

11. Transportation

Cameron Engineering & Associates, LLP has performed a detailed traffic investigation of the traffic impacts of the proposed development on the adjacent street system. It reviews the area's existing roadway characteristics and traffic conditions (including traffic volumes, traffic flow quality, and geometry), determines future conditions if this project is not constructed by 2025, estimates the project's expected peak-period trip generation, and assesses the effect of this additional traffic on the surrounding roads. The Traffic Impact Study is provided in Appendix F and summarized herein.

11.1. Traffic - Existing Conditions

The property is currently zoned for municipal use, industrial use, residential use, and the developed area has various County facilities. The LIE runs to the north of the property, Horseblock Road is to the south, and Yaphank Avenue runs north-south to the east side of Parcels B, C, and D, and to the west of Parcel A.

The majority of the surrounding area consists of vacant space, municipal buildings, and residential neighborhoods to the east. The Yaphank station of the LIRR Montauk branch is close by, on the east side of Yaphank Avenue, south of Parcel A.

The first step of the Transportation analysis was to determine the 2010 Existing condition at each of these key intersections (Figure 11-1). For the purposes of traffic analysis, the Existing condition data includes:

- Counting traffic volumes in 15-minute intervals in June 2010 and November 2010 during four peak hour periods:
 - The weekday AM peak period (7:00 – 9:00 am)
 - The weekday Midday peak period (11:00 am – 2:00 pm)\
 - The weekday PM peak period (4:00 – 6:00 pm)
 - The Saturday midday peak period (11:00 am – 2:00 pm)
- Adjust the traffic counts using New York State Department of Transportation (NYSDOT) accepted “seasonal adjustment factors” to yield average-month traffic volumes – this yielded increases of 7.3 to 10.3 percent over counted volumes
- Determining the numbers of lanes in each direction

- Determining the presence of stop signs vs. traffic signals
- Determining the existing traffic signal timing and the presence of any left turn or right turn arrow phases
- Determining the order of “phases” at individual traffic signals
- Determining the existence of “coordination” between adjacent traffic signals (where subsequent signals display green lights on the major road in order to progress major road traffic flow)
- Identifying the local Suffolk County Transit (SCT) bus routes and stops, and Long Island Rail Road (LIRR) stations

Cameron Engineering performed traffic counts in June 2010 and November 2010 at thirteen study intersections during the AM, Midday, PM, and Saturday peak hour periods identified above, since these intersections have the greatest potential for traffic impacts from the Proposed Action:

1. Yaphank Avenue (CR 21) at Long Island Expressway (LIE) North Service Road
2. Yaphank Avenue (CR 21) at LIE South Service Road
3. Yaphank Avenue (CR 21) at SCDPW Driveway
4. Yaphank Avenue (CR 21) at Gerard Road
5. Yaphank Avenue (CR 21) at Glover Drive
6. Yaphank Avenue (CR 21) at Horseblock Road (CR 16)
7. Yaphank Avenue (CR 21)/Horseblock Road (CR 16) at Sunrise Highway Exit 57
8. Horseblock Road (CR 16) at Woodside Avenue (CR 99)
9. Horseblock Road (CR 16) at the Brookhaven Town Landfill
10. Horseblock Road (CR 16) at Patchogue-Yaphank Road (CR 101)
11. Horseblock Road (CR 16) at Bellport Road
12. Horseblock Road (CR 16) at LIE North Service Road
13. Horseblock Road (CR 16) at LIE South Service Road

11.1.1. Existing Levels of Service

An intersection’s Level of Service (LOS) describes its quality of traffic flow, and ranges in grade from LOS “A” (relatively congestion-free) to LOS “F” (congested). LOS grades are based on average delay, measured in “seconds per vehicle”, and the threshold delays for each grade depend on whether the

intersection is controlled by a traffic signal or stop sign. Existing LOS analyses were performed at the above intersections using *Synchro* version 7, and the results summarized in the Traffic Impact Study.

Synchro software accounts for numerous elements that get incorporated into a Level of Service analysis: lane geometry (the numbers of lanes in each direction), the length of any turn lanes, the distance between adjacent intersections, the timing and phasing patterns of any traffic signals, and the extent to which traffic flow is grouped or more random.

The overall Existing levels of service at the study intersections are detailed Section 2.7 of the Traffic Impact Study and its Appendices C and D.

11.1.2. 2025 No Build Scenario

The next step was to project traffic conditions into the year 2025 – fifteen years after the Existing condition analysis – should the Proposed Action not be implemented. This is known as the 2025 “No Build” condition, and was determined using several projected elements:

- General population growth, based on the growth rate for this section of the Town of Brookhaven, in the *Long Island Transportation Plan (LITP 2000)* study
- Correspond with representatives of the Town of Brookhaven, the Suffolk County Planning Department, and the NYSDOT to determine if there are any specific projects being planned in the relative immediate area (within $\pm 1/2$ mile), whose traffic has the potential to affect traffic volumes through any of the key intersections within the 15-year scope of the Traffic Study. To the extent possible, utilize trip generation and trip distribution data from corresponding traffic studies for these other projects. For projects that have no traffic study available, calculate the corresponding peak hour trip generation using the Institute of Transportation Engineers (ITE) *Trip Generation* manual, 8th Edition.
- Correspond with NYSDOT and the Suffolk County Department of Public Works (SCDPW) to determine if there are specific geometric (e.g. turn

lane additions), signalization, or pavement marking improvements planned at the key intersections. These improvements could be municipal or they could be associated with the other planned projects.

The future “No Build” condition includes an ambient growth rate of 2.04% per year (specific to the Town of Brookhaven, south of the Long Island Expressway) from general population increases and minor development in the area. Regarding other planned projects, there were thirteen such projects identified by the Suffolk County Planning Department. It was determined that one of these projects would yield improved lane geometry at one study intersection. The full descriptive list of these other planned developments is included in the Traffic Impact Study Section 3.2 and in Figure 21-2 of this document. The projects are as follows:

1. Starlight Properties: ±45 acres of general light industrial
2. Pinewood Gardens: 10 housing units
3. Silver Glen and Silver Corporate Park: 310 senior housing units and ±59 acres of industrial/commercial park
4. Enchanted Forest: 9 housing units
5. Romeo Estates: 23 housing units
6. Whispering Hills: 32 single family units
7. Windwood Oaks at Yaphank: 12 housing units
8. Yaphank Avenue Corporate Center: 115,750 square feet of general office
9. Meadows at the Hamlet: 60 senior housing units
10. Meadows at Yaphank PDD: 1,032,500 square feet of hotel, retail, and office/flex space, and 850 residential units
11. Riegel Warehouse, LLC: 73,825 square feet of warehouse use
12. Suffolk Federal Credit Union: 40,030 square feet of general office use
13. Rosh Industrial Park: 644,690 square feet of industrial park

For this project, its mitigation will change the geometry of the Horseblock Road–Brookhaven Town Landfill intersection. There will be a new eastbound left turn lane, a new westbound right turn lane, a widened

northbound approach with separate left and through-right lanes, plus a new southbound approach with a left lane and a through-right lane.

The Yaphank Correctional Facility Expansion (318,000 square feet, 740 prisoner beds) was also identified. As this project is currently under construction, and its temporary construction traffic is included in the base traffic counts, it was determined that leaving this temporary traffic in the base condition and then applying the ambient growth factor would be greater than the alternative of removing the temporary traffic and then applying new traffic after the expansion opens.

The traffic to be generated by these other projects was referenced from their traffic studies (where available) or determined based on the ITE *Trip Generation* manual (8th Edition). The total numbers of “other project trips” are detailed below (all numbers reflect “trips per hour”):

Table 11-1: Peak Hour Other Project Trips

	AM Peak Hour	Midday Peak Hour	PM Peak Hour	Saturday Peak Hour
Enter:	2,252	1,532	1,597	1,532
Exit:	899	1,480	2,717	1,480
Total:	3,151	3,012	4,314	3,012

These trips and any changes in lane geometry were input into the *Synchro* analysis to determine the 2025 No Build Scenario.

11.1.3. 2025 Mitigated No Build Scenario

Comparisons between the Existing and No Build analyses indicate that several intersection turning movements would perform at LOS E or F or at significantly changed levels of service prior to the Proposed Action, due to the 15-year ambient growth and the trips generated by the other proposed developments. It was projected that certain minor traffic improvements will be in place by this project’s 2025 build year, associated with one or more of the other planned projects. These traffic improvements focused on traffic control changes (such as the installation of a new traffic signal, or adjustments to the timing plan of an existing traffic signal) and did not include roadway improvements (such as roadway widening or realignments). The list of projected traffic improvements in the “2025 Mitigated No Build Scenario” are:

1. Yaphank Avenue (CR 21) at Horseblock Road (CR 16)
 - Minor signal retiming to redistribute green time more efficiently between phases in the PM peak period
2. Yaphank Avenue at Sunrise Highway Exit 57
 - Install a traffic signal at this location, coordinated with the adjacent signal at Yaphank Avenue and Horseblock Road (CR 16).
3. Horseblock Road (CR 16) at Brookhaven Town Landfill
 - Minor signal retiming to redistribute green time more efficiently between phases in the AM peak period
4. Patchogue-Yaphank Road (CR 101) at Horseblock Road (CR 16)
 - Minor signal retiming to redistribute green time more efficiently between phases in the AM, Midday, and PM peak periods
5. Horseblock Road at Bellport Station Road
 - Minor signal retiming to redistribute green time more efficiently between phases in the AM peak period
6. LIE North Service Road and Horseblock Road
 - Introduce a northbound left protected-permitted signal phase and readjust the signal timing for each peak period.

These changes were input into the *Synchro* analysis to determine the 2025 Mitigated No Build Scenario.

11.2. Traffic - Potential Impacts of Proposed Project

The next step of the Traffic Study was to analyze the conditions that would change due to the Proposed Action, and to analyze the traffic-related elements of the site plans available as of December 2010.

11.2.1. Site Access

The project will have four total access points for the four development areas. Area A will have one primary access point on Yaphank Avenue and one secondary access on the LIE South Service Road. Areas B and C will access Glover Drive, just west of its intersection with Yaphank Avenue. Area D will access Horseblock Road, at the intersection with the existing Brookhaven Town Landfill driveway. The manner of signalization and the intersection geometry for each access point is as follows:

1. Yaphank Avenue at Glover Drive: 3-Phase traffic signal

<u>Dir.</u>	<u>Lanes</u>	<u>Dir.</u>	<u>Lanes</u>
NB	1-L 2-T	EB	2-L 1-R
SB	2-T 1-R	WB	None

2. Horseblock Road at Brookhaven Town Landfill/Area D Driveway: 4-Phase traffic signal

<u>Dir.</u>	<u>Lanes</u>	<u>Dir.</u>	<u>Lanes</u>
NB	1-L 1-TR	EB	2-L 2-T 1-R
SB	2-L 1-TR	WB	1-L 2-T 2-R

3. Yaphank Avenue at Area A Main Driveway: 3-Phase traffic signal

<u>Dir.</u>	<u>Lanes</u>	<u>Dir.</u>	<u>Lanes</u>
NB	2-T 1-R	EB	None
SB	2-L 2-T	WB	2-L 2-R

4. LIE North Service Road at Area A Secondary Driveway: Stop sign on Driveway

<u>Dir.</u>	<u>Lanes</u>	<u>Dir.</u>	<u>Lanes</u>
NB	1-R	EB	1-T 1-R
SB	None	WB	None

11.2.2. Grades and Sight Distance

People exiting the site will need to see vehicles on the main roads in order to see gaps and judge when to leave, and motorists on the main roads will need to see people exiting the site in time to let them merge. The required sight distance (i.e., the farthest away a motorist on the main road can be from a driveway and still be seen by a driver waiting to exit, and vice versa) depends on the main road's 85th percentile speed (the speed below which 85% of motorists are traveling). Sight requirements are listed in the text, *A Policy on Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials (AASHTO) in 2001. Based on the relatively flat roadways, no horizontal curves obstructing the views to or from the driveways,

and several future proposed deceleration lanes close to the site driveways, sight distance will not be an issue.

11.2.3. Site Trip Generation

Trip generation for the project was primarily based off of the 8th Edition of the *Trip Generation* manual, published by the Institute of Transportation Engineers (ITE) in 2008. Using the project description for each area, peak hour trips for each land use were generated. Due to the project's proximity to local mass transit, a 3% transit credit was applied to reduce the vehicle trips by a certain percentage. In addition, due to the mixed-use nature of this site, a 5%-10% internal capture percentage was utilized to illustrate some of the project's residential uses working at the project.

The ITE *Trip Generation* manual is based on "stand alone" single-use type developments and does not take into account reductions in trip generation that will result from the mixed-use nature of this project. The ITE *Trip Generation Handbook* recognizes that the overall number of external vehicle trips generated by a mixed-use development will be less than the number of trips that would be generated by each of the individual uses separately. This is because a portion of the trips will be internal trips which take place between the various land uses and does not leave the project area, and therefore does not impact the external roadway network.

This TIS utilized a conservative 10 percent internal capture of Area A's non-arena traffic by Area B to illustrate that 10% of Area A's workforce will most likely be living in Area B. It is projected that "living close to the new commercial uses" would be a draw for future residents of this site. In addition, 5% of Area D's traffic was internally captured by Area B. Likewise, this is to demonstrate that 5% of Area D workforce is projected to live in Area B. Taking into consideration the numerous sources of local employment (for example, Yaphank County Center, John J. Foley's Nursing Home, Suffolk County Services) an additional 5% of Area B's traffic is assumed to be captured by the local area.

There is no set percentage to use for internal capture trips for a multi-parcel project with many (more than three) different land uses. 10% was a reasonable

percentage of stadium/restaurant visitors and employees to come from on-site residences, and 5% was a reasonable percentage of industrial commuter trips to come from on-site residents.

The 5% and 10% values were chosen to be reasonable, and to yield fewer than 60 trips per hour for each parcel's "internal capture." The total credit is 77 trips or less an hour: 42 or fewer trips for Parcel A and 34 or fewer trips for Parcel B.

Since the 5% and 10% values are applied only to two out of four parcels, the overall effect is a 2.4% shared trip credit at most:

- AM Peak Hour: 30 shared trips out of 2,114 trips = 1.4%
- Midday and Saturday Peak Hours: 77 shared trips out of 2,343 trips = 2.4%
- PM Peak Hour: 70 trips out of 4,307 trips = 1.6%

A summary of the expected trip generation is shown in Table 11-2 (all numbers reflect "trips per hour").

Table 11-2: Site Trip Generation

Phase	AM Peak Hour			MD/Sat Peak Hour			PM Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Area A	155	114	269	1,848	388	2,236	428	1,757	2,186
Area B	80	465	546	395	353	749	453	188	642
Area C	0	0	0	37	26	63	1	1	2
Area D	1,075	146	1,221	77	77	154	172	1,262	1,434
Total	1,310	725	2,036	2,358	844	3,202	1,054	3,208	4,264

11.2.4. Directional Distribution and Traffic Assignment

Next, the peak volumes of traffic this development would generate in each direction at each study intersection was determined. This was done by determining the distribution (in percentage form) of new site trips at each approach and then using the distribution to calculate actual numbers of generated trips. Due to the project's mixed use nature, its associated travel patterns will have three separate components: trips associated with industrial/office uses, trips associated with residential uses, and trips associated with recreational uses (for example, Area A's stadium/arena). The breakdown for each can be referenced in the Traffic Impact Study. These distributions were then used to calculate actual

numbers of site-generated trips. The hourly generated trips are summarized below and are detailed in the Traffic Study:

Table 11-3: Proposed Action Generated Trips

External Trips:				
	AM Peak Hour	Midday Peak Hour	PM Peak Hour	Saturday Peak Hour
Enter	1,326	2,301	1,087	2,301
Exit	758	865	3,150	865
Total	2,084	3,166	4,237	3,166
Internally Captured Trips:				
Enter	17	42	39	42
Exit	13	35	31	35
Total	30	77	70	77
Total Trips:				
Enter	1,343	2,343	1,126	2,343
Exit	771	900	3,181	900
Total	2,114	3,243	4,307	3,243

These trips were distributed to the study intersections to determine the 2025 Build Scenario traffic volumes.

11.2.5. Traffic Signals at Existing Unsignalized Intersections

The Traffic Study includes “signal warrant analyses” at several locations which are currently unsignalized:

- The proposed Area A access on Yaphank Avenue
- Yaphank Avenue at the SCDPW driveway
- Yaphank Avenue at Glover Drive
- The Exit 57 intersection with Yaphank Avenue and Horseblock Road

In New York State, an unsignalized intersection can justify (or “warrant”) a new traffic signal if it meets certain traffic volume and delay criteria. Based on the projected 2025 Build Scenario traffic volumes and delays, each of these intersections will warrant new traffic signals, so the 2025 Build Scenario *Synchro* analyses account for traffic signals at those locations.

11.2.6. 2025 Build Scenario Capacity Analysis

Synchro LOS analyses of the 2025 Build scenario indicated that nearly every intersection will experience LOS F in at least one of the four peak periods. The

following mitigation measures/improvements are proposed to help counter impacts to traffic flow quality:

1. Yaphank Avenue (CR 21) at LIE North Service Road
 - Add a northbound left turn lane
2. Yaphank Avenue (CR 21) at LIE South Service Road
 - Add an eastbound left turn lane, and a northbound through lane
3. Yaphank Avenue at SCDPW Driveway (#335)
 - Install a traffic signal at this location
 - Add a northbound through lane
4. Yaphank Avenue at Gerard Road
 - Add a northbound through lane, and a southbound through lane
5. Yaphank Avenue at Horseblock Road (CR 16)
 - Add a southbound left turn lane and an eastbound left turn lane
 - Restripe southbound approach to provide 2 left turn lanes, 1 through-right lane, and 1 right turn lane
6. Yaphank Avenue/Horseblock Road at Sunrise Highway Exit 57
 - Add a westbound right turn lane
7. Horseblock Road at Patchogue-Yaphank Road (CR 101)
 - Add an eastbound through lane, and a westbound through lane
8. Horseblock Road at Bellport Road
 - Add an eastbound through lane, and a westbound through lane
9. Horseblock Road at LIE North Service Road
 - Add a northbound left turn lane
10. Horseblock Road at LIE South Service Road
 - Add an eastbound right turn lane, and a northbound through lane.

These mitigation measures and improvements yield 2025 Mitigated Build conditions. Most LOS grades are E or better, with some LOS F grades that would still be improvements over the Mitigated No Build condition.

The following table illustrates the overall intersection LOS results for all future year traffic analyses: the 2025 No Build, 2025 Mitigated No Build (where applicable), 2025 Build, and 2025 Mitigated Build.

Table 11-4: 2025 Levels of Service

		AM LOS	MID LOS	PM LOS	SAT LOS
Yaphank Avenue at LIE North Service Road	No Build	B	A	A	A
	Build	F	D	F	C
	Mitigated Build	C	D	D	C
Yaphank Avenue at LIE South Service Road	No Build	B	A	C	A
	Build	D	F	F	F
	Mitigated Build	A	C	D	C
Yaphank Avenue at SCDPW Driveway	No Build	A	A	A	A
	Build	A	F	F	A
	Mitigated Build	A	A	A	A
Yaphank Avenue at Gerard Road	No Build	A	A	A	A
	Build	A	A	A	A
	Mitigated Build	A	A	A	A
Yaphank Avenue at Glover Drive	No Build	A	A	A	A
	Build	F	F	F	F
	Mitigated Build	B	B	B	A
Yaphank Avenue at Horseblock Road	No Build	B	B	D	B
	Mitigated No Build	Not applicable	Not applicable	D	Not applicable
	Build	D	C	F	B
	Mitigated Build	C	C	D	B
Yaphank Av/Horseblock/Sunrise Hwy Exit 57	No Build	F	F	C	B
	Mitigated No Build	F	D	A	B
	Build	F	F	D	E
	Mitigated Build	E	C	B	B
Horseblock Road at Woodside Avenue	No Build	A	C	A	A
	Build	B	C	C	B
	Mitigated Build	B	C	C	B
Horseblock Road at Sills Road	No Build	E	C	E	C
	Mitigated No Build	D	C	E	Not applicable
	Build	E	C	F	C
	Mitigated Build	C	B	C	B
Horseblock Road at Bellport Road	No Build	C	E	E	C
	Mitigated No Build	C	E	Not applicable	Not applicable
	Build	E	E	F	D
	Mitigated Build	C	D	D	C

Table 11-4 continued:

Horseblock Road at LIE North Service Road	No Build	F	E	F	E
	Mitigated No Build	C	C	D	C
	Build	D	C	F	C
	Mitigated Build	C	C	D	C
Horseblock Road at LIE South Service Road	No Build	E	E	F	F
	Mitigated No Build	E	E	Not applicable	Not applicable
	Build	F	E	F	F
	Mitigated Build	C	B	C	B
Horseblock Road at Town Landfill	No Build	C	A	B	B
	Mitigated No Build	A	Not applicable	Not applicable	Not applicable
	Build	F	A	F	B
	Mitigated Build	C	B	D	B
CR 21 - Area A Main Driveway (Signalized Build)		A	B	C	B
LIE South Service Road-Area A Driveway (Build)		A	A	B	A

11.2.7. Future Off-Peak Conditions

The next step of this report was to determine how off-peak conditions might compare to the peak conditions analyzed in the Traffic Study.

2025 Build *Synchro* analyses were conducted based on the peak hours of the project's surrounding road network, which generally coincides with the Proposed Action's peak hours with respect to traffic. The exception is the proposed arena/stadium whose peak hour trip generation occurs during off-peak periods (i.e., outside the four peak periods). Based on the 2010 traffic counts and on 2007-2008 Average Annual Daily Traffic reports for Yaphank Avenue and the LIE, the Traffic Impact Study concluded that the surrounding roadway network experiences a significant decrease in traffic volume between peak and off-peak periods. On Yaphank Avenue, traffic volumes decrease by approximately 8 to 70 percent during the hour immediately following each of the four peak hours. For example, between Horseblock Road and the LIE, the two-way volume during the AM peak hour on Yaphank Avenue (8:00-9:00 am) is 749 vehicles. This volume drops to 469 vehicles between 9:00 and 10:00 am, which is a decrease of 37%. On the LIE, traffic volumes decrease by approximately 1 to 31 percent during the hours immediately following the four peak hours of this report. Between Yaphank Avenue and William Floyd Parkway (Exits 67 to 68), during the AM

peak hour of 8:00-9:00 am, the two-way volume on the LIE is 5,876 vehicles. This volume drops to 5,238 vehicles during the following hour (9:00-10:00 am), which is a decrease of 11%. Therefore, the cumulative off-peak intersection traffic volumes from an event at the arena/stadium will be smaller than the traffic volumes during the Midday peak hour that was analyzed in the Traffic Study. This conclusion means that there is no need to perform off-peak period *Synchro* traffic analyses.

11.2.8. Public Transportation

The site is served by Suffolk County Transit (Route S71) and is located within the vicinity of the Long Island Rail Road's Yaphank Station. Currently this station has limited service. It is anticipated that should the proposed project go forward, along with other planned projects in the general area, there could be enough need to make additional bus and train service viable. Additionally, the Selected Developer could provide jitneys service for the residents, workers and visitors to the site.

