APPENDIX H
AIR QUALITY SCREENING

Air Quality Analysis Screening

1. Background and Purpose of Report

This office has performed an Air Quality analysis screening for the potential sale and redevelopment of County property to determine if full air quality analysis is required.

1.1 Introduction

Proposed sites are subject to established air quality criteria for certain pollutants. The overall list of pollutants is dictated by the National Ambient Air Quality Standards, or NAAQS:

- Sulfur dioxide (SO_2)
- Carbon monoxide (CO)
- Inhalable particulates ("PM_{10}")
- Fine particulates ("$PM_{2.5}$")
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)

New York also has criteria for hydrocarbons (HC) and total suspended particulates (TSP).

The above list is all-inclusive; specific applications may require analysis of only some (or none) of the above pollutants, or they may require analysis at only some (or none) of the adjacent intersections.

For proposed projects in New York, the criteria for judging which pollutants to analyze is based on the methodology in the **Environmental Procedures Manual** (**EPM**) published by the New York State Department of Transportation (NYSDOT) Environmental Analysis Bureau in January 2001. There are two levels of criteria for determining whether and where pollutant analyses are warranted.

First, the pollutant must fall into one of two categories:

1) It is associated with vehicular traffic (when the site use itself will not generate pollutants)
2) It is typically studied on the local (as opposed to the regional) level

Next, the **EPM** has a three-step secondary procedure to determine what intersections might warrant air quality screening of the pollutants that pass the above test, based on meeting all three criteria.

1.2 Step 1: Pollutant Categories

Several pollutants can be eliminated from the screening list because they are not associated with vehicular emissions:

a) Sulfur dioxide
b) Inhalable particulates PM_{10}
c) Fine particulates $PM_{2.5}$
d) Total suspended particulates
e) Lead* →

* Lead used to be a significant vehicle pollutant, but it has dropped significantly since leaded gasoline was outlawed. Even older cars (1970s and prior) that need leaded gasoline instead get lead substitute mixed into unleaded gasoline. Therefore, lead is eliminated from the

This leaves nitrogen oxides, hydrocarbons, ozone, and carbon monoxide.

Next, two more pollutants are eliminated from the list because of their scale. Nitrogen oxides and hydrocarbons are important on a regional level, as opposed to individual projects.
Based on these two steps, only carbon monoxide remains as a potential subject pollutant.

1.3 Step 2: EPM Screening Procedure

This second level of screening determines which study intersections in the Traffic Study should be considered for micro-scale CO emissions analysis. This screening evaluated conditions during the AM, Midday, PM, and Saturday Build peak hours.

A) Level of Service (LOS) Screening

This first step screens intersections based on their peak hour LOS. Intersections with LOS A, B, or C are eliminated from further consideration, as are intersections controlled by stop signs.

The DGEIS Traffic Study includes thirteen (13) study intersections, nine of which are currently signalized, plus four intersections whose traffic volumes will warrant a new traffic signal by 2025. If it happens that these latter four intersections are not signalized by 2025, they will not meet the LOS Screening criteria anyway.

Of the thirteen currently or to-be signalized intersections, eight will operate at or worse than LOS D during at least one Build or Mitigated Build peak hour analysis, as shown below in Table 1. These LOS results account for improvements planned by the Suffolk County Department of Public Works (SCDPW), New York State Department of Transportation (NYSDOT), and mitigation planned by other planned project developers.

Table 1: LOS Screening Results

Intersection *Peak Hour:*	*AM*	*Midday*	*PM*	*Saturday*
Yaphank Avenue at LIE North Service Road	C	D	D	D
Yaphank Avenue at LIE South Service Road	B	B	D	D
Yaphank Avenue at Horseblock Road	C	C	D	D
Horseblock Road at Woodside Avenue	B	B	B	B
Horseblock Road at Town Landfill-Area D Driveway	C	B	D	D
Horseblock Road at Patchogue-Yaphank Road (CR	C	B	C	C
Horseblock Road at Bellport Road	B	D	D	D
Horseblock Road at LIE North Service Road	C	C	D	D
Horseblock Road at LIE South Service Road	C	B	C	C
Yaphank Avenue at Glover Drive	B	B	B	B
Yaphank Avenue at SCDPW Driveway	A	A	C	A
Sunrise Highway at Exit 57 (Yaphank/Horseblock)	E	C	B	B
Yaphank Avenue at Proposed Area A Site Driveway	C	B	E	C

Note: Shaded cells denote periods where the LOS will be A, B, or C, which do not meet the LOS criteria.

These eight intersections pass on to the next level of screening: Capture Criteria.

B) Capture Criteria Screening

This step has five criteria that examine changes between the No Build and Build scenarios:

1. A 10% or more reduction in the source-receptor distance (occurs with road widening)
2. A 10% or more increase in traffic volume
3. A 10% or more increase in vehicle emissions (similar to the increase in vehicular volume, factored slightly by changes in truck trips)
4. Any increase in the number of queued lanes
5. A 20% reduction in travel speed, when Build speeds are below 30 mph

The first point of comparison was the percentage change in traffic volume. For the purposes of this analysis, it was projected that the traffic volume change (item 2) corresponds to the change in vehicle emissions (item 3), since the potential land uses are not expected to significantly change heavy vehicle percentages along the LIE, Yaphank Avenue, or Horseblock Road.

Table 2 lists the No Build intersection volumes, site-generated volumes, and percentage changes in volume between the No Build and Build conditions. Nearly every intersection experiences high enough volume changes to pass through to Level 3 screening:

Table 2: Percentage Volume Changes

Intersection	Period	No Build volumes	Site volumes	% Change	Over 10%?
Yaphank Avenue at LIE North Service Road	MID	806	802	99.5%	**Yes**
	PM	955	1,112	116.4%	**Yes**
	SAT	829	802	96.8%	**Yes**
Yaphank Avenue at LIE South Service Road	PM	2,257	2,087	92.5%	**Yes**
	SAT	1,039	2,038	196.1%	**Yes**
Yaphank Avenue at Horseblock Road	PM	3,082	1,792	58.1%	**Yes**
	SAT	2,284	938	41.1%	**Yes**
Horseblock Road at the Brookhaven Town Landfill – Area D Driveway	PM	2,242	1,769	78.9%	**Yes**
	SAT	1,981	459	23.2%	**Yes**
Horseblock Road at Bellport Road	MID	2,254	35	1.5%	No
	PM	2,690	350	13.0%	**Yes**
	SAT	2,381	35	1.5%	No
Horseblock Road at LIE North Service Road	PM	2,981	316	10.6%	**Yes**
	SAT	2,781	19	0.7%	No
Sunrise Highway at Exit 57	AM	2,709	669	24.7%	**Yes**
Yaphank Avenue at Area A Access	PM	2,157	2,747	127.4%	**Yes**

For the remaining two intersections, items B1, B4, and B5 were examined next to see if they would pass through to Level 3:

1. Horseblock Road at Bellport Road – Midday and Saturday Peak Hours
2. Horseblock Road at LIE North Service Road – Saturday Peak Hour

Horseblock Road travel speed data was obtained from the *Synchro* analyses performed for the Traffic Impact Study. Eastbound and westbound speeds are unavailable in the software, since these locations have no upstream intersections within the Synchro network that was created as part of the traffic impact study. Their speed change is approximated based on delay changes:

Table 3: Percentage Speed Changes

Intersection	Time Period	Approach	No Build Speed (mph)	Build Speed (mph)	Reduction (mph)	Percent Reduction	Over -20%?
Horseblock Road at Bellport Road	MID	Westbound	11.3	20.8	9.5 increase	84.1% gain	No
		Eastbound	38.4	45.7	7.3 increase	19.0% gain	No
	SAT	Westbound	15.3	23.2	7.9 increase	51.6% gain	No
		Eastbound	39.6	47.6	8 increase	20.2% gain	No
Horseblock Road at LIE N Service Road	SAT	Northbound	19.9	20.9	1 increase	5.0% gain	No
		Southbound	8.4	9.1	0.7 increase	8.3% gain	No

Intersection	Time Period	Approach	No Build Delay (LOS)	Build Delay (LOS)	Delay Reduction?
Horseblock Road at Bellport Road	MID	Northbound Southbound	87.5 (F) 16.5 (B)	87.5 (F) 16.5 (B)	None – no speed drop
	SAT	Northbound Southbound	158.3 (F) 17.3 (B)	158.3 (F) 17.3 (B)	None – no speed drop
Horseblock Road at LIE N Service Road	SAT	Westbound	13.5 & 33.2 (B & C)	13.5 & 33.2 (B & C)	None – no speed drop

As shown in Table 3, the Mitigated Build scenario is enough of an improvement that all northbound and southbound speeds increase. Based on the LOS results, since the Mitigated Build condition maintains North Service Road and Bellport Road delays, their speeds are projected to remain the same, or at least "decrease less than 20 percent," so no intersection meets item B5.

The next step was to analyze items B1 and B4:

1. A 10% or more reduction in the source-receptor distance (occurs with road widening)
4. Any increase in the number of queued lanes

Since (as shown in the Traffic Study) both intersections require road widening as part of their mitigation, both intersections meet criteria B1 or B4.

To summarize, the following signalized intersections pass on to the third and final level of screening (Volume Threshold):

- Yaphank Avenue at LIE North Service Road (Midday, PM, Saturday)
- Yaphank Avenue at LIE South Service Road (PM, Saturday)
- Yaphank Avenue at Horseblock Road (PM, Saturday)
- Horseblock Road at Town Landfill-Area D Driveway (PM, Saturday)
- Horseblock Road at Bellport Road (Midday, PM, Saturday)
- Horseblock Road at LIE North Service Road (PM, Saturday)
- Sunrise Highway at Exit 57 (Yaphank/Horseblock) (AM)
- Yaphank Avenue at Proposed Area A Site Driveway (PM)

C) Signalized Intersection Volume Threshold Screening

This final screening step compares the peak hour approach volumes with threshold volumes determined from the appropriate EPM vehicle threshold table. Here, that table is Table 3c, which corresponds to signalized intersections. Each study location's highest approach volume would need to exceed the corresponding threshold volume, for the location to be a candidate for a micro-scale analysis during that peak hour. Below the threshold traffic volume, it is very unlikely that the location would violate the NAAQS for CO.
The volumes in the table are based on queue (idle) and free-flow (average speed) emission factors.

The emission factors in these tables are given by the U.S. Environmental Protection Agency (EPA) Mobile Source Emission Factor Model, MOBILE6, using data obtained from the NYS Department of Environmental Conservation (NYSDEC). MOBILE6.2, the most recent version of the program, generates emission factors for hydrocarbons (HC), CO, nitrogen oxides (NOx), particulate matter (PM), and air toxics.

The CO emission factors are listed in tables on the NYSDOT Environmental Analysis Bureau (EAB) website. Locations in Suffolk County use Table EF1 (attached at the end of this report).

To determine the appropriate volume threshold, the following steps were taken:

1) The locations are signalized intersections – use Table 3c (attached at the end of this report)
2) Yaphank Avenue, Horseblock Road, and the LIE service roads were classified as urban arterials (Functional class 14/16)
3) The intersections were located in Suffolk County, NYSDOT Region 10
4) The highest approach (e.g., eastbound, northbound) volumes were determined
5) The approaches' average travel speeds were established
6) The "Emission Factors" (EF) were determined using Table EF1 for the year 2010 (*Note: for emission factors that fall in between an interval, the upper bound emission factor was used.*)
7) The volume thresholds were determined from Table 3c

The hourly volumes are shown in Table 4:

Table 4: Hourly Build Volumes on Each Approach

Intersection		Northbound	Southbound	Eastbound	Westbound
Yaphank Avenue at LIE North Service Road	(MID)	931	255		***1,341***
	(PM)	1593	271		***1,116***
	(SAT)	750	217		***1,279***
Yaphank Avenue at LIE South Service Road	(PM)	***2,589***	821	1,024	
	(SAT)	981	758	***1,413***	
Yaphank Avenue at Horseblock Road	(PM)	11	1,707	***2,454***	1,394
	(SAT)	10	576	1,132	***1,509***
Horseblock Road at the Town Landfill and Proposed Area D Drivreway	(PM)	46	***1,686***	1,354	1,085
	(SAT)	306	303	895	***939***
Horseblock Road at Bellport Road	(MID)	523	198	***907***	701
	(PM)	467	341	***1,178***	1,097
	(SAT)	491	216	***1,035***	737
Horseblock Road at LIE North Service Road	(PM)	***1,749***	1,099		810
	(SAT)	***1,300***	949		728
Sunrise Highway at Exit 57	(AM)	1,156	748		***1,475***
Yaphank Avenue at Area A Site Driveway	(PM)	***1,770***	1,611	1,526	

The busiest approaches are shown in bold italics.

Based on the speed data in the Synchro files (except for the North Service Road and proposed driveways, where the speed was projected as "half of the speed limit" or "10 mph" at the driveways), the average speeds on these approaches are shown in Table 5.

Since Emission Factors are based on speeds in 5 mph increments, each average speed was rounded down to the next 5 mph interval to be conservative:

Table 5: Average Approach Speeds

Intersection		Busiest Approach	Approach speed (mph)
Yaphank Avenue at LIE North Service Road	(MID)	Westbound (LIE NSR)	*Speed limit is 40 mph - Use 20*
	(PM)	Westbound (LIE NSR)	
	(SAT)	Westbound (LIE NSR)	
Yaphank Avenue at LIE South Service Road	(PM)	Northbound (Yaphank Av)	15.1 (*round to 15*)
	(SAT)	Eastbound (LIE SSR)	*Use 20*
Yaphank Avenue at Horseblock Road	(PM)	Eastbound (Horseblock Rd)	26.7 (*round to 20*)
	(SAT)	Westbound (Horseblock Rd)	14 (*round to 10*)
Horseblock Road at the Town Landfill	(PM)	Southbound (Site Driveway)	*Use 10*
and Proposed Area D Driveway	(SAT)	Westbound (Horseblock Rd)	27.9 (*round to 25*)
Horseblock Road at Bellport Road	(MID)	Eastbound (Horseblock Rd)	45.7 (*round to 45*)
	(PM)	Eastbound (Horseblock Rd)	47.5 (round to 45)
	(SAT)	Eastbound (Horseblock Rd)	47.6 (round to 45)
Horseblock Road at LIE North Service Road	(PM)	Northbound (Horseblock Rd)	19.4 (*round to 15*)
	(SAT)	Northbound (Horseblock Rd)	20.9 (*round to 20*)
Sunrise Highway at Exit 57	(AM)	Westbound (Exit)	*Use 10*
Yaphank Avenue at Area A Site Driveway	(PM)	Northbound (Yaphank Av)	8.6 (*round to 5*)

The next step was to determine each location's Emission Factor, based on their approach speeds. These factors also needed to be calculated, based on the makeup of the approach's traffic streams.

Based on Chapter 1.1 of the NYSDOT Environmental Analysis Bureau EPM (sections attached at the end of this report), on urban arterials in Region 10, the following vehicle types account for 95% of all January/winter-time vehicle registrations:

Percent	Vehicle Type
54.16%	LDGV Light-Duty gasoline vehicles (Passenger Cars)
6.69%	LDGT1 Light-Duty gasoline trucks (0-6000 lbs GVWR, 0-3750 lbs LVW)
22.14%	LDGT2 Light-Duty gasoline trucks (0-6000 lbs GVWR, 3751-5750 lbs LVW)
7.49%	LDGT3 Light-Duty gasoline trucks (6,001-8,500 lbs GVWR, 0-5,750 lbs ALVW)
3.40%	LDGT4 Light-Duty gasoline trucks (6,001-8,500 lbs. GVWR, >5,751 lbs. ALVW)
1.10%	HDGV2B Class 2B Heavy-Duty gasoline trucks (8,501-10,000 lbs. GVWR)

There are numerous other (larger) sizes of diesel trucks and buses, but each type constitutes less than 0.5% of registrations, and barely 5% of registrations when combined, which is too few to impact the results of this screening.

Table EF1 was used to obtain the EFs for various vehicle types at the above-referenced approach speeds for the year 2025 (the Build year in the Traffic Impact Study) in Suffolk County (see Table 6):

Table 6: Emission Factors

Emission	Passenger Cars	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B
Queue (0 mph)	40.72	34.98	37.57	36.54	37.43	79.76
5 mph	11.68	9.90	10.63	10.21	10.48	25.49
10 mph	9.56	7.95	8.55	8.13	8.36	16.96
15 mph	8.94	7.35	7.91	7.50	7.72	11.92
20 mph	8.63	7.05	7.59	7.18	7.39	8.85
25 mph	8.45	6.88	7.41	7.00	7.21	6.95
45 mph	8.91	7.33	7.92	7.50	7.72	4.56

All Emission Factors are in terms of "grams of CO per mile," except the idle factors, which are in terms of "grams of CO per hour."

These factors were then weighted to determine the overall "Vehicle Mix Weighted CO Emission Factor."
For example, the Weighted Queue Emission Factor (0 mph) is 37.60, calculated as follows:

- Passenger cars make up 54.16% of registrations. 54.16% x its base factor of 40.72 = 22.05
- LDGT1 makes up 6.69% of registrations. 6.69% x its base factor of 34.98 = 2.34
- LDGT2 makes up 22.14% of registrations. 22.14% x its base factor of 37.57 = 8.32
- LDGT3 makes up 7.49% of registrations. 7.49% x its base factor of 36.54 = 2.74
- LDGT4 makes up 3.40% of registrations. 3.4% x its base factor of 37.43 = 1.27
- HDGV2B makes up 1.10% of registrations. 1.1% x its base factor of 79.76 = 0.88
- *TOTAL OF 22.05 + 2.34 + 8.32 + 2.74 + 1.27 + 0.88 =* ***37.60***

All of the factors were then rounded up to the next higher interval in Table 3c:

- The Queue Emission Factor gets rounded up to 100, the smallest factor in the table
- All Emission Factors get rounded up to the near 2.5 g CO/mile. For example, the 13.75 factor (for the 5 mph range) gets rounded up to 15.0

Based on the above, the following table lists each Weighted Emission Factor, the corresponding minimum approach volumes from Table 3c, and the actual approach volumes:

Table 7: Weighted CO Emission Factors and Volumes

Speed	Weighted CO Emission Factor	Minimum Volume	Corresponding Locations & Volumes	Volume Met?
0 mph	37.60 *(round to 100)*	--	--	--
5 mph	10.74 *(round to 15)*	2,562	• Yaphank Avenue at Area A Site Driveway (PM): 1,770	NO
10 mph	8.68 *(round to 10)*	3,800	• Yaphank Ave. at Horseblock Rd (SAT): 1,509 • Horseblock at Town Landfill and Area D Driveway (PM): 1,686 • Sunrise Highway Exit 57 (AM): 1,475	NO NO NO
15 mph	8.04 *(round to 10)*	3,800	• Yaphank Avenue at LIE SSR (PM): 2,589 • Horseblock Road at LIE NSR (PM): 1,749	NO NO

Speed	Weighted CO Emission Factor	Minimum Volume	Corresponding Locations & Volumes	Volume Met?
20 mph	7.71 *(round to 10)*	3,800	• Yaphank Avenue at LIE NSR (MID, PM, SAT): 1,116 to 1,341 • Yaphank Avenue at LIE SSR (SAT): 1,413 • Yaphank Avenue at Horseblock Road (PM): 2,454 • Horseblock Road at LIE NSR (SAT): 1,300	NO NO NO NO
25 mph	7.52 *(round to 10)*	3,800	• Horseblock at Town Landfill and Area D Driveway (SAT): 939	NO
45 mph	7.94 *(round to 10)*	3,800	• Horseblock Road at Bellport Road (MID, PM, SAT): 907 to 1,178	NO

As shown above, none of the busiest approach volumes meet the volume threshold.

Conclusion

Most of the study intersections pass through the initial steps of Air Quality screening. However, since none of the critical approach volumes in Table 7 will exceed the Volume Thresholds, none of the intersections require a microscale CO analysis.

When intersections fail to pass through all of the above screening levels, it means that any CO concentration predicted in a micro-scale analysis would likely be well below ambient standards, and therefore this project will not have a significant air quality impact.

ATTACHMENTS

- MOBILE 6.2 Emission Factor Table
- Environmental Procedures Manual Table 3c
- Environmental Procedures Manual:
  Air Quality Project Environmental Guidelines
- Speed Data Reports from Synchro

MOBILE6 CO Emission Factor Table
(Arterial, Collector, and Local Road)

For Bronx, Kings, Nassau, Queens, Richmond, Rockland, Suffolk, and Westchester Counties

Year: 2025

CO Rate (grams/hour for 0.0 mph; grams/mile for 5 - 65 mph)

	Average Vehicle Speed (mph)													
Veh. Type	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	65.0
LDGV	40.72	11.68	9.56	8.94	8.63	8.45	8.40	8.44	8.68	8.91	9.14	9.37	9.60	9.83
LDGT1	34.98	9.90	7.95	7.35	7.05	6.88	6.84	6.88	7.10	7.33	7.56	7.79	8.02	8.25
LDGT2	37.57	10.63	8.55	7.91	7.59	7.41	7.37	7.42	7.67	7.92	8.17	8.41	8.66	8.91
LDGT3	36.54	10.21	8.13	7.50	7.18	7.00	6.96	7.01	7.25	7.50	7.75	7.99	8.24	8.49
LDGT4	37.43	10.48	8.36	7.72	7.39	7.21	7.17	7.22	7.47	7.72	7.97	8.22	8.48	8.73
HDGV2B	79.76	25.49	16.96	11.92	8.85	6.95	5.76	5.04	4.67	4.56	4.72	5.15	5.93	7.23
HDGV3	104.25	33.32	22.17	15.58	11.57	9.08	7.53	6.59	6.10	5.97	6.16	6.73	7.76	9.45
HDGV4	103.66	33.13	22.04	15.49	11.51	9.03	7.49	6.56	6.07	5.93	6.13	6.69	7.71	9.40
HDGV5	120.45	38.50	25.61	18.00	13.37	10.49	8.70	7.62	7.05	6.89	7.12	7.77	8.96	10.92
HDGV6	123.39	39.44	26.24	18.44	13.70	10.75	8.91	7.80	7.22	7.06	7.29	7.96	9.18	11.19
HDGV7	143.55	45.88	30.52	21.46	15.94	12.50	10.37	9.08	8.40	8.22	8.49	9.26	10.68	13.01
HDGV8A	152.03	48.59	32.33	22.72	16.88	13.24	10.98	9.62	8.90	8.70	8.99	9.81	11.31	13.78
LDDV	7.72	2.63	1.99	1.59	1.34	1.18	1.08	1.01	0.97	0.95	0.94	0.96	0.99	1.05
LDDT12	2.56	0.86	0.63	0.49	0.40	0.34	0.30	0.28	0.26	0.25	0.25	0.26	0.27	0.29
LDDT34	2.83	0.94	0.68	0.52	0.42	0.35	0.31	0.28	0.27	0.26	0.26	0.26	0.28	0.30
HDDV2B	1.24	0.40	0.28	0.20	0.15	0.12	0.10	0.09	0.08	0.07	0.07	0.08	0.08	0.09
HDDV3	1.39	0.45	0.31	0.23	0.17	0.13	0.11	0.10	0.09	0.08	0.08	0.09	0.09	0.11
HDDV4	1.55	0.50	0.35	0.25	0.19	0.15	0.12	0.11	0.10	0.09	0.09	0.10	0.10	0.12
HDDV5	1.85	0.60	0.42	0.30	0.23	0.18	0.15	0.13	0.12	0.11	0.11	0.11	0.12	0.14
HDDV6	2.11	0.69	0.48	0.34	0.26	0.20	0.17	0.15	0.13	0.13	0.13	0.13	0.14	0.16
HDDV7	2.61	0.85	0.59	0.42	0.32	0.25	0.21	0.18	0.16	0.16	0.15	0.16	0.17	0.20
HDDV8A	4.49	1.47	1.01	0.73	0.55	0.44	0.36	0.31	0.28	0.27	0.27	0.28	0.30	0.34
HDDV8B	4.34	1.42	0.98	0.70	0.53	0.42	0.35	0.30	0.27	0.26	0.26	0.27	0.29	0.33
HDGB	169.76	54.26	36.10	25.37	18.84	14.79	12.26	10.74	9.94	9.72	10.04	10.95	12.63	15.39
HDDBT	9.86	3.22	2.22	1.60	1.21	0.96	0.79	0.68	0.62	0.59	0.58	0.61	0.66	0.75
HDDBS	3.54	1.16	0.80	0.57	0.43	0.34	0.28	0.25	0.22	0.21	0.21	0.22	0.24	0.27
MC	217.05	51.75	26.99	18.96	15.27	13.00	11.36	10.15	9.31	8.77	8.56	8.56	13.93	19.31

Table 3C. PEAK HOUR TRAFFIC VOLUME THRESHOLDS AT ANY APPROACH FOR SIGNALIZED INTERSECTIONS

QUEUE EMISSION FACTOR (GRAMS/HOUR)

FREE FLOW SPEED (MPH)	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
2.5	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	3405
5.0	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	3930	3670	3333	3157	2769	2593	2272	2042
7.5	4000	4000	4000	4000	4000	4000	3828	3742	3454	3298	3040	2900	2730	2570	2333	2182	1969	1893	1784	1642
10.0	3800	3727	3481	3379	3202	3101	2878	2845	2654	2498	2390	2250	2111	1970	1933	1832	1637	1543	1484	1442
12.5	3075	2927	2856	2679	2602	2501	2378	2279	2179	2048	2015	1850	1804	1720	1633	1557	1474	1418	1384	1329
15.0	2562	2427	2381	2279	2202	2094	2028	1929	1841	1773	1740	1675	1604	1507	1483	1410	1361	1318	1309	1291
17.5	2199	2142	2031	1979	1914	1869	1796	1729	1666	1623	1540	1500	1454	1407	1358	1310	1292	1280	1271	1253
20.0	1927	1892	1815	1754	1689	1669	1621	1604	1528	1498	1415	1371	1354	1322	1292	1285	1254	1248	1221	1178
22.5	1727	1710	1665	1613	1589	1556	1521	1454	1403	1373	1340	1296	1285	1272	1242	1216	1163	1148	1146	1084
25.0	1627	1585	1542	1513	1454	1431	1396	1366	1328	1298	1283	1258	1210	1172	1167	1097	1063	1041	1039	1009
27.5		1481	1429	1402	1354	1331	1296	1266	1228	1210	1183	1158	1110	1072	1067	1047	1000	953	951	934
30.0			1329	1302	1279	1256	1211	1166	1153	1116	1083	1070	1060	997	979	972	921	903	876	865
32.5				1202	1186	1181	1117	1116	1053	1041	1033	995	981	937	929	900	871	846	826	805
35.0					1101	1081	1067	1016	1003	966	958	945	912	887	869	843	833	789	785	755
37.5						1028	992	969	940	916	908	882	862	849	819	805	776	739	735	730
40.0							942	908	886	866	851	838	810	797	794	755	738	721	710	686
42.5								854	836	816	813	788	772	753	750	730	697	683	681	651
45.0									798	778	763	750	734	715	709	680	672	658	643	626
47.5										740	738	712	702	680	677	670	634	620	618	601
50.0											700	687	670	655	645	638	609	595	593	582
52.5												662	645	630	620	607	584	570	568	557
55.0													620	608	595	582	577	551	543	538
57.5														583	579	557	555	538	524	513
60.0															557	544	531	513	511	497
62.5																519	518	500	486	484
65.0																	493	490	486	459
67.5																		472	473	452
70.0																			455	452
72.5																				427
75.0																				
77.5																				
80.0																				
82.5																				
85.0																				
87.5																				
90.0																				
92.5																				
95.0																				
97.5																				
100.0																				
102.5																				
105.0																				
107.5																				
110.0																				
112.5																				
115.0																				
117.5																				
120.0																				
122.5																				
125.0																				
127.5																				
130.0																				
132.5																				
135.0																				
137.5																				
140.0																				
142.5																				
145.0																				
147.5																				
150.0																				
152.5																				
155.0																				
157.5																				
160.0																				
162.5																				
165.0																				
167.5																				
170.0																				
172.5																				
175.0																				
177.5																				
180.0																				
182.5																				
185.0																				
187.5																				
190.0																				
192.5																				
195.0																				
197.5																				
200.0																				

FREE FLOW SPEED (MPH)

NYSDOT Environmental Procedures Manual, Chapter 1.1
Environmental Analysis Bureau
January, 2001

CHAPTER 1.1

AIR QUALITY

PROJECT ENVIRONMENTAL GUIDELINES

January 2001

New York State Department of Transportation
Environmental Analysis Bureau

Section 9. Projects Needing Air Quality Analysis

The National Environmental Policy Act (NEPA) and the State Environmental Quality Review Act (SEQR) are the Federal and State acts, respectively, that require environmental review of actions that may affect the environment. NYSDOT projects are subject to these environmental review requirements. The NEPA requirements for Federal-Aid highway projects are codified in the Federal Highway Administration regulations 23 CFR Part 771. SEQR regulations are codified in 6NYCRR Part 617 and 17NYCRR Part 15.

Projects that require air quality analysis are often based on the environmental class of the project. Projects that are classified as categorically excluded, by their nature, are more likely not to require an air quality analysis. Projects that are classified as requiring environmental assessments or environmental impact statements often require an air quality analysis.

If the project does not meet any of the criteria below, either for a microscale or a mesoscale analysis, then a quantitative air quality analysis is not required. In this case, the air quality section of environmental document should include the following statement: **An air quality analysis is not necessary since this project will not increase traffic volumes, reduce source-receptor distances or change other existing conditions to such a degree as to jeopardize attainment of the National Ambient Air Quality Standards**.

The actual determination of whether a project requires an air quality analysis is based on the project's potential to significantly affect air quality.

A. Criteria For Determining Which Projects Require An Air Quality Analysis.

This section lists the specific criteria (and the assumptions used to determine the criteria) in determining the need for conducting an air quality analysis. The criteria are divided between microscale and mesoscale analyses.

i. Criteria for Projects Needing A Microscale Air Quality Analysis

Carbon Monoxide (CO) impacts are local; high concentrations are generally limited to within a relatively short distance of heavily traveled roadways. Consequently, it is appropriate to predict concentrations of CO on a localized or microscale basis.

Depending on the nature of the proposed project, a microscale air quality analysis may be required. The need for an analysis should be evaluated on any of the roadways in the project area or any other roadways affected by the project. Consultation with EAB is encouraged if departure from any of these criteria might be necessary to address project specific conditions.

The determination for a required microscale analysis is based on the consideration of various criteria. The outcome of the consideration of the criteria will establish the need for a microscale air quality analysis. The criteria are described below.

I-1. Level of Service (LOS) Screening

Intersections impacted by a project, with a build Estimated Time of Completion (ETC), ETC+10, and ETC+20 LOS of only A, B, or C, are generally excluded from microscale air quality analysis. The LOS levels are as defined by the Highway Capacity Manual (HCM). Regardless of the LOS, if there are potentially sensitive receptors, i.e. schools, hospitals, retirement communities, etc., the REC/RELM (Regional Environmental Contact/Regional Environmental-Landscape Manager) or EAB staff should be contacted to determine if a microscale analysis may be appropriate.

If there is no documented LOS information for an intersection or it can not be calculated due to over capacity traffic volumes, the intersection will be deemed to have a LOS of D or worse.

I-2. Capture Criteria Screening

Intersections and roadways impacted by the project and exhibiting ETC, ETC+10, or ETC+20 build LOS D, E, or F will be screened by the criteria below:

1) a 10 % or more reduction in the source-receptor distance (that is, the straight line distance between the edge of the travel lane closest to the receptor and that point of the receptor closest to the roadway);

2) a 10 % or more increase in traffic volume on affected roadways for ETC, ETC+10 or ETC+20;

3) a 10% or more increase in vehicle emissions for ETC, ETC+10 or ETC+20; Increases in vehicle emissions can be due to speed changes, changes in operating conditions (hot/cold starts), changes in vehicle mix, etc. Use the appropriate vehicle emission factor table provided in Attachment 1.1-E. to determine if this criterion is met. The emission factors for the project conditions associated with the no-build and build alternatives can be read from the table. To calculate the emission percentage change, the following formula should be used:

$$\%\ Change = \frac{EF_{build} - EF_{no\text{-}build}}{EF_{no\text{-}build}} \times 100,$$

where EF_{build} and $EF_{no\text{-}build}$ are the emission factors for the build and no-build conditions, respectively.

4) any increase in the number of queued lanes for ETC, ETC+10 or ETC+20; This criterion applies to intersections. Typical projects that may result in an increase in the number of queued lanes include intersection channelization projects and projects that install turn lanes at intersections. It is not expected that intersections in a build alternative controlled by stop signs will require an air quality analysis. If a particular stop sign situation may be appropriate for analysis, consultation with EAB is encouraged.

5) a 20% reduction in speed, when build estimated average speed is at 30 mph or less.

If the impacted intersection or roadway meets any one of the applicable criteria above, the use of the volume and emission factor chart is needed to do the volume threshold screening. If none of the criteria is met, the project does not need a microscale air quality analysis.

When a SIP intersection (an intersection analyzed in the CO SIP attainment demonstration) is located within ½ mile of the project, then a different set of criteria apply to those intersections. These criteria are:

1) a 5% or more reduction in the source-receptor distance (that is, the straight line distance between the edge of the travel lane closest to the receptor and that point of the receptor closest to the roadway);

2) a 5% or more increase in traffic volume on affected roadways for ETC, ETC+10 or ETC+20;

3) a 5% or more increase in vehicle emissions for ETC, ETC+10 or ETC+20; Increases in vehicle emissions can be due to speed changes, changes in operating conditions (hot/cold starts), changes in vehicle mix, etc. Use the appropriate vehicle emission factor table provided in Attachment 1.1-E to determine if this criteria is met. The emission factors for the project conditions associated with the no-build and build alternatives can be read from the table. To calculate the emission percentage change, the following formula should be used:

$$\%\ Change = \frac{EF_{build} - EF_{no\text{-}build}}{EF_{no\text{-}build}} \times 100,$$

where EF_{build} and $EF_{no\text{-}build}$ are the emission factors for the build and no-build conditions, respectively.

4) any increase in the number of queued lanes for ETC, ETC+10 or ETC+20; This criterion applies to intersections. Typical projects that may result in an increase in the number of queued lanes include intersection channelization projects and projects that install turn lanes at intersections. It is not expected that intersections in a build alternative controlled by stop signs will require an air quality analysis. If a particular stop sign situation may be appropriate for analysis, consultation with EAB is encouraged.

5) a 10% reduction in speed, when build estimated average speed is at 30 mph or less.

Intersections evaluated in the SIPs are listed in Table 2. Intersections within ½ mile of a SIP intersection are not subject to the volume threshold screening.

If the project does not meet any of the above criteria, a microscale air quality analysis is not required.

I-3. Volume Threshold Screening

If any of the criteria listed above are realized, then a traffic volume threshold should be considered to further determine the need for a microscale air quality analysis (except for SIP intersections). The vehicle threshold tables (Table 3a, Table 3b, Table 3c) tie the volume threshold with emission factors. The advantage of this approach is that emission factors determined by project area specific vehicle speed, thermal states, and emission control strategies are used in the determination of vehicle thresholds. A wind speed of 1 m/s and an atmospheric stability of E are assumed in the development of the tables. The thresholds establish traffic volumes below which a violation of the NAAQS for carbon monoxide is extremely unlikely. Therefore, projects whose ETC, ETC+10, and ETC+20 peak hour volume, or if unavailable, design hour volumes (see discussion in Section 10.C.iii.) are equal to or less than the applicable threshold do not need a microscale air quality analysis.

Table 3a applies to one-way free flow traffic conditions with no traffic signal involved. To find the volume threshold, the user should determine emission factors for the specific free flow site. The highest emission factor should be used for the site in finding the corresponding vehicle volume threshold. Since the emission factors given in the table are in 2.5 g/mi interval, the user should always use the upper bound value when the emission factor falls in between two emission factors. No microscale air quality analysis is necessary when the peak hour volume is under the threshold. The highest vehicle volume threshold given in the table is 8000 vph. When the peak hour traffic volume exceeds 8000 vph, analysis should be performed.

Table 2 INTERSECTIONS ANALYZED IN CO SIP ATTAINMENT DEMONSTRATION

County	Intersection
Onondaga	1) East Adams Street and Almond Street 2) Route 5, Route 92, and Lyndon Drive 3) John Glenn Boulevard and Route 370 4) Buckley Road and 7th North Street
New York	1) 9A & W57th St. 2) 9A & 42nd St. 3) Delancy & Allen Sts. 4) 8th Ave. & 42nd St. 5) 3rd Ave. & 57th St. 6) 2nd Ave. & 36th St. 7) 1st Ave. & 57th St. 8) 10th Ave. & 57th St. 9) Lincoln Center 10) Herald Square 11) 7th Ave. / Broadway & 45th St. 12) Columbus Circle 13) Third Ave. & 125th St. 14) Alexander's Monitor - 59th Street between 3rd & Lexington Aves. 15) Broadway Transit Monitor between Tillary & Johnson
Queens	1) Jackson & 49th Ave. / 11th St. 2) Queens Blvd. & Crescent St. 3) Queens Blvd. & Jackson Ave. 4) Queens Blvd. & Van Dam / Thompson Sts. 5) Hillside Ave. & Van Wyck 6) Woodhaven Blvd. & Rockaway / Liberty Aves.
Kings	1) Flatbush Ave & Tillary St./and Johnson 2) Flatbush, Atlantic & Fourth Aves. 3) Adams & Tillary 4) Linden Blvd. & Pennsylvania Ave.
Richmond	1) Hyland Blvd. & New Dorp Lane 2) Victory Blvd. & Richmond Ave.
Bronx	1) Grand Concourse & 161st St. 2) Bruckner Blvd. & Hunts Pt. Ave.
Nassau	1) Old Country Rd @ So. Oyster Bay Rd & Plainview Rd. 2) Sunrise Hwy (Rt. 27) @ Central Ave. & Mill Rd. 3) Old Country Rd @ Glen Cove Rd. & Clinton Rd. 4) Hempstead Tpke (Rt 24) @ New Hyde Park Rd. & Franklin Ave.
Westchester	1) Central Park Ave. & Palmer Road/ Sprain Brook Parkway Ramps - Yonkers 2) Route 1 (Huguenot St) and North Ave. - New Rochelle 3) Ashburton Ave. & Yonkers Ave. 4) Route 119 & Route 100A - White Plains

Similar to Table 3a, Table 3b applies to two-way free flow sites with no traffic signal involved. Vehicle volume thresholds in the table are volumes in any single direction. They are determined the same way as for one-way free flow sites. No microscale air quality analysis is needed for a peak hour directional traffic volume under the volume threshold. When the peak hour directional traffic volume exceeds 8000 vph, analysis should be performed.

Table 3c applies to signalized intersections. It requires both free-flow and queue link emission factors to determine volume thresholds. The volumes in the table represent the total number of vehicles of any single approach to the intersections. Similar to the instruction above, the user should first determine free flow and queue emission factors for each approach at the intersection. The highest free flow and queue emission factors should be used to determine the vehicle volume threshold. When the emission factors fall in between an interval, the upper bound emission factor should be used.

If the project does not meet the applicable volume threshold, no microscale air quality analysis is necessary even if any of the other criteria are met. In this case, the standard statement listed at the beginning of this Section will suffice to address the microscale air quality concerns.

I-4. Ranking and Selection of Sites to be Modeled

If, as a result of evaluation by these criteria, a large number of intersections are identified as potentially requiring analyses, the intersections should be ranked and prioritized. Only those most likely to experience an air quality impact need to be analyzed. To accomplish this prioritization: 1)analyze all intersections related to SIP intersections as identified in Table 2; and 2) of the intersections identified by any of the other criteria, identify and analyze the intersections with the three highest level of service and the three highest traffic volumes. If none of these intersections exhibit an exceedance of the CO standards, then a sufficient number of intersections have been analyzed. If an intersection experiences an exceedance of a CO standard after Level 2 analysis described in Section 10, then the next three highest level of service intersections and the next three intersections with the highest traffic volumes should be identified and analyzed. This iterative process should continue until the analysis shows no more exceedances with the newly analyzed intersections.

For free flow sites, the same ranking methodology applies.

This guidance determines the minimum number of intersections to be analyzed. The analysis should be representative of the project area. In addition to the guidance offered above, the analysis should ensure adequate geographic coverage.

Arterial Level of Service: NW Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yaphank Avenue (CR 2	I	55	12.8	28.3	41.1	0.13	11.5	F
Area D Main Driveway	I	55	37.3	29.1	66.4	0.51	27.7	C
Patchogue-Yaphank Ro	I	55	35.5	19.7	55.2	0.54	35.4	B
Bellport Station Roa	I	55	15.9	19.5	35.4	0.16	16.7	E
LIE South Service Ro	I	55	74.6	40.0	114.6	1.14	35.8	B
LIE North Service Ro	I	55	16.8	15.3	32.1	0.17	19.4	E
Total	I		192.9	151.9	344.8	2.66	27.8	C

Arterial Level of Service: EB Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
LIE North Service Ro	I	55	6.7	49.9	56.6	0.07	4.4	F
LIE South Service Ro	I	55	16.8	6.7	23.5	0.17	26.5	D
Bellport Station Roa	I	55	74.6	11.9	86.5	1.14	47.5	A
Patchogue-Yaphank Ro	I	55	15.9	24.4	40.3	0.16	14.7	F
Brookhaven Town Land	I	39	54.0	43.1	97.1	0.59	21.9	D
Yaphank Avenue (CR 2	I	55	37.3	31.4	68.7	0.51	26.7	D
Total	I		205.3	167.4	372.7	2.65	25.6	D

Arterial Level of Service: NB Yaphank Avenue (CR 21)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Glover Drive	I	50	100.3	5.9	106.2	1.39	47.3	A
SCDPW Driveway	I	50	44.5	5.8	50.3	0.62	44.2	A
Area A Main Driveway	I	50	7.2	22.9	30.1	0.07	8.6	F
LIE South Service Ro	I	50	17.2	24.0	41.2	0.17	15.1	F
LIE North Service Ro	I	50	9.1	3.4	12.5	0.09	26.1	D
Total	I		178.3	62.0	240.3	2.35	35.2	B

Arterial Level of Service: SB Yaphank Avenue (CR 21)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
LIE North Service Ro	I	50	11.0	25.7	36.7	0.11	10.8	F
LIE South Service Ro	I	50	9.1	0.6	9.7	0.09	33.6	C
Area A Main Driveway	I	50	17.2	7.8	25.0	0.17	24.8	D
SCDPW Driveway	I	50	7.2	6.5	13.7	0.07	18.8	E
Glover Drive	I	50	44.5	13.3	57.8	0.62	38.5	B
Horseblock Road (CR	I	50	100.3	48.8	149.1	1.39	33.7	C
Total	I		189.3	102.7	292.0	2.46	30.3	C

Arterial Level of Service: NB Yaphank Avenue (CR 21)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Glover Drive	I	50	100.3	5.9	106.2	1.39	47.3	A
SCDPW Driveway	I	50	44.5	5.8	50.3	0.62	44.2	A
Area A Main Driveway	I	50	7.2	22.9	30.1	0.07	8.6	F
LIE South Service Ro	I	50	17.2	24.0	41.2	0.17	15.1	F
LIE North Service Ro	I	50	9.1	3.4	12.5	0.09	26.1	D
Total	I		178.3	62.0	240.3	2.35	35.2	B

Arterial Level of Service: SB Yaphank Avenue (CR 21)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
LIE North Service Ro	I	50	11.0	25.7	36.7	0.11	10.8	F
LIE South Service Ro	I	50	9.1	0.6	9.7	0.09	33.6	C
Area A Main Driveway	I	50	17.2	7.8	25.0	0.17	24.8	D
SCDPW Driveway	I	50	7.2	6.5	13.7	0.07	18.8	E
Glover Drive	I	50	44.5	13.3	57.8	0.62	38.5	B
Horseblock Road (CR	I	50	100.3	48.8	149.1	1.39	33.7	C
Total	I		189.3	102.7	292.0	2.46	30.3	C

Arterial Level of Service: NW Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yaphank Avenue (CR 2	I	55	12.8	14.6	27.4	0.13	17.3	E
Area D Main Driveway	I	55	37.1	21.2	58.3	0.51	31.4	C
Patchogue-Yaphank Ro	I	55	35.5	17.2	52.7	0.54	37.1	B
Bellport Station Roa	I	55	15.9	22.8	38.7	0.16	15.3	F
LIE South Service Ro	I	55	74.6	272.7	347.3	1.14	11.8	F
LIE North Service Ro	I	55	16.8	14.5	31.3	0.17	19.9	E
Total	I		192.7	363.0	555.7	2.66	17.2	E

Arterial Level of Service: EB Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
LIE North Service Ro	I	55	6.7	22.7	29.4	0.07	8.4	F
LIE South Service Ro	I	55	16.8	7.2	24.0	0.17	25.9	D
Bellport Station Roa	I	55	74.6	29.1	103.7	1.14	39.6	B
Patchogue-Yaphank Ro	I	55	15.9	49.6	65.5	0.16	9.0	F
Brookhaven Town Land	I	39	54.1	3.6	57.7	0.59	37.0	B
Yaphank Avenue (CR 2	I	55	37.1	14.0	51.1	0.51	35.8	B
Total	I		205.2	126.2	331.4	2.65	28.7	C

Arterial Level of Service: NW Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yaphank Avenue (CR 2	I	55	12.8	21.0	33.8	0.13	14.0	F
Area D Main Driveway	I	55	37.1	28.4	65.5	0.51	27.9	C
Patchogue-Yaphank Ro	I	55	35.5	14.1	49.6	0.54	39.4	B
Bellport Station Roa	I	55	15.9	9.6	25.5	0.16	23.2	D
LIE South Service Ro	I	55	74.6	20.6	95.2	1.14	43.1	A
LIE North Service Ro	I	55	16.8	13.0	29.8	0.17	20.9	E
Total	I		192.7	106.7	299.4	2.66	32.0	C

Arterial Level of Service: EB Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
LIE North Service Ro	I	55	6.7	20.5	27.2	0.07	9.1	F
LIE South Service Ro	I	55	16.8	4.4	21.2	0.17	29.3	C
Bellport Station Roa	I	55	74.6	11.7	86.3	1.14	47.6	A
Patchogue-Yaphank Ro	I	55	15.9	12.9	28.8	0.16	20.5	E
Brookhaven Town Land	I	39	54.1	14.6	68.7	0.59	31.1	C
Yaphank Avenue (CR 2	I	55	37.1	9.0	46.1	0.51	39.7	B
Total	I		205.2	73.1	278.3	2.65	34.2	B

Arterial Level of Service: NW Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yaphank Avenue (CR 2	I	55	12.8	20.6	33.4	0.13	14.2	F
Area D Main Driveway	I	55	37.0	16.3	53.3	0.51	34.2	B
Patchogue-Yaphank Ro	I	55	35.5	15.2	50.7	0.54	38.5	B
Bellport Station Roa	I	55	15.9	36.2	52.1	0.16	11.3	F
LIE South Service Ro	I	55	74.6	139.8	214.4	1.14	19.1	E
LIE North Service Ro	I	55	16.8	13.1	29.9	0.17	20.8	E
Total	I		192.6	241.2	433.8	2.66	22.1	D

Arterial Level of Service: EB Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
LIE North Service Ro	I	55	6.7	24.2	30.9	0.07	8.0	F
LIE South Service Ro	I	55	16.8	5.1	21.9	0.17	28.4	C
Bellport Station Roa	I	55	74.6	32.4	107.0	1.14	38.4	B
Patchogue-Yaphank Ro	I	55	15.9	48.5	64.4	0.16	9.2	F
Brookhaven Town Land	I	39	54.2	3.0	57.2	0.59	37.4	B
Yaphank Avenue (CR 2	I	55	37.0	14.8	51.8	0.51	35.2	B
Total	I		205.2	128.0	333.2	2.65	28.6	C

Arterial Level of Service: NW Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yaphank Avenue (CR 2	I	55	12.8	37.8	50.6	0.13	9.4	F
Area D Main Driveway	I	55	37.0	13.0	50.0	0.51	36.4	B
Patchogue-Yaphank Ro	I	55	35.5	8.7	44.2	0.54	44.2	A
Bellport Station Roa	I	55	15.9	12.5	28.4	0.16	20.8	E
LIE South Service Ro	I	55	74.6	17.0	91.6	1.14	44.8	A
LIE North Service Ro	I	55	16.8	13.4	30.2	0.17	20.6	E
Total	I		192.6	102.4	295.0	2.66	32.4	C

Arterial Level of Service: EB Horseblock Road (CR 16)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
LIE North Service Ro	I	55	6.7	22.4	29.1	0.07	8.5	F
LIE South Service Ro	I	55	16.8	3.8	20.6	0.17	30.2	C
Bellport Station Roa	I	55	74.6	15.2	89.8	1.14	45.7	A
Patchogue-Yaphank Ro	I	55	15.9	14.3	30.2	0.16	19.6	E
Brookhaven Town Land	I	39	54.2	14.4	68.6	0.59	31.2	C
Yaphank Avenue (CR 2	I	55	37.0	4.3	41.3	0.51	44.1	A
Total	I		205.2	74.4	279.6	2.65	34.1	B