7.0 ALTERNATIVES ANALYSIS

The following alternatives to the proposed action are described and evaluated in this section: no action, alternative project location, alternative energy production technologies, alternative turbine technology, alternative project design/layout, and alternative project size/magnitude. These alternatives offer a potential range and scope of development that could reasonably be undertaken by the Applicant for comparative analysis and consideration. The "no action" alternative, which is required for consideration under SEQRA, represents the environmental conditions that would exist if current land use and activities were to continue as is. In addition, several potential alternate routes for the electric transmission interconnection also are evaluated in this section.

7.1 No Action Alternative

SEQRA requires consideration of the "no action" alternative. In the case of the Project, the "no action" alternative assumes that the Project area would continue as active agricultural land, forest, and rural residential property. The "no action" alternative would have no impact on current land use or zoning. It would maintain environmental, socioeconomic and energy-generating conditions as they currently exist.

If the "no action" alternative were selected, no wind energy generating facility and ancillary Project facilities would be built in the Project area. As a result, none of the minor environmental impacts associated with Project construction and operation would occur.

Conversely, if the "no action" alternative were selected, no socioeconomic benefits would accrue to the area. The local economy and community would not benefit from income from construction jobs, lease payments to the landowners, annual tax revenues or PILOT payments.

Also, if the "no action" alternative were selected, lands that would be protected by Project construction and operation might be lost to development projects that more negatively impact the local community and environment by destruction of land by housing and industry development. These types of development would be much more destructive of native grasslands and local agricultural production and would more severely impact natural resources such as available clean water and air, thereby, possibly impacting the popular tourist industry found in the area.

In addition, if the "no action" alternative were selected, the benefits of adding 79.5 MW of clean, renewable energy to New York State's energy mix would be lost. There would be no offset of the State's reliance on fossil-fuel-fired generators, which contribute to acid rain, smog, greenhouse gases, and other environmental problems.

If the "no action" alternative were selected, other Project benefits would also be lost, such as lost potential tourism to the Towns of Cape Vincent and Lyme. Consequently, given the short-term and relatively minor nature of anticipated impacts of the Project, and the significant economic benefits that the Project would generate, the "no action" alternative is not a preferred alternative.

7.2 Alternative Project Location

Under 6 NYCRR § 617.9(b)(5)(v)(g), site alternatives addressed in an Environmental Impact Statement (EIS) may be limited to parcels owned by, or under option to, a private project sponsor. SLW does not own, or have under option, parcels other than the ones that constitute the Project Site and the route for the transmission interconnection. Therefore, there is no requirement to evaluate any alternative Project locations other than the Project Site. Nonetheless, this section provides background information on SLW's selection of the Project Site to facilitate understanding of the criteria that SLW employed.

Alternative site location analysis occurs very early in the planning process for wind power projects. Because sites suitable for wind energy development in New York are limited, there is a great deal of competition among companies for potential development sites. In order to secure the right to develop in an area, a developer must obtain adequate land control and expend considerable funds in transmission, meteorological, and environmental studies. This requires a significant expenditure of limited financial and human resources. Therefore, a careful screening process is employed.

The selection of wind farm locations is affected by several factors which allow a project to operate in a technically and economically viable manner. These factors include the following primary criteria:

- Adequate wind speeds to support a viable project;
- Proximity to a transmission line that can transport energy generated by a project;
- Ability to build a project in compliance with applicable local, state, and federal laws and regulations; and
- Ability to build a project without significant adverse environmental and socioeconomic impacts.

SLW's evaluation demonstrated that the proposed Project Site satisfies all of these criteria:

- **Adequate wind speeds to support an economic project:** SLW evaluated the wind resource in the Project Area using computer models that combined wind resource data from meteorological towers in the Project Area, long-term weather data, topography, and

environmental factors. This evaluation demonstrated that the wind resource in the Project Area is suitable to support an economically viable project. Wind turbines create turbulence, or wake, immediately downstream of the rotor. Wake can interfere with the operation of neighboring wind turbines, creating extra wear and tear, and decreasing their efficiency for producing electricity. Using computer models, SLW ensured that turbines were spaced correctly so as to avoid wake losses and turbulence and optimize energy creation.

- **Proximity to a transmission line that can transport energy generated by a project:** The Project would be interconnected with the 115 kV transmission line owned by National Grid in the Town of Lyme. The System Reliability Impact Study of the Project approved by the NYISO demonstrated that the transmission line and downstream interconnected transmission system are adequate to accept and reliably transport the energy generated by the Project.
- **Ability to build a project in compliance with applicable local, state, and federal laws and regulations:** As demonstrated in this SDEIS and in SLW's application to the Planning Board for site plan review, the Project will meet all of the following setbacks required by the Planning Board of Cape Vincent:
    - 1,500 feet from the Village of Cape Vincent boundary line;
    - 1,000 feet to a non-participating property line;
    - 1,250 feet to a non-participating residence; and
    - 750 feet to a participating residence.

The turbine buffers minimize the visual and sound effects of the turbines on local residences. The turbine locations were also selected to maintain a minimum buffer from existing road rights-of-way. The minimum buffer, as measured from the centerline of the tower foundation, is at least 615 feet from all roads.

- **Ability to build a project without significant adverse environmental and socioeconomic impacts:** As demonstrated in this SDEIS, the Project will not have significant adverse environmental or socioeconomic impacts, and, in fact, will have positive socioeconomic impacts.

Few other areas in the State of New York have as strong and reliable wind as the mouth of the St. Lawrence River. This, in combination with the sparse population, and dominant agricultural and managed land use, make the Project Area in Towns of Cape Vincent and Lyme suitable for development of a large-scale wind power project.

Various Project layout alternatives were considered and rejected during the Project siting process (see Section 7.4, below). The proposed Project layout (see Figure 2-1) is the result of an iterative meteorological, environmental, social, and engineering analysis of the best locations for Project facilities in the Towns of Cape Vincent and Lyme. The current Project layout is sited so as to maximize the productivity of the proposed wind energy project by using the most energetic (windy) sites along with the land where wind turbines would have the least environmental or residential impact. Areas to the north and west are within prohibited municipal districts and a significantly greater extent of wetlands near the coast of Lake Ontario (west) and the St. Lawrence River (north), as well as greater population densities (Village of Cape Vincent) to the north. Thus, relocating the Project elsewhere within the Towns of Cape Vincent and Lyme would reduce its economic viability, and potentially increase its environmental and socioeconomic impacts.

7.3 Assessment of Alternate Electric Generation Technologies

The purpose of the proposed action is to create a commercial-scale wind-powered electrical-generating facility which will provide a significant source of renewable energy to the New York power grid. An important component of that purpose is to be compliant with the Public Service Commission (PSC) "Order Approving Renewable Portfolio Standard Policy", issued on the 24th of September 2004. This Order calls for NYSERDA to purchase renewable energy attributes from qualifying facilities to spur an increase in renewable energy used in the state to 25 percent by the year 2013. SLW proposes to construct a facility that generates 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 percent of the renewable energy attributes it produces. Other electric generating technologies are not reasonable alternatives to the Project because they would not fulfill the Project's purpose of generating electric power through the use of wind energy.

The types of wind turbine generators considered for this Project were all MW-class, three-bladed, upwind designs with proven track records. These types of wind turbines have been the most reliable and commercially viable types for use in utility scale wind energy projects. Turbine sizes ranged from 1.5 MW with 77 meter rotor diameters to 3.0 MW and 100 meter rotor diameters. SLW rejected the turbines below 1.5 MW or above 3 MW due to limited availability in the marketplace, or unfavorable pricing/economics in the current timeframe. SLW also rejected turbine technologies other than three-bladed upwind designs because they either are largely unproven in commercial projects of similar output to the proposed Project (e.g., vertical axis turbines), or have poor track records in commercial use (e.g., downwind turbines). SLW chose the 1.5 MW Acciona AW-82/1500 turbines manufactured by Acciona Windpower, S.A.

Each turbine will consist of a 262-foot (80-meter) conical, tubular steel tower; a 269-foot (82-meter) rotor consisting of three composite blades; and a nacelle, which houses the generator, gearbox, and power train as shown in Exhibit 2.5.1. The towers are slightly tapered, with diameter of approximately 20 feet at ground level. This turbine combines reduced sound impacts, while enabling full available potential transmission capacity given all the constraints

The final choice of turbine was influenced by two additional factors:

- **Cost of Energy** – Various model turbines perform differently in different conditions. A project location's meteorological characteristics, such as wind speed, density, distribution and shear, is a critical factor in the selection of one type of turbine over another. The 82-meter rotor, 1.5 MW turbine selected by SLW is well-adapted for the meteorological characteristics of the Project Site because it maximizes capture of the wind on the St. Lawrence site and therefore maximize energy production and efficiency. This turbine selection also optimizes the site's production potential considering all other factors including setbacks and environmental constraints while minimizing the number of turbines required to achieve an economically viable level of production. The AW82 is also well suited to the site given its low voltage ride through capabilities. This characteristic enhances grid reliability compared to turbines that do not have this feature.
- **Turbine Availability** – Because of the recent public support for generating homegrown, clean, renewable energy, there has been a shortage of all MW class, three-bladed, upwind turbines, which has created uncertainties and/or long delays in the availability of particular turbine models. The selected Acciona turbine is commercially available within the time frame necessary to support the Project schedule.

7.4 Alternative Turbine Technology

The capacity to generate MWs is largely a function of rotor blade length, and productivity is directly related to the size of the rotor swept area. Longer bladed turbines are relatively more productive. Multi-megawatt class turbines also result in lower energy prices than sub-megawatt-class turbines. As previously indicated, the 1.5 MW turbine was selected by SLW because it is well-adapted for the meteorological characteristics of the Project Site and generates enough energy to allow for an economically viable project.

In terms of other Project components, the Project is using tubular steel, guyed-wire towers instead of lattice meteorological towers. These preferred structures are believed to reduce potential avian and bat collision impacts and have fewer visual and agricultural land impacts.

7.5 Alternative Project Design/Layout

SLW has analyzed several different project configurations since submittal of the DEIS. Each version incorporated major or minor adjustments based on the criteria outlined below. While many criteria are evaluated in designing a project layout, the primary siting criteria considered included:

- Availability of adequate wind resource;
- Setbacks requirements for homes, structures, roads, property lines;
- Spacing between turbines to minimize turbulence effects and maximize power production;
- Compliance with agricultural protection measures;
- Avoidance of unstable land forms and other engineering constraints;
- Avoidance of environmental and cultural resources;
- Sensitivity to viewshed and noise issues; and
- Landowner preferences.

Initial Project layout iterations were based on desktop analyses evaluating constraint information and wind resource data. These configurations contained significantly more turbines than the current layout and were refined after incorporating data from initial environmental field surveys and engineering constraints. Subsequent iterations of the layout addressed the results of wetland and stream delineations, meteorological modeling, setback requirements provided by the Cape Vincent Planning Board, additional data provided by environmental field surveys, and landowner acceptability. Subsequent iterations of the layout minimized environmental impacts or adjusted for engineering constraints, while striving to achieve energy efficiency and economic viability. The final revised Project layout represents the least environmental impacts of all the alternatives evaluated. Optimal turbine configuration for energy production has been modified by landowner agreements/considerations, public involvement, and recognition of the need to protect sensitive resources such as forest habitat, wetlands, and agricultural land. Movement of turbines in one location could result in increased impact in another location and/or reduced power generation. In the case of visual impact, removal or relocation of one to several individual turbines from a 53-turbine layout is unlikely to result in a significant change in project visibility and visual impact from most locations. As a result, alternative project designs were likely to pose equal or greater risk of adverse environmental, engineering, or community acceptability impacts and thus were rejected.

7.6 Alternative Project Scale and Magnitude

St. Lawrence Windpower, LLC has invested significant time and resources in determining the optimal project configuration. The current Project design consisting of 53 Acciona Windpower 1.5MW wind turbines minimizes potential environmental effects while maintaining an economically viable project. Initially, SLW proposed a larger project (96 turbines) and associated project components as described in the DEIS. As discussed throughout previous sections of this SDEIS, SLW has reduced the Project's scale (53 turbines) to more effectively mitigate impacts on sensitive environmental, agricultural, and cultural resources, while achieving a reasonable balance with the desired energy production goals that ensure economic viability.

The same factors that make the Project Site desirable were considered in siting individual turbines. Individual turbines were sited in a manner that sought to minimize or avoid adverse environmental impacts while maximizing the utilization of wind resources and, as a result, the commercial viability of the proposed Project. The proposed wind turbines and associated facilities on the site have been located so as to minimize loss of active agricultural land and/or interference with agricultural operations. Turbines have also been sited to minimize impacts to forests, wetlands, adjacent landowners and local municipal districts (e.g., Riverfront, Lake).

The proposed Project layout has been designed to maximize use of the area's high wind energy, while minimizing wake effects on downwind turbines and adverse environmental impacts. Location of turbines and associated facilities reflects input and recommendations provided by project ecological, visual, and noise consultants, as well as agency personnel who have visited the site (e.g., Cape Vincent Planning Board, New York State Department of Agriculture & Markets, NYSDEC, and USACE). The proposed layout represents the culmination of an iterative process that considers numerous constraints and results in a balance of energy production and environmental protection.

The proposed 53-turbine alternative described in this SDEIS and the 96-turbine alternative described in the DEIS are summarized in Table 7-1. Overall, the construction, both temporary and permanent, and operational footprints for the 53-turbine alternative are smaller and would result in fewer environmental impacts. The 53-turbine alternative results in a 45 percent turbine density reduction and decreased impacts to wetlands, surface waters, water quality, grasslands, wildlife habitat, and viewshed. Further reductions in the Project's electrical generation output would undermine the economic viability of the Project.

Table 7-1

Summary of Impacts

Resource	53-Turbine Alternative	96-Turbine Alternative	No Action
Geology, Topography, and Soils	• The Project area encompasses 7,849 acres. • Construction of 53 turbine, 14.4 miles of gravel access roads, 37.1 miles of underground interconnect cables, 8.9 mile overhead transmission line, two electrical substations, and an operations and maintenance building may result in minor impacts to existing drainage patterns	• The Project area encompasses 9,000 acres. • Construction of 96 turbine, 29 miles of gravel access roads, 44 miles of underground interconnect cables, 9 mile overhead transmission line, two electrical substations, and an operations and maintenance building may result in minor impacts to existing drainage patterns	No impacts expected.
Water/Wetland Resources	• Possible temporary impacts (erosion/sedimentation) during construction could result from clearing and grading near streams and wetlands. • Two (2) surface water bodies and 42 wetland, will be crossed by Project interconnect and transmission line. • Construction and operation of the Project will result in: o temporary disturbance of 1.67 acres of wetlands o permanent fill of 0.33 acres of wetlands o conversion of 0.34 acres of forested wetlands to non-forested wetland cover • Minimal to no impact to groundwater quality.	• Possible temporary impacts (erosion/sedimentation) during construction could result from clearing and grading near streams and wetlands. • Fifty-one (51) surface water bodies and nine (9) wetlands will be crossed by Project interconnect and transmission line. • Construction and operation of the Project will result in: o temporary disturbance of 14.8 acres of wetlands o no permanent fill of wetlands o conversion of 9.2 acres of forested wetlands to non-forested wetland cover • Minimal to no impact to groundwater quality.	No impacts expected.
Biological Resources	• Construction may result in the development of 41 acres of agricultural land and 0.6 acres of forested land. • Seventeen (17) acres of forested land in the 100-ft transmission line right-of-way will be converted to herbaceous and open shrub cover. • Minor temporary impacts to wildlife associated with construction of the Project would be limited to clearing of forested habitat to widen the buffer corridor along the overhead transmission line right-of-way and within small portions of the lay-down area for 6 of the 53 turbines. • There may be minor temporary impacts to bird nesting areas during construction by clearing and construction work in open nesting and foraging habitat. • Approximately 17 acres (<1 acre will be permanently cleared) of second growth deciduous forest would be cleared for Project components, which will result in temporary and permanent minor habitat loss for some forest-nesting avian species.	• Construction may result in the development of 98 acres of agricultural land and 14 acres of forested land. • Sixty-eight (68) acres of forested land in the 120-ft transmission line right-of-way will be converted to herbaceous and open shrub cover. • Minor temporary impacts to wildlife associated with construction of the Project would be limited to clearing of forested habitat to widen the buffer corridor along the overhead transmission line right-of-way and within small portions of the lay-down area for 16 of the 96 turbines. • There may be minor temporary impacts to bird nesting areas during construction by clearing and construction work in open nesting and foraging habitat. • Approximately 82 acres (14 acres will be permanently cleared) of second growth deciduous forest would be cleared for Project components, which will result in temporary and permanent minor habitat loss for some forest-nesting avian species.	No impacts expected.

Table 7-1

Summary of Impacts

Resource	53-Turbine Alternative	96-Turbine Alternative	No Action
Biological Resources (continued)	• Displacement of mobile wildlife to adjacent undisturbed areas. • Avian mortality is likely to be in the range of 122 to 509 birds/ year. • Raptor mortality is likely to be in the range of 1 and 15 raptors/year. • Bat mortality is likely to be in the range of 180 to 2,454 bats/ year. • Individual Indiana and small-footed myotis bats or colonies have been documented within approximately 15 miles of the proposed Project.	• Displacement of mobile wildlife to adjacent undisturbed areas. • Avian mortality is likely to be in the range of 221 to 922 birds/ year. • Raptor mortality is likely to be in the range of 7 to 28 raptors/year. • Bat mortality is likely to be in the range of 326 to 4,445 bats/ year. • Individual Indiana and small-footed myotis bats or colonies have been documented within approximately 15 miles of the proposed Project.	
Transportation	• Traffic delays and road closures due to transportation improvements or construction traffic. Construction is anticipated to be completed in 9 months. • Potential impacts to traffic and the transportation system limited to activities that would occur during construction only. • Transportation infrastructure improvements required to accommodate construction needs. • Temporary relocation of overhead lines and other facilities may be required to accommodate oversize vehicles used during the construction of the Project. • Traffic may increase over local roads during construction. • Fugitive dust from Project construction activities is possible.	• Traffic delays and road closures due to transportation improvements or construction traffic. Construction is anticipated to be completed in 15 to 18 months. • Potential impacts to traffic and the transportation system limited to activities that would occur during only. • Transportation infrastructure improvements required to accommodate construction needs. • Temporary relocation of overhead lines and other facilities may be required to accommodate oversize vehicles used during the construction of the Project. • Traffic may increase over local roads during construction. • Fugitive dust from Project construction activities is possible.	No impacts are expected.
Land use and zoning	• Sixty (60) working farms and 60 percent of the area is designated as prime farmland or farmland of statewide importance. • Temporary disturbance of 425 acres of agricultural land and permanent conversion of 41 acres of agricultural land; however, set back constraints preserve surrounding land use for the life of the Project.	• One hundred two (102) working farms and 75 percent of the area is designated as prime farmland or farmland of statewide importance. • Temporary disturbance of 191 acres of agricultural land and permanent conversion of 98 acres of agricultural land; however, set back constraints preserve surrounding land use for the life of the Project.	Land in Project area would be subject to other types of development.
Cultural and Visual Resources	• Construction and operation of the Project will not affect NRHP archaeological resources. • Turbine tip height of 390.5 feet. • Visual effects that may result in a change to the local rural setting and/or character. • One or more proposed turbines will be visible from	• Construction and operation of the Project could affect NRHP archaeological resources. • Turbine tip height of 425 feet. • Visual effects that may result in a change to the local rural setting and/or character. • One or more proposed turbines will be visible from	No impacts expected.

Table 7-1

Summary of Impacts

Resource	53-Turbine Alternative	96-Turbine Alternative	No Action
Cultural and Visual Resources (continued)	approximately 68 percent of the five-mile radius study area. • Fifty-six (56) visually sensitive resources have a potential view of the proposed Project. • One hundred eighty-six (186) residences located within 10 rotor diameters could experience some degree of shadow flicker. • None of the 186 studied shadow receptors would be affected more than 30 hours per year. • Required aviation warning lights (USDOT – FAA) on the turbines could present a potential adverse visual impact from some viewing locations. • In some open elevated areas within the landscape, it is possible that large portions of the Project would be visible.	approximately 67 percent of the five-mile radius study area. • Sixty-seven (67) visually sensitive resources have a potential view of the proposed Project. • One hundred ninety-seven (197) residences located within 10 rotor diameters could experience some degree of shadow flicker. • Thirty-five (35) of the 197 studied shadow receptors would be affected more than 30 hours per year. • Required aviation warning lights (USDOT – FAA) on the turbines could present a potential adverse visual impact from some viewing locations. • In some open elevated areas within the landscape, it is possible that large portions of the Project would be visible.	
Air Quality	• Temporary minor adverse impacts to air quality may result from the operation of construction equipment and vehicles. • It is estimated that annual reductions of air pollutants would be 87 tons of nitrogen oxides and 313 tons of sulfur dioxides. • The proposed project will offset approximately 73,085 tons of carbon dioxide annually.	• Temporary minor adverse impacts to air quality may result from the operation of construction equipment and vehicles. • It is estimated that annual reductions of air pollutants would be 669 tons of nitrogen oxides and 236 tons of sulfur dioxides. • The proposed project will offset approximately 158, 576 tons of carbon dioxide annually.	No impacts expected; however, no benefits would be realized.
Noise	• The proposed Project would generate noise during and after construction • Construction noise would include noise generated during the transport of project materials and equipment, and the installation of project components. • Construction activities at turbine sites will result in sound levels substantially below 80 dBA at any homes due to the setback distance of at least 1,000 feet. • During operation, three (3) residences would have a nominal Project sound level slightly above the potential impact threshold of 6dBh over the estimated ambient 42 dBA	• The proposed Project would generate noise during and after construction • Construction noise would include noise generated during the transport of project materials and equipment, and the installation of project components. • During operation, approximately 48 residences would have a nominal Project sound level slightly above the potential impact threshold of 6dBh over the estimated ambient 42 dBA	No impacts expected.
Telecommunications	• There are no impacts to television signal coverage during Project construction and operation. • It is unlikely that the Project would impact government communications.	• There are no impacts to television signal coverage during Project construction and operation. • It is unlikely that the Project would impact government communications.	No impacts expected.

Table 7-1

Summary of Impacts

Resource	53-Turbine Alternative	96-Turbine Alternative	No Action
Safety and Security	• There is a remote possibility that ice shed from turbines could cause personal or property injury. • There is a remote possibility that tower collapse or turbine failure could cause personal or property injury. • Potential to create stray voltage if the electrical system is both poorly grounded and located near underground or poorly grounded metal objects. • Due to height and materials used to construct, the wind turbines are susceptible to lightning strikes. The Project, by the nature of the physical dimensions, may present response difficulties to local emergency responders should a fire occur within a structure. • Storage and use of diesel fuels, lubricating oils, and hydraulic fluids within the Project boundary may create the potential for fire or medical emergencies.	• There is a remote possibility that ice shed from turbines could cause personal or property injury. • There is a remote possibility that tower collapse or turbine failure could cause personal or property injury. • Potential to create stray voltage if the electrical system is both poorly grounded and located near underground or poorly grounded metal objects. • Due to height and materials used to construct, the wind turbines are susceptible to lightning strikes. The Project, by the nature of the physical dimensions, may present response difficulties to local emergency responders should a fire occur within a structure. • Storage and use of diesel fuels, lubricating oils, and hydraulic fluids within the Project boundary may create the potential for fire or medical emergencies.	No impacts expected.

7.7 Alternative Transmission Line Routing

The following routing alternatives for the 115 kV transmission line have been evaluated:

- Placement within the abandoned railroad ROW
- Placement adjacent to the abandoned railroad ROW
- Underground placement of the 115 kV line in sensitive resources

All alternatives originate at a collector substation located on Swamp Road and would connect to an existing substation in the Town of Lyme, owned and operated by National Grid. The point of interconnect would be located on the east side of County Road 179. All alternatives would also require crossing the Chaumont River.

Most transmission lines have three conductors. Aboveground conductors are un-insulated bundles of wire suspended on poles or towers. Separation between lines ranges between four to 24 feet depending on line voltage. Open air circulating between and around the conductors cools the wires and dissipates the heat that is generated by the current passing through the conductors. The air also prevents power from flashing over to ground eliminating the need for insulation.

Underground transmission lines are generally placed in pipes, ducts, or conduits buried in the earth, and typically are placed four to five feet underground. In place of natural air circulation and spacing, other methods are used to insulate the conductors from their surroundings and each other, and to dissipate heat. There are several types of underground transmission lines. They are classified by the need for piping and the type of insulation. The main types are:

- High-pressure, fluid-filled pipe (HPFF)
- High-pressure, gas-filled pipe (HPGF)
- Self-contained fluid-filled (SCFF)
- Cross-linked polyethylene (XLPE)

High pressure fluid-filled (HPFF) types are the most common in the United States. Self-contained fluid filled (SCFF) types are the least common and least likely to be used in northern New York due to climate.

There are different advantages and disadvantages for underground transmission lines. When compared with overhead transmission lines, underground lines produce fewer post-construction impacts. However, in general, as compared to overhead lines, underground lines have greater construction impacts, cost significantly more, and have operational limitations.

7.7.1 Alternative 1 – Above Ground Placement within the abandoned railroad ROW

This alternative consists of an approximately 9-mile, 100-foot wide construction ROW and a 17-foot wide permanently maintained ROW. The transmission line will be constructed in an existing abandoned railroad ROW for approximately 7.5 miles, 85 percent of its entire length. At the hamlet of Chaumont, the route turns to the northeast, approximately 750 feet north Old Town Spring Road for approximately 0.5-mile before turning southeast and crossing the Chaumont River. The entire length of this alternative is above ground. Exhibit 7.7.1 shows the route for Alternative 1.

The construction right-of-way will be cleared and grubbed. The construction right-of-way will serve as access for construction vehicles. Additional access to the work area will include use of existing farm roads and drives. Single trees or small clusters of trees within the proposed ROW will be avoided and will not require removal. Tree clearing adjacent to the transmission line will be limited to "danger trees" associated with the electric transmission line conductors. "Danger trees" adjacent to the transmission line that pose a threat to the reliability of the overhead line include trees that could fall or strike the conductors and take the transmission line out of service. These trees will be selectively cut by hand (i.e., non-mechanized clearing) to avoid heavy equipment access and adverse impacts to adjacent wetlands.

An existing Development Authority of the North Country (DANC) water line (the Western Jefferson County Regional Water Line) is located within the existing abandoned railroad ROW. The above ground siting of the transmission line will use setbacks from the water line to avoid disruption. The Applicant will work with DANC to identify exact locations of the water line, weight restrictions for working on and around the water line and appropriate setbacks. The setbacks will be based on several factors including industry standards and DANC requirements. Siting will also consider OHSA requirements for working setbacks around transmission lines in the event DANC needs to work on the water line during the operation of the wind farm.

7.7.2 Alternative 2 – Above Ground Placement adjacent to the abandoned railroad ROW

This alternative consists of an approximately 9-mile, 100-foot wide construction ROW constructed approximately 200 feet from the existing abandoned railroad ROW. Approximately two-thirds of the ROW would be north of the abandoned railroad ROW and one-third would be south of the abandoned railroad ROW. The route would cross the abandoned railroad ROW at Merchant Road (a.k.a. Gibbons Road). At the hamlet of Chaumont, the route turns to the northeast, approximately 750 feet north Old Town Spring Road for approximately 0.5-mile

before turning southeast and crossing the Chaumont River. The permanently maintained ROW will be 17 feet wide. The entire length of this alternative is above ground. Exhibit 7.7.2 shows the route for Alternative 2.

Exhibit 7.7.1 - Alternative 1 – Above Ground Placement Within the Abandoned Railroad ROW

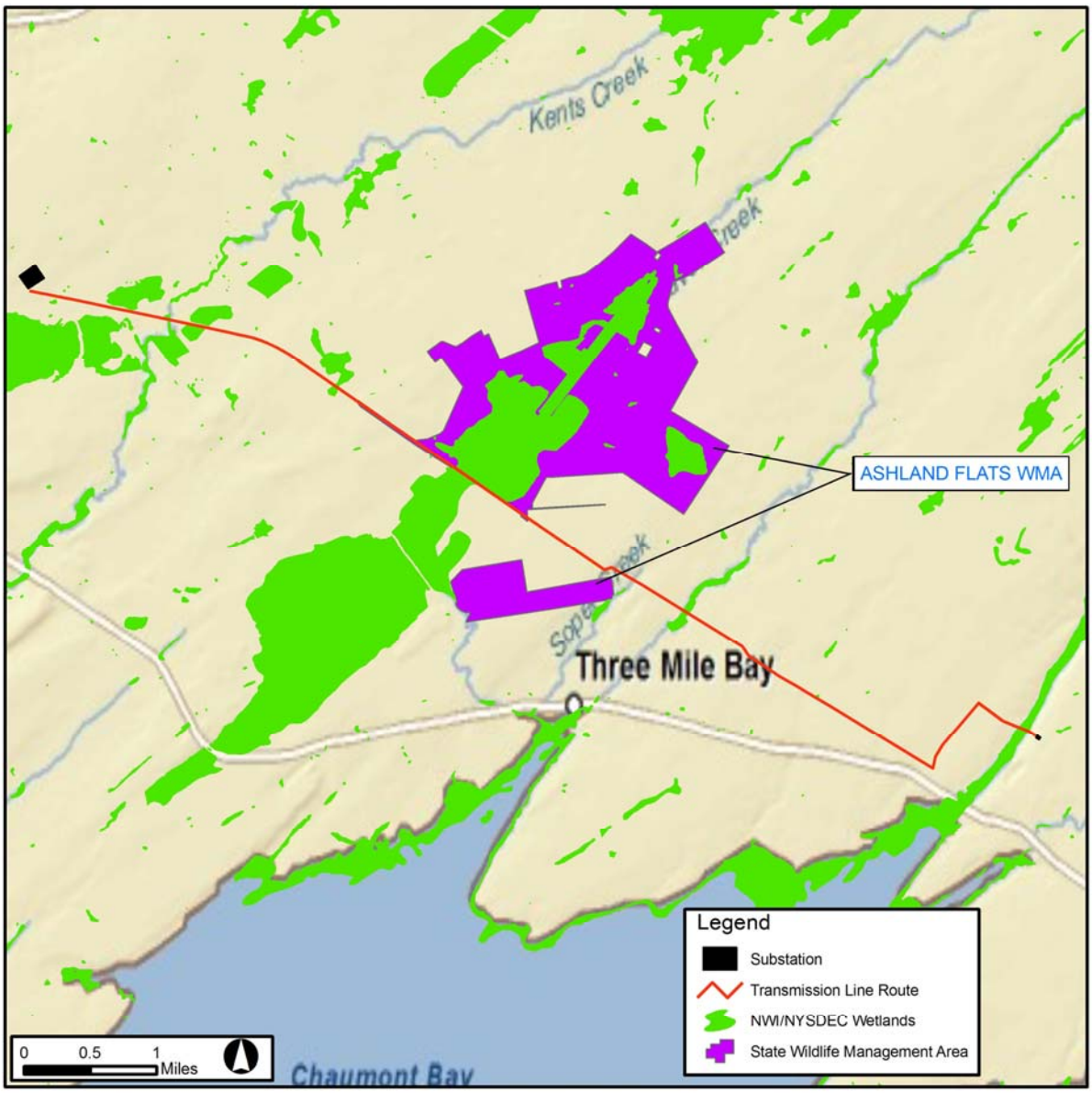
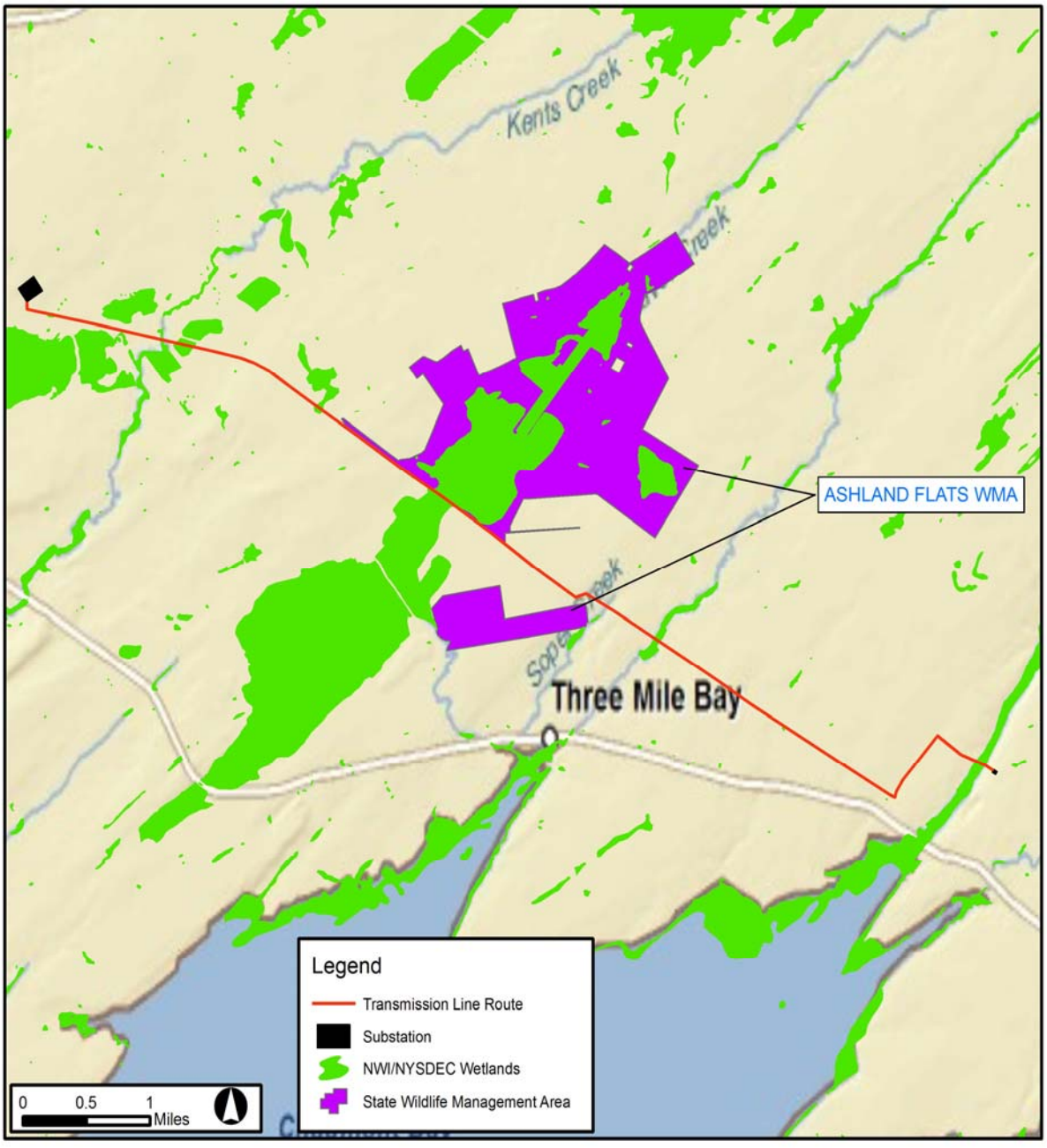


Exhibit 7.7.2 - Alternative 2 – Above Ground Placement Adjacent to the Abandoned Railroad ROW



7.7.3 Alternative 3 – Underground placement of the 115 kV line in sensitive resources

This alternative consists of an approximately 9-mile, 100-foot wide ROW constructed approximately 200 feet from the existing abandoned railroad ROW. Approximately two-thirds of the ROW would be north of the abandoned railroad ROW and one-third would be south of the abandoned railroad ROW. The route would cross the abandoned railroad ROW at Merchant Road (a.k.a. Gibbons Road). At the hamlet of Chaumont, the route turns to the northeast, approximately 750 feet north Old Town Spring Road for approximately 0.5-mile before turning southeast and crossing the Chaumont River. The permanently maintained ROW will be 17 feet wide. Unlike the adjacent alternative (Alternative 2), approximately 2.3 miles of this alternative would be placed underground to avoid sensitive resources (i.e., surface water bodies and wetlands, and Ashland Wildlife Management Area). Exhibit 7.7.3 shows the route for Alternative 3.

7.7.4 Comparison of Alternatives

Alternative 1 (above ground placement within the abandoned railroad ROW) is the environmentally preferred alternative. As discussed in Table 7-2, impacts to Geology, Topography, and Soils; Transportation; Land Use and Zoning; Air Quality; Noise; Telecommunications; and Safety and Security will be similar for the three alternatives considered. However, Alternative 1 avoids or minimizes adverse environmental impacts, to the maximum extent practicable, to Biological Resources and Archeological Resources. The least amount of forested cover will be temporarily disturbed and permanently converted to shrub/herbaceous cover under Alternative 1, because even though an underground line (Alternative 3) is hidden from view, its ROW must be cleared and maintained in an unforested state. Alternative 1 will also result in fewer impacts to surface water bodies and wetlands than Alternative 2. While Alternative 1 may result in slightly greater impacts to water bodies than Alternative 3, Alternative 3 leaves the potential for unanticipated discharges into the Chaumont River due to fluid or sealant seepage/blowout through fractures during directional drilling; in addition, the Project's proposed mitigation will result in a net positive impact on wetland acreage. Visual impacts will be similar for Alternatives 1 and 2 and reduced for those underground portions of the ROW. No impacts to archeological sites are anticipated for Alternatives 1 and 2; however, there is the potential for disturbance of sites in the underground segments of the transmission line. In addition, Alternatives 1 or 2 are the only economically feasible alternatives since underground lines are considerably more costly and environmentally invasive than overhead lines. As a rule of thumb, the installed cost for 115 kV underground line will be about four to six times more than 115 kV above ground line.

Exhibit 7.7.3 - Alternative 3– Underground Placement of the 115 kV line in Sensitive Resources

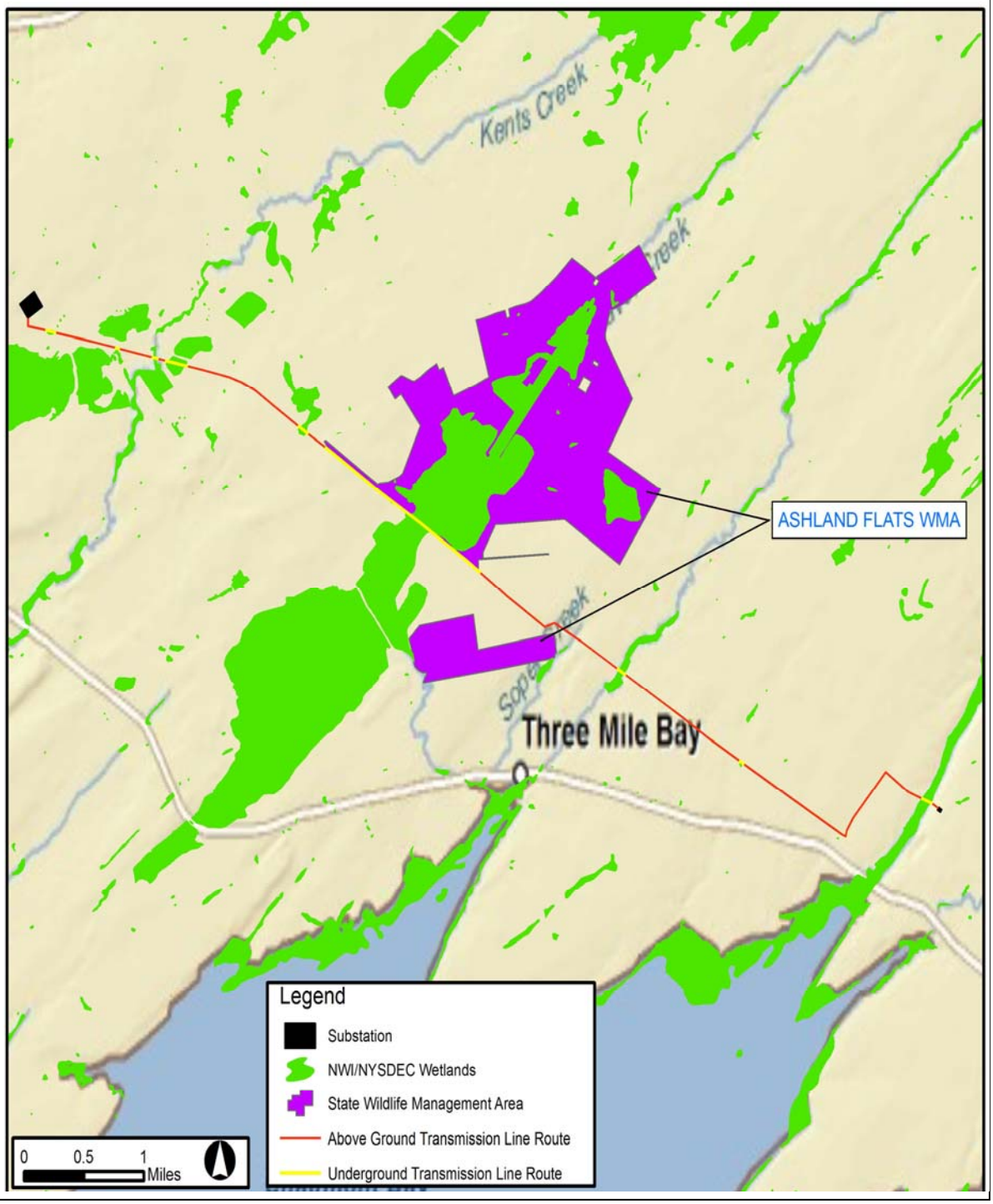


Table 7-2

Summary of Electrical Transmission Routing Impacts

Resource	Alternative 1 Preferred – Above Ground Transmission Line in Abandoned Railroad ROW	Alternative 2 Above Ground Transmission Line Adjacent to Abandoned Railroad ROW	Alternative 3 Underground Transmission Line
Geology, Topography, and Soils	• Nine (9)-mile overhead transmission line and electrical substations may result in temporary erosion and sedimentation, and minor impacts to existing drainage patterns.	• Nine (9)-mile overhead transmission line and electrical substations may result in temporary erosion and sedimentation, and minor impacts to existing drainage patterns.	• Nine (9)-mile transmission line, with 6.7 miles above ground and 2.3 miles underground and electrical substations will result in displacement of soils during excavation and maintenance of horizontal bore.
Water/Wetland Resources	• Possible temporary impacts (erosion/ sedimentation) during construction could result from clearing and grading within ROW • Seven (7) streams, 20 wetlands, one pond will be crossed by the transmission line. • Construction and operation of the transmission will temporarily affect 1.7 acres of wetlands. Less than one acre (0.34 acre) of forested wetlands will be permanently converted to non-forested wetland cover. • Negligible impact to groundwater quality	• Possible temporary impacts (erosion/ sedimentation) during construction could result from clearing and grading within ROW • Seven (7) streams, 20 wetlands, one pond will be crossed by the transmission line. • Construction and operation of the transmission will temporarily affect 11.8 acres of wetlands. Approximately 4.2 acres of forested wetlands will be permanently converted to non-forested wetland cover. • Negligible impact to groundwater quality	• Possible temporary impacts (erosion/ sedimentation) during construction could result from clearing and grading near streams and wetlands. • Wetland and stream impacts avoided. • Negligible impact to groundwater quality • Potential for discharges into the River, due to fluid or sealant seepage/blowout through fractures
Biological Resources	• Approximately 17 acres of second growth deciduous forest would be cleared for ROW, resulting in temporary and permanent minor habitat loss for some forest-nesting avian species. • Less than one acre (0.34 acre) of forested land in the 100-ft transmission line ROW will be converted to open shrub cover. • Minor temporary displacement of wildlife associated with clearing within the ROW. • Possible minor temporary displacement of nesting birds during construction in open nesting and foraging habitat.	• Approximately 27 acres of second growth deciduous forest would be cleared for ROW, resulting in temporary and permanent minor habitat loss for some forest-nesting avian species. • Five (5) acres of forested land in the 100-ft transmission line ROW will be converted to open shrub cover. • Minor temporary displacement of wildlife associated with clearing within the ROW. • Possible minor temporary displacement of nesting birds during construction in open nesting and foraging habitat.	• Approximately 18 acres of second growth deciduous forest would be cleared for ROW, resulting in temporary and permanent minor habitat loss for some forest-nesting avian species • Three (3) acres of forested land in the 100-ft transmission line ROW will be converted to open shrub cover. • Minor temporary displacement of wildlife associated with clearing within the ROW. • Possible minor temporary displacement of nesting birds during construction in open nesting and foraging habitat.

Table 7-2

Summary of Electrical Transmission Routing Impacts

Resource	Alternative 1 Preferred – Above Ground Transmission Line in Abandoned Railroad ROW	Alternative 2 Above Ground Transmission Line Adjacent to Abandoned Railroad ROW	Alternative 3 Underground Transmission Line
Biological Resources (continued)	• Individual Indiana and small-footed myotis bats or colonies have been documented within approximately 15 miles of the proposed transmission line and clearing of forested habitat may also remove potential roosting summer roosting habitat.	• Individual Indiana and small-footed myotis bats or colonies have been documented within approximately 15 miles of the proposed transmission line and clearing of forested habitat may also remove potential roosting summer roosting habitat.	• Individual Indiana and small-footed myotis bats or colonies have been documented within approximately 15 miles of the proposed transmission line and clearing of forested habitat may also remove potential roosting summer roosting habitat.
Transportation	• Improvements to local roads and intersections may be required to accommodate oversize vehicles used during the construction of the ROW. • Traffic may generally increase over local roads during construction. • Fugitive dust from Project construction activities is possible.	• Improvements to local roads and intersections may be required to accommodate oversize vehicles used during the construction of the ROW. • Traffic may generally increase over local roads during construction. • Fugitive dust from Project construction activities is possible.	• Improvements to local roads and intersections may be required to accommodate oversize vehicles used during the construction of the ROW. • Traffic may generally increase over local roads during construction. • Fugitive dust from Project construction activities is possible.
Land Use and Zoning	• Placement of approximately 8.6 miles of ROW in Agricultural and Rural Residence District, and approximately 0.3 miles in Resort District. • Placement of approximately 0.41 miles of ROW within state designated Coastal Zone. • SLW has secured property agreements for this route.	• Placement of approximately 8.6 miles of ROW in Agricultural and Rural Residence District, and approximately 0.3 miles in Resort District • Placement of approximately 0.41 miles of ROW within state designated Coastal Zone. • SLW has not secured property agreements for this route.	• Placement of approximately 8.6 miles of ROW in Agricultural and Rural Residence District, and approximately 0.3 miles in Resort District • Placement of approximately 0.41 miles of ROW within state designated Coastal Zone. • SLW has not secured property agreements for this route.
Cultural and Visual Resources	• Approximately 9 miles above ground. • Placement of approximately 150 wooden monopole structures, approximately 68 to 75 feet in height. • From some vantage points the proposed transmission line will be visible in the distance across open fields. • The proposed transmission line will be visible from the Chaumont River, the Ashland Flats Wildlife Management Area,	• Approximately 9 miles above ground. • Placement of approximately 150 wooden monopole structures, approximately 68 to 75 feet in height. • From some vantage points the proposed transmission line will be visible in the distance across open fields. • The proposed transmission line will be visible from the Chaumont River, the Ashland Flats Wildlife Management Area,	• Approximately 6.7 miles above ground. • Placement of approximately 120 wooden monopole structures, approximately 68 to 75 feet in height. • From some vantage points the proposed transmission line will be visible in the distance across open fields. • Avoids visual impacts over the Chaumont River, and within the Ashland Flats Wildlife Management Area.

Table 7-2

Summary of Electrical Transmission Routing Impacts

Resource	Alternative 1 Preferred – Above Ground Transmission Line in Abandoned Railroad ROW	Alternative 2 Above Ground Transmission Line Adjacent to Abandoned Railroad ROW	Alternative 3 Underground Transmission Line
Cultural and Visual Resources (continued)	and the Bay Breeze Golf Links near the hamlet of Chaumont. • Consistent with surrounding area transmission lines • No impacts to archeological sites.	and the Bay Breeze Golf Links near the hamlet of Chaumont. • Consistent with surrounding area transmission lines • No impacts to archeological sites.	• The proposed transmission line will be visible from the Bay Breeze Golf Links near the hamlet of Chaumont • Potential disturbance of archeological sites within 2.3 mile underground segment.
Air Quality	• Temporary minor adverse impacts to air quality may result from the operation of construction equipment and vehicles.	• Temporary minor adverse impacts to air quality may result from the operation of construction equipment and vehicles.	• Temporary minor adverse impacts to air quality may result from the operation of construction equipment and vehicles.
Noise	• Temporary noise during construction.	• Temporary noise during construction.	• Temporary noise during construction.
Telecommunications	• No anticipated impacts	• No anticipated impacts	• No anticipated impacts
Safety and Security	• Storage and use of diesel fuels, lubricating oils, and hydraulic fluids within the Project boundary may create the potential for fire or medical emergencies.	• Storage and use of diesel fuels, lubricating oils, and hydraulic fluids within the Project boundary may create the potential for fire or medical emergencies.	• Storage and use of diesel fuels, lubricating oils, and hydraulic fluids within the Project boundary may create the potential for fire or medical emergencies.
Cost	• Installed cost for 115kV above ground will be about four to six times less than 115kV underground	• Installed cost for 115kV above ground will be about four to six times less than 115kV underground	• Installed cost for 115kV underground will be about four to six times more than 115kV above ground.

Burying the transmission line within the abandoned railroad bed presents the greatest potential for impacts to the water line because of trench digging. The placement of transmission lines underground requires specific engineering construction measures to ensure the safe and reliable operation of the line. Because a single transmission line circuit requires three wires, each must be installed in an individual pipe or conduit. The three pipes are encapsulated in thermal concrete and surrounded by special thermal backfill materials. These facilities require significant trenching of at least five feet in depth and width. In addition, rocky ledges on the railroad bed near Burnt Rock Road and other places closer to Cape Vincent would likely require blasting to bury a transmission line. Blasting adjacent to the DANC water line poses public safety challenges that the Project will not be able to overcome.

In addition, because the repair of failed underground lines can be costly, environmentally disruptive and time-intensive, underground construction design often includes the installation of a spare pipe that can be used to replace a damaged cable or pipe without reopening the entire trench. The underground design also must accommodate a dedicated fiber optic cable for operation of line protection and control devices, which protect the system during faults and other anomalies.

While there are aesthetic benefits of placing transmission lines underground, those benefits are offset by other drawbacks. In addition to cost, a key difference between underground and overhead lines relates to repairs. It typically takes more time to locate, diagnose a problem and repair an underground transmission line. The difference in repair time can take up to weeks or months for underground repairs compared to hours or days for overhead lines.

The increased cost of installation, maintenance and repair combined with the more environmentally invasive and disruptive consequences of installing larger trenches and conduits along the entire route of the line make the underground alternative both unreasonable and infeasible, given SLW's capabilities and objectives, and environmentally less preferable compared to installation of overhead facilities**.**