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- Map 2 Turbine Delivery Routes from on-site to individual access point locations (from the laydown area)

1.0 PURPOSE

The Marble River Wind Project is being proposed to construct a wind turbine generator (WTG) project in the towns of Ellenburg and Clinton, NY. These municipalities are the designated lead agencies for the project's State Environmental Quality Review (SEQR) process. Consulting Engineers representing these municipalities have communicated that a complete Draft Environmental Impact Statement (DEIS) shall include a report detailing the expected impacts the construction activities for this project will have on the local roads. This report has been prepared to show anticipated delivery routes for the WTG equipment, and associated equipment and materials necessary for construction and operation of the WTG's. The report also includes an estimate of the number of vehicle trips that will need to be made by the WTG component delivery vehicles and material delivery vehicles, and lists safety issues related to these deliveries.

The descriptions and mapping included herein provide details on the preferred delivery routes, both from locations external to the overall site (such as WTG equipment delivered directly to the WTG location), and from locations internal to the site (e.g. material and equipment deliveries from the laydown area or central staging area of the project). The delivery routes for the WTG equipment to the project area are based on a report prepared by ESS Group, of Wellesley, Massachusetts, entitled *Preliminary Transportation Assessment Report* (prepared November 9, 2005).

2.0 PROJECT LOCATION AND DESCRIPTION

The project, which is located in the towns of Ellenburg, New York and Clinton, New York in Clinton County, New York, involves the construction and operation of an estimated 109 WTG towers to generate approximately 218 megawatts of electricity (Figure 1). As part of this project access roads, on private land, off of existing local roads will be constructed to each WTG site. A substation will be constructed to connect the project's electric collection system to nearby transmission lines.

3.0 SUMMARY OF PRELIMINARY TRANSPORTATION ASSESSMENT REPORT

As noted previously, a report was prepared by ESS Group to describe and evaluate potential WTG equipment delivery routes from the component manufacturers' facilities to the

project sites/area. The ESS report evaluated the major east-west and north-south routes in the area that could be used for permitted oversized (OS) and overweight (OW) delivery vehicles. ESS evaluated two alterative routes: New York State (NYS) Route 190 from Plattsburgh, New York to the south, and NYS Route 11 from Interstate 87 (the Northway) to the east.

The report investigated the following elements of each route:

- a. Traffic safety
- b. Traffic capacity
- c. Structural capacity of roads, bridges, and drainage structures (i.e., culverts)
- d. Underpasses and overpasses
- e. Intersection geometry and roadway alignment

4.0 WIND TURBINE DELIVERY ROUTES

4.1 <u>Methodology</u>

For the purposes of this report, the preferred WTG component delivery routes were based on the assumption that delivery of equipment would be made from either the east or the west. URS evaluated the road network within the project area to select the delivery routes that served the largest number of access road entrances while minimizing the number of roads and adjacent route features (e.g. houses or sensitive properties). Intersection impacts were also considered when determining alternative delivery routes, including impacts to dwellings, other buildings, or sensitive properties (such as the cemetery located at the intersection of Clinton Mills Road and NYS Route 189). Potential impacts to the local roads may include road widening, intersection improvements such as corner radius enlargement, and road surface deterioration.

It should be noted that during the evaluation of the alternative routes, impacts to overhead utility lines were also considered. Due to the large number of overhead utility lines along the routes a visual assessment was performed to identify lines that may hang exceptionally low. Some low hanging electric service lines were found, but in most instances, the lowest utility wire crossing the preferred route was for telephone service. Utility wire heights in some locations were between 14 feet and 16 feet above the centerline of the road, while in most other areas they were more that 17 feet above the centerline. When the preferred routes are finalized prior to

construction, the WTG component transportation contractor will perform a detailed assessment of the utility lines needing relocation.

The primary east-west route within the project is NYS Route 11, and based on this route and the criteria noted above, URS selected primary north-south delivery routes within the site intersecting NYS Route 11. These routes were selected to reach the largest number of WTG access road entrances possible. For those access roads that didn't intersect the primary routes, secondary east-west routes were selected. As with the primary routes, the secondary routes were selected to reach the largest number of WTG access road entrances possible.

After the preliminary selection of the secondary access roads, the intersections on the secondary and primary routes were evaluated. The intersections were evaluated to determine if they could accommodate the turning radius required by the delivery vehicles, and based upon previous project construction project the inside turning radius is approximately 140 feet.

4.2 <u>Anticipated WTG Delivery Routes</u>

The anticipated primary north-south routes to be used for WTG component delivery are NYS Route 189, Looby Road, Patnode Road, Brandy Brook Road and Ryan Road. NYS Route 189 will be used for delivery of 32 WTGs, which require the construction of eighteen access roads; Access Roads 19 through 25, 30 through 38, and 40 through 42. Looby Road intersects nine access roads including Access Roads 26 through 29, 39, and 43 through 46, and will used for delivery of 35 WTGs. Brandy Brook Road will be used for delivery to six access roads including Access Roads 3 through 7 and 12, and 18 WTGs. Patnode Road will be used for four access roads, Access Roads 8, 9, 14 and 15, and nine WTGs. Ryan Road will be used for delivery to two access roads, Access Roads 1 and 2, and five WTGs. Of the remaining access roads one (Access Road 18) is located directly off NYS Route 11, and will serve three WTGs, and five (Access Roads 10, 11, 13, 16 and 17) will use Gagnier Road, which will serve seven WTGs (Gagnier Road runs east-west and also intersects NYS Route 11.) The delivery routes can be found on Maps 1 and 2 at the end of the report.

- **Delivery Route No. 1** will deliver WTG components to access roads intersecting NYS Route 189 and the laydown area. It will follow NYS Route 189 northbound and intersect Access Roads 21, 22, 23, 24, 30, 34, 35, 36, and 37 (by way of Robare Pond Road).
- **Delivery Route No. 2** will use NYS Route 189 as the primary north-south route. The route will follow NYS Route 189 northbound to Liberty Pole Road, and then follow Liberty Pole Road eastbound to Access Roads 38, 40, 41 and 42.
- Delivery Route No. 3 will also use NYS Route 189 as the primary north-south route. The
 route will follow NYS Route 189 northbound to Frontier Road, and then follow Frontier
 Road westbound to Access Road 33.
- Delivery Route No. 4 will use NYS Route 189 as the primary north-south route. The route
 will follow NYS Route 189 northbound to Merchia Road, and then follow Merchia Road
 westbound to Access Roads 31 and 32.
- **Delivery Route No. 5,** like routes 1 through 4, will use NYS Route 189 as the primary north-south route. The route will follow NYS Route 189 northbound to LaGree Road, and then follow LaGree Road westbound to access roads 19 and 20; Access Road 25, off of LaGree Road, will not be used on this route. Delivery of turbine components to turbines located along Access Road 25 will be made by Access Road 26, located on Looby Road.
- **Delivery Route No. 6** will use Looby Road as the primary north-south route. The route will follow Looby Road northbound to Whalen Road; at this point Looby Road turns east-west. The route will continue eastbound on Looby Road to Access Roads 26, 28 and 29. The route will continue eastbound and cross NYS Route 189. At NYS Route 189, Looby Road becomes Clinton Mills Road. The route continues eastbound on Clinton Mills Road to Access Roads 39, 43 (by way of Rogers Road), 44, 45 (by way of Soucia Road) and 46. A short stub of Route No. 6 will follow Whalen Road northbound to Access Road 27.
- **Delivery Route No. 7** will use Brandy Brook Road as the primary north-south route. The route will follow Brandy Brook Road southbound and intersect Access Road 12. It will continue southbound on Brandy Brook Road to NYS Route 190, and then follow NYS Route 190 to Access Roads 3, 4, 6 and 7. A stub of Route No. 7 will follow Sancomb Road

southbound from NYS Route 190. Access Road 5 is located off of Sancomb Road. This route will also be used for delivery of the substation equipment. This equipment will be delivered by Access Road 7 from NYS Route 190.

- **Delivery Route No. 8** will use Patnode Road as the primary north-south route. The route will follow Patnode Road southbound, where it will intersect Access Roads 14 and 15, and cross Gagnier Road to the season/gravel section of Patnode Road, where it will intersect Access Roads 8 and 9.
- **Delivery Route No. 9** will use Ryan Road as the primary north-south route. The route will follow Ryan Road southbound to Access Road 1. A stub of Route No. 9 will follow Number 5 Road eastbound to Access Road 2.
- **Delivery Route No. 10** will follow Gagnier Road westbound from NYS Route 11, to Access Roads 10, 11, 13 and 16. It will continue westbound to Campbell Road then turn northbound on Campbell Road to Access Road 17.

These routes are the preferred routes based on field investigations performed by URS. However, the turbine component transport company will make final route determinations, in consultation with Horizon Wind Energy and the local town road officials, which may be different than the preferred routes described above. An alternative north-south route may be LaFrancis Road. However, due to snow cover, this alternative route was not investigated for this report, and further investigation of this route will be made at a later date.

4.3 Road Modifications

The roads within the project area vary in surface type between gravel and asphalt. It was determined that the majority of the roads had an overall condition of fair with areas of good pavement or gravel, while other areas had very poor surface conditions, which consisted of severe cracking, potholes and rippling for the asphalt roads, and potholes and rippling on the gravel roads.

As a result of the preceding investigation, we concluded that not all of the roads in the project area would require modification. The following roads were considered in acceptable

condition to handle the turbine component deliveries: NYS Route 11, NYS Route 189, NYS Route 190, Brandy Brook Road and Ryan Road. The remainder of the roads may require some type of modification to allow them to be used for turbine component and other types of vehicles and construction equipment delivery. These modifications may include gravel overlay to reduce rippling and smooth grade changes; widening to provide sufficient road width for the delivery vehicles; raising the profile of the road to provide additional structural capacity and sufficient surface drainage; adding larger culverts to smooth grade changes; and widening.

Soucia Road located off of Clinton Mills Road is the only road being considered for widening at this time. This road is not wide enough to allow vehicles traveling in opposite directions to easily pass each other. Widening will be done using gravel, increasing the width of the road to approximately 20 feet to provide two 10-foot travel lanes. The specific requirements will be determined after a topographic survey has been performed to determine the exact grade changes in the area, and based upon consultation with local road officials. Other narrow roads within the project area are Liberty Pole Road, Lagree Road and Patnode Road. However, it is anticipated that these roads will be used for one-way traffic and will not require widening.

4.4 Intersection Modifications

The types of the turbine component delivery vehicles dictate what delivery route intersections may require modification. The existing intersection geometry is insufficient to accommodate the large turning radii of these vehicles, and the majority of the intersection approach roads vary in width from 18 to 20 feet. The exceptions are NYS Route 11 (which is 24 feet away from intersections and wider where there are turning lanes); and at the seasonal roads of Lagree Road and Patnode Road (which are seasonal roads and have widths of approximately 10 feet to 15 feet).

Modifications to the intersections may include increasing the corner radii, adding road width upstream of the intersection, adding road width downstream of the intersection, or some combination of all three. Houses, bridges or culverts located in proximity to the intersections will limit the amount the corner radii can be enlarged, making it necessary to increase the road width either upstream or downstream of the intersection. Intersection modifications may require additional property and, in some cases, relocation of utility poles and/or guide rails. Where there are culverts or ditches crossing under the existing intersection, the culverts will have to be

extended. If ditches run along the intersection culverts for these ditches will need to be added or new ditches have to be created along the edge of the new road to maintain proper drainage.

All intersections were evaluated using a truck inside turning radius of approximately 140 feet, which is the anticipated turning radius of the truck carrying the turbine blades. The type of intersection modifications that may be required can be found in tables 4-1 and 4-2. Figures showing the modifications at each intersection can be found in Appendix A.

Table 4-1
Clinton, NY Intersection and Road Modifications

Road Name/Intersection	Modification	Reason For Modification
Soucia Road	Widening	To provide for two-way traffic
NYS Route 189/Frontier Rd/Liberty Rd	Increase road width and corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 189/Merchia Rd	Increase corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 189/Lagree Rd/Swamp Rd	Increase corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 189/NYS Route 11	Increase road width and corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 11/Brandy Brook Rd	Increase corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 11/Gagnier Rd	Increase road width and corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 11/Patnode Rd	Increase road width and corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 11/Looby Rd	Increase road width and corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 11/Lost Nation Rd/Ryan Rd	Increase road width and corner radius at intersection	Accommodate delivery vehicle turning radius
Looby Rd/Whalen Road	Increase road width and corner radius at intersection	Accommodate delivery vehicle turning radius
Campbell Rd/Gagnier Rd	Increase corner radius at intersection	Accommodate delivery vehicle turning radius

Table 4-2
Ellenburg, NY Intersection and Road Modifications

Road Name/Intersection	Modification	Reason For Modification
Ryan Rd/Number 5 Rd	Increase road width at intersection	Accommodate delivery vehicle turning radius
NYS Route 190/Brandy Brook Rd	Increase corner radius at intersection	Accommodate delivery vehicle turning radius
NYS Route 190/Sancomb Rd	Increase and corner radius at intersection	Accommodate delivery vehicle turning radius

4.5 Access Road Entry Construction

Access road entries will be constructed similar to the intersection modifications described in Section 4.4. All access roads will be constructed to a width of 16-34 feet wide at the entry to limit the impact to adjacent property from the delivery vehicle turning radii. At each access road entrance, the larger turning radius needed for the delivery vehicles will be constructed on the side that the delivery vehicles will approach. The opposite radius will be constructed with a 30-foot radius. Figures showing the anticipated construction impacts can be found in Appendix B.

5.0 MATERIAL DELIVERY ROUTES

5.1 <u>Material Locations</u>

The materials used for construction of this project, because of its size, will be obtained from many locations. The material will include gravel, concrete, reinforcing steel, electrical materials, and miscellaneous materials. The volume of material needed may require stockpiling some material at the laydown area. There may also be a need for set up of a concrete batching plant at the laydown area (or suitable location) because of the amount of concrete needed for each turbine foundation (approximately 320 cubic yards).

Major gravel and concrete material suppliers are located in Malone, NY, west of the project area, and Plattsburgh, NY, south of the project area. Materials coming from Plattsburgh, NY will be delivered by way of NYS Route 190, and materials from Malone, NY will be delivered by way of NYS Route 11. There are also numerous smaller material suppliers located

within and in proximity to the project area that may be used to supply the project. These suppliers will use the local road network to bring the materials to the locations needed.

5.2 **Route Descriptions**

It is anticipated that vehicles used for delivery of material to the project will be of a standard type that normally uses the roads within the project area. These vehicles include dump trucks, 18-wheel tractor-trailers, which will include flat-bed and dump types, and concrete trucks. Although these vehicles are standard, we plan to use the preferred routes established, however this may change once the finalized batch plant location is chosen and aggregate suppliers have been selected.

6.0 ROUTE SAFETY AND DELIVERY QUANTITIES

Route Safety

Traffic safety is a concern throughout the project area during construction. There will be nine (9) turbine component delivery vehicles for each turbine being constructed. Since each vehicle delivering components will be oversized, various safety features will be employed to insure the safety of other vehicles on the road. Safety features will include at a minimum a lead vehicle with flashers for each delivery vehicle, and a project area speed limit no greater than 35 mph.

URS does not anticipate any adverse safety impacts to the area due to material delivery vehicles. Although there will be a significant number of vehicles in the area during construction activities, project safety procedures will be developed and implemented to reduce the potential for unsafe traffic conditions. The project, NYDOT and local road officials will work together to implement a prudent traffic control plan.

6.2 Delivery Quantities

As noted above nine (9) vehicles will be required for each WTG component delivery, which will result in 918 total component deliveries.

It is estimated that 35 to 40 concrete trucks will be required for each turbine foundation. This will result in approximately 5,000 trips to the WTG site over the duration of the project. In addition, material delivery will include gravel for creation of access roads, road improvements and intersection modification, and other material deliveries will include reinforcing steel for each foundation, and electrical equipment and materials for each WTG and the project substation/switchyard. It is anticipated that a concrete batching plant may be installed at the laydown area, or suitable location, because of the distances the concrete trucks would otherwise be required to travel, thus necessitating delivery of aggregate, sand and cement to the laydown area for use in the batching plant.

7.0 CONCLUSION

URS investigated several routes throughout the project area that could be used for delivery of WTG components and construction materials. The WTG component delivery vehicles will be of an oversized type, requiring modification to intersections on the preferred routes. Therefore, routes investigated were evaluated for possible intersection impacts, road type, surface condition, intersection geometry and proximity of structures and sensitive properties to the road. It is expected that delivery of WTG components and materials will come from the east or west along NYS Route 11. From NYS Route 11, Primary North-South and secondary East-West routes have been identified.

Based on this information URS has established the preferred routes for turbine component delivery. These routes have been selected to minimize impacts to the local roads and communities. The number of roads used for these deliveries have been minimized and steps will be taking during construction to make certain that safety is a priority along these routes. Material delivery routes will in most cases follow the routes established for WTG component delivery.

In Clinton, New York, one road and 11 intersections will be impacted by this project through road widening and increased corner radii. In Ellenburg, NY the same changes noted above will have to be made to three intersections. The modifications may also include utility pole relocations, creation of temporary ditches, culvert extensions and traffic control signage relocations.

APPENDIX A

Intersection Improvements

APPENDIX B

Access Road Entrance Intersection Improvements

MATERIAL AND EQUIPMENT DELIVERY ROUTE ASSESSMENT

MARBLE RIVER WIND PROJECT CLINTON COUNTY, NEW YORK

PREPARED FOR:

AES - EHN NY WINDPOWER LLC 4300 WILSON BOULEVARD ARLINGTON, VIRGINIA 22203

PREPARED BY:



PROJECT No. 11174329

MARCH 2006





















































































































