APPENDIX I

NOISE MEASUREMENTS AND MODELING

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October 2010

Noise Measurements and Modeling

The Meadows at Yaphank
Yaphank, New York

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1.0 EXISTING CONDITION

Sound is created when changes of pressure (waves) are produced in the air. These pressure changes are created at many frequencies (i.e., spacing of the waves). Sound is received and perceived when the human ear reacts to these pressure changes. The average person's ear can detect sounds ranging from 20 to more than 10,000 hertz (Hz). Each frequency is detectable at different pressure levels and so, the system for sound measurement mimics the human ear is an A-weighted decibel system or dB(A)'s. The human ear can barely detect a 3 dB(A) change in sound levels. A 6 dB(a) change in sound levels is approximately a doubling of sound wave pressure and results in a generally audible change.

Sound measurements in this case were made using a Cirrus CK831C Noise Meter, which is meant to measure A-weighted decibel levels as a mimic of the average human ear. The noise meter digitally records the monitoring session and then calculates/produces the required averaged results and peaks at the user's direction.

With regard to the methodology of the ambient noise analysis, there is no specific mathematical methodology that was applied to ambient noise measurements. The readings are straight forward, in 15 minute intervals, and were monitored at a fixed points given existing conditions. Measurements were recorded along the Colonial Woods Condominiums, at the existing and proposed entry road (Yaphank Blvd.) and William Floyd Parkway and Long Island Expressway (I495 West) facing the dominant source with no obstructions. The directly measured levels occurred in sunny conditions with minor winds and 70 degree temperatures (F). The monitored/measured sound levels are presented in Tables 1A, 1B and 1C in Appendix A. The measured levels were dominated generally by vehicle noise from William Floyd Parkway and Long Island Expressway (I495) at the locations measured. These locations were monitored for the mid-day peak.

Sound levels, in the existing condition, were first measured at the existing residential neighborhood of the Colonial Woods. This produced the lowest L(eq) at 62.9 dB(A) with an $L_{(50)}$[1] of 43.8 dB(A) and a high reading $L_{(1)}$ of 75.8 dB(A). The second measurement was taken at the Colonial Woods main "entrance" at the William Floyd Parkway. Noise measurements (as L(eq) taken from the proposed entrance road) varied from an L(eq) of 72.2 dB(A) to an $L_{(50)}$ of 65.7 dB(A). The noise measurements at this location were dominated by traffic from the William Floyd Parkway. The "peak" measurement, $L_{(1),}$ of 83 dB(A) was recorded when a heavy duty, diesel truck passed. The third location measured was the northern side of the Long Island expressway (I495) North Service Road. This location had one L(eq) of 76.3 dB(A), a midrange $L_{(50)}$ of 73.1 dB(A) and a peak noise level of $L_{(1)}$ of 84.3 dB(A). This location had the highest peak noise level of all those revealed. The highest level was recorded when a loaded, diesel dump truck passed the monitoring location. The average measurement for for both the William Floyd Parkway and Long Island Expressway was typical for an intense transportation use (Harris, C.-1998, 3rd edition).

[1] The median sound level.

2.0 MODELING

The receptor identification and result for this modeling analysis is provided on Table 2 (at the end of the text). The inputs to and outputs from the sound modeling are presented in Appendix B.

2.1 Modeling Methodology

The site was modeled using the Sound Transportation Noise Model-Look-up 2.5. The Transportation Noise Model Look up tables provide a quick but numerical method to determine the existing condition and proposed project transportation noise impacts when no Federal Highway Administration funding is included in a proposed action. The TNM uses the vehicle volumes and speeds for five classes to determine the decibel level (A-weighed) for a particular receptor adjacent to a roadway. The modeling is conducted to determine an $L_{(eq)}$ for the existing condition. This process is then repeated for the future condition with the proposed action and a projected increase in sound levels (as $L_{(eq)}$ db(A)) can be determined.

The Transportation Noise Model (TNM) methods (and especially the look-up method) is intended to be environmentally conservative. As a result, it usually over-estimates sound levels at a particular location. The modeling result of importance in most cases (and this case) is whether or not the modeled Proposed Action will vary from the modeled existing condition, and, if so, by how much.

2.2 Existing Condition (Modeled)[2]

In the existing sound/noise condition, all locations on the project site are and will be dominated by transportation sources. The corridor is defined by the William Floyd Parkway and the Long Island Expressway. These two roadways carry tens of thousands of vehicles per day and are well used routes for commercial travel. As such, they are linear sources of noise/sounds produced by motor vehicles ranging from light duty, gas vehicles to heavy duty, diesel trucks. The data as to vehicle volumes and speeds for five classes of these vehicles were input to the model. The result was a one hour $L_{(eq)}$ of 83.9 dB(A) for a receptor in the Colonial Woods Development in proximity to William Floyd Parkway and a one hour $L_{(eq)}$ of 79.6 dB(A) for a virtual receptor located north of the Northern Service Road to the Long Island Expressway.

[2] In both cases, the modeled results exceeded the existing condition. This is not unusual as the Transportation Noise Model (TNM) methods (and especially the look-up method) is intended to be environmentally conservative. The result which of most importance in most cases (and this case) is whether or not the modeled Proposed Action will vary from the modeled existing condition.

2.3 Proposed Action – Operational

With the proposed action, all locations in the project will still be dominated by sound/noise resulting from transportation sources. The corridor is defined by the William Floyd Parkway and the Long Island Expressway. These two roadways carry tens of thousands of vehicles per day and are well used routes for commercial travel. As such, they are linear sources of noise/sounds produced by motor vehicles ranging from light duty, gas vehicles to heavy duty, diesel trucks. The project will add several hundred vehicles per day to the traffic on these roadways. The question in this case is whether or not the increased traffic from the project will materially (significantly) affect the sound/noise levels emanating from these sources and so, whether or not project can or will materially (significantly) affect the sound/noise levels in the area.

The data as to vehicle volumes and speeds for five classes of these vehicles, with the project traffic included, were input to the model to analyze the Proposed Action. The result was a one hour $L_{(eq)}$ of 83.9 dB(A) for a receptor in the Colonial Woods Development in proximity to William Floyd Parkway and a one hour $L_{(eq)}$ of 79.7 dB(A) for a virtual receptor located north of the Northern Service Road of the Long Island Expressway (I495).

The modeled future condition (with the project) demonstrates:

(a) no measurable increase (or modeled increase) in sound levels along William Floyd Parkway and
(b) an increase of less than 1.0 decibels (0.1 decibel, A-weighted) along the northern service Road of the Long Island Expressway (I 495).

Neither of these levels could be differentiated from the existing condition by any human ear. To do so, would require a differential of at least 3.0 dB(A). Therefore, it can be concluded that the project will have no significant impact upon the sound/noise environment of the project area.

APPENDIX A

Monitoring Data

TABLE 1A

Location: Residential Reading (Colonial Woods Condos)

Item	**Value**	**unit**
Date	10/18/2010	
Time	12:40pm	
Run Time	00:15:02	hh:mm:ss
Leq	62.9	dBA
Lepd	47.8	dBA
LAE	92.2	dBA
LAFmax	87.5	dBA
Peak	101.9	dBC
L1.0	75.8	dBA
L5.0	66.9	dBA
L10.0	61.5	dBA
L50.0	43.8	dBA
L90.0	36.6	dBA
Lmin	32.3	dBA
Range	30-100	dB
Overload	no	
Serial No.	D20216FF	
Exp.Time	0:00	hh:mm

TABLE 1B

Location: Yaphank Woods Rd/WFP

Item	**Value**	**unit**
Date	10/18/2010	
Time	1:10pm	
Run Time	00:15:02	hh:mm:ss
Leq	72.2	dBA
Lepd	57.1	dBA
LAE	101.5	dBA
LAFmax	92.5	dBA
Peak	113.5	dBC
L1.0	83.0	dBA
L5.0	77.9	dBA
L10.0	75.5	dBA
L50.0	65.7	dBA
L90.0	55.7	dBA
Lmin	48.9	dBA
Range	30-100	dB
Overload	no	
Serial No.	D20216FF	
Exp.Time	0:15	hh:mm

TABLE 1C

Location: 495 RAMP

Item	**Value**	**unit**
Date	10/18/2010	
Time	1:35pm	
Run Time	00:15:09	hh:mm:ss
Leq	76.3	dBA
Lepd	61.3	dBA
LAE	105.7	dBA
LAFmax	90.9	dBA
Peak	110.1	dBC
L1.0	84.3	dBA
L5.0	81.1	dBA
L10.0	79.8	dBA
L50.0	73.1	dBA
L90.0	67.3	dBA
Lmin	59.9	dBA
Range	30-100	dB
Overload	yes	
Serial No.	D20216FF	
Exp.Time	0:00	hh:mm

APPENDIX B

Modeling Results

TABLE 2 SOUND/NOISE MODELING RESULTS

10/2010

EXISTING CONDITION

	Receptor ID	*1 (WFP)*	*2 (I495)*
Result		83.9	79.6

PROPOSED ACTION OPERATIONAL

	Receptor ID	*1 (WFP)*	*2 (I495)*
Result		83.9	79.7

Notes: All modeling results in dB(A), Leq.
Reflector building surfaces assumed to be absent during operation.

NPVYAP01-Sound Results.xls

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

Existing Condition WFP&Yap.Woods Blvd

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	9720.0
Average automobile speed (mph):	50.0
Medium truck volume (v/h):	7200.0
Average medium truck speed (mph):	50.0
Heavy truck volume (v/h):	720.0
Average heavy truck speed (mph):	50.0
Bus volume (v/h):	180.0
Average bus speed (mph):	50.0
Motorcycle volume (v/h):	180.0
Average Motorcycle speed (mph):	50.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface:	hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

Exisitng Residence

Distance from center of 12-ft wide, single lane roadway (ft):	85.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	83.9

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

Proposed Action-WFP&Yap.Woods Road

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	9834.5
Average automobile speed (mph):	50.0
Medium truck volume (v/h):	7284.8
Average medium truck speed (mph):	50.0
Heavy truck volume (v/h):	728.5
Average heavy truck speed (mph):	50.0
Bus volume (v/h):	182.1
Average bus speed (mph):	50.0
Motorcycle volume (v/h):	182.1
Average Motorcycle speed (mph):	50.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface:	hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

Proposed Action-Exisitng Residence

Distance from center of 12-ft wide, single lane roadway (ft):	85.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	83.9

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

Existing Condition 495(service rd)&WFP

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	13878.0
Average automobile speed (mph):	60.0
Medium truck volume (v/h):	10280.0
Average medium truck speed (mph):	60.0
Heavy truck volume (v/h):	1028.0
Average heavy truck speed (mph):	60.0
Bus volume (v/h):	257.0
Average bus speed (mph):	60.0
Motorcycle volume (v/h):	257.0
Average Motorcycle speed (mph):	60.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface:	hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

Existing Condition 495(service rd)&WFP

Distance from center of 12-ft wide, single lane roadway (ft):	446.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	79.6

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

Proposed Action 495(service rd)&WFP

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	14107.5
Average automobile speed (mph):	60.0
Medium truck volume (v/h):	10450.0
Average medium truck speed (mph):	60.0
Heavy truck volume (v/h):	1045.0
Average heavy truck speed (mph):	60.0
Bus volume (v/h):	261.3
Average bus speed (mph):	60.0
Motorcycle volume (v/h):	261.3
Average Motorcycle speed (mph):	60.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface:	hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

Proposed Action 495(service rd)&WFP

Distance from center of 12-ft wide, single lane roadway (ft):	446.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	79.7