HIGH RIVER ENERGY CENTER

Case No. 17-F-0597

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 August 26, 2019, and therefore, the requirements of 16 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.

All bridges identified within the vicinity of the Project Area appear to have sufficient width and load bearing capabilities to accommodate haul routes needed for the construction of the Project, with the exception of a single bridge (Bridge Identification Number (BIN) – 1038800), located along County Route (CR) 165 (Thayer Road) approximately 0.2 miles southeast of the CR 165 and CR 149 intersection (42°53’48.4” N, 74°09’58.6” W). The primary owner of the bridge is Montgomery County. The bridge is listed to have a posted load maximum of 15 tons. Oversize/overweight vehicles will be used during the construction of this Project. The New York State Department of Transportation (NYSDOT) will review and approve all bridges proposed to be used for the Special Hauling Permit application process, and alternate routes for delivery will be used to avoid this bridge as discussed in Section 25(d)(3) below. Refer to Appendix 25-2 for NYSDOT Bridge Load Rating information regarding the CR 165 bridge.

Sight distance diagrams were developed for the proposed access roads at the entrance/exit gates for Areas 1 through 6A and the substation access road. No sight distance diagrams were done for the site entrance and gate to Area 3 as there are no turning movements to access the site, Hutchinson Road dead ends directly into the site entrance. 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. For all roadways without a posted speed limit on the roadway (except for Hutchinson Road), it is to be assumed that the legal speed limit is 55 mph according to the NYSDOT Highway Design Manual (HDM), which according to the NYSDOT HDM Chapter 5 Appendix 5C Table 5C-3 and Table 5C-4, has a required sight distance of 930 feet for left turning vehicles and 850 feet for right turning vehicles. A speed limit of 25 mph was assumed on Hutchinson Road since it is a narrow dead-end road, the required sight distance for left turning vehicles is 425 feet and right turning vehicles is 390 feet. These tables are shown below. It was determined that the sight distance requirement should come from the Combination Truck column.

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

Locations where the minimum sight distance could not be met occurred at:

- Area 2A Access Road and Hutchinson Road (Left and Right Turn Vehicles)
- Area 5 Access Road and Pattersonville Road (Left Turn Vehicles)
- Hutchinson Road and Pattersonville Road (Right Turn Vehicles)

The intersection sight distance for Area 2A is impacted by horizontal curves for right turning vehicles and end of the road for left turning vehicles. With the site access driveway located at the end of Hutchinson Road and being on a low speed road, the site distance limitations are not a major concern at Area 2A. Area 5 is impacted by a horizontal curve for left turning vehicles and vegetation/tree branches for right turning vehicles. Recommend adding “Hidden Drive” advance warning signs with flashers approaching both sides of the driveway along Pattersonville Road. In addition, trimming tree branches and other vegetation near the access road may improve the intersection sight distance. Hutchinson Road will serve mainly construction traffic to Areas 2 and 3, also has limited intersection sight distance for right turning vehicles due to a horizontal curve west of the intersection. Recommend adding a “Hidden Drive” advance warning sign with flashers at this location to warn traffic of the upcoming intersection.

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 Viewer and NYSDOT Highway Data Services Bureau, where historical traffic count data is available for downloading. 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 of Interstate 90 (I-90), NY-30, NY-5S, Thayer Road, Bulls Head Road, and Pattersonville Road in proximity to the Project Area (see Graphic 25-1) for a three- year period from 2016 – 2018 and is summarized in Appendix 25-4 by case number. During that three-year period, there were a total of 171 accidents, with 54 (32%) accident types being fixed object, 31 (18%) deer or other animal, 24 rear end, 12 overtaking, 6 angle, 3 head on, 3 sideswipe, 2 overturning, 1 left turn, 1 bicycle, 1 backing, and 33 listed as other or unknown. Of the 171 accidents, 110 (64%) accidents were listed as property damage only, 32 (19%) accidents involved some type of injury or fatality, and 29 (17%)

accidents were non-reportable. One accident listed as a fatality, occurred on I-90, no reference point was reported. Of the 171 total accidents, there were 66 (39%) accidents that occurred during the morning hours and the remaining 105 (61%) accidents occurred in the afternoon hours. The breakdown by year for the three-year period is as follows: 47 accidents in 2016, 50 accidents in 2017, and 74 accidents in 2018. There was about a 50% increase in 2018 compared to the prior two years. I-90 is responsible for more than half of the accidents in proximity to the Project and the majority of the accidents occurred outside the immediate proximity of the Project Area, closer to the urban center of Amsterdam.

Graphic 25-1. Project Area Accident Map

(2) Transit Facilities and School Bus Routes

The Applicant reached out to the Greater Amsterdam School District as recently as August 9, 2019 to coordinate school bus routing and stops. Although no formal response regarding school bus routes has been received as of the filing of this Application, the Interim School Superintendent verbally stated that after consulting with his team they concluded that there would be no impacts. 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. Construction of the High River 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.

(3) Emergency Service Approach and Departure Routes

The Applicant has made several attempts to obtain information on emergency service routes to and from the Project Area; however, no response from the emergency service providers has been received as of the filling of this Application. In the event of an emergency, it is assumed that the local emergency service providers will take the most direct available route to the Project Area, as their origin points may change due to other emergencies. The Applicant will continue to 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. Refer to Exhibit 18 for additional information regarding emergency service routes and communication.

(4) Load Bearing Structural Rating Information

In addition to the bridge identified above in Section 25(a), the NYSDOT may issue weight and speed restrictions when weather conditions dictate.

(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

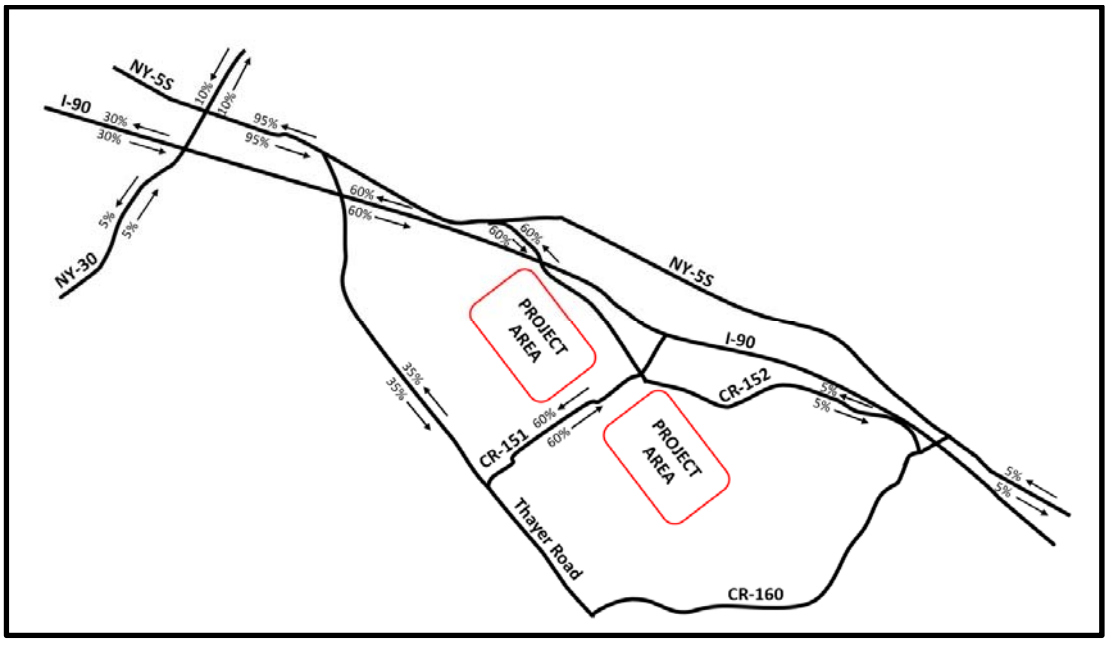
To better understand how the construction of the High River Energy Center will potentially impact the adjacent roadway system, trips were generated for the Project Area based on the peak construction workforce and construction equipment deliveries. Typically, these trips would be calculated using the 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 approximately 190 workers which was distributed to/from the Project Area, 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 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.

During the operational phase of the Project, two to three 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 can be found in Appendix 5-3, Preliminary Operation and Maintenance (O&M) Plan.

Construction of the High River Energy Center will comply with the substantive requirements of the Town of Florida and Montgomery County local laws and ordinances as they relate to transportation and construction vehicle deliveries. Refer to Exhibit 31 for further analysis.

Graphic 25-2. Project Area Site Distribution Percentages



Site Preparation and Grading Equipment

Graders – It is expected that there will be three graders used for the site preparation and grading of the Project. Each grader will have an approximate weight of 43,000 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. The weight of the rubber tired loader is approximately 31,000 lbs.

Scrapers – It is anticipated that there will be three scrapers used with. 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. 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.

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.

Trencher – There will be four trenchers used at the Project Area.

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.

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

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 road will be constructed at the Project Area to provide access from the existing roadways. The access roads will be constructed of 23,941 cubic yards gravel aggregate material. A total of 1,088 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 is expected to occur during the first three months, which equates to approximately 18 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 27,931 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 1,182 cubic yards of concrete will be needed for fencing and an additional 160 cubic yards of concrete for the substation 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 for perimeter fencing and substation foundation is expected to occur during the peak construction period; therefore, was not included in the traffic analysis.

Conventional Semi-Trucks/Flatbeds – Semi-trucks and flatbeds will be used to transport a majority of 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. 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	3
	Rubber Tired Loaders	2
	Scrapers	3
	Water Trucks	2
	Generator Sets	2
	Roller/Compactor	1
Trenching and Road Construction	Excavators	3
	Graders	3
	Water Trucks	2
	Trencher	4
	Rubber Tired Loader	2
	Generator Sets	2
Equipment and Installation	Crane	1
	Crane	1
	Forklifts	8
	Pile Drivers	10
	Pickup Trucks/ATVs	45
	Water Trucks	2
	Generator Sets	2
Commissioning	Pickup Trucks/ATVs	5
Equipment Delivery	Flatbeds	26
	Semi-Trucks	419
Access Roads	Dump Trucks	1,088
Fencing & Substation	Concrete Trucks	168

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 190 trips per day and equipment/installation phase of 69 trips. Therefore, dump trucks for earthwork/access roads and concrete trucks for fencing was 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. Section 4 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 281,894 cubic yards of material will be excavated during the facility construction. In addition, approximately 333,767 cubic yards of fill will be placed, of which approximately 23,941 cubic yards is gravel fill which will be imported to the Project Area. The remainder of the fill is derived from excavations associated with Project construction. Excess material from excavations will be distributed across the disturbed areas and blended into existing topography to return each area to its approximate original condition. Please see Appendix 11-1 for the Preliminary Design Drawings and Exhibit 21 for additional information on cut and fill activity.

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

To High River Energy Center – The primary access route to the High River Energy Center will be along I-90. Use exit 27 on I-90 for both eastbound and westbound traffic. At the intersection of the I-90 exit ramp and NY-30 (Minaville Road) make a right turn, staying in the right lane to immediately exit on to NY- 5S. Make a right turn on NY- 5S and refer to specific Project Areas below for further directions. Refer to Appendix 25-5 for mapping of the construction assess routes for construction equipment and materials, as well as for Project personnel.

Area 1: Continue eastbound on NY-5S. At the intersection with Thayer Road make a slight right turn and continue southeast bound on Thayer Road. The site entrance gate will be on the right-hand side of Thayer Road between the intersections of Thayer Road/Langley Road (CR 149)/Bulls Head Road (CR 151).

Area 1 Laydown Area - alternative route to avoid the load restricted bridge: Continue eastbound on NY-5S. At the intersection with Pattersonville Road (CR 152) make a right turn and continue southeast bound on Pattersonville Road. Make a right turn on Bulls Head Road (CR 151) and continue southbound. Make a right turn on Thayer Road, the site entrance gate will be on the left-

hand side of Thayer Road between the intersections of Thayer Road/Bulls Head Road (CR 151) and Thayer Road/Langley Road (CR 149).

Area 2, Area 2A, Area 3 Laydown Area: Continue eastbound on NY-5S. At the intersection with Pattersonville Road (CR 152) make a right turn and continue southeast bound. Make a right turn on Hutchinson Road, the road will lead directly to the site entrance gate for Area 2, 2A, and Laydown Area on the right and site entrance gate for Area 3 on the left.

Area 4: Continue eastbound on NY-5S. At the intersection with Pattersonville Road (CR 152) make a right turn and continue southeast bound. Make a right turn on Bulls Head Road (CR 151) and continue southbound. Make a left on Mohr Road, the site entrance gate will be on the right-hand side of the road.

Area 5 Laydown Area: Continue eastbound on NY-5S. At the intersection with Pattersonville Road (CR 152) make a right turn and continue southeast bound, the site entrance gate will be on the right-hand side of the road.

Area 6, Area 6A Laydown Area: Continue eastbound on NY-5S. At the intersection with Pattersonville Road (CR 152) make a right turn and continue southeast bound, the site entrance gate will be on the left-hand side of the road.

25(d) Traffic and Transportation Impacts

(1) Analysis of Future Traffic Conditions

The majority of traffic impacts will be short-term and primarily due to the temporary influx of personnel and investment during construction. 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 209 additional trips; therefore, no impacts on future traffic conditions is 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 solar farm, the construction level of service (LOS) will be 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 Volume	Count Station	Count Year
A	I-90	I-90 Exit #28	I-90 Exit #27	24,991	25_0052	2016
B	I-90	I-90 Exit #27	Montgomery/Schenectady County Line	29,548	25_0053	2016
C	NY-30	NY-5S	NY-5	18,329	25_0044	2016
D	NY-30	NY-161	Amsterdam/Florida City Line	4,079	25_0461	2016
E	NY-5S	NY-30 Exit Ramp	Amsterdam/Florida City Line	3,548	25_0282	2016
F	CR 165	NY-5S	CR 154	629	25_6001	2016
G	CR 151	CR 165	CR 152	198	25_8073	2016
H	CR 152	NY-5S	CR 151	251	25_6086	2016
I	NY-5S	NY-160	NY-103	4,178	16_0277	2016
J	CR 152	NY-5S	CR 151	251	25_6086	2016

No traffic data was available for CR 152 (Pattersonville Road) east of CR 151 (Bulls Head Road). For this segment of CR 152, the AADT was used from the adjacent section NY-5S to CR 151.

Roadway Characteristics

Existing roadways within the Project Area fall into six 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 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 Expressway – The only Principal Arterial Expressway found within the Project Area is NY-30 north of the I-90 entrance/exit ramp intersection. Principal Arterials in rural areas are roadways that can range from two-lane to multilane divided, controlled-access facilities. This type of roadway is primarily high-speed for travel between major points.

Minor Arterial – The are two Minor Arterial roadways found within the Project Area. The first is NY-30 south of the I-90 entrance/exit ramp intersection. The second is NY-5S west of the Amsterdam/Montgomery County Line. 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 found within the Project Area is NY-5S east of the Amsterdam/Montgomery County Line. 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 two Minor Collector roadways found within the Project Area are NY-165 (Thayer Road) and CR 151 (Bulls Head Road). Minor Collectors have more drive access points and generally operate at lower operating speeds.

Local Road – The remaining roadways within the Project Area are classified as Local Roads. 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, roadways in the Project Area are rural in nature and generally provide one travel lane in each direction with limited shoulder and roadside treatments. A majority of the existing intersections are stop-controlled.

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 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 from the HCM visually depicts the ranges of the density of the multilane highway that determines the level of service. This can be seen below.

Table 25-5. LOS Criteria for Multilane Highway Segments

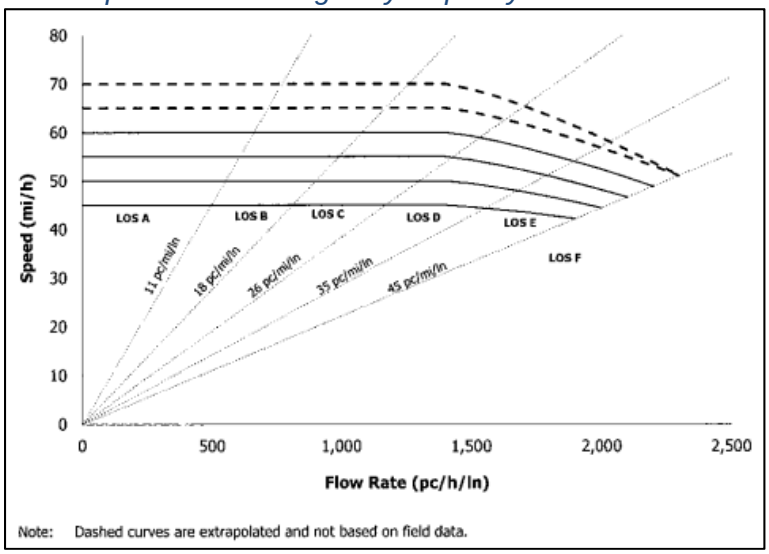
[Taken from Chapter 12 of the Highway Capacity Manual 6th Edition (HCM)]

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 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 can be seen below in Graphic 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%/40%.

As shown in Table 25-7 and Table 25-8 below, under base conditions all roadways within the Project Area are currently operating as LOS B or better during the design hour for both the multilane and two-lane highways.

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

Site No.	Route/Road Name	Direction	Design Hour Volume (PC/H)	Average Speed (MI/HR)	Density (PC/MI/LN)	LOS
A	I-90	Eastbound	1,499	68.2	12.8	B
	I-90	Westbound	1,000	68.2	8.5	A
B	I-90	Eastbound	1,773	68.2	15.1	B
	I-90	Westbound	1,182	68.2	10.1	A
C	NY-30	Northbound	1,100	52.0	11.9	B
	NY-30	Southbound	733	52.0	7.9	A

Table 25-8. 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
D	NY-30	55	245	163	1.4	A
E	NY-5S	55	213	142	1.1	A
F	CR 165	55	38	25	0.1	A
G	CR 151	55	12	8	0.0	A
H	CR 152	55	15	10	0.0	A
I	NY-5S	40	251	167	2.3	A
J	CR 152	55	15	10	0.0	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 190 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 25-9 and Table 25-10 below summarizes the HCS outputs for both multilane and two-lane highways. Refer to Appendix 25-6 for additional information on HCS outputs for multilane and two-lane highways.

Table 25-9. Traffic Volumes & Characteristics for Multilane Highways During Construction

Site No.	Route/Road Name	Direction	Design Hour Volume (PC/H)	Average Speed (MI/HR)	Density (PC/MI/LN)	LOS
A	I-90	Eastbound	1,546	68.2	13.3	B
	I-90	Westbound	1,031	68.2	8.9	A
B	I-90	Eastbound	1,866	68.2	16.0	B
	I-90	Westbound	1,244	68.2	10.7	A
C	NY-30	Northbound	1,116	52.0	12.2	B
	NY-30	Southbound	743	52.0	8.1	A

Table 25-10. 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
D	NY-30	55	253	168	1.5	A
E	NY-5S	55	361	240	2.8	B
F	CR 165	55	93	61	0.3	A
G	CR 151	55	105	70	0.3	A
H	CR 152	55	108	72	0.4	A
I	NY-5S	40	259	172	2.5	A
J	CR 152	55	23	15	0.0	A

It is expected that all roadways will operate at LOS B or better within the Project Area for both the multilane and the 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, one of the bridges located on CR 165 south of the Project Area is listed to have a maximum load capacity of 15 tons. Given that there will be oversize/overweight deliveries for this project, this bridge should be avoided by vehicles exceeding the maximum load capacity. If the proposed oversize/overweight detour route is not feasible, then the condition and load rating of the bridge will be checked during the haul route evaluation. Should the permit review find reason for concern, the bridge structure will be temporarily reinforced for the oversize/overweight Component delivery. 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 alternatives 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 on 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. No capacity improvements or roadway upgrades are required to accommodate the construction of the proposed facilities.

(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 (substation/switchyard control rooms, substation poles, GSU, inverters, etc.) will require special hauling permits and/or road use agreements along the project haul routes. The types of 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 25-11 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 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 are cumulative based on load configuration and weight.

Table 25-11. 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[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. The final transportation plan will be provided 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.

Additionally, Road Use Agreements with the Town of Florida, Montgomery County and NYSDOT will be negotiated, as required. The Applicant is requesting that the Department of Public Service Staff not supplant the procedural requirements for any required NYSDOT, Montgomery County or municipal highway work permits and instead authorize these entities to approve the required road or highway work permits. The Applicant plans to enter into easements or any other required approval from the Town of Florida and Montgomery County for the installation of collection lines along Mohr Road, which is a Town of Florida public road, and Bulls Head Road, Thayer Road, and Pattersonville Road, which are county roads. Exhibit 31 provides a further discussion of these approvals.

In accordance with the anticipated Road Use Agreements, directly prior to construction, a 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) Aeronautical and Military Operations

The Project is designed to avoid and mitigate impacts to mass transit, and aeronautical and military operations. 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 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

As part of the construction of the High River Energy Center, no construction or alteration is proposed 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.

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

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