TRELINA SOLAR ENERGY CENTER

Case No.: 19-F-0366

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 June 19, 2020, and therefore, the requirements of 16 NYCRR § 1001.25.

25(a) Conceptual Site Plan

These plans identify the proposed solar panel locations, access road locations and widths, and other related Project plans and details.

Preliminary Design Drawings for the Trelina Solar Energy Center (Project) are included in Appendix 11-1. The Project proposes to install fixed or tracker racking systems. As the technology is rapidly evolving for solar panel technology, and market conditions at the time that procurement decisions need to be made are unknown, the Applicant is proposing in this Application to evaluate both types of racking systems, with the final decision to be made and detailed in the Compliance Filing. Only selected elements of the Project would change based upon the type of array racking system types used, but all changes would be within the component fence line and to the same land uses shown in the Proposed Layout. There would be additional significant adverse environmental impacts by choosing one racking system over the other. See Exhibit 9 for further discussion of the racking technology.

Details specific to Project access roads and intersections showing horizontal and vertical geometry, number of approach lanes, lane 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 bridge weight limits within the vicinity of the Project Area. However, the following roadways have posted truck weight limit restrictions within the Project Area, some of which are signed “Except Local Deliveries”. Haul routes exceeding these limits should avoid the roads and use an alternate route:

- Packwood Road (County Route 112) – 10-ton weight limit (Except Local Deliveries) between Lyons Road (NY Route 14) to Edwards Road (just northwest of Waterloo Geneva Road

- Pre-Emption Street – 10-ton weight limit, along the entire route
- Serven Road – 10-ton weight limit, along the entire route
- East North Street – has a No Truck sign in Geneva just west of Pre-Emption Street

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. Packwood Road – south side, east of Townline Road

B. Serven Road - west side, south of Packwood Road

C. Packwood Road - south side, east of Serven Road

D. Packwood Road - north side, east of Serven Road

E. Packwood Road - south side, east of Serven Road

F. Serven Road - west side, south of Packwood Road

G. Pre-Emption Road - east side, south of Packwood 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. Packwood Road (CR 112) has a posted speed limit of 45 mph. Serven Road does not have a posted speed limit but does have two curve warning signs of 35 mph, so 45 mph was utilized in the Sight Distance analyses. Pre-Emption Street has a posted speed limit of 30 mph. Border City Road has a 40-mph posted speed limit in Waterloo. US Route 20/Highway 5/Waterloo Geneva Road in the vicinity of the Site has a posted speed limit of 45 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 are shown in Tables 25-1 and 25-2 below.

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

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

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
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

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	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

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
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. Due to the current pandemic travel precautions and restrictions, the sight distances were based upon photos and aerials but the sight distances provided are conservatively accurate.

All Design and Stopping Sight Distances will be met for each of the access points. For Site Driveway F, the Site Entrance/Exit on the west side of Serven Road, the sight distance looking right is partially impacted by some slight curvature in the roadway but can be increased by the clearance of some vegetation along the roadway. The Stopping Sight Distance along Serven Road is significantly met, even without any vegetation clearance. 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 determined 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.

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 near the Project Area (Figures 25-1a and 25-1b) for a three-year period from September 1, 2016 to August 31, 2019 and is summarized in Appendix 25-4 by case number. During that three-year period, there were

a total of 110 accidents, with the majority being driver error (mainly failure to yield right-of-way or following too close). There were 34 (31%) accident types involving a deer or other animal, 8 (6%) that were due to unsafe speed, 3 (3%) that were alcohol related, and 3 (3%) where the driver fell asleep. One accident involved a pedestrian and one accident involved a bicyclist.

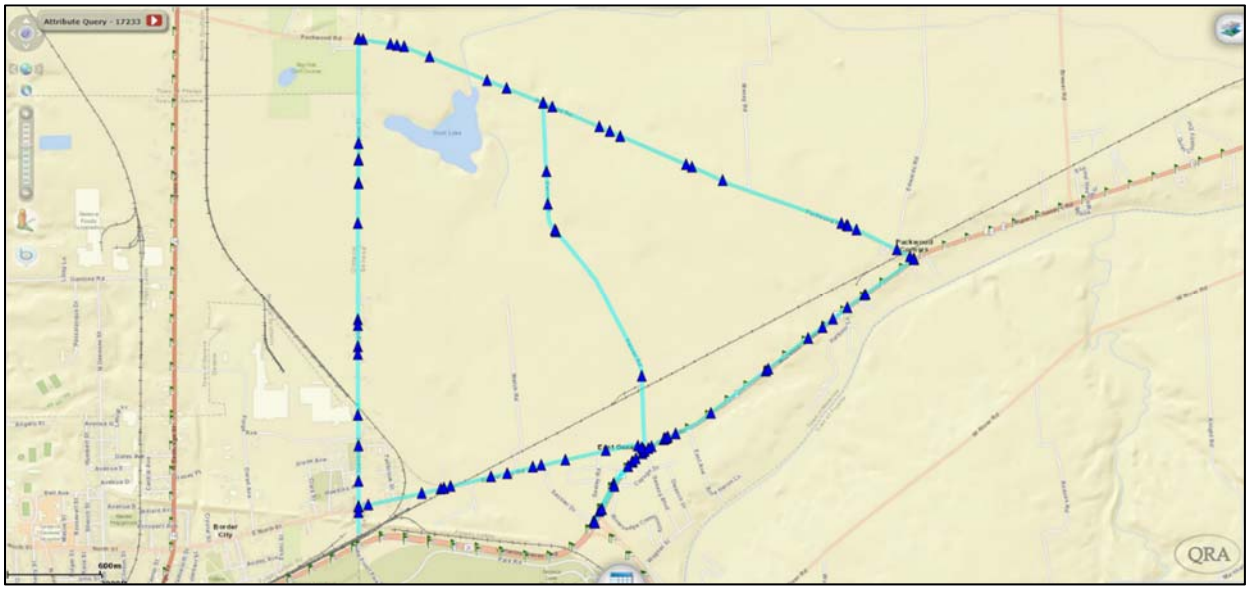

Figure 25-1a. Project Area Accident Map.

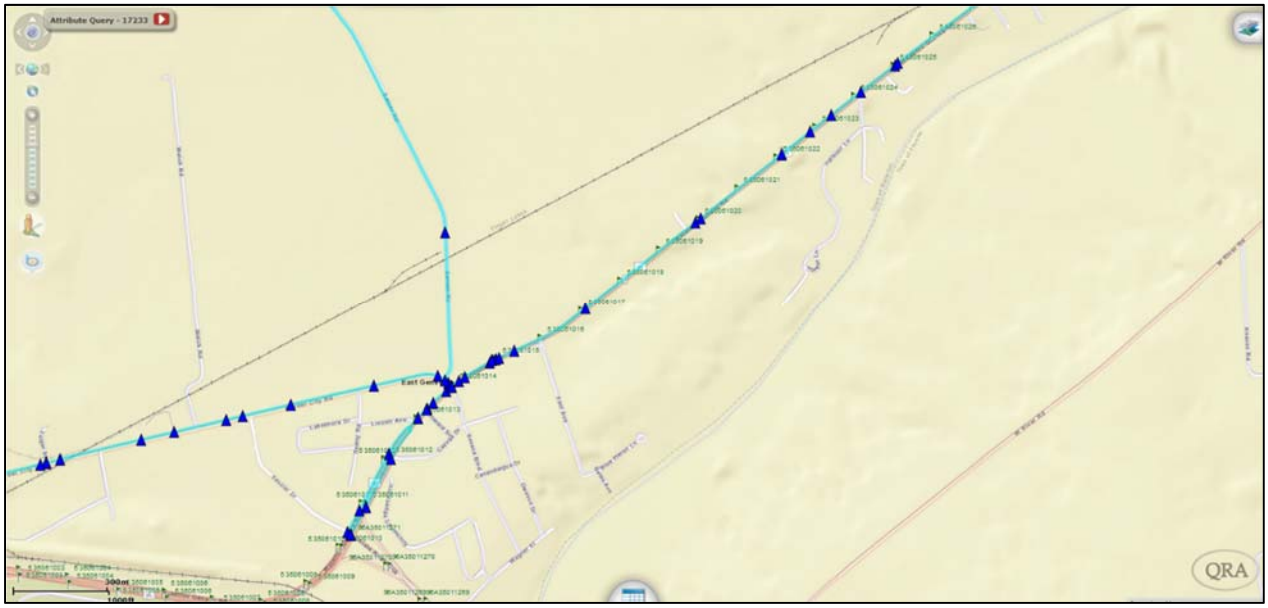

Figure 25-1b. Project Area Accident Map.

Fourteen (10%) accidents occurred in snow or ice conditions and 26 (24%) others occurred in wet conditions. Of the 110 accidents, 60 (55%) were listed as property damage only, 23 (21%) accidents involved some type of injury, and 27 (24%) accidents were non-reportable. There were 0 fatalities. The breakdown by year for the three-year period is as follows: 12 accidents in the last four months of 2016, 37 accidents in 2017, 38 accidents in 2018, and 23 accidents in the first eight months of 2019, so consistently at approximately 37 accidents per year.

(2) Transit Facilities and School Bus Routes

Regional Transit Service (RTS) Seneca has limited routes within the Project Area. RTS Routes 281 and 282 serve the area along Waterloo Geneva Road but are currently suspended and operating on a Dial-A-Ride system. 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 are expected to be minimal. If necessary, the Applicant will coordinate with RTS to avoid 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 Waterloo Central School Transportation Department and the Geneva City Schools Office of Transportation, who establishes the school bus routes. Construction of the Project is not expected to impact school bus stop locations, but if 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:

- Border City Hose Company (Fire Department and EMS)
  3000 Fallbrook Street
  Geneva, NY 14456
- Border City Serven (Fire) Company
  352 US 20
  Waterloo, NY13165

- Waterloo Volunteer Fire Company
  39 East Water Street
  Waterloo, NY 13165
- Geneva Fire Department
  79 Geneva Street
  Geneva, NY 14456
- Waterloo Village Police Department
  41 West Main Street
  Waterloo, NY 13165
- Seneca County Sheriff
  44 West Williams Street
  Waterloo, NY 13165
- New York State Police Department
  853 Waterloo Geneva Road
  Waterloo, NY 13165
- North Seneca Ambulance
  1645 North Road
  Waterloo, NY 13165
- Geneva General Hospital
  196 North Street
  Geneva, NY 14456

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 possible 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 use 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. As described in Section 25(a), there are some roadways in the area with weight restrictions.

(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 Project 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 approximately 150 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. Figures 25-2a and 25-2b show 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 used to maximize conservativeness of the Traffic Analyses. Additional details regarding these routes are described in Section 25(c)(4).

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
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)	418
Fencing & Substation	Concrete Trucks	168

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 Project will comply with the substantive requirements of the Town of Waterloo and Seneca County local laws and ordinances as they relate to transportation and construction vehicle deliveries. Road use agreements with these agencies will be sought regarding, amongst other matters, the current weight restrictions on certain roadways. The hours of construction will be 7:00AM to 7:00 PM Monday through Saturday, but the peak construction trips were combined with the roadway peak hours for analysis purposes to be conservative. Refer to Exhibit 31 for further analysis.

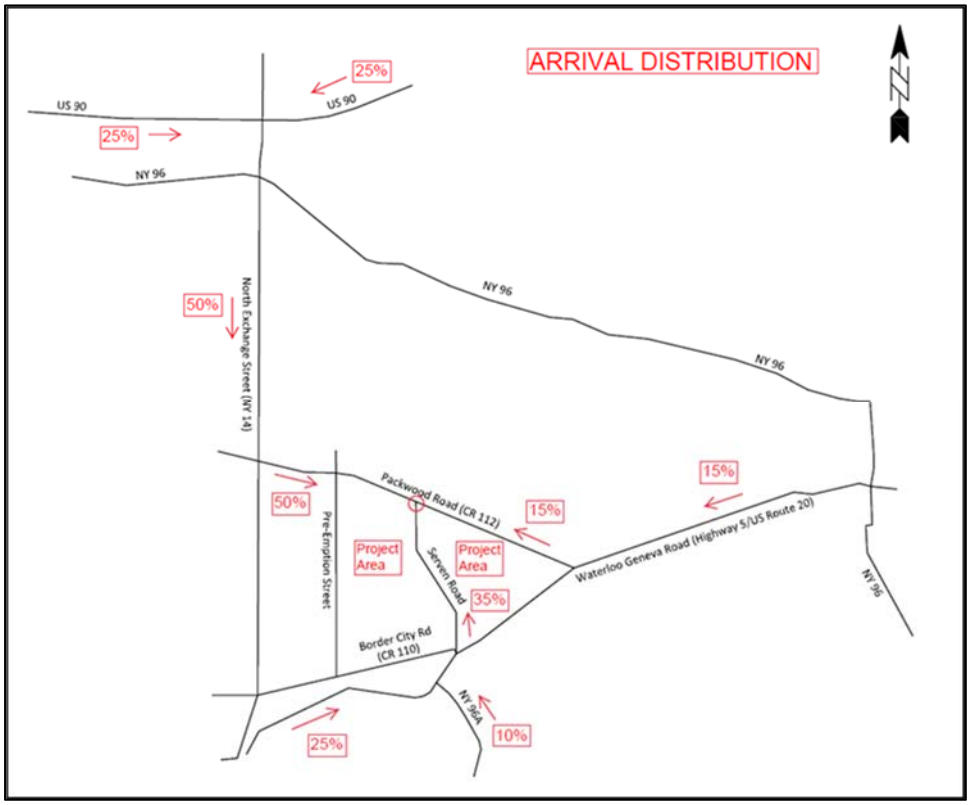

Figure 25-2a. Project Area Site Arrival Distribution Percentages

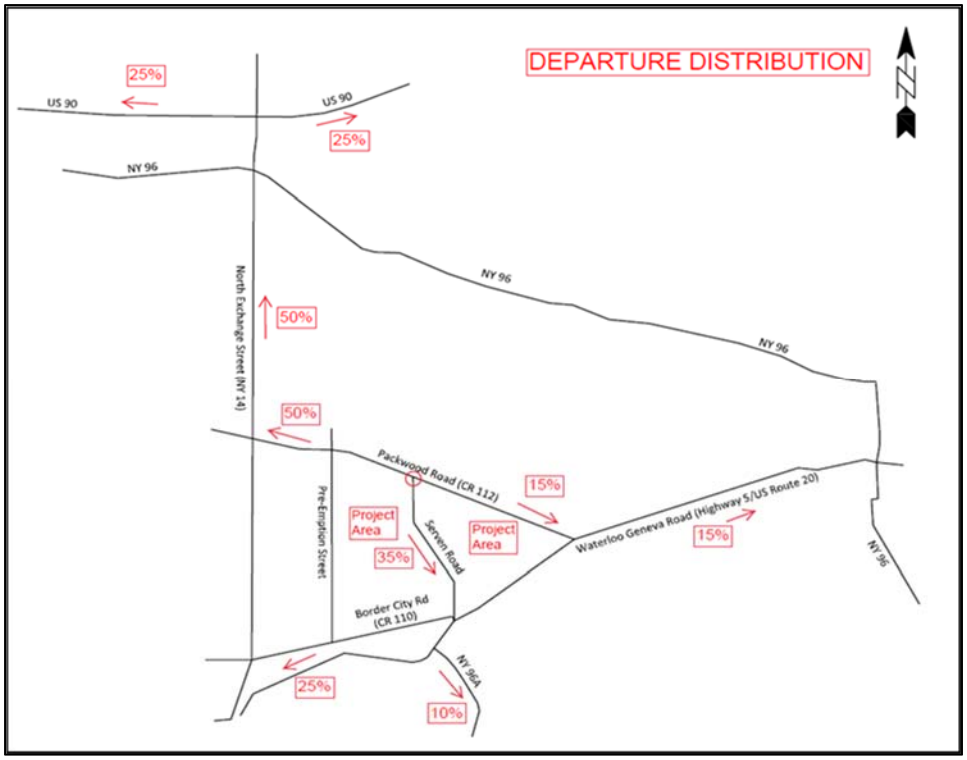

Figure 25-2b. Project Area Site Departure Distribution Percentages

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, while three graders will be utilized overall for the project. Each grader will have a 174-horsepower engine and have an approximate weight of 43,000 pounds (lbs) 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 lbs.

Scrapers – It is anticipated that there will be three scrapers used with approximately 313 horsepower each. The approximate operating weight is 80,000 lbs 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 lbs to 75,000 lbs. For every 2,500 gallons of liquid the average approximate weight will be an additional 25,000 lbs over the weight of the vehicle carrying the tank, which can range from 17,000 lbs to 25,000 lbs.

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

Roller/Compactor – One roller/compactor will be utilized.

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 lbs. 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 lbs. Two cranes are expected to be utilized.

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

Pickup Trucks/ATVs – There will be approximately 45 pickup trucks and 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 7,308 cubic yards gravel aggregate material. A total of 418 large dump trucks with an approximate carrying capacity of 22 cubic yards and a weight of 80,000 lbs will be used to deliver the materials to the Project Area. Construction of the access roads is expected to occur during the first three months, which equates to approximately 6 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.

Concrete Trucks – Concrete will be necessary for perimeter fencing and substation/switchyard foundations associated with the Project. Approximately 3,800 cubic yards of concrete will be needed for fencing and an additional 300 cubic yards of concrete for the substation/switchyard foundations. Trucks with an approximate capacity of 8 cubic yards and a weight of 70,000 lbs will be used to deliver the material to the Project Area. These vehicles will be of legal size and weight, not exceeding 80,000 lb load limits. Construction of the perimeter fencing and substation foundation is not expected during the peak construction period but is expected to occur during the last couple of months of construction, and therefore not included in the traffic analysis. These are estimated to require 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 lb load limits.

Special equipment Components including substation/switchyard control rooms, substation poles, generator step-up unit (GSU), inverters, etc. are likely to exceed the legal weight and/or size. 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 above summarizes the expected number of loaded trips generated entering the Project Area.

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 18 trips per day during the first three months and 4 trips per day during the final two months, which does not exceed the peak workforce of 150 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 follow the same delivery routes used by other construction vehicles/component delivery haulers. Section 25(c)(4) of this Exhibit 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 9,406 cubic yards of material will be excavated during the facility construction. In addition, approximately 9,700 cubic yards of fill will be placed. Refer to 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 Trelina Solar Energy Center – There are various regional routes to reach the Project. Interstate 90 runs in an east-west direction and is approximately four and a half miles north of the Project Area. Interstate 90 has Entrances/Exits along State Route 14 west of the Site and State Route 414 east of the Site. US Route 20/Highway 5/Waterloo Geneva Road also runs east-west and is located just to the south of the Project Site.

State Route 96 runs in a north-south direction east of the Site and then runs east-west to the north of the Site. State Route 96A runs in a north-south direction with its northern terminus at US Route 20/Highway 5/Waterloo Geneva Road.

Locally, Border City Road runs east-west just south of the Site with its eastern terminus at US Route 20/Highway 5/Waterloo Geneva Road. Pre-Emption Street runs north-south on the western border of the Site and will have one Site access point. Serven Road runs north-south through the Project Site and will have two Site access points. Packwood Road, County Route 112, is just north of the majority of the Site and runs in a southeast-northwest direction. Packwood Road will have four access points to the Site.

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

25(d) Traffic and Transportation Impacts

(1) Analysis of Future Traffic Conditions

Most traffic impacts will be short-term, primarily due to the temporary influx of personnel and equipment during construction. Long-term effects to maintain and operate the Project are anticipated to be minimal. As mentioned 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 219 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.

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

With additional trips generated by the construction of the Project, the level of service (LOS) is evaluated below 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 most County and State Routes in the area. Traffic count data was sporadically available for many of the local roads within the Project Area. Table 25-4 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	I-90	Inter 43 RT 21	Inter 42 RT 14	40,041	440073	2004
B	NY 14	Gambee Rd	RT 96W Junius	9,151	440026	2015
C	Packwood Rd	NY 14	Town Line Rd	1,763	447029	2016
D	Pre-Emption St	Geneva C Ln	Phelps T/L	1,538	447019	2015
E	Border City Rd	T/L West	US 20	6,579	357029	2015
F	NY 96A	CR 119 River Rd (N)	RTS 5 & 20 End RT 96A	9,341	350008	2015
G	Serven Rd	CR 110	Packwood Rd	1,046	357027	2011
H1	US 20	Ont/Seneca Co Line	RT 96A	12,336	350344	2015
H2	US 20	RT 96A	RT 96 Waterloo	10,032	350407	2011

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 – The only Principal Arterial Interstate found within the Project Area is Interstate I-90. 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 two Principal Arterial Other found within the Project Area are US Route 20 and NY Route 14. 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: NY Route 96. 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 roadway analyzed within the Project Area as classified by the NYSDOT is NY Route 96A. Major Collectors generally have few driveways and allow for minimal disruption to the through traveling vehicles. Major Collectors can be shorter in length and have fewer daily traffic than Minor Arterials.

Local Road – There rest of the roadways within the Project Area are identified as Local Roads including Packwood Road, Pre-Emption Road and Serven 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 rural and provide one travel lane in each direction with limited shoulder and roadside treatments, with the exceptions of I-90 and portions of US 20, which have more than one travel lane in each direction. Most existing intersections are stop-controlled. There are a few signalized intersections.

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 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 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:

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

Each of the three measures are indicators of how well traffic is being accommodated by the multilane highway segment. Exhibit 12-15 from the HCM visually depicts the ranges of the density of the multilane highway that determines the level of service. This is illustrated in Table 25-5 and Figure 25-3.

Table 25-5. LOS Criteria for Multilane Highway Segments

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

Excerpt from Chapter 12 of the Highway Capacity Manual 6th Edition (HCM)

Figure 25-3, obtained from Exhibit 12-17 from the HCM, graphically represents the speed of the passenger car verses flow rate of the multilane highway segment.

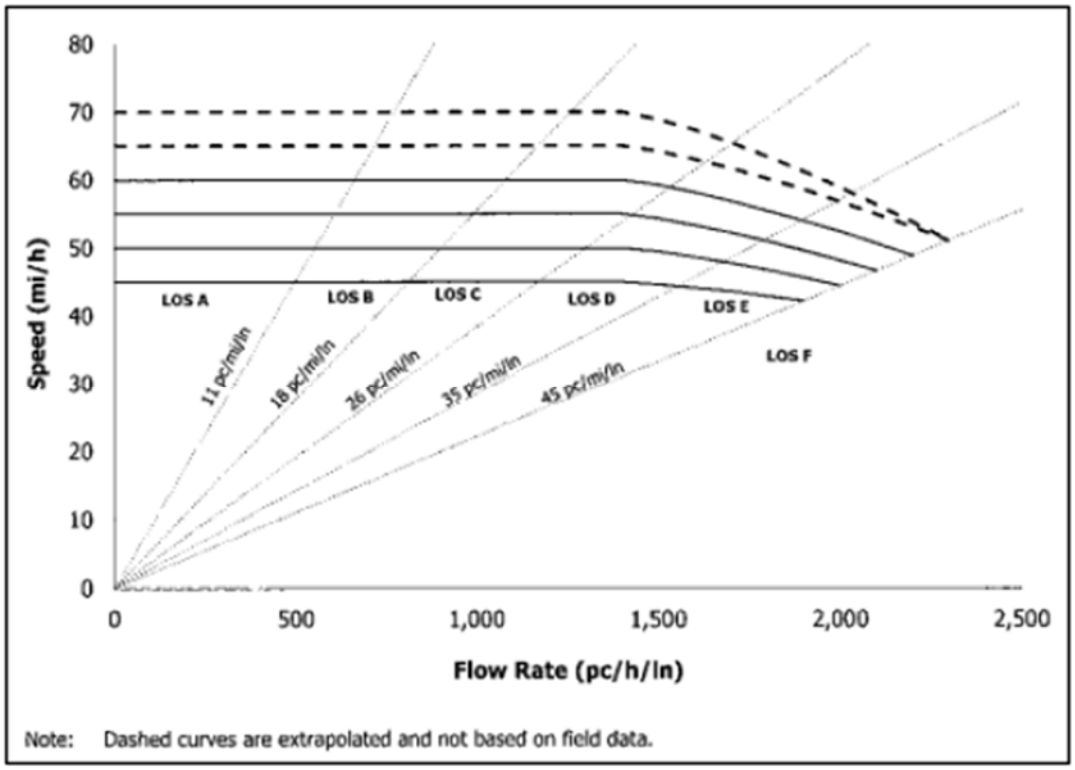

Figure 25-3. LOS Criteria and Speed-Flow Curves for Multilane Highway Segments. Excerpt from Chapter 12 of the Highway Capacity Manual 6th Edition (HCM)

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 multiplying by the ratio of the flow rate vs. average speed in the analysis direction. This formula is illustrated as:

$$FD = \frac{PF}{100} \times \frac{v_d}{S}$$

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).

When calculated, the LOS can be determined by comparing the FD value received to the range of values for the LOS (Table 25-6).

Table 25-6. 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
C	> 4.0 – 8.0	> 5.0 – 10.0
D	>8.0 – 12.0	> 10.0 – 15.0
E	> 12.0	> 15.0

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

Existing Level of Service

The existing LOS was calculated based on the existing traffic volumes and existing roadway characteristics. 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.

Under base conditions all roadways within the Project Area are currently operating as LOS C or better during the design hour which indicates that there are no capacity problems (Table 25-6).

Table 25-7. Existing Traffic Volumes & Characteristics for Multilane and 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
A1	US 90 EB	65	1879	-	19.0	C
A2	US 90 WB	65	1749	-	17.7	B
B	NY 14	45	466	418	4.9	B
C	Packwood Rd	45	98	108	0.4	A
D	Pre-Emption St	30	98	77	0.4	A

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
E	Border City Rd	40	360	308	3.7	B
F1	NY 96A NB	45	446	-	5.9	A
F2	NY 96A SB	45	515	-	6.8	A
G	Serven Rd	45	54	57	0.1	A
H1A	US 20 EB	45	625	-	8.3	A
H1B	US 20 WB	45	565	-	7.5	A
H2	US 20	45	597	530	7.3	C

Construction Level of Service

To evaluate the impacts that the construction of the solar farm may have on the roadway system, roadways within the Project Area were evaluated with the additional construction traffic, which were then compared to the existing roadway traffic capacity analysis. The previously developed 150 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 25-7 summarizes the HCS outputs for multilane and two-lane highways. Refer to Appendix 25-7 for additional information on HCS outputs for multilane and two-lane highways.

Table 25-8. Traffic Volumes & Characteristics for Multilane and 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
A1	US 90 EB	65	1934	-	19.6	C
A2	US 90 WB	65	1804	-	18.0	B
B	NY 14	45	588	540	7.1	C
C	Packwood Rd	45	220	230	1.6	A
D	Pre-Emption St	45	98	77	0.4	A
E	Border City Rd	40	360	308	3.7	B
F1	NY 96A NB	45	468	-	6.1	A
F2	NY 96A SB	45	537	-	7.0	A
G	Serven Rd	45	140	142	0.7	A

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
H1A	US 20 EB	45	702	-	9.3	A
H1B	US 20 WB	45	642	-	8.5	A
H2	US 20	45	633	567	8.0	C

It is expected that all roadways will continue to operate at LOS C 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 to no 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 C 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. Weight limit restrictions of 10 tons were identified on some roads adjacent to the Project Site. Road use agreements will be sought with the appropriate agencies, as necessary, to use these roadways. If the proposed oversize/overweight detour route is not feasible, then the condition and load rating of the roadway will be checked during the haul route evaluation. Should the review with the appropriate authority find reason for concern, the structure will be temporarily reinforced for the oversize/overweight component delivery at the Applicant's expense. 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 possible impacts and delays to bus routes throughout the construction process. Local school districts will be advised in advance of any possible road closures so that alternatives routes can be developed in sufficient time. 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 possible 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 C 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.

(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 Town 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 (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 lbs will require a superload permit. The application/permit process can be done on-line through the NYSDOT website. The fee structure for the superload permit is also published on-line and costs are cumulative based on load configuration and weight.

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

	Parameter	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[2]
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 and the County Road use agreement with the Town and Seneca 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.

Three new access entrances to the Project are proposed along County Route 112 (Packwood Rd) along with a collection line crossing. The Applicant will consult with the County to determine any approvals required and/or the necessity of entering into a road use agreement. Road use agreements with the Town are also expected to be negotiated and access points and collection line crossings on local roadways may be addressed therein.

In accordance with the anticipated road use agreements, directly prior to construction, survey of the agreed delivery route 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. 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 along US Route 20, are not present within the Project Study Area; therefore, impacts are not anticipated, and mitigation measures will not be required.

As noted above in Section 25(b)2, the Applicant will coordinate with local school districts to avoid impacts and delays to bus routes throughout the construction process. Public Transportation was also discussed in Section 25(b)2. Regional Transit Service (RTS) Seneca offers a reduced fare to those 60 years of age and older. It also provides a Dial-A-Ride system.

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 near public use and military airports (14 CFR §77.9(a-e)). The proposed facility will not trigger notification to the FAA. Airports and heliports have not been identified within the Project Study Area.

25(f) Federal Aviation Administration Review

No construction or alteration is proposed for this Project that requires a Notice of Proposed Construction to be submitted to the administrator of the Federal Aviation Administration (FAA) in accordance with 14 Code of Federal Regulations, Part 77 pursuant to 49 U.S.C., Section 44718.

25(g) Offsite Improvements

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

References

National Academics of Sciences, Engineering, and Medicine. 2018. *Improved Analysis of Two-Lane Highway Capacity and Operational Performance.* Washington, D.C.: The National Academies Press. https://doi.org/10.17226/25179

American Association of State Highway and Transportation Officials (AASHTO) – A Policy on Geometric Design off Highways and Streets, Seventh Edition, 2018, 44 North Capital Street, N.W., Suite 249, Washington, D.C. 20001

Transportation Research Board. 2016. *Highway Capacity Manual, Chapter 15.* Washington, D.C.

New York State Department of Transportation – Highway Design Manual

New York State Department of Transportation – Traffic Data Viewer https://www.dot.ny.gov/tdv

New York State Department of Transportation – Bridge Data
https://www.dot.ny.gov/main/bridgedata

New York State Department of Transportation – Posted Bridges
https://www.dot.ny.gov/postedbridge

New York State Department of Transportation -
https://www.dot.ny.gov/main/bridgedata/repository/SenecaBridgeData.pdf

New York State Department of Transportation – gis.dot.ny.gov/fc

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

Waterloo Central School Transportation Department, 1719 North Road Waterloo, NY 13165
www.waterlooscd.org

Regional Transit Service (RTS) Seneca, 1 DiPronio Drive Waterloo, NY 13165
www.myRTS.com