MARBLE RIVER WIND FARM
SUPPLEMENTAL ALTERNATIVES ANALYSIS

1.0 INTRODUCTION

This Supplemental Alternatives Analysis represents an addition to the original Alternatives Analysis located in Section 8 of the Marble River DEIS (submitted on March 30, 2006).

Alternatives to the proposed action that are described and evaluated in greater detail in this analysis include: no action, alternative energy production technologies, alternative turbine technologies, alternative location, alternative project size/magnitude, alternative project design/layout and cumulative alternatives. These alternatives offer a reasonable range and scope of development for comparative analysis and consideration. The no action alternative represents the environmental conditions that would exist if current land use and activities were to continue as is.

2.0 NO ACTION

The no action alternative assumes that the Project would not be built. Under this scenario, the Project area would remain as active agricultural land, forest land, residential property and vacant land, and any Project-related adverse impacts would not occur. Similarly, the Project's positive environmental and economic benefits described in Section 2.3 of the DEIS, Project Purpose, Public Needs and Benefits, would also not be realized.

The Project as proposed will have a significant beneficial impact on air quality by producing up to 218 MW of electricity without any emissions to the atmosphere. The annual production of wind power by the Project will reduce CO_2 emissions, which contribute to global warming, by an amount equivalent to removing about 58,000 cars from the road [calculated using US EPA Greenhouse Gas Calculator, 2001].

If the Project were not built, the positive environmental benefits associated with adding this new renewable energy source to the New York bulk electric power system as detailed in Table 1 below, will not occur:

Table 1. Estimated Emissions Reductions Resulting from the Project

Compound	Emission Factor (lbs/MW-hr)	Total Annual Reductions (tons/year)[1]
Nitrogen oxides (NO_x)	1.363	416
Sulfur dioxide (SO_2)	1.765	538
Carbon dioxide (CO_2)	1,274	388,621
Particulate matter less than 10 microns in diameter (PM_{10})	0.041	13
Volatile organic compounds (VOCs)	0.035	11
Mercury	2 E-06	0.0006 (1.2 lbs/yr)

[1] Assumes 550,000 MW-hrs of electrical power generated by Marble River during an average year. Source: Table 3.9.3.2-1 of DEIS (ESS Group & EDR, 2006).

Further, if this Project were not developed, potentially negative impacts from the lack of economic development activities in the Project area or the development of other, less desirable land uses could ensue, including:

1. **Potential for continued economic stagnation in the local vicinity** - As stated in the DEIS, Appendix M, "Given the relatively low median incomes, slow growth and limited base economy near the towns of Clinton and Ellenburg, the proposed Marble River Project may yield net economic benefits, which could in turn, spur demand for housing and increase property" (DeLacy, Page 19, Impacts of the Marble River Wind Farm on Local Property Values, January 30th 2006).
   Specific references of additional positive benefit include the following:

   a. **School (Northern Adirondack School district)** - The NACS School Board (meeting minutes of January 21st 2008), suggested that the additional revenues generated by the PILOT program would provide the funds needed to finance:

      i) Additional employee benefits for teachers under the 403b program

      ii) New baseball fields and tracks

   b. **Towns** - The Clinton and Ellenburg Town Supervisors (Michael Filion and James Mcneil, respectively) have suggested that the proceeds of the PILOT program and Host Community Agreements from the Marble River Wind Farm will be integral to their plans to decrease local taxes as a means to spur local economic development in addition to improving available town facilities as suggested by town participants at monthly board meetings. Suggested town facility improvements included:

i) Building street lights in Merrill (Ellenburg)

ii) Building municipal athletic fields at the local VFW (Ellenburg)

iii) Improving Town Hall facilities including the addition of computers, sound systems.

iv) Funding additions to a Town Library (Ellenburg)

v) Renovate and maintain a historic school site to use as a Community gathering center (Ellenburg)

vi) Fund the demolition and clean-up of abandoned properties in the hamlet of Ellenburg Depot.

vii) Fund the permitting and re-construction of a local dam (Ellenburg)

viii) Upgrade highway department facilities and equipment to appropriately cover the roads network (Clinton/Ellenburg)

ix) Build/upgrade local athletic facilities (Ice Rink/ Baseball field (Clinton)

x) Build and maintain a town Library (Clinton)

xi) Fund the restoration of local cultural resources like the Church and Clinton Mills historic area

c. **Fire Districts** - Ellenburg and Churubusco Fire Departments suggested that the additional fire district revenues generated by the Marble River Wind Farm would be helpful in supporting equipment investment to enhance preventative and response measures.

2. **Potential for development of Projects with more significant adverse impacts than the proposed Project** - As there are significant economic pressures on farmers in upstate New York, the trend is to convert open space to other uses, such as manufacturing, housing development and similar intensive uses in order to generate additional income. Though these practices may be permitted under local zoning ordinances, these more intensive land uses replace agriculture, eliminate open space, alter the character of the community and significantly

increase the burden and costs on communities for services such as schools, roads, fire and emergency response, water and sewer, etc.

Given the minor long-term impacts of Project operation (which are discussed in other sections of the DEIS/SDEIS/FEIS, see Sections 3.0 of the DEIS and SDEIS) compared to the significant environmental and economic benefits that the Project would generate, the no action alternative is not preferred. Specifically, the no action alternative is not preferred because:

- It fails to meet the Project purpose, public needs and benefits (Section 2.3 of the DEIS);
- It does not further the goal of the New York State Renewable Portfolio Standard (RPS) of increasing the percentage of renewable electricity purchased by New York consumers from 19 percent to at least 25 percent by 2013 (see Section 3.0 of this document);
- It precludes the specific Project-related benefits from occurring in the community;
- There are potentially far more severe adverse impacts associated with the no action alternative, as summarized above.

3.0 ALTERNATIVE ENERGY PRODUCTION TECHNOLGIES

The purpose of the proposed Project is to create a wind-powered electrical generating facility that will provide a significant source of renewable energy to the New York power grid in order to:

- Meet regional energy needs in an efficient and environmentally sound manner
- Provide increased stability to the price volatility of fossil fuel electricity generation in the region
- Realize the full potential of the wind resource under lease
- Promote the long term economic viability of agricultural areas of New York State's North County
- Assist New York State of meeting its Renewable Portfolio Standard for the consumption of renewable energy in the State.

An important component of that purpose is to be compliant with the New York State Public Service Commission (PSC) "Order Approving Renewable Portfolio Standard Policy", issued on the 24th of September 2004. This Order puts in place policies and economic incentives to help New York State meet the goal of having 25% of the electricity consumed in the State come from renewables by the year 2013. The Order anticipates that most of this increased supply of renewable energy (approximately two thirds) will come from commercial scale wind farms such as proposed by the Applicant. The Marble River Wind Farm will generate electricity by converting the energy in the wind to electricity. Such a facility is clearly a qualifying facility for the Renewable Portfolio Standard (RPS), and therefore eligible to bid to receive payment from NYSERDA for up to 95% of the renewable energy attributes it produces. The following section, which draws heavily on analysis performed by experts at the NYS Department of Public Service (DPS) for the Generic Impact Statement performed for the RPS, describes other technologies that comply with the RPS. These technologies are reviewed for purposes of completeness. None are reasonable alternatives to the selected technology because none would fulfill the Applicant's purpose of constructing and operating a wind energy generation facility. However, all could potentially comply with the RPS.

3.1 Biomass Energy

The term biomass includes a wide-variety of closed-loop and open-loop organic energy resources. Closed-loop resources, which can be either woody (i.e., willow or hybrid poplars) or herbaceous (i.e., switchgrass), are those that are grown exclusively for the purpose of being consumed as an energy feedstock. Open-loop resources are typically either woody residues produced as byproducts in the wood processing industry or clean, non-treated, woody waste materials intercepted from the municipal solid waste stream.

A variety of technologies can be used to produce electricity from biomass. In some cases, a particular biomass resource is more suitable for conversion to electricity using a particular technology. Primary types of energy conversion technologies from biomass are presented below:

- Customer-Sited Biomass Combined Heat and Power (CHP)
- Co-firing Biomass with Coal
- Gasification
- Direct-Fire
- Co-firing Gasified Biomass with Natural Gas or Coal

None of the Applicant's leases authorize any of these activities on the subject parcels, which constitute the Project area, nor are these activities specifically regulated by the town zoning ordinance in the Project area. Nevertheless the opportunities to produce electricity using the biomass technologies referenced above are discussed herein.

Customer-Sited Biomass Combined Heat and Power (CHP)

As implied by the title, this technology is typically employed at “customer” facilities, generally wood processing plants (especially in the pulp and paper industry) that have large electricity and steam needs and a captive supply of biomass residues. Opportunities also exist in some food products manufacturing facilities.

The typical scale of CHP technology is 1 – 30 MW. It is estimated by the DPS that the market potential for new biomass CHP in New York is 18MW by 2009 and 40.5MW by 2013 spread over several mills.

Given the fact that the Applicant is not a facility owner or operator in the pulp and paper or food industries, the small size of these facilities relative to the Project and the targets of the RPS, and the difficulty in negotiating stand-by agreements with the local utility, customer-sited biomass combined heat and power would not be a reasonable alternative for the Applicant.

Co-firing Biomass with Coal

For companies that generate electricity from coal, it is possible to directly displace a portion of the coal used in the combustion process with biomass. The typical application for co-firing coal with biomass is in larger base-load electricity generators. Biomass can be blended with coal on the coal-pile (mixed feed), or injected through a separate biomass transfer system.

With 10.7 MW of active co-firing capacity at Greenidge Station in Yates County, an additional (currently unused) 11 MW of co-firing capacity at two other plants in Chenango and Steuben Counties and a 10 MW co-firing system at the Dunkirk Station, in Chautauqua County, co-firing biomass with coal is a minor activity in New York. This alternative is not open to the Applicant because the Applicant is not an owner or operator of coal generation facilities.

Biomass Gasification

Biomass gasification is a thermal conversion technology that converts solid biomass fuel into a combustible gas. Gasification applies air to the biomass feedstock in a high temperature reactor to produce the product gas, which can then be used to generate electricity from standard gas turbines or in a combined cycle unit. Biomass gasifiers have the potential to be up to twice as efficient as conventional boilers to generate electricity. A typical scale of biomass gasification is from 5 MW to 40 MW.

However, biomass gasification is still considered an emerging technology with only a few gasifiers in operation in the United States, and no biomass gasification in New York State. Given that, biomass gasification is not considered to be a reasonable, commercially available alternative technology.

Direct-Fire, Stand-Alone Wood-Fired Power Plants

The technology consists of combustion of wood fuel directly to produce power, which is sold in the wholesale market. Although this technology is in widespread use nationally, efficiency is typically low (17 to 24%) relative to most other types of power plants. The typical scale of this technology is 1-50 MW.

Direct-fire wood-fired power plants produce solid waste and air emissions. The ash requires disposal, either by being spread over land or in a landfill. If the wood fuel is treated with compounds such as chromium, chlorine, or arsenic, the ash produced may have a higher concentration of hazardous materials resulting in greater environmental risks associated with disposal. The air emissions from biomass in combustion technology will vary depending on the properties of the wood, but will in all cases require emissions control technologies. Unless the amount of biomass combusted is replaced by the applicable amount of biomass growth (i.e., closed-loop), this technology results in increased CO2 emissions, both at the generation facility and from collecting and transporting the biomass and the solid waste. The available supply of suitable biomass fuels in any given geographic area is also limited

New York currently has two operating direct-fire, stand-alone wood-fired power plants in operation - an 18 MW plant in Chateaugay, Franklin County, and a 21 MW plant in Lyonsdale, Lewis County. Even though both facilities have been operating for a number of years and would have been expected to have paid off their financing, both facilities were able to demonstrate that they needed RPS funds to continue economical operation. Since these facilities were constructed, there has been a significant increase in the cost of key materials used in boiler house and turbine construction (most recently due to the war in Iraq and economic growth in China and India), leading to a more difficult competitive environment.

In recognition that RPS objectives include (a) promoting a cleaner and healthier environment, improved air quality and a reduction of greenhouse gases and (b) a competitive green energy price, and given the potential for increased costs due to the Regional Greenhouse Gas Initiative, generating renewable energy at direct-fired, stand-alone wood/biomass power plants would not be a reasonable alternative for the Applicant.

3.2 Biofuels

In addition to the biomass generation technologies mentioned above, a variety of other fuels - ethanol, methanol and biodiesel - can be made from biomass resources. Biofuels are primarily used to fuel vehicles and, although they can fuel engines or fuel cells for electricity generation, both biofuels and fuel cells are considered emerging technologies and, as such, are not a reasonable viable alternative for the Applicant to use for commercial scale electric power generation.

3.3 Biogas Energy

<u>Landfill Gas</u>

Landfill gas (LFG) is generated when organic materials in municipal solid waste (MSW) landfills naturally decompose by bacteria. The gas is approximately 50% methane, the primary component of natural gas. The other 50% of the gas is predominantly CO_2, with small amounts of NO_x, and trace levels of non-methane organic compounds (NMOC). LFG generation typically begins after waste disposal and can continue for 20 or 30 years after the landfill is closed. LFG can be used for on-site electricity generation, a use widely practiced throughout the United States with approximately 330 LFG facilities currently in operation.

Reciprocating engines are the most common technology used to generate electricity from LFG. Engine models used at landfills range in size from approximately 0.5 to 3 MW. The engines are generally used in projects with capacities ranging from 0.8 to 6 MW (many with more than one engine).

Landfill gas-to-electricity projects have been in operation at large landfills in New York for the past 20 years. There are approximately 15 in operation in the state, with a total generating capacity of approximately 65 MW, ranging in size from 1 MW to 11.2 MW and averaging 4.33 MW. The U.S. EPA identifies New York as having potential for 17 additional landfill gas to energy sites through 2013. The potential sites are spread across the state and are not located on the Project area. Landfill gas generation is not a reasonable alternative for the Applicant both because it will not fulfill the Applicant's purpose of generating electricity from wind, and also because it cannot be applied at a scale even approaching the scale of the Project. Further, the Applicant, a wind farm development company, is less well positioned to develop these projects than local engineering or packaging firms, landfill gas developers, engine manufacturers or, the landfill owner operator itself.

Methane Digesters

A methane digester system, commonly referred to as an anaerobic digester, can be used for manure waste management on farms, or to process methane waste at wastewater treatment facilities. At farm locations, digesters promote the decomposition of manure into methane gas. The manure is fed into an anaerobic (without oxygen) tank where bacteria convert the organic matter into methane, which is collected under a plastic dome or hard cover. The gas is piped into an engine generator to generate electricity for farm use, with any excess sold into the grid.

The DPS projected the potential level of development of manure digesters in New York based on, among other things, the number of dairy farms and milk cows in the state. It was estimated that approximately 44 MW of potential generating capacity could be operating by 2013. The State University of New York at Morrisville (SUNY) announced a manure digester project that would produce approximately 1 MWh per cow per year. It is appropriate for large farms to install manure digesters, initially with the support of organizations like NYSERDA, for the purposes of controlling odors and pollution and to produce electricity for on-site consumption. The technology is not, however, a reasonable alternative generation technology for the Applicant, because of its small scale and distributed nature. A single wind turbine can produce up to 8,000 times the energy per year per acre used as a manure digester/dairy farm combination.,

3.4 Photovoltaics

Photovoltaic (or PV) systems, commonly known as "solar cells," convert light energy directly into electricity. Today's PV devices convert 7%-17% of light energy into electric energy.

The largest drawback to solar power today is price, with electricity from PV systems costing about 30 cents/kWh about 5 times the cost of electricity generated by a commercial wind farm, which is roughly 6 cents/kWh (depending on the quality of the wind resource). Another drawback to PVs is that they only generate electricity during daylight, and are most efficient when the sun is shining. On a small scale, therefore, energy storage systems are required.

- **Residential** - A typical residential PV system can average 3 kW installed capacity, and take advantage of utility net metering. Net metering permits the customer to spin their meter backwards when the solar electric system produces more power than is consumed at the home, and to receive retail credit for this power.
- **Commercial / Industrial Sited Systems** - These PV systems are designed to maximize solar energy and capacity output. These systems, with an average installed capacity of 200 kW, will generally be sized so that they produce power "behind the meter" for the customer, and not export any power to the utility grid since they are not eligible for retail net metering. Although the customer is not exporting power to the grid, the electric and capacity benefits produced by these systems reduce the customer load, and therefore, directly off-set demands on the power grid.
- **Building Integrated Photovoltaic Systems** - These systems will typically provide lower levels of solar output, due to their vertical orientation on building facades. However, they can provide building material cost reductions (for glazing or cladding materials) that can partially or wholly off-set the power production penalty. To take advantage of this benefit, building integrated systems are therefore most likely to be installed in new construction applications. These systems are primarily sized to meet loads on the customer's side of the meter.

PV technologies remain a very small generation source in the current state energy mix (generating considerably less than the output of the smallest wind farm in the state). The market development and application of solar technologies will be greatly affected by cost factors and the availability of sites. Solar technologies are best suited for generation near points of electricity use, because solar will be much more competitive with retail electricity rates of 15c/kWh than with wholesale rates of 6.5c/kWh. Deployable spaces include roofs, facades, parking lots, and exclusion zones (i.e., along roadways). The DPS estimates that New York's PV potential development is 18.7MW by 2013.

Finally, and similar to the circumstances discussed above, none of the Applicant's leases authorize any PVC technologies on the subject parcels, which constitute the Project area nor are these activities specifically regulated by the town zoning ordinances in the Project area. Further, upstate New York does not have a suitable solar resource for commercial scale PV systems. Finally the Applicant, a commercial wind farm developer, is not well suited to PV system development or operation.

3.5 Ocean Energy

Generating technologies that derive electrical power from the world's oceans include tidal energy, wave energy and ocean thermal energy conversion. Tidal energy takes the highly predictable nature of the tides and converts its kinetic energy into electricity by placing turbine equipment in off-shore areas. It is only practical at those sites where energy is concentrated in the form of large tides and where the geography is suitable for tidal plant construction. These conditions are not commonplace, but several locations in Maine and Alaska have been identified as having the greatest potential in the United States. Most of the efforts in this field are taking place in Europe. In 2003, the world's first offshore tidal energy turbine was built in the United Kingdom. Many devices have been invented to harness the waves' power, but few have been tested. Of those that have, most have only been in artificial wave tanks.

Ocean thermal energy conversion converts the temperature difference between the ocean's surface and at depth into electricity. This is done by using the warmer water to heat a working fluid which evaporates at pressure and operates a turbine. Conditions require a temperature difference of at least 36ºF, at a depth of around 1000 meters for the process to work, meaning there is no real potential in and around New York. Further, these technologies are still under development and are not expected to become commercially available in the foreseeable future. This option is clearly not viable within the specified Project area.

3.6 Conclusion

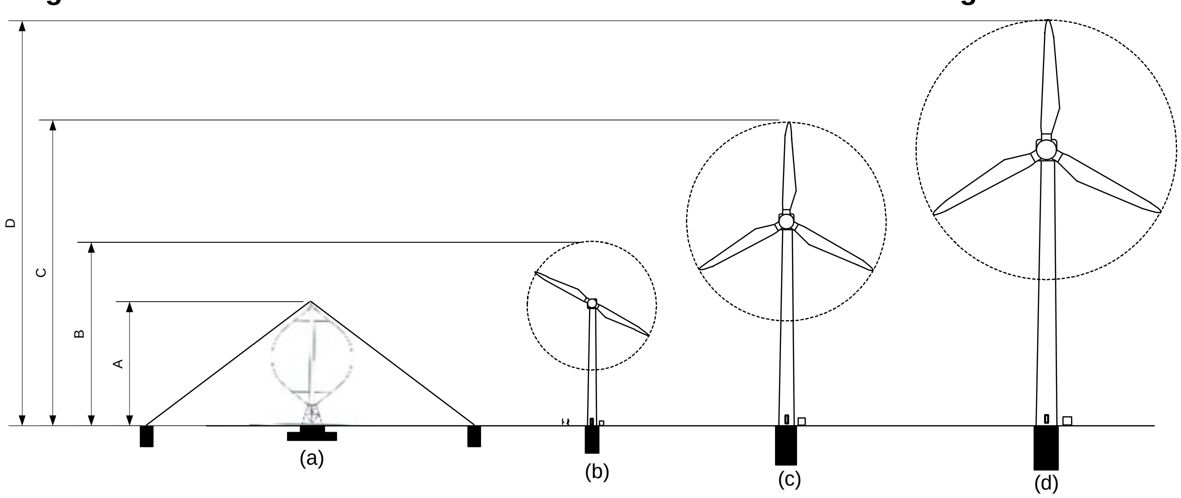
To summarize, the Applicant's purpose is to generate electricity from wind. Even if the Applicant's purpose were broader – to generate renewable energy from any technology that could qualify under the New York State RPS – the alternative technologies open to the Applicant to meet such broader purpose are limited, and none are reasonable alternatives for the Applicant at the current time given the Applicant's capabilities, the lease limitations and local zoning restrictions. Further, the Applicant has no existing coal facilities that can be co-fired with biomass that can be developed or expanded. The

Applicant is not a large dairy farmer, an engineering contractor, landfill developer or landfill owner/operator. The ocean energy, biofuel and biogasifier fields are not well developed and not necessarily suitable for power generation in New York. The photovoltaic market in New York is tiny and is generally limited to residential and commercial behind-the-meter applications

4.0 ALTERNATIVE TURBINE TECHNOLOGIES

Several types of wind energy conversion technologies were evaluated for the Project. However, for the application of utility scale electrical power generation, the technology that has demonstrated itself as the most reliable and commercially viable is the 3-bladed, upwind, horizontal axis, propeller-type wind turbine as shown in Figure 1 (turbines labeled (c) and (d)). Figure 1 and Table 2 compare various wind turbine technologies on the basis of the relative scale and size of commercially used units. Although larger versions of all models shown have been produced, the diagram illustrates the average sizes of versions that have been implemented on a substantial scale with hundreds of units installed. The Project contemplates the use of the most successful class of wind turbines which are megawatt-class wind turbines. The choice of this type of turbine also minimizes overall impacts, since there are fewer turbines, a smaller overall Project footprint, less visual impact, and less potential for avian or bat impacts due to a smaller total Rotor Swept Area and a lower RPM.

Figure 1. Relative Scale and Size of Various Wind Turbine Technologies



Source: Horizon Wind Energy, 2007.

Table 2. Comparison of Various Wind Turbines

	Type	Typical Generator Size	Typical Size	Typical Rotational Speed
a	Darrieus Rotor	50-100 kW	A - 100-150 ft.	50-70 RPM
b	2-bladed (downwind)	50-200 kW	B - 150-200 ft.	60-90 RPM
c	3-bladed (upwind)	500-1,000 kW	C - 240-300 ft.	28-30 RPM
d	3-bladed (upwind)	1,500-3,000 kW	D - 300-475 ft.	9-25 RPM

Source: Horizon Wind Energy, 2007.

4.1 Vertical Axis Darrieus Wind Turbines

The most widely used vertical axis wind turbine (VAWT) was that invented in the 1920s by French engineer, D.G.M. Darrieus. It is called the Darrieus Wind Turbine or Darrieus Rotor and commonly dubbed the "eggbeater." Figure 1 illustrates both the eggbeater (VAWT) and the propeller types (horizontal axis - HAWT) of wind turbines. The Project will utilize the horizontal axis type of wind turbines. The Darrieus turbine was experimented with and used in a number of wind power projects in the 1970s and 1980s including projects in California. Figure 2 illustrates an example of a Darrieus turbine in Washington State.

Despite years of diligent design, experimentation and application, the Darrieus turbine never reached the level of full commercial maturity and success that horizontal axis turbines have, due to inherent design disadvantages. Over the years, the 3-bladed horizontal axis wind turbine has proven to be the most reliable, efficient, and commercially viable wind power technology.

Figure 2. Darrieus Wind Turbine

A few of the advantages of propeller type wind turbines over the eggbeaters are discussed in further detail below.

4.2 Higher Wind Speeds Higher Above the Ground

Darrieus rotors are generally designed with much of their swept area close to the ground compared to HAWTs. Wind speed generally increases with the height above ground as is the case on the Project area. HAWTs benefit from having higher wind speeds and higher wind energy that can be extracted incident to their rotor plane.

A wind assessment program has been performed by Marble River over the six year period from 2002 to 2008. Based on this data, the wind shear characteristics at the project site have been determined. Wind shear describes the amount by which wind speed changes with an increase in height. The calculated wind shear indicates that, because of it relatively low height, the Darrieus turbine or VAWTs would not be a viable option at the Project area.

4.3 Cut-in Wind Speed

VAWTs require a higher level of wind speed to actually start spinning as compared to HAWTs. Older VAWT machines were generally “motored-up” by using the generator as a motor for start-up. HAWTs do not require as much wind speed for start-up and most have the advantage of variable pitch blades, which allow the turbine to simply change blade pitch to start up. Modern HAWTs do not need to use the generator to motor-up the rotor.

4.4 Variable Pitch

Most all modern HAWTs have mechanisms which pitch the blades along their axis to change the blade angle to catch the wind. Variable pitch allows the turbine to maximize and control power output. VAWTs generally do not have variable pitching capability and rely on stall regulation. This results in less efficient energy capture by VAWTs.

4.5 Avian Hazards – Guy Wires

VAWTs are generally constructed with guy wires, which have been shown to be a greater hazard to birds than turbines themselves, as they are much more difficult for birds to see and avoid. The HAWTs contemplated for the Project use free-standing tubular steel towers and do not require guy wires.

4.6 Turbine Footprint

VAWTs are generally fitted with four sets of guy wires which span out from the top of the central tower and are anchored in foundations as shown in Figure 2. Including the tower base foundation, VAWTs require a total of five foundations all spread apart. The result is that the overall footprint and disturbed area for a VAWT is larger than that required for a comparably sized HAWT. HAWTs on free-standing towers use only one main foundation and have a relatively small overall footprint in comparison.

4.7 Fatigue Life Cycles

Due to their design, VAWTs have higher fatigue cycles than HAWTs. As the rotor blades rotate through one full revolution, they pass upwind, downwind and through two neutral zones (directly upwind of the tower and directly downwind of the tower). In contrast, the rotor blades on a HAWT do not pass through similar upwind/downwind neutral zones. As a result, VAWTs are subjected to a far higher number of fatigue load cycles compared to HAWTs which, past operating history shows, result in far more frequent mechanical failures and breakdowns on VAWTs.

For all of the reasons cited above, VAWT's are not considered a suitable alternative to the turbines proposed on the Marble River Wind Farm Project.

Figure 3. Two-Bladed, Downwind Wind Turbine

4.8 Two-Bladed, Downwind Wind Turbines

The most widely used vertical 2-bladed wind turbines are of the downwind variety and in the size range of 50-200 kW. They are referred to as downwind because the blades are positioned downwind of the supporting tower structure. Although there is continued experimentation with prototype wind turbines of this design at a larger scale (300 to 500 kW), they have not proven to be reliable and commercially viable units.

The 2-bladed turbines require a higher rotational speed to reach optimal aerodynamic efficiency compared to a 3-bladed turbine. The 2-bladed rotors are also more difficult to balance, and this, combined with the downwind tower shadow, results in higher fatigue loads and higher noise compared to the 3-bladed design. As shown in Figure 3, 2-bladed downwind turbines use guy wires which likely incur additional avian and agricultural impacts. For all of the reasons cited above, 2-bladed downwind wind turbines are not considered a suitable alternative to the turbines proposed on the Marble River Wind farm Project.

4.9 Smaller Wind Turbines

Over the past 20 to 30 years, wind turbines have generally become larger and more efficient. The Applicant considered using smaller turbines in the 600 to 1,000 kW range for the Project; however, this is both less cost-effective and would result in a far higher total number of turbines, a larger project footprint, and an overall higher impact to the surrounding environment. Use of 600 to 1,000 kW turbines would result in up to twice as many total turbines and a greater total rotor swept area to produce the same amount of energy. For example, the total height of the typical 660 kW turbine is about 73 percent of the total height of the typical 1,500-kW turbine, while its total output is only 44 percent of the output of the 1,500-kW turbine. As the growth trend of the wind energy industry has continued, smaller machines have become less cost-efficient and less competitive. Use of multi-megawatt class turbines result in lower energy prices than sub-megawatt-class turbines.

Using more turbines to produce the same amount of energy also results in more turbine foundations, which results in more land area being disturbed. Potential operational impacts (e.g., noise, avian mortality) could also increase with a larger number of smaller machines. In terms of visibility and visual impact, while smaller turbines might be marginally less visible from a distance, the larger number of turbines necessary to generate an equivalent amount of power would likely have a greater overall visual impact (see discussion in the Project Visual Impact Assessment [VIA] and Supplemental VIA [SVIA]; Appendix K of the DEIS and SDEIS). As indicated above, “small” turbines, depending on the make, have features that have a greater impact on the local environment (visually as well as ecologically) for substantially less amounts of renewable energy output.

4.10 Alternative Multi-Megawatt Turbines

The Applicant initially considered nine potential turbine models produced by five manufacturers. Turbine sizes ranged from 1.5 MW with 77 meter rotor diameters to 3.0 MW and 100 meter rotor diameters.

The Applicant rejected the extreme ends of the spectrum (below 1.5 MW or above 3 MW), based largely on limited availability in the marketplace or unfavorable pricing/economics in the current timeframe. Additional constraints exist in New York that make the 1.5 MW to 2.3 MW scale of the turbine size spectrum the most beneficial to project efficiency and quality. On the lower end of the spectrum (1 MW and below), the following three specific concerns have led to the decision to avoid siting a smaller turbine size at the Marble River site.

- **Decrease in Land Owner Royalties** – Each landowner in the Marble River site will receive royalties (based on a percentage of energy generated) from the operation of the turbine on their land. The landowners are, by and large, dairy farmers who have come to look forward to, expect and depend on the amount of revenue that can be generated from a multi-megawatt turbine. The decreased in royalty (it would decrease by over 50%) from a smaller turbine would represent a substantial economic hit to each participating farmer in the Project and likely a re-consideration regarding the benefits of participating in the Project.

- **Long Term Maintenance** – As noted in Figure 1, technological innovation in the wind turbine industry has trended toward larger (and hence more efficient) turbines since the 1970's (e.g., whereas the average turbine size in 1995 was 600 kW, the average turbine size in 2007 is 1.6 MW). Accordingly, turbine manufacturers attention is focused on contemporary technology rather than yesterday's technology. Similar to patterns observed in other technology-based industries, turbine manufacturers will discontinue support for less popular models, hence making operational maintenance more expensive and less reliable for turbines below 1 MW.
- **Potential Increased Avian Impact** – Smaller turbines (less than 1 MW) operate at higher rpm's than the larger multi-megawatt range of turbine. The body of data from existing post-construction studies of wind turbines ranging in size from 660 kW to 3.0 MW suggest that for a site with an equivalent number of turbines, the potential for negative avian impact decreases as the average rpm of the turbine decreases (though the same body of data also suggest that minimizing avian impact is more strongly correlated with responsible siting practices than rpm considerations).

On the larger end of the spectrum (3 MW and beyond), one specific concern has led to the decision to avoid siting larger turbines at the Marble River site. For larger turbine models, the size of the components associated with currently available 3+ MW turbines exceed the logistical constraints (road width, bridge height, etc.) that exist when transporting these components to the site. For this reason, current applications of 3+ MW turbines are currently all offshore applications where road constraints like turning radii, bridge heights and overhead wire heights don't apply.

Given the limited land under lease and the constraints previously mentioned, a 1MW turbine would have reduced the Project output by almost 50% without reducing the access road or collection line length, and interconnection facilities and associated costs, or making any significant difference to the footprint of the proposed layout. This would reduce the Project's return and concomitant environmental benefits, while maintaining essentially the same Project costs. This would result in increased energy price in order to accommodate these circumstances

Additionally, based on the expert opinion of the panel of three registered landscape architects that evaluated the nature of the visual impact of the Project (as described in the Methodology section of the VIA located in Appendix K of the DEIS and SDEIS), it was determined that the visual characteristics of current multi-megawatt turbines, specifically their narrow profile, slender blades and white color, work to limit potential visual impact.

A further important constraint that must be considered when assessing the viability of potential project alternatives is the current supply and demand equation that exists for wind turbines. As suggested in a National Renewable Energy Lab paper titled "A Preliminary Examination of the Supply and Demand Balance of Renewable Energy" (dated October 2007 and authored by Blair Swezey, Jorn Abakken and Lori Bird), global demand for renewable energy equipment is leading to supply shortages for wind turbines. This means long lead times for wind turbines and high upfront costs to secure wind turbines early enough within the development period to assure a projects ultimate viability.

As a result, the approximate size of the turbines (in this case ~2MW) must be identified very early in the development process to allow plans to be made to procure turbines in time for construction. The consequence is that the approximate turbine size was locked in early on in order to allow the NYISO and NYPA to study the impacts of a certain size project on the reliability of the electric grid. The turbine size (~2MW) and the number of turbine sites (109) dictates the size of the project studied, and a smaller turbine alternative becomes less viable (smaller turbines would require more turbine sites to have the same impact in the system studies).

5.0 ALTERNATIVE LOCATION

At the outset we note that the Applicant is a private developer without the power of eminent domain. It has a lease hold interest in the Project area, based on individual leases which were negotiated with private landowners. Project sites are not fungible and are put together as a result of extensive, and often competitive, negotiations with multiple landowners. Each of the 87 participating landowners in the Project has invested their personal time and energy to visit operating wind farms in the state and work with legal council to negotiate a mutually beneficial lease with the Applicant. A majority of the

87 landowners within the Project actively farm the land within the Project area. The steady revenues produced from harvesting the wind will be counted on as a reliable source of alternative revenue and fundamental pillar supporting the long term economic viability of each farm in the Project area.

The Applicant determined to negotiate for control of the proposed site (a process that has taken over 5 years) as opposed to other possible sites located in the same region and market as the site for the Marble River Wind Farm for three unique reasons:

- **Superior Wind Resource** – The proposed Marble River Wind Farm has been identified by AWS Truewind in a NYSERDA funded study as including two of the top 10 wind energy sites in New York State, and is thus considered ideal for development of clean renewable energy in compliance with the NYS Renewable Portfolio Standard (RPS). It is important to note that to shift the current Project area either a half mile west or east would result in decreases of wind duration, extent and velocity, and an overall decrease in ultimate productivity by a factor of up to 10% (and a corresponding price increase). Wind farm projects must maximize productivity to effectively compete in the New York State electricity market and, ultimately, efficiently fulfill the New York State Renewable Portfolio Standard by supplying energy-related benefits (e.g. Renewable Energy Certificates [RECs]) at the lowest possible price to the state's ratepayers.
- **Transmission** – The presence of available 230 kV transmission lines within the Project area (New York Power Authority Willis-Plattsburgh 230kV line) is critical in developing a wind farm that is able to reliably deliver inexpensive electricity to the New York power grid. Existing on-site transmission facilities avoid the cost and environmental impact associated with the construction of additional transmission lines to facilitate connection to the power grid.
- **Land Owner/Community Acceptance** – The complex nature of wind projects requires community acceptance both from the local governing bodies as well as individual landowners. The towns of Ellenburg and Clinton, with the support of 136 participating land parcel owners, have made wind energy a town priority by passing comprehensive wind energy zoning ordinances in November 2005. The local dairy farming community has also enthusiastically welcomed and supported the development of the Marble River Wind Farm. The potential alternative revenue source for local farmers will provide many participating

small farmers the opportunity to remain competitive as farming entities, thereby assisting with the maintenance of their long-standing way of life and preserving the rural character of the community.

Few other areas in the state of New York have as strong and reliable wind as the Churubusco Plateau and the Applicant does not have control of other sites in this region or market. This, in combination with the lack of Forest Preserve lands, the sparse population, and the dominant agricultural land use make the towns of Clinton and Ellenburg uniquely suitable for development of a large-scale wind power project. The current Project boundary within the towns of Clinton and Ellenburg, the northern tip of the Churubusco plateau, is sited so as to maximize the productivity of the proposed wind farm by using the most energetic (windy) sites along with the land where wind turbines are most compatible and would have the least impact. As mentioned above, areas to the immediate west and east have reduced wind velocities (See Wind Resource Map attached in Figure 4. Areas to the south are not considered viable due to their location within the Adirondack Park, and areas to the North are not viable due to the fact that they lie within Canada, which does not provide for access to the New York State Power grid. Thus, relocating the Marble River Wind Farm elsewhere within the towns of Clinton or Ellenburg would both reduce its economic viability and potentially increase its environmental impacts.

6.0 ALTERNATIVE PROJECT SCALE AND MAGNITUDE

Project components of alternative size and number were considered. A project of significantly more, or fewer, turbines would pose challenges to the technical or economic feasibility of the Project. If the proposed number of turbines were significantly reduced, the economic feasibility of the Project would be jeopardized and the maximum benefit of the available wind resource would not be realized.

The Applicant seriously considered a smaller Project. Horizon Wind Energy originally planned a smaller Project of 75, 1.65 MW turbines within the towns of Clinton and Ellenburg. While a smaller project does result in fewer temporary and operational impacts, the economic benefits to the towns also decrease proportionately. Further, there were multiple companies proposing projects within the towns of Clinton and Ellenburg. The cumulative impacts of the smaller projects proposed by Horizon Wind Energy and NY Windpower, respectively, were greater than the potential impacts of a single, jointly developed site. One reason for this is that a jointly developed site allows for flexibility and economies of scale. A joint development allows for a single substation, switchyard, O&M facility and a single underground collection system, thus decreasing the permanent impact of the proposed Project. Most importantly, the flexibility gained by joining forces has allowed the Applicant the ability to develop a project in a manner that minimizes environmental impacts while maintaining economic viability. Finally, the Marble River Wind Farm's proposed 109 wind turbines are significantly less than the cumulative number of turbines that would have been proposed in the two smaller projects (i.e. two smaller projects were originally proposed to be 50 turbines and 75 turbines, respectively – for a total of 125 turbines – 16 more than the current proposal).

In addition to a smaller design, the Applicant initially considered a larger development consisting of 190 turbine sites, approximately 70 miles of access road, and approximately 103 miles of underground collection system (electrical). Reasons for abandoning this alternative and reducing the size of the proposed development are provided below.

Marble River, LLC is doing business in a wholesale electric market that is highly competitive and extremely price-sensitive. Commercial wind farms produce two products: a) the commodity electric energy, and b) RECs that convey the "environmental attributes" that are generated along with each unit of electricity produced from renewable sources. The power produced is sold directly to the power grid through an hourly auction, essentially guaranteeing that the lowest price always wins the auction (and thus assuring New York rate-payers the most competitive electricity rates). The emphasis of this "merchant" market place is on low cost. Thus, for a wind power project to be economically viable and maintain its financial commitments designated within the PILOT and Host community agreements, it must be able to sell its electricity at the lowest possible rates in the merchant market place. The high fixed costs of developing and constructing a wind farm dictate that a larger project will always be the more cost competitive.

Alternatively, a larger project would result in location of wind turbine towers in areas that are less windy, and would also force installation of more turbines in areas with larger or more abundant sensitive resources (like wetlands). Further, the Applicant has concluded that the transmission line on which the Applicant will interconnect has limited capacity. Additional upgrades to the line would decrease the viability of a larger project.

Economic and policy reasons taken into consideration when considering a smaller project alternative included the following:

- **NYS Renewable Portfolio Standard Fulfillment** – As detailed in Section 3.0 of this document, the plan to fulfill the New York States RPS has been driven by the NYS DPS. Aside from the ultimate goal of 25% renewable energy by 2013, the plan published by NYSERDA sets annual clean energy procurement goals for each year leading into 2013, as Table 3 illustrates:

Table 3. RPS Energy Targets (in Megawatt hours)

	Main Tier Targets	Customer Sited Tier Targets	EO 111 Targets	Voluntary Market Targets	Combined Targets
2006	1,121,247	25,259	282,812	228,584	1,657,902
2007	2,326,171	50,488	314,579	457,167	3,148,405
2008	3,549,026	75,685	346,366	685,751	4,656,828
2009	4,767,994	100,855	378,174	914,335	6,161,358
2010	6,012,179	125,988	410,002	1,142,919	7,691,088
2011	7,297,746	151,081	391,857	1,371,502	9,212,186
2012	8,556,710	176,123	373,712	1,600,086	10,706,631
2013	9,854,038	201,130	355,568	1,828,670	12,239,406

Source: New York State Renewable Portfolio Standard – Performance Report period ending March 2007, http://www.nyserda.org/rps/2006RPSPerformanceReport.pdf

As Table 4 suggests, the economically competitive, clean energy available for procurement by NYSERDA has fallen short of the targets set by NYSERDA to fulfill the RPS policy in 2006, 2007 and 2008.

Table 4. Main Tier Targets and Results (000s MWh)

	2006	2007	2008	2013
Main Tier Targets	1,121	2,326	3,549	9,854
Results (1st & 2nd Main Tier Solicitations)	582	866	2,776	2,776
Results as % of Target	52%	37%	78%	28%

Source: New York State Renewable Portfolio Standard – Performance Report period ending March 2007, http://www.nyserda.org/rps/2006RPSPerformanceReport.pdf

One major factor driving the Applicant's decision against the smaller project size alternative was this demonstrated need for additional supply of clean energy to meet RPS goals.

- **Local Municipal and Landowner Benefit** – Throughout the SEQR process the landowners and municipalities have had the opportunity to review the layout and provide input into the Applicant's design plans. Throughout this process one consistent message from landowners and municipalities was that they would prefer a Project alternative that generated the greatest potential for additional revenue. Of the 87 participating landowners in the Project (67 of which are landowners in Clinton which is equivalent to 30% of the 201 Clinton households [2000 Census]) have similarly voiced a preference against the smaller alternative. In particular, the local municipality of Ellenburg suggested the smaller alternatives were not their preferred option because those options would fall short of fulfilling their fiscal goal of generating revenue equivalent to the respective town budgets.
- **Lesser Economic Viability of Small Project Alternative** – New York State's de-regulated electricity market emphasizes the use of competition amongst electricity generating utilities to assure that New York State ratepayers are receiving the lowest rates available. As an independent power producer in New York State, the Applicant must generate a competitively priced product in order to be able to sell it into the grid. Like most competitive businesses, wind farms have fixed costs and variable costs. A substation would be considered a fixed cost, because no matter what the size of the project, a substation must still exist, whereas each additional wind turbine would be considered a variable cost, because each additional turbine provides additional revenue to pay for itself. As fixed costs increase, a competitive business must increase its potential revenues to dilute the higher costs and still compete effectively. The high fixed costs associated with the proposed Marble River Wind Farm (including system upgrade costs of $4.66 million for the New York Power Authority and substantial up-front expenses associated with obtaining local, state and federal permits for the Project) suggest that the economic hurdle to be competitive on this Project is higher than it might in a situation where system upgrades, interconnect facilities and permitting costs were more modest. When considering alternatives to the proposed Project, this relationship between fixed costs and variable costs suggested that a smaller alternative would be less likely to competitively

produce clean electricity for the New York State ratepayer. The following Table 5 provides an example (using hypothetical numbers) of the relationship between the size of a Project (# of turbines) and the fixed costs. The smaller the project (the fewer the # of turbines) the longer it takes to pay for the initial investment. Please note that this "period of payback" is an important criterion that major financial institutions use to evaluate the economic viability of loan candidate. Most financial institutions consider a payback period of much more than 12 years to be prohibitive.

Table 5. Hypothetical Relationship Between Project Size (# of Turbines) and the Fixed Costs

Size of Project (# of turbines)	**10 turbines**	**50 turbines**	**100 turbines**
Fixed Costs (Combined costs of substation, interconnection cost and permitting costs)	$30 million	$30 million	$30 million
Variable Costs (Cost per turbine ($2mm) X number of turbines)	$20mm	$100mm	$200mm
Revenue (per year) ($150,000 per turbine X number of turbines)	$1.5mm	$7.5mm	$15mm
# of years to breakeven ((Fixed Costs + Variable Costs) / Revenue)	**33 years**	**17 years**	**15 years**

7.0 ALTERNATIVE PROJECT DESIGN AND LAYOUT

Over the past 36 months, various Project layouts have been evaluated in an attempt to maximize energy efficiency while minimizing adverse environmental impacts. The Project layout as proposed has been engineered to maximize productivity while avoiding and minimizing potential adverse impacts associated with cultural resources, aesthetic resource, agricultural land, forests, and wetlands.

The location of turbines and associated facilities (roads, substation and collection system), as currently proposed, reflect specific Project siting guidance received from the lead agency, individual landowners and expert third party engineers, scientists and landscape architects along with specific public comments received from state agencies through the SEQR process (including meetings with the NYSDPS, on-site field meetings with the NYSDEC, planning meetings with NYSOPRHP and on-site walkovers with the NYSDAM).

Over the course of the past 36 months, the Applicant has implemented multiple impact avoidance and minimization measures, as suggested in the various studies completed for the Marble River DEIS and SDEIS, to minimize the total environmental adverse impact.

Special priority was given to avoiding and minimizing potential adverse impact to wetland, cultural resources, and visual resources, as described below.

7.1 Wetland Resource Avoidance and Minimization Methodology

The practice of avoiding impacts to aquatic resources was implemented in the initial stages of the Project. Efforts included desktop review of mapped wetlands during the initial siting phase, preliminary field investigations and three major Project layout modifications. The first layout modification effort was conducted during the summer and fall of 2005 and the second was conducted during the summer of 2006, after completion of the DEIS and three wetland delineation reports. The overall objective of these efforts was to eliminate impacts by relocating Project facilities, and determining the optimal location of the 109 wind turbines to achieve the least environmentally damaging, practicable alternative.

Avoidance: The following approach to large scale wetland avoidance was undertaken by the Applicant:

- **Objective** - Avoid wetland impact by identifying areas of significant wetland impact and suggesting alternative locations for Project facilities.
- **Methodology** - Each avoidance step was made as a result of a field team (made up of GPS operators, expert wetland biologist and a developer's representative) walking the proposed facilities, assessing potential wetland impact, and evaluating alternative solutions.
- **Examples of Avoidance** - Table 6 provides a list of the 339 field delineated wetlands that based on the review of the potential impacts and relocations where completely avoided to minimize wetland impacts. Many of the major avoidance measures included:
    - Turbine deletions, including associated access road deletions.
    - Re-location of turbines.

- Major access road relocations.
- Relocation of underground collection corridors.

Minimization: Refers to the small scale adjustments which were made within the Project layout in order to reduce impacts to resource areas. Once the Project avoided all possible field delineated wetlands, the Project team set out to micro-site the Project facilities to minimize the unavoidable wetland impacts. The field efforts consisted of a three year process utilizing the following approach:

- **Objective** - To minimize wetland impacts by making minor adjustments to Project facilities after reviewing each wetland impact and identifying possible means to avoid permanent impacts and minimize temporary impacts.
- **Methodology** - Each minimization adjustment was made as a result of a field team (made up of a civil engineer, expert wetland biologist, GPS operator and a developer's representative) visiting each delineated area deemed to have a potential wetland impact and to propose and evaluate the viability of alternative solutions.
- **Examples of Minimization** - Table 6 provides a detail of the 339 wetlands that would be affected by a Project improvement, and a justification for how the Project minimized the impact to the wetland. Since April 2007, Marble River, LLC decreased the potential permanent and temporary wetland impacts by 4.36 acres and 4.61 acres, respectively. Details of these impact reductions by wetland are provided in Table 6.

7.2 Results of the Avoidance and Minimization Measures Implemented

The initial design and layout of the Marble River Wind Farm proposed the development of 190 turbine sites, approximately 70 miles of access road, and approximately 103 miles of underground collection system (electrical). Appendix GG of the Supplemental Joint Wetlands Permit Application (Oversized Wetland Avoidance and Minimization Map) provides details regarding the previous layouts compared to the currently proposed layout and provides a comprehensive presentation of the efforts that have been progressed by the Applicant. Avoidance and minimization efforts resulted in the following:

1) Seventy four (74) of the 190 turbines sites (40%), along with the associated roadways and collectors, were eliminated for the following reasons.

   - Wetland Impact (46 turbine sites) – Given the prevalence of wetlands at the site, many proposed turbines sites affected substantial wetland acreage, would not have complied with the 404 (b)(1) Guidelines, and/or would not have represented the least environmentally damaging practicable alternative. Fourteen of these 46 turbines (3a, 161a, 204, 63a, 201, 202a, 203, 208, 209, 148a, 84a, 28a, 15a, 207) were subsequently added to the layout as new turbine sites.

   - Excessive Access Road Length (19 turbine sites) – Many of the most productive turbine sites lay well out of reach of any public or private roads. In 19 of these cases the Applicant deemed that the cost and impact of building access roads outweighed the benefit of the respective turbines.

   - Wind Productivity (9 turbine sites) – Each wind turbine produces a "wake effect" that has the potential to negatively interfere with the productivity of other turbine sites. In some cases this required elimination of a proposed turbine. The Applicant moved nine turbine areas as a result of this analysis.

2) The size of each proposed turbine was increased from 1.6 MW to 2.0 MW per turbine. The change allowed the Project to maximize potential output while decreasing the number of required turbine sites, decreasing associated access road impacts, and decreasing utility line impacts.

3) Approximately 25 miles of proposed access roads were adjusted to coincide with existing/abandoned farm and logging roads, reducing impacts from 70 miles to approximately 45 miles (a reduction of 40%).

4) A single overhead collection line, running the length of the Project, was incorporated into the Project design to eliminate temporary wetland impacts associated with multiple underground collection line trenches.

5) Within the survey area (refer to final wetland delineation report in Appendix A of the FEIS) there are approximately 141 acres of USACE jurisdictional wetlands, of which only 8.84 acres would be permanently filled, and 64.63

acres would be temporarily disturbed. This represents only 6 percent of the on-site being filled.

7.3 Routing of the Overhead Collection System – Alternative Analysis

The Applicant retained the services of TRC, a recognized expert in the electrical and environmental engineering field, to perform a study of the options for the collection line between the northeast of the Project and the substation. In coordination with Rob Simms (an expert electrical engineer with AES) the options considered included (a) a 230kV line, which was discarded due to the extended permitting schedule and the expense of the higher voltage line, (b) a 115kV line, which was discarded due to the environmental and financial costs of installing an additional substation in the northeast of the Project and an additional transformer at the substation and (c) a 34.5 kV line. The latter was chosen because it has less impact and lower cost then the other options.

The current routing of the proposed 34.5 kV overhead collection system has been selected over three alternative routes for four specific reasons; 1) minimization of impacts to wetlands (including forested impacts), 2) existing and potential land control, 3) reduction of visual impacts, and 4) cost. Data regarding these aforementioned factors for the existing and alternative overhead electric collection line routes is provided in Table 7. Potential temporary wetland impacts of each alternate route are provided in Table 8. Appendix FF of the Supplemental Joint Wetlands Permit Application (Oversized Overhead Electric Collection Line Alternative Analysis Map) illustrates wetland impacts associated with the existing and alternate overhead collection line routes. Details regarding the selected and alternate routes follow.

- **Current Proposed Overhead Collection Route:**

  The existing route starts at Wind Turbine Generator (WTG) 155 in the northeast portion of the Project, and proceeds down Soucia Road until it reached Clinton Mills Road. The route travels southwest towards State Route 189, where it continues to travel southwest crossing over Gagnier Road, before ultimately reaching the Project substation. This route was chosen because it would affect the least amount of wetlands (33.83 acres). The Applicant was able to utilize the existing route by purchasing a 200 acre parcel in the middle of the line and by signing leases and options with all the remaining landowners.

  The existing route has leases and options signed with all the landowners, and it is the least costly option of the four options. This is the only route for which the Applicant has secured land control.

- **Alternate Route A: (Lagree Work Around)**

  The alternative Route A starts at WTG 155 in the northeast portion of the Project. The route proceeds down Soucia Road, following the existing route until it reaches La Francis Road. The route would then travel down La Francis road for ¾ of a mile, where it would travel west to until rejoining the existing route to the substation. This route was proposed because of the possible non-participation of one landowner and the need to work around this landowner to make the Project constructible. This route would be the second best option of the four, since it impacts the second least amount of wetlands (34.66 acres). However, this alternate route would traverse high quality wetlands and would increase the overall line length of the collection system by one-half mile.

- **Alternative Route B: (Clinton Mills Road)**

  The alternative Clinton Mills Road route (Route B) starts at WTG 155 and follows the existing route until it reaches Clinton Mills Road. The route would then proceed westward down Clinton Mills Road, until it reaches Route 189, where it would travel south to Gagnier Road, and then west to Patnode Road. It would then proceed south on Patnode to the Project substation. This route is not feasible because it would have to traverse the hamlet of Churubusco. This route would have visual impacts to six historic properties, including the Immaculate Heart of Mary Church and associated cemetery. This route would also affect the most wetlands (46.17 acres), and would require additional approval by the towns of Clinton and Ellenburg and 22 landowners. This alternative would also result in an increase of over of four miles to the overhead collection line and would add a significant cost burden to the Project. Finally, as noted above, the Applicant does not have land control along this Route.

- **Alternative Route C: (La Francis Road)**

  The alternative La Francis Road route (Route C) starts at WTG 155 and follows the existing route until it reaches Clinton Mills Road, where it would travel west to La Francis Road. The route would then proceed south on La Francis Road, until it reached Route 11, where it would travel north to Gagnier Road, and then follow the remaining Route B alternative. This route would affect the second highest amount of wetlands (36.67 acres) and would require the inclusion of 22 additional land parcels, the owners of which have not signed any agreements with the Applicant.

7.4 Wetland Resource and Resource Avoidance and Minimization Conclusion

As a result of the process described above, approximately 250 detailed layout adjustments of varying scale were implemented to avoid and minimize potential impacts to state and federal jurisdictional wetlands within the Marble River Wind Farm Project area.

As a result of this process, none of the wind turbines (turbine towers or tower pads) are located within a field delineated wetland.

Given the large concentration of wetland resources within the Project area, the proposed layout is considered the best possible alternative due to its ability to avoid and minimize undue adverse impact to wetland resources to the fullest extent practicable.

See Table 6 of this Alternatives Analysis for a detailed breakout of avoidance and minimization measures taken since April 3rd 2006.

7.5 Cultural Resource Avoidance and Minimization

The Applicant contracted with John Milner Associates (JMA), a recognized expert in the field, to conduct cultural and resource investigations and surveys in accordance with Office of Parks Recreation and Historic Preservation (OPRHP) policy. Each study scope was produced after receiving input and approval from the OPRHP. Specific studies included the following:

- **Phase 1A Cultural Resources Survey** - This study was conducted in accordance with the New York Archaeological Council's Standards for Cultural Resources Investigations and the Curation of Archaeological Collections (1994). JMA's report entitled Phase IA Cultural Resources Survey: Marble River Wind Farm, towns of Clinton and Ellenburg, Clinton County, New York is included in Appendix J of the DEIS

- **Phase 1B Archeological Field Survey** - This study was conducted in accordance with the Guidelines for Wind Farm Development Cultural Resources Survey Work issued by the State Historic Preservation Office (SHPO) in January 2006 and further discussed at the Project meeting with OPRHP staff on January 17, 2006.

- **Phase 1B Historic and Architectural Survey** - This study was conducted in accordance with the Guidelines for Wind Farm Development Cultural Resources

Survey Work issued by the SHPO in January 2006 and further discussed at the Project meeting with the OPRHP staff on January 17, 2006.

- **Phase 1B Archeological Survey Addendum and Phase 1B-2 Archeological Investigations of the Clinton Mills Historic Site** - This study was necessitated by changes in Project layout that occurred subsequent to the original Phase 1B fieldwork.

While the professional conclusions of the JMA surveys suggested little in the way of significant adverse impact to historic or prehistoric cultural resources, the surveys identified three potentially significant areas that the originally proposed Project layout (DEIS, April 2006) might adversely impact. Please note, the SHPO concurred with the findings and avoidance recommendations in their review of the Phase 1B Survey Report (please see FEIS Appendix N, Agency Correspondence dated July 17th 2007.)

Subsequently, the Applicant proposed layout alternatives to assure avoidance of all potential adverse impact to cultural and historic sites located within the Project area.

Specific layout and Project design alternatives suggested were as follows:

- **The Merchia Road Site**
  1. *JMA Suggested Avoidance Measure* - JMA recommended that the proposed access road be relocated further east to avoid foundation remains within 30 feet of the originally proposed access road
  2. *Marble River Wind Farm Avoidance Measure Implemented* – Marble River re-designed alternative Project facility locations in the vicinity of the site to ensure that the documented resource was not impacted during construction or operation of the Project. This included the relocation of the proposed access road 50 feet to the east of the originally proposed location
- **The Ogdensburgh & Lake Champlain Railroad**
  1. *JMA Suggested Avoidance Measure* – Avoid permanent demolition or obstruction of the railroad route and provisions to restore and maintain the condition of the railroad route so it continues to be a readily apparent landscape feature

2. *Marble River Avoidance Measure Implemented* – Marble River re-routed the proposed overhead 34.5 kV collection line to avoid running parallel to the existing railroad route.

- **Clinton Mills Historic Site**
  1. *JMA Suggested Avoidance Measure* – After completing a supplemental Phase 1B of the Clinton Mills Historic site, JMA recommended that the Project components in this area (access road and underground collection line) be re-located to avoid disturbing the documented features at the site.
  2. *Marble River Avoidance Measure Implemented* – Marble River relocated proposed Project facilities to the south and east to avoid disturbing the existing archeological features.

7.6 Cultural and Historical Resource Avoidance and Minimization Conclusion

As a result of the comprehensive studies undertaken by JMA (specialists in the field) in conjunction with guidance and review from OPRHP, the Applicant was able to implement specific layout alternatives to avoid adverse impact to all documented cultural resources located within the Area of Potential Effect.

The proposed layout represents the best available design because it avoids impacting documented cultural resources.

7.7 Visual Resource Avoidance and Minimization

The Applicant contracted with Environmental Design & Research (EDR) to provide an expert assessment of the potential visual impact of the proposed Project. EDR is a recognized leader in the fields of landscape architecture, planning and environmental services, with lengthy experience in evaluating the visual impact of wind projects throughout the Northeast (including the Maple Ridge, Cape Wind and Fenner Wind Farm projects).

Over the past 36 months EDR conducted two comprehensive visual impact analyses of the Marble River Project (located in Appendix K of the DEIS and SDEIS, respectively). As part of each Visual Impact Assessment (VIA), EDR assembled an in-house panel of three registered landscape architects, and evaluated the visibility and visual impact of the Project based on visual simulations from representative/sensitive viewpoints throughout the visual study area (defined as a 5-mile radius around the perimeter turbines). Utilizing 11 x 17-inch digital color prints of existing conditions photographs and visual simulations from each the selected viewpoints (along with digital animations of the simulations from two viewpoints) the rating panel members evaluated the simulations, assigning each quantitative visual contrast ratings on a scale of 1 (completely compatible) to 5 (strong contrast). Each panel member's ratings were averaged to get an overall score for each viewpoint, and these scores were then compiled to obtain a composite impact score for each viewpoint.

Results of the VIA prepared for the original Project layout (DEIS, April 2006) were re-evaluated as part of a supplemental VIA (SVIA) for a substantially revised Project layout (SDEIS, July 2007). Whereas the VIA evaluated the visual impact of the original layout, the SVIA evaluated a layout where 14 of the original wind turbines had been deleted and 14 new wind turbine locations were proposed. For each of the 10 viewpoints evaluated in the VIA, the original photo simulations were remodeled based on the currently proposed turbine model and layout. The panel was then asked to compare the revised simulations with those prepared for the VIA to see if Project changes altered their previous conclusions.

Results:

As stated in the SVIA (p. 32) "*individual contrast ratings for the revised simulations for the original viewpoints (Viewpoints 3, 8, 15, 34, 38, 74, 81, 165, 170, and 179) were generally very similar to those reported in the original VIA*". In addition, review of the rating panel results indicated that changes in Project layout did not significantly change the basis for scoring in these viewpoints, the number of turbines in a view, by itself, was not the prime determinant of visual impact. As stated in the SVIA, (p. 34), "*As indicated by the rating panel's overall reaction to the revised simulations, turbine relocation did not significantly alter the visual impact of the project as a whole*".

Subsequent to completion of the SVIA, EDR prepared an additional simulation to further evaluate the potential effect of the number of visible turbines on perceived impact. This simulation is a revised version of the SVIA simulation from the fire tower on Lyon Mountain (Viewpoint 196). In the revised simulation, only the approved Noble Clinton and Ellenburg Wind Park projects are shown. This simulation was compared to the cumulative simulation included in the SVIA that shows these projects along with the proposed Marble River Wind Farm (see Figure 5). As this figure illustrates, deleting the entire 109 turbine Project from this view does not significantly alter visual impact/landscape character of the view from this location with the Noble projects in place.

7.8 Visual Resource Avoidance and Minimization Conclusion

The visual impact assessments conducted by EDR support several conclusions pertaining to the visual impact of alternated Project layout and size:

- Visual impact is not directly correlated with the number of turbines in the view (i.e. there were many cases where the rating panel indicated that visual impact was the same or greater in viewpoints where fewer turbines were visible).
- Visual impact is directly correlated with proximity to a turbine (i.e. in cases where a notable decrease in visual impact was documented in the SVIA, this was primarily attributable to the removal of a turbine in the immediate foreground rather than a decrease in number of visible turbines).
- Land use context affects the perceived contrast and visual impact of wind turbines more than the number or arrangement of visible turbines in the view.
- In views where significant numbers of turbines are already visible (e.g., Lyon Mountain), reduction in the size of the proposed Project will not significantly alter the overall visual impact.

These conclusions suggest that a smaller project (in the same location) would not necessarily equate to a decrease in visual impact. The location of the turbines and their compatibility with surrounding landscape features is much more important. The panel found that the turbines generally fit in a rural agricultural setting. In addition, as noted in the original VIA (DEIS Appendix K, p. 25), "*several studies have concluded that people tend to prefer fewer larger turbines to a greater number of smaller ones (Thayer and Freeman, 1987; van de Wardt and Staats, 1988)*". For these reasons, the proposed layout of the Marble River Wind Farm represents the best available alternative because it maximizes potential community benefits while minimizing adverse visual impact.

The following conclusions also justify the Applicant's suggestion that the current layout is the best available alternative to fulfill the Project purpose and public need.

- Given the current existence of the Noble Clinton and Ellenburg Wind Parks within the visual study area, the Marble River Wind Farm will not, in and of itself, significantly alter the visual character of the town's of Clinton and Ellenburg. (Please see cumulative simulations in the SVIA, Appendix K of the SDEIS July 2006)

- The vegetation viewshed analysis included in the SVIA indicates that only 31% of the 5-mile radius study area, and 5% of the area between 5 and 10 miles from the Project (excluding Canada) will have potential views of the Marble River turbines
- Based on the vegetation viewshed analysis in the SVIA, and review of simulations by JMA, actual impact on historic sites in the Project area is likely to be limited because views to or from the structures themselves typically are at least partially screened by foreground structures or trees (SVIA Conclusions, SDEIS, July 2007).

Table 6. Comparison of 4/03/2007 Layout and Existing Layout Wetland Impacts

Wetland ID	-------Permanent Disturbance-------			-------Temporary Disturbance-------			Total Net Change
	April 2007 Layout	Existing Layout	Net Change	April 2007 Layout	Existing Layout	Net Change	
	---------------------------*Acres*---------------------------						
AR1-A	0.0478	0.0468	-0.001	0.0207	0.0271	-0.006	-0.007
AR3-A	0.0330	0.0330	0.000	0.0648	0.0648	0.000	0.000
AR3-B	0.0016	0.0016	0.000	0.0041	0.0041	0.000	0.000
AR4-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR5-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR6A	0.0284	0.0377	0.009	0.0086	0.0035	0.005	0.014
AR11-B	0.0187	0.0187	0.000	0.0036	0.0036	0.000	0.000
AR16-B/C	0.0183	0.0183	0.000	0.0399	0.0404	0.000	0.000
AR18-A,OH1201-A	0.2912	0.0012	-0.290	2.1811	2.0572	0.124	-0.166
AR22-A	0.0124	0.0125	0.000	0.0163	0.0164	0.000	0.000
AR23-B	0.0000	0.0000	0.000	0.0005	0.0005	0.000	0.000
AR25-A	0.0000	0.0000	0.000	0.0257	0.0242	0.001	0.001
AR26-A/B	0.0168	0.0753	0.059	0.1316	0.0310	0.101	0.159
AR33-A	0.0000	0.0000	0.000	0.0001	0.0014	-0.001	-0.001
AR35-A	0.0418	0.0418	0.000	0.0453	0.0453	0.000	0.000
AR36-A	0.0000	0.0000	0.000	0.0104	0.0104	0.000	0.000
AR37-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR38-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR39-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR40-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR41-A	0.1027	0.1454	0.043	0.2256	0.1378	0.088	0.130
AR45-A/B, AR131	0.0003	0.0003	0.000	0.1006	0.1006	0.000	0.000
AR46-A	0.0009	0.0009	0.000	0.0008	0.0008	0.000	0.000
AR54-A/B	0.0024	0.0024	0.000	0.4870	0.4909	-0.004	-0.004
AR55-A	0.0001	0.0001	0.000	0.3980	0.3805	0.018	0.018
AR56-A	0.0419	0.0388	-0.003	0.2556	0.3579	-0.102	-0.105
AR57-A/B	0.0489	0.0458	-0.003	0.5715	0.6203	-0.049	-0.052
AR58-A	0.0389	0.0389	0.000	0.5728	0.5728	0.000	0.000
AR58-B	0.1215	0.1215	0.000	0.4537	0.4537	0.000	0.000
AR59-A	0.0384	0.0383	0.000	0.3005	0.3619	-0.061	-0.062
AR60-A	0.0087	0.0001	-0.009	0.0514	0.1341	-0.083	-0.091
AR61-A	0.0037	0.0037	0.000	0.0010	0.0010	0.000	0.000
AR62-A	0.0738	0.0738	0.000	0.4565	0.4565	0.000	0.000
AR62-B	0.0378	0.0378	0.000	0.1392	0.1392	0.000	0.000
AR63-A	0.0004	0.0004	0.000	0.0235	0.0235	0.000	0.000
AR64-A/B	0.0318	0.0318	0.000	0.0704	0.0714	-0.001	-0.001
AR65-A	0.0269	0.0269	0.000	0.0375	0.0311	0.006	0.006
AR65-B	0.0390	0.0390	0.000	0.0226	0.0226	0.000	0.000
AR68-A	0.0000	0.0000	0.000	0.0000	0.0000	0.000	0.000
AR70-A	0.0098	0.0098	0.000	0.0352	0.0352	0.000	0.000
AR71-A	0.0101	0.0101	0.000	0.0256	0.0256	0.000	0.000
AR72-A	0.0263	0.0263	0.000	0.0596	0.0596	0.000	0.000
AR79A	0.0385	0.0385	0.000	0.1375	0.1375	0.000	0.000
AR79B	0.0048	0.0048	0.000	0.1844	0.1843	0.000	0.000

Wetland ID	-------Permanent Disturbance-------			-------Temporary Disturbance-------			Total Net Change
	April 2007 Layout	Existing Layout	Net Change	April 2007 Layout	Existing Layout	Net Change	
	---Acres---						
AR79C	0.0000	0.0008	0.001	0.0067	0.0075	-0.001	0.000
AR80/81-A	0.0328	0.0328	0.000	0.0000	0.0000	0.000	0.000
AR81-A	0.0426	0.0426	0.000	0.0000	0.0000	0.000	0.000
AR102-A	0.0514	0.0514	0.000	0.0252	0.0252	0.000	0.000
AR103-A/B	0.0130	0.0161	0.003	0.2040	0.1552	0.049	0.052
AR105-A	0.0000	0.0000	0.000	0.0688	0.0689	0.000	0.000
AR111-A/B	0.0591	0.0591	0.000	0.0555	0.0555	0.000	0.000
AR114-A/B	0.0242	0.0225	-0.002	0.0386	0.0386	0.000	-0.002
AR115-A/B/C	0.3291	0.3291	0.000	0.8050	0.7728	0.032	0.032
AR117-A	0.0000	0.0000	0.000	0.0042	0.0042	0.000	0.000
AR118-A	0.0426	0.0398	-0.003	0.0126	0.0156	-0.003	-0.006
AR118-B	0.0016	0.0016	0.000	0.0482	0.0483	0.000	0.000
AR120-Y	0.0044	0.0044	0.000	0.0089	0.0089	0.000	0.000
AR124-A	0.0083	0.0083	0.000	0.0147	0.0146	0.000	0.000
AR125-A	0.0135	0.0135	0.000	0.0025	0.0025	0.000	0.000
AR200-A	0.0000	0.0000	0.000	0.0265	0.0266	0.000	0.000
AR201-A	0.0014	0.0014	0.000	0.2614	0.2726	-0.011	-0.011
AR202-A	0.0830	0.0829	0.000	0.1705	0.1704	0.000	0.000
AR203-A/B	0.0314	0.0313	0.000	0.6934	0.6928	0.001	0.001
AR204-A	0.0095	0.0095	0.000	0.0185	0.0185	0.000	0.000
AR205-A	0.0240	0.0240	0.000	0.0103	0.0499	-0.040	-0.040
AR205-B	0.0293	0.0293	0.000	0.0092	0.1000	-0.091	-0.091
AR206-A	0.0286	0.0287	0.000	0.0323	0.0328	-0.001	0.000
AR206-B	0.0055	0.0055	0.000	0.0471	0.0471	0.000	0.000
AR207-A	0.0002	0.0002	0.000	0.0038	0.0038	0.000	0.000
AR208-A	0.0200	0.0200	0.000	0.1342	0.1342	0.000	0.000
AR208-B	0.0000	0.0000	0.000	0.0583	0.0583	0.000	0.000
AR210-C	0.0004	0.0000	0.000	0.0000	0.0122	-0.012	-0.013
AR210-D	0.0000	0.0000	0.000	0.0011	0.0011	0.000	0.000
AR212-A	0.0001	0.0004	0.000	0.0014	0.0029	-0.001	-0.001
AR213-A	0.0000	0.0000	0.000	0.0117	0.0117	0.000	0.000
AR213-B	0.0000	0.0000	0.000	0.0084	0.0084	0.000	0.000
AR213-C	0.0165	0.0165	0.000	0.0029	0.0029	0.000	0.000
AR214-A	0.0139	0.0138	0.000	0.0092	0.0091	0.000	0.000
AR218-B	0.0100	0.0116	0.002	0.0076	0.0045	0.003	0.005
AR360-A	0.0877	0.0877	0.000	0.0440	0.0440	0.000	0.000
AR367-A	0.0345	0.0346	0.000	0.0400	0.0400	0.000	0.000
AR370-A	0.0000	0.0000	0.000	0.3482	0.3481	0.000	0.000
AR502-A	0.0000	0.0000	0.000	0.3428	0.3428	0.000	0.000
AR506, OH1206	0.3819	0.0463	-0.336	2.6265	2.2908	0.336	0.000
AR507-A	0.0278	0.0003	-0.027	0.3321	0.3187	0.013	-0.014
AR508-A/B	0.0340	0.0340	0.000	0.0161	0.0161	0.000	0.000
AR509-A/B	0.3765	0.1841	-0.192	1.1556	0.9629	0.193	0.000
AR513-A/B	0.0900	0.0900	0.000	0.1331	0.1332	0.000	0.000
AR521-A/B	0.0615	0.0615	0.000	0.0308	0.0308	0.000	0.000
AR522-A	0.0189	0.0189	0.000	0.0270	0.0270	0.000	0.000

Wetland ID	-------Permanent Disturbance------- April 2007 Layout	Existing Layout	Net Change	-------Temporary Disturbance------- April 2007 Layout	Existing Layout	Net Change	Total Net Change
	---Acres---						
AR523-A	0.0099	0.0099	0.000	0.0122	0.0122	0.000	0.000
AR524-A	0.0076	0.0076	0.000	0.0668	0.0669	0.000	0.000
AR524-B	0.0062	0.0062	0.000	0.0580	0.0580	0.000	0.000
AR524-D	0.0127	0.0127	0.000	0.0168	0.0168	0.000	0.000
AR525-A	0.0000	0.0000	0.000	0.0340	0.0340	0.000	0.000
AR526-A/B	0.0205	0.0175	-0.003	0.0279	0.0285	-0.001	-0.004
AR530-A/B	0.0478	0.0478	0.000	0.0246	0.0247	0.000	0.000
AR531-A	0.0000	0.0000	0.000	0.0119	0.0187	-0.007	-0.007
AR534-A	0.0004	0.0004	0.000	0.0043	0.0043	0.000	0.000
AR534-B	0.0070	0.0070	0.000	0.0102	0.0102	0.000	0.000
AR538-A	0.0221	0.0221	0.000	0.0237	0.0237	0.000	0.000
AR599-A1	0.0006	0.0005	0.000	0.0022	0.0041	-0.002	-0.002
AR599-A2	0.0000	0.0000	0.000	0.0002	0.0002	0.000	0.000
AR599-B2	0.0001	0.0001	0.000	0.0011	0.0011	0.000	0.000
AR601-A	0.0000	0.0000	0.000	0.0000	0.0141	-0.014	-0.014
AR602-A	0.0004	0.0004	0.000	0.0037	0.0617	-0.058	-0.058
AR602-B	0.0069	0.0069	0.000	0.0000	0.1725	-0.172	-0.173
AR603-A	0.0218	0.0218	0.000	0.0000	0.3804	-0.380	-0.380
AR603-B	0.0486	0.0480	-0.001	0.0000	0.4490	-0.449	-0.450
AR604-A	0.0000	0.0000	0.000	0.0000	0.0768	-0.077	-0.077
AR604-B	0.0026	0.0026	0.000	0.0000	0.1355	-0.136	-0.136
AR605-A	0.0041	0.0041	0.000	0.0000	0.1445	-0.145	-0.144
AR605-B	0.0000	0.0000	0.000	0.0000	0.2547	-0.255	-0.255
AR606-A/C	0.0256	0.0256	0.000	0.0000	0.6965	-0.696	-0.696
AR606-B	0.0626	0.0618	-0.001	0.0000	0.5761	-0.576	-0.577
AR607-A	0.0010	0.0010	0.000	0.0000	0.1370	-0.137	-0.137
AR607-B	0.0000	0.0000	0.000	0.0000	0.1633	-0.163	-0.163
AR608-A	0.1965	0.0086	-0.188	0.0000	0.0000	0.000	-0.188
AR609-A	0.0028	0.0028	0.000	0.0000	0.3503	-0.350	-0.350
AR609-B	0.0172	0.0170	0.000	0.0000	0.4031	-0.403	-0.403
AR610-A	0.0165	0.0165	0.000	0.0000	0.3319	-0.332	-0.332
AR610-B	0.0105	0.0102	0.000	0.0000	0.7434	-0.743	-0.744
AR611-A/B/C/D/E	0.3109	0.3390	0.028	0.4340	0.8358	-0.402	-0.374
AR611-B	0.0075	0.0069	-0.001	0.1903	1.1468	-0.956	-0.957
AR615-A	0.0010	0.0250	0.024	0.0663	0.1555	-0.089	-0.065
AR615-B	0.0287	0.0279	-0.001	0.2568	0.8705	-0.614	-0.614
AR617-A	0.0000	0.0000	0.000	0.0093	0.0093	0.000	0.000
AR618-A	0.0000	0.0000	0.000	0.0811	0.0811	0.000	0.000
AR618-B	0.0770	0.0770	0.000	0.2523	0.2538	-0.001	-0.001
AR618-C	0.0000	0.0000	0.000	0.0661	0.0661	0.000	0.000
AR619-A	0.0009	0.0009	0.000	0.0556	0.0555	0.000	0.000
AR619-B	0.0552	0.0552	0.000	0.0591	0.0591	0.000	0.000
AR622-A/B/C	0.0459	0.0459	0.000	0.0685	0.0685	0.000	0.000
AR625-A	0.0295	0.0295	0.000	0.0809	0.0809	0.000	0.000
AR625-B	0.0081	0.0081	0.000	0.0620	0.0619	0.000	0.000
AR630-A/B	0.0764	0.0764	0.000	0.1506	0.1533	-0.003	-0.003

Wetland ID	-------Permanent Disturbance------- April 2007 Layout	Existing Layout	Net Change	-------Temporary Disturbance------- April 2007 Layout	Existing Layout	Net Change	Total Net Change
	---Acres--						
AR701-A/B	0.0000	0.0000	0.000	0.0957	0.1060	-0.010	-0.010
AR702-A	0.0000	0.0000	0.000	0.0071	0.0071	0.000	0.000
AR703-A	0.0308	0.0318	0.001	0.3344	0.3512	-0.017	-0.016
AR709-A/B	0.0009	0.0009	0.000	0.0007	0.0007	0.000	0.000
AR710-A	0.0000	0.0000	0.000	0.0150	0.0151	0.000	0.000
AR711-B	0.0000	0.0000	0.000	0.0100	0.0099	0.000	0.000
AR713-B	0.0000	0.0000	0.000	0.1208	0.1208	0.000	0.000
AR719-A/B/C	0.5410	0.5411	0.000	0.7394	0.7534	-0.014	-0.014
AR724-A	0.0810	0.0000	-0.081	0.4891	1.1407	-0.652	-0.733
AR725-A/B/C	0.0489	0.0488	0.000	0.0571	0.0565	0.001	0.000
AR725-D	0.0332	0.0344	0.001	0.0513	0.0527	-0.001	0.000
AR737-A	0.0291	0.0291	0.000	0.0175	0.0175	0.000	0.000
AR802-A	0.0000	0.0000	0.000	0.1681	0.1681	0.000	0.000
AR803-A/B/C	0.0697	0.0626	-0.007	0.3486	0.5888	-0.240	-0.247
AR804-A	0.0000	0.0000	0.000	0.0023	0.0023	0.000	0.000
AR805-A/B	0.0254	0.0254	0.000	0.0599	0.0599	0.000	0.000
AR807-A	0.0000	0.0000	0.000	0.0083	0.0083	0.000	0.000
AR808-A	0.0000	0.0000	0.000	0.0015	0.0015	0.000	0.000
AR809-A	0.0000	0.0000	0.000	0.0266	0.0272	-0.001	-0.001
AR816-A	0.0241	0.0241	0.000	0.0088	0.0088	0.000	0.000
AR825-A/B	0.3125	0.1121	-0.200	1.6374	1.5680	0.069	-0.131
AR828-A	0.0061	0.0061	0.000	0.0039	0.0039	0.000	0.000
AR852-A/B	0.0509	0.0834	0.033	0.3612	0.1941	0.167	0.200
AR902-A	0.0000	0.0000	0.000	0.0000	0.0000	0.000	0.000
AR904-A	0.0008	0.0008	0.000	0.0244	0.2014	-0.177	-0.177
AR906-A	0.0000	0.0000	0.000	0.0192	0.0192	0.000	0.000
AR907-A	0.0022	0.0022	0.000	0.0079	0.0079	0.000	0.000
AR909-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR917-A	0.0000	0.0000	0.000	0.0270	0.0000	0.027	0.027
AR917-C	0.0000	0.0000	0.000	0.0327	0.0131	0.020	0.020
AR925-A/B/C, IC	0.0000	0.0000	0.000	0.0391	0.0391	0.000	0.000
AR926-A/B	1.1473	0.0063	-1.141	9.8701	8.5596	1.310	0.169
AR927-A/B	0.0000	0.0000	0.000	0.0035	0.0035	0.000	0.000
AR939-A	0.0000	0.0000	0.000	0.0035	0.0035	0.000	0.000
AR939-B	0.0071	0.0069	0.000	0.0292	0.0295	0.000	-0.001
AR939-C	0.0000	0.0000	0.000	0.0055	0.0055	0.000	0.000
AR939-D	0.0000	0.0000	0.000	0.0013	0.0013	0.000	0.000
AR940-A/B	0.0661	0.0661	0.000	0.0672	0.0673	0.000	0.000
AR941,IC942	0.0255	0.0253	0.000	0.7226	1.1554	-0.433	-0.433
AR945-A	0.0019	0.0019	0.000	0.0061	0.0061	0.000	0.000
AR947-A	0.0000	0.0000	0.000	0.0004	0.0004	0.000	0.000
AR949-A	0.0000	0.0000	0.000	0.0533	0.0534	0.000	0.000
AR950-A	0.0009	0.0009	0.000	0.0133	0.0134	0.000	0.000
AR951-A	0.0000	0.0000	0.000	0.0226	0.0226	0.000	0.000
AR952-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR954-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J

Wetland ID	-------Permanent Disturbance-------			-------Temporary Disturbance-------			Total Net Change
	April 2007 Layout	Existing Layout	Net Change	April 2007 Layout	Existing Layout	Net Change	
	---------Acres---------						
AR958-A,IC962	0.2569	0.2569	0.000	0.8750	0.9386	-0.064	-0.064
AR964-A	0.0000	0.0000	0.000	0.0108	0.0108	0.000	0.000
AR967-A/B	0.0195	0.0194	0.000	0.1880	0.1880	0.000	0.000
AR967-D	0.0299	0.0307	0.001	0.0852	0.0979	-0.013	-0.012
AR967-E	0.0561	0.0524	-0.004	0.1469	0.1546	-0.008	-0.011
AR968-A	0.0000	0.0000	0.000	0.0427	0.0492	-0.007	-0.007
AR986-B	0.0424	0.0424	0.000	0.0283	0.0283	0.000	0.000
AR1008-A	0.0000	0.0000	0.000	0.0071	0.0071	0.000	0.000
AR1009-A	0.0503	0.0000	-0.050	0.2901	0.2390	0.051	0.001
AR1017-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
AR/IC1021-A/B	0.2180	0.2164	-0.002	0.4520	0.4321	0.020	0.018
AR1026-A	0.0431	0.0431	0.000	0.0184	0.0184	0.000	0.000
AR1027-A/B	0.0784	0.0784	0.000	0.0943	0.0943	0.000	0.000
AR1028-A/B	0.1482	0.1482	0.000	0.2063	0.2059	0.000	0.000
AR1029-A/B	0.0780	0.0779	0.000	0.1238	0.1238	0.000	0.000
AR1030-A/B	0.0521	0.0521	0.000	0.0891	0.0891	0.000	0.000
AR1031-A	0.0000	0.0000	0.000	0.0219	0.0219	0.000	0.000
AR1032-A	0.0643	0.0643	0.000	0.0641	0.0641	0.000	0.000
AR1033-A/B	0.0473	0.0473	0.000	0.0299	0.0299	0.000	0.000
AR1034-A	0.0000	0.0000	0.000	0.0001	0.0001	0.000	0.000
AR1035-A	0.0000	0.0000	0.000	0.0063	0.0064	0.000	0.000
AR1036-A	0.0000	0.0000	0.000	0.0006	0.0006	0.000	0.000
AR1037-A/D/C	0.3524	0.3519	0.000	0.5350	0.5141	0.021	0.020
AR1042-A	0.0645	0.0645	0.000	0.0723	0.0724	0.000	0.000
AR1044-A/B	0.2332	0.2332	0.000	0.2505	0.2505	0.000	0.000
AR1105-A	0.0000	0.0000	0.000	0.0611	0.0381	0.023	0.023
AR1105-B	0.0000	0.0000	0.000	0.0151	0.0151	0.000	0.000
AR1105-C	0.0000	0.0000	0.000	0.0252	0.0253	0.000	0.000
AR1107-A	0.0082	0.0000	-0.008	0.0000	0.0085	-0.009	-0.017
AR1108-A	0.0000	0.0659	0.066	0.1818	0.0000	0.182	0.248
AR1305-A	0.0096	0.0000	-0.010	0.0000	0.0745	-0.074	-0.084
AR1307-A	0.1444	0.1443	0.000	0.0010	0.0010	0.000	0.000
AR1312-A	0.0075	0.0075	0.000	0.0978	0.0978	0.000	0.000
CV1173-A	0.0033	0.0033	0.000	0.0165	0.0165	0.000	0.000
CV1400-A	0.0000	0.0000	0.000	0.0109	0.0000	0.011	0.011
CV1400-C	0.0000	0.0000	0.000	0.0283	0.0000	0.028	0.028
CW715-B, IC1022	0.2009	0.2009	0.000	0.8226	0.8227	0.000	0.000
CW829-A	0.1607	0.1607	0.000	0.1265	0.1266	0.000	0.000
CWIC705-A/B	0.0901	0.0901	0.000	0.0781	0.0781	0.000	0.000
CWIC722-A	0.0024	0.0024	0.000	0.0031	0.0031	0.000	0.000
IC360-A	0.0000	0.0577	0.058	0.2384	0.2470	-0.009	0.049
IC361-A	0.0000	0.0586	0.059	0.0702	0.0187	0.052	0.110
IC363-A	0.0000	0.0027	0.003	0.0082	0.0000	0.008	0.011
IC364-A	0.0000	0.0000	0.000	0.2536	0.2536	0.000	0.000
IC364-A/B	0.0000	0.0000	0.000	0.1887	0.0000	0.189	0.189
IC365-A	0.0000	0.0000	0.000	0.0588	0.0588	0.000	0.000

Wetland ID	-------Permanent Disturbance------- April 2007 Layout	Existing Layout	Net Change	-------Temporary Disturbance------- April 2007 Layout	Existing Layout	Net Change	Total Net Change
	--Acres--						
IC366-A	0.0000	0.0000	0.000	0.1179	0.1179	0.000	0.000
IC371-A	0.0000	0.0000	0.000	0.0000	0.0182	-0.018	-0.018
IC371-B	0.0000	0.0000	0.000	0.0000	0.0018	-0.002	-0.002
IC371-C	0.0000	0.0000	0.000	0.0195	0.0000	0.020	0.020
IC727-A/B	0.0000	0.0000	0.000	0.5299	0.5299	0.000	0.000
IC738-A	0.3120	0.3120	0.000	0.0966	0.0967	0.000	0.000
IC739-A	0.0000	0.0000	0.000	0.0502	0.0532	-0.003	-0.003
IC818	0.0000	0.0000	0.000	0.2390	0.2386	0.000	0.000
IC818-A	0.0000	0.0000	0.000	0.1178	0.1178	0.000	0.000
IC818-B	0.0000	0.0000	0.000	0.2261	0.2261	0.000	0.000
IC820-A	0.0102	0.0102	0.000	0.0168	0.0168	0.000	0.000
IC827-A/B/C	0.0433	0.0000	-0.043	0.3939	0.3506	0.043	0.000
IC919-A	0.0858	0.0766	-0.009	0.0426	0.0456	-0.003	-0.012
IC963-A	0.0000	0.0000	0.000	0.0138	0.0138	0.000	0.000
IC963-B	0.0000	0.0000	0.000	0.0062	0.0062	0.000	0.000
IC969-A/B	0.3529	0.3499	-0.003	0.0123	0.0128	0.000	-0.003
IC970-A	0.0128	0.0128	0.000	0.0517	0.0517	0.000	0.000
IC970-B	0.0241	0.0241	0.000	0.0346	0.0346	0.000	0.000
IC971-A	0.0029	0.0009	-0.002	0.0105	0.0105	0.000	-0.002
IC972-A	0.0000	0.0000	0.000	0.0204	0.0204	0.000	0.000
IC973-A	0.0000	0.0002	0.000	0.0005	0.0005	0.000	0.000
IC977-B	0.0000	0.0000	0.000	0.0302	0.0302	0.000	0.000
IC977-C	0.0000	0.0000	0.000	0.0217	0.0217	0.000	0.000
IC978-A	0.0000	0.0000	0.000	1.2037	1.2084	-0.005	-0.005
IC978-F	0.0000	0.0000	0.000	0.2053	0.2072	-0.002	-0.002
IC978-G	0.0000	0.0000	0.000	0.1099	0.0979	0.012	0.012
IC980-A	0.0000	0.0000	0.000	0.1174	0.1323	-0.015	-0.015
IC980-A/B	0.0000	0.0000	0.000	0.0932	0.1201	-0.027	-0.027
IC981-A	0.0000	0.0000	0.000	0.0555	0.0555	0.000	0.000
IC983-A/B	0.0000	0.0000	0.000	0.1029	0.1029	0.000	0.000
IC1005-A	0.0000	0.0000	0.000	0.0484	0.0484	0.000	0.000
IC1006-A	0.0272	0.0000	-0.027	0.2402	0.1895	0.051	0.024
IC1010-A	0.0000	0.0000	0.000	0.0262	0.0421	-0.016	-0.016
IC1014-A/B	0.0000	0.0000	0.000	0.2374	0.2374	0.000	0.000
IC1015-A	0.0000	0.0000	0.000	0.0239	0.0239	0.000	0.000
IC1015-B	0.0000	0.0000	0.000	0.0076	0.0076	0.000	0.000
IC1016-A	0.0000	0.0000	0.000	0.0169	0.0169	0.000	0.000
IC1016-A/B	0.0000	0.0000	0.000	0.5312	0.5312	0.000	0.000
IC1024-A	0.0000	0.0000	0.000	0.0034	0.0034	0.000	0.000
IC1038-B	0.0000	0.0000	0.000	0.0785	0.0785	0.000	0.000
IC1047-A	0.0000	0.0000	0.000	0.1779	0.1779	0.000	0.000
IC1048-A	0.0000	0.0000	0.000	0.0267	0.0267	0.000	0.000
IC1049-A	0.0000	0.0000	0.000	0.1634	0.1634	0.000	0.000
IC1050-A	0.0000	0.0000	0.000	0.1027	0.1027	0.000	0.000
IC1052-A	0.0000	0.0000	0.000	0.0031	0.0031	0.000	0.000
IC1054-A	0.0000	0.0000	0.000	0.0047	0.0047	0.000	0.000

Wetland ID	-------Permanent Disturbance------- April 2007 Layout	Existing Layout	Net Change	-------Temporary Disturbance------- April 2007 Layout	Existing Layout	Net Change	Total Net Change
	---Acres---						
IC1154-A	0.0000	0.0000	0.000	0.0037	0.0037	0.000	0.000
IC1156-A/B	0.0000	0.0000	0.000	0.0901	0.0874	0.003	0.003
IC1300-B	0.0000	0.0000	0.000	0.0707	0.0707	0.000	0.000
IC1311-A	0.0000	0.0000	0.000	0.0002	0.0002	0.000	0.000
IC1920-A	0.0000	0.0000	0.000	0.0000	0.4313	-0.431	-0.431
MET1003-A/B/C	0.0000	0.0000	0.000	0.0047	0.0000	0.005	0.005
MET1544-A	0.0000	0.0000	0.000	0.0087	0.0000	0.009	0.009
MET1544-B	0.0000	0.0000	0.000	0.0045	0.0000	0.005	0.005
MET1548-A	0.0000	0.0000	0.000	0.0249	0.0000	0.025	0.025
MET1548-B	0.0000	0.0000	0.000	0.0019	0.0000	0.002	0.002
MET1549-A	0.0000	0.0000	0.000	0.0235	0.0000	0.024	0.024
MET1551-A	0.0000	0.0000	0.000	0.0692	0.0000	0.069	0.069
MIT1560-A	0.0000	0.0040	0.004	0.0379	0.0000	0.038	0.042
OH1110-A,IC1123	0.0174	0.0000	-0.017	0.0807	0.0633	0.017	0.000
OH1110-B	0.0000	0.0000	0.000	0.0163	0.0163	0.000	0.000
OH1111-A/B	0.1328	0.0003	-0.133	0.8063	0.6738	0.133	0.000
OH1113-A/B	0.0260	0.0000	-0.026	0.1216	0.0956	0.026	0.000
OH1114-A	0.0000	0.0000	0.000	0.0271	0.0271	0.000	0.000
OH1115-A	0.0000	0.0000	0.000	0.1039	0.1039	0.000	0.000
OH1116-A	0.0000	0.0000	0.000	0.2546	0.2546	0.000	0.000
OH1117-A	0.0000	0.0000	0.000	0.0658	0.0658	0.000	0.000
OH1117-B	0.0000	0.0000	0.000	0.1855	0.1855	0.000	0.000
OH1118-A/B	0.1096	0.0003	-0.109	0.5418	0.4287	0.113	0.004
OH1119-A	0.0000	0.0000	0.000	0.2441	0.2441	0.000	0.000
OH1120-A/B/C/D	1.2861	0.0032	-1.283	8.6700	7.3855	1.285	0.002
OH1200-A	0.0958	0.0009	-0.095	0.8886	0.7937	0.095	0.000
OH1204-A	0.0000	0.0000	0.000	0.0295	0.0295	0.000	0.000
OH1326-A	0.0000	0.0000	0.000	0.0087	0.0087	0.000	0.000
OH1327-A	0.0015	0.0000	-0.001	0.0086	0.0072	0.001	0.000
OH1328-A/B/C	0.0473	0.0000	-0.047	0.2683	0.2209	0.047	0.000
OH1329-A/B/C/D	0.0465	0.0003	-0.046	0.0000	0.1994	-0.199	-0.246
OH1330-A/B	0.0383	0.0002	-0.038	0.3720	0.3338	0.038	0.000
OH1350-A/B	0.0728	0.0000	-0.073	0.4297	0.3569	0.073	0.000
OH1352-A	0.0000	0.0000	0.000	0.0420	0.0420	0.000	0.000
OH1353-A	0.1231	0.0000	-0.123	0.7311	0.6079	0.123	0.000
OH1354-A	0.0000	0.0000	0.000	0.0311	0.0311	0.000	0.000
OH1355-A	0.0000	0.0000	0.000	0.0001	0.0001	0.000	0.000
OH1357-A	0.0000	0.0000	0.000	0.0291	0.0291	0.000	0.000
OH1401-A	0.0244	0.0000	-0.024	0.0000	0.0870	-0.087	-0.111
RW1163-A	0.0000	0.0000	0.000	0.0000	0.0022	-0.002	-0.002
RW1163-B	0.0000	0.0000	0.000	0.0000	0.0006	-0.001	-0.001
SA821-A	0.0791	0.0000	-0.079	0.5020	0.3660	0.136	0.057
WET AG. FIELD	0.0057	0.0057	0.000	0.0391	0.0391	0.000	0.000
WTG1A, AR905	0.0000	0.0000	0.000	0.0454	0.0452	0.000	0.000
WTG2A-A	0.0000	0.0000	0.000	0.0012	0.0012	0.000	0.000
WTG5A-A	0.0419	0.0419	0.000	0.0405	0.0405	0.000	0.000

Wetland ID	-------Permanent Disturbance------- April 2007 Layout	Existing Layout	Net Change	-------Temporary Disturbance------- April 2007 Layout	Existing Layout	Net Change	Total Net Change
	----------Acres----------						
WTG5A-C/D	0.0422	0.0422	0.000	0.0442	0.0442	0.000	0.000
WTG15-1A	0.1442	0.1442	0.000	0.0128	0.0128	0.000	0.000
WTG15A-ALT-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
WTG15-ALT-B	0.0099	0.0102	0.000	0.0051	0.0049	0.000	0.000
WTG28A-B	0.0020	0.0020	0.000	0.0916	0.0886	0.003	0.003
WTG31-R-B-A	0.0000	0.0000	0.000	1.0541	1.0541	0.000	0.000
WTG44-A/B/C	0.0000	0.0000	0.000	0.0561	0.0561	0.000	0.000
WTG48B	0.0000	0.0000	0.000	0.0018	0.0000	0.002	0.002
WTG51-A	0.0000	0.0000	0.000	0.0160	0.0140	0.002	0.002
WTG57-A/B	0.0957	0.0957	0.000	0.1714	0.1692	0.002	0.002
WTG58-A	0.0000	0.0000	0.000	0.0005	0.0005	0.000	0.000
WTG67, SUB1058	0.3157	0.3158	0.000	0.7747	0.7747	0.000	0.000
WTG70R-A,IC1012	0.0000	0.0000	0.000	0.2178	0.2178	0.000	0.000
WTG87-A/C	0.0000	0.0000	0.000	0.0614	0.0614	0.000	0.000
WTG90-A	0.0000	0.0000	0.000	0.0356	0.0386	-0.003	-0.003
WTG91-A	0.0000	0.0000	0.000	0.2715	0.2713	0.000	0.000
WTG115-A	0.0000	0.0000	0.000	0.1037	0.1037	0.000	0.000
WTG116-A	0.0000	0.0000	0.000	0.0150	0.0150	0.000	0.000
WTG119-B/C	0.0652	0.0652	0.000	0.1805	0.1804	0.000	0.000
WTG120-A	0.0000	0.0000	0.000	0.0960	0.0960	0.000	0.000
WTG120-B	0.0086	0.0086	0.000	0.1294	0.1294	0.000	0.000
WTG134S-B	0.0000	0.0000	0.000	0.0878	0.0878	0.000	0.000
WTG137-A	0.0228	0.0198	-0.003	0.0301	0.0288	0.001	-0.002
WTG138-A	0.0143	0.0142	0.000	0.1805	0.1768	0.004	0.004
WTG140-A/D	0.0259	0.0259	0.000	0.1094	0.1094	0.000	0.000
WTG155-A/B	0.0052	0.0052	0.000	0.0083	0.0083	0.000	0.000
WTG175-A	N/J	N/J	N/J	N/J	N/J	N/J	N/J
WTG175-B	N/J	N/J	N/J	N/J	N/J	N/J	N/J
WTG202A-A	0.0000	0.0000	0.000	0.0047	0.0047	0.000	0.000
WTG208-R-A/B	0.0341	0.0341	0.000	0.9071	0.8961	0.011	0.011
WTG1051-A/B	0.0000	0.0000	0.000	0.7747	0.7747	0.000	0.000
Total:	**13.193**	**8.838**	**-4.355**	**64.630**	**69.236**	**-4.607**	**-8.961**

Table 7. Wetland Impact Analysis

Overhead Alternatives Analysis Marble River Wind Farm Clinton County, NY				
Wetland ID	**Existing Route**	**Alternate Route A (Lagree Work-around)**	**Alternate Route B (Clinton Mills Road)**	**Alternate Route C (La Francis Road)**
	--------------------------------*Acres*--------------------------------			
Field Delineated Wetlands				
AR18-A,OH1201-A	1.6847	1.6847		
AR19-A			0.0474	
AR20-A			0.5235	
AR23-B			0.0333	0.0333
AR25-A			0.4010	0.4010
AR54-A/B	0.4774	0.4774	0.4774	0.4774
AR55-A	0.3728	0.3728	0.3728	0.3728
AR56-A	0.3012	0.3012	0.3012	0.3012
AR57-A/B	0.5877	0.5877	0.5877	0.5877
AR58-A	0.5587	0.5587	0.5587	0.5587
AR58-B	0.3728	0.3728	0.3728	0.3728
AR59-A	0.3018	0.3018	0.3018	0.3018
AR60-A	0.0542	0.0542	0.0542	0.0542
AR61-A	0.0048	0.0048	0.0048	0.0048
AR62-A	0.4940	0.4940	0.4940	0.4940
AR62-B	0.1506	0.1506	0.1506	0.1506
AR63-A	0.0239	0.0239	0.0239	0.0239
AR64-A/B	0.0977	0.0977	0.0977	0.0977
AR65-A	0.0636	0.0636	0.0636	0.0636
AR65-B	0.0584	0.0584	0.0584	0.0584
AR200-A	0.0221	0.0221	0.0221	0.0221
AR201-A	0.2496	0.2496	0.2496	0.2496
AR202-A	0.2213	0.2213	0.2213	0.2213
AR203-A/B	0.6915	0.6915	0.6915	0.6915
AR204-A	0.0235	0.0235	0.0235	0.0235
AR205-A	0.0565	0.0565	0.0565	0.0565
AR205-B	0.1630	0.1630	0.1630	0.1630
AR206-A	0.0445	0.0445	0.0445	0.0445
AR206-B	0.0526	0.0526	0.0526	0.0526
AR207-A	0.0004	0.0004	0.0004	0.0004
AR208-A	0.1419	0.1419	0.1419	0.1419
AR208-B	0.0333	0.0333	0.0333	0.0333
AR502-A			0.7884	0.7890
AR505-A/B			0.3719	0.3721
AR506, OH1206	2.3709	2.3709		
AR507-A	0.3005	0.3005		
AR509-A/B	1.0588	1.0588		
AR802-A	0.0985	0.0985		
AR803-A/B/C	0.4755	0.4755	1.9561	1.9552

Overhead Alternatives Analysis Marble River Wind Farm Clinton County, NY				
Wetland ID	Existing Route	Alternate Route A (Lagree Work-around)	Alternate Route B (Clinton Mills Road)	Alternate Route C (La Francis Road)
	-------------------------------*Acres*-------------------------------			
AR825-A/B	0.9711	0.9711		
AR926-A/B	7.3969	7.3969		
AR1009-A	0.2153	0.2153		
AR1105-A			0.0064	0.0064
AR1105-B			0.7157	0.7157
AR1106-A			0.0853	0.0853
AR1305-A			0.4797	0.4796
IC360-A			1.0924	1.0932
IC362-A			0.0392	0.0393
IC363-A			0.0482	0.0482
IC1005-A	0.0001	0.0001		
IC1006-A	0.1203	0.1203		
IC1010-A	0.0008	0.0008		
IC1038-A			3.8013	
IC1038-B			0.2515	
IC364-A			0.7219	
IC827-A/B/C	0.2657	0.2657		
IC978-B			0.4204	
MIT1560-A	0.0272	0.0272	0.0272	0.0272
OH1110-A,IC1123	0.0654			2.0036
OH1110-B	0.0129			
OH1111-A/B	0.7409			
OH1113-A/B	0.1114			
OH1114-A	0.0146			
OH1115-A	0.0770			
OH1116-A	0.2343			
OH1117-A	0.0531			
OH1117-B	0.1502			
OH1118-A/B	0.5092			
OH1119-A	0.2479			
OH1120-A/B/C/D	7.9502			
OH1200-A	0.6133	0.6133	0.5874	
OH1204-A	0.0218	0.0218		
OH1326-A	0.0041	0.0041		
OH1327-A	0.0086	0.0086		
OH1328-A/B/C	0.2556	0.2556		
OH1329-A/B/C/D	0.2451	0.1101		
OH1330-A/B	0.2654	0.2654		
OH1350-A/B	0.4040	0.4040		
OH1352-A	0.0375	0.0375		
OH1353-A	0.6848	0.6848		
OH1354-A	0.0269	0.0269		
OH1501-A		0.0165		

Overhead Alternatives Analysis Marble River Wind Farm Clinton County, NY				
Wetland ID	**Existing Route**	**Alternate Route A (Lagree Work-around)**	**Alternate Route B (Clinton Mills Road)**	**Alternate Route C (La Francis Road)**
	--------------------------------*Acres*--------------------------------			
OH1502-B		0.0561		
OH1504A		0.2175		
OH1505-A/B		0.6809		
OH1506-A		0.0150		0.0680
OH1509-A				0.0053
OH1510-A		0.0278		0.4458
OH1512-A		0.0322		
OH1512-B		0.0740		
OH1513-A/B		0.3339		
OH1514-A/B/C		0.2817		
OH1515-A		0.0281		
OH1516-A		0.0075		
OH1520-A/B		1.1039		0.1062
OH1522/26/27/31		5.0343		
OH1525-A		0.1455		
OH1529-A/B		0.6808		
OH1530/34/40/41		2.3935		
OH1357-A	0.0228	0.0228		
SA821-A	0.4670	0.4670		
Desktop Delineated Wetlands				
DD2000-A			5.8040	5.8050
DD2001-A			0.3276	0.3277
DD2002-A			0.1019	0.1019
DD2003-A			0.9843	0.9843
DD2004-A			3.3019	0.8650
DD2005-A				0.3196
DD2006-A				0.3704
DD2007-A				0.1351
DD2008-A				3.8141
DD2009-A				3.1852
DD2010-A				0.1035
DD2011-A				0.1139
DD2012-A				0.2792
DD2013-A				0.2740
DD2014-A				0.1016
DD2015-A				0.5590
DD2016-A				0.3325
DD2017-A				0.3704
DD2018-A				1.4191
DD2019-A			0.2108	0.2108
DD2020-A			0.1622	0.1622
DD2021-A			0.3054	0.3054

Overhead Alternatives Analysis Marble River Wind Farm Clinton County, NY				
Wetland ID	**Existing Route**	**Alternate Route A (Lagree Work-around)**	**Alternate Route B (Clinton Mills Road)**	**Alternate Route C (La Francis Road)**
	--------------------------------*Acres*--------------------------------			
DD2022-A			2.7233	
DD2023-A			7.5900	
DD2024-A			0.7460	
DD2025-A			0.1268	
DD2026-A			1.6241	
DD2027-A			1.0441	
DD2028-A			0.7692	
DD2029-A			0.1382	
DD2030-A			0.2606	
DD2031-A			1.5190	
DD2032-A			0.4150	
DD2033-A				0.0422
DD2034-A				0.7912
DD2035-A				1.2620
DD2036-A				0.0206
DD2037-A				0.0252
DD2038-A				0.0984
Total:	33.8299	34.6571	46.1722	36.6738

Table 8. Existing and Alternative Overhead Electric Collection Line Routes

Proposed Route	Affected Wetlands (acres)	Land Parcels Required	Signed Land Parcels	Non-Participating Land Parcels	Line Length (Miles)
Existing Route	33.83	19	19	0	9.87
ALT A	34.66	25	22	3	10.32
ALT B	46.17	39	17	22	11.22
ALT C	36.67	37	12	25	14.15

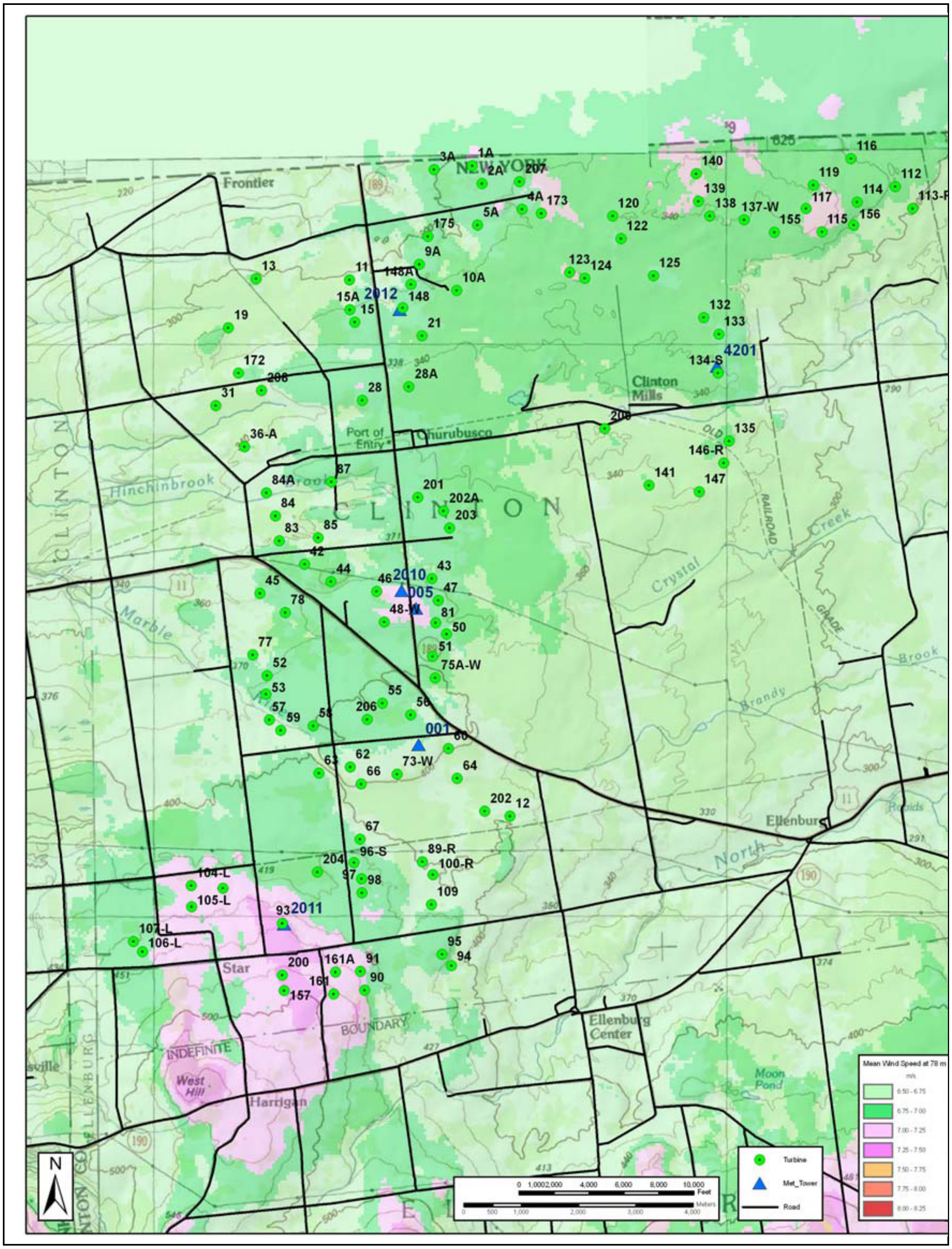


Figure 4. Wind Resources Map
Marble River Wind Power Project
Final Environmental Impact Statement
Clinton and Ellenburg, New York

Simulation - Proposed Marble River Wind Farm and Noble Wind Parks

Simulation - Noble Wind Parks

Figure 5: Viewpoint 196

View from Lyon Mountain Fire Tower, looking north

Marble River Wind Farm

Towns of Clinton and Ellenburg
Clinton County, New York

Prepared By:

EDR

Marble River Wind Farm

January 2008