

Transportation Effect and Route Evaluation Study

Cassadaga Wind Project

Towns of Charlotte, Cherry Creek, Arkwright, and Stockton

Chautauqua County, New York

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Prepared for:

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1.0 INTRODUCTION

Cassadaga Wind, LLC (a wholly owned subsidiary of EverPower Wind Holdings, Inc.) [herein referred to as the Applicant] is preparing an Application under Article 10 of the Public Service Law to the New York State Board on Electric Generation Siting and the Environment (“Siting Board”) for its wind farm development proposal in Chautauqua County, New York. This report has been prepared to satisfy relevant portions of the Preliminary Scoping Statement (PSS), specifically Section 2.25 Effect on Transportation and relevant portions of 1001.25 of the Article 10 Regulations.

1.1 PROJECT DESCRIPTION

The Cassadaga Wind Project is a proposed 126 megawatt (MW) wind powered electric generating project located within the Towns of Charlotte, Cherry Creek, Arkwright, and Stockton, Chautauqua County, New York. The Regional Project Location and Project Area Maps are depicted in Appendix A.

The proposed “Project” consists of all activities necessary for the construction and operation of a commercial-scale wind power project, including the installation and operation of up to 58 wind turbines, together with approximately 33.6 miles of associated collection lines (below grade and above ground), approximately 17.2 miles of access roads, up to two permanent meteorological towers, one operation and maintenance (O&M) building, one collector substation, one point of interconnect substation (POI), overhead transmission line to carry power from the collector substation to the POI substation and up to two temporary construction staging/laydown areas.

During construction there will be temporary increases in truck traffic on area roadways served by the Project. The purpose of this evaluation is to document the existing transportation conditions in the area and identify probable local travel routes, constraints, and proposed improvements. Also this evaluation will contain any school bus routes along proposed haul roads, identification of emergency responders and the routes they will take to the Project locations, roadway permit and road use agreement requirements, construction vehicle volumes/level of service and airport impacts associated with the Project.

1.2 METHODOLOGY

The study methodology was developed to address the relevant needs identified in the scoping document and the Article 10 Regulations. A field inventory, photo log, and visual assessment was conducted to evaluate possible travel routes. Sample roadway characteristics and conditions were documented. A Project site review was also performed by the Applicant’s construction personnel. The Applicant’s notes from this review were analyzed and included in the study of possible access routes needed for the construction of the wind turbine locations. Representatives were contacted including the Chautauqua County Civil Engineer and the Highway Superintendents from the Towns of Stockton, Charlotte, Cherry Creek, Arkwright, and Villenova to understand jurisdictional concerns and permit requirements. Research was conducted on wind turbine transportation requirements, and a potential worst-case design vehicle was evaluated to identify possible roadway improvements.

1.3 VEHICLE TYPES

During the Construction phase to build the facilities, there will be some temporary impacts to transportation routes that are needed to get to and travel within the Project Site. These impacts will result from the movement of vehicles involved in the Project construction. These vehicles and their role in the Project are described below. The exact construction vehicles have not yet been determined, however, it is known that transportation of turbine components and associated construction material involves numerous conventional and specialized transportation vehicles, including:

Wind Turbine Equipment

- Blade Sections – Blades are transported on trailers with one blade per vehicle. Blades typically control the length of the design vehicle, and the radius of the curves along the travel route to the site. Specialized transport vehicles are designed with articulating (manual or self-steering) rear axles to allow maneuverability through curves.
- Tower Sections – Typically transported in three to four sections depending on the supplier. Towers generally control the height and width of the design vehicle dimensions.
- Nacelle – The turbine and related elements are typically the heaviest component transported.
- Hub and Nose Cone – Typically transported with one or more of the same element on a vehicle. These elements are not critical elements related to design vehicle dimensions.
- Escort Vehicles – Typically a car or pick-up truck.

Construction Equipment and Materials

- Construction of Access Roads – Conventional trucks carrying stone and/or gravel and steel rebar.
- Crane – For assembly of the wind towers, cranes are transported in sections utilizing up to 16 trucks producing numerous trips to the site. Assembled cranes may be crawled between tower sites or dis-assembled to travel along the local roads to the next site.
- Concrete trucks for tower foundations and transformer pads.
- Variety of conventional semi-trailers for delivery of substation, turbine and O&M facility components and materials.
- Construction staff and other incidental truck trips.

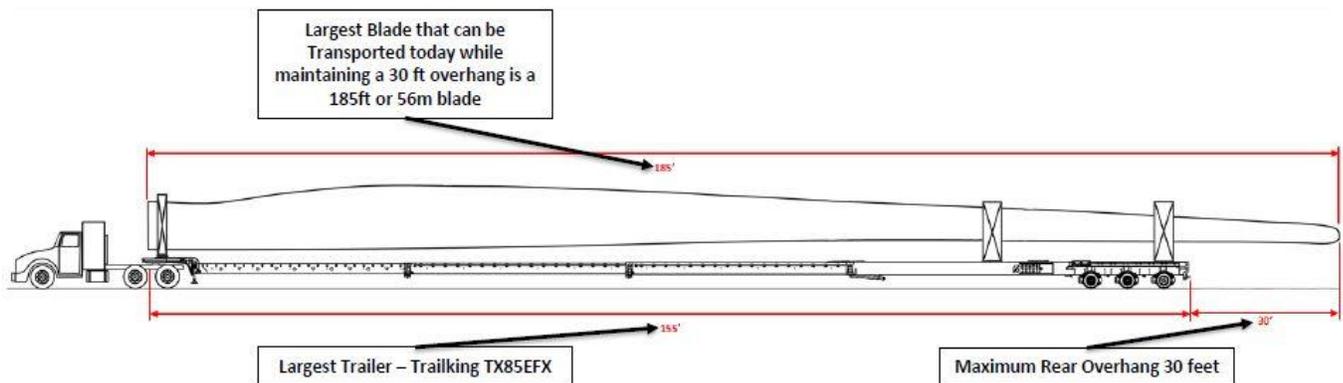
1.4 DESIGN VEHICLE RESEARCH

Transportation of turbine components and associated construction material involves numerous conventional and specialized transportation vehicles. Wind turbine components (such as the tower sections, blade sections and nacelle) are transported separately. The actual dimensions and specifications of the design vehicles may vary, depending on the

specific wind turbine supplier and components. Recognizing that the specific wind turbine supplier has not been determined, several possible suppliers were researched to determine their transportation requirements and potential design criteria for this route analysis. The following table summarizes the blade lengths from several possible turbine suppliers.

Turbine Supplier	Turbine Size (MW)	Blade length	
		Metric	English
Gamesa	2.1 or 2.63	55.5 m	182 ft
	2.5	62 m	203 ft
GE	2.3	56.9 m	186.7 ft
	2.78	58.7 m	192.6 ft
	3.23	63.7 m	209 ft
Nordex	3	58.4 m	191.6 ft
Siemens	2.3	59 m	193.5 ft
	3.3	63 m	206.7 ft
Vestas	3	54.7 m	179.3 ft
	3.3	57.2 m	187.5 ft
	3.3	62 m	203.4 ft
	3.45	66.7 m	218.8 ft

This table shows that blade lengths range from 179.3 feet for the 3 MW Vestas wind turbine, to 218.8 feet for a 3.45 MW Vestas wind turbine. The minimum turning radius requirements will ultimately be dependent on the wind turbine supplier selected. In this study, a minimum inside radius of 150 feet has been used to model intersection modification scenarios. A 150-foot radius is a conservative design standard used when developing improvements for wind power component delivery and is based on a design vehicle assuming a 155 foot trailer with extended rear axle (outer trailer) as shown in the following drawing.



Design Vehicle Dimensions for Route Planning Purposes. Actual Dimensions will vary.

1.5 REGIONAL DESTINATION ROUTES

The possible designated routes for deliveries of the wind turbine components to study were State Route 60, starting at the I-90 Thruway Exit 59 just east of the City of Dunkirk to I-86, Exit 12, just north of the City of Jamestown and local roads from Route 60 leading to the wind turbine construction site locations. Depending on the turbine manufacturer, the delivery route could come from

I-86 to the south and use State Route 60 to go north to the project area or use I-90 to the north and use State Route 60 to go south and reach the project area. For the purpose of this report, it was assumed that all deliveries will be using I-90 and traveling south on State Route 60 to access the project locations. I-90 is the largest freeway that is closest to the project site and is the preferred access for large turbine components that will be coming from other states and major cities with ports. When deliveries are close to the project area, local roads (county and town) in the Towns of Stockton, Charlotte, Cherry Creek, Arkwright, and Villenova are to be utilized from State Route 60 to reach the wind turbine project locations. This study will review all of the possible delivery routes and construction vehicle transport routes needed for the construction of the wind turbine facility.

2.0 ROADWAY ANALYSIS

2.1 TRAFFIC VOLUMES

Existing traffic volume data within the study area was obtained from the NYSDOT Traffic Data Viewer Website online and also updated County and Local Road listings from the NYSDOT Highway Data Services Website. Most of the county roads and all of the state roads had available traffic volume data. The data consists of some segments with total Annual Average Daily Traffic (AADT) and other segments showing AADT for both directions of travel. Most of the local town roads do not have traffic volume data, so estimated volumes, based on the surrounding traffic counts, were added to these roadways. The existing traffic data will be included in the analysis of the traffic capacity Level of Service (LOS) for the delivery/construction vehicle routes during the construction phase. See Appendix B for the Table of Existing Traffic Volumes.

2.2 ACCIDENT DATA

A FOIL request for accident data within the project area was sent to the NYSDOT Regional Office in Buffalo, NY. Once the information was received, there was data for the State Route and the six County Routes being proposed for use during the construction project. The existing accident data from the NYSDOT Accident Location Information System (ALIS) dated from August, 2012 to July, 2014 showed that the segment study area of State Route 60 had the most accidents at 152 for the two year study period, while CR 64 had the least amount of accidents at 2 within the same study period. State Route 60 had eight Safety Deficient Locations (SDL) and one Priority Intersection Location (PIL) within the 25 mile segment between I-90 near Fredonia and I-86 near Jamestown. The accident data from the FOIL request did not show any SDL's or PIL's on the County Roads. Based on the existing accident data and Annual Average Design Traffic (AADT) for the roadway segments, the annual Accident Rates can be established and compared to the New York Statewide Average Rate which is 2.81 accidents/million vehicle miles (acc/mvm) for 2-lane Rural Arterials (segment and juncture accidents). State Route 60, County Route 64, County Route 75 and County Route 77 fall below the Statewide Average while County Route 66, County Route 72 and County Route 85 are just above the Statewide Average. The higher accident rates for the three county roads may be attributed to having lower AADT for their segments. At this time, there is no accident data available for local town roads. See Appendix C for the Table of Existing Accident Data.

2.3 SCHOOL BUS ROUTE INFORMATION

A request was sent to Dunkirk City, Fredonia City, Cassadaga Valley, Falconer and Pine Valley school districts asking for identification of school bus routes, number of buses and pickup/drop off times along the possible haul roads needed for delivery trucks and construction vehicles. Currently only the Dunkirk City, Fredonia City, Falconer and Pine Valley school districts have responded back with the requested school bus information. A total of three requests were sent to the Cassadaga Valley School District, but at this time, no response has been received. The information received as of now has shown that most roads have at least one school bus in the morning and one school bus in the afternoon while a few roads have two and one road has three school buses among the various school districts. See Appendix D for the Table of Existing School Bus Routes showing this information.

2.4 EMERGENCY SERVICE RESPONDER INFORMATION

A request with maps showing suggested emergency response routes to the project areas was sent to all of the emergency responders (Stockton, Cassadaga, Sinclairville and Cherry Creek volunteer fire departments, ALSTAR private ambulance service, Chautauqua County Sheriff and New York State Troopers) within and around the project area asking for verification of the routes they would take to the project sites when responding to a possible emergency. Responses to the request have been received from the Sinclairville, Cassadaga and Cherry Creek Volunteer Fire Departments, Chautauqua County Sheriff Department and one of two New York State Police Stations (A Station in Fredonia, NY). The Sinclairville and Cassadaga Volunteer Fire Departments have also confirmed that they provide ambulance services and will transport patients to the WCA Hospital in Jamestown, New York and/or Brooks Memorial Hospital in Dunkirk, New York. At this time, there have been no other responses from the other emergency responders. See Appendix E for the maps depicting the potential emergency routes for all of the local emergency responders.

2.5 LOAD RESTRICTIVE BRIDGES/CULVERTS

Existing bridge posting data was taken from the R-Posted Bridge and Posted Bridge listings dated October 28, 2015 at the NYSDOT Highway Data Services online website. There was one bridge on the R Posted List under the Town of Charlotte that was restricted. The Bridge Identification Number (BIN) is 3323900 and the location is Hooker Rd over Trib. Mill Creek, just 0.5 miles west of Charlotte Center. This bridge will not be able to accommodate the Overwidth/Overweight delivery vehicles, so this segment of Hooker Road shall not be considered as a designated haul route. Based on a conceptual evaluation using the heaviest load and shortest truck length (Nacelle loading, 380,000 lbs. (190 Tons), 115 feet long), two of the bridge structures (BIN 1027860, and BIN 3325930) along the potential construction routes appear to be adequate for Overwidth/Overweight vehicle loading. The other remaining bridges along the potential construction routes and within the project area do not appear to be adequate for the Overwidth/Overweight vehicles. All bridges along potential construction routes will be checked for adequacy during the Special Hauling Permit Application process with the NYSDOT. See Appendix J for a Map of Existing Bridge & Traffic Signal Locations and the Table of Bridge Rating Information showing the HS Ratings, Condition Ratings, Sufficiency Ratings and Bridge Inspection Dates for bridges along the potential haul routes and within the project area. Also see Appendix G for the Table of Roadway Restrictions.

Also within the project area, there are numerous small and large culverts along the possible haul routes. Based on the site evaluation, a little over 50% of these culverts have less than 2 feet of coverage over them. It is assumed that any culvert with less than 2 feet of cover may be susceptible to damage during construction activities. These locations will be further analyzed during final engineering to determine if improvements are necessary prior to construction of the turbines. Any improvements needed may be a condition under the Road Use Agreement with the local municipalities. See Appendix J for the Table of Culvert Locations.

2.6 ROADWAY PERMITS/ROAD USE AGREEMENTS

Special hauling permits are required when loads exceed legal dimensions or weights. Transport of the wind turbine sections and crane will require a variety of special hauling permits. Actual loads will depend on the specific turbine supplier, crane equipment chosen, and degree of disassembly of the crane. The types of permits depend on the characteristics of the vehicle and its cargo, number of trips, distance traveled, and duration. An example, according to the NYSDOT Central Permit Office in Albany, NY, when any vehicle exceeds 16 feet in width, 15'-11" in height, 160' in length, or 200,000 pounds in gross weight; or any combination of those, a Type 1S – Superload Trip Permit is required from NYSDOT. For the Type 1S Permit it is also suggested that the Applicant fill out and submit a PERM 12 Form – Special Hauling Pre-Approval Form for a Future Permit. The permit process can now be done online for Divisible and Non-Divisible Load Overweight Permits. The NYSDOT Website, www.dot.ny.gov/hypermits outlines the guidelines, types and fees for various special hauling permits. Referring to the website, it shows that additional Permit Forms may be needed with the Type 1S – Superload Trip Permit such as PERM 39 – Application for Special Hauling Permit, PERM 39-1VC – Vehicle Configuration Attachment, PERM 39-4 – Additional Trailer Attachment (Option 1), PERM 99 – Additional Trailer Attachment (Option 2), PERM 85 – Special Hauling Route Survey and a Special Hauling Customer Guide is available under the PERM 30 form. The applicant or other responsible party such as the BOP Contractor or Turbine supplier will need to set up an account in order to complete the permit process online. Additional information can also be found at www.NYPermits.org. Various Highway Work Permits are also needed for any intersection and roadway improvements within the NYSDOT, County and Town right-of-ways.

In the County and Towns where the local roads are being used for delivery and construction vehicle transport routes, a Road Use Agreement with the affected municipalities may need to be established to ensure that the hauling routes are to be repaired if there is any damage from excessive use. Previous conversations with several Town Highway Supervisors have indicated that they may or will pursue a road use agreement as a mitigation measure for roads that will be used as hauling routes. See the following Table of Roadway Agreements and Permits on the next page.

CASSADAGA WIND FARM								
ROADWAY AGREEMENT AND PERMIT TABLE								
GOVERNMENT AGENCY	ROAD USE AGREEMENT	HIGHWAY WORK PERMIT TO WORK WITHIN ROW	HIGHWAY UTILITY PERMIT TO WORK WITHIN ROW	TRAFFIC SIGNAL PERMIT TO WORK WITHIN ROW	SPECIAL HAUL PERMIT FOR OVERSIZED/OVERWEIGHT VEHICLES	PERMIT TO EXCEED POSTED WEIGHT LIMIT ROADS	DIVISIBLE LOAD OVERWEIGHT PERMIT	CONTACT INFORMATION
TOWN OF ARKWRIGHT	YES	YES	INCLUDE UNDER HWY	N/A	YES	INCLUDE UNDER HWY	NOT AVAILABLE	HWY. SUPERINTENDENT STEVE MEAD, 716-679-6950
TOWN OF CHARLOTTE	YES	YES	INCLUDE UNDER HWY	N/A	YES	NOT AVAILABLE	NOT AVAILABLE	HWY. SUPERINTENDENT MARK LEBARON, 716-665-8506, NO PAPER COPIES OF PERMITS, NEED TO CONTACT MARK LEBARON
TOWN OF CHERRY CREEK	YES	YES	INCLUDE UNDER HWY	N/A	YES	NOT AVAILABLE	NOT AVAILABLE	HWY. SUPERINTENDENT KENNETH CHASE, 716-499-5721, NO PAPER COPIES OF HWY. WORK PERMITS, NEED TO CONTACT KENNETH CHASE
TOWN OF STOCKTON	YES	YES/NO?	YES/NO?	N/A	YES/NO?	YES/NO?	YES/NO?	HWY. SUPERINTENDENT AARON BURNETT, 716-640-3866
TOWN OF VILLENOVA	YES	YES	INCLUDE UNDER HWY	N/A	YES	YES	NOT AVAILABLE	HWY. SUPERINTENDENT JUDITH ROSE (Until 1/1/16), THEN CONTACT DAVID BARNES AFTER THAT DATE AT 716-988-3678
CHAUTAUQUA COUNTY	TBD	YES	INCLUDE UNDER HWY	INCLUDE UNDER HWY	YES	YES	NOT AVAILABLE	APPLY ONLINE AT http://www.co.chautauqua.ny.us/339/Engineering OR CONTACT GEORGE SPANOS, PE, 716-661-8400
NYSDOT	NO	YES	YES	YES	YES	NOT AVAILABLE	YES	NYSDOT REGION 5 TRAFFIC SAFETY & MOBILITY, PERMIT ENGINEER GREG RUHLAND, 716-847-3286

3.0 LOCAL ROAD REVIEW

3.1 EXISTING ROADWAY CHARACTERISTICS

A field evaluation was conducted from October 29th, 2015 to November 5th, 2015 of the potential delivery and construction vehicle haul routes to and within the project area. The condition of the roads were evaluated by visual inspection and rated with a very good (new)/good/fair/poor designation. The visual pavement condition ratings were based on the criteria from the NYSDOT 2014 Pavement Report, under the section "Pavement Condition Measures" on page 4. Any roadside features, bridge and roadway horizontal/vertical restrictions, bridge/culvert locations, hazardous roadway areas and possible restricted intersection radii locations were also included in the evaluation.

Generally, State Route 60, between I-90 to I-86, provides 12 foot lanes with shoulders that vary in width from 6 feet to 10 feet. The roadway terrain is considered rolling, with some flat areas amongst the northern portion of the segment. It will be determined during the Special Haul Permit process whether this state highway is adequate to handle traffic loads required for the project's construction operations.

County roads CR 64, CR 66, CR 72, CR 75, CR 77 and CR 85 have travel lanes that vary from 9 feet to 11 feet and shoulders with varied widths from 3 feet to 8 feet. The roadway terrain is considered mostly rolling with some roads having roadside hazards such as steep banks, unprotected areas at culverts, falling rock areas, non-standard guide rail, trees close to the roadway, low tree

branches, and low speed curves as well as various restrictions. Numerous requests for information (email and verbal) on the county roads, bridges and culverts were sent to the Chautauqua County Engineer. The county responded on 12/17/2015 by providing information on posted bridges, posted roads and other roadway information including traffic volumes, pavement thicknesses, widths, utilities, construction history, etc., but no condition information for any bridges or culverts. Pavement thicknesses range from 3.5 inches (portion of CR 85) to 19.5 inches (portion of CR 66, Sinclair Drive), including asphalt and concrete layers.

The various town roads along the evaluation routes had roadway surfaces that were either asphalt, oil & stone or gravel. The travel lane widths ranged from 8 feet to 10 feet with a few roads showing only a 12 foot single lane. The shoulder widths vary from 3 feet to 6 feet along these roads. The terrain for these roads are considered rolling to mountainous with a few areas considered being flat. There are numerous roads with roadside hazards that are similar to the county roads along with low speed curves and various restrictions. Several conversations with the Town Highway Supervisors have indicated that their paved town highways have thin asphalt over their sub base material. On average an existing oil and stone road may have a 3 inch or less asphalt thickness over gravel while an asphalt road may have a thickness of 3" to 5" of asphalt over gravel subbase. The Town Supervisors have also mentioned that some of their gravel roads are in bad shape, the evaluation confirms this with some areas showing potholes, erosion and loss of gravel material. The town roads are 20 feet in width or less, have very little pavement built up or they are gravel and are most likely to require some sort of stabilization to support the vehicle loads during construction. Additional conversations with the Town Highway Supervisors have confirmed that there is no documented information on the conditions of town road culverts and all bridges on town roads are under the jurisdiction of the county.

3.2 ROADWAY EVALUATION

State roads and County roads will be utilized as much as possible for construction traffic within the project area, using town roads as the last point of access to the wind turbine locations. Based on the conditions of the town roads, the most economical routes with the least impacts have been determined. Some of the roads in and around the Village of Sinclairville within the project area were included in the evaluation, but are not to be considered for construction traffic due to constraints that include:

- Additional turning movements
- Intersection restrictions at some locations that would involve extensive easements
- Numerous overhead wire relocations from residential/commercial buildings
- Heavier traffic volumes

See Section 4.1 Haul Route Recommendations for the preferred routes.

According to the 2014 Pavement Data Report for New York State Highways, the majority of State Route 60 has a condition rating of 7 or better with 10 being the highest rating. There is only a 3 mile segment within this 25 mile corridor with a rating of 6. It is assumed that the County does not have a roadway rating system. It has been confirmed that the towns do not have a rating system for their roads. Because of the majority of the roadways being considered for haul road and construction vehicle use are local roads,

a project roadway condition rating is needed to determine the best routes to the facility since there are no rating systems set up under the local highway departments.

The following is a more descriptive evaluation, including visual pavement ratings of each state, county, and town road being considered and/or projected to be used as a haul road, construction vehicle route or providing access to a potential facility location. See Appendix F for the Table of Roadway Field Evaluation (Condensed) showing a condensed version of the field evaluation, including pavement thicknesses. The full version of the field evaluation sheets for each roadway segment will be available as a separately bound document. See Appendix L for Roadway Rating Photos.

NY 60, I-90 to I-86 – The length of this segment is 25 miles. The asphalt pavement condition ranges from Good to Very Good between I-90 and Sinclairville and from Fair to Good from Sinclairville to I-86. There is heavy truck traffic between the intersections of the I-90 ramps and US 20 near Fredonia, NY. Speed limits vary from 45 mph to 50 mph between I-90 and US 20, 55 mph between US 20 and just north of Cassadaga, 35 mph around Maple Avenue/High Street in Cassadaga, 55 mph again from just south of Cassadaga to the school zone near Sinclairville, where it is 45 mph. After the school zone, the speed increases to 55 mph again until just north of the intersection of CR 50/65, changes to 35 mph around the CR 50/65 intersection and then back to 55 mph until the I-86 ramps. Most bridges along this route have non-conforming bridge rail. On one bridge between US 20 and NY 83, the shoulders narrow down to 4 feet. The I-86 EB and WB bridges over NY 60 near Jamestown, NY have minimum vertical clearances on NY 60 of 15 feet and 14 feet respectively. The total horizontal clearance under each of the I-86 bridges is 54 feet. The minimum width between any bridge/culvert rails along this route is 35 feet and is located just north of NY 83. A majority of culverts are in good shape, a few have shallow coverage while others are in deep fill. There are a few culverts between Maple Avenue in Cassadaga and Sylvester Road in Sinclairville that have spalling headwalls. There are overhead traffic signals at:

- The I-90 ramp intersection near Fredonia (span wire)
- Walmart driveway near Fredonia (span wire)
- US 20 intersection near Fredonia (span wire)
- Maple Avenue/High Street intersection in Cassadaga (span wire)
- A flashing light on mast arm poles at the CR 50/65 intersection
- A flashing light on span wires at the CR 380 intersection
- A flashing light on span wires at the I-86 WB ramp intersection (north) near Jamestown

The height between the top of roadway to the bottom of the NYSDOT signal heads can vary from 15.5 feet to 17 feet as per the NYSDOT Traffic Signal Standard Sheets. The actual heights were not verified in the field. See Appendix J for the Map of Existing Bridge and Traffic Signal Locations.

CR 64, CR 66/77 Main Street to CR 66 Thornton Road - The length of this segment is 5.9 miles. The pavement condition for this road is considered Good. The travel lanes are 10 feet and shoulder widths are 4 feet. The eastern portion of the roadway is located in the Village of Sinclairville with sidewalks, utility poles near the road, overhead wires present and possible intersection

radii restrictions. Speed limits are 30 mph in the village and 55 mph in the rural areas. The minimum width between any bridge/culvert rails along this route is 26 feet and is at a location just east of Harris Hill Road. There is some pavement settlement for an approach slab at a bridge about 0.5 miles west of the CR 66 intersection. Most of the culverts have 2 feet or less of coverage over the roadway with one culvert showing pavement settlement. Also there are various lower speed curves along this roadway.

CR 66, NY 60 Bridge/Access Road to CR 64 Bates Road - The length of this segment is 8 miles. The pavement along this road is in Fair condition. The travel lanes are 10 feet and shoulder widths vary from 4 to 5 feet with additional parking lanes in the village. The eastern portion of the roadway is located in the Village of Sinclairville with sidewalks, utility poles near the road, overhead wires present and possible intersection radii restrictions. This route overlaps with CR 77 in the Village of Sinclairville for 0.4 miles. Speed limits are 30 mph in the village and 55 mph in the rural areas. There is a sharp curve in the village with a posted warning speed of 10 MPH. The NY 60 bridge over CR 66 Sinclair Drive has a minimum vertical clearance on CR 66 of 16 feet and a total horizontal clearance of 39 feet. The minimum width between any bridge/culvert rails along this route is 28 feet which is located just south of CR 85. The bridge between Main Street and Sylvester Road has non-conforming bridge rail. Within the section between Sylvester Road and the access road to NY 60, there is an overhead bridge (NY 60 over CR 66) where the minimum vertical clearance is 16 feet and the total horizontal clearance is 39 feet along CR 66. There is some shoulder erosion and severely cracked/spalled headwall for a small box culvert just west of the CR 85 intersection. At least 40% of the culverts have 2 feet or less of coverage over the roadway and two of these large box culverts among the 40% have less than 1 foot of thickness. One of the culverts along this route (closer to CR 85) has a non-conforming culvert rail. Also there are various lower speed curves along this roadway.

CR 72, NY 60 to South Hill Road – The length of this segment is 9.9 miles. The pavement condition for this road is mostly Good with a Fair condition between CR 85 and South Hill Road. The travel lanes are 11 feet and shoulder widths vary from 5 feet to 8 feet. Speed Limits are 45 mph between NY 60 and Shumla Road and 55 mph between Shumla Road and just east of South Hill Road, then lowered to 45 mph at the South Hill Road intersection. Some of the bridges along this route have non-conforming bridge rail and bridge transition rail. The minimum width between any bridge/culvert rails along this route is 25 feet and is located at a bridge between CR 85 and Hamlet Road. At least 60% of the culverts along this route have 1 to 3 feet of coverage. Most culverts seem to be in good shape as per the field evaluation, but some deep culverts do not have any culvert rail. The shoulder between CR 77 and CR 85 on the south side of the road narrows down to 1 to 2 feet. This road also has several lower speed curves along with some blind hill locations. The intersections of NY 60, Barnum Road, Tarbox Road, Hall Road, Griswold Road CR 77, CR 85 and South Hill Road have intersection radii turning restrictions based on the wind turbine delivery vehicles. An 8 feet x 5 feet concrete box culvert at the CR 85 Farrington Hollow Road intersection will be part of the mitigation needed when increasing the radius for the delivery vehicle movement. At the South Hill Road intersection, an easement will be required to increase the turning radius. Just east past the Griswold Road intersection, there are some areas with steep unprotected slopes on both sides of the roadway (one side had gabion baskets next to the shoulder). There is also steep slopes on the south side of

the road near the CR 85 intersection. There is also a soldier pile and lagging wall consisting of railroad rails, whalers and 2x4 timbers in fair condition near the shoulder between CR 85 and South Hill Road.

CR 75, NY 60 to CR 77 Park Street - The length of this segment is 5.5 miles. There is one wind turbine access road located near the Andrews Road intersection. The pavement condition for this road is mostly Fair with a Good rating in the short section between NY 60 and Barnum Road. The travel lanes are 9 feet and shoulder widths are 5 feet. The southern portion of the roadway is located just inside the Village of Sinclairville with intersection radii restrictions. Intersection radii restrictions also exist at other locations outside of the village. The pavement exhibits some transverse cracking and longitudinal cracking along the edge, but the pavement maintains a Good rating in the village. Speed limits are 30 mph in the village and 55 mph in the rural areas. The minimum width between any bridge/culvert rails along this route is 28 feet which is located between NY 60 and Barnum Road. This bridge also has shoulders that narrow down to 2 feet and has some shoulder approach settlement and significant pavement cracking (bridge ends). There is also non-conforming bridge rail at this location. The roadway outside of the village has gravel shoulders with utility poles located at the edge of the shoulder. This road also has several lower speed curves. A little more than half of the culverts along this route have 2 feet or less of coverage and some show signs of pavement settlement over top.

CR 77, NY 60 to CR 72 Bard Road - The length of this segment is 11.6 miles. There are two wind turbine access roads located between Cook Road and Mill Creek Road. The pavement condition for this road is mostly Good with a Fair rating between CR 72 and Rutenbur Road. The travel lanes range from 10 to 11 feet and shoulder widths vary 3 to 6 feet (3 foot shoulders only along Jamestown Road portion in Sinclairville). The portion between Rutenbur Road and Mill Creek Road is oil and stone with crack sealant. The southern portion of the roadway is located in the Village of Sinclairville with sidewalks, utility poles near the road and possible intersection radii restrictions. This route overlaps with CR 66 in the Village of Sinclairville for 0.4 miles. Speed Limits are 30 mph in the village, 45 mph between the village and a mile south of Mill Creek Road and 55 mph for the remainder of the segment. Utility poles are located near the shoulder. The minimum width between any bridge/culvert rails along this route is 29 feet which is located just south of East Road. Approximately 80% of the culverts along this route have 2 feet or less of coverage. One of these culverts between NY 60 and Main Street in Sinclairville has transverse cracking above it in the roadway. Another culvert between Rutenbur Road and Mill Creek Road requires guide rail. Low wires are present at the Cook Road intersection. One bridge along this route between Main Street and Hooker Road has non-conforming bridge rail and bridge rail transitions while another bridge between Hooker Road and Mill Creek Road has non-conforming bridge rail only. All the bridges have varying degrees of approach slab settlement and transverse cracking near the bridge joints. There is also turning radii restrictions at the Rutenbur Road intersection and the CR 72 intersection which may require easements and intersection modifications. Also there are various lower speed curves along this roadway.

CR 85, CR 72 Bard Road to CR 66 Thornton Road - The length of this segment is 8.9 miles. There is one wind turbine access road located between Sanford Road and CR 66. The pavement condition for this road is Fair from CR 72 to Plank Road and Good from Plank Rd. to CR 66 Thornton Road. The travel lanes are 10 feet and shoulder widths vary from 4 to 5 feet. The speed

limit is 55 mph for this segment of roadway. The pavement between Plank Road and CR 72 has numerous areas with patching, wheel rutting, longitudinal and alligator cracking while the pavement between CR 66 and Plank Road had some patching, cracking and some shoulder erosion. The minimum width between any bridge/culvert rails along this route is 30 feet which is located between Boutwell Hill Road and Sanford Road. This bridge also has non-conforming bridge railing and pavement settlement at the approaches. Low wires are present between the intersections of Plank Road and CR 72. There are also turning radius restrictions at the Boutwell Hill Road and Plank Road intersections. The restriction at Plank Road could involve a large easement with a house for turbine delivery traffic movements traveling southbound on CR 85 and turning left on to Plank Road northbound due to the geometry of the intersection. The alignment of this roadway is considered winding from a point 1.6 miles north of Plank Road to CR 66 Thornton Road. There is an existing soldier pile and lagging retaining wall made with railroad rails and 2x4 timbers near the shoulder between Plank Road and CR 66 Thornton Road. It was observed in the field that some of the deadman tie backs for this lagging wall may be under the roadway. There are numerous culverts along this route. Some of the concrete culverts between Boutwell Hill Road and CR 66 Thornton Road are showing signs of deterioration such as spalling headwalls, pavement settlement over the culvert, cracks in the concrete and one location where the 5'x5' culvert box shows signs of leaning. At least 80% of the culverts have 2 feet or less of coverage. One large box culvert near the CR 72 intersection has no culvert rail. Lower speed curves exist throughout the roadway segment along with a lower speed warning set at the Boutwell Hill Road intersection. There is also a falling rock zone approximately 2.5 miles south of the Plank Road intersection.

Ames Road, CR 75 Nelson Road to Hall Road - The length of this segment is 1.2 miles. This road has an asphalt surface with a condition rating of Fair. The travel lanes are 10 feet and shoulder widths are 5 feet. The pavement has various areas with alligator and longitudinal cracking and spot area patching. All the culverts along this route have at least 1 to 4 feet of coverage. There are no pavement markings along this roadway.

Andrews Road, CR 75 North to CR 75 South - The length of this segment is 1.3 miles. There are two wind turbine access roads located between CR 75 north intersection and CR 75 south intersection. This road has an asphalt surface with a condition rating of Good starting at the CR 75 South intersection and extends for about 0.6 miles north of until it transitions to a gravel surface for the remaining segment of the roadway with a condition rating of Poor. According to the field evaluation, the gravel portion is considered a seasonal road. The travel lanes are 9 feet and shoulder widths are 5 feet. The intersection of CR 75 (north) and Andrews Road will have a turning radius restriction. All the culverts along this route have 2 feet or less of coverage. One of the culverts near the CR 75 intersection is showing signs of settlement within the pavement. There are no pavement markings on the roadway.

Tarbox Road, CR 72 Bard Road to Griswold Road - The length of this segment is 3.2 miles. This road has a gravel surface with a condition rating of Fair. The travel lanes are 10 feet and shoulder widths are 5 feet. This road has several steep grades and blind hills. About 0.8 miles east of the Hall Road intersection, there is a very sharp curve with a warning speed of 15 mph. All the culverts along this route have 2 feet or more of coverage. Also, there are no pavement markings along this roadway.

Hall Road, CR 72 Bard Road to CR 77 Charlotte Center Road. - The length of this segment is 5.1 miles. There is one wind turbine access road located between Hooker Road and CR 77 Charlotte Center Road. This road has an asphalt surface from CR 72 to about 800 feet north of Tarbox Road, then gravel until the Town Line, then back to an asphalt surface for the remaining segment of the roadway with a condition rating of Fair. The travel lanes are 9 feet and shoulder widths are 5 feet. The gravel area of the roadway has numerous potholes and some washboard potholes near the asphalt transition areas. This roadway is posted for 45 mph from CR 72 to about 0.5 miles past Hooker Road, then reduced to 35 mph going to CR 77. This road has a blind hill located near the CR 72 intersection. The minimum width between any bridge/culvert rails along this route is 18 feet which is located just north of CR 77. Most of the culverts along this route have 2 feet or less of coverage. One culvert has a transverse crack along the centerline of the culvert near the gravel to asphalt transition area. Low tree branches exist on both sides of the roads along various sections of this road. There is also turning radii restrictions at most of the intersections and no pavement markings along this roadway. Also, lower speed curves exist with one sharp curve with a downhill grade just south of Cassadaga Road.

Housington Road, Lewis Road to Boutwell Hill Road - The length of this segment is 2.1 miles. This combination gravel/asphalt road has a condition rating of Good. Starting at Boutwell Hill Road, the road surface is asphalt for the first 500', then gravel to the Boutwell Hill Road intersection. The travel lanes are 8 feet and shoulder widths are 5 feet. The gravel road shows some minor rutting in places. There are no pavement markings along this roadway and the one culvert has 1 to 3 feet of cover. The intersection of Boutwell Hill Road and Housington Road has turning radius restrictions. There are four curves along this road with one at the town line being very sharp and possibly requiring additional roadway mitigation. The road portion from Lewis Road to the Cherry Creek Town Line is a seasonal road, not being maintained from Dec. 1st to Apr. 1st.

North Hill Road, Griswold Road to CR 77 Rood Road - The length of this segment is 2.9 miles. There are two wind turbine access roads, one located just north of Cassadaga Road and the other located just south of Cassadaga Road. This asphalt road has a condition rating of Poor. The travel lanes are 9 feet and shoulder widths are 5 feet. This road has numerous pavement areas with alligator cracking, isolated patching, rutting and deteriorated shoulders. Most of the culverts along this route have 2 feet or less of coverage. There are several areas along this route that have low branches from the trees that line the roadway. At the Cassadaga Road intersection, there is also turning radii restrictions. It was noted on the evaluation form that farm vehicles also use this route. Additionally, lower speed curves exist and there are no pavement markings along this roadway.

Lewis Road, Ruttenbur Road to Mill Creek Road - The length of this segment is 2.2 miles. There is one wind turbine access road location at the intersection of Cook Road. This road has a gravel surface with a condition rating of Poor. This single lane road is 12 feet wide with shoulder widths of 3 feet. This road is rough and rocky with some potholes with a steep slope and curve near the Mill Creek Road intersection. Lewis Road is considered a seasonal road. All the culverts along this route have 2 feet or less of coverage. There are no pavement markings along this roadway.

Mill Creek Road, CR 77 Rood Road to East Road - The length of this segment is 2.3 miles. There is one wind turbine access road located just south of Lewis Road. This combination gravel/asphalt road has a condition rating of Poor. Starting at CR 77, the road surface is asphalt for 0.2 miles, then gravel for another 0.6 miles, then back to asphalt until Lewis Road, then back to gravel again for the remaining road section. The travel lanes are 9 feet and shoulder widths are 4 feet. There was some washboarding observed in the gravel sections. The minimum width between any bridge/culvert rails along this route is 21 feet and is located just west of the Lewis Road intersection. Most of the culverts along this route have 1 foot or less of coverage, with one location 0.7 miles from CR 77 showing frost heave. There are also turning radii restrictions at all the intersections along this road. There are no pavement markings along this roadway.

East Road, CR 77 Charlotte Center Road. to Boutwell Hill Road. - The length of this segment is 3.2 miles. There are two wind turbine access roads locations, one just east of Cleland Road and the other just west of Cleland Road (which also has access from Cleland Road). This combination gravel/asphalt road has a condition rating of Fair. Starting at Boutwell Hill Road, the road surface is asphalt for 0.1 miles, then gravel for another mile, then back to asphalt again for the remaining road section ending at North Hill Road. There was some washboarding observed in the gravel sections. The subbase material under the asphalt pavement is baled whole tires (experimental section by the County and NYSDEC) starting at a location 1.1 miles west of Boutwell Hill Road and continuing east for a 1000 feet. The travel lanes are 10 feet and shoulder widths are 6 feet. Intersection radii restrictions exist at the Mill Creek Road and Cleland Road intersections. There are two wind turbine access roads locations, one just east of Cleland Road and the other just west of Cleland Road. One of the culverts along this route has 2 feet or less of coverage. Another culvert about 1 mile west of Boutwell Hill Road is new, but the pavement shows settlement around the pipe. There are low wires at one location and low branches at various locations along this route. Also, lower speed curves exist, and there are no pavement markings along this roadway.

Boutwell Hill Road, CR 66 Thornton Road to CR 85 Erwin Road - The length of this segment is 5.8 miles. There are two wind turbine access road locations located between Housington Road and CR 85 Erwin Road. This combination gravel/asphalt road has a condition rating of Fair. Starting at CR 66 Thornton Road., the road surface is asphalt for 0.7 miles, then gravel to the Cherry Creek Town Line (this portion is also a seasonal road from Dec. 1st to Apr. 1st), then back to asphalt and continuing with this surface to CR 85 Erwin Road. The travel lanes are 10 feet and shoulder widths are 4 feet. Shoulder erosion was documented at a location 0.4 miles east of CR 66. The gravel section has some wheel rutting, isolated potholes and long gully erosion. All the culverts along this route have 2 feet or less of coverage with a few with only 6 inches or less of coverage. There are low wires just east of CR 66 Thornton Road at one location and low branches at various locations along this route. Blind hills are located approximately 0.2 miles and 0.7 miles east of the CR 66 Thornton Road intersection and 0.1 and 0.3 miles east of the Cleland Road intersection. The roadway narrows down to an 18 foot width, 0.3 miles east of Cleland Road. There is a sharp curve at approximately 0.25 miles east of Housington Rd with pine trees within the clear zone in an area just before the curve. A steep grade is located 1.8 miles east of the Housington Road intersection and there are no pavement markings along this roadway.

Plank Road, Dybkas Road to CR 85 Farrington Hollow Road - The length of this segment is 2.2 miles. There are two wind turbine access roads located between Dybkas Road and Weaver Road. This asphalt road has a condition rating of Good, it was recently resurfaced. The travel lanes are 9 feet and shoulder widths are 3 feet. The minimum width between any bridge/culvert rails along this route is 30 feet. Most of the culverts along this route have 2 feet or less of coverage. At the CR 85 Farrington Hollow Road and the Weaver Road intersections, easements are also required to increase the turning radii. There are several blind hills and no pavement markings along this roadway.

Ruttenbur Road, CR 77 Rood Road to CR 85 Farrington Hollow Road - The length of this segment is 1.6 miles. This gravel road has a condition rating of Poor. The single travel lane is 12 feet with shoulder widths of 5 feet. The narrow gravel road shows some wheel rutting and washboarding in places. Also, lower speed curves exist and there are no pavement markings along this roadway. The entire section has low branches and earthen banks on both sides of the road. Most of the culverts along this route have 1 foot or less of coverage. This road is considered a seasonal road.

Weaver Road, Plank Road to NY 83. - The length of this segment is 2.3 miles. There is one wind turbine access road located between Plank Road and Davidson Road. This asphalt road has a condition rating of Fair. The travel lanes are 10 feet and shoulder widths are 3 feet. The pavement has numerous longitudinal cracking with crack seal and the shoulders are low. At least half of the culverts along this route have 3 feet or more of coverage. A culvert closer to Plank Road has some pavement settlement. There is a posted warning speed of 15 MPH near the Davidson Road intersection and a steep hill near the Plank Road intersection. The turning radii at the Davidson/Aldrich Hill Road intersection are restricted. There are no pavement markings along this roadway.

Sanford Road, Boutwell Hill Road to CR 85 Erwin Road - The length of this segment is 2.5 miles. This road has an asphalt surface with a condition rating of Good. The travel lanes are 9 feet and shoulder widths are 4 feet. The pavement shows only minor wheel rutting. Two locations along this road have steep grades and another location has a blind hill. At a location 1.1 miles south of the Boutwell Hill Road intersection is a 1000 foot linear area of sub base consisting of baled tires. There are low overhead wires and no pavement markings along this roadway. The intersections with Boutwell Hill Road and Erwin Road both have turning radius restrictions.

Smith Road, Barnum Road to Hall Road - The length of this segment is 1.4 miles. This road has an asphalt surface with a condition rating of Fair. The travel lanes are 10 feet and shoulder widths are 5 feet. The pavement shows some patching and alligator cracking. The one culvert along this route has less than 1 foot of coverage. There are no pavement markings along this roadway. The intersection of Bernard Road and Smith Road has a turning radius restriction.

South Hill Road, Dybkas Road to CR 72 Bard Road/Cassadaga Road. - The length of this segment is 1.5 miles. This asphalt road has a condition rating of Poor. The travel lanes are 9 feet and shoulder widths are 3 feet. The pavement condition for the first mile after CR 72 has numerous patching, potholes, alligator cracking, crumbling shoulders and wheel rutting present, then the

last 0.5 miles has new oil and stone. All the culverts along this route have 3 feet or less of coverage. There are no pavement markings along this roadway.

Swanson Road, CR 66 Thornton Road to Boutwell Hill Road - The length of this segment is 1.1 miles. This combination gravel/asphalt road has a condition rating of Fair. Starting at CR 66 Thornton Road., the road surface is asphalt with for 0.2 miles, then gravel to the Boutwell Hill Road intersection. The travel lanes are 9 feet and shoulder widths are 5 feet. At the transition from asphalt to gravel, the gravel surface has a longitudinal gully erosion spot in the center of the road. There are no pavement markings along this roadway. The intersections with Boutwell Hill Road and Thornton Road both have turning radius restrictions. There are two curves within this roadway section and low tree branches near the road at about 0.4 miles north of Thornton Road. The road is a seasonal road, not being maintained from Nov. 1st to May 1st.

Cleland Road, East Rd to CR 66 Thornton Rd. - The length of this segment is 2 miles. There is a sub-station and staging area located near the Boutwell Hill Road intersection. Also the access road to the sub-station/staging area is used to access the turbine sites located along East Road, west of Cleland Road intersection. This combination gravel/asphalt road has a condition rating of Fair. Starting at East Road, the road surface is gravel with some isolated potholes and centerline gully erosion for 1.3 miles, then transitions to asphalt for the remaining section to CR 66 Thornton Road. The travel lanes are 9 feet and shoulder widths are 5 feet. There are low wires at approximately 1.5 miles from East Road and turning radii restrictions at the Boutwell Hill Road and Thornton Road intersections that may require easements. All the small culverts along this route have 2 feet or less of coverage with one only having 6 inches of cover. The culvert with 6 inches of cover is heavily corroded and collapsing and is located near the Thornton Road intersection. There is a blind hill located about 0.8 miles south of East Road; no pavement markings are present along this roadway.

Moon Road, NY 60 to CR 71 - The length of this segment is 1.1 miles. This road has an asphalt surface with a condition rating of Good. The travel lanes are 9 feet and shoulder widths are 5 feet. The shoulders are gravel. There is a sub-station located near the NY 60 intersection. There is an abandoned rail road track crossing in this segment of roadway and no pavement markings.

Roberts Road, NY 60 to CR 75 Nelson Road - The length of this segment is 0.5 miles. This road has a gravel surface with a condition rating of Fair. The travel lanes are 8 feet and shoulder widths are 5 feet. A 6 foot diameter corrugated metal pipe is located about 300 feet west of the CR 75 intersection with less than 1 foot of cover and no guide rail is present. The road is a seasonal road, not being maintained from Dec. 1st to Apr. 1st. There are low tree branches and no pavement markings along this roadway.

Cook Road, CR 77 Rood Road. to Lewis Road - The length of this segment is 0.7 miles. This combination gravel/asphalt road has a condition rating of Poor. Starting at CR 77, the road surface is asphalt for 250 feet, then gravel for another 0.5 miles, then back to broken asphalt with gravel shoulders until Lewis Road. The travel lanes are 9 feet and shoulder widths are 5 feet. There was some washboarding taken place in the gravel sections. Most of the culverts along this route have 2 feet or less of coverage.

There are also turning radii restrictions at the intersections at either end of this road. There are no pavement markings along this roadway, which is considered a seasonal road.

Griswold Road, CR 72 Bard Road to North Hill Road - The length of this segment is 1.4 miles. This combination gravel/asphalt road has a condition rating of Fair. Starting at CR 72, the road surface is asphalt for 0.2 miles, then gravel for the remainder segment to North Hill Road. The travel lanes are 9 feet and shoulder widths are 5 feet. In the gravel portion there are isolated areas of potholes and eroded areas on the vertical curves. There is a bridge close to the CR 72 intersection that has non-conforming bridge rail and pavement cracks and minor approach settlement. The minimum width between the bridge rails at this location is 24 feet. This bridge location will create a turning radius restriction at this location. There are no pavement markings along this roadway.

Cassadaga Road, Barnum Road to CR 77 Rood Road - The length of this segment is 4.2 miles. This road has an asphalt surface with a condition rating of Poor between Barnum Road and Hall Road and a condition rating of Very Good (New) from Hall Road to CR 77 Rood Road. The travel lanes are 9 feet and shoulder widths are 5 feet. There are gravel shoulders and significant patching, alligator cracking and wheel rutting in the pavement between Barnum Road and Hall Road. The road has new oil and stone for pavement between Hall Road and North Hill Road and asphalt between North Hill Road and CR 77 Rood Road. This road has several steep grades and numerous blind hills. The bridge located between Barnum Road and Hall Road has non-conforming guide rail transitions to the bridge. The minimum width between the bridge rails at this location is 25 feet. All the culverts along this route have 2 feet or more of coverage. Also, lower speed curves exist and there are no pavement markings along this roadway.

High Street, NY 60 to Barnum Road - The length of this segment is 0.7 miles. This road has an asphalt surface with a condition rating of Good. The travel lanes are 9 feet and shoulder widths are 4 feet. The speed limit along this road is 30 to 35 mph. There is a signal at the NY 60 intersection and utility poles also near the road that are creating a turning radius restriction at this location. A sign indicating "Only Local Delivery Trucks Permitted" is present along this route. A new oil and stone surface was just placed within a year for this segment. Most of this segment is considered a residential neighborhood. Large 2 foot diameter trees exist about 5 feet away from the pavement edge with some low hanging branches. There are numerous low wires within the 30 mph zone and no pavement markings along this roadway.

Hooker Road, CR 75 Nelson Road to CR 77 Charlotte Hill Road - The length of this segment is 1.1 miles. This road has an asphalt surface with a condition rating of Good. The travel lanes are 9 feet and shoulder widths are 6 feet. The shoulders are gravel, the pavement shows some cracking and minor wheel rutting. The bridge located between Hall Road and CR 77 Charlotte Hill Road is an R Posted bridge with regulatory signs present indicating the posting. Low branches from trees are present at a few locations along this roadway. All the culverts along this route have at least 2 feet of coverage. There are no pavement markings along this roadway.

Barnum Road, CR 72 Bard Road to CR 75 Nelson Road - The length of this segment is 2.2 miles. This road has an asphalt surface with a condition rating of Poor. The travel lanes are 9 feet and shoulder widths are 5 feet. The speed limit for this segment is 45 mph. There are gravel shoulders and significant patching, alligator cracking and wheel rutting in the pavement. A sign indicating "Only Local Delivery Trucks Permitted" is present along this route. A steep slope is also along this route. A 5 foot crushed culvert with less than 1 foot of cover is located between CR 72 and High Street. A bridge located just north of CR 75 has cracks at the bridge joint and approach pavement settlement. The minimum width between the bridge rails at this location is 21 feet. All the culverts along this route have 2 feet or less of coverage. There are no pavement markings along this roadway.

Bernard Road, Smith Road to Hall Road - The length of this segment is 1.3 miles. This road has an asphalt surface with a condition rating of Good. The travel lanes are 10 feet and shoulder widths are 5 feet. There are scattered areas of transverse cracking at culvert locations. Most of the culverts along this route have at least 1 to 3 feet of coverage. There are no pavement markings along this roadway. The intersection of Bernard Road and Smith Road has a turning radius restriction and a low speed curve just east of this intersection.

3.3 ROADWAY/INTERSECTION RESTRICTIONS

Existing roadway restrictions (height, width, weight) and deficient intersection radius locations were observed in the field and researched from NYSDOT resources during our initial review. Height restrictions such as overhead span wire signal heads and vertical clearances under bridges along State Route 60 as well as low utility wires along various local roads as described under the roadway evaluation will prevent or make it difficult for access of Overwidth/Overweight vehicles. There are a few local roads within the project area that are considered narrow with only one lane. Some wind turbine access roads are located along these narrow roads, so it may be necessary to either widen the road or provide traffic control (contractor flag person or local police agency) for the Overwidth/Overweight delivery vehicles. The bridges along the potential construction routes appear to have sufficient width to accommodate the Overwidth/Overweight vehicles, but also will be checked during the Special Hauling Permit Application process. There are no weight restrictions along State Route 60, but the following local roads have load postings:

- County Route 64 is posted for a 6 Ton weight limit between Park Street in Sinclairville and County Route 66
- County Route 72 is posted for a seasonal 6 Ton weight limit (March 1st to May 31st) between NY 60 and County Route 85, then posted for axle weight limit of 6 Tons from County Route 85 to South Hill Road.
- County Route 75 is posted for a 6 Ton weight limit between Park Street in Sinclairville and Barnum Road.
- County Route 77 is posted for a seasonal 6 Ton weight limit (March 1st to May 31st) from Main Street in Sinclairville to Mill Creek Road and from Rutenbur Road to CR 72 Bard Road.
- Tarbox Road, located in the Town of Arkwright, is posted with a 6 Ton weight limit from County Route 72 to Hall Road.
- Weaver Road, located in the Town of Cherry Creek, is posted with a 6 Ton weight limit for the entire length.
- Plank Road located in the Town of Cherry Creek, is posted with a seasonal 6 Ton weight limit (Nov. 1st to Apr. 30th) from CR 85 to Dybkas Road.

- South Hill Road, located in the Town of Arkwright, is posted with a seasonal 6 Ton limit (March 1st to June 1st) from Dybkas Road to CR 72.
- Boutwell Hill Road, in the Town of Cherry Creek, has a seasonal posted weight limit (Nov. 1st to Apr. 30th) of 6 Tons from the Town Line to CR 85 Erwin Road.
- Cleland Road, in the Town of Charlotte, has a posted weight limit of 5 Ton for all axles between Boutwell Road and Thornton Road.
- Sanford Road, in the Town of Cherry Creek, has a seasonal 6 ton weight restriction (Nov. 1st to Apr. 30th) for the entire length.

For the deficient intersections, the path of the 155 foot trailer design vehicle (for turbine blades) using a 150 foot intersection radius was evaluated along the potential travel routes to the wind turbine sites to identify temporary intersection improvements required. Additional mitigation (tree removal, utility pole relocation, removal/relocation of other tall objects) may be needed due to the turbine blade length extending beyond the rear trailer of the delivery vehicle. See Appendix G for the Table of Roadway Restrictions and Table of Intersection Restrictions (along potential access route locations only).

4.0 TRANSPORTATION ROUTES

4.1 HAUL ROUTE RECOMMENDATIONS

When evaluating viable transportation routes for delivery vehicles and construction vehicles going to the facility locations, several items were considered. These items are:

- The roadway characteristics and condition
- The number of bridges along a designated route
- The condition of the bridges and culverts that are along the route
- The number of intersections needing turning movements
- Roadways with minimal sharp curves to avoid additional mitigation and/or safety issues
- Various potential restrictions such as narrow bridges, low overhead clearances and impacts from small intersection radii affecting the turning movements.

Based on this assessment, the following are recommended routes to the various facility locations:

Access Route #1 - To Wind Turbine Sites T28, T39, and T45/T46/T44: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret, Stockton and Charlotte. Turn left onto Roberts Road, then right onto CR 75 Nelson Road. Travel southbound on CR 75 Nelson Road and turn left for Turbine Site T28. Across from Turbine Site T28, turn right onto Andrews Road and continue southbound, turn right for T45/T46/T44 site, continue further on Andrews Road and turn right for the T39 site. See Appendix A for the Map of Access Route Locations. In the map, all potential access routes start at the I-90/Thruway interchange with State Route 60 and travel south on State Route 60 to the project area. Each potential

access route is color-coded, but do overlap with other color-coded routes, whereas the actual color for a majority of routes may only show along the route that is closest to the wind turbine site access roads. There is a legend on the map that also shows the overlapped routes along each individual color-coded route for better guidance.

Other routes evaluated for turning off of NY 60 to reach these sites were studied. The High Street/Barnum Road/CR 75 Nelson Road route from NY 60 was considered, but determined to be not viable because of various intersection radii restrictions at the NY 60/High Street intersection. These restrictions included having to replace the NYSDOT signal because of the poles being close to the road and relocating utility poles at this intersection. High Street is also a residential area with numerous low wires between the poles and houses and large trees close to the road with some low hanging branches. Barnum Road is in poor condition and has a bridge structure with 21 feet of horizontal clearance, pavement settlement near the bridge, and it is unknown whether the bridge can accommodate the turbine delivery truck loads.

The CR 75 Nelson Road route from NY 60 was considered, but determined not to be viable as there is a bridge located between NY 60 and Barnum Road, at this time it is unknown whether the bridge can accommodate the delivery truck loads. Also this option has the delivery trucks traveling on a longer segment of CR 75, whereas the Roberts Road route utilizes NY 60 for that additional segment, which is in better condition, so there is less mitigation. Other intersections along NY 60, south of Roberts Road, congregate through the Village of Sinclairville, but it is preferable to keep construction vehicles away from the village, so those roads were not included as alternate transportation routes to the project area.

Access Route #2 - To Wind Turbine Site T38/T43/T33: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret and Stockton. Turn left onto CR 72 Bard Road, travel eastbound, turn right onto Hall Road. Travel southbound on Hall Road, after Hooker Road, turn right into the T38/T43/T33 site. See Appendix A for the Map of Access Route Locations.

An alternate route using Roberts Road from NY 60 and utilizing CR 75 Nelson Road/Hooker Road to get to Hall Road involves two additional turning movements and intersection mitigation. This route is approximately 2.6 miles shorter and involves staying longer on NY 60 and avoiding CR 72 Bard Rd and the majority of Hall Road (CR 72 is still a major route for the other access routes and the northern portion of Hall Road is being used for Access Route #3). It may also eliminate any possible mitigation to the portion of Hall Road from Cassadaga Road to Hooker Road. This route could be considered as an alternate route.

Access Route #3 – To Wind Turbine Sites T7/T11/T3 and T20/T19/T21/T36: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret and Stockton. Turn left onto CR 72 Bard Road, travel eastbound, turn right onto Hall Road. Travel southbound on Hall Road to the Cassadaga Road intersection, turn left onto Cassadaga Road. Proceed eastbound on Cassadaga Road to the North Hill Road intersection, turn left onto North Hill Road. Travel northbound, turn left for the T7/T11/T3 site. For the T20/T19/T21/T36 Site, from eastbound on Cassadaga Road, turn right

at the North Hill Road intersection and proceed southbound on North Hill Road, then turn left into the T20/T19/T21/T36 site. See Appendix A for the Map of Access Route Locations.

Tarbox Road was considered as another route from CR 72 Bard Road or as a turn at the Hall Road intersection, but this road has a 6 Ton weight limit between CR 72 Bard Road and Hall Road with additional mitigation needed to eliminate the posting limit (since CR 72 is already being used for access routes for other sites). Additionally, it is winding with three sharp curves to the east of Hall Road prior to arriving at the turbine site access roads which could involve using the whole width of the road and possibly beyond the roadway when navigating the curves. Additional mitigation, such as widening the roadway, could be necessary to ensure safe traveling through the curve areas.

Griswold Road was also considered but there is an existing bridge near the intersection of CR 72 which will be affected by required intersection widening to accommodate the turning movements. Neither of these roads are considered a viable alternative route.

Access Route #4 – To Wind Turbine Sites T57/T56/T35, T53/T48, T4 and T58/T54: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret and Stockton. Turn left onto CR 72 Bard Road, travel eastbound, turn right onto CR 77 Rood Road. Travel southbound on CR 77 Rood Road (bridge with guide rail located 0.2 miles south of CR 72 Bard Road), going past the Cook Road intersection, turn left for the T53/T48 site, continue further on CR 77 Rood Road and turn right for the T57/T56/T35 site.

For the T4 site, same directions as above and reaching the point of traveling southbound on CR 77 Rood Road, turn left onto Cook Road, proceed eastbound on Cook Road to the Lewis Road intersection, the access road for Turbine Site T4 is straight after the intersection.

For the T58/T54 site, same directions as above and reaching the point of traveling southbound on CR 77 Rood Road, turn left onto Cook Road. Travel eastbound on Cook Road and turn right onto Lewis Road. Continue southbound on Lewis Road to the Mill Creek Road intersection. Turn left onto Mill Creek Road and proceed south, then turn left for the T58/T54 site. See Appendix A for the Map of Access Route Locations.

Another route to consider is using the same directions as above and reaching the point of traveling eastbound on CR 72 Bard Road and turning right onto Hall Road. Proceed southbound on Hall Road to the Cassadaga Road intersection and turn left. Travel eastbound on Cassadaga Road, past the North Hill Road intersection, turn right at the CR 77 Rood Rd intersection. Proceed southbound on CR 77 Rood Road, going past the Cook Road intersection, turn left for the T53/T48 site and then right for the T57/T56/T35 site. The other sites would be the same directions as for the above preferred route and reaching the point of going southbound on CR 77 Rood Road past the Cassadaga Road intersection. The alternate route would eliminate going over a bridge/culvert (BIN 3323450) on CR 77 Rood Road just south of CR 72 Bard Road and eliminate an easement mitigation at the CR 72 and CR 77 intersection. But another intersection mitigation will be needed at the Cassadaga Road intersection and this route will also involve two extra turns (at intersections that need to be mitigated under the previous access routes). Under the preferred

route, CR 77 Rood Road has a seasonal 6 Ton Weight Limit from CR 72 Bard Rd to the Town Line, which is about 70% of the road segment between CR 72 Bard Road and Cassadaga Road, so a roadway mitigation may be needed here. This can be eliminated by using this alternate route, but Cassadaga Road, which has a Very Good (New) rating, may or may not need an additional asphalt overlay for the construction traffic. This route could be considered as an alternate route.

Access Route #5 – To Wind Turbine Sites T8/T29/T47/T16/T25/T30/T10/T42/T51/T55/T49, T13 and T23/T17/T14/T5: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret and Stockton. Turn left onto CR 72 Bard Road, travel eastbound, turn right onto South Hill Road. Travel southbound on South Hill Road, continue straight, road becomes Plank Road, turn right for the T8/T29/T47/T16/T25/T30/T10/T42/T51/T55/T49 site, turn left at the same location for the T13 site. For the T23/T17/T14/T5 site, continue south on Plank Road after the T13 access road, turn left onto Weaver Road. Travel eastbound on Weaver Road, then turn right for the T23/T17/T14/T5 site. See Appendix A for the Map of Access Route Locations.

The CR 85 Farrington Hollow Road route from CR 72 Bard Road was considered but, extensive easements and improvements would be needed at the CR 72 Bard Road intersection and the Plank Road intersection. At the CR 72 Bard Road intersection, there is a farm building and a house situated at the intersection that may be within the large turning radius needed, as well as a 115 feet long, 8 feet x 5 feet concrete box culvert located diagonally across the intersection that will need total replacement. At the Plank Road intersection, a large radius will be needed for the CR 85 southbound turn onto the Plank Road northbound direction, which will require a large easement. There is a house within this area which will be part of the mitigation as well as a 40 foot long, 5 feet x 2 feet concrete box culvert under CR 85 Farrington Hollow Road and a 30 foot long, 48 inch corrugated metal pipe under Plank Road, both will have to be replaced under this mitigation. Also the road is considered winding, presenting a safety issue when the turbine delivery truck may need to encroach into the opposite direction travel lane and possibly off the road to navigate around the curves. There could be possible additional mitigation at the curve areas to eliminate this safety issue. It was decided that this route will involve a costly mitigation and was not considered viable.

Access Route #6 – To Wind Turbine Sites T31 and T15/T32/T26/T34/T40: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret and Stockton. Turn left onto CR 72 Bard Road, travel eastbound, turn right onto South Hill Road. Travel southbound on South Hill Road, continue straight, road becomes Plank Road, turn left onto CR 85 Farrington Hollow Road. Travel southbound on CR 85 Farrington Hollow Road, then turn right onto Boutwell Hill Road. Proceed westbound on Boutwell Hill Road, turn right for the T31 site, continue westbound on Boutwell Hill Road, then turn right for the T15/T32/T26/T34/T40 site. See Appendix A for the Map of Access Route Locations.

From CR 72, the CR 77 Rood Road/Cook Road/Lewis Road/Mill Creek Road/East Road/Boutwell Hill Road route was considered but there would be an additional three turns (one involving additional mitigation, the other two have mitigation under the other access routes), so this route was not preferred. Another route is to travel along Housington Road instead of Mill Creek Road/East Road. This road is rated Good, but there are 4 curves, one which is very sharp and will need mitigation. Also two additional

intersections with restricted radii will require mitigation too, so this road was not considered viable. The CR 85 Farrington Hollow Rd. route was considered, but is not viable due to the reasons mentioned under Access Route #5.

Access Route #7 – To the Collector Substation and West Laydown Area, Wind Turbine Sites T41 and T52/T50: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret and Stockton. Turn left onto CR 72 Bard Road, travel eastbound, turn right onto South Hill Road. Travel southbound on South Hill Road., continue straight, road becomes Plank Road, turn left onto CR 85 Farrington Hollow Road. Travel southbound on CR 85 Farrington Hollow Road, then turn right onto Boutwell Hill Road. Proceed westbound on Boutwell Hill Road, past a sharp curve (may or may not require widening), turn right onto Cleland Road. Proceed northbound on Cleland Road, turn left for the Collector Substation and West Laydown area site. Continue through the West Laydown area site to the northwest corner for the access road to the T52/T50 sites. For the T41 site, again continue through the West Laydown area site to the northwest corner for the access road to the T52/T50 sites, stay on the access road, passing the T50 and T52 sites until the intersection of East Road. Turn right at the East Road intersection and proceed eastbound on East Road, past the Cleland Road intersection and then turn left for the T41 site. See Appendix A for the Map of Access Route Locations.

The CR 77 Rood Road/Cook Road/Lewis Road/Mill Creek Road/East Road route was considered but there was one additional turn at a skewed intersection with a tight turn from Mill Creek Road southbound to East Road westbound that would involve a large easement, so this route was not preferred. Another route using Roberts Road from NY 60, then utilizing CR 75 Nelson Rd, Hooker Road and CR 77 Charlotte Center Road to get to East Road involved using the same five turns as the preferred route, but there is an R Posted Bridge on Hooker Road, between Hall Road and CR 77 Charlotte Hill Road, so this route is not viable. Another route to take from NY 60 involved CR 72 Bard Road/Hall Road/Cassadaga Road/North Hill Road to get to East Road. It had the same amount of turns, but North Hill Road had a condition rating of Poor, one bridge along the route, and the segment needed to travel on is 2.6 miles long which could lead to an expensive mitigation, so this route was dropped. The CR 85 Farrington Hollow Rd. route was considered, but was not viable due to the reasons mentioned under Access Route #5. Other roads from NY 60 (Charlotte Hill Rd, Sylvester Road to CR 66 Sinclair Drive, CR 77 Jamestown Road) that go through the Village of Sinclairville and lead to CR 66 Thornton Road, then to Boutwell Road to get to Cleland Road were not acceptable because of the avoidance of construction traffic in the village.

Access Route #8 – To Wind Turbine Site T37/T12/T18/T27/T9/T2/T1/T6/T24/T22: Use Exit 59 off ramp from the Thruway (I-90). Turn left onto NY 60 and travel southbound through the Towns of Pomfret and Stockton. Turn left onto CR 72 Bard Road, travel eastbound, turn right onto South Hill Road. Travel southbound on South Hill Road., continue straight, road becomes Plank Road, turn left onto CR 85 Farrington Hollow Road. Travel southbound on CR 85 Farrington Hollow Road, then turn right onto Boutwell Hill Road. Proceed westbound on Boutwell Hill Road, past the East Road intersection, to the Cleland Road intersection. Turn left onto Cleland Road and proceed southbound until the CR 66 Thornton Road intersection. Turn left onto CR 66 Thornton Road and proceed southbound to the CR 85 Erwin Road intersection. Turn left onto CR 85 Erwin Road and proceed northbound, turn right into the T37/T12/T18/T27/T9/T2/T1/T6/T24/T22 site. See Appendix A for the Map of Access Route Locations.

A more direct route, using the directions above and reaching the point of going southbound on CR 85 Farrington Hollow Road, past Boutwell Hill Road (CR 85 becomes Erwin Road) and turning left for the wind turbine site was considered. But the portion of CR 85 Erwin Road between Boutwell Hill Road and the turbine site is extremely winding with at least four low speed curves in this area. This portion of the roadway creates a hazard when the turbine delivery truck may need to encroach into the opposite direction travel lane to navigate around the curves. There is also a falling rock zone in this general vicinity. This area also has 3 to 4 mid-size concrete box culverts with possible deteriorating conditions, one culvert consists of soldier piles and lagging walls at least 10 feet high and is at a minimum distance of 8 feet from the pavement. It is unknown whether the culvert crossings can support the delivery truck loading. Because of the hazardous conditions around the curves and possible additional mitigation for the culverts, this portion of CR 85 is not a viable route.

The CR 77 Rood Road/Cook Road/Lewis Road/Mill Creek Road/East Road/Boutwell Road/Sanford Road to CR 85 Erwin Road involves 3 additional turns, one at a skewed intersection with a tight turn from East Road eastbound to Boutwell Hill Road westbound which is worse than the Mill Creek Road/East Road intersection evaluated under Access Route #7. There is also a house within this tight curve area where the proposed turning radius is likely to be, involving an expensive easement. Also there are three curves on Sanford Road, two that may require additional mitigation due to the sharpness of the curves, so this route is not viable.

Another route using Roberts Road from NY 60, then utilizing CR 75 Nelson Rd, Hooker Road, CR 77 Charlotte Center Road and East Road to get to Cleland Road involves one extra turn, but was eliminated under Access Route #7 because of the R Posted bridge on Hooker Road.

The CR 85 Farrington Hollow Rd. route was considered, but is not viable due to the reasons mentioned under Access Route #5.

Another route to take from NY 60 involved CR 72 Bard Road/Hall Road/Cassadaga Road/North Hill Road/East Road/Cleland Road/Thornton Road to get to CR 85 Erwin Road, but this route is not viable based on the reasons from Access Route #7.

Swanson Road, which is located east of Cleland Road and somewhat parallel with this road was considered as a connection from Boutwell Hill Road to CR 66 Thornton Road instead of Cleland Road. Swanson Road would have the same amount of restricted intersections as the Cleland Road route but Swanson Road is mostly a gravel road with a Fair condition, while Cleland Road is 75% paved with a fair condition. Swanson Road also has two curves, low tree branches present and is considered a seasonal road, not maintained from Nov. 1st to May 1st, so this roadway segment was not viable. Other roads from NY 60 (Charlotte Hill Rd, Sylvester Road to CR 66 Sinclair Drive, CR 77 Jamestown Road) that go through the Village of Sinclairville and lead to CR 66 Thornton Road or CR 64 Edson/Bates Road, to get to CR 85 Erwin Road were not acceptable for reasons under Access Route #7.

4.2 ROUTE SEGMENT MITIGATION

Along the potential access routes there are numerous roads that have posted weight limits (both seasonal and year round). Also there are five roads (North Hill Road, Cook Road, Lewis Road, Mill Creek Road, and South Hill Road) rated "Poor" that are either used as proposed access routes and/or have turbine access roads located along them. One of these poorly rated roads (Lewis

Road) is a gravel road with a single lane (with one turbine access road location across from Cook Road) that might need to be widened or traffic control provided to accommodate the Overwidth/Overweight delivery vehicles. The asphalt and gravel roads rated “Fair” to “Very Good” should be monitored during construction for pot-holing and deterioration of the pavement to ensure they are safe for general construction and local roadway traffic. The volume and weight of both the general construction traffic and turbine delivery (Overwidth/Overweight) vehicles may cause accelerated distress that could require temporary repair. These temporary repairs/improvements could include repaving with asphalt, adding gravel stone, temporary traffic signs, etc. and be as a condition of a Road Use Agreement with the local municipalities.

After completion of construction activities, there may be permanent improvements needed after the facility completion due to any damage caused by the heavy construction vehicle traffic (especially on any roads that had temporary repairs made during the Construction activities). The contractor might need to repair the roadways to pre-construction conditions using the appropriate treatments such as oil & stone, hot or cold mix asphalt or additional gravel as a condition for a Road Use Agreement. See Appendix H for Table of Potential Roadway Improvements indicating the segment of road that may need temporary and/or permanent improvements along with suggested type for the mitigation and also for Map of Potential Roadway Improvement and Intersection Improvement Locations.

4.3 ROUTE INTERSECTION MITIGATION

The existing pavement widths of the county and town roads vary from approximately 12 feet to 22 feet wide. The existing radius of the edge of the pavement at a typical intersection is approximately 25 to 50 feet. It is typical that a radius of approximately 135-feet to 150 feet is necessary to accommodate the wheel paths of permit vehicles while 150 feet or more may be needed for the load clearance of the vehicles. As a result, the temporary widening of the pavement surface with an aggregate roadway surface will be required to accommodate the trucks turning movements at some locations. Additional mitigation may be needed if the length of a turbine blade extends beyond the outer trailer of the delivery vehicle.

Depending on the truck hauler, there can be various truck configurations to consider. Each truck that the hauler proposes to use will be evaluated and the vehicle with the largest turning movement will determine the design of intersections.

In reference to available information on access road construction, there are formulas that determine the width of clear turning movement needed for the turbine delivery trucks when navigating along curve sections of the roadway. Applying the radius of 150 feet, as mentioned above, and using the mathematical formula (from Gamesa Corp. document dated 5/29/2012) for the longest transport vehicle (turbine blade), the width of the turning radius to accommodate the truck can be determined. Existing pavement surfaces would need to be widened up to three (3) different directions in order to balance the impacts and to attempt to keep the impacts within the existing right of way. Impacts that extend outside of the right of way would require easements and/or land purchases from adjacent property owners.

Facilities typically impacted include ditches, traffic signs, trees, above ground utilities and utility poles. Mitigation usually includes temporary gravel fills, pipe to maintain drainage in the ditched areas, and the relocation of poles, street signs and other appurtenances.

See Appendix H for the Maps of Intersection Turning Movements showing the 150 foot radius impacts on the various intersections along the designated haul routes. Again, the extent of these intersection radii improvements will also be decided/confirmed under a Road Use Agreement with the local municipalities. See Appendix H for the Table of Intersection Improvements indicating the intersections that may need temporary and/or permanent improvements and suggested type of improvements. Also see Appendix H for the Map of Potential Roadway Improvements and Intersection Improvement Locations.

4.4 EXISTING STRUCTURE/UTILITY MITIGATION

The drainage pipes/culverts along the construction routes that have 2 feet or less of cover may have a potential to be damaged by construction activities causing delays to construction and local traffic. Each pipe should be analyzed during final design of the roadway improvements to determine the amount of cover over the pipe or necessary improvements needed to accommodate the construction traffic. Any improvements needed may be a condition under the Road Use Agreement with the local municipalities.

In regard to the bridge structures, the preferred access routes have been decided based on avoiding as many deficient bridges as possible to prevent additional mitigation. The New York State Department of Transportation and Chautauqua County Department of Public Facilities will be required to review and approve all bridges to be used along the access routes in the construction phase during the Special Hauling Permit application process.

Also at various locations along the construction access routes, there may be low overhead wires present that will need to be raised to accommodate the Overwidth/Overweight delivery vehicles due to their transport material heights. Coordination with the local utility companies will be needed to obtain the necessary permits to raise the wires.

5.0 CONSTRUCTION TRAFFIC

5.1 CONSTRUCTION VEHICLE VOLUMES

There will be approximately 11 Overwidth/Overweight trucks required for each turbine. Depending on the turbine selected for the project, at the most, there could be up to 58 turbines. For impact calculation purposes, this study will assume that 58 turbines will be required. Other construction equipment trips will include the following:

- Gravel trucks with capacity of approximately 10 cubic yards (cy) per truck and an estimated gross weight of 75,000 pounds (lbs.), for access road construction (currently the total length of the access roads is 93,000 feet long (17.6 miles) and a minimum of 16 feet wide, with gravel 8 to 10 inches deep.

- Concrete trucks for construction of turbine foundations and transformer pads with capacity of approximately 10 cy per truck and an estimated gross weight of 96,000 lbs. The concrete may range from 500 Tons to 900 Tons depending on model and size of turbine selected per location.
- Variety of conventional semi-trailers for delivery of reinforcing steel (two per turbine foundation) and small substation components and interconnection facility material (approximately 116 trucks).
- Variety of conventional vehicles carrying water, fuel oil, bulk fuels (including wood, biomass, coal and municipal solid waste), chemicals or hazardous materials for construction or operation of the facility.

Trucks and cars for transporting construction workers, equipment and tools are not included in the above list because they are not significant in regard to traffic volumes and causing any damage to the roads.

There are no specific locations for concrete batch plants or stone/sand quarries. All excavation operations for the wind turbine foundations and access roads will have on-site excavation disposal.

The following table represents an order-of-magnitude estimate of the total number of heavy loaded truck trips entering the project site associated with construction of the towers.

Component/Truck Type	Assumption	Trips
Blades	One blade per truck	174
Towers	4 tower sections per turbine	232
Nacelle and Hub	2 truck trips per turbine	116
Road Construction	Gravel trucks 10 cubic yards per truck, plus other construction equipment.	4019
Crane	Several trips per access point depending on the degree of disassembly.	116
Concrete	250 to 450 cubic yards per foundation, 10 cubic yards per truck. Assume 40 trips per tower.	2320
Total Heavy Vehicle Trips		6977

Note: trips should be doubled to account for exiting.

While Overwidth/Overweight vehicles are traveling within the project area and delivery route roadways, the existing traffic may experience minor delays as escort vehicles and/or flag persons stop traffic to allow the safe passage of the Overwidth/Overweight vehicles. See Appendix I for the Table of Construction Vehicle Volumes and Maps of Construction Vehicle Routes/Trip Volumes along access routes to the wind turbine locations.

5.2 CONSTRUCTION ROUTES LEVEL OF SERVICE

A capacity analysis was performed for the study area using the HCS (Highway Capacity Software) by compiling the existing condition traffic volumes and additional construction traffic volumes to estimate the construction route Level of Service during the construction phase. Level of Service (LOS) is a qualitative measure used to relate the quality of traffic service. LOS is used to analyze highways by categorizing traffic flow and assigning quality levels of traffic based on performance measure like speed, density, etc. North American Highway LOS standards, as described in the Highway Capacity Manual and the AASHTO

Geometric Design of Highways and Streets use letter designations of A through F to describe levels of service, with A being the best and F being the worst.

It was assumed that all the turbine sites had the same start and completion date, worked 12 hour days, 6 days a week, 4 weeks per month for a duration of 7 months. The analysis showed that there was very little increase from the Existing Peak Hour Volume compared to the Future Construction Phase Peak Hour Volume. Thus, the Future Construction Phase Level of Service is the same as the Existing Level of Service. Along the access route, State Route 60, between I-90 Thruway Exit 59 and US Route 20, had a Level of Service "C" (Existing and Future), while the remaining access route segments had a Level of Service "A" (Existing and Future). As the existing traffic volumes are low, local traffic flow should not be significantly impacted by the normal construction traffic or during the turbine delivery vehicles. As mentioned in the previous section, local traffic may experience minor delays due to slow moving construction vehicles and increased traffic related to the construction activities. To minimize any delays to local traffic during the construction phase, the Owner/Contractor will be required to coordinate with the State, County and local Municipalities to respond to any locations that may experience any traffic flow or capacity issues. See Appendix B for the Table of Level of Service.

5.3 POST-CONSTRUCTION NEEDS

After construction the project will employ approximately 7 full time employees, all of whom may drive separately to the Operation and Maintenance (O&M) building. Some of these personnel will need to visit each turbine location, as well as the collector sub-station and return to the O&M building. Each turbine and the sub-station typically requires routine maintenance visits once every 3 months, but certain turbines or other project improvements may require periods of more frequent service visits should a problem arise. Such service visits typically involve 1 to 2 pick-up trucks. The post-construction traffic will not have a significant impact on the Level of Service for the highway system or require special transportation considerations such as building new roads, so in conclusion, there are no long term impacts.

6.0 AIRPORT IMPACTS

6.1 AIRPORT LOCATIONS

There are numerous airports and airstrips located within a 20 mile radius from the outside of the wind farm project limits. Two municipal airports operated by Chautauqua County, one in Dunkirk, NY to the north and the other in Jamestown, NY, located to the south, are within 7.5 miles and 10 miles respectively. There is one private airstrip, Spaulding Aerodrome Airport, located on East Road, 0.5 miles east of CR 77 in the Town of Charlotte. This airport/airstrip location is configured in a north-south direction. There are at least 18 wind turbine locations within 2 miles around this airport/airstrip. The closest wind turbine locations are T52, at 0.7 miles and T50, at 0.9 miles, both southeast from the southern end of the airstrip. Assuming the landing and take-off direction are at the northern portion of the runway, there are 9 proposed wind turbine locations that are due north and north/northeast of the

airstrip. The closest turbine locations are location T36 at 1.2 miles and T21 at 1.4 miles north and T35 at 1.6 miles north/northeast. There is also one wind turbine location, T41, which is closest to the airport due east at approximately 1.3 miles.

6.2 AIRPORT COORDINATION

The process of coordinating with the two municipality airports, Dunkirk and Jamestown, was started approximately 2 years ago by the developer. Meetings with the airport manager are documented in the Meeting Log. No concerns with the current turbine layout have been raised by the airport manager. The latest submittal is still under review by the FAA. The United States Department of Defense has also been included in this coordination and have no issues from the previous submittals. See Appendix K for the List of Airports with contact information and for the Map of Regional Airports.

7.0 CONCLUSION

This study has determined the probable local travel routes required for delivery of wind turbine components and construction vehicle transport during the construction of the Cassadaga Wind Project. The study also assesses any impacts to the highway system and road users, both short term (construction) and long-term (post-construction). Various intersection and roadway segment improvements have been identified. Final engineering design and/or a Road Use Agreement will be required prior to construction activities to confirm that all transportation related impacts have been addressed to the satisfaction of the State and local highway departments. The State, County and town municipalities will also be involved with the final routing of the Overwidth/Overweight vehicle loads during the permit process.