LAND USE	
					FSH	WL	SC	SH	BOT	CLT	PHY		ACCESS	DEV
Beal Pond	Madrid		7.3	32	S		S					2		
Beaver Mtn. L. (Long Pd)	Sandy River Plt.		11.0	543	S		S					2	AC	DEV
Caribou Pond	T4 R1 Mt Abram Twp.		1.5	10	S							2	AC	U
Cow Pond	T2 R3 Lang Twp.	X	8.5	62	S							2	AC	U
Dodge Pond	Rangeley	X	12.0	230	S							2	AC	DEV
Flagstaff Lake	Dead River Twp.	X	13.0	20300	O	O	S	S				1A	AC	U
Greeley Pond	Dallas Plt.	X	7.2	42		S						2	INAC	U
Greeley Pond (Little)	Dallas Plt.		7.2	15	S	S						2	INAC	U
Greeley Pond (Third)	Dallas Plt.		7.5	14								3	INAC	U
Gull Pond	Dallas Plt.	X	8.2	281	S							2	AC	DEV
Haley Pond	Dallas Plt. / Rangeley	X	9.0	170	S							2	AC	U
Jones Pond	T4 R3 Wyman Twp.		7.0	36		O						1B	INAC	U
Kennebago Lake	T3 R3 Davis Twp.	X	13.0	1700	O	O	O	O		S-	O	1A	AC	DEV
Loon Lake	Dallas Plt / Rangeley	X	8.7	168	S					S-		2	AC	DEV
Quimby Pond	Rangeley	X	13.6	165	O							1B	AC	DEV
Rangeley Lake	Rangeley Plt.	X	12.0	6000	O	S	O	S	S	O	O	1A	AC	DEV
Redington Pond	R1 R2 Redington Twp.		2.2	37	S		S					2	AC	DEV
Round Pond	Rangeley	X	12.5	166	S							2	AC	DEV
Saddleback Lake	Dallas Plt.	X	5.5	358	S					S-		2	AC	U?
Sandy River Pond (Lower)	Sandy River Plt.		9.3	17								3	AC	DEV
Sandy River Pond (Mid)	Sandy River Plt.		9.3	70	S							2	AC	DEV
Sandy River Pond (Upper)	Sandy River Plt.		9.3	28								3	AC	DEV
Stratton Brook Pond	T4 R3 Wyman		6.6	26		O	O					1A	AC	U
Tea Pond	T1 R5 Jim Pond		14.0	90	S	S					O	1B	AC	U
The Horns Pond	T4 R3 Wyman		8.9	10	S		O	O				1A	INAC	U
Tim Pond	T2 R4 Tim Pond		12.5	320	O		O			+	S-	1A	AC	U
Tufts Pond	Kingfield		9.4	53	S							2		

Resource Ratings: FSH – fisheries; WL – wildlife; SC – scenic quality; SH – shoreline character; BOT – botanical features; CLT- cultural resources; PHY – physical resources; O – Outstanding (clearly of statewide significance); S – Significant (met a predetermined standard)
 Resource Class: 1A – Statewide sig. with >1 outstanding nat. value; 1B – Statewide sig. with 1 outstanding nat. value;
 2 – Regional significance (no outstanding values but at least one significant resource value) ; 3 – Local or unknown significance
 Land Use: AC – Relatively accessible; INAC – Relatively inaccessible (no roads within 1/4 mile of lake shore; DEV – Relatively developed;
 UNDEV – Less than one development unit per shore mile

3.3.2.3 Waterfalls

The study area also has at least two significant waterfalls that provide aesthetic enjoyment for those who seek them out: Redington Pond Falls (two miles south of Black Nubble) and Poplar Steam Falls (11 miles to the east northeast in Carrabassett Valley). These features tend to be well off the beaten track, requiring a thorough knowledge of the area to find them. The RWF will not be visible from either waterfall. See Section 5.1A of this report for additional information.

3.3.3 *Vegetation*

The forestland surrounding the RWF is covered with mixed softwood-hardwood in the valleys and a predominantly spruce-fir cover on the summits. Much of the forestland within the study area has been extensively cut over, with clear cuts and some selective thinning evident throughout. Areas that have not been cut include state-mandated buffer zones around lakes, ponds, streams, and the summits of the higher mountains. For additional information on vegetation, see Section 7.

3.3.4 *Cultural Features*

The cultural features are man-made changes to the visible landscape found within the viewshed of the proposed wind farm. These features include small towns and villages, four-season trails and major recreational areas, scenic roadways, and natural resource-based industrial development.

Within five miles (foreground and midground)

- Sugarloaf USA Ski area (ski trails, lifts, residential villages, slopeside condominium development, and commercial buildings)

Sugarloaf Golf Course (championship golf course, residential village, access roads, support facilities)

- Single family homes along Route 16 in Coplin Plantation.
- Caribou Valley Road, leading to Caribou Pond
- Extensive network of haul roads for timber harvesting
- Appalachian Trail and other hiking trails

Within ten miles (background)

- Village of Stratton (relocated when Flagstaff Lake was created)
- Stratton Energy (woodchip-fired electrical producer)
- Route 16/27 (Maine Scenic Byway) between Carrabassett Valley and Stratton
- Sugarloaf USA spray irrigation ponds
- Route 16 between Stratton and Rangeley (known as “Moose Alley”)
- Village of Rangeley
- Rangeley Municipal Airport
- Sections of Route 4 (Rangeley Lakes National Scenic Byway)
- Saddleback Mountain Ski Area (ski trails, lifts, residential development)
- Carrabassett Village
- Carrabassett Regional Airport
- Commercial development along Route 27
- Rural residential development and seasonal cottages throughout
- Extensive network of haul roads for timber harvesting
- Appalachian Trail
- East Kennebago Trail (10.0 miles from nearest turbine to summit)
- Other hiking trails

Within fifteen miles (background)

- Village of Eustis
- Cathedral Pines Campground (Eustis)
- Eustis Ridge Picnic Area (private)

- Tim Pond camps
- Rangeley Lake residential/commercial development
- Mingo Springs Golf Course
- Wilhelm Reich Museum/Orgone Energy Observatory, (Dodge Pond, Rangeley)
- Rangeley Lakes State Park
- Route 4 (Rangeley Lakes National Scenic Byway)
- Village of Madrid
- Village of Phillips
- Town of Kingfield
- Extensive network of haul roads for timber harvesting
- Appalachian Trail
- Spotted Mountain Trail (12.5 miles from nearest turbine to summit)
- Other hiking trails

4.0 SCENIC RESOURCES WITHIN THE VIEWSHED

Public natural resources and public lands are usually visited by the general public, in part with the purpose of enjoying their visual quality. Under Chapter 315 regulations, MDEP considers a scenic resource as the typical point from which an activity in, on, over, or adjacent to a protected natural resource is viewed. Scenic resources include, but are not limited to, locations of national, state, or local scenic significance. The following narrative supplements the information provided in Figure 6-3 MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540).

4.1 WOULD THE ACTIVITY BE VISIBLE FROM:

4.1.A. National Natural Landmarks and other outstanding natural and cultural features.

Bigelow Mountain is the only National Natural Landmarks (NNL) within 15 miles of the proposed RWF according to the NNL website:

www.nature.nps.gov/nnl/Registry/USA_Map/States/Maine/maine.htm

Bigelow is noted on the website as “One of the best and most representative alpine vegetation zones among lower elevation New England Mountains.”

The National Natural Landmarks Program recognizes and encourages the conservation of outstanding examples of our country's natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. National Natural Landmarks (NNLs) are designated by the Secretary of the Interior, with the owner's concurrence. To date, fewer than 600 sites have been designated⁴. The National Park Service administers

⁴ According to the NNL website there are 14 NNL's in Maine. The other Landmarks in Maine include Number 5 Bog in Somerset County, New Gloucester Black Gum Stand, Monhegan Island, Gulf Hagas, The Hermitage, Colby-Marston Preserve, Penny Pond – Joe Pond Complex in Kennebec County, Mount

the NNL Program, and if requested, assists NNL owners and managers with the conservation of these important sites.

A portion of the wind farm will be visible from the Bigelow Range at a distance of 8-10 miles (See View Location Map 6-2). Cross-sectional analysis has shown that the view toward the RWF will be partially blocked by Crocker and Sugarloaf Mountains, so observers will not be able to see all the turbines from any one location. The turbines and a portion of the collection line on Black Nubble will be visible from West Peak, Cranberry Peak, and the Horns. The top five or six turbines and a small section of the access road on Mount Redington will be visible from Myron Avery Peak, West Peak, and the Horns. The westernmost turbines on Mount Redington will be visible from Cranberry Peak. The 115kV transmission line will be visible in some locations but it will be seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27. See Table 6-2 Project Visibility for a complete description of visibility.

The Maine Atlas and Gazetteer lists the following unique natural areas within a 15-mile radius:

- **Crocker Cirque**, a glacial cirque between Crocker and South Crocker Mountains, accessible via the Appalachian Trail and the Caribou Pond Road off Route 27. The cirque is on the east side of Crocker Mountain and therefore not within the viewshed of the RWF. A Maine Appalachian Trail Conference campsite is located at the base of the cirque. A considerable amount of timber harvesting has occurred along the Caribou Pond Road in recent years, opening up views toward Mount Redington.
- **Redington Pond Falls**, north of Redington Pond, two miles south of Black Nubble. The Maine Atlas and Gazetteer describes this feature as a “Spectacular

series of waterfalls and cascades on mountain stream – total drop 107 yds. Great Views. Difficult access; no marked trails.” None of the turbines on either Black Nubble or Mount Redington will be visible from this falls due to the configuration of the landforms and the vegetation in the immediate vicinity.

- **Poplar Stream Falls**, 11 miles to the east-northeast in Carrabassett Valley. The RWF will be screened from view by Crocker and Sugarloaf Mountains.

4.1.B. State or National Wildlife Refuges, Sanctuaries, or Preserves and State Game Refuges

There are no State or National Wildlife Refuges, Sanctuaries, or State Game Refuges within 15 miles of the proposed RWF. The Maine Atlas and Gazetteer lists the following Maine Public Reserved Lands (PRL) within a 15-mile radius:

- **Bigelow PRL**: 30,000 acres of land between Route 27 and Flagstaff Lake just east of Stratton and 7-13 miles from the RWF. The preserve encompasses the seven peaks that make up the Bigelow Range. The preserve is a popular three-season recreation area according to the Bureau of Parks and Lands’ website (spring sees few visitors). The primary activities include hiking the numerous trails, fishing in the preserve’s brooks and ponds, cross country skiing, snowmobiling, camping, swimming, hunting, and trapping. The Appalachian Trail crosses most of the peaks, affording panoramic views to the nearby lakes and mountains.

Figure 6-3: MDEP Visual Evaluation Field Survey Checklist

**APPENDIX B: MDEP VISUAL EVALUATION
FIELD SURVEY CHECKLIST**

(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: **Redington Mountain Windpower, LLC** Phone: **207-847-9323**
 Application Type: **NRPA, Fragile mountain ecosystem**
 Activity Type: **Utility scale wind farm on Redington Pond Range and Black Nubble**
 Activity Location: **Redington Township and Town of Carrabassett Valley**
 County: **Franklin**
 GIS Coordinates, if known: **See project location maps**
 Date of Survey: **7/98, 9/98, 9/15/03, 10/10/03** Observer: **T. DeWan, T. Farmer, A. Segal**
 Phone: **207-846-0757**

Distance Between the Proposed Activity and Resource (in Miles)
Visibility

1. Would the activity be visible from:	0-1/4	1/4 -1	1+
A. <i>A National Natural Landmark or other outstanding natural feature?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. <i>A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. <i>A state or federal trail?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. <i>A public site or structure listed on the National Register of Historic Places?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. <i>A National or State Park?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. 1) <i>A municipal park or public open space?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) <i>A publicly owned land visited, in part, for the use, observation, enjoyment and appreciation of natural or man-made visual qualities?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) <i>A public resource, such as the Atlantic Ocean, a great pond or a navigable river?</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 6-3: MDEP Visual Evaluation Field Survey Checklist (Continued)

	0-1/4	1/4 -1	1+
2. What is the closest estimated distance to a similar activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. What is the closest distance to a public facility intended for a similar use?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Is the visibility of the activity seasonal? (i.e., screened by summer foliage, but visible during other seasons)		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
5. Are any of the resources checked in question 1 used by the public during the time of year during which the activity will be visible?		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

See narrative under 4.1.A National Natural Landmarks (above) and Table 6-3 Visibility Chart for a description of the visibility from the Bigelow Range.

- **Dead River PRL:** 4,771 acres of land on the shoreline of Flagstaff Lake and the first few miles of the North Branch Dead River. Lakefront camping, accessed by vehicle and by boat, is the primary recreational activity. The turbines on Black Nubble will be visible from portions of the reserve near the Dead River at a distance of 11 miles.
- **Bald Mountain PRL:** 1,873 acres of preserved land just south of the village of Oquossuc on the western end of Rangeley Lake. A popular one-mile hike to the summit of Bald Mountain offers a 360-degree panorama that encompasses Rangeley Lake, Cupsuptic Lake, and Mooselookmeguntic Lake as well as the Bigelow Range and East Kennebago Mountain. From Bald Mountain the closest wind turbines on Black Nubble will be 15.7 miles away; the turbines on Mount Redington will be 18 miles away. Visualization 6-1a is panorama of the view from Bald Mountain. Visualization 6-1b is a photosimulation of the same scene

with the wind farm in place. Visualization 6-1c is a 'normal' lens (50mm) visualization of the scene. See Photos 6-P1-14 in Appendix C.

- **Four Ponds PRL:** 6,000 acres between Mooselookmeguntic Lake and Route 4. Visitor activities include swimming, hiking, fishing, and snowmobiling. A section of the Appalachian Trail crosses the southern half of the reserve. The RWF will be located 11-17 miles to the northeast and should not be visible from any portion of the reserve.

4.1.C. A state or federal trail

The Appalachian Trail and Side Trails

The Appalachian National Scenic Trail (AT) starts at Mount Katahdin and runs 2,100 miles to Springer Mountain in Georgia. Over 281 miles of the trail are in Maine. Approximately 34 miles are within the 15-mile radius study area. The AT crosses diagonally through the middle of the study area, starting at the Bigelow Range on the north and extending to Saddleback Mountain in the south. The Appalachian Trail Guide to Maine describe the section from Route 16/27 in Carrabasset Valley south to Route 4 in Rangeley as the "most difficult along the AT in Maine."

The majority of the trail in the study area is wooded, providing limited opportunities for visual contact with the surrounding mountains and the proposed RWF. The wind farm may be fully or partially visible from a total of 3± miles of the AT, as well as some segments along several side trails. Maps 6-5 and 6-6, Views from Hiking Trails Maps, show the AT as it passes through the study area and the location of areas of both full and partial visibility. These maps also illustrate where the RWF may be visible from other trails in the area. The maps also show the location of photographs that were taken along the AT (in Appendix C) and visualizations showing 'before' and 'after' views from

several locations along and within the study area (See Visualizations V6-2 through V6-6 in Appendix B).

For the south-bound hiker, the first views of the wind farm will be on Myron Avery Peak in the Bigelow Range. Here the turbines on Black Nubble may be seen at a distance of 11 miles to the southwest (depending upon weather and haze conditions). As the hiker heads west along the crest of the Bigelow Range, views of the RWF will change relative to the position of Crocker Mountain, which will screen most of the view of Mount Redington. As shown on Map 6-4, portions of the wind farm will be seen intermittently along the AT on mountain tops and forest openings from Myron Avery Peak to the junction with the Bigelow Range Trail (leading to Cranberry Peak). See Appendix D for cross sections between West Peak on the Bigelow range and the RWF.

At this distance the turbines will appear as tall as an object 0.2" in height (or approximately the thickness of three stacked nickels) held at arms length (24"). See Table 6-3 Visibility Chart for a discussion on the visibility and relative size (R/S) of the RWF throughout the length of the AT.

Once the hiker descends the Bigelow Range, there will be no open views of the wind farm for approximately ten miles as the trail descends into the Carrabassett River Valley. In an effort to minimize potential visual impacts on the AT and a trailhead parking area, EEC will be locating the 115 kV transmission line underground in the vicinity of the Route 27 crossing. See Section 6.8 for a description of this section of the transmission line. Photographs 6-P77 through P84 provide views of the AT and the area surrounding the Route 27 road crossing.

Heading south from the Bigelow Mountain range, the trail ascends the north face of Crocker Mountain and reaches the closest point of visible contact with the wind farm. While the north summit of Crocker is the taller of the two peaks that make up Crocker Mountain, its wooded summit offers little viewing opportunities from the trail. A narrow

opening at the peak will afford a very brief filtered view to Mount Redington (see Photo 6-P15).⁵ The tops of 5± turbines will be visible above the treeline from the high point on the trail. Visualization 6-2 provides a photosimulation of this view with the RWF in place. It should be noted that this is not an overlook (such as the one at South Crocker) but a point along the trail where the vegetation is low enough to look beyond the forest in the immediate foreground.

A very narrow opening in the forest starts at a point near the north summit of Crocker Mountain and heads down its southwestern flank. Its straight alignment and disregard for the steep topography suggest that it may have been a traverse line cut by a survey crew within the past decade. Hikers venturing off the Appalachian Trail 250± feet down this cut would encounter a panoramic view of the RWF site. At this point Mount Redington is 1.5 miles to the south and Black Nubble is 3.1 miles to the southwest. (The Appalachian Trail Guide to Maine makes no mention of the clearing or the view.) See Photos 6-P16, 17 and 18. Visualization 6-3 has been prepared to illustrate what the wind farm will look like from this viewpoint.⁶

As the hiker descends into the wooded saddle between North and South Crocker there will be a few filtered views of the RWF. The closest turbine at this point would be 1.2 miles from the AT. Dense vegetation throughout the saddle would probably screen most views of the turbines. (Photos 6-P19 and P20 show an opening in the characteristically dense vegetation along the trail.)

The summit of South Crocker is mostly wooded and will provide no visual contact with the wind farm. The Trail Guide makes no mention of any views from this point. The Maine Atlas and Gazetteer describes the best views from Crocker Mountain (both North

⁵ This photograph was taken in July 1998. Some additional growth may have occurred in the intervening seven years.

⁶ Just as the south summit of Crocker has a side trail leading to an overlook toward Sugarloaf Mountain, this site on the north summit of Crocker could be developed as a vantage point for hikers who wanted to see the wind farm close up.

and South peaks) at the south summit, where a side trail leads to a viewpoint looking southeast toward Spaulding and Sugarloaf Mountains. (Photos 6-P21-P27 are views on South Crocker down to Caribou Valley Road. Photos 6-P28 and P29 are views from the South Crocker overlook toward Sugarloaf Ski Area.)

From Crocker Mountain the AT descends into a wooded valley formed by the Carrabassett River, crosses Caribou Valley Road, and starts the ascent to Spaulding Mountain via Sugarloaf Mountain. The top of Mount Redington is visible intermittently between elevation 2,500 and 3,400± as the trail climbs the western edge of Sugarloaf. Photographs 6-P30 through P37 show the variety of open and filtered views along this segment of the trail. Hikers heading north on the AT would primarily experience these views.

A 0.6-mile side trail off the AT takes hikers to the summit of Sugarloaf Mountain. (At elevation 4,237, it is the second highest mountain in Maine.) Hikers and skiers on the mountain have panoramic views of the Bigelow Range to the north, the western mountains to the west (including Mount Redington and Black Nubble), and the development of Sugarloaf USA below. Visualization 6-4a is a panorama of the view from Sugarloaf Mountain. Figure 6-4b is a visualization of the same scene with the RWF in place. Figure 6-4c is a 'normal' lens view of the projected view from Sugarloaf with the RWF in place.

The summit of Spaulding Mountain is wooded and affords no views to the west toward the wind farm site. A 1.7-mile side trail (off the AT) leads to the ruins of a fire tower at the summit of Mount Abraham. The view is a panorama of mountains, forests, and cutting patterns to the west (see photos 6-P40-43). The summit of Mount Redington is 4.5 miles to the northwest. The summit of Black Nubble is 7.3 miles away and is seen over Mount Redington. Visualization 6-5a is a panorama of the view from Mount Abraham. Visualization 6-5b is a visualization of the same scene with the RWF in place.

Visualization 6-5c is a 'normal' lens view of the projected view from Mount Abraham with the RWF.

At several places along the trail up the east side of Poplar Ridge the forest cover opens up to provide short open views toward the wind farm site. At this point, 8.3 miles south of Spaulding Mountain, the summit of Black Nubble is 4.0 miles to the north and Mount Redington is 4.7 miles to the northeast. The lean-to on Poplar Ridge will not have views of the RWF site. Photos 6-P48-P62 are a sequence of images along AT showing the characteristic landscape, filtered views, and the occasional open panorama.

The southernmost segment of the AT on Saddleback Mountain is well known for its concentration of open mountain views. The summit of Saddleback Junior, 1.9 miles south of Poplar Ridge, affords hikers 360-degree views of the western mountains (see photos 6-P63-P66). At this point hikers will be just over four miles due south of the RWF site.

On the west side of Saddleback Junior the trail descends into the woods for another 1.3 miles. At elevation 3,600' (0.4 miles east of The Horn), the trail emerges from the treeline and starts a 3± mile section of open ridgelines. The AT passes over The Horn and the summit of Saddleback Mountain, providing panoramic mountain views in all directions. The wind farm will be visible for 1.5± miles of this exposed ridgeline.⁷

At the northern end of this open ridgeline (0.4 miles east of The Horn) the nearest wind turbines will be 4.5 miles to the north on Black Nubble and 5.3 miles to the northeast on the Redington Pond Range. The viewshed of the wind farm will extend south to

⁷ The RWF will not be visible throughout a 0.6 mile segment of the AT on the southwest side of The Horn. This segment is not included in the 1.5 miles of ridgeline described above. Mileage is horizontal distance derived from USGS topo quads. Actual on-the-ground distance may vary.

Saddleback Mountain. At this point the nearest wind turbine on Black Nubble will be 5.9 miles to the north northeast and 7.5 miles to the northeast on the Redington Pond Range.

Photographs 6-P67 through P70 provide images from The Horn. Photographs 6-P71 through P76 were taken from the summit of Saddleback Mountain by two different photographers under varying weather conditions.

Visualization 6-6a is a panorama of the view from the summit of Saddleback Mountain looking toward the wind farm site. Visualization 6-6b is a computer-enhanced view of the same scene with the RWF in place. Visualization 6-6c is a 'normal' lens view of the projected view from Saddleback Mountain with the RWF in place.

The hiked distance from Myron Avery Peak in the Bigelow Range (where the RWF will first come into view) to Saddleback Mountain is 34.2 miles, according to the Appalachian Trail Guide to Maine. Based upon the description in the Guide, 1997 USGS aerial photographs, and TJD&A field investigations, open and filtered views to the wind farm will be seen for a total of approximately 3 miles (9%) of this distance. The Guide estimates that the hike over the Bigelow Range, from Long Falls Dam Road (east of Flagstaff Lake) to Route 27 should take 1-2 days. The Guide estimates the hike from Crocker Mountain to Saddleback Mountain (from Route 27 to Route 4) should take 2-4 days.

State-Designated Snowmobile Trails

The Rangeley area is a popular destination for snowmobiling in Maine. The Interstate Trail System (ITS), a comprehensive network of snowmobile trails in Maine, has several routes in the vicinity of the wind farm. ITS 84/89, a 15-mile segment that extends east out of Rangeley, provides access to the south side of Saddleback Mountain.. ITS 89 is a 35-mile connection between Stratton and Rangeley. This route is west of the project area. In addition, there are many other routes maintained by local snowmobile clubs in

the area that afford wintertime access to the forestland in the region. Maps 6-2 through 6-6 show the approximate location of known routes on the USGS base map.

4.1.D. A property on or eligible for inclusion in the National Register of Historic Places pursuant to the National Historic Preservation Act of 1966, as amended.

The following is a listing of National Register properties within 15 miles of the RWF, organized by township. The sites with views of the proposed wind farm are shown *in italics*.

Dallas Plantation

- Upper Dallas School, Saddleback Road. 8 miles west of the RWF. The school faces Rangeley Lake and is not within the viewshed of the wind farm.

Kingfield

- Frank Hutchins House, High Street.
- William F. Norton House, 1 Stanley Avenue.
- Amos G. Winter House, Winter's Hill off Route 27.

Views of the RWF from all structures in Kingfield (13± miles south-southeast of the RWF) will be blocked by Sugarloaf and Spaulding Mountains.

Madrid

- Madrid Village Schoolhouse, Reeds Mills Road. 11 miles south-southwest of the RWF. View will be blocked by Saddleback Mountain.

Phillips

- Maine Woods Office, Main Street.
- Captain Joel Whitney House, 8 Pleasant Street.

Both structures are 13± miles south of the RWF, which will be screened by Potato Hill, Mecham Hill, and other low hills on the north side of Phillips.

Rangeley

- Wilhelm Reich Energy Observatory, Dodge Pond Road off Routes 4/16. RWF may be visible at distances of 12-15 miles to the east from a few points on the grounds of the Observatory, but not from the historic structures (see Photos 6-P147 and P147).
- Oquossoc Log Church, Route 4. >15 miles from wind farm.
- Rangeley Trust Company Building, Main Street. 9 miles west of the RWF.
- Rangeley Public Library, Lake Street. 9 miles west of the RWF.

Several of the turbines will be visible over Haley Pond within Rangeley Village at a distance of approximately 9 miles. (see Photos 6-P153 and 154).

Stratton

- Ora Blanchard House, Main Street. 7 miles north of RWF. View will be screened by vegetation and structures in the immediate vicinity.
- *Coplin Plantation Schoolhouse*, Route 16, 4.5 miles from the junction of Route 27. Turbines on Black Nubble will be partially visible at a distance of 4.5 miles. See Photos 6-P123 and P124.

4.1.E. National or State Parks

There are no National Parks within the viewshed of the proposed RWF. Acadia National Park, which is over 100 miles to the southeast, will not be affected by the project.

Rangeley Lake State Park, located on the southerly shore of Rangeley Lake, is an 869-acre park featuring camping, swimming, picnicking, boating, wildlife watching, photography, and hiking. The park is connected to the regional snowmobile trail network, as well as to ITS 89. Cross sectional analysis indicates that portions of the RWF on both Black Nubble and Mount Redington will be visible from the eastern

shoreline of the park. The closest turbines on Black Nubble will be 12.7 miles to the east northeast. The peak of Mount Redington is 17 miles away. While Rangeley Lake State Park is officially closed from October 2 through May 14, it still attracts winter hikers, cross-country skiers, and snowmobilers. See Photos 6-P85 and P86 for winter views from the park.

4.1.F. Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment and appreciation of natural or cultural visual qualities.

4.1.F.1. Municipal park or public open space. While most of the local communities within 15 miles of the RWF have parkland or public open space, there are few that have any views of the proposed wind farm. There are no public parks within five miles of Black Nubble or Mount Redington.

The closest public park within ten miles of Black Nubble or Mount Redington is Lakeside Park on Rangeley Lake in Rangeley village. The park is a focal point for activity in the community, featuring a boat launch, small beach, picnic grounds, a town green, and dramatic southwesterly views down the lake. However, the park is not within the viewshed of the RWF and will not be affected by it. (See Photos 6-P87 and 88.)

In Carrabassett Valley the town owns 1,000 acre of land on the south side of Route 27. This land is primarily used for cross-country skiing and other winter pursuits. The land is six miles east of the closest turbines proposed for Mount Redington. The land is oriented to the north and will not be affected by the RWF.

A small private picnic area on Eustis Ridge above Cathedral Pines Campground on Flagstaff Lake will have filtered views of the RWF. This locally recognized overlook is less than an acre in size with two picnic tables and grills. The picnic area provides

a panoramic view of the Bigelow Range and Flagstaff Lake to the southeast and east. The wind farm will be partially visible at a distance of 12 miles, looking south across the Eustis Ridge Road and through roadside trees. (See Photos 6-P89 through P92.) The views to the RWF will be more open during the leaf-off season, but picnic areas generally get little use during this time of the year.

Another private viewpoint that will afford views of the RWF is from a field below Viles Road, further up the Eustis Ridge Road in Eustis. Visualization 6-7a is a panorama of the view from the field below Viles Road on Eustis Ridge. Visualization 6-7b is a visualization of the same scene with the RWF in place. Visualization 6-7c is a 'normal' lens view of the projected view from this viewpoint with the RWF in place.

4.1.F.2. A publicly owned land visited, in part, for the use, observation, enjoyment and appreciation of natural or man-made qualities.

Scenic Byways. Between the 1960's and the early 80's, the Maine Department of Transportation (MaineDOT, formerly the Maine State Highway Commission) undertook a program to identify scenic state-assisted highways throughout the state. Eight roadways, with a total length of 200 miles, were nominated by a Committee convened by MaineDOT, using Federal Highway Beautification Act funds. This program resulted in the placement of a green line on the official Highway Map and roadside markers designating Scenic Highways. While the initial program did raise public awareness, it did not result in any additional protection to the lands abutting the roadways.

In recent years, as part of a nationwide movement to recognize the value of scenic byways, MaineDOT started to take a more active interest in these roadways. The state established a Scenic Byways program to help communities develop plans and receive state and federal funding. In 1999 and 2000 MaineDOT focused on the four

byways in the western mountains of Maine, working with local citizen advisory groups to establish corridor management plans to guide the management and enhancement of the byway corridors. Two of these byways traverse portions of the RWF study area:

- Route 27, from Kingfield to the Canadian Border (47 miles).
- Routes 4/17 (Rangeley Lakes National Scenic Byway) from Madrid through Kingfield and Oquossuc and Height of Land to the Franklin County line in Township D (36 miles).

As shown on Map 6-2, the only place along the Route 27 Scenic Byway where the RWF will be visible from year-round is on the Flagstaff Lake causeway (see Photos 6-P97 and 98). At this location southbound motorists may be able to see the turbines at a distance of 8 miles. During winter months the turbines might be seen at other locations, but deciduous roadside trees will filter the view. While Mount Redington is screened by Hedgehog Hill, the tops of some of the turbines may be partially visible above the hill.

On Route 4/16 the turbines will be momentarily visible to eastbound motorists during the summer months as the road crosses over the top of several hills between Oquossuc and Rangeley. These points are 10-13 miles from the RWF (see Map 6-3). During leaf-off season, filtered views of the wind farm may be seen from Route 17 on the east side of Bald Mountain at a distance of 15 miles (see Photos 6-P99 through P112). Visualization 6-8a is a panoramic view from Route 16 between Oquossuc and Rangeley. Visualization 6-8b is the same view with the RWF in place. Visualization 6-8c is a 'normal' lens view of the projected view from Route 16 with the RWF.

The Rangeley Scenic Overlook⁸ on Route 17, 5 miles north of Height of Land in Rangeley Plantation, provides a 180-degree panoramic view to the east. The view

⁸ donated to the State of Maine by Shelton C. Noyes, Esq

encompasses Rangeley State Park (directly below the overlook), the Horns on Bigelow, Potato Nubble, Crocker Mountain, and Sugarloaf Mountain. Black Nubble and Mount Redington are visible at 14 and 18 miles respectively. The wind farm will be seen against the backdrop of Sugarloaf and Crocker Mountains and will not be silhouetted against the sky (see Photos 6-P133 through P136).

The Height of Land, a well-known overlook 5 miles south of Rangeley Scenic Overlook in Township D, is oriented to the north and west and has no views of the RWF.

4.1.F.3. Public resources, such as great ponds. As noted above, GIS and cross-sectional analysis indicates that portions of the RWF may be visible from at least a portion of the following lakes and ponds within the 15-mile study area. (See also Table 6-1 in Section 4.3.2.1 for a description and physical characteristics of the lakes and ponds within the viewshed of the project.)

- Cow Pond
- Dodge Pond
- Flagstaff Lake
- Gull Pond
- Haley Pond
- Kennebago Lake
- Loon Lake
- Quimby Pond
- Rangeley Lake
- Round Pond
- Saddleback Lake

Maps 6-2, 6-3, and 6-4 illustrate where the wind farm will be visible from on the lakes and ponds in the study area. Cross-sectional analysis and GIS analysis has also shown that on most of the lakes and ponds only a portion of the RWF will be visible. (See Appendix D for computer-generated cross-sections. See also Table 6-1, Waterbody Chart.)

4.2 WHAT IS THE CLOSEST ESTIMATED DISTANCE TO A SIMILAR ACTIVITY?

At the present time there are no other commercial grade wind farms in operation in Maine. The closest energy production facility is the Boralex Stratton Energy Plant, located 7 miles north of the RWF in Stratton, adjacent to the Bigelow Public Reserve Land. This 50 MW energy plant is the largest of the biomass-fired independent power projects that were developed in this state in response to PURPA regulations enacted by the Maine Public Utility Commission. The plant went on line in November 1989. The facility is located on a side road off Route 27. The most visible elements of the plant are its 295-foot tall stack and occasional steam plume that are seen from parts of Cranberry Peak and most of Flagstaff Lake, Eustis Ridge, and Stratton Village.

4.3 WHAT IS THE CLOSEST DISTANCE TO A PUBLIC FACILITY INTENDED FOR A SIMILAR USE?

There are no public facilities intended for a similar use (wind power generation) in Maine.

4.4 IS THE VISIBILITY OF THE ACTIVITY SEASONAL?

The RWF will be visible from most of the scenic resources described above throughout the year. The description indicates seasonal changes in vegetation that may affect the visibility of the project.

4.5 ARE ANY OF THE RESOURCES USED BY THE PUBLIC DURING THE TIME OF THE YEAR DURING WHICH THE ACTIVITY WILL BE VISIBLE?

All the resources listed above are used by the public to varying degree throughout the year.

5.0 PROJECT DESCRIPTION

The following section describes the components of the proposed RWF relative to its location and scale within the viewshed of the surrounding scenic resources.

5.1 Wind Turbines

The basic unit of production will be the Vestas V90-3.0 MW turbine. This machine is a utility grade wind turbine incorporating state of the art mechanical and electronic technologies and aerodynamic design. Each turbine consists of three blades attached to a nacelle mounted on a tapered base. The turbines are controlled electronically so they always face into the wind. All components of the turbine will be painted light gray. There will be no visible logos or company insignia on the sides of any of the turbine components.

A total of 30 turbines will be installed, 12 on Redington Pond Range and 18 on Black Nubble. The blades will be attached to a nacelle, a large aerodynamically-designed housing at the rear of the turbine that contains all the mechanical and electronic equipment as well as the generators. The nacelle will be mounted on an 80-meter (263 feet) tapered tower set in a 20-foot diameter concrete foundation. The gray, smooth-finished towers will be 12.5 feet in diameter at the base, tapering to 7 feet in diameter at the top.

Each of the three blades is 44 meters (144 feet) in length (the blades describe a circle 90 meters in diameter). The total height from the concrete base to the top of the blade will be 125 meters (410 feet). See photographs 6-P159 and P160 of the V90-3.0 MW turbine.

The blades will spin very slowly in low wind and will begin producing power when the wind velocity reaches 9 mph. After the wind reaches a certain maximum velocity, which will vary with the intensity of turbulence, the machines will cut out. The turbines may

not be operational at other times, such as when the winds are in-line (wind direction is parallel to the string, which limits the number of turbines that can operate) or when they are taken out of service for repair.

Depending upon the wind velocity, the blades will rotate at 9–19 revolutions per minute (RPM). At 19 RPM (the top operational speed), one of the three blades will pass the apogee (highest point in the blade circle) slightly less than one every second. At 10 RPM (just above the minimum cut-in speed) one blade would pass the apogee every two seconds. Most first-time observers will remark how relatively slow this appears, especially if they have seen wind turbines that use older technology with rapidly spinning blades. Individual blades will still be visible while they rotate.

The turbines will be spaced a minimum of two rotor diameters apart (180 meters/590 feet). Turbine spacing is a function of meteorological considerations related to wind speed and direction, interference from adjacent turbines, and other technical factors. The siting of individual turbines has taken into account site-specific topography, access road locations, wetland boundaries, wildlife habitat considerations, and other unusual site conditions.

By using a constant tower height, each of the nacelles (the hub of the turbines) will be roughly parallel to the ridgeline. This will result a line that follows the existing ridgeline, creating a sense of order in each group of turbines.

Installation procedures will require clearing an area approximately 50 feet by 160 feet at the base of each turbine for laydown and assembly. Since the majority of the viewpoints where the wind farm will be visible are below the elevation of the project site, the clearings for turbine installation should generally not be visible to most viewers.

5.2 Project Lighting

Lighting for the RMW will follow the Federal Aviation Administration (FAA) proposal. Red lights will be mounted on the top of several of the nacelles on each mountain so there is one warning light every 0.5 mile. Under normal operations, the lights will be red, flashing, with a slow-on, slow-off profile, similar to the rhythm and pattern produced by a lighthouse. The final lighting plan is subject to FAA approval.

5.3 Summit Roadways

Each wind turbine will be linked by a 32-foot± wide gravel road designed to provide safe and convenient access to the structures throughout construction. The road width will be reduced to 16-feet after construction to allow for inspection and maintenance. Where the terrain is relatively level, the roads will follow the ridgeline. In many instances, however, the topography will dictate a more circuitous route.

For the most part, the summit roadways built on relatively level ridge top areas will not be highly visible from outside the immediate area. The exception is on the east side of Black Nubble, where roads will be built on the side slope to provide access to three separate turbines and the upper section of the Redington access road.⁹ In these situations special treatments may be used to reduce the amount of cut and fill necessary and minimize visual impact.

5.4 Access Roads

The access roads to the turbines have been designed to follow existing haul roads wherever possible. Where new roads are required they have been designed to a maximum slope of 14 percent.

⁹ See Basis of Design for the Roadways to Access Wind Turbines, DeLuca-Hoffman Associates, Inc. for detailed description of the road standards used for both the summit roadways and access roads.

The most visible portions of the access roads are on the west side of Black Nubble and the west face of Mount Redington. Individualized treatments of cuts and fills in these areas may be necessary to reduce contrasts in color and texture. (See Section 9 – Mitigation Strategies – for recommended construction and erosion/sedimentation control procedures that may be required in the more highly visible areas). Table 6-3, Summary of Visual Impacts, describes the viewpoints where portions of the access roads may be visible.

5.5 Electrical Collection System

Power generated by each turbine will be transmitted in a 34.5 kV cable, direct buried under the summit roadways to a single exit powerline at the north end of both mountains. Direct burial will be used to avoid overhead power lines visible against the skyline. Fiber optic communications cabling, telephone lines, and other communication lines to service the facility will also be buried in the road in their own conduit.

5.6 34.5 kV Collection Line

Electricity generated in the turbines on each mountain will be carried above ground on a single pole line to the substation between the mountains (see project base map). The transmission lines will consist of 40-foot ± wooden poles (out of ground height) spaced 300 to 350 apart in a 75-foot cleared right of way (or existing clear cuts). Three conductors will be attached to each pole with a cross arm. Since these collection lines will be approximately the same height as the tallest trees and similar in line and color, they should not have any significant visual impact where they will be seen. The right of way will be maintained to the full 75-foot width by periodic hand-cutting of any vegetation greater than six feet in height.

5.7 Substation

The 34.5 kV lines will tie into a new electrical substation, to be located on the Nash Stream Road. The substation will consist of a step-up transformer, a small enclosure for a back-up generator, and communications equipment in a 120-foot by 150-foot fenced area. All vegetation will be removed from an area 150-feet by 200-feet to provide a buffer for fire protection purposes outside the fence. A new gravel spur road will be constructed off an existing mountain road to provide access to the facility. The substation will not be visible from either the Appalachian Trail or Route 27.

5.8 115 kV Transmission Line

From the substation, the generated electricity will be carried over a 7.8-mile long, 115 kV transmission line to the existing substation off Route 27 in Carrabassett Valley. The right-of-way will be 150 feet wide and typically cleared for the full width. The transmission structure will typically be a double wood pole, H-frame construction, similar in character to the existing transmission line on Hedgehog Hill in Stratton. Pole height will typically be 45 feet above the ground. The poles will be installed 500 to 600 feet apart. The conductors will be hung from insulators mounted on a 34' wide cross arm.

When the line approaches Route 27, it will be located underground, starting 600 feet± west of the highway. The line will be buried primarily to avoid visual impacts to the Appalachian Trail and the recently improved trailhead parking area on the southwest side of Route 27. The transmission line will cross Route 27 and proceed in a southerly direction under the east side shoulder within the state's right-of-way to the entrance to the existing Bigelow Substation. Within this section the line will cross the Appalachian Trail corridor and the Carrabassett Valley town line. The Bigelow Substation is the wind farm's interconnection point with Central Maine Power's transmission grid. The total underground cable system will be approximately 2,500 feet in length. (See photographs 6-P77 through P84 for views of the area surrounding the Route 27 road crossing.)

The route selected for the 115 kV line generally follows township borders for the first 2/3's of its length to minimize conflict with ongoing timber harvesting operations. In Wyman Township down to Route 27 the line will share the existing 115 kV Boralex transmission corridor that serves the Stratton Biomass plant. Co-location of the transmission facilities will substantially reduce the amount of clearing required and minimize new visual impacts.

5.9 Meteorological Towers

Two meteorological reference towers will be installed (one on each mountain) to provide ongoing monitoring of weather conditions at the site. The design will be 80 meters (263 feet) in height and cable guyed at three locations. Their slim profile and light color make them virtually invisible at distances greater than one mile.

5.10 Laydown Areas

The project will require the construction of one laydown area for each mountain located near the site entrance to receive incoming components and stage the towers, nacelles, and blades. The locations will be sited in existing clearings off the main roads, in part to avoid visual impacts on the surrounding area. The laydown areas will also serve as a parts depot, assembly area, and concrete batch plant. At the conclusion of the construction process, the areas will be regraded and revegetated.

5.11 Operations and Maintenance Facility

The O&M Facility will be located on a five-acre lot in Redington TWP. The facility will consist of a small office and parking area for the facility, a 40' X 60' garage for maintenance and vehicle storage, and an outdoor storage area for turbine components

(such as spare blades). A description of the facility is provided in Section 13: Property Maintenance.

5.12 Crane Pads and Crane Assembly Areas

A 50' X 160' cleared area will be required at the base of each turbine for staging, crane movement, and turbine installation. In three areas – one on the Redington Pond Range (near turbine 1) and two on top of Black Nubble (near turbines 19 and 26) – an additional area (25' X 240' ±) will be cleared and graded for the assembly of the crane boom.

Following their use, these areas will be revegetated. The three crane assembly areas are relatively flat and surrounded by dense vegetation and should be minimally visible from the identified viewpoints.

6.0 VISUALIZATIONS

A variety of graphic tools have been used to create the images in this Visual Assessment. This section describes the methodologies used and the interplay between them. In all cases the objective was to create images that were highly accurate and representative of the landscape that will be created by the wind farm.

The visualizations represent a point in time approximately 5-10 years after construction. During that period vegetation will have a chance to become reestablished on the roadsides, the rock cuts will have aged (either naturally or through the use of Permeon in critical areas), and the surrounding woodland will have grown at its natural rate. As noted elsewhere in this report, areas of particular visual sensitivity will be treated to minimize contrast in color and texture.

6.1 Visualizations (Photosimulations)

Visualizations (photosimulations, or computer-altered photographs) are used to illustrate the anticipated change to characteristic landscapes within the study area resulting from the installation of the Redington Wind Farm. The following visualizations are provided in Appendix B:

- V6-1 View from Bald Mountain
- V6-2 View from Appalachian Trail on North Summit of Crocker Mountain
- V6-3 View below Appalachian Trail on North Summit of Crocker Mountain
- V6-4 View from Sugarloaf Mountain
- V6-5 View from Mount Abraham
- V6-6 View from Saddleback Mountain
- V6-7 View from Eustis
- V6-8 View from Route 16 in Rangeley

The following section describes the methodology used to develop these images:

1. Photographs of each site were taken by TJD&A and other photographers during the field trips noted earlier in 3.0 Data Collection. (See Appendix C Photography for a representative sampling of images taken during the course of fieldwork.) The position of the camera was recorded by TJD&A staff using GPS equipment or measured from known observation points (e.g., road intersections, observation towers, or mountain summits). Photographs were taken with both a Nikon FM film camera (using a zoom lens set at 50 mm) and Nikon digital cameras (set to shoot at a focal length equivalent to a 52 mm (“normal”) lens).
2. Photographs were selected to provide the reviewer with characteristic views of the existing landscape and the scenic resources within and adjacent to the project. For most of the visualizations, two or three photographs were merged into a panorama (using Photoshop software) to provide a more representative view of how the observer experiences the landscape. (The disadvantage of this approach, however, is that the resultant ‘wide-angle’ view may visually diminish the size of individual elements within the scene, such as the wind turbines. In order to compensate for this effect, for each panorama the report also provides a ‘normal’ view that more accurately shows what the human eye will see.)
3. Spatial Alternatives, Inc. provided wireframe images of the views from the selected viewpoints (see 7.2 below). These included diagrammatic illustrations of the turbine bases, blades, roads, and transmission corridors that were combined with a 3D black and white model of the existing landscape.¹⁰
4. The existing conditions photographs were imported into Photoshop and digitally

¹⁰ In most Visual Impact Assessments done by TJD&A, weather balloons are used to provide reference points in the landscape. These have proven to be very useful in establishing the heights of transmission lines, cell towers, and similar structures. However, due to the high wind conditions and the great distances that were being evaluated, the use of weather balloons proved to be infeasible.

superimposed over the computer-generated images of the wind farm. The photographs were then electronically modified in Photoshop to show the anticipated changes to the landscape. These include removal of vegetation, installation of the wind turbines, collector lines, and roadways. Adjustments were made to the images to account for the effects of atmospheric perspective and to correct uneven lighting conditions. Photographs of similar wind turbines from Vestas were used as the source imagery.

5. For each panorama a 'normal' view was created to give a more realistic representation of the scale of the turbines. Since panoramic views include much more of the landscape, they tend to understate the size of individual objects. Normal views are actually enlargements of the panoramas which allow the reviewers to examine the scene with more precision.

In reviewing the visualizations, the reader should keep in mind that these are reduced versions of the final products. Ideally, the reviewer should be able to project and enlarge the images onto a flat surface to approximate the size of the 'window' that the photographer saw when the photographs were taken. Alternatively, the PDF version of the visualizations should be viewed on a high resolution computer screen to enable the reviewer to look at the details of the RWF.

6.2 3D Model Methodology

Spatial Alternatives, Inc., a GIS (Geographic Information Systems) consulting firm in Yarmouth, Maine worked with TJD&A to create a three-dimensional computer model of the area surrounding the proposed turbine strings on Redington Pond Range and Black Nubble. The model was used in two ways:

- To create a wire frame image of the existing landscape with the proposed towers, access roads, and transmission lines in place. These images included enough of

the surrounding and background topography so the computer images could be registered (aligned) with the digital photographs.

- To plot the viewshed of the wind farm components in order to determine their visibility from lakes, ponds, mountains, scenic highways, and other scenic resources.

The base model was created from 10-meter Digital Elevation Model (DEM) data provide by the Maine Office of GIS.¹¹ Turbine locations, existing and proposed access roads, and transmission line alignments were provided by Deluca-Hoffman in the form of an AutoCAD drawing that was georeferenced to UTM Zone 19 (with units in feet). This information was converted to units in meters to match all the other data. Existing roads and trails, the Appalachian Trail, and hydrography are created from the USGS 7.5” Quads and were downloaded from the Maine Office of GIS. The USGS Digital Orthoquads and digital copies of the quad sheets were also downloaded for use as background information. Viewpoints were created from maps provided by TJDA.

Spatial Alternatives created a 3D model using ESRI’s 3D Analyst software. The DEM data was combined into one large DEM that was placed in the computer model. All other features were draped over this model. Turbines were represented by simple 3D shapes. The tower was extruded as a cone 6.4 meter at the base and 80 meters in height. The blades were represented by a 90-meter diameter sphere that was placed on the top of the tower. The roads were portrayed as a ribbon 25 feet in width and the transmission lines a ribbon 75 feet in width.

The 3D views were created by digitally moving the observer to the viewpoint where the photograph was taken from. The viewer height and angle was then adjusted to match the ridgeline of existing photographs provided by TJD&A. The images were screen captured as BMP images and provided to TJD&A to be imported into Photoshop as noted above.

¹¹ The metadata referencing this data source is provided in the file medem10.htm

The viewshed analysis (Appendix D) shows what would be visible from the ground level and the top (125 meters) of the turbines. The model does not take into account tree cover or other features beyond ground elevations. The view sheds were created using ESRI's 3D Analysts viewshed model.

6.3 Cross Sections

Cross-sectional analysis was used in many instances to determine whether a portion of the wind turbines would be visible from specific viewpoints. (The results of this analysis were used in the preparation of Table 6-3, Project Visibility Chart on pages 6-54–6-57.) The cross sections were derived from USGS base maps and followed the methodology outlined in the MaineDEP NRPA Chapter 315 Appendix A (Guidance for the Preparation of Line of Sight Profiles).

7.0 AFFECTED POPULATION / USER EXPECTATIONS

7.1 Introduction

There are several groups of people who may be able to view the wind farm from the ground at some time during the year:

Residents. Year-round and seasonal residents of Rangely, Oquossuc, and other surrounding towns.

Working Population. Woods workers in the commercial forests that make up much of the land within the study area. These include people who are employed in land management activities, timber harvesting, hauling of logs, pulp, and chips. Their level of sensitivity to the visual changes that may result from the wind farm is expected to be minimal.

Recreating Population. The study area is well known for its abundance of natural resource-based recreational activities that attract people throughout the year. Table 6-2 summarizes the types of users who may come into contact with the wind farm, their relative numbers, and their anticipated level of expectation.¹²

As noted in the introduction, the methodology for assessing the visual impacts of the wind farm employed both a professional and a public approach. The professional approach (based upon the observation and judgment of experienced landscape architects) was supplemented by a public approach, which involved the use of professionally developed intercept surveys of people likely to be affected by the wind farm. EEC used three separate surveys to gain an understanding of people's attitudes toward wind energy in Maine and the use of this site for a wind farm.

¹² There are many other recreational activities enjoyed within the study area (e.g., golf, mountain biking, ATV riding) were not included in Table 6-2 since they would not likely be affected by the RWF.

Table 6-2: Recreational Users

USERS	GENERAL LOCATION	RELATIVE USE	VIEWER EXPECTATION
Boaters / Canoers / Kayakers	Rangeley Lake, Flagstaff Lake, Kennebago Lake, and numerous smaller lakes and ponds; South Branch Dead River.	Moderate: variable with the season and water levels.	Moderate to high. Many of the lakes are enclosed or semi-enclosed by surrounding mountain ranges. Perception influenced by degree of development along shoreline, road noise, and conflicts with other boaters.
Fishermen	Lakes, ponds, rivers, and streams.	Moderate: seasonal	High. Many of the lake fishing areas are enclosed or semi-enclosed by surrounding mountain ranges. Perception influenced by degree of development along shoreline, road noise, and other factors.
Hikers	Appalachian Trail, Kennebago Ridge Trail, Mount Abraham, Sugarloaf, other mountains	High: seasonal	High: opportunity to hike above tree line on both Saddleback and Bigelow Range. Perception influenced by cutting operations, ski areas, transmission lines, development patterns, and other cultural modifications.
Hunters	In forestland throughout the study area	Low to moderate Seasonal	Low to moderate: hunters are often attracted to the edge conditions found along utility / road corridors and cutting operations.
Motorist Driving for Pleasure	Scenic Byways, local roads around lakes and in communities	Moderate	Moderate to high along the Scenic Byway and in proximity to mountain ranges. Perception influenced by views of timber harvesting and visible recreational, industrial, and residential development
Skiers (Downhill)	Sugarloaf USA and Saddleback Ski Areas	High	High: Opportunities for people of all ability levels to ski in a variety of mountain terrain and challenge levels.
Snowmobilers	Throughout the study area; concentration in Rangeley and along ITS and other routes.	Moderate to high. Seasonal	Moderate to high: ITS offers riders a way to experience a highly varied landscape. Perception influenced by harvesting operations, power lines, and industrial facilities. However these facilities are often used as the basis for trail development.

7.2 1994 Intercept Surveys

In 1994 EEC initiated a series of surveys to test the public's reaction to the proposed wind farm. The initial survey was prepared, administered, and analyzed by Market Decisions (MDI), a market-research consulting firm in South Portland, Maine. This

survey was used to gather objective data from hikers, hunters, local residents, skiers, and snowmobilers in the vicinity of the RWF.

Early in the survey design process input was solicited and received from members of the Appalachian Trail Conference (ATC), the Maine Appalachian Trail Club (MATC), and the National Park Service (NPS). This input included selecting the sites to interview hikers and the format of the survey instrument. Dr. James Palmer, State University of New York School of Landscape Architecture., also reviewed the survey¹³. The hiker survey then became the core survey instrument that was used in developing other questionnaires.

The following is a narrative summary of the 1994 surveys.

7.2.1 Hikers

The survey of hikers was conducted at Mount Abraham, Sugarloaf Cirque, and the Horn on Saddleback Mountain. Over 160 intercept surveys were completed between July 2, 1994 and October 10, 1994.

- 57% saw the proposed wind farm as being appropriate. 20% were neutral. 23% felt that it was inappropriate.

7.2.2 Hunters

The survey of hunters was based upon intercept surveys at the Caribou Pond Road. Participants were shown images of the Mount Redington portion of the project as seen from the Caribou Pond Road.

- 67% saw the proposed wind farm as being appropriate. 13% were neutral. 20% felt that it was inappropriate.

¹³ Dr. Palmer is a recognized expert in visual impact assessment, having co-authored Foundations for Visual Project Analysis with Richard Smardon and John Felleman, one of the classic texts in the field.

7.2.3 Local Residents

The survey was based on 101 interviews conducted in the Kingfield/Sugarloaf area using images of the Mount Redington string. Those who used the woods in the winter months (about half the respondents) were also shown a winter scene of Mount Redington from the Caribou Pond Road.

- Respondents noticed little impact of the project on Route 16.
- 65% saw the project as having a neutral or positive visual impact.
- 56% saw the project as harmonious with the natural environment or neutral.
- 68% saw the proposed wind farm as being appropriate. 16% were neutral. 16% felt that it was inappropriate.

7.2.4 Skiers

The survey was based upon 100 interviews with skiers on Sugarloaf Mountain at the Spillway Chair Lift, halfway up the mountain and the base lodge. Respondents were shown images of the wind turbines on Redington Mountain as well as simulation of wind generators erected on Sugarloaf Mountain.

- 72% saw the proposed wind farm as being appropriate. 13% were neutral. 15% felt that it was inappropriate.

7.2.5 Snowmobilers

The survey was based on 52 interviews with snowmobile owners in the area surrounding Sugarloaf Mountain. Participants were shown images of the Mount Redington portion of the project as seen from the Caribou Pond Road.

- 52% saw the project as having a neutral or positive visual impact.
- 54% saw the project as harmonious with the natural environment or neutral.
- 13% saw the project as having a negative affect on their snomobiling experience while 50% saw it as having a neutral impact, and 37% saw it has having a positive impact.
- Views of large clear cuts, industrial facilities, and roads were all seen as having a more negative impact on the snowmobile experience than the wind power project.

- 63% saw the proposed wind farm as being appropriate. 12% were neutral. 25% felt that it was inappropriate.

7.3 2003/2004 Hiker Surveys

In 2003 and 2004 EEC again engaged the services of Market Decisions to conduct an intercept survey of hikers in the study area, with a concentration on those using the Appalachian Trail. The survey instrument and methodology were very similar to the 1994 survey that was also conducted by Market Decisions. The results of this recent work are provided in Appendix E, Hikers Survey.

One of the main differences between the two sets of surveys was the quality of the visualizations (computer-enhanced photographs) that were shown to respondents to test their reaction to the wind farm. The 2003/2004 visualizations (included as part of Appendix B) represent a decade's worth of technological improvements that resulted in more realistic, photographic-quality images that are the accepted standards among professionals who engage in visual impact assessments.

The following is a narrative summary of the 2003/2004 surveys.

7.3.1 Overview

The Mount Redington Wind Farm Visual Analysis Survey is based on in-person interviews conducted from October 3rd to 13th, 2003 with 93 hikers at the Saddleback Mountain, Crocker Mountain, and Sugarloaf Mountain trailheads, then again from August 25 to 31, 2004, with 108 hikers at the Saddleback Mountain and Crocker Mountain trailheads. The sampling approach used during the course of this research was designed to target only those hiking along the trails and to exclude those using the areas for other purposes (such as picnics).

7.3.2 *Hikers Survey*

The survey instrument was designed to assess hikers' attitudes about the visual impact of the proposed wind farm and their views of wind power as a source of energy. The survey questions included in the survey covered the following topics:

- Respondent characteristics
- Participation in outdoor activities in the Carrabassett Valley/Rangeley area
- Factors that contribute to the quality of the hiking experience
- Impacts of human activity on the hiking experience
- Assessment of the appropriateness of wind power for Maine
- Assessment of the visual impact of the proposed Redington wind farm
- Impact of the Redington wind farm on the hiking experience

7.3.3 *Visualizations*

In evaluating their views, respondents were shown a series of visualizations and asked to evaluate their scenic value. The survey methodology used these visualization to assess the respondents' perceptions of the scenic value of viewpoints along hiking trails. Respondents were shown both a view of existing conditions and a view showing what it would look like with the RWF. The visualizations were all 30'' by 9'' and were prepared by TJD&A. The visualization provided views from a number of locations at varying distances (from approximately 6 miles to 1.5 miles). The viewpoints included:

- Mount Abraham
- Saddleback Mountain (on the Appalachian Trail)
- Crocker Mountain (below the Appalachian Trail)
- Sugarloaf Ski Area.

7.3.4 Respondent Characteristics

Seventy percent of the respondents were male. The ages of respondents varied from 18 to 81. Almost four in ten respondents (36%) lived in Maine. Twenty-two percent (22%) of respondents belonged to a club that helps maintain the Appalachian Trail. Sixteen percent (16%) of respondents were members of the Appalachian Trail Conference.

Ninety percent of the respondents had hiked in the area at least once before. Most had hiked sections of the Appalachian Trail at least once. Half of the respondents were day hikers. The respondents participated in a variety of outdoor activities during the past 12 months in the Carrabassett Valley/Rangeley area, including hiking, camping, canoeing or kayaking, cross-county skiing, and downhill skiing.

7.3.5 Assessment of Visual Impact

Visual Impact. Respondents were asked to evaluate their overall feeling of the visual impact of the RWF. On average, respondents rated the visual impact as 3.5 on a seven point scale, or slightly negative. Twenty-six percent of respondents rated the visual impact as positive while 21% rated the visual impact as neither positive nor negative. Thus, 47% of respondents felt that the RWF will not have a negative visual impact. Fifty percent of respondents indicated the RWF would have a negative visual impact.

Hiking Experience. 60% of respondents indicated that the RWF would have no effect or a positive effect on their hiking experience. Only 38% of respondents indicated the proposed wind farm would have a negative effect on the quality of their hiking experience. Among those indicating it would have a negative impact on the quality of their hiking experience, 48% indicated that it would alter the scenic view, 11% said that it would have no real affect and that they would tolerate it, 7% indicated it would lessen their enjoyment of the area, and 7% indicated it would disturb the solitude of the area.

Effect of Distance. The presence of the wind farm will decrease the value of the scenic view from Saddleback Mountain, but it is important to note that even with the wind farm, respondents still rate the scenic value as high. The impact from Mount Abraham (4 miles) and North Crocker Mountain (1.5 miles) are comparable and significantly larger than that observed in the view from Saddleback Mountain. This suggests that there is somewhat of a threshold distance to the effect and the threshold is about 4 miles. That is, the impact on the scenic value of a view should be approximately the same from all distances of four miles or less.

Effects of Human Activity. The presence of other man made features has a strong moderating effect on the rating of the value of the scenic view including the RWF. The respondents rated other evidence of human activity as causing a greater negative impact on the quality of their hiking experience. Those with a significantly greater negative impact include views of industrial facilities, views of large clear cuts, views of developed areas, and views of power lines. The negative impact of views of roads and views of ski trail and facilities were somewhat greater than the visual impact of the RWF.

Appropriateness. In all, 77% rated wind power as appropriate to some degree for the state of Maine as a whole. After assessing the visual impacts, respondents were asked about the appropriateness of the RWF. On average, respondents rated the appropriateness of the RWF as 4.7 on a seven-point scale, or slightly appropriate. Only 20% of respondents indicated that the RWF is inappropriate to some degree.

Potential Benefits. After their initial assessment of appropriateness, respondents were asked to reassess their views taking into consideration some potential benefits of the wind farm. In all cases, there was a significant increase in the average scale score and the percentage of respondents viewing the proposed wind farm as appropriate. The project's environmental benefits that seemed to resonate most strongly were the reduction in pollution and the decrease in fossil fuel consumption.

Dark Blades. The use of black blades on the wind turbines had no impact on the average assessment of the scenic value of the view, though it did slightly increase the percentage of those assessing the scenic value negatively.

8.0 VISUAL IMPACT ASSESSMENT

8.1 Summary of Impacts

Table 6-3, Summary of Visual Impacts, summarizes the visual impact of the wind farm on known scenic resources in the study area. The Scenic Resources are those places identified in the Section 315 regulations as “Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment, and appreciation of natural or cultural visual qualities”. In addition to these defined areas, Table 6-3 identifies a few other areas of local significance.

The Distances given is the horizontal distance, in miles, between the observer and the closest wind turbine, access road, 34.5 kV collection line, or the 115 kV transmission line. The location of the closest turbine is identified by initials in parentheses (BN) or (RR).

The Relative Size (R/S) is a measurement of how large the turbine will appear at various viewpoints. The R/S shows the height (in inches) the turbines will appear to be when measured at a distance of 24” (arms length) from the observer. For example, from Mount Abraham the nearest turbine on Mount Redington will appear to be as large as an object 0.45” in height (slightly less than half an inch) held at arms length.

Visualizations of selected viewpoints that illustrate the anticipated changes are provided in Appendix B.

8.2 Assessment

This section evaluates the potential adverse impacts of the RWF on existing scenic and aesthetic uses of protected natural resource (fragile mountain areas, streams, wetlands) within a fifteen-mile radius of Mount Redington and Black Nubble. The assessment

follows standard professional practice¹⁴ to describe and illustrate the proposed change to the visual environment and the effectiveness of any proposed mitigation measures. The introductory paragraphs *in italics* are taken from the MDEP Chapter 315 Regulations.

A. *Landscape compatibility, which is a function of the sub-elements of color, form, line, and texture. Compatibility is determined by whether the proposed activity differs significantly from its existing surroundings and the context from which they are viewed such that it becomes an unreasonable adverse impact on the visual quality of a protected natural resource as viewed from a scenic resource.*

- Color. The wind turbines will be painted light gray to help blend into the sky, since many of the turbines will be seen above the ridgeline.
- Form. The scale and form of a wind turbine is not indigenous to western Maine. Where they will be visible, they will present a contrast in form. Contrasts will be minimized by using the alignment of the ridge tops and preserving as much vegetation as possible at the base of the installations. The relatively slow movement of the blades will draw additional attention to their presence.
- Line. The lines created by the access roads will be similar in appearance to the logging roads found throughout the study area and should not create a noticeable contrast in most locations due to the viewing distance. One exception is the view of Burnt Nubble from a point below the northern summit of Crocker Mountain.

¹⁴ This methodology is described in detail in *Foundations for Visual Project Analysis*, 1986, edited by Richard Smardon, James Palmer, and John Felleman. It is the core of many of the assessment techniques that have been developed by Federal agencies such as the USDA Forest Service and are used throughout the United States on similar projects.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Dodge Pond Rangeley. Photo 6-P148.	Turbine: 12.0 (BN) 34.5 kV line: 14.2	0.15"	The turbines on BN will be visible from the middle and southern half of the pond. Views from the southern half will also include the RR turbines and portions of the top of the collection line. Burnham and Chick Hill will block views from the northern portion of the pond.	The wind farm will not have any effect on the Wilhelm Reich Museum / Orgone Energy Observatory on the west side of the lake. At this distance the RWF will be scarcely visible and should have a slight-negligible visual impact on the lake.
Greeley Pond Dallas Plt.	Turbine: 7.2 (BN) Access road: 7.5 34.5 kV line: 10.7	0.25"	Both sets of turbines will be visible from the west half of the pond. RR will be partially screened by BN. West access roads on BN and the top part of the collection line from RR may be visible.	Greeley Pond is one of several inaccessible, undeveloped waterbodies that are within the viewshed of the RWF. Visual impact is expected to be negligible.
Gull Pond Dallas Plt.	Turbine: 8.2 (BN)	0.22"	Turbines on BN will be visible.	Most of the camp development on Gull Pond is on the eastern shore, oriented toward the west. The RWF should have a slight visual impact on the resource.
Kennebago Lake T3 R3 T3 R4	Turbine:10.0 - 15.0 (BN)	0.18- 0.12"	BN will be visible from most of the lake, except for a small portion at the northern end. The turbines may be visible above the tops of the surrounding low hills, depending upon the viewer's position. RR will be screened by BN. The majority of the viewers who may be affected are concentrated at the northern end of the lake.	Kennebago Lake is accessible and developed at both the north and southern end (much of which is private and limited access). Viewer expectation is high; use levels are moderately low. At these distances the RWF will be scarcely visible and should have a negligible-slight visual impact.
Loon Lake Dallas Plt.	Turbine: 8.7 (BN) Access road: 8.8 34.5 kV line: 12.2	0.21"	Turbines on both BN and RR will be visible from 3/4 of the lake. Turbines on RR will be partially screened by BN. The western access roads on BN will be visible. The top part of the collection line from RR may be visible.	Most of the camp development on Loon Lake is on the eastern shore, oriented toward the west. The RWF should have a slight visual impact on the lake.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Round Pond Rangeley	Turbine: 12.5 (BN)	0.15"	Both sets of turbines visible from about 2/3 of the pond.	Round Pond is very lightly developed with minimal views of the surrounding mountains. Visual impact is expected to be negligible to slight.
Saddleback Lake Dallas Plt.	Turbine: 5.5 (BN) 34.5 kV line: 8.8	0.33"	Turbines on both BN and RR will be visible from approximately 3/4 of the lake. Portions of the RR turbines will be partially screened by Potato Nubble. Upper portions of the collection line from RR may be visible as well as the upper portion of the access road to BN.	Saddleback Lake currently has scattered development along the north shoreline, oriented to the south. Viewer expectation is high, moderated by the presence of Saddleback ski area. The RWF is expected to have a slight to moderate visual impact on the lake.
Myron Avery Peak, Bigelow Range: Wyman Twp.	Turbine: 10.0 (RR) Access road: 10.1 34.5 kV line: 10.7 Trans. line: 5.0	0.18"	The high point of RR will be visible with approximately 5 turbines completely or partially visible. The remainder of the turbines will be blocked by Crocker Mountain. The turbines, summit access roads, and collection line on BN will be visible. The main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the Bigelow substation off Route 27.	Viewer expectation along the Bigelow Range is high, but tempered by views of Sugarloaf ski area, the golf course, roadways, clearcuts, and other cultural modifications. Hiker use is relatively heavy. Much of the RWF will be screened by nearby mountains. At a distance of ten miles, the wind turbines will be perceived as very small objects in a vast landscape. Visual impact is expected to be slight to moderate.
West Peak Bigelow Range: Wyman Twp.	Turbine: 9.7 (RR) Access road: 9.7 34.5 kV line: 10.4 Trans. line: 4.5	0.19"	The high point of RR will be visible from this viewpoint with approximately 5 turbines completely or partially visible, the remainder of the turbines will be blocked by Crocker Mountain. The turbines, summit access roads, and collection line on BN will be visible. Portions of the main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27.	Viewer expectation along the Bigelow Range is high, but tempered by views of Sugarloaf ski area, the golf course, roadways, clearcuts, and other cultural modifications. Hiker use is relatively heavy. Much of the RWF will be screened by nearby mountains. At a distance of 9.7 miles, the wind turbines will be perceived as very small objects in a vast landscape. Visual impact is expected to be slight to moderate.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
The Horns Bigelow Range: Wyman Twp.	Turbine: 8.8 (RR) 34.5 kV line: 9.1 Trans. line: 3.4	0.21''	Approximately 4 turbines on RR will be partially visible above the ridge line of Crocker Mountain. The turbines, summit roads and collection line on Black Nubble will be visible. The main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27.	Viewer expectation along the Bigelow Range is high, but tempered by views of Sugarloaf ski area, the golf course, roadways, clearcuts, and other cultural modifications. Hiker use is relatively heavy. Much of the RWF will be screened by nearby mountains. At a distance of 8.8 miles, the wind turbines will be perceived as very small objects in a vast landscape. Visual impact is expected to be slight to moderate.
Cranberry Peak Bigelow Range: Wyman Twp.	Turbine: 8.0 (RR) 34.5 kV line:7.6 Trans. line: 2.7	0.23''	The turbines, summit roads and transmission line on BN will be visible. The turbines on RR will be hidden by Crocker Mountain. The main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27. This viewpoint is not on the Appalachian Trail.	Viewer expectation on Cranberry Peak is moderated by proximate views of Sugarloaf ski area, the Stratton energy plant, the Boralex transmission line, roadways, clearcuts, and other cultural features. Hiker use is moderately heavy. More of the RWF will be screened by nearby mountains than on other parts of the Bigelow Range. Visual impact is expected to be slight.
Bald Mountain Rangeley Photos 6-P3-13, Visualization 6-1.	Turbine: 15.7 (BN) Access road: 16.0 34.5 kV line:19.1	0.11''	All turbines on BN and RR, and the western access roads off BN will be visible. The collection line off RR may be visible. At this distance, the roads, collection and transmission lines will barely be distinguishable.	Viewer expectation atop Bald Mountain is high, since it is a well-marked and easily accessed vantage point. Relative numbers of visitors is high. At this distance the RWF will be scarcely visible and should have a negligible visual impact.
AT: No. Summit of Crocker Mountain, Carrabassett Vall. Photos 6-P15/16. Visualization: 6-2 (AT).	Turbine: 1.5 (RR) Access road: 0.9 34.5 kV line: 1.5	1.24''	From the north summit of Crocker Mountain, the only view of the RWF from the AT is a brief filtered view of a portion of the turbines on top of RR.	Hikers on the AT reach the top of Crocker Mountain (north summit) with no expectation of a view (according to the Appalachian Trail Guide). The north summit may offer a few seconds of contact with the turbines on Redington. This intermittent glimpse will be repeated a handful of times between here and the south summit of Crocker Mountain. Visual impact is expected to be slight to moderate. View may become less obvious as surrounding vegetation continues to mature.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
North Summit of Crocker Mountain, Carrabassett Vall. Photos 6-P16-20, Visualization: 6-3 (below AT).	Turbine: 1.5 (RR) Access road: 0.9 34.5 kV line: 1.5	1.24''	Visualization 6-3 is from approximately 75 yards down a surveyor's cut off the AT. From this viewpoint all turbines on RR and BN will be visible. Portions of the access roads and minor portions of the collection lines on RR and BN will be visible. Portions of the summit roads on BN will be visible to varying degrees depending on the clearing necessary.	Since this viewpoint is well off the AT, there will be no visual impact on the trail itself. For hikers who are looking for a way to see the RWF, this side route offers an excellent opportunity to see the wind farm. The route is presently unmarked and would need improvements to transform it into an overlook. The visual impact is expected to be moderate to strong for hikers purposely leaving the AT to see this view.
Sugarloaf Mtn, Carrabassett Vall. Visualization 6-4.	Turbine: 3.8 (RR) Access road: 3.4	0.49''	All of the RR turbines and about half the turbines on BN will be visible. The upper portion of the summit access roads on BN will be visible. Minor portions of the access roads on RR will be seen.	The view from Sugarloaf ski area (on a side trail off the AT) includes a significant amount of cultural modification: ski slopes, communication towers, golf course, roadways, etc. Ski population is heavy; viewer expectation is high, but tempered by existing conditions. 85% of the skiers interviewed in the 1994 intercept survey rated the wind farm as appropriate or neutral. The visual impact is expected to be slight-moderate.
Below Sugarloaf Mtn, Carrabassett Vall. Photos 6-V30-37.	Turbine: 2.7 (RR)	0.69''	There are a few openings in the woods (between 200' and 400'± in length) along the AT between Caribou Pond Road and the Sugarloaf spur trail, where all turbines on RR will be visible.	These views represent the most open conditions along this segment of the trail. Viewer expectation is high; hiker use is relatively heavy. Visual impact is expected to be moderate to strong for north-bound hikers.
Mount Abraham. Mt. Abraham Twp. Photos 6-P40-43, Visualization 6-5.	Turbine: 4.1 (RR)	0.45''	All turbines on RR and BN will be visible. No access roads or transmission lines from either mountain will be visible. Portions of the summit roads on BN and RR will be visible.	Viewer expectation is relatively high, tempered by the views of cutting patterns and development in the valley below. Visitor use is moderate-heavy. Viewpoint is off the AT. Visual impact is expected to be moderate to strong. The scale of the surrounding mountains minimizes the impact.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Poplar Ridge Redington Twp. Photos 6-P51–60,	Turbine: 3.2 (BN) Access road: 3.2 34.5 kV line: 3.9	0.58''	The turbines on RR and BN will be intermittently visible from the eastern edge of Poplar Ridge. The Poplar Ridge lean-to will not have views of the RWF. Some summit roads on BN will be visible.	Viewer expectation along this segment of the AT is high; hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate due to the intermittent nature of the views.
Saddleback Junior Redington Twp. Photos 6-P63–66,	Turbine: 4.0 (BN) Access road: 4.0 34.5 kV line: 5.0	0.46''	All turbines on RR and BN will be visible from the summit of Saddleback Junior. The top portion of the collection line on RR and some summit roads on BN will also be visible.	Viewer expectation along this segment of the AT is high; hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate-strong.
The Horn Madrid Twp. Photos 6-P67–70, Visualization 6-6.	Turbine: 4.5 (BN) Access road: 4.5 34.5 kV line: 6.1	0.41''	All turbines on RR and BN will be visible. The top portion of the collection line on RR and some access and summit roads on BN will be visible.	Viewer expectation along this segment of the AT is high; hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate-strong. According to the 2003/2004 intercept survey, even with the wind farm, hikers still rated the scenic value of Saddleback as high.
Saddleback Mtn. Sandy Ridge Twp Photos 6-P71–76, Visualization 6-6.	Turbine: 5.8 (BN) Access road: 5.8 34.5 kV line: 7.5	0.32''	The turbines on RR and BN will be visible across the top of Saddleback Mountain and The Horn, a distance of 1.5 miles. The top portion of the collection line on RR and some summit roads on BN and RR will be visible.	Viewer expectation along this segment of the AT is high; hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate-strong. According to the 2003/2004 intercept survey, even with the wind farm, hikers still rated the scenic value of Saddleback as high.
Rangeley Lake Rangeley Rangeley Plt. Photos 6-P85/86; 143– 146; 149/150	Turbine: 9.0 -14.6 (BN) 34.5 kV line: 16.3	0.20- 0.13''	Turbines on both BN and RR will be visible from over 3/4 of the lake, including the waterfront at Rangeley Lake State Park. Views from coves (e.g., Greenvale Cove and South Bog Cove) will be partially screened by foreground landforms and shorefront vegetation. Top portions of the collection line from RR may be visible.	Rangeley is a very popular recreation destination during the summer, fall, and winter months. Visitor use levels are high; expectations are similarly high, but moderated by intense shorefront camp development throughout much of the lake. The RWF should have a slight to moderate visual impact on the lake, depending upon the viewing distance.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Eustis Ridge Eustis Photos 6-P89-94, Visualization: 6-7	Turbine: 11.2 (BN) Access road: 11.4 34.5 kV line: 10.9 Trans. line: 9.0	0.16''	All the turbines and a portion of the access road on RR will be visible. Four of the turbines on BN will be visible; two will be partially visible. Some of the collection lines on BN will be visible. The 115kV transmission line will be visible below Crocker Mountain where it is aligned with the viewer. It will be seen in conjunction with the existing Boralex transmission line that crosses over Hedgehog Hill to the Stratton Energy Plant.	This viewpoint affords a panoramic view of both the western mountains and the RWF. However, it is on a private rural road overlooking private property. Viewer expectation is high; relative number of people who would be affected by the project is low. The visual impact is expected to be slight.
Flagstaff Lake Eustis Flagstaff Twp. Dead River Twp. Photos 6-P95-98.	Turbine: 8.0 - 14.0 (BN) Access road: 9.0 34.5 kV line: 7.4 Trans. line: 4.8	0.13-0.23''	Turbines on both BN and RR will be visible from the west half of Flagstaff Lake. The view from the east half of the lake is blocked by the Bigelow Range. The turbines on BN will be most visible, as Hedgehog Hill and Crocker Mountain will block views of RR. Turbines on RR will only be visible from the most SW part of the lake near Stratton. Collection lines on both BN and RR and the 115 kV transmission line will be visible from the west half of the lake. The transmission lines will be seen in context of the existing Boralex Transmission line.	Flagstaff Lake is an extensive, man-made waterbody on the north side of the Bigelow Range. Relative use is light-moderate (due to its shallow depth); viewer expectation is high in the shadow of the mountains, though it is tempered by the presence of the Stratton Energy Plant, the village of Stratton, and other cultural modifications. At these distances the RWF will be scarcely visible and should have a slight visual impact on those portions of the lake where it will be seen.
Route 4/16 Rangeley , east of Quimby Road near existing radio tower. Photos 6-P99/ 100.	Turbine: 12.9 (BN) Access road: 13.7 34.5 kV line: 16.8	0.14''	The RWF will be visible for approximately 300 yards along Route 16. Turbines on Redington Pond Range (RR) and Black Nubble (BN) will become visible as the viewer descends the hill. The view of RR and BN diminishes and Saddleback Mt. dominates as the viewer continues easterly. The upper portion of the northern access road (on the western side) to the high point of BN and the upper portion of the collection line off RR may be visible.	This viewpoint is on the Rangeley Lakes Area National Scenic Byway, so visitor expectations are relatively high. Visitor perception along the byway is influenced by frequent cultural intrusions: e.g., utility lines, radio towers, roadside development, etc. At 50 mph, the motorist would experience the view of the RWF for 12± seconds. The visual impact is expected to be slight at this distance.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Route 4/16 Rangeley , near Mingo Loop Road. Photos 6-P101-106.	Turbine: 11.1 (BN) Access road: 11.8 34.5 kV line: 14.9	0.16"	There will be approximately 250± yards of view of RWF from this viewpoint. The turbines on both RR and BN, the northern access road (on the western side) to the high point of BN and the collection line off Redington will be visible. As the viewer reaches Proctor Road there is no view of RWF, only a view of Saddleback Mt.	Same comments as above. At 50 mph, the motorist would experience the view of the RWF for less than 9 seconds. The visual impact is expected to be slight at this distance.
Route 4/16 Rangeley , E of Wigon Road. Photos 6-P107/108, Visualization 6-8.	Turbine: 10.0 (BN) Access road: 10.9 34.5 kV line: 13.9	0.19"	Approximately 300 yards of view of RWF. All turbines on RR and BN will be visible. The northern access road (on the western side) to the high point of BN and the upper portions of the collection line off RR may be visible under certain atmospheric conditions.	Same comments as above. Rangeley village is becoming a more prominent part of the view. At 50 mph, the motorist would experience the view of the RWF for less than 12± seconds. The visual impact is expected to be slight to moderate at this distance.
Route 16, Dallas Plt. 0.8± miles w of South Branch of Dead River. Photos 6-P113-115.	Turbine: 5.9 (BN) Access road: 6.3 34.5 kV line: 9.9	0.32"	A portion of the upper turbines on RR and BN will be visible looking easterly from this viewpoint - extending approximately 1000 feet along Route 16. The upper portions of the collection line from the high point of RR and the upper portions of the access roads on the west side of BN may be visible.	Route 16 is a rural road connecting Rangeley and Stratton. Powerlines parallel the road in several locations. Viewer expectation for scenery is low-moderate, with few opportunities to see mountains. The road is better known for moose-watching. The visual impact is expected to be slight.
Route 16, Coplin Plt. near Green Farm Plant Works. Photos 6-P119/120.	Turbine: 5.0 (BN) Access road: 4.8 34.5 kV line: 5.5	0.37"	From this viewpoint the turbines on both BN and RR will be visible. Some minor notches in the forest cover may be visible resulting from road and transmission line clearing. The top 1/4 of the collection line from the high point on BN may be visible. Collection line and the upper portion of the access roads on RR may be visible.	Similar to Dallas Plantation viewpoint above. The visual impact is expected to be slight.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Route 16, Coplin Pt. near intersection with Nash Stream Road / IP Road. Photos 6-P123/128	Turbine: 4.5 (BN) Access road: 5.1 34.5 kV line: 6.7	0.41''	Both RR and BN will be visible over a field on the south side of Route 16 from this viewpoint. The upper portion of the collector line from BN will be partially visible and the collection line and access roads on RR will be partially visible. Turbines on BN will also be intermittently visible from several points along Route 16 between Nash Stream Road and Stratton (see Photos 6-P129-130).	This viewpoint offers one of the few opportunities for an open view of Black Nubble along Route 16. The Coplin Plantation Schoolhouse (on the Nation Register of Historic Places) is located on Route 16 opposite the IP road. The visual impact is expected to be moderate due to the introduction of contrasting elements to a culturally significant landscape.
Rangeley Scenic Overlook , Route 17, Rangeley Plt. Photos 6-P133-136	Turbine: 14.5 (RR) Access Road: 14.5 34.5 kV line: 16.3	0.13''	The only portion of the RWF that will be visible will be the turbines on BN and half the turbines on RR. The collector lines and access roads will all be hidden by topography or by Potato Nubble in the midground.	Viewer expectation at this scenic overlook is high; relative numbers of visitors is also high. At this distance the RWF will be scarcely visible and should have a negligible visual impact on the view.
Route 4 Phillips Photos 6-P137-140.	Turbine: 11.5 (RR) Access Road: 11.5 34.5 kV line: 12.8	0.16''	The turbines will be visible on the top of both BN and RR.	This panoramic view off Route 4 offers an unusual opportunity to experience the western mountains. Relative numbers of travelers is moderate; viewer expectation is moderate. The RWF is expected to have a slight visual impact.
Haley Pond Rangeley Dallas Plt. Photos 6-P153/154	Turbine: 9.0 (BN)	0.20''	Turbines on the upper elevations of both BN and RR will be visible; lower turbines will be screened by topography and shorefront vegetation.	Haley Pond has seen relatively heavy development on the south shoreline. Viewer expectation is moderately high. The view of the upper sections of the turbines is expected to have a slight visual impact on the lake.

NOTES FOR TABLE 6-3.

VIEWPOINT: The actual point from which a viewer sees the landscape or a proposed alteration.

DISTANCE (mi): The horizontal distance, in miles, between the observer and the closest wind turbine, access road, 34.5 kV collection line, or the 115 kV transmission line.

R/S (Relative Size): The relative height (in inches) the turbines will appear at the selected viewpoint, when measured at a distance of 24'' (arms length) from the observer.

RR: Redington Pond Ridge; **BN:** Black Nubble

At this location the summit access roads will create a set of visible lines near the top of Black Nubble. The new roads will be seen in the context of a network of established logging roads visible between Crocker Mountain and Black Nubble. Preserving existing vegetation and providing opportunities for new vegetation that will help break up the line of the road will minimize the degree of visibility.

Wherever possible the roads follow existing haul roads to minimize the amount of visible change. The lines created by the collection and transmission lines are familiar to people who will be viewing the RWF. Existing transmission lines (e.g., the Boralex line in Stratton) and local distribution lines are an accepted part of the landscape.

- Texture. Contrasts in texture are most apparent within three \pm miles of the observers (in the foreground and part of the midground viewing distances). The smooth surfaces of the towers and blades will be seen as a noticeable contrast with the texture of the surrounding forestland and mountainsides. Roads have been carefully designed to avoid steep slopes and minimize cuts and fills in order to reduce contrasts in color and texture. Where steep slope crossings are unavoidable, additional mitigation measures will be utilized to minimize contrasts in texture and color.

B. Scale contrast, which is determined by the size and scope of the proposed activity given its specific location within the viewshed of a scenic resource.

The scale of the landscape surrounding the wind farm site can be described as very large. Most of the mountains within the study area have a vertical rise of over a thousand feet and a separation of one to three miles between peaks. The lakes range in size from small ponds to some of the largest lakes in the state. Clear-cuts range in size from several dozen acres up to several hundred acres in size.

Even though the turbines are over 400 feet in height, they will be in scale with their mountaintop setting.

C. Spatial dominance, which is the degree to which an activity dominates the whole landscape composition or dominates landform, water, or sky backdrop as viewed from a scenic resource.

Robert Thayer, FASLA, in his research at California's Altamont Pass¹⁵, determined that turbines dominate the observer's field of vision at a distance equivalent to about ten times the turbine's height. In the case of the RWF, this is approximately 3/4 mile, or roughly equivalent to objects within the foreground viewing distance. Beyond that distance, turbines are seen, but become part of the visible landscape.

The closest observer will see the turbines at a distance of 1.5 miles (unless they choose to hike up the access road to see them up-close). The majority of the viewers will see the turbines at distances of 3-12 miles, where they will clearly be perceived as subordinate or co-dominant elements in the larger landscape.

The scenic resources identified in Table 6-3 were analyzed using the Basic Visual Impact Assessment Form contained in Appendix A of the Chapter 315 Regulations. The results were used to predict the relative severity of the anticipated visual impact from the RWF. (Note that the term 'weak' was replaced with 'slight' in the descriptions.)

8.3 Compliance with LURC Section 10.25 Scenic Character Standards

LURC's Section 10.25 Development Standards contain three review criteria to evaluate the impact that proposed structures and uses may have on scenic character. The following narrative presents each of these criteria and describes how the RWF is in compliance.

¹⁵ Thayer, Robert, and Carla Freeman. Altamont: Public Perceptions of a Wind Energy Landscape.

- a. The design of a proposed development shall take into account the scenic character of the surrounding area. Structures shall be located, designed and landscaped to reasonably minimize their visual impact on the surrounding area, particularly when viewed from existing roadways or shorelines.*

Chapter 9, Mitigation Strategies, outlines the considerations that went into the planning and design of the wind farm. All facilities associated with the project were evaluated in terms of their potential visual impacts. As a result of this analysis, roadways were relocated and the routes of the transmission line and collection lines were altered. The setting for the structures will be restored to minimize color and texture contrast when seen from above. The narrative for LURC Section 10.25.b (below) describes the potential effect on views from public roadways and shorelines.

- b. To the extent practicable, proposed structures and other visually intrusive development shall be placed in locations least likely to block or interrupt scenic views as seen from traveled ways, water bodies, or public property.*

By their very nature, wind-generating facilities in mountainous regions will be visible to a portion of the population who live, work, and recreate nearby. The RWF turbines have been sited along the ridgelines and side slopes of Mount Redington and Black Nubble to take advantage of the available wind resource above the RMW's property. As noted in Table 6-3, Summary of Visual Impacts and in Chapter 5, Project Description, EEC has sited the access roads, collection lines, transmission lines, and other project components in areas that will have minimal visual impact on public viewpoints.

The RWF will not *block* or *interrupt*¹⁶ scenic views as seen from traveled ways, water bodies, or public property.

¹⁶ Block: to obstruct; shut out from view or get in the way so as to hide from sight. Interrupt: to make a break in. From wordnet.princeton.edu/perl/webwn

Traveled Ways. As noted in Table 6-3, the project will be visible from a few public highways (e.g., several places along Route 4/16 west of Rangeley, several places along Route 16 in Dallas and Coplin plantations). In most of these instances the wind turbines will be visible in the background viewing distance and will not block or interrupt the views.

Water Bodies. As noted in Table 6-1, Lakes and Ponds within the Study Area, and Table 6-3, Summary of Visual Impacts, portions of the wind farm may be visible from a dozen waterbodies within the study area. The closest possible viewpoint will be from Saddleback Lake, at a distance of 5.5 miles, which is in the background viewing distance. Where the turbines are visible from the waterbodies, they will mainly be seen against the sky and will not block or interrupt views of the surrounding landscape.

Public Property. There are two significant pieces of public property (other than the roads and water bodies described above) that will have a view of the RWF: the Bigelow Preserve, on the north side of Route 27, and the Appalachian Trail between the Bigelow Range and Saddleback Mountain. As noted above, extensive study went into the siting of individual wind turbines, as well as the access roads and collection/transmission lines, to minimize visibility from both the Appalachian Trail corridor and the peaks of the Bigelow Range. Table 6-3 summarizes the visual impact that the RWF will have on these mountain peaks and the Appalachian Trail. In no instance will views from the trails be blocked; i.e., hikers will still be able to view the surrounding landscape. Some of the views will be altered by the addition of the turbines.

- c. If a site includes a ridge elevated above surrounding areas, the design of the development shall preserve the natural character of the ridgeline.*

The majority of the RWF site is on ridgelines elevated above the surrounding areas. The natural character of the site has been considered by careful siting of access roads, the wind turbines, and ancillary facilities.

As noted in Chapter 9, Mitigation Strategies, all elements of the project have been sited and designed to minimize their visual impact on the views from scenic resources. Road widths will be kept to the minimum required for the special equipment needed to install and maintain the wind turbines. The laydown areas will be the minimal size necessary to assemble the units and erect them on the bases. Laydown areas will be revegetated following installation. Electrical collection lines will be placed under the roads to minimize disruption to the scenic character of the site.

8.4 Conclusion

Although there will be visual impacts on scenic and recreational resources within the RWF viewshed, those impacts have been minimized to the maximum extent possible. In no instances will the wind turbines or the transmission structures block views of scenic resources or from these resources.

The proposed project has been planned and designed to minimize visual impacts to scenic resources within the study area. EEC has made adequate provisions for fitting the wind turbines, collection lines, transmission line, access roads, and ancillary facilities harmoniously into the existing natural environment. Based upon this assessment, we conclude that there will be no unreasonable interference with existing scenic or aesthetic uses, nor will there be an undue adverse effect on the scenic character of the land within the viewshed of the wind farm.

9.0 MITIGATION STRATEGIES

Mitigation is defined as any action taken or not taken to avoid, minimize, rectify, reduce, eliminate, or compensate for actual or potential adverse environmental impact.¹⁷

Because the wind farm site is in a visually sensitive area, mitigation of visual impacts has been of primary concern throughout its planning and design. The following section describes the various measures that have been taken in the site selection, planning, and design process, and will be taken during construction and site management to minimize visual impacts.

9.1 Wind Turbines

9.1.1 Site Selection and Planning

- The site selection process specified avoiding significant visual impacts on identified scenic resources to the maximum extent possible.
- The site was selected with the recognition that wind energy production can be highly compatible with commercial forest practices (cutting, road construction, operation of heavy machinery).
- EEC selected this site because of its proximity to existing transmission lines, roads, and the wind resource.
- The initial plans for the facility using the V80 turbine would have resulted in 35 turbines installed on the two mountains. By using the V90 turbine design, the number of turbines has been reduced to 30.

¹⁷ See definition of Mitigation in the Glossary, Appendix F.

9.1.2 Design

- The Vestas turbine was selected in part for its aesthetic qualities: the tapered base, its uncluttered lines and aerodynamic forms, the shape of the airfoil blades. The clean design of the turbine is a good example of form following function.
- The color of the blades, tower, and nacelle will be a light neutral gray, designed to minimize the turbines' contrast in color with the surrounding landscape and to blend in with typical atmospheric conditions. Black blades were considered for their ability to shed ice, but were eliminated after testing public sentiment in the hiker's survey, comparing their visual impacts in photosimulations, discussing the issue with Vestas, and observing black bladed turbines in other locations (e.g., Searsburg, Vermont).
- Vestas has made several modifications to the design of their blade system in recent years. The V90 blades have a thin profile that minimizes their appearance when seen from the side.
- The height of the towers and the size of the turbines will be consistent throughout the RWF to create a sense of visual uniformity.
- Lighting will be the minimum required under Federal Aviation Administration regulations. Lighting will consist of red lights, slow off and slow on.

9.1.3 Construction

- The laydown area at the base of each turbine will be limited to the minimum size required to assemble the towers and blades.
- Following installation, the laydown areas will be revegetated to minimize contrasts in color and texture.
- A crane specially suited to the terrain will be used to erect the turbines. This equipment will be moved to each turbine on 32' wide summit roads. After construction, the roadway will be reduced to 12' wide and the shoulders allowed to revegetate.

- The concrete bases for the towers will be buried to allow vegetation to become re-established at the foot of the turbine. This will minimize the amount of disturbed area and reduce contrast between the light-colored concrete and native vegetation.
- The design team will evaluate the location of stump disposal areas, borrow pits, and other features which would result in additional clearing in highly sensitive viewsheds (e.g., the Appalachian Trail and mountain peaks with cleared peaks).

9.2 Access Road Network

- The access road network will follow existing timber haul roads wherever possible to minimize the amount of new earthwork, cutting, culverting, and road construction.
- Current Soil Conservation Service Best Management Practices for road construction and erosion control will be followed.
- The Erosion and Sedimentation Control Report for the Roadways to Access Wind Towers on Black Nubble and Redington Mountain Ranges, DeLuca-Hoffman Associates, Inc., has been prepared to address specific issues related to mountainside construction. An underlying premise throughout this manual is the recognition that the roads need to be constructed with the utmost care to avoid erosion and sedimentation. By following these guidelines the contractor is expected to minimize the amount of denuded land that is exposed at any one time and greatly reduce visual contrasts.
- The Erosion and Sedimentation Control Report also stresses the need for effective fugitive dust control during road construction. Dust raised by large vehicles can be a significant source of visual pollution, especially to people at higher elevations looking down at the construction site.
- New access roads to the top of the mountains have been sited to minimize their visibility from public viewpoints and scenic resources, especially those viewpoints in the foreground and midground, i.e., the Appalachian Trail.

Alternative road alignments were considered and discarded for their potential visibility from public viewpoints.¹⁸

- Access roads have been designed to meet the technical requirements of the vehicles that will be used to haul the windfarm components to the construction site. Maximum grades of 14% have kept the road length to a minimum.
- Roads have been designed to allow the contractor the flexibility to make horizontal or vertical adjustments based upon field conditions. The design intent is to retain flexibility to allow the final layout to harmoniously blend with the existing topography.
- Switchback curves were sited in areas of relatively mild topography wherever possible to minimize the depth of cut and fill sections.
- Access roads above 2,700 feet are being carefully sited to avoid steep slopes and significant cuts and fills wherever possible to minimize contrasts in color, line, and texture.
- Access roads are being kept as narrow as possible (typically 12-16 feet travel surface with 2 to 4-foot shoulders) to minimize visual impacts. Summit roads are being designed as narrow as possible to safely accommodate the crane and transport equipment required to bring the components up to each turbine site.
- Rip-rap and/or gabions may be used in some areas to minimize the extent of clearing and excavation required on the more visible side slopes of roads. The design team will evaluate the use of such techniques for both their effectiveness and their potential for visual impact, since some slope treatments may present unacceptable levels of color and texture contrast.
- Following turbine installation, the travel way for both the access roads and summit roads will be reduced to a maximum width of 12'.

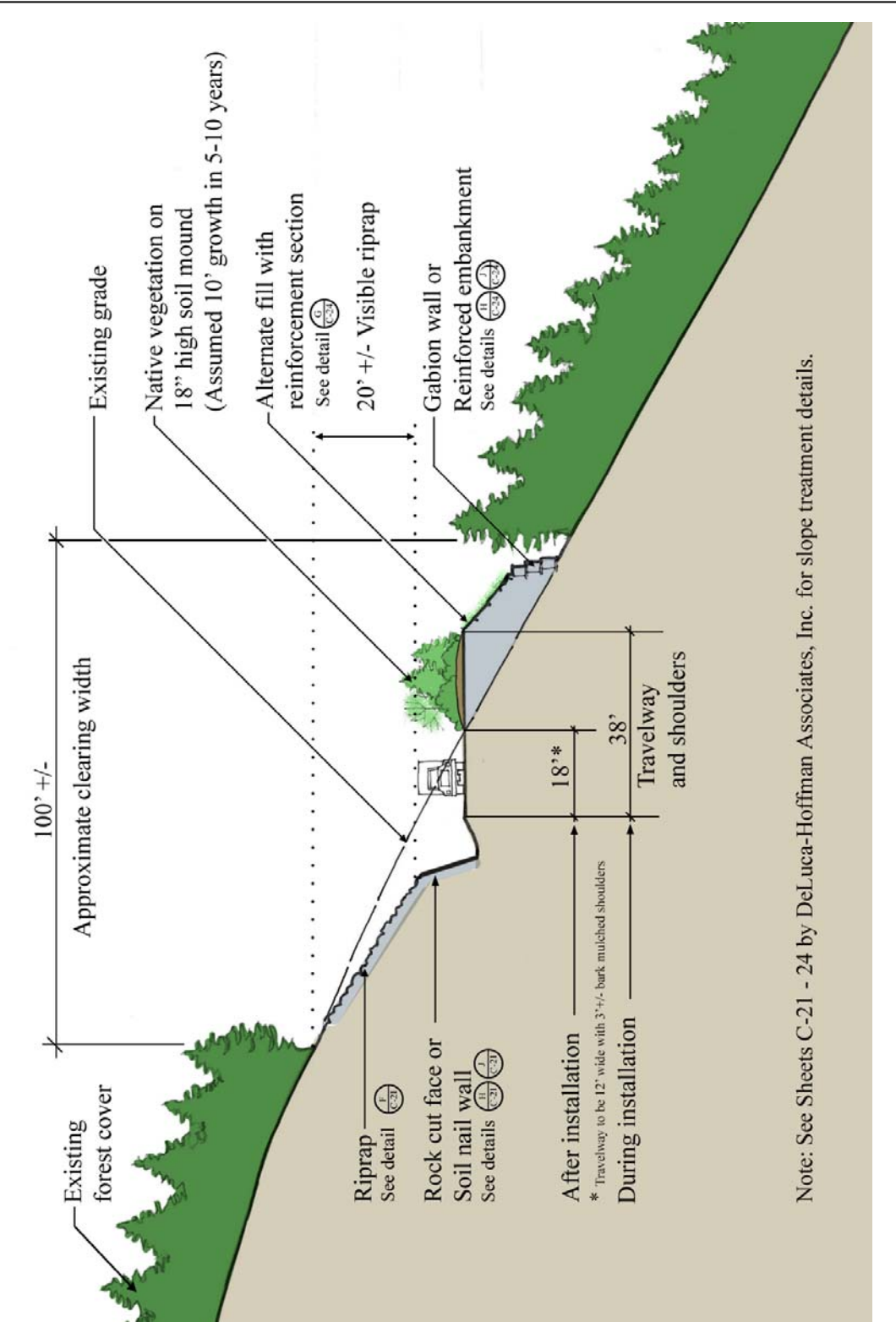
¹⁸ For example, the access road to Mount Redington was originally planned to ascend the north face. However this would have put the road within a mile of the north peak of Crocker Mountain and the Appalachian Trail. While there will be no direct view of the wind farm from the AT from this location, EEC decided to move the access road to the west side of the mountain, further removed from the AT viewshed.

- Sections of the summit access roads in visually sensitive areas will be assessed after turbine installation. In addition to reducing the width of the travelway to 12', portions of the gravel surface may be removed and a planting berm may be installed on one side of the road.¹⁹ As illustrated in Figure 6-4, the 18"-high berm will allow native vegetation to become established and screen the rock face or engineered wall treatment on the uphill side of the road. Other techniques, including the use of Permeon²⁰ to accelerate the natural weathering process in highly visible areas where there is blasted rock, exposed ledge, rip-rap, or concrete, may also be utilized.
- Roadway construction will use naturally occurring materials wherever possible to maintain consistency in color and texture with the surrounding landscape.
- The contractor will be required to have a number of tools at their disposal to deal with unusual situations (such as steep side slopes that might normally require extensive tree clearing and earth moving). These include the use of filter cloth, geotextile fabrics, erosion control mesh, and geogrids.²¹ Figure 6-4, Representative Cross Section of the Summit Roads on the East Side of Black Nubble, shows some of the engineering and mitigation techniques that may be used to reduce the visibility of the summit roads.
- Seed mix will be tailored to the specific requirements of the site, using native materials wherever feasible to achieve a stable surface that closely resembles the color and texture of existing vegetation. See Appendix A of the Erosion and Sedimentation Control Report.

¹⁹ The location of the planting berm will depend on grading, exposure, maintenance considerations, and other site-specific factors.

²⁰ Permeon is a sprayed-on material that has been used extensively by federal resource agencies that 'ages' exposed rock faces to replicate the effects of weathering and aging, thus minimizing contrasts in color. See www.permeon.com for additional information.

²¹ The use of these materials is outlined in Redington Wind Farm: Basis of Design of the Roadways to Access Wind Towers, DeLuca-Hoffman Associates, Inc.



Note: See Sheets C-21 - 24 by DeLuca-Hoffman Associates, Inc. for slope treatment details.

Figure 6-4: Representative Cross Section for Summit Roads on the East Side of Black Nubble

- Bark mulch and erosion control mix will be used to treat side slopes along the access roads. The dark color of these materials will minimize color contrast and provide a growing medium for the establishment of native vegetation. See the Erosion and Sedimentation Control Report for further information about the application of bark mulch and erosion control mix.

9.3 34.5 kV Collection Line

- Power and communication lines will be buried in a trench under the summit roadways to minimize clutter surrounding the turbines. Trenches will be revegetated following installation.
- The 34.5 kV lines leading from the turbines down the mountains have been sited to take advantage of topography and existing clear cuts to make them as unobtrusive as possible.

9.4 Substation

- The substation was sited well off Route 27 to allow a substantial buffer between the public and the facility.
- Existing vegetation, clearings, and landforms have been considered in siting the substation and O&M facilities.
- The proposed location concentrates impacts by locating the facilities in the vicinity of an existing gravel pit/staging area, and the Nash Stream Road.

9.5 115 kV Transmission Line

- The corridor selection process stressed avoidance of visual and other environmental impacts. Several early alignments were abandoned or modified due to their potential impacts on the Appalachian Trail and other scenic resources.

- The transmission line will be buried as it crosses Route 27 and the Appalachian trail to minimize impacts on the trail and the existing trailhead parking lot.
- Visually sensitive areas and viewpoints have been avoided to the maximum extent possible.
- Adjustments were made in the transmission corridor alignment to minimize visibility and take advantage of existing vegetation and landforms.
- Existing access roads will be used wherever possible for construction and maintenance.
- Buffer zones will be provided for screening at all river, stream, and road crossings.

9.6 O&M Facilities

- The Operations and Maintenance facility has been consolidated in a five-acre property in a wooded area generally out of public view. See Section 13, Property Maintenance, for a rendering of the building.

9.7 Management and Maintenance

- Following the installation of the facility, the existing and expanded road network will generally remain open for the public. This will give the public the opportunity to see the turbines at close range and to better understand how they transform the wind into electricity.
- Access will be restricted during weather conditions that produce severe icing to protect the public from ice being shed from the blades and nacelles of the turbines. The existing gate near route 16 is usually locked by the abutting landowner(s) for 4-6 weeks in the spring to protect the roads during mud season.
- Redington Mountain Windpower, LLC will stress high quality maintenance once the facility is operational. It is very important that all turbines are in working order, and that any problems be corrected as soon as possible.

- The site will be monitored on a weekly basis and all trash and debris will be removed immediately.

9.8 Public Contact and Education

- RMW expects that there will be a considerable amount of public interest in the RWF, due to the inherent nature of the facility, the public's concern for alternate energy sources, and the character of the project area. Experience in other locations in the northeast has shown that there will be additional visitorship to the area to observe the turbines. At this point, however, it would be impossible to predict the level of visitor interest. If warranted, RMW may develop an informational exhibit regarding the RWF at a point within the project area. This will probably consist of interpretive panels (similar to those installed at Searsburg, VT and seen in Photo 6-P162 and P163) that describe the function and operation of the facility.

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