NORTH SIDE ENERGY CENTER

Case No. 17-F-0598

1001.25 Exhibit 25

Effect on Transportation

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Exhibit 25: Effect on Transportation

This Exhibit will track the requirements of proposed Stipulation 25, dated February 10, 2021, and therefore, the requirements of 16 New York Codes, Rules, and Regulations (NYCRR) § 1001.25.

25(a) Conceptual Site Plan

Preliminary Design Drawings for the Project are included in Appendix 11-1. These plans identify the proposed solar panel locations, access road locations and widths, and other related Project plans and details.

Details specific to Project access roads and intersections showing horizontal and vertical geometry, number of approach lanes, lane widths, shoulder widths, and traffic control devices are included in Appendix 11-1. Intersection sight distances at the proposed access roads are also included in Appendix 25-1. According to the requirements of 16 NYCRR § 1001.25(2), characterization of public road intersection suitability is required for Projects which include wind turbines. Due to the nature of the Project, expected size of the material, and lack of turbines, characterization of the public road intersection suitability outside of the Project Area is not applicable.

There are no identified posted bridge weight limits within the vicinity of the Project Area. However, the bridge over the St. Regis River that connected Massena-Helena Road (County Route 37) and Basher Falls/Main Street is closed, as is the Depot Street bridge over the Deer River, the Maple Ridge Road over Squeak Brook is signed as a Narrow Bridge (and listed by the NYSDOT as Closed), and the Munson Road Bridge over the St. Regis River. Additional detailed information regarding the bridges in the area is contained in Appendix 25-8. Taylor Road and Munson Road do have truck restrictions.

Sight distance diagrams were developed for the proposed access roads at the entrance/exit for the site entrances at the following locations illustrated in Appendix 25-1:

A. Massena-Helena Road (County Route 37) – north side, west of Taylor Road
B. Massena-Helena Road – north side, east of Taylor Road
C. Taylor Road – west side, south of Massena-Helena Road
D. Massena-Helena Road – south side, west of Taylor Road
E. Daly Road – south side, west of Taylor Road

F. Daly Road – north side, west of Taylor Road
G. Daly Road – south side, west of Taylor Road
H. Small Road – west side, south of Daly Road
I. Hopson Road – east side, north of Small Road
J. Hopson Road – west side, across from Small Road
K. Hopson Road – west side, south of Small Road
L. Quinell Rd – north side, west of Hamill Road
M. NY 420 – east side, south of Gladding Road
N. NY 420 – west side, south of Brouse Road
O. NY 420 – east side, south of Brouse Road
P. Brouse Road – north side, west of NY 420
Q. NY 420 – east side, north of Brouse Road
R. Quinell Road – south side, west of Hamill Road
S. Massena-Helena Road – east side, northwest of Taylor Road

The recommended setback for the decision point is 14.5 feet from the edge of the roadway, plus half the distance to the required travel lane. Massena-Helena Road does not have a posted speed limit. Massena-Raquette River Road does not have a posted speed limit but has a suggested speed limit of 45 mph on a turn so 55 mph was used in the analysis. NY 420 has a posted speed limit of 35 mph. Small Road does not have a posted speed limit but has a suggested speed of 30 mph on turns so 40 mph was used in the analysis. South Raquette Road has a posted speed limit of 30 mph.

The NYSDOT Highway Design Manual (HDM) Chapter 5 Appendix 5C Table 5C-3 and Table 5C-4, have recommended sight distances for left turning vehicles and for right turning vehicles for passenger cars and for combination trucks based upon the Design Speed. These recommended distances reduce significantly at lower speeds. These tables are shown below.

Table 25-1. Design Intersection Sight Distance for Left Turning Vehicles

Table 5C-3 Design Intersection Sight Distance (in feet) - Case B1 - Left Turn From Stop

Design speed (mph)	Passenger Car Lanes Crossed			Single-Unit Truck Lanes Crossed			Combination Truck Lanes Crossed		
	1	2	3	1	2	3	1	2	3
15	170	180	190	210	225	245	255	270	285
20	225	240	250	280	300	325	340	360	380
25	280	295	315	350	375	405	425	450	475
30	335	355	375	420	450	485	510	540	570
35	390	415	440	490	525	565	595	630	665
40	445	475	500	560	600	645	680	720	760
45	500	530	565	630	675	725	765	810	855
50	555	590	625	700	750	805	850	900	950
55	610	650	690	770	825	885	930	990	1045
60	665	710	750	840	900	965	1015	1080	1140
65	720	765	815	910	975	1045	1100	1170	1235
70	775	825	875	980	1050	1125	1185	1260	1330

Table 25-2. Design Intersection Sight Distance for Right Turning Vehicles

Table 5C-4 Design Intersection Sight Distance (in feet) - Case B2 - Right Turn From Stop and - Case B3 - Crossing Maneuver

Design Speed (mph)	Passenger Car Case B2-- Lane Entered Case B3 – Lanes Crossed			Single-Unit Truck Case B2-- Lane Entered Case B3 – Lanes Crossed			Combination Truck Case B2-- Lane Entered Case B3 – Lanes Crossed		
	1	2	3	1	2	3	1	2	3
15	145	155	170	190	205	220	235	250	265
20	195	210	225	250	275	295	310	330	350
25	240	260	280	315	340	365	390	415	440
30	290	310	335	375	410	440	465	495	525
35	335	365	390	440	475	510	545	580	615
40	385	415	445	500	545	585	620	660	700
45	430	465	500	565	610	655	695	745	790
50	480	515	555	625	680	730	775	825	875
55	530	570	610	690	745	805	850	910	965
60	575	620	665	750	815	875	930	990	1050
65	625	670	720	815	880	950	1005	1075	1140
70	670	725	775	875	950	1020	1085	1155	1225

Additional Sight Distance Tables from the American Association of State Highway and Transportation Officials (AASHTO) – A Policy on Geometric Design off Highways and Streets, Seventh Edition, 2018, which forms the basis for the NYSDOT Sight Distances referenced above are contained in Appendix 25-1. The AASHTO Tables show the Stopping Sight Distances, which are the minimum Sight Distances and are the required Sight Distances. It is noted that some of the sight distances were determined based upon photos and aerials. The following are the standard Stopping Sight Distances as per AASHTO for level roadways, with the additional information contained in Appendix 25-1:

Design Speed: 30 mph SSD Design: 200 feet

Design Speed: 35 mph SSD Design: 250 feet

Design Speed: 40 mph SSD Design: 305 feet
Design Speed: 45 mph SSD Design: 360 feet
Design Speed: 50 mph SSD Design: 425 feet
Design Speed: 55 mph SSD Design: 495 feet

All Design Stopping Sight Distances and most Design Sight Distances will be met for each of the access points. Thus, the minimum required sight distances will be met for all conditions. There are some locations that may require trimming and/or removal of vegetation to provide the proper sight distances. There are some locations where the roadway curvature somewhat limits the sight distance but there could be an increase in the sight distance by the trimming and/or clearance of some vegetation along the roadway. Site Driveway D, Massena-Helena Road – south side, west of Taylor Road, may need some trimming and/or clearance of vegetation on the curves. Site Driveway P, Brouse Road – north side, west of NY Route 420, is approximately 410 feet from NY Route 420. Cars traveling westbound will have turned from NY Route 420 and thus would be making the turn at a lower speed. In addition, because of the height of the seated truck driver and the height of the trucks, trucks drivers can see a further distance and trucks can be seen at a further distance, thus further increasing the available Sight Distance. Signage could be added if deemed necessary.

25(b) Description of the Pre-construction Characteristics of Roads in the Vicinity of the Project

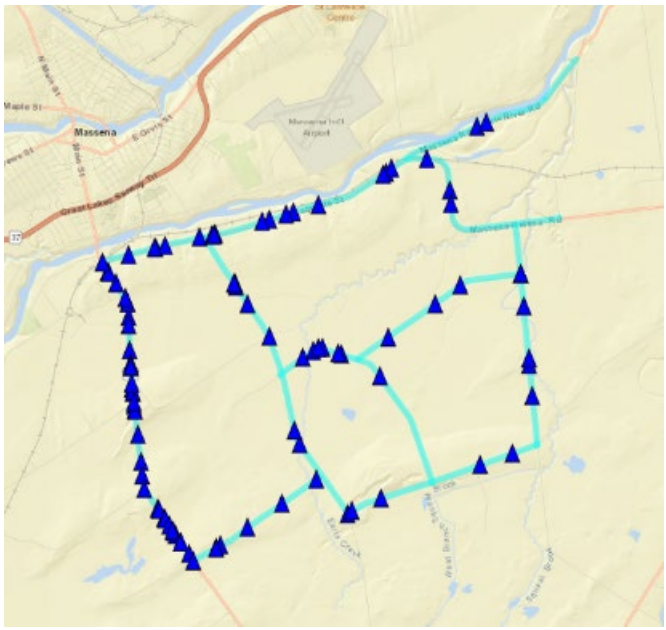
(1) Traffic Volumes and Accident Data

Existing traffic volume data was obtained from the NYSDOT Traffic Data Viewer and NYSDOT Highway Data Services Bureau, where historical traffic count data is available online. Average Annual Daily Traffic (AADT) volumes for roads within the Project Area are provided by route in Appendix 25-3. Additional detailed information is also contained in Section 25(d)(2) below including vehicle traffic and use levels.

Existing accident data for the Project Area was obtained from NYSDOT through a Freedom of Information Law (FOIL) Request. Accident data was obtained for segments in the vicinity of the Project Area (see Figure 25-1) for a three-year period from 2017-2019 and is summarized in Appendix 25-4 by case number. During that three-year period, there were a total of 92 accidents, with 55 (60%) accident types involving a deer or other animal, 9 (10%) rear end, 14 (15%) fixed object, 4 (4%) angle, and 6 (7%) other. Of the 92 accidents, 70 (76%) accidents were listed as property damage only, 5 (5%) accidents involved some type of injury, and 18 (16%) accidents

were non-reportable. The breakdown by year for the three-year period is as follows: 31 accidents in 2017, 25 accidents in 2018, and 36 accidents in 2019.

Graphic 25-1. Project Area Accident Map



(2) Transit Facilities and School Bus Routes

St. Lawrence County Public Transit has many routes travelling throughout the county. Transit routes and schedules are included in Appendix 25-5. While transit vehicles and some construction related vehicles will share one of the same roadways, the impacts to the local transit routes is expected to be minimal. The Applicant will coordinate with the County to avoid any impacts and delays of routes throughout the construction process.

Though road closures are not anticipated, should any local roadways need to be temporarily closed during construction for a short period of time, the contractor (or Applicant) will contact the appropriate local agencies to provide notifications including the Massena Central School District Transportation Department and the Brasher Falls Central School District Transportation Department, who establishes the school bus routes. Construction of the North Side Energy Center is not expected to impact school bus stop locations, but in the event that stops are impacted, the contractor (or Applicant) will provide safe accessible waiting areas. Additional information regarding the School Bus Routes is contained in Appendix 25-5.

(3) Emergency Service Approach and Departure Routes

Emergency services, if necessary, would be provided by various entities including, but not limited to:

- Brasher Winthrop Fire Department
  900 NY-11C
  Brasher Falls, NY 13613
- Massena Police Department
  60 Main Street
  Massena, NY 13662
- Massena Rescue Squad
  341 East Orvis Street
  Massena, NY 13662
- Massena Volunteer Fire Department
  34 Andrews Street
  Massena, NY 13662
- Tri-Town Volunteer Rescue
  900 NY-11C
  Brasher Falls, NY 13613

In the event of an emergency, the local emergency service providers will take the most direct/fastest available route to the Project Area, depending upon current conditions and their starting locations as their origin points may change due to other emergencies or if a police vehicle is on patrol at the time, as well as the location of the incident at the Site. Descriptions and illustrations of the routes to/from each of the above Emergency Services facility are contained in Appendix 25-2.

The Applicant will reach out and coordinate with the local emergency service providers throughout the development and construction process, so that they are aware of road closures (if necessary) that may impact their routing decisions. They will also be kept informed of expected site work and number of workers so they can plan accordingly.

(4) Load Bearing Structural Rating Information

No bridges with weight restrictions that vehicles traveling to or from the Project Site would utilize were identified in the Project Area. However, the NYSDOT may issue weight and speed restrictions when weather conditions dictate. Information on bridges including Posted Bridges is provided in Appendix 25-8.

There is a “No Trucks” sign on Munson Road northwest of County Route 53. There is a “No Trucks - 8 Ton Total Load” sign on Taylor Lane, just south of Route 53.

(5) Urbanized Areas Traffic Volume Summary

The Project is not within a congested urbanized area. Therefore 24-hour traffic volume counts and peak turning movement counts for typical weekday morning, weekday afternoon, and Saturday peaks, at representative critical intersections are not applicable and are not included in this Application.

25(c) Facility Trip Generation

(1) Number, Frequency and Timing of Vehicle Trips

To better understand how the construction of the North Side Energy Center will potentially impact the adjacent roadway system, trips were generated for the Project Area based on the peak construction workforce and construction equipment deliveries. Typically, these trips would be calculated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, where data from similar sites has been collected and aggregated to provide estimates for peak hour and daily site traffic volumes. However, there are no published trip generation rates for solar farm construction or similar type construction. The peak construction workforce for this Project is expected to be up to approximately 247 workers which was distributed to/from the Project Area, conservatively assuming one worker per vehicle per day. In addition to construction workforce trips, construction equipment delivery trips were included in the traffic analysis for the construction period. Table 25-3 provides a detailed summary of the expected construction and Project material delivery vehicles with a brief overview in the subsequent section. Load trips for the “Equipment and Installation” phase (69 trips) were added to the peak construction workforce to conservatively simulate the worst-case traffic operation scenario during the construction period. Graphic 25-2 shows the estimated distribution percentages used in calculating construction worker trips and construction equipment deliveries to and from the Project Area. There are other potential routes

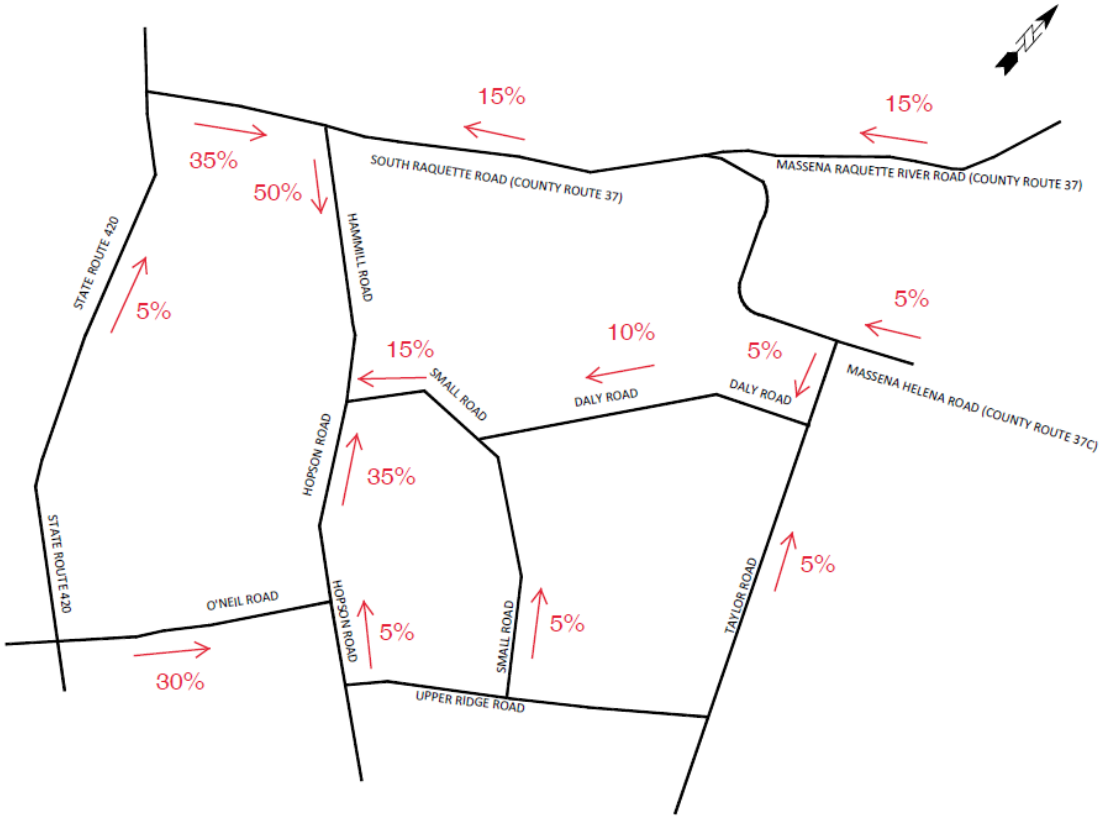
that some vehicles may take but the routes illustrated were utilized to be conservative in the Traffic Analyses. Additional details regarding these routes are described in Section 25(c)(4) below.

During the operational phase of the Project, two employees will be on-site periodically for vegetation management and routine Project Component maintenance. Heavy vehicles/equipment will not be traveling to and from the site regularly. This workforce will not affect traffic around the Project Area and will have no impacts on adjacent roadways. Details on frequency of employee visits to the Project for operations and maintenance is provided in Appendix 5-3, Preliminary Operation and Maintenance (O&M) Plan.

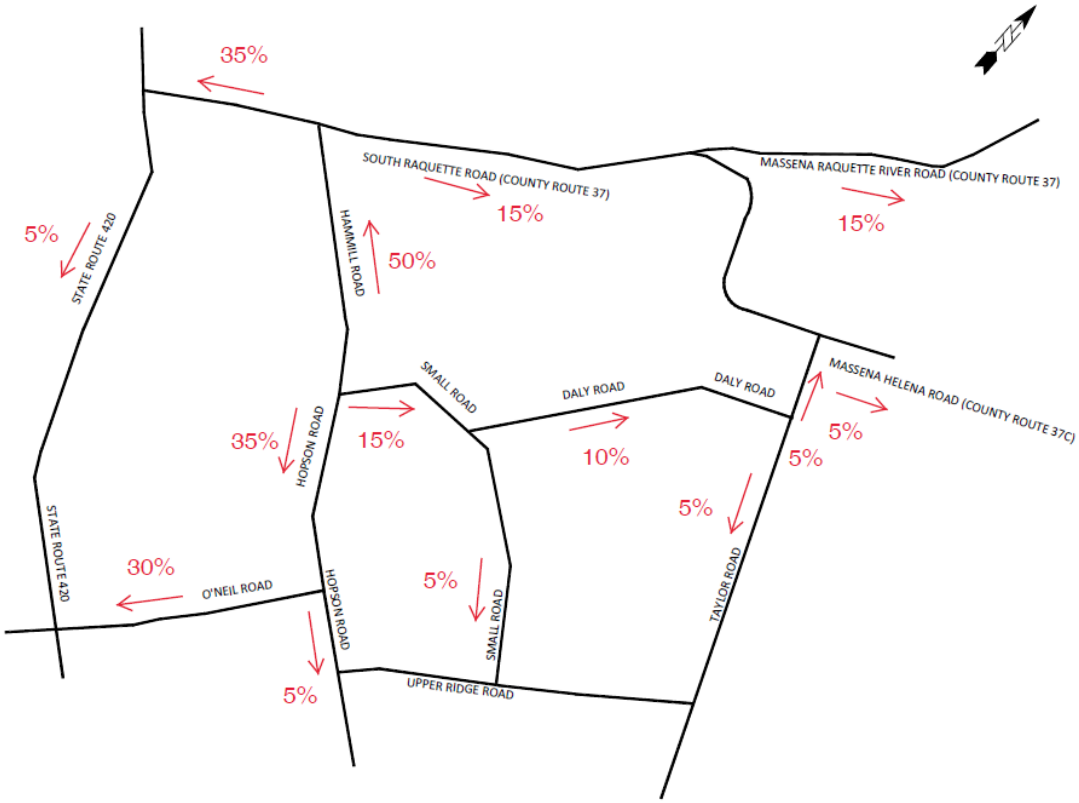
Construction of the North Side Energy Center will comply with the substantive requirements of the Town of Massena, Town of Brasher, and St. Lawrence County local laws and ordinances as they relate to transportation and construction vehicle deliveries. The Applicant anticipates entering into Road Use agreements with the three host towns and St. Lawrence County concerning repairs to any roads damaged by construction of the Project. The hours of construction are to be determined but are likely to be 7:00 AM to 7:00 PM Monday through Saturday. To be conservative, the peak construction trips were combined with the roadway peak hours for analysis purposes. Refer to Exhibit 31 for further analysis.

Graphic 25-2. Project Area Site Distribution Percentages

ARRIVAL DISTRIBUTION DIAGRAM



DEPARTURE DISTRIBUTION DIAGRAM



Site Preparation and Grading Equipment

Graders – It is expected that there will be two graders used for the site preparation and grading of the Project. Each grader will have a 174-horsepower engine and have an approximate weight of 43,000 pounds per vehicle.

Rubber-Tired Loaders – It is expected that there will be two rubber-tired loaders in use. Each loader will have a bucket capacity of approximately 2.1 to 5.0 cubic meters and a maximum horsepower of 164. The weight of the rubber-tired loader is approximately 31,000 pounds.

Scrapers – It is anticipated that there will be three scrapers used with approximately 313 horsepower each. The approximate operating weight is 80,000 pounds for each scraper.

Water Trucks – It is expected that there will be two water trucks in use at the Project Area. Each truck will be equipped with a 189-horsepower engine. Depending on the size of the tank, the average weight can be 50,000 pounds to 75,000 pounds. For every 2,500 gallons of liquid, the

average approximate weight will be an additional 25,000 pounds over the weight of the vehicle carrying the tank, which can range from 17,000 pounds to 25,000 pounds.

Generator Sets – Two generator sets will be delivered and used for the construction of the Project.

Trenching and Road Construction Equipment

Excavators – Three excavators will be delivered and used for the construction of the Project. It is approximated that each excavator will weigh roughly 50,000 pounds. The net power for the excavator will be approximately 168 horsepower.

Trencher – There will be four trenchers used at the Project Area. These trenchers will have an operating power of approximately 63 horsepower.

Equipment Installation

Crane – It is expected that a Lattice Crawler Crane will be used to construct the Project. Typical transportation of these cranes requires disassembly and placement on a trailer. It is expected that each crane set up will require approximately seven trailer loads with the main transport load weighing approximately 80,000 pounds.

Forklifts – Eight forklifts will be in operation during construction of the Project. The weight of each forklift is approximately 25,000 pounds. The horsepower of each forklift is approximately 145 horsepower.

Pile Drivers – It is estimated that ten pile drivers will be in use at the Project Area. Each pile driver will have an approximate weight of 30,000 pounds.

Pickup Trucks/ATVs – There will be approximately 45 pickup trucks and all-terrain vehicles (ATVs) entering the Project Area during construction.

Construction Equipment and Materials

Aggregate Trucks – Temporary and permanent access roads will be constructed at the Project Area to provide access from the existing roadways. The access roads will be constructed of 11,121 cubic yards gravel aggregate material while 3,478 cubic yards will be utilized for the inverter pads and substation/switchyard pads. A total of 664 large dump trucks with an approximate carrying capacity of 22 cubic yards and a weight of 80,000 pounds will be used to

deliver the materials to the Project Area. Construction is expected to occur during the first three to four months, which equates to approximately 7-10 truck trips per day.

Based on the preliminary cut and fill calculations performed in Exhibit 21, no soil is expected to be removed during construction. There will be an excess of approximately 5,390 cubic yards of topsoil which will be distributed throughout the site.

Concrete Trucks – Concrete will be necessary for perimeter fencing and substation foundations associated with the Project. Approximately 3,100 cubic yards of concrete will be needed for fencing and an additional 410 cubic yards of concrete for the substation and switchyard foundations. Trucks with an approximate capacity of 8 cubic yards and a weight of 70,000 pounds will be used to deliver the material to the Project Area. These vehicles will be of legal size and weight, not exceeding 80,000 pounds load limits. Construction of the perimeter fencing and substation and switchyard foundations are not expected during the peak construction period but are expected to occur during the last couple of months of construction, and therefore is not included in the traffic analysis but equates to approximately 9 truck trips per day.

Conventional Semi-Trailers – Semi-Trailers will be used to transport the solar array components and construction equipment to the Project Area. These vehicles will be of legal size and weight, not exceeding 80,000 pounds load limits.

Special equipment Components including substation/switchyard control rooms, substation poles, generator step-up unit (GSU), inverters, etc. will exceed the legal weight and/or size up to 200,000 lbs. Special hauling permits and/or road use agreements along the Project haul routes will be obtained prior to delivery.

Based on the expected transportation methods and proposed construction work, Table 25-3, below, summarizes the expected number of loaded trips generated entering the Project Area.

Table 25-3. Expected Number of Loaded Trips

Equipment/Activity	Construction Equipment	Trips
Site Preparation and Grading	Graders (174 hp)	2
	Rubber Tired Loaders (164 hp)	2
	Scrapers (313 hp)	3
	Water Trucks (189 hp)	2
	Generator Sets	2
	Roller/Compactor	1

Table 25-3. Expected Number of Loaded Trips

Equipment/Activity	Construction Equipment	Trips
Trenching and Road Construction	Excavators (168 hp)	3
	Graders (174 hp)	3
	Water Trucks (189 hp)	2
	Trencher (63 hp)	4
	Rubber Tired Loader (164 hp)	2
	Generator Sets	2
Equipment and Installation	Crane (399 hp)	1
	Crane (165 hp)	1
	Forklifts (145 hp)	8
	Pile Drivers	10
	Pickup Trucks/ATVs	45
	Water Trucks (189 hp)	2
	Generator Sets	2
Commissioning	Pickup Trucks/ATVs	5
Access Roads	Dump Trucks (22 yd^3)	664
Fencing & Substation	Concrete Trucks	439

Earthwork activity, construction of access roads, and fencing installation will not occur at the same time as the peak workforce and equipment installation construction period. Added trips for these activities are expected to be approximately 10 trips per day during the first three to four months and 9 trips per day during the final two months, which does not exceed the peak workforce of 247 trips per day and equipment/installation phase of 69 trips. Therefore, dump trucks for earthwork/access roads and concrete trucks for fencing were not factored into the traffic analysis, which only analyzed the peak construction traffic volumes.

(2) *Approach and Departure Routes for Trucks Carrying Water, Fuels, or Chemicals*

During Project construction, all trucks carrying water, fuels, or chemicals will utilize the same delivery routes used by other construction vehicles/Component delivery haulers as illustrated in Appendix 25-6. Section 25(c)(4) of this Exhibit below provides detailed routes to the Project Area from every direction which applies to the haul routes as well as construction worker commuter trips.

(3) Cut and Fill Activity

Estimates using the Preliminary Design Drawings (Appendix 11-1) indicate approximately 44,937 cubic yards of material will be excavated during the facility construction. In addition, approximately

39,546 cubic yards of soil fill (not gravel) will be required and placed. The fill is derived from excavations associated with Project construction. Excess material of approximately 5,390 cubic yards from excavations will be distributed across the disturbed areas and blended into existing topography to return each area to its approximate original condition. Approximately 14,599 cubic yards of gravel fill will be imported to the Project Area for roads, inverter pads and substation/switchyard pads Please see Appendix 11-1 for the Preliminary Design Drawings and Exhibit 21 for additional information on cut and fill activity.

(4) Conceptual Haul Routes and Employee Approach and Departure Routes

To North Side Energy Center – There are various regional routes to reach the North Side Energy Center. In the vicinity of the Site, there are different State Routes including US 11, NY 37 and 37C, NY 56, NY 95 NY 310, and NY 420. There are also different County Routes including CR 17, CR 21,CR 37, CR 38, CR 46 and CR 53 as well as local roadways. There are also routes from Canada.

There are no Interstate Highways in the immediate vicinity of the Site. Interstate 81 is about 70 miles west of the Site while Interstate 87 is about 70 miles east of the Site. Interstate 90 is approximately 120 miles south of the Site.

Illustrations of preliminary potential key routes from major centers are contained in Appendix 25-6. These include details of the particular possible routes including turn by turn movements and account for other locations along the routes. For consistency purposes, all of the routes are shown to end at the intersection of Hopson Road and Small Road.

25(d) Traffic and Transportation Impacts

(1) Analysis of Future Traffic Conditions

The majority of potential traffic impacts will be short-term and primarily due to the temporary influx of personnel and investment during construction. Potential long-term effects to maintain and operate the solar farm are anticipated to be minimal. As mentioned previously in section 25(c)(1), two employees will be on-site periodically for various management/maintenance work, which is significantly fewer trips than the peak construction period of 316 additional trips. Therefore, no impacts on future traffic conditions are anticipated as a result of the operation of the Project. Refer to Appendix 5-3, Preliminary O&M Plan, for details on frequency of employee visits to the Project

for operation and maintenance. Based upon a preliminary review of the Project Area, no existing culverts were considered to be in poor condition requiring upgrading or replacing at this time.

(2) Evaluation of the Road System to Accommodate the Projected Traffic

With additional trips generated by the construction of the solar farm, the level of service (LOS) was evaluated for both the existing traffic volumes and construction level traffic volumes to express the performance of the existing roadway facilities.

Existing Traffic Data

Existing traffic volume data was obtained from the NYSDOT Traffic Viewer and NYSDOT Highway Data Services Bureau, where historical traffic count data is available for downloading. AADT volumes are provided by route for a majority of the County and State Routes in the area. Traffic count data was sporadically available for many of the local roads within the Project Area. The table below summarizes the available traffic data within the Project Area:

Table 25-4. Available Traffic Data within the Project Area

Site No.	Route/ Road Name	From	To	AADT	Count Station	Count Year
A	Massena-Helena Road	CR 46	Brasher T/L	293	756158	2012
B	Massena Raquette Road	CR 37	SR 37C	532	756056	2012
C	NY - 420	End 11C/420 OLAP	CR-57	3,083	750062	2014
D	Small Road	Hopson Road	Upper Ridge Road	307	756115	2014
E	South Raquette Road - West	S Main St	Village Line	2197	751211	2016
F	South Raquette Road - East	Massena V/L	CR 46	1,510	758079	2010

Roadway Characteristics

Existing roadways within the Project Area fall into three functional classifications as defined by NYSDOT Office of Technical Services and Federal Highway Administration (FHWA).

Principal Arterial Interstate – There are no Principal Arterial Interstates located within the Project Area. Principal Arterial Interstates are roadways classified as an interstate that carry multiple travel lanes and are designated for high rates of speed between major points.

Principal Arterial Other – The only Principal Arterial Other found within the Project Area is NY Route 37. Principal Arterials Other are roadways classified as a non-interstate that consist of a connected rural network of continuous routes that serve corridor movement having trip length and travel density characteristics indicative of substantial statewide or interstate travel and provide an integrated network without stub connections except where unusual geographic or traffic flow conditions dictate otherwise.

Minor Arterial – There is one Rural Minor Arterial roadway classified by the NYSDOT in the vicinity of the Project Area: Bayley Road. A portion of NY Route 420 and CR 40 are also considered Minor Arterials. Minor Arterials are often moderate length and usually provide a connection to a higher-level roadway, such as a Principal Arterial. In rural areas, such as the Project Area, Minor Arterials provide high travel speeds with minimal disruption to the through traveling vehicles.

Major Collector – The only Major Collector roadways within the Project Area as classified by the NYSDOT are NY Route 11C and NY Route 420 as well as East Hatfield Street. Major Collectors generally have few driveways and also allow for minimal disruption to the through traveling vehicles. Major Collectors can be shorter in length and have fewer daily traffic than Minor Arterials.

Minor Collector – The only Minor Collector roadways within the Project Area as classified by the NYSDOT are NY 37C, CR 49, CR 53 and portions of CR 37 and CR 46. Minor Collectors generally are spaced at intervals to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road, while providing service to the remaining smaller communities and linking the locally important traffic generators with their rural areas.

Local Road – There rest of the roadways within the Project Area are identified as Local Roads including Hopson Road, Small Road, and Daly Road. These roads account for the largest percentage of total roadway miles. These roadways are short and are intended for specific local access. Local roads primarily facilitate direct access to adjacent property owners with many driveways and access points.

In addition to the classifications, most of the roadways in the Project Area are generally rural in nature and generally provide one travel lane in each direction with limited shoulder and roadside

treatments. A few roads like NY Route 37 have two lanes per direction. The majority of the existing intersections are stop-controlled. There are limited signalized intersections aside from the main portion of Massena.

Performance Methodology

Based on the functional classifications of the roadways in the Project Area, roadway performance was analyzed by methods described in Chapter 12 and Chapter 15 of the Highway Capacity Manual 6th edition (HCM). Chapter 12 covers the guidance necessary for determining the performance of Multilane Highways, defined as highways with two (2) or more lanes of travel in one direction. Chapter 15 of the HCM provides guidance for determining the performance of Two-Lane Highways, defined as roadways where passing maneuvers take place in the opposing lane of traffic and where segments are in excess of two miles from the nearest signalized intersection. Chapter 15 was recently amended by the National Cooperative Highway Research Program (NCHRP) and calculations for the Level of Service (LOS) of two-lane highways were performed using the methodology from their findings.

Chapter 12 of the HCM states that multilane highways can be characterized by three performance measures. Each of the three measures are indicators of how well traffic is being accommodated by the multilane highway segment. The three measures are listed below.

- Density in passenger car per mile per lane
- Space mean speed in miles per hour
- Ratio of demand flow rate to capacity (v/c)

Exhibit 12-15 (Table 25-5 below) from the HCM visually depicts the ranges of the density of the multilane highway that determines the level of service. This is illustrated below.

Table 25-5. LOS Criteria for Multilane Highway Segments

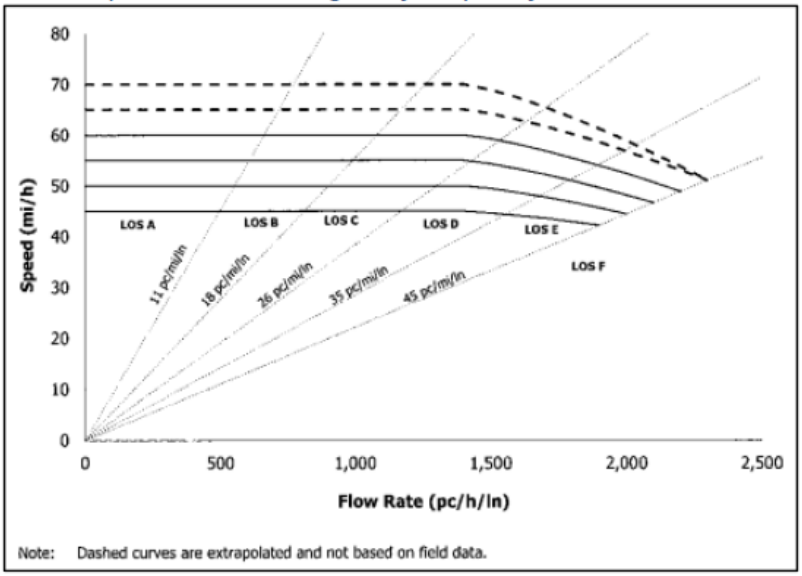
[Taken from Chapter 12 of the Highway Capacity Manual 6th Edition (HCM)]

LOS	Density (pc/mi/ln)
A	≤11
B	>11–18
C	>18–26
D	>26–35
E	>35–45
F	Demand exceeds capacity OR density > 45

Exhibit 12-17 (Figure 25-3) from the HCM graphically represents the speed of the passenger car verses flow rate of the multilane highway segment. This graphic can be seen below.

Graphic 25-3. LOS Criteria and Speed-Flow Curves for Multilane Highway Segments

[Taken from Chapter 12 of the Highway Capacity Manual 6th Edition (HCM)]



Two-lane highway LOS calculations were recently updated within Highway Capacity Software (HCS) 7 based on new studies performed by the NCHRP and published in the *"Improved Analysis of Two-Lane Highway Capacity and Operational Performance (2018)"*. Calculating the LOS for a two-lane highway includes the analysis of the "Follower Density" (FD). FD is calculated by examining the percent follower in the analysis direction and multiplied by the ratio of the flow rate vs. average speed in the analysis direction. This formula is illustrated below in Figure 25-4. When calculated, the LOS can be determined by comparing the FD value received to the range of values for the LOS as seen in Table 25-6 below.

Graphic 25-4. Follower Density Equation

[Taken from "Improved Analysis of Two-Lane Highway Capacity and Operational Performance (2018)"]

Follower density, for use with Table F-35 is calculated as follows.

$$FD = \frac{PF}{100} \times \frac{v_d}{S} \qquad \text{(F-25)}$$

where:

FD = follower density in the analysis direction (followers/mi),
PF = percent follower in the analysis direction,
v_d = flow rate in the analysis direction (veh/h), and
S = average speed in the analysis direction (mi/h).

Table 25-6. Follower Density Thresholds

[Taken from "Improved Analysis of Two-Lane Highway Capacity and Operational Performance (2018)"]

Table F-35. Follower Density Thresholds

LOS	Follower Density (followers/mi/ln)	
	High-Speed Highways Posted Speed Limit ≥ 50 mi/h	Low-Speed Highways Posted Speed Limit < 50 mi/h
A	≤ 2.0	≤ 2.5
B	> 2.0 – 4.0	> 2.5 – 5.0
C	> 4.0 – 8.0	> 5.0 – 10.0
D	> 8.0 – 12.0	> 10.0 – 15.0
E	> 12.0	> 15.0

Existing Level of Service

Based on the existing traffic volumes and existing roadway characteristics, the existing LOS was calculated. It was assumed that the design hour of the roadway accounts for 10% of the AADT and that the directional distribution is 60% of the combined two-way design hour volume.

As shown in Table 25-7 below, under base conditions, all roadways within the Project Area are currently operating as LOS A during the design hour which indicates there are no capacity problems.

Table 25-7. Existing Traffic Volumes & Characteristics for Two-Lane Highways

Site No.	Route/Road Name	Speed Limit (MI/HR)	Design Hour Volume (V/H)	Opposing Direction Volume (V/H)	Follower Density (FOLLOWERS/MI/LN)	LOS
A	Massena-Helena Road	55	21	19	0.0	A
B	Massena Raquette Road	50	24	28	0.0	A
C	NY - 420	35	154	211	1.1	A
D	Small Road	40	18	16	0.0	A
E	South Raquette Road - West	30	133	127	1.2	A
F	South Raquette Road - East	30	86	97	0.6	A

Construction Level of Service

To evaluate the impacts that the construction of the solar farm will have on the roadway system, roadways within the Project Area were evaluated with the additional construction traffic, which can then be compared to the existing roadway traffic capacity analysis. The previously developed

247 peak hour construction worker trips and 69 equipment delivery trips were added to the existing design hour traffic volumes to develop the total traffic volumes during construction. Table 25-8 below summarizes the HCS outputs for two-lane highways. Refer to Appendix 25-7 for additional information on HCS outputs for two-lane highways.

Table 25-8. Traffic Volumes & Characteristics for Two-Lane Highways During Construction

Site No.	Route/Road Name	Speed Limit (MI/HR)	Design Hour Volume (V/H)	Opposing Direction Volume (V/H)	Follower Density (FOLLOWERS/MI/LN)	LOS
A	Massena-Helena Road	55	39	36	0.1	A
B	Massena Raquette Road	50	77	80	0.2	A
C	NY - 420	35	277	334	2.9	B
D	Small Road	40	71	69	0.3	A
E	South Raquette Road - West	30	257	250	3.5	B
F	South Raquette Road - East	30	138	149	1.3	A

It is expected that all roadways will continue to operate at LOS B or better within the Project Area for the multilane and two-lane highways during the construction period. Additional construction related vehicles traveling the roadways will have little impact on the roadways due to the minimal existing demand. Future traffic analysis for the operating condition was not performed since that period is expected to have significantly fewer daily trips than the construction period. The construction period represents the absolute worst case in terms of total traffic volumes. Given that the construction period is not expected to have any traffic impacts, with LOS B or better at each segment analyzed, the future operations will function with equal or less traffic operational impacts than the construction period.

(3) Route Evaluation - Over-Size Load Deliveries and Roadway Restrictions

As mentioned at the beginning of this Exhibit, no bridge weight limits were identified within the vicinity of the Project Area. Taylor Road and Munson Road do have truck restrictions. Road use agreements will be sought with the appropriate agencies, as necessary, to use these roadways. Turning template diagrams for trucks are contained in Appendix 25-9. The roadway system is adequate to accommodate oversize and overweight vehicles without additional mitigation. If a

proposed oversize/overweight route is not feasible, then the condition and load rating of the roadway will be checked during the haul route evaluation. Should the review find reason for concern, the structure will be temporarily reinforced for the oversize/overweight Component delivery or a different route will be utilized. No other improvements are necessary to accommodate oversize/overweight vehicles that will be used.

(4) Measures to Mitigate for Impacts to Traffic and Transportation

Transit and School Busing – The Applicant will coordinate with local school districts to avoid impacts and delays to bus routes throughout the construction process. Local school districts will be advised in advance of any road closures so that alternative routes can be developed. It is expected that overall impacts to the local school districts busing program will be minimal and no significant mitigation exceeding ongoing coordination is recommended.

Emergency Response – The Applicant will coordinate with local emergency service providers throughout the construction process, so that they are aware of any sporadic road closures that may impact their routing decisions during the duration of the closure. They will also be kept informed of expected site work and number of workers so that emergency response can be planned for in advance. It is expected that overall impacts to the local emergency service providers will be minimal and no significant mitigation exceeding ongoing coordination is recommended.

Traffic Impacts – It is expected that all roadways will operate at LOS B or better within the Project Area during the peak hour of the day. The results of the traffic analysis indicate that no new traffic control devices are required and that there will be minimal impacts to the traveling public during the peak construction period and virtually no impact to the traveling public during off-peak periods. Thus, measures such as timing restrictions are not required. No capacity improvements or roadway upgrades are required to accommodate the construction of the proposed facilities. If any overweight/oversize permitting and road feasibility issues arise, Road Use and Restoration Agreements will be put in place, as well as the necessary Permits, as described below in Section 25(d)(5).

(5) Road Use and Restoration Agreements

The Applicant has met with local officials in the Project Area. During these meetings the Applicant has briefed the local and county representatives about the Project, construction operations, the

application process, and discussed road use agreements/permits. No major road projects or future plans were identified by any of the representatives.

The Applicant anticipates that the large dimension and weight of several components (switchyard control rooms, substation poles, GSU, etc.) will require special hauling permits and/or road use agreements along the project haul routes. The types of NYSDOT and County permits required depend on the characteristics of the vehicle and its cargo, number of trips, distance traveled, and duration. NYSDOT defines oversize/overweight vehicles as those exceeding the dimensions provided in Table 25-8 below (e.g., overall, inclusive of load, bumpers, etc.).

Any vehicle exceeding 16 feet wide, 160 feet long, 15 feet 11 inches high or 199,999 pounds will require a super load permit. The application/permit process can be done on-line through the NYSDOT website. The fee structure for the super load permit is also published on-line and are cumulative based on load configuration and weight.

Table 25-9. NYSDOT Over-size/Over-weight Vehicle Dimensions

		State Highway	Qualifying or Access Highway
A.	Width of Vehicle, inclusive of load	8 feet	8 feet 6 inches
B.	Height of vehicle from underside of tire to top of vehicle, inclusive of load	13 feet 6 inches	13 feet 6 inches
C.	Length of single vehicle inclusive of load and bumpers	40 feet	40 feet
D.	Length of a combination of vehicles inclusive of load and bumpers	65 feet	Unlimited
E.	Length of a single trailer	48 feet	53 feet
F.	Length of a single twin trailer	28 feet 6 inches	28 feet 6 inches

Prior to construction, the Applicant and/or contractor will obtain all necessary permits from the NYSDOT. Road Use Agreements with the Towns and St. Lawrence County will be sought, as applicable. The final transportation plan will be provided to the Secretary or in the Compliance Filing prior to construction, and will specify the local, County, and State roads to be used as delivery routes (both within and outside of the Project Area) by construction/transportation vehicles.

The Applicant is requesting in this Application delegation by the Siting Board to NYSDOT for any required NYSDOT highway work/use permits. The Applicant plans to enter into easements, road use agreements, or any other required approvals from the Towns of Massena, Brasher, and Norfolk, and St. Lawrence County for the installation of collection lines, as applicable. The Applicant will discuss with the County any potential permitting for County rights of way. Exhibits 31 and 32 provide a further discussion of any potential approvals.

In accordance with the anticipated Road Use Agreements, directly prior to construction, a survey of the local roadways utilized to access the Project Area will be carried out by appropriately qualified engineers (and NYSDOT, County Highway, and Town Highway Departments as available) to assess and document current existing road conditions as requested by the applicable Town or the County. Any extraordinary damage or over-run caused by vehicles during the construction period is to be repaired to agreeable standards under a Road Use Agreement with the relevant authority (State, County, or Town). The Applicant will repair damage done to roads affected by construction thereby restoring the affected roads to a condition equal to or better than documented by the pre-construction survey. Roads will also be maintained in good working order during construction. The Project Sponsor will establish a road use reparation fund or purchase a reparation bond as financial assurance that the roads damaged by the activities of the Project's construction will be repaired to the standards required by the Road Use Agreement.

25(e) Public Transportation, School Bus Routes, Aeronautical and Military Operations

The Project is designed to avoid and mitigate impacts to mass transit, and aeronautical and military operations. Mass transit systems, aside from some bus routes, are limited within the Project Study Area. Therefore, impacts are not anticipated, and mitigation measures will not be required.

As noted above, the Applicant will coordinate with local school districts to avoid impacts and delays to bus routes throughout the construction process.

The Federal Aviation Administration (FAA) evaluates potential impacts on air navigation for proposed structures that exceed certain criteria, such as heights greater than 200 feet above ground level and in close proximity to public use and military airports (14 CFR §77.9(a-e)). The Applicant will utilize the FAA Notice Criteria Tool to confirm if a consultation is required. Massena International Airport (also known as Richards Field) is located north of the Site, on the northern side of the Raquette River. It is a public airport and provides both commercial and commuter air

service. It is owned and operated by the Town of Massena. It is also a United States Customs Port of Entry for airplanes entering the United States from Canada or other foreign countries.

25(f) Federal Aviation Administration Review

As noted above, the Applicant will utilize the FAA Notice Criteria Tool to confirm if a consultation is required in accordance with 14 Code of Federal Regulations, Part 77 pursuant to 49 U.S.C., Section 44718.

In accordance with NYCRR §1001.25(f)(2)(i), the Applicant has consulted with Massena International Airport and provided a detailed map, a description of the project, and a request for any questions and/or comments regarding the Project. No response has been received as of the filing of this Application.

25(g) Offsite Improvements

No offsite improvements are anticipated to be necessary for the Project.

References

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New York State Department of Transportation – Functional Classifications https://www.dot.ny.gov/divisions/engineering/applications/traffic-data-viewer/tdv-definitions/Functional-Classifications.htm

New York State Department of Transportation Over Size/Over Weight Vehicle Pre-Screening Tool https://gis.dot.ny.gov/html5viewer/?viewer=osowscreen

NYSDOT. Accident Data FOIL Request

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