OSTERGAARD ACOUSTICAL ASSOCIATES

EVALUATION OF SITE SOUND EMISSIONS

PROPOSED INDUSTRIAL PARK
Village of Suffern, New York

Revision 2

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INTRODUCTION

Ostergaard Acoustical Associates (OAA) was asked to assist with the evaluation of potential sound emissions from a proposed speculative industrial park planned for construction in the Village of Suffern, Rockland County, New York. The site is a former Novartis Pharmaceutical Campus just south of Interstate-287. Plans call for the demolition of all existing structures to accommodate the construction of the industrial park facility, comprised of three warehouse buildings. The site is particularly suitable for this location from an acoustical aspect given the proximity to the Interstate and other distribution and industrial facilities to the east. There are residential receptors in the vicinity: beyond Interstate-287 to the north and along Lafayette Avenue (Route 59) to the south.

While none of the proposed buildings have specific tenants, this report takes a conservative approach and assumes the potential to operate at all hours of the day and night. This report addresses the on-site sound radiated from this project to off-site nearby potentially noise-sensitive residential receptors.

The purpose of this sound study is to analyze future site sound emissions for comparison with applicable code limits and to evaluate the potential for noise complaints. Site sound emissions from the site were evaluated against applicable Village of Suffern noise codes. Research indicates that there is no New York State noise code; however, the New York State Department of Environmental Conservation (DEC) does have guidelines for assessing and mitigating noise impacts. Sound produced by the site will comprise steady sound from rooftop HVAC equipment as well as intermittent sound from truck and car[1] movements.

This revised report includes additional analyses and a second sound survey requested by the Village's acoustical consultant.

Work by OAA was overseen by Benjamin C. Mueller, P.E., with assistance from OAA staff. The representatives at Brookfield Properties coordinating this project are Lisa Lyng and William Passik.

[1] Note that throughout this report, the term "car" collectively refers to personal passenger vehicles including automobiles, vans, pick-ups, or SUVs. The term "truck" refers to heavy trucks such as over-the-road or line-haul trucks.

SITE AND VICINITY

Figure 1 is an aerial image obtained from Google Earth showing the site outlined in red. Also shown in Figure 1 are sound survey locations, which are discussed later in this report. The project is primarily located on Section 55.22, Block 1, Lot 1, which accommodates a defunct Novartis Pharmaceutical Campus. This property and an adjacent parcel (Section 55.06, Block 1, Lot 1) in Montebello are collectively referred to as the "site" in this report. The Montebello parcel accommodates a connection roadway that accesses the development. A small parcel associated with the site is south of the adjacent railroad. This parcel is generally not discussed as no development is proposed here at this time. Based on a review of the Village of Suffern zoning map, the parcel being developed is in the PLI, Planned Light Industrial, district. Properties in the Village of Suffern surround this parcel on three sides. Receptors located in the Village of Montebello are to the northeast, east, and southeast. In general, zoning districts aligns with use. OAA's understanding of land uses and zoning in the area is as follows:

- ❑ Abutting the site to the north is Interstate-287 with multi-family residential uses beyond in the R-7.5, One-Family Residence, district. Of note is that there is a substantial concrete highway noise barrier between the residences and the Interstate.

- ❑ East of the site is Hemion Road with a variety of other logistics facilities farther east. South of these logistics facilities are multi-family residences and commercial uses fronting on Lafayette Avenue. To the northeast is the Suffern Middle School, approximately 2,000 feet away from the project building. These receptors are all located withing the Village of Montebello.

- ❑ Bordering the site to the south is a railroad right-of-way. South of the railroad are a variety of uses fronting on Lafayette Avenue including a library, multi-family residences, and a religious facility. We understand that there are also two multi-family buildings approved and under construction in this direction. These uses are in either in a PO, Professional Office, or MR, Multi-Family Residence, districts. A hospital, college, and single-family neighborhoods are farther south, and all located within Residential districts. Southern receptors abutting the eastern part of the site are in Montebello; all others are in Suffern.

- ❑ West of the site is a former quarry and industrial use. This land has since been vacated and now accommodates a large body of water as a result of the excavations. Suffern residences are about 2,000 feet away from the site in this direction and are far away enough not be an acoustical concern.

Figure 1 — Google Earth image showing the proposed industrial park site and vicinity in the Village of Suffern, NY. The site property line is outlined in red. Ambient sound survey measurement locations also shown.

Plans call for the demolition of the existing campus and construction of three rectangular buildings located in the central portion of the site. The new site will utilize the same access points as the pharmaceutical campus, with access to the north via Old Mill Road as well as through the eastern parcel to Hemion Road. The northernmost building is Building 1, which is approximately 963,100 ft^2. Buildings 2 and 3 are in the southern portion of the site and are 170,500 and 88,200 ft^2, respectively. Heavy truck docks are located along the west and east facades of Building 1 and the west facades of Buildings 2 and 3; these positions are acoustically beneficial as they do not directly face residential receptors. Personnel vehicle parking is along the north and south sides of Building 1 and east sides of Buildings 2 and 3. Two 15-foot noise walls are proposed at Buildings 2 and 3 to screen residential receptors to the south.

Specific traffic counts depend on the end user tenants. While the end users of the site are not currently known, this sound study utilizes the same database as the traffic study, the most current revision of this report was issued 16 June 2023. The Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, gives a detailed look at quantities and hourly distribution of cars and trucks for sites such as what is proposed. These data are constantly updated based on existing facilities. Specifically, the traffic study uses ITE Land Use Code 150 and assumes 1437 daily vehicle trips, of which 532 are trucks. The traffic study report provides hourly distribution of total vehicles and trucks in Appendix D (pages 688 and 689). Those details are considered in this sound study. The vehicle and truck hourly distribution confirm that, while industrial parks operate 24/7, most of the activity occurs during the daytime hours; nighttime operations are generally used to prepare for the next day and have lower trip counts. The ITE hourly truck distribution calls for just over 70% of all truck trips to occur between the daytime hours of 9:00 a.m. to 5:00 p.m. This sound study has been updated to scrutinize how this distribution of site activity aligns with the ebb and flow of existing ambient sound in the area.

REGULATIONS/GOALS

When developing a site of this type, it is appropriate to consider how sound from the facility will likely be received, especially by noise-sensitive receptors. Sound produced by a typical facility such as this is characterized by motor vehicle activity, such as idling and vehicle movement as well as steady HVAC equipment. Although there will be cars on site, they are common to the area and are not expected to be an acoustical concern; hence, cars are not a main focus of this sound study. The steady sound produced by HVAC equipment and heavy truck activity were evaluated and compared to applicable noise code limits as well as acoustical goals based on professional experience. As a general practice, when motor vehicles are on site, they are considered part of a site's sound emissions; when vehicles are on public roads, they are not.

Site sound emissions are regulated by the Village of Suffern Chapter 175: *Noise*. This chapter promotes the comfort and repose of all residences and discusses noise in a qualitative manner. No sound limits are provided in this ordinance; however, a variety of activities such as nighttime construction activity, loading and unloading, and using horns for an unreasonable period of time that cause noise disturbances are prohibited. Heavy construction equipment operations that create a noise disturbance are prohibited except between 7:00 a.m. to 8:00 p.m. on weekdays. Construction activity that causes noise disturbances is prohibited except between 8:00 a.m. to 8:00 p.m. on weekdays and 10:00 a.m. to 8:00 p.m. on Saturdays. In Article IV ¶266-16: *Performance Standards*, sound limits are given in octave frequency bands across the audible spectrum. Of note is that these performance standards do not apply to noises not directly under the control of the property user, daytime construction activities, noises of safety or warning devices, or transient noises of moving sources such as automobiles, trucks, airplanes, and railroads. Chapter 209: *Quarrying and Blasting* discusses noise limits and procedures for blasting. The code provides allowable hours, requires notification to the Village 24 hours in advance, and limits blasting sound to not exceeding 120 dB(A) at nearby receptors.

Adjacent to the project site to the east are receptors in the Village of Montebello. Montebello codes are not applicable to this project given development is occurring on the Suffern parcel but were reviewed for familiarity and consideration. Montebello discusses noise in Chapter 118: *Noise*. Similar to Suffern, noise is primarily discussed in a qualitative manner. Loading and unloading is prohibited within a residential district or within 300 feet from a hotel or motel between 10:00 pm and 6:00 a.m. Domestic power tools are prohibited from 10:00 p.m. to 8:00 a.m. in residential areas. Construction noise is also to not occur between sunset and 8:00 a.m. on weekdays or at any time on Sundays or legal holidays. Construction noise should generally not exceed an L_{10} of 60 dB(A) across a real property boundary. The L_{10} is the level exceeded ten percent of time across the daily period of operation. Explosives are not permitted to create unreasonable noise across a real property boundary.

It is also appropriate to review any applicable State of New York codes/laws. New York State Vehicle and Traffic (VAT) Law states that all motor vehicles must have a muffler and must be below specific sound limits when measured at a distance of 50 feet from the source. Specifically, vehicles over 10,000 pounds must not exceed 86 dB(A) at speeds of 35 mph or less nor exceed 90 dB(A) at speeds above 35 mph. There are also limits for lighter weight vehicles and motorcycles. Overall, these State limits are generally easy to meet with modern, well-maintained vehicles. The New York State Department of Environmental Conservation (DEC) has a policy "Assessing and Mitigating Noise Impacts" that provides guidance for analyzing and minimizing the acoustical impact applicable to the State Environmental Quality Review Act (SEQRA) review. Guidelines compare the equivalent ambient sound level to proposed site sound emissions to determine the extent of any potential acoustical impact. The DEC states that an increase in ambient sound level by 0-to-3 dB should have no appreciable effect on receptors and an increase of 3-to-6 dB is tolerable but may have potential for an adverse noise impact only in cases where the most noise sensitive of receptors are present. The term "the most noise sensitive of receptors" is not defined but assumed to reference the small percent of the population who are exceptionally sensitive to noise. Increases of more than 6 dB require closer scrutiny while increases of 10 dB deserve consideration of avoidance and mitigation measures in most cases. No relevant quantitative Rockland County codes regarding noise could be found.

To comply with DEC guidelines, the site must show that site sound does not substantially deviate from existing ambient sound levels in the area. Specifically, equivalent site sound should not exceed existing equivalent ambient sound conditions by more than 6 dB to avoid any negative acoustical impact to the area. The existing ambient sound is discussed in the next section.

Sound Level Survey

To determine appropriate criteria for comparison to DEC guidelines, an ambient sound survey was carried out to document existing sound in the area. Two ambient sound surveys were carried out. The first survey occurred on 16-to-22 March 2022 at Locations 1 and 2 shown in Figure 1. A second sound survey was carried out on 6-7 July 2023 at the request of the Village's acoustical consultant. Sound survey Locations 3 through 11 are from the second survey and are also shown in Figure 1. Measurement locations were selected to characterize the ambient of specific areas of nearby existing receptors. OAA uses ANSI S12.9 "Quantities and Procedures for Description and Measurement of Environmental Sound" as a guideline for all outdoor sound surveys; all measurements conform to this standard to the extent feasible. Locations 1, 2, 5, and 8-through-10 were surveyed using a long-term sound level monitor to acquire a minimum of 24-hours of data. These are shown in Figure 1 with a white circle. The measurements at Locations 3, 4, 6, 7, and 11 were manned 10-minute measurements at different hours of interest; these Locations were each surveyed in the 0500, 0700, 1100, 1500, and 2000 hours. These manned survey Locations are shown in Figure 1 with a yellow circle. All Locations were selected in coordination with the Village's acoustical consultant to typify potentially noise-sensitive receptors near the site. Some compromises were required due to access or physical constraints; a combination of monitors and manned measurements were used to make the survey manageable. The Location descriptions are as follows:

- **Location 1** – Along the on-site access road in the southern portion of the property in the direction of nearby receptors.
- **Location 2** – On the west side of Hemion Road, across from Indian Rock Road.
- **Location 3** – Along Lackawanna Trail near the westernmost residence.
- **Location 4** – At the northwest corner of the retail parking lot located northwest of the intersection of Hemion Road and Route 59.
- **Location 5** – Near the site's southern property line, between the Library and Monastery along the tree line.
- **Location 6** – East of the intersection of Hillcrest Road and the hospital access road.
- **Location 7** – Within the north parking lot of Ester Gitlow Towers.
- **Location 8** – Along the east side of Cedar Lane, in line with north façade of Verizon building.
- **Location 9** – At the east terminus of Cross Street.
- **Location 10** – Along the north side of Memorial Drive, across from Suffern Horton Baseball Field.
- **Location 11** – In the southern parking lot of Suffern Middle School.

Locations 1 and 2 used a Rion NL-52 sound level meter placed within a weather enclosure with the microphone attached to an adjacent tripod. Locations 5, 8, 9, and 10 utilized a Piccolo II sound level meter placed within a weather enclosure with the microphone extending outside of the enclosure. Manned survey Locations utilized an HBK 2270 sound level meter. Windscreens were used on all microphones. Rion NL-52 sound level meter were instructed to record detailed octave band time history data at one-second intervals and hourly statistics for a minimum of 24 hours. Piccolo II sound level meters were instructed to record detailed octave band time history statistical data at one-minute intervals. All sound levels meters were calibrated before and after deployment using an HBK Model 4231 sound level calibrator, which is calibrated by an outside calibration service annually. It was observed during both surveys that the acoustical environment was dominated by steady local and distant traffic flow including both automobiles and heavy trucks. Intermittent fauna noise was present at all measurement locations. Weather conditions were appropriate during the survey based on the surveyor's observations and a review of historical data obtained from the nearest weather station at Teterboro Airport. There was no precipitation or high winds documented.

Acquisition of ambient sound data over the course of an extended period with multiple monitors results in a large amount of data. As a result, it is helpful to review data as hourly statistics to assist with observing ambient sound level trends. Past reports focused on 24-hour statistics to understand the environment. However, at the request of the Village's acoustical consultant, a different approach was used to instead examine the hourly equivalent sound level (L_{eq}) of survey results. The L_{eq} is the focus of DEC guidelines; other statistics are available upon request. The 10-minute L_{eq} data from manned surveys are assumed to be representative of the hourly equivalent sound level. The purpose of this survey was to understand the existing acoustical conditions for comparison to project emissions. These data are important for use in establishing specific project noise goals to ensure no negative acoustical impact.

A summary of the hourly equivalent sound levels recorded during both surveys is provided in Table I. Where 24-hour data exist, the 24-hour equivalent sound level (24-Hr Avg) and the day-night average sound level (L_{dn}) are also shown. The L_{dn} is another metric used to evaluate the cumulative noise during a 24-hour period; there is a 10 dB penalty imposed on nighttime hours.

Table I – Summary of the hourly equivalent ambient sound documented across two sound surveys. All data are in dB(A) re 20μPa.

Time	Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Loc 6	Loc 7	Loc 8	Loc 9	Loc 10	Loc 11
2:00:00 PM	48	66			51			52	54	66	
3:00:00 PM	48	67	49	57	51	56	52	52	53	65	N/A
4:00:00 PM	46	69			50			52	53	65	
5:00:00 PM	46	66			50			52	53	65	
6:00:00 PM	46	66			50			51	53	65	
7:00:00 PM	47	64			49			51	53	65	
8:00:00 PM	47	64	47	58	49	59	47	50	53	65	61
9:00:00 PM	46	64			48			50	53	65	
10:00:00 PM	49	64			49			48	53	64	
11:00:00 PM	46	60			49			46	53	63	
12:00:00 AM	45	58			48			45	53	62	
1:00:00 AM	44	55			48			44	53	62	
2:00:00 AM	43	54			48			44	53	60	
3:00:00 AM	46	57			48			43	53	59	
4:00:00 AM	44	58			48			43	53	58	
5:00:00 AM	44	57	47	57	49	60	49	44	53	60	60
6:00:00 AM	47	62			51			50	54	63	
7:00:00 AM	49	65	48	62	51	56	60	51	54	64	62
8:00:00 AM	49	66			51			52	54	65	
9:00:00 AM	49	66			50			51	53	66	
10:00:00 AM	49	66			49			51	53	66	
11:00:00 AM	49	68	55	62	50	58	49	51	53	66	62
12:00:00 PM	47	65			49			51	54	66	
1:00:00 PM	47	66			50			52	53	66	
24-Hr Avg	47	64			50			50	53	64	
L_{dn}	52	67			55			54	59	68	

Project Noise Goals

The Village of Suffern outlines the intent of the noise code but does not provide quantitative limits to be used in an acoustical analysis such as this. Limits given in the performance standards reference a metric not used by modern sound level meters. Despite this, the limits do not apply to motor vehicles. Given the above, the State DEC guidelines were used to develop project noise goals at nearby residential receptors.

Of most interest in the ambient sound survey data are the equivalent sound levels as they directly correspond to DEC guidelines. While OAA finds that taking a 24-hour equivalent sound level is aligned with the DEC guidelines, the Village's noise consultant has requested breaking this down further and looking at hourly equivalent sound levels compared to how the site is expected to operate. Per DEC guidelines, the appropriate target is for future equivalent sound levels, with the new site in operation, to not exceed 6 dB above the measured equivalent ambient sound levels shown in Table I to ensure no negative acoustical impact. In the next section, a projection of future site sound emissions is discussed. To determine expected future sound emissions, projections will be added to the Table I values based on the proximity of the receptor to the ambient survey location. The project goal is that future sound emissions (ambient plus site sound) should not be greater than 6 dB above Table I results.

A brief discussion is warranted on construction noise and blasting. These activities are short in duration but can produce sound high in level. OAA agrees with the applicable noise ordinances which limit construction to daytime hours when ambient is high in level and sensitivity is low. All construction noise codes will be followed, and additional mitigation techniques are provided near the end of the report. Blasting is not expected to be needed for this project. However, should it be deemed necessary, all applicable codes will be followed, and proper notice will be given.

EXPECTED SOUND EMISSIONS

Acoustical modelling software, specifically CadnaA, was used to create and analyze site sound emissions for the site. The model takes into account relevant parameters between the noise source and receptor positions of interest to predict how sound will propagate. Using ISO Standard 9613, the model accurately predicts distance attenuation as well as the attenuation effects of terrain, various types of ground cover, shielding by structures, and reflections from buildings. In the model, buildings are white and the site property line is outlined in red. Two 15-foot-tall sound walls are proposed at the southern end of truck courts at Building 2 and 3. The sound wall at Building 2 is about 130 feet long; the Building 3 wall is about 375 feet long. Sound walls are shown in light blue in the model. Also included in the model is a 2,500-foot-long, 10-foot-tall section of the Interstate 287 highway barrier to the north, which is shown in pink. North is pointing up in all figures.

The acoustical model shows the results graphically as A-weighted sound level contours, in 1 dB increments, and tabulates the summed A-weighted sound levels at 15 discrete locations at nearby residences and other potentially sensitive receptors. Sound level contours are at ear height, 5-feet above grade. Location A is not used and reserved for future use. Table II provides a list of each modelled Location of interest, their associated height, and their nearest ambient sound survey Location.

Table II – Modelled receptors of interest and modelled height, correlated to the nearest ambient sound survey location.

Location	Receptor Description	Height (ft)	Nearest Survey Location
B	Brooklands Avenue Residences	15	10
C	Knolls at Ramapough Residences	15	11
D	Ramapo Cirque Residences	25	11
E	Suffern Middle School	25	11
F	Montebello Crossing	35	4
G	Tagaste Monastery	35	5
H	Good Samaritan Hospital	35	6
I	Suffern Free Library	20	5
J	Hillcrest Road Residences	15	6
K	Esther Gitlow Towers	45	7
L	Salvation Army College of Officer Training	35	6
M	Yvette & Louis Tekel Senior Residence	45	8
N	Antrim Pointe Apartments	45	8
O	Cross Road Residences	15	9
P	Lackawanna Trail Residences	15	3

From our professional experience, while code language is typically cited to apply "at or within" the property line of a receptor, noise is most commonly assessed and enforced at the location of repose. Inaccessible or uninhabited portions of the property are generally not scrutinized. For this study, sound was scrutinized at the facades of residences or other sensitive receptors where inhabitants are sleeping during the night hours.

To present ambient data in a suitable format for comparison to model results, Table I data needs to be re-organized to match the Locations in the acoustical model, shown in Table II. This is provided in Table III below, which will be the format used for the remainder of the report.

Table III **Combination of Tables I and II. Summary of modelling Locations B-through-P aligned with the closest sound survey data from Locations 3-through-11. 24-hour equivalent sound level and L_{dn} also shown. All data are in dB(A) re 20μPa.**

	Model Location	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	Survey Location	10	11	11	11	4	5	6	5	6	7	6	8	8	9	3
	2:00:00 PM	66					51		51				52	52	54	
	3:00:00 PM	65	N/A	N/A	N/A	57	51	56	51	56	52	56	52	52	53	49
	4:00:00 PM	65					50		50				52	52	53	
	5:00:00 PM	65					50		50				52	52	53	
	6:00:00 PM	65					50		50				51	51	53	
	7:00:00 PM	65					49		49				51	51	53	
	8:00:00 PM	65	61	61	61	58	49	59	49	59	47	59	50	50	53	47
	9:00:00 PM	65					48		48				50	50	53	
	10:00:00 PM	64					49		49				48	48	53	
	11:00:00 PM	63					49		49				46	46	53	
	12:00:00 AM	62					48		48				45	45	53	
Time	1:00:00 AM	62					48		48				44	44	53	
	2:00:00 AM	60					48		48				44	44	53	
	3:00:00 AM	59					48		48				43	43	53	
	4:00:00 AM	58					48		48				43	43	53	
	5:00:00 AM	60	60	60	60	57	49	60	49	60	49	60	44	44	53	47
	6:00:00 AM	63					51		51				50	50	54	
	7:00:00 AM	64	62	62	62	62	51	56	51	56	60	56	51	51	54	48
	8:00:00 AM	65					51		51				52	52	54	
	9:00:00 AM	66					50		50				51	51	53	
	10:00:00 AM	66					49		49				51	51	53	
	11:00:00 AM	66	62	62	62	62	50	58	50	58	49	58	51	51	53	55
	12:00:00 PM	66					49		49				51	51	54	
	1:00:00 PM	66					50		50				52	52	53	
	24-Hr Avg	64					50		50				50	53	64	
	L_{dn}	68					55		55				54	54	59	

Rooftop HVAC Sound

Rooftop HVAC equipment produces noise that is nominally steady in nature, and hence will not vary significantly over time. Initially, OAA utilized a conservative assumption for HVAC sound modeling; HVAC details are typically not available at this time in the design stage. As a result of feedback from the Village's acoustical consultant, OAA has collected sound data from a now-completed warehouse HVAC arrangements and updated the acoustical model to reflect this more refined approach. Table IV provides a list of modelled HVAC equipment along with pertinent equipment details.

Table IV – Summary of the modelled HVAC equipment details. Sound power levels (L_w) are in dB(A) re 1 picowatt.

Building	Unit	Model	CFM	Quantity	Lw
1	EF	Cook 60EUB	68705	5	106
	MAU	Greenheck DGXP127	1600	6	93
	RTU	AAON 15-Ton	4950	2	91
	CEF	Cook CN960	1050	2	69
2	EF	Cook 52EUB	22900	3	84
	MAU	Greenheck DGXP117	4800	4	84
	RTU	AAON 15-Ton	4950	1	91
	CEF	Cook CN960	1050	1	69
3	EF	Cook 52EUB	17175	2	84
	MAU	Greenheck DGXP127	4800	2	84
	RTU	AAON 15-Ton	4950	1	91
	CEF	Cook CN960	1050	1	69

For each building, the large exhaust fans are placed along the centerline of the building. The make-up air-handlers (MAU) are located along the edge of the roof. Each office area is served by a rooftop unit (RTU) and associated ceiling exhaust fan (CEF) over the assumed location of the office space, which is at the corner of the building. Note that Building 1 was assumed to have two offices to be conservative.

The noise from the HVAC equipment in Table IV was included in the HVAC sound model. HVAC noise sources are shown as blue "+"s. Noise sources were placed 4 feet above the rooftop, and sound was projected off site. Figure 2 shows the results graphically and tabulates the summed A-weighted sound levels at the nearby Locations of interest.

Figure 2 — A-weighted sound emission contours, 5 feet above grade, from rooftop HVAC equipment. Each HVAC unit shown with a blue + sign. Buildings shown in white, site property line outlined in red, 15-foot-tall sound barrier shown in light blue, and highway sound barrier shown in pink. All Locations typify upper story receptors of interest. See Table II for receptor Location description and modelled height.

The results show that, with all rooftop units operating, HVAC sound levels at off-site receptors ranges from 23-to-46 dB(A) at nearby receptors. HVAC sound at all receptors is generally in line with some of the lowest hourly equivalent sound levels documented during the sound survey indicating that HVAC sound will be difficult to hear at off-site vantage points. Note that for these model results to be realized, acoustical performance of HVAC equipment must be aligned with what was modelled.

Truck Activity

OAA has had the opportunity to visit various logistics facilities and industrial parks over the years to survey and document the sounds of truck activity. In addition to experience, truck operations are modelled based on information provided by ITE Standards, which are also used by traffic engineers to accurately and realistically forecast potential traffic concerns. The industrial park will have over-the-road line-haul trucks and potentially have terminal tractors (yard tractors) active on site. From an acoustical aspect, terminal tractors and line-haul trucks are acoustically equivalent. This project is not proposed as a refrigerated warehouse use at this time. Such a use would require specialized HVAC equipment and would likely include trucks with refrigerated trailers. This sound study was carried out based on standard warehouse operation with standard, non-refrigerated trailers.

Truck noise in a typical dock area can routinely produce maximum sound levels of 79 dB(A) when measured at a distance of 50 feet from the source. This sound level was determined by looking at a wide variety of truck activity, such as truck movement, air brakes, standard tonal back-up alarms, and coupling/decoupling, and distilling it to a single conservative maximum level and spectrum for use in acoustical studies such as this. A driving truck exhibits slightly lower maximum sound levels of 74 dB(A) when measured 50 feet from the source. Idling trucks produce steady sound levels of 63 dB(A) when measured 50 feet from the source. The height of a truck source for all truck activity is modelled at a conservative height of 8 feet above grade. OAA has found that using these maximum sound levels at this height ensures a conservative approach to evaluating truck sound within the truck court. When specific individual activities are modelled at their actual height and sound level, results are typically lower in level than predicted below. For example, many of the high sound level activities, such as back-up alarms and air brakes, occur at a height of 4 feet above grade, not 8 feet. This is a critical detail when evaluating the effectiveness of a sound barrier or berm and when considering intervening topography. It is also important to recognize that all truck noise is dynamic in nature. Maximum sound levels only occur for a short duration and are not representative of the constant sound level produced by on-site trucks.

While there will certainly be multiple trucks onsite at any given time, maximum sound from an individual truck are not cumulative. Several factors support this. Because maximum levels are dynamic and short in duration, it is unlikely that multiple truck sound level maximums will occur at exactly the same time and location. In addition, safe practices restrict more than one truck from operating in proximity to each other in the same vicinity. Hence, off-site maximum sound levels will be driven by individual truck sources. In the unlikely event that two truck sources would contribute the same level in the same location at the exact same time, maximum emissions would only be 3 dB higher due to the logarithmic nature of sound pressure level addition.

In an effort to be conservative, OAA carried out a series of analyses to understand what the prospective hourly site sound emissions might be from on-site activity. In addition to HVAC sound, models were created to look at the hourly distribution of vehicles and trucks on site, and how associated dock activity might change with truck trips.

Sound produced by driving vehicles and trucks was analyzed using pages 688 and 689 from the traffic study. An acoustical model was developed using the vehicle and truck distribution chart. In the model, a road source was looped around the site; the road sources uses the RLS-90 standard, which is a recognized standard for evaluating traffic noise. Road speed was set to 15 miles per hour, and the road surface was set to smooth pavement. Input data for this model are shown in Table V, which reflects a discussion with the traffic engineer that Building 2 will accommodate 16% of the total traffic and Building 3 will accommodate 9% of the total traffic. All other roads, including Building 1, were assumed to accommodate 100% of the traffic to remain conservative. Figure 3 shows an example of this process for the 1100–1200-hour period, which is shown to have the highest activity of the day. Figure 3 also includes the road source as well as all HVAC sound sources ON. This process was repeated for each hour. Results for all 24 hours are tabulated in Table VI.

Table V – CadnaA road source model inputs based on traffic study hourly distribution of ITE Land Use Code 150.

Time	Building 1 (100%)		Building 2 (16%)		Building 3 (9%)	
	Total Veh.	% truck	Total Veh.	% truck	Total Veh.	% truck
2:00 - 3:00 PM	135	24	22	4	12	2
3:00 - 4:00 PM	179	28	29	4	16	2
4:00 - 5:00 PM	143	26	23	4	13	2
5:00 - 6:00 PM	119	18	19	3	11	2
6:00 - 7:00 PM	60	8	10	1	5	1
7:00 - 8:00 PM	22	15	4	2	2	1
8:00 - 9:00 PM	20	42	3	7	2	4
9:00 - 10:00 PM	37	11	6	2	3	1
10:00 - 11:00 PM	13	0	2	0	1	0
11:00 - 12:00 AM	14	6	2	1	1	1
12:00 - 1:00 AM	6	28	1	4	1	3
1:00 - 2:00 AM	8	10	1	2	1	1
2:00 - 3:00 AM	11	61	2	10	1	5
3:00 - 4:00 AM	14	48	2	8	1	4
4:00 - 5:00 AM	30	42	5	7	3	4
5:00 - 6:00 AM	62	30	10	5	6	3
6:00 - 7:00 AM	108	22	17	3	10	2
7:00 - 8:00 AM	122	23	19	4	11	2
8:00 - 9:00 AM	118	25	19	4	11	2
9:00 - 10:00 AM	156	34	25	5	14	3
10:00 - 11:00 AM	138	38	22	6	12	3
11:00 - 12:00 PM	164	36	26	6	15	3
12:00 - 1:00 PM	161	22	26	4	14	2
1:00 - 2:00 PM	132	33	21	5	12	3

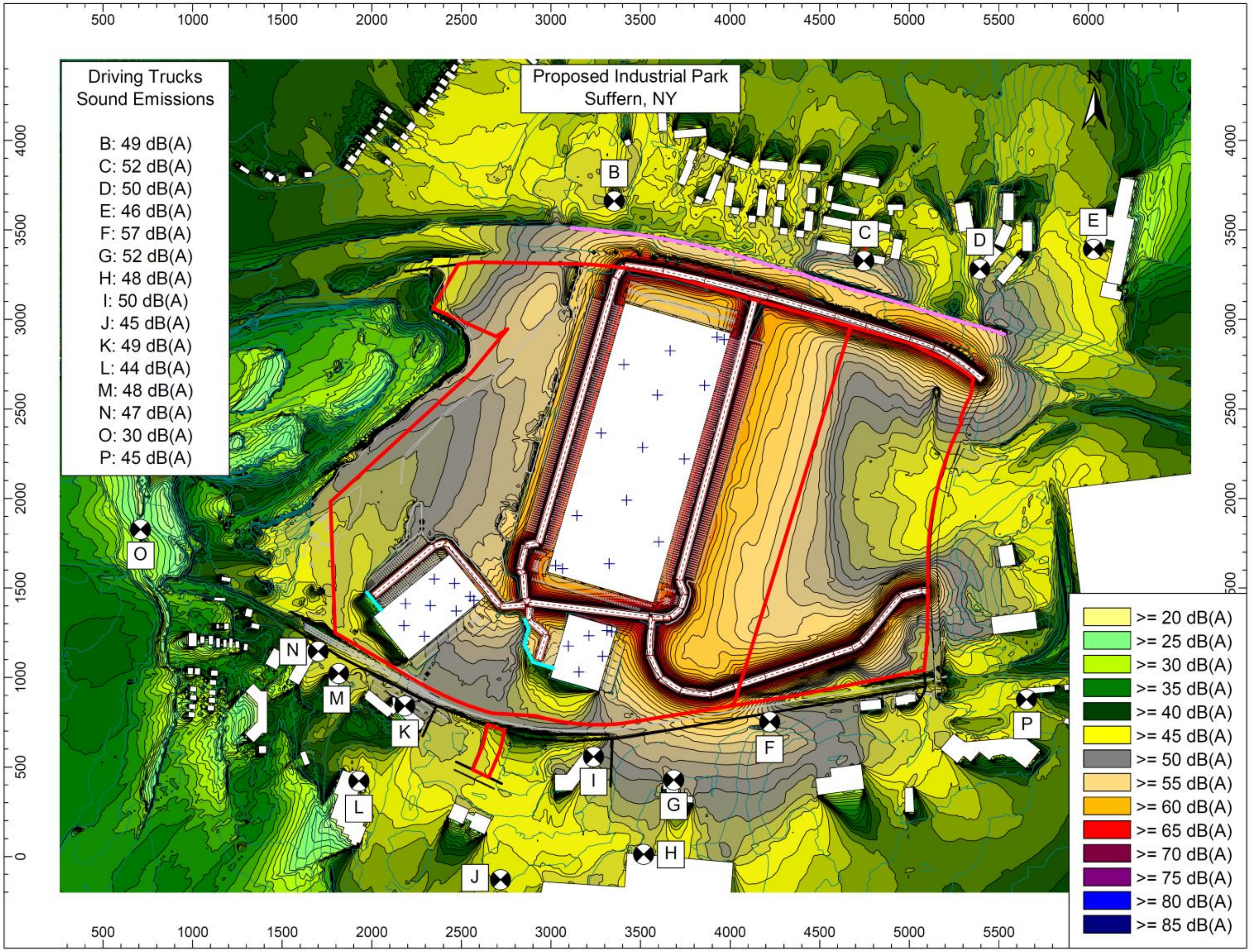

Figure 3 — Equivalent A-weighted sound level contours 5 feet above grade expected for vehicle and truck trips between 1100 and 1200 hours. Rooftop units shown with a blue + sign. Buildings shown in white, site property line outlined in red. All Locations typify upper story receptors of interest. See Table II for Location description and modelled height.

Table VI – Summary of modelled results for each hour of vehicle distribution. Input data provided in Tables IV and V. All sound levels are in dB(A) re 20μPa.

	Hourly	Hourly	Model Location B-through-P with associated Survey Location 3-through-11															
	Truck	Vehicle	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
Time	trips	trips	10	11	11	11	4	5	6	5	6	7	6	8	8	9	3	
2:00 - 3:00 PM	33	102	47	50	48	45	55	50	46	49	43	48	43	46	46	28	43	
3:00 - 4:00 PM	49	129	48	52	50	46	56	51	47	50	44	49	44	47	47	29	45	
4:00 - 5:00 PM	37	106	48	51	49	45	55	50	47	49	44	48	43	47	46	28	44	
5:00 - 6:00 PM	21	98	47	49	47	44	53	49	46	48	43	47	42	46	45	27	42	
6:00 - 7:00 PM	5	55	45	46	43	41	50	47	44	46	41	46	40	45	44	28	39	
7:00 - 8:00 PM	3	19	44	45	42	40	48	46	44	45	40	46	39	44	44	24	38	
8:00 - 9:00 PM	8	11	45	46	44	41	50	47	44	46	41	46	40	45	44	25	39	
9:00 - 10:00 PM	4	33	45	45	43	41	49	47	44	45	41	46	40	44	44	25	38	
10:00 - 11:00 PM	0	13	44	43	41	40	47	46	44	44	40	45	39	44	43	24	37	
11:00 - 12:00 AM	1	13	44	44	41	40	47	46	44	44	40	45	39	44	43	24	37	
12:00 - 1:00 AM	2	4	44	44	41	40	47	46	44	45	40	45	39	44	44	24	37	
1:00 - 2:00 AM	1	7	44	43	41	40	47	46	44	44	40	45	39	44	43	24	37	
2:00 - 3:00 AM	7	4	45	45	43	41	49	47	44	45	41	46	40	44	44	25	39	
3:00 - 4:00 AM	7	7	45	45	43	41	49	47	44	45	41	46	40	44	44	25	39	
4:00 - 5:00 AM	13	17	45	47	45	42	51	48	45	46	41	46	41	45	44	26	40	
5:00 - 6:00 AM	18	43	46	48	46	43	53	49	45	47	42	47	41	45	45	27	41	
6:00 - 7:00 AM	23	85	47	49	47	44	54	49	46	48	43	47	42	46	46	27	42	
7:00 - 8:00 AM	28	93	47	50	48	44	54	50	46	48	43	48	43	46	46	28	43	
8:00 - 9:00 AM	29	89	47	50	48	44	54	50	46	48	43	48	43	46	46	28	43	
9:00 - 10:00 AM	53	103	48	52	50	46	56	51	47	50	44	49	44	47	47	29	45	
10:00 - 11:00 AM	52	86	48	52	50	46	56	51	47	50	44	49	44	47	47	29	44	
11:00 - 12:00 PM	59	105	49	52	50	46	57	52	48	50	45	49	44	48	47	30	45	(Figure 3)
12:00 - 1:00 PM	36	125	48	51	49	45	55	50	47	49	44	48	43	47	46	28	43	
1:00 - 2:00 PM	43	89	48	51	49	45	56	51	47	49	44	49	44	47	47	29	44	
Total	532	1438																

Lastly, two models were created to model worst-case dock activity using data shown in Table VII below. Table VII uses the overall hourly truck distribution, as presented on page 689 of the traffic study, and breaks it down by building based on information provided by the traffic engineer. To be efficient and conservative, only two models were created to typify the busiest daytime truck activity (between 1100 and 1200 hours) and the busiest nighttime dock activity (between 0600 and 0700 hours).

To model the day and night hour periods, OAA assumed 1/6th of all trucks during that hour were idling at the same time. Maximum sound levels from dock activity, such as back-up alarms and coupling/decoupling, were statistically modelled using the total number of trucks distributed across an hour period. Maximum sound levels were assumed to occur for 30 seconds per truck. For Building 1, the truck maximums were distributed across the four corners of the larger building. Truck maximums were modelled using 79 dB(A) at 50 feet and are shown as a white "+"; idling trucks were modelled using 63 dB(A) at 50 feet and are shown as a green "+". The idling trucks were distributed around the site, while maximum activity was placed in position near off-site receptors. Figures 4 and 5 show the resulting models for the busiest day and night dock conditions, respectively. Note that these models intentionally do not include HVAC sound sources.

The future sound emissions can now be calculated by adding the site sound emissions from the various analyses to the prevailing ambient. Using the rules of special decibel arithmetic, HVAC and driving truck sound emissions, shown in Table VI, are added to the results in Figures 4 and 5 and the respective ambient sound levels shown in Table III. Daytime dock sound emissions added only to 0700-to-2100 hours; night dock sound emissions added to the remaining night hours. The results shown in Table VIII are the projected future hourly equivalent sound levels after the project is completed. Lastly, Table IX shows the change in sound level, comparing calculated sound levels in Table VIII to existing ambient sound levels in Table III. It is the results in Table IX that are comparable to DEC guidelines.

Table VII – Modified hourly distribution of truck trips taken from traffic study (page 689) and broken down by building. Daily truck trips shown in orange. Night hours highlighted in yellow. Busiest daytime hour shown in green. Busiest nighttime hour show in blue.

			24-hour trips			
	Building Square Footage (ft^2)		Total	B1	B2	B3
			1221800	963100	170500	88200
	Daily Truck Trips		532	401	83	48
	Hour	% of 24-Hour				
	2:00 - 3:00 PM	6.1%	33	25	5	3
	3:00 - 4:00 PM	9.3%	49	37	8	4
	4:00 - 5:00 PM	6.9%	37	28	6	3
	5:00 - 6:00 PM	3.9%	21	16	3	2
	6:00 - 7:00 PM	0.9%	5	4	1	0
	7:00 - 8:00 PM	0.6%	3	3	1	0
	8:00 - 9:00 PM	1.6%	8	6	1	1
	9:00 - 10:00 PM	0.8%	4	3	1	0
Night Hours	10:00 - 11:00 PM	0.0%	0	0	0	0
Night Hours	11:00 - 12:00 AM	0.2%	1	1	0	0
Night Hours	12:00 - 1:00 AM	0.3%	2	1	0	0
Night Hours	1:00 - 2:00 AM	0.2%	1	1	0	0
Night Hours	2:00 - 3:00 AM	1.3%	7	5	1	1
Night Hours	3:00 - 4:00 AM	1.3%	7	5	1	1
Night Hours	4:00 - 5:00 AM	2.4%	13	9	2	1
Night Hours	5:00 - 6:00 AM	3.5%	18	14	3	2
Night Hours	6:00 - 7:00 AM	4.4%	23	18	4	2
	7:00 - 8:00 AM	5.3%	28	21	4	3
	8:00 - 9:00 AM	5.5%	29	22	5	3
	9:00 - 10:00 AM	9.9%	53	40	8	5
	10:00 - 11:00 AM	9.7%	52	39	8	5
	11:00 - 12:00 PM	11.2%	59	45	9	5
	12:00 - 1:00 PM	6.8%	36	27	6	3
	1:00 - 2:00 PM	8.0%	43	32	7	4

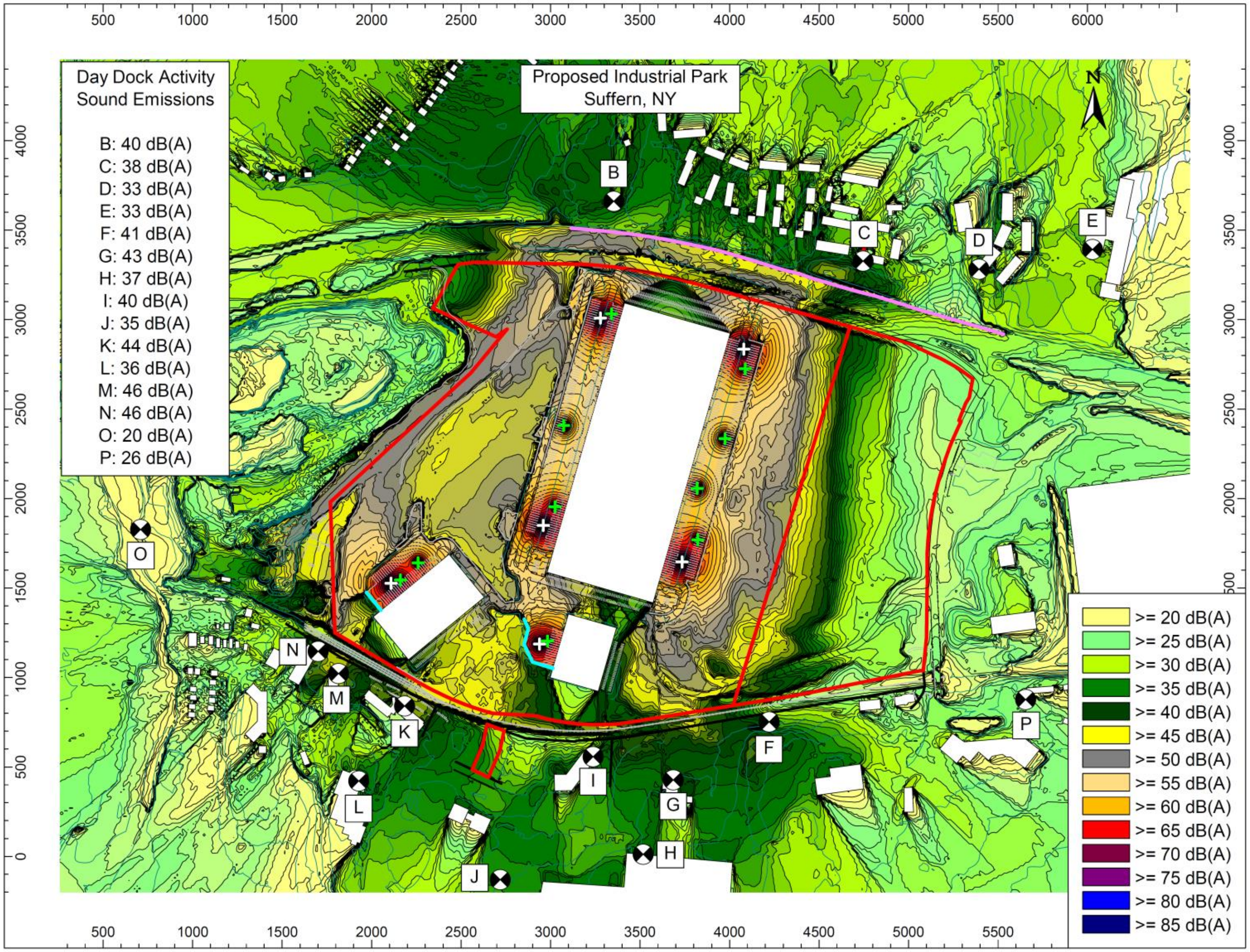

Figure 4 — Maximum A-weighted sound level contours 5 feet above grade expected for busiest daytime dock operations between 1100 and 1200 hours. Buildings shown in white, site property line outlined in red. All Locations typify upper story receptors of interest. See Table II for receptor Location description and modelled height.

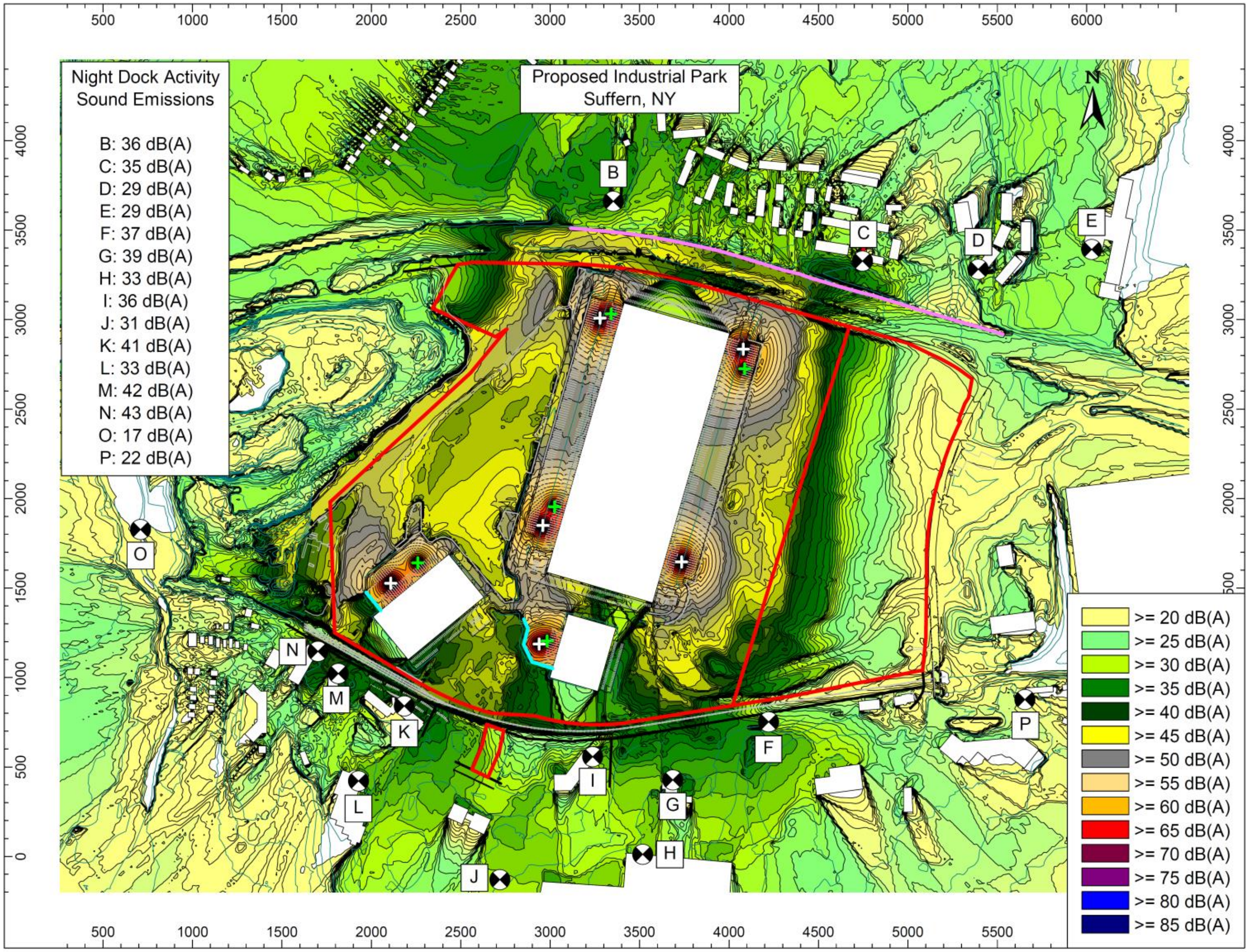

Figure 5 — Maximum A-weighted sound level contours 5 feet above grade expected for busiest nighttime dock operations between 0600 and 0700 hours. Buildings shown in white, site property line outlined in red. All Locations typify upper story receptors of interest. See Table II for receptor Location description and modelled height.

Table VIII – Projected future hourly equivalent sound emissions after project completion. Combination of HVAC, vehicle driving, and dock activities added to existing ambient sound levels. 24-hour equivalent (24-Hr Avg) sound level and L_{dn} also shown. All data are in dB(A) re 20μPa.

	Model Location	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	Survey Location	10	11	11	11	4	5	6	5	6	7	6	8	8	9	3
Time	2:00:00 PM	66	50	48	45	55	54	47	53	44	49	44	53	53	54	43
	3:00:00 PM	65	52	50	46	60	54	57	54	56	54	56	54	54	53	50
	4:00:00 PM	65	51	49	45	55	54	47	53	45	49	44	54	53	53	44
	5:00:00 PM	65	49	47	44	53	53	47	53	44	49	43	53	53	53	42
	6:00:00 PM	66	47	43	42	51	52	45	51	42	48	41	53	53	53	39
	7:00:00 PM	65	46	43	41	49	51	45	51	41	48	41	53	53	53	38
	8:00:00 PM	65	61	61	61	59	52	59	51	59	51	59	53	52	53	48
	9:00:00 PM	65	46	43	42	50	51	45	50	42	48	41	52	52	53	38
	10:00:00 PM	64	44	41	40	48	51	45	50	41	46	40	51	50	53	37
	11:00:00 PM	63	45	41	40	48	51	45	50	41	46	40	50	49	53	37
	12:00:00 AM	62	45	41	40	48	51	45	50	41	46	40	49	49	53	37
	1:00:00 AM	62	44	41	40	48	51	45	50	41	46	40	49	48	53	37
	2:00:00 AM	60	45	43	41	49	51	45	50	42	47	41	49	49	53	39
	3:00:00 AM	59	45	43	41	49	51	45	50	42	47	41	48	48	53	39
	4:00:00 AM	59	47	45	42	51	51	45	50	42	47	42	49	48	53	40
	5:00:00 AM	60	60	60	60	58	52	60	51	60	52	60	49	49	53	48
	6:00:00 AM	63	49	47	44	54	54	46	53	43	48	43	52	52	54	42
	7:00:00 AM	64	62	62	62	63	54	56	53	56	60	56	53	53	54	49
	8:00:00 AM	65	50	48	44	54	54	47	53	44	49	44	54	54	54	43
	9:00:00 AM	66	52	50	46	56	54	47	53	45	50	45	54	54	53	45
	10:00:00 AM	66	52	50	46	56	54	47	53	45	50	45	54	54	53	44
	11:00:00 AM	66	62	62	62	63	54	58	53	58	53	58	54	54	53	55
	12:00:00 PM	66	51	49	45	55	53	47	53	45	49	44	54	53	54	43
	1:00:00 PM	66	51	49	45	56	54	47	53	45	50	45	54	54	53	44
	24-Hr Avg	65	55	54	54	56	53	52	52	52	51	52	52	52	53	46
	L_{dn}	69	59	59	58	60	58	58	57	58	55	58	56	56	59	49

Table IX – Change in sound level from existing ambient sound levels in Table III compared to future sound levels of Table VIII.

	Model Location	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	Survey Location	10	11	11	11	4	5	6	5	6	7	6	8	8	9	3
Time	2:00:00 PM	0					3		2				2	2	0	
	3:00:00 PM	0				3	4	1	3	0	2	0	2	2	0	1
	4:00:00 PM	0					3		3				2	2	0	
	5:00:00 PM	0					3		2				2	2	0	
	6:00:00 PM	0					2		2				2	2	0	
	7:00:00 PM	0					3		2				2	2	0	
	8:00:00 PM	0	0	0	0	1	3	0	2	0	4	0	2	2	0	1
	9:00:00 PM	0					3		2				2	2	0	
	10:00:00 PM	0					2		1				2	2	0	
	11:00:00 PM	0					2		2				3	3	0	
	12:00:00 AM	0					2		2				4	4	0	
	1:00:00 AM	0					2		2				4	4	0	
	2:00:00 AM	0					3		2				4	4	0	
	3:00:00 AM	0					3		2				5	5	0	
	4:00:00 AM	0					3		2				5	5	0	
	5:00:00 AM	0	0	0	0	1	3	0	2	0	3	0	5	5	0	1
	6:00:00 AM	0					2		2				2	2	0	
	7:00:00 AM	0	0	0	0	1	3	0	2	0	0	0	2	2	0	1
	8:00:00 AM	0					3		2				2	2	0	
	9:00:00 AM	0					4		3				2	2	0	
	10:00:00 AM	0					4		4				2	2	0	
	11:00:00 AM	0	0	0	0	1	5	0	3	0	4	0	2	2	0	0
	12:00:00 PM	0					4		3				2	2	0	
	1:00:00 PM	0					4		3				2	2	0	

Results in Table IX show the potential change in sound levels from existing conditions to future conditions are in the range of 0-to-5 dB. DEC guidelines state that increases of 6 or less will not have any negative impact on the area. Most Locations for most hours of the day will see increases of 0-to-2 dB. Increases of about 3 dB are shown at the monastery, Location G; however, OAA notes that these projected levels are highly dependent on the on-site traffic on the southern driveway. OAA has conservatively assumed 100% of all traffic would use this road, so increases of this magnitude would not likely be observed here. Increases of 5 dB only occur for a three-hour period from 0300-to-0500 hours at Locations M and N as well as for one hour during the late morning at Location G. Emissions at Locations M and N are highly dependent on activity at Building 3, which was conservatively analyzed.

A second analysis was carried out by comparing existing and future L_{dn} sound levels. These values are shown at the bottom of Tables III and VIII for certain Locations. The day-night average sound level is forecast to potentially increase by 0-to-3 dB, which is minimal.

Lastly, while off-site truck routes are not regulated by code, they were reviewed to evaluate their potential for acoustical impact. All trucks will use Lafayette Avenue to access the site via Hemion Road. It is logical to assume that most trucks will come from the east where Interstate access is available. These roadways are heavily travelled, and hence, receptors along these off-site routes are accustomed to occasional short duration high sound levels from motor vehicle passbys. This statement is supported based on the sound data obtained at Location 2, which typified receptors along active roadways. Across the survey period, equivalent sound levels were routinely above 60 dB(A) and maximum sound levels each hour exceeded 70 dB(A) even during the night. Given the above, OAA concludes that project truck traffic will blend in with existing traffic flow noise in the area and no negative acoustical impact is expected from off-site truck routes.

RECOMMENDATIONS

1. To ensure the results above are realized, construct two sound barriers as shown in the Figures. Both barriers, shown in light blue in the figures above, should be carried to 15 feet above the paved truck court. The sound barrier for Building 2 should be approximately 130 feet in length; the sound barrier for Building 3 should be approximately 375 feet in length. Note that to be effective, the noise control barrier needs to meet the following requirements:

    a. The barrier needs to be solid, without openings, and be of sufficient surface weight. A recommended minimum surface weight for the barrier is 7 lbs/ft^2.

    b. Appropriate materials of construction for the barrier include $^5/_8$-inch-thick sheet steel piling, precast or poured-in-place concrete, treated wood/engineered lumber, acoustical metal panels, or other hybrid system specifically manufactured for the purpose.

c. The barrier, being solid, must be designed to resist wind load. Hence, it is a structure that requires engineered footings, the design of which will need to be overseen by structural professionals.

2. Back-up alarms can be the cause of noise complaints. To minimize any potential complaints from back-up alarms, we generally recommend outfitting trucks owned and controlled by the site with smart, ambient sensing, multi-frequency back-up alarms. This is especially effective on on-site terminal tractors/yard jockeys as these trucks are responsible for the majority of back-up movements at sites like this. Acceptable back-up alarms are available from a variety of manufacturers, such as Ecco, specifically Model EA9724. These devices reduce annoyance generated from constant level, pure tone back-up alarms. The reduction in annoyance is accomplished in two ways:

   - A broadband sound is less intrusive and annoying than a pure tone sound since, at a distance, it can blend in easier with other ambient sounds.

   - The smart, ambient-sensing feature allows back-up alarms to operate safely and effectively at far lower sound levels than typical brute-force, constant level devices. The smart alarms sample ambient noise and adjust the warning signal to be 5-to-10 dB higher than the ambient, therefore reducing levels nearby and off-site.

3. Proceed with current HVAC equipment plans, assuming plans do not markedly deviate from those presented in the model. Acoustical performance of new equipment should be kept in mind.

ADDITIONAL CONSIDERATIONS

The Village noise code prohibits construction noise outside of allowable hours. Although construction noise is temporary in nature, it is worth discussing considerations to minimize the acoustical impact of this activity. The closest on-site building is at least 500 feet from the nearest dwelling. Construction of the actual building is not an acoustical concern; however, earth moving equipment used during the civil construction phase of the project could be closer to receptors. Construction equipment, such as bulldozers, front end loaders, and dump trucks, can typically produce maximum sound levels of 80 dB(A) at 50 feet. At a distance of 500 feet with line-of-sight, construction equipment may approach 60 dB(A). OAA finds that levels of this magnitude to not have any negative impact given they will occur during the day during allowable construction hours. To minimize receptor exposure to construction noise during this phase, consider the following construction mitigation measures:

- ❑ Limit all heavy equipment operation to non-noise-sensitive daytime hours and follow allowable Village construction hours as applicable. Any construction activity in Montebello should not exceed an L_{10} of 60 dB(A).

- ❑ If possible, limit the number of equipment operating near one receptor at a given time. Avoid exposing any one receptor to high sound levels for an extended period of time.

- ❑ Place stationary equipment such as generators, compressors, and office trailers away from receptors.

- ❑ Avoid having construction parking or laydown areas nearby receptors.

- ❑ Coordinate any high sound level construction activities with Village representatives and provide advance notice to residences as feasible.

- ❑ Should blasting need to occur, follow applicable code directives.

Specific noise issues can be individually evaluated for tailored noise mitigation recommendations should traditional methods above not be sufficient. Given the temporary nature of construction and potential blasting as well as following allowable construction noise code hours, no short or long term negative acoustical impacts are expected from construction activity.

CONCLUSION

Plans call for the development of a speculative industrial park on appropriately zoned property, along the Interstate, in the Village of Suffern, New York. There are residences in the vicinity, and hence, the focus of this analysis was on these potentially noise-sensitive receptors. Other receptors of interest evaluated include a school, college, hospital, and a monastery. The construction of a 24/7 industrial park would bring car and truck activity to the area. Site sound emissions must meet the local noise code and should also not deviate from existing sounds in the area to ensure no negative acoustical impact at potentially noise-sensitive receptors.

The site is well laid out and designed. Off-site truck routes via Lafayette Avenue are a direct path to the Interstate and use existing well-travelled roads. Analyses show that distance and site geometry will sufficiently attenuate on-site HVAC and vehicle noise to have no negative effect on the surroundings. Steady site sound from HVAC equipment will be comparable to ambient lulls and will be difficult to discern at off-site vantage points. An evaluation of all proposed noise sources, which includes HVAC, driving vehicles, and dock activity, results in future sound levels 0-to-5 dB higher in level than existing hourly equivalent ambient sound levels. Under DEC guidelines, these results indicate that there will be no negative acoustical impact on the area. Most receptors in the vicinity will only see increases of 0-to-3 dB, which will have no appreciable effect on the area. Construction noise and potential blasting are temporary noise producing activities, that, when carried out in accordance with appliable code, will minimize any impact on the surrounding area; note that while blasting is referenced, it is not anticipated at this time. Based on the foregoing, the findings in this report support and conclude that the industrial park will not create any significant adverse sound impacts and is appropriate for this site.