Sound Measurements and Impact Review

Proposed KSH Warehouse Facility
Village of Montgomery, New York

October 2023

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1.0 EXISTING CONDITION

1.1 **Purpose of Study**

B. Laing Associates, Inc. is an environmental consultant firm providing sound/noise analyses services for the proposed KSH Facility (herein referred to as the Project) located in the Village of Montgomery, Orange County, New York. The Project site is currently a vacant, largely wooded use. The site consists of one parcel which lies northwest of and "fronts" on NY State Route 211 (east of Route 416), 0.3 miles east-northeast of Orange County Airport (an active, general aviation facility) and one mile north of Interstate I-84. The proposed Facility will be general warehouse and distribution operation for various companies products. The site is composed of 33.9 acres. It will include four buildings, with two each being 60,000 and 80,000 square feet. Space will be provided for up to 266 cars and 102 trucks (loading bays).

The purpose of this analysis is to evaluate sound levels that may occur as a result of the Project and compare them to the Village of Montgomery's Noise Code. This report presents updated monitoring, modeling/calculations conducted and conclusions reached since B. Laing Associates, Inc.'s (BLG) April 2023 - **Sound Measurements and Impact Review** report.[1]

1.2 **General Sound Characteristics**

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 pressure changes are expressed as decibels (dB) depending upon the power of the source as expressed in watts of power (with a reference of 1 picowatt or 10^{-12} watts). Frequency varies depending upon the rate at which sound pressures fluctuate in a cycle over time. It is measured in Hertz (Hz). One Hz equals 1 cycle per second. Frequency determines the perceived pitch of the sound. 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 which 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) increase results in a generally audible change. A 10 dB(a) change in sound levels is approximately a doubling of sound wave pressure[2]. As a point of reference, human conversations at a distance of two to three feet occurs at a sound pressure level (SPL) of 60 dB(A) with a calm voice to 75 dB(A) with a raised voice (USEPA's Community Noise, 1971).

1.3 **Sound Monitoring**

Sound measurements around the project site were made using a Cirrus Research plc CR:831C noise meter, which was set to measure A-weighted decibel levels as a mimic of the average human ear. Daytime and nighttime ambient noise levels were measured from four locations on and immediately adjacent to the project site as described below. Figure 1 Noise Sampling and Analysis Locations (at the rear of the text) represents the mapped measured locations on an aerial of the proposed project site.

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, taken in 10 to 15 minute durations and were monitored at the listed locations for existing ambient conditions.
The measurements occurred in two sets:

[1] While this report contains numerous additions, revised monitoring, and modeling as responses to The Noise Consutancy, LLC's (TNC) August 17, 2023 of B. Laing Associates, Inc.'s (BLG) April 2023 - **Sound Measurements and Impact Review** report, a separate, October 2023, point by point response document was also prepared and is not attached hereto.

[2] The human acoustical system perceives sound in logarithmic manner rather than as a straight line, mathematical function.

- The original measurements occurred Wednesday, April 12, 2023, during the PM peak (4:00 to 6:00) and post-PM (after 9:00 PM) plus Thursday, April 13, 2023 post-peak/mid-day AM (9:00 to 10:00). Measurements occurred in sunny conditions, with winds between 15 and 20 miles per hour and a high temperature of 80 degrees (F). Nighttime measurements occurred on Wednesday, April 12, 2023, during the nighttime post-peak (9:00 to 10:00 PM). Measurements occurred in clear conditions, with winds between 10 and 12 miles per hour and a high temperature of 71 degrees (F). The monitored sound levels were presented in Appendix A of the BLG April 2023 report.
- Additional measurements occurred Tuesday, September 12, 2023, during the PM peak (5:00 to 6:30) and Nighttime (9:00 PM to 3:00 to 5:00AM - at Weaver Street backyard) plus Wednesday, September 13, 2023 post-peak/mid-day PM (1:00 to 2:30). Measurements occurred in clear to cloudy conditions, with winds between 1 and 5 miles per hour and temperatures of 80 to 60 degrees (F)[3]. Nighttime measurements re-occurred on Thursday, September 14, 2023, during the nighttime post-peak (9:00 PM to 6:00 AM - at NY State Route 211 backyard). Finally, Thursday, September 14, 2023 measurements occurred during the AM peak (7:00 to 8:30). Measurements occurred in clear conditions, with winds between 5 and 10 miles per hour and a temperature of 60 to 65 degrees (F). The September 2023 monitored sound levels are presented in Appendix A.

The measured levels were generally dominated by vehicle noise at locations measured along NYS Route 211. Route 211 also carries significant traffic with substantial inputs from Route 416 in day and night conditions (Sample A represents a "source" sample). Sound measurements were recorded largely during times when existing sound/noise sources were expected to create an increase in the dominant average and peak sound/noise values. This was anticipated at "mid"-day and "rush hour" period in the PM, respectively.[4] In addition, as the proposed facility will be operating during evening and night hours, two sets of sound measurements were recorded after 9 PM until the following 5 or 6 AM.

Sound levels, in the existing condition, were measured at four locations/points. Sampling Point A is at toward the site's easternmost end of the property along NYS Route 211. April 2023 noise measurements from the proposed project's emergency entrance showed an $L_{(eq)}$ of 75.5 dB(A) in the PM peak. Noise measurements at this location showed a daytime off-peak level of 72.0 dB(A). Noise measurements at this location showed a nighttime off-peak level of 69.3 dB(A). September 2023 noise measurements ranged from 68.8 to 71.6 dB(A), with the lesser level at midday. Elevated sound levels at this location for both day time and nighttime result from the existing traffic on NYS Route 211[5].

Sampling Point B is located at the backyard/site boundary west of NYS Route 211. April 2023 noise measurements from this site showed an $L_{(eq)}$ of 55.1 dB(A) in the PM peak. Noise measurements at this location showed an off-peak level of 50.4 dB(A). Noise measurements from the proposed project's interior showed an $L_{(eq)}$ of 53.2 dB(A) in the nighttime ambient. September 2023 measurements at this location ranged from 51.3 to 54.3 dB(A) with the nighttime level at 54.0 dB(A). These measurements did not vary significantly as the existing sound environment is dominated by continuous traffic on NYS Route 211. This existing sound level exceeds the Village's Chapter 77 nighttime residential standard of 51 dB(A).

Sampling Point C is on Weaver Street. April 2023 Noise measurements from Point C showed an $L_{(eq)}$ of 51.3 in the PM. Daytime, off peak sound levels were 53.5 dB(A). In the nighttime ambient, noise measurements from the Sampling Point C showed an $L_{(eq)}$ of 50.9 dB(A). This receptor has an existing sound level typical of a more a residential, daytime and a somewhat elevated, residential, nighttime setting with peaks due to 24 hour traffic on NYS Route 211 and daytime local traffic/service vehicles.

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[3] Thunderstorms occurred between the hours of 6:00 to 9:00 AM on September 13 and so, the very end of that nighttime measurement was not included and peak AM measurements were postponed until September 14, 2023.

[4] A value referred to as the "equivalent sound level," L_{eq}, averages were computed/determined from the data.

[5] It should be noted that the Orange County Airport occurs in proximity to the site and is approximately 1,500 feet to the east of same. The 08/26 runway is closest to the site. Its approach extends approximately over the southern end of the Village of Montgomery. Stewart Airport is also nearby. Two specific measurements of a takeoffs was recorded on site with ambient levels rising from 55 to 60's dB(A) during PM Peak (a jet) and daytime (a helicopter). Up to 8 aircraft movements were noted and clearly audible in daytime hours. General aviation aircraft generate sound levels above 80 decibels at a considerable distance when taking off at full power.

Sampling Point D was added in the September 2023 monitoring effort. It is located at the southern backyard/northern site boundary south of Weaver Street. September 2023 noise measurements from this location showed an $L_{(eq)}$ of 48.0 dB(A) in the PM peak. Noise measurements at this location showed a daytime off-peak level of 48.8 dB(A). Noise measurements showed an $L_{(eq)}$ of 50.0 dB(A) in the nighttime ambient. These measurements did not vary significantly as the existing sound environment is dominated by 24 hour traffic on NYS Route 211.

There are no "sensitive" noise receptors (e.g., hospitals, libraries, etc.) in the immediate vicinity of the site. To the extent receptors of any kind (residential buildings, etc.) occur long NYS Route 211 (Union Street), they are already "impacted" to a significant degree as described/measured above by noise/sound levels from NYS Route 211[6]. However, there are residences in the vicinity along on Weaver Street which will be further discussed below. Further, an elementary school property does occur approximately 0.45 miles northeast of the subject site on Route 211. It does not abut the property.

TABLE 1
Noise Sampling Locations

Monitoring ID	Location	Description
Sample Location A	NYS Route 211	"Main" proposed entry location
Sample Location B	NYS Route 211- West Edge	Wooded, Rt 211 Auto Body rear
Sample Location C	Weaver Street	Mid-west along front yards
Sample Location D	Weaver Street Rear Yards	Wooded- wetland/upland

TABLE 2a
Noise Monitoring Results (Existing Condition)

Monitoring ID	*Location*	*Date*	*Time*	*Meteorological Conditions*	*L_{eq} dB(A)*
Sample Location A	NYS Route 211	4/12/2023	04:57 PM	10 kt wind[7] 0% cloud 80 degrees (F)	75.5
		4/12/2023	08:57 PM/Night	1 kt wind 0% cloud 70 degrees (F)	69.3
		4/13/2023	10:25 AM-Midday	<5 kt wind 0% cloud coverage 72 degrees (F)	72.0
		9/12/2023	05:55 PM	<5 kt wind 0% cloud coverage 84 degrees (F)	69.3
		9/13/2023	1:25 PM-Midday	1 kt wind 0% cloud 77 degrees (F)	68.6
		9/14/2023	07:31 AM	<5 kt wind 0% cloud coverage 61 degrees (F)	71.8

[6] IBID.
[7] As recorded at Orange County Airport. Project site conditions less than 10 mph due to wooded site.

Sample Location B	Rear Yards – Route 211	4/12/2023	04:16 PM	10 kt wind 0% cloud 80 degrees (F)	55.1
		4/12/2023	09:16 PM Night	1 kt wind 0% cloud 70 degrees (F)	53.2
		4/13/2023	10:43 AM-Midday	<5 kt wind 0% cloud coverage 78 degrees (F)	50.4
		9/12/2023	06:14 PM	<5 kt wind 0% cloud 80 degrees (F)	53.9
		9/13/2023	01:00+ AM Night	1 kt wind 0% cloud <70 degrees (F)	54.0
		9/13/2023	1:45 PM - Midday	<5 kt wind 0% cloud coverage 78 degrees (F)	51.3
		9/14/2023	07:10 AM	1 kt wind 0% cloud 60 degrees (F)	54.3
Sample Location C	Weaver Street Front Yard	4/12/2023	04:38 PM	10 kt wind 0% cloud 80 degrees (F)	51.3
		4/12/2023	09:35 PM Night	1 kt wind 0% cloud 70 degrees (F)	50.9
		4/13/2023	09:38 AM	12 kt wind 0% cloud 80 degrees (F)	51.3
		9/12/2023	06:14 PM	1 kt wind 0% cloud 84 degrees (F)	53.9
		9/13/2023	01:02 PM Midday	1 kt wind 0% cloud 77 degrees (F)	55.4
		9/14/2023	07:51 AM	1 kt wind 0% cloud 64 degrees (F)	53.7
Sample Location D	Weaver Street Rear Yards	9/12/2023	5:35 PM	1 kt wind 0% cloud 84 degrees (F)	48.0
		9/13/2023	03:00+ AM Night	1 kt wind 0% cloud <70 degrees (F)	50.0

		9/14/2023	10:00 12:00 PM Midday	1 kt wind 0% cloud 77 degrees (F)	48.8
		9/14/2023	07:09 AM	1 kt wind 0% cloud 64 degrees (F)	47.0

2.0 NOISE REGULATION

2.1 Department of Environmental Conservation Criteria

The New York State Department of Environmental Conservation (NYSDEC) published, *Assessing and Mitigating Noise Impacts* (October 6, 2000 revised February 2, 2001). This document states that sound level increases of 0 to 5 dB(A) have no appreciable effect on receptors, increases of 5 to 10 dB(A) may have the potential for adverse impact but only in cases where the most sensitive receptors are present. Increases of more than 10 dB(A) may require a closer analysis of impact potential depending on existing noise levels and surrounding land uses, and an increase of 10 dB(A) or more suggests consideration of mitigation measures. It also states that the addition of operational noise sources, in a "non-industrial" setting, should not raise the ambient noise level above a maximum of 65 dB(A). Ambient noise levels in industrial or commercial areas may exceed 65 dB(A) but should not exceed 79 dB(A). Construction noise levels are not specifically addressed by this guidance. All data, existing conditions and impacts are expressed as $L_{(eq)}$.

2.2 Federal Highway Administration Criteria

The U.S. Department of Transportation Federal Highway Administration provides noise abatement criteria depicting noise levels for varying land use categories that are used to determine if and where traffic noise impacts occur, as defined in 23 CFR 772.5. Table 3 below depicts each criterion.

TABLE 3

Noise Abatement Criteria (NAC) Hourly A Weighted Sound Level in Decibels (dB(A))

(Source: 23 CFR Part 772, Table 1)

Activity Category	L_{eq}	L_{10}	Analysis Location	Description of Activity Category
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[3]	67	70	Exterior	Residential.
C[3]	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D (Table 3, Con't)	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or

				nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F				Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G				Undeveloped lands that are not permitted.

[1]Either L_{eq} or L_{10}(but not both) may be used on a project.
[2]Either L_{eq} and L_{10} Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.
[3]Includes undeveloped lands permitted for this activity category.

In this case, the receptors fall in the industrial and residential categories. However, receptors along NYS Route 211/Union Street to the north) already have higher sound levels due to the roadway and, intermittently, the Orange County Airport.

The FHWA 1995 Highway Traffic Noise Guidance specifies a level of 67 dB(A) $L_{(eq)}$ less at most exterior locations for public use such as parks, *residences*, hotels, churches, libraries, etc. A level of 72 dB(A) $L_{(eq)}$ or less for other developed uses[8].

2.3 Village of Montgomery Noise Ordinance

The Village of Montgomery regulates standard noise/sound pressure levels in Chapter 77 of their Village Code "*Noise.*" Per 77-5[9], "No person in a residential zone shall emit noise beyond the boundaries of his/her premises exceeding the levels stated herein and applicable to adjacent residential, business, and industrial zones:

TABLE 4
Village of Montgomery Code, Chapter 77-5

	Receptor's Zone			
Emitter's Zone (dBA)	**Industrial (dBA)**	**Business (dBA)**	**Residential (day) (dBA)**	**Residential (night) (dBA)**
Residential	62	55	55	45
Business	62	62	55	45
Industrial	70	66	61	51

[8] The proposed project site is located on and obtains access from the heavily traveled, arterial collector roadway - NY State Route 211. Further, some residences and businesses adjacent to the site also front on NY State Route 211 and Weaver Street has its entry/exit from NY State Route 211. NY State Department of Transportation has adopted and applies the FHWA criteria for sound/noise analyses (see also 1.3 E) of receptors located along NY State Routes. Thus, the FHWA's $L_{(eq)}$-based standard applies in this case.
[9] Per a separate, October 2023 BLG response document to TNC's August 2023 comments, Section 1.3 E Standards, BLG explains in detail that the Village's standards as elucidated in this Table are based on $L_{(eq)}$.

Chapter 77 states that nighttime hours extend from 9 p.m. to 8 a.m. Monday to Saturday and from 9 p.m. to 9 a.m. Saturday into Sunday morning. Daytime hours are all other hours.

Per the Village, construction in daytime hours is exempt from the above levels in Table 4. Construction or demolition related activities may occur during nighttime hours after 9 p.m. to 8 a.m. Monday to Saturday and from 9 p.m. to 9 a.m., **if** that operation of construction equipment during nighttime hours does not exceed the maximum noise levels as specified in § 77-5B. *Per Section 3.3 below, the applicant has agreed to limit their construction activity to daytime hours only.*

Finally, warning devices required by the Occupational Safety and Health Administration or other state or federal safety regulations are specifically exempted from the Code.

3.0 PROPOSED ACTION ANALYSIS

3.1 Operational Sound Analysis[10]

The proposed Warehouse Facility Project site, consists of one parcel totaling 33.9 acres which fronts along NYS Route 211, east of Route 416 and one mile north of north of Interstate I-84. While currently unused and wooded, the sound environment has an ambient level somewhat above that typical for such a use (see Section 1.0 above) as it is significantly influenced by traffic on NYS Route 211. NYS Route 211 is a major, arterial collector and through-bound traffic roadway. Route 211 carried 6,984 vehicle trips per day including some 532 trucks in 2019 (actual counts per NYSDOT-TDV). As such, residences adjacent to it experience higher sound levels in the existing condition than those fronting on a "typical" residential roadway, with sound levels averaging 50.4 to 55.1 dB(A) in the daytime and 53.2 to 54.0 at night in the *rear* yards.

The proposed Warehouse Facility will be a distribution operation center for the products that multiple, smaller to mid-sized leasing companies wholesale to contractors and manufacturers. The proposed site plan includes four general warehouse buildings, with two each being 60,000 and 80,000 square feet. Space will be provided for up to 266 cars and 102 trucks loading bays.

Several items of note will result from the proposed action:

1. The applicant and project team's early design choices will provide some basic sound/noise mitigation.
2. The Project development has been moved away from the northern and eastern property boundaries. The presence of wooded wetlands and other factors have resulted in substantial distances between the portion of the site to be developed and adjacent residential properties (250 feet plus).
3. The northeastern accessway to NYS Route 211 will be used as emergency-only.
4. The southeastern access to NYS Route 211 will be used for two-way, day to day traffic and so, will keep the entry and exiting vehicles within the Village's industrial zone.
5. The southeastern access to NYS Route 211 will have a very flat slope. This allows trucks and other vehicles to accelerate at lower engine power levels.
6. Parking for Project personnel is arranged along the "outer" sides (north and south sides) of the buildings. These vehicles will operate at much lower sound levels than the warehouse trucks.
7. 102 truck loading bays will occur on the in the center of the four buildings. Signage will be posted to direct these vehicles to the site's center only. No warehouse truck traffic will be allowed around the "outer" vehicle parking areas.
8. The applicant is now proposing to add two, overhead bar-barriers (similar to parking garages) which will allow the passage of passenger vehicles, delivery vans and emergency service vehicles but not tractor trailers. The maximum height of a folded emergency fire ladder truck or bucket truck is 10.5 feet. Tractor trailer cargo boxes are some 13 feet above grade. Thus, the two, overhead bar-barriers will be set at 11.5 feet above grade level and will be established in the ring road to the north and south of Buildings' 1 and 2 eastern and western edges, respectively. This will act to physical bar tractor trailer rigs from traveling to and around the northern sections of the proposed ring road and parking opposite the rear yards (still some 350 feet south) of properties fronting on Weaver Street. Emergency vehicles will be able to pass beneath the overhead bar-barriers and/or will have unimpeded access via the emergency roadway.
9. The buildings themselves (two to the north and two to the south) will then act as a very effective sound barrier for receptors to the northeast and southwest for the truck bays.
10. Additionally, a 15-foot-high sound wall or overlapping walls will be installed between the two, 60,000 square foot buildings proposed of the site's north-central area to provide sound mitigation (i.e., eliminate sound flanking) for Analysis Points 1 and 2.

[10] Michael P. Bontje of B. Laing Associates, Inc. is the principal author of this report. He has been practicing environmental science since 1980 (43 years) and sound/noise analysis for 35 years. His resume was attached to the BLG April 2023 report.

11. The general warehouse buildings will have HVAC units mounted on the roof sufficient to cool the office spaces only and these will be surrounded by a 4-foot-high, solid material fence with a roughened surface texture. The resulting mitigation is predicted as approximately 7 dB(A)[11]. This was included in the Soun Plan computer modeling.
12. An 8-foot-high fence/sound barrier will be installed at the north edge of vehicle parking for the two northern buildings. It will extend to the west and east along the norther roadway's entire northern side plus the outer edge of the internal passenger vehicle circulation roadway.
13. The facility may operate up to 24 hours a day.
14. Concrete "pads" will be added at ground level between the buildings near the truck loading bays for emergency generator use. Their use will not be for day-to-day operations but for emergencies accompanied by a power outage[12].

In many cases of sound analysis, "natural" methods of sound mitigation include distance, soils, landscaping, etc. However, every doubling of the distance from a sound source will result in a noticeable, 6 dB(A) reduction in the resultant sound level. On a smaller residential or commercial lot, this impact is often not very significant. In this case, however, the distances within the site are substantial (measured in hundreds of feet) relative to the typical locations where sound source strengths are measured (3.28 to 50 feet from the source). Thus, in this case, the distance these sounds will have to travel to approach Analysis Points 1 through 6 (i.e., the residential receptors) accounts for significant reductions in the resultant, sound impacts.

Operational sounds were subjected to an analysis using SoundPLAN Computer Modeling[13]. A summary description of this modeling is as follows:

> To add precision to the analysts of possible sound-noise impacts resulting from the project, B. Laing Associates, Inc. supplements the review by conducting noise emission dispersion analysis using SoundPLAN computer modeling. This modeling tool is based on International Organization for Standardization (ISO) standards (i.e., ISO96-13-2, ISO 12354-3:2017) which is used world-wide in sound/noise analysis. Further, the traffic that is generated internally to the project is analyzed according to Transportation Noise Model (TNM 3.0) developed by the US FHWA Office of Planning, Environment, and Realty.
>
> SoundPLAN is a computer-based modeling/calculation system. Background images are inserted from Google Maps or OpenStreetMap and re then set UTM northern hemisphere and the UTM zone. Elevation works as a digital ground model (DGM) and places the objects on top of the triangulated surface based on a user-defined local coordinate system. The base units are in meters. Imported data that use feet need to be converted. Project-specific geometry data

[11] The release height for these HVAC units has been assumed to be 2.5 feet. The fence/barrier height will be 4 feet and/or a minimum of 1 foot above the release height.

[12] Since the generators will be on an as-needed basis, their exact specification cannot be provided at present. So, B. Laing Associates, Inc. has utilized a C32 Caterpillar generator configuration capable of powering the entire facility and enclosed in a metal container with 4" of rockwool insulation. See Appendix C.

[13]

ADDITION OF SOUND SOURCE LEVELS	
Difference Between Two Sound Levels	Add to the Higher of the Two Sound Levels
1 dB or less	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0 dB
(USEPA, Protective Noise Levels, 1978 as cited by NYSDEC, 2001)	

are included on the basis of a scanned and geo-referenced bitmap or by importing from DXF, ESRI Shapefile, ASCII files or OSM. Projects require terrain produce the digital ground model (DGM) entering elevation lines from the Google Maps sources. These are then edited/adjusted as needed (e.g., according to future site grading for the project) with topographic lines and/or spot heights.

The modeler then defines the properties of the objects to be analyzed:

- building heights,
- receiver names,
- the traffic numbers and types on roads (per the project's traffic analyses)
- the sound power or emission level for "industrial sources" (e.g., HVAC, Generators, etc.).
- mitigation wall heights or berms
- Noise type combinations
- Receiver locations
- Applicable standards at each receiver

A project usually contains several different noise sources (road, industrial sources, parking lot). The above inputs allow the calculation, superimposition, and compilation of different noise sources at the receivers and a comparison to the applicable standards[14].

In general, any need for sound reduction with the current site plan beyond the careful placement of proposed Project facilities will be fulfilled by construction of permanent fences and sound walls as shown on the Site plan by Engineering and Surveying Properties, PC.

Sound Analysis Points 1, 2 and 8 have southern lots line for homes fronting on Weaver Street. They were used to represent a definite "worst-case" analysis for all the residences fronting on Weaver Street (i.e., if these locations attain the Village's Noise standards all the others will as well). Analysis Points 1, 2 and 8 will have direct line-of-sight to the northern buildings. The buildings will be finished with roughened exterior surface to minimize reflections and maximize scattering of sounds from the northern roadway and parking lot. The intervening, preserved wetlands and woodlands is ground which has a "soft" acoustical surface. An 8-foot high fence/sound barrier will be installed at the north edge of vehicle parking for the two northern buildings and it will extend to the west and east along its entire northern side plus the outer edge of the internal passenger vehicle circulation roadway. The combination of the fence/sound barrier, distance to the property line and intervening wetlands will reduce sound levels from this activity to 45.7 dB(A)[15] daytime to 38.1 dB(A) nighttime. This will be well below the Village's residential daytime standard of 61 dB(A) and below the residential nighttime standard of 51 dB(A). Further, it will be below the 47.0 dB(A) daytime and 50.0 dB(A) nighttime measurements obtained in the existing condition.

The truck loading bays and generators will be located in the site's interior, outside spaces and the buildings themselves (the two northern buildings) will then act as a very effective sound barrier for receptors to the northeast resulting in lower decibel levels Analysis Points 1, 2. 3 and 4 for those sources. A 15-foot-high sound wall or overlapping walls will be installed between the two, 60,000 square foot buildings proposed of the site's north-central area to provide sound mitigation (i.e., eliminate sound flanking) for Analysis Points 1 and 2[16].

Analysis Points 3 and 4 occur the western residential lot lines of the closest residences along NY State Route 211. Both analysis points will have direct line-of-sight to the eastern wall of Building 2 and the northeastern

[14] This combination of SoundPLAN inputs resulted in 13,000 plus calculation points within the project and receiver grids.
[15] Per a separate, October 2023 BLG response document to TNC's August 2023 comments, Section 1.3 E Standards, BLG explains in detail that the Village's standards as elucidated in 77-5B(1)'s Table are based on $L_{(eq)}$ as are these modeled sound levels.
[16] See Section 3.3 Construction and Table 7 for operational results when the northern, Buildings 1 and/or 2 are not yet completed.

extension of the internal entry/truck circulation roadway and the southern buildings. The intervening ground (preserved wooded wetlands and uplands) has (will have) a "soft" acoustical surface. An 8-foot-high fence/sound barrier will be installed at the eastern edge of the internal entry/truck circulation roadway. The fence, since it will be elevated above the eastward ground surface, will also act as a partial screen, interrupting direct line of sight, for portions of all four buildings. It will extend north to south along the internal entry circulation roadway's entire eastern side. The combination of the fence/sound barrier, distance to the eastern, residential property line and intervening wetlands will reduce sound levels from this activity to 45.3 dB(A) daytime to 40.9 dB(A) nighttime. This will be well below the Village's residential daytime standard of 61 dB(A) and below the residential nighttime standard of 51 dB(A). Further, it will be below the 55.1 dB(A) daytime and 53.2 dB(A) nighttime measurements obtained in the existing condition at analysis Point 4.

Analysis Point 5, is the western residential lot line of the closest residence along NY State Route 211. It will be well east from (i.e., 250 feet from) and have direct line-of-sight to the project's eastern, entry/exit drive. The intervening ground (preserved wooded wetlands and uplands) has (will have) a "soft" acoustical surface. An 8-foot-high fence/sound barrier will be installed at the eastern edge of the internal entry/truck circulation roadway. The fence, since it will be elevated above the eastward ground surface, will also act as a partial screen, interrupting direct line of sight, for portions of Building 4. It will extend north to south along the internal entry circulation roadway's entire eastern side. The combination of the fence/sound barrier, distance to the eastern, residential property line and intervening wetlands will reduce sound levels from this activity to 50.7 dB(A). This will be well below the Village's residential daytime standard of 61 dB(A) and below the residential nighttime standard of 51 dB(A). Further, it will be below the 55.1 dB(A) daytime and 53.2 dB(A) nighttime measurements obtained in the existing condition at analysis Point 4, which similarly fronts on NY State Route 211.

Analysis Point 6 is the western residential lot line of the closest residence along NY State Route 211. It will be well north from (i.e., 300 plus feet from) and have direct line-of-sight to the Project's southeastern, entry/exit drive. The intervening ground (preserved wooded wetlands and uplands) has (will have) a "soft" acoustical surface. No fence/sound barrier will be installed along the northern edge of entry/exit drive. The sound levels from this activity will be 49.2 dB(A) in daytime as a result of truck and automotive traffic on the entry/exit drive. This will be below the Village's residential daytime standard of 61 dB(A) and at the residential nighttime standard of 51 dB(A)[17].

Sound calculations to Analysis Point 7 is a dual, Industrial Zone lot line for an agricultural property fronting on NYS Route 211. Analysis Point 7 will have direct line-of-sight to the southern buildings and the ground will have a "hard" acoustical surface. No fence/sound barrier will be installed at the southern edge of vehicle parking for the two southern buildings as the adjacent lot is also Industrially Zoned. The ground will have a "hard" acoustical surface. The sound levels from this activity will be up to 68.2 dB(A) in daytime. This will be well below the Village's industrial daytime and nighttime standard of 70 dB(A)[18].

The truck loading bays and generators will be located in the site's interior, outside spaces and the buildings themselves (the two northern buildings in particular) will then act as a very effective sound barrier for receptors to the north and northeast resulting in lower decibel levels Analysis Point 3 for those sources.

In winter, all trucks that are being readied to leave the facility are to be plugged in to electrical outlets to keep the engines warm overnight. The engines are turned on and idled for up to 5 minutes. Each truck cannot idle for more than 5 minutes. This is due to (a) the trucks are usually equipped with an idling timer that can be set to turn off at the five-minute mark, (b) the trucks are all plugged in and kept warm in winter conditions, and

[17] It should be noted that the commercial and residential properties along Rt 211 are already experiencing 69.3 dB(A) along the frontage and 54.0dB(A) on their rear yards in the nighttime condition. Both values already exceed the Village's Noise Code.

[18] No barrier/fence will be installed on this southern boundary of the southeastern entry road. However, vegetative barrier as described in BLG correspondence of May 2, 2023 Item 1.

(c) New York State regulations prohibit truck idling for more than 5 minutes (Title, 6 NYCRR, Subpart 217-3).

As a result of the above with the project mitigation as proposed, the resultant sound levels will be well below the DEC's and FHWA's residential receptor standards of 65 and 67 dB(A), respectively. Furthe, no discernable increase will occur above ambient $L_{(eq)}$ levels. Thus, NYSDEC's secondary test comparing existing sound levels verses proposed sound levels falls into the potential impact category of "insignificant."

TABLE 5 - Warehouse Facility Sound Propagation Results– NYS Route 211, Montgomery, NY[19]

Receiver list

No.	Receiver name	Building side	Floor	Limit Day	Limit Night	Level Day	Level Night	Conflict Day	Conflict Night
				dB(A)		dB(A)		dB	
1	1 Weaver Street Backyard Central	-	1.Fl	61	51	42.7	37.6	-	-
2	2 Weaver Street Backyard Eastern	-	1.Fl	61	51	40.8	36.4	-	-
3	3 NYS Route 211 Backyard Northern	-	1.Fl	61	51	45.3	40.9	-	-
4	4 NYS Route 211 Backyard Auto/Res	-	1.Fl	70	70	43.7	39.5	-	-
5	5 NYS Route 211 Backyard Southern	-	1.Fl	61	51	50.7	47.5	-	-
6	6 NYS Route 211 Sideyard Southern	-	1.Fl	61	51	49.2	45.9	-	-
7	7 Industrial Property Soutnern	-	1.Fl	70	70	68.2	65.2	-	-
8	8 Weaver Street Backyard Western	-	1.Fl	61	51	45.7	38.1	-	-

See also Figure 2 at the rear of the text.

[19] Detailed contributions to these receivers and resulting sound levels can be found in Appendix B.

3.2 Traffic Sound Analysis

As provided above, the Project site's eastern boundaries along NYS Route 211 (Sampling Point A)experience daytime sound $L_{(eq)}$ levels ranging from 68.6 to 75.5 dB(A) [Peak PM]. The existing, ambient sound level somewhat exceeds the criteria of 67 dB(A) as set forth by the U.S. Department of Transportation Federal Highway Administration suitable for the exterior of hotels, motels, offices, restaurants, and other developed lands, properties, or activities. The Project site's ambient sound level, when west of NYS Route 211 (Sampling Point B), currently ranges from 50.4 to 55.1 dB(A). Ambient levels in the area also were recorded at a rear yard along Weaver Street (Sampling Point C) and currently ranges from 47.0 to 50.0 dB(A).

Sound levels associated with vehicular traffic are a function mainly of traffic speed, vehicle mix (automobiles, medium trucks, heavy trucks) and volume. Posted vehicle traffic speeds will not be affected by the Proposed Action. Vehicle mixes are also anticipated to be very similar to the existing condition following construction at the Site. Therefore, any changes in traffic related sound will be a function of the change in volume. A doubling of traffic volume (assuming speeds and vehicle mixes do not change) equates to an increase in sound of 3 dB(A). The project will cause an increase in traffic volumes of much less than a doubling. Thus, sound levels due to that traffic will increase one or two decibels at most. A 3 dBA increase is unnoticed to tolerable according to the NYSDEC noise evaluation guidelines in "Assessing and Mitigating Noise Impacts."

As provided in the existing conditions section above, there are no "sensitive" noise receptors in the immediate vicinity of the site. At the elementary school, 0.45 miles east of the site's ingress/egress, traffic generation along NYS Route 211 as a result of the proposed Project will not, as described above, materially add to these sound levels.

3.3 Construction Sound Analysis

During construction, noise levels will be (1) temporary and (2) will occur at two distinctly different levels. First, the temporary component results from the transient nature of the construction process. The U.S. EPA reports sound levels **at** construction projects range from a high of 88 dB(A) to a low of 75 dB(A) from grading through finishing operations (U.S. EPA, Construction Noise Control Technology Initiatives, Table 2.2).

The approximate location of the proposed construction occurs along Route 211. The noise generated during construction is due mainly from diesel engines that run the equipment. Exhaust is typically the predominant source of diesel engine noise, which is the reason that maintaining mufflers on all equipment is imperative. Noise measurements from some common equipment used in construction can be found in *Assessing and Mitigating Noise Impacts* (October 6, 2000 revised February 2, 2001). See Tables 6a and 6b below.

TABLE 6a
CONSTRUCTION SOUND LEVELS

Sound Source	Measurements	1,000 feet	2,000 feet	3,000 feet
Hitachi 501 shovel loading	92 dB(A) at 50 ft	66.0 dB(A)	60.0 dB(A)	56.5 dB(A)
Euclid R-50 pit truck loaded	90 dB(A) at 50ft	64.0 dB(A)	58.0 dB(A)	54.4 dB(A)
Caterpillar 988 loader	80 dB(A) at 300 ft	69.5 dB(A)	63.5 dB(A)	60.0 dB(A)
(The Aggregate Handbook, 1991)				

TABLE 6b CONSTRUCTION EQUIPMENT SOUND LEVELS		
Equipment	Decibel Level	Distance in feet
Augered earth drill	80	50
Backhoe	83-86	50
Cement mixer	63-71	50
Chain saw cutting trees	75-81	50
Compressor	67	50
Wood Chipper	89	50
Bulldozer	80	50
Grader	85	50
Generator	78	50
(Excerpt and derived from Cowan, 1994)		

No sensitive receptors are within the immediate vicinity of this project. The noise created by the initial phase of the construction process *during daytime hours only*, with levels ranging from 75 to 88 dB(A) on site will decrease as a function of distance. Given initial noise measurement standardized at 50 feet from the sound source, every doubled distance will decrease the noise level by approximately 6 dB(A). Thus, at a distance of 250 feet to the average residential lot line and a sound level of 75 to 88 dB(A) at the northern and eastern building edges, the noise generated by the "heavy" construction at the construction site, will be *decreased* by approximately 12 dB(A) or approximately 63 to 76 dB(A). NYS Route 211 recorded L(eq) measurements yielded between 75.5 and 69.3 dB(A) during peak and off-peak times. Thus, the ambient sound levels at this point will be approximately the same and will be clearly audible during the heavy construction phase of the site. However, *without* the on-site mitigating berm and fences on site as described below, these construction-only levels would run some 15 decibels above the current ambient levels in the low to mid 50's dB(A) levels at the backyard area of the NY State Route 211 properties. With the addition of the eastern roadway edge fence described below, these differential levels are expected to be reduced by approximately 8 dB(A) and so, will be 7 dB(A) above current ambient. Also, at the backyard area of the Weaver Street properties, *without* the on-site mitigating berm and fences described, these construction-only levels would run some 20 decibels above the current ambient levels in the high 40's dB(A) levels. With the addition of the berm/fence combination described below (and the temporarily retained 300 feet of undeveloped property), these differential levels are expected to be reduced by approximately 13 dB(A) and so, will be 7 dB(A) above current ambient.

Once "rough grading" has been finalized and foundations have been poured then, peak upper sound levels will decline in duration as the construction uses tools which are (1) smaller, (2) less continuous in use and (3) begin to move "indoors." During the subsequent phase of construction, heavy equipment is generally replaced by internal work and smaller/hand equipment on external work. Consequently, it is expected that sound levels at the point of generation will further be reduced *during daytime, construction hours only.* This level of intermittent noise (up to several hours per day) is expected to occur for approximately one year for each phase of the project.

Sound mitigation has been proposed for the construction phase of the project in three ways:

1. The 8-foot-high fence proposed for the internal roadways' northern and eastern edges will be built as soon as possible in the road construction phase of the project (which will come first).

2. A 3-foot-high soil berm will be created with an 8-foot-high fence placed on top of it (for a combined 11-foot-high structure) from the site's western edge to the eastern project roadway. This will occur through approximately the middle of the development site and will be in place when Buildings 3 and 4 are constructed (if Buildings 1 and 2 are not yet present). As Building 2 is constructed, the eastern half of the berm will be re-constructed to run northerly to intersect the fence per Item 1 above.
3. Construction in daytime hours is exempt from Village Code Chapter 77 levels presented in Table 4. Construction or demolition related activities may occur during nighttime hours after 9 p.m. to 8 a.m. Monday to Saturday and from 9 p.m. to 9 a.m., if that operation of construction equipment during nighttime hours does not exceed the noise levels as specified in § 77-5B. This is unlikely to occur. Thus, the applicant has agreed to limit their construction activity to *daytime hours only.*

A SoundPLAN analysis was conducted for the operation of the facility with only one northern building constructed. This modeling demonstrated that the berm/wall combination and the added 300 plus feet of separation from Weaver Street properties will result in sound levels at or below those predicted for the full operation of the site.

TABLE 7 - Warehouse Facility Sound Phased Operation Propagation Results– NYS Route 211, Montgomery, NY[20]

Receiver list

No.		Receiver name	Building side	Floor	Limit Day	Limit Night	Level Day	Level Night	Conflict Day	Conflict Night
					dB(A)		dB(A)		dB	
1	1	Weaver Street Backyard Central	-	1.Fl	61	51	35.9	32.5	-	-
2	2	Weaver Street Backyard Eastern	-	1.Fl	61	51	38.2	34.8	-	-
3	3	NYS Route 211 Backyard Northern	-	1.Fl	61	51	43.9	40.5	-	-
4	4	NYS Route 211 Backyard Auto/Res	-	1.Fl	70	70	42.1	38.8	-	-
5	5	NYS Route 211 Backyard Southern	-	1.Fl	61	51	50.4	47.5	-	-
6	6	NYS Route 211 Sideyard Southern	-	1.Fl	61	51	49.1	46.2	-	-
7	7	Industrial Property Soutnern	-	1.Fl	70	70	67.7	65.4	-	-
8	8	Weaver Street Backyard Western	-	1.Fl	61	51	32.1	28.8	-	-

See also Figure 3 at the rear of the text.

[20] IBID.

FIGURE 1 - Noise Sampling and Analysis Locations

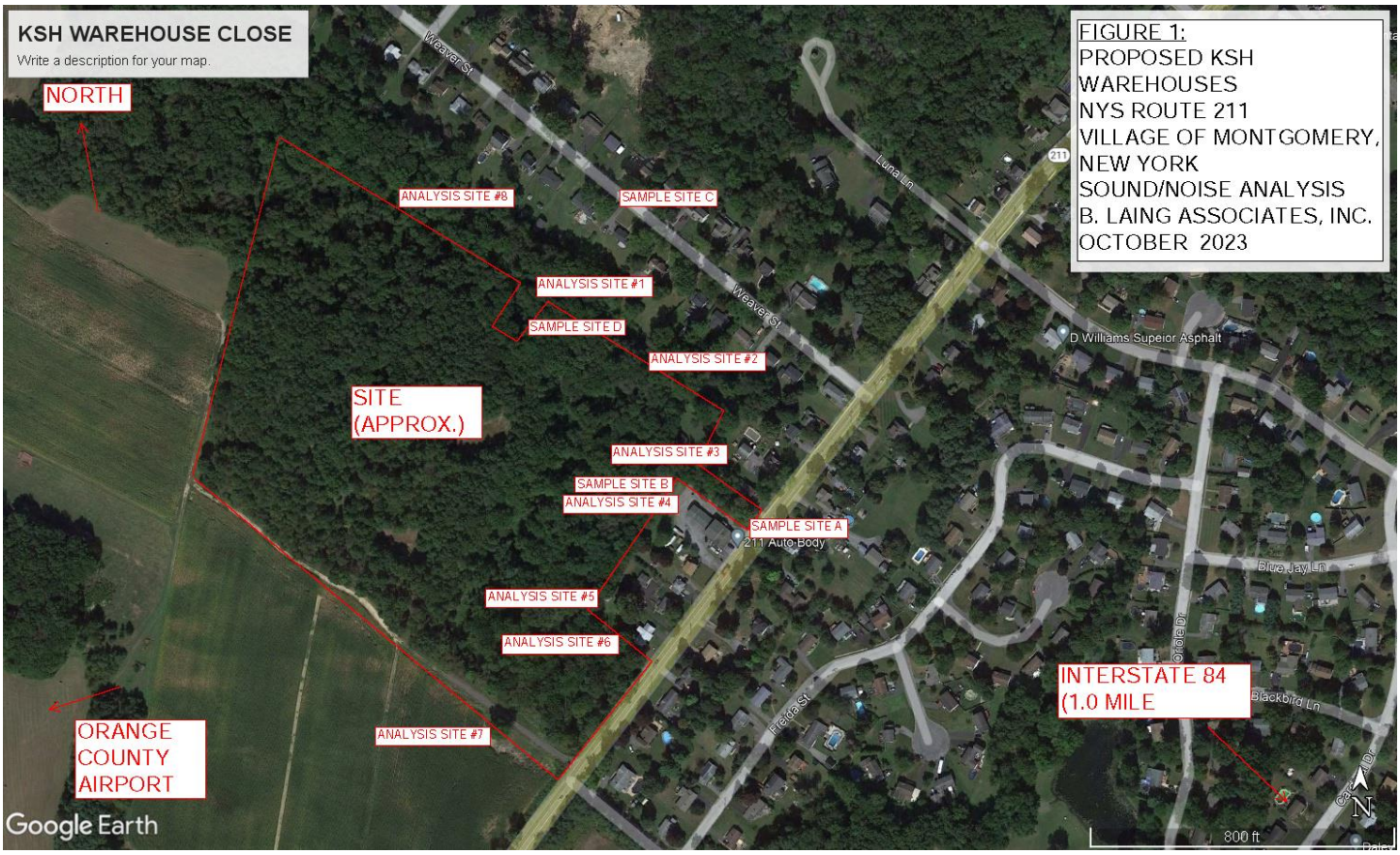
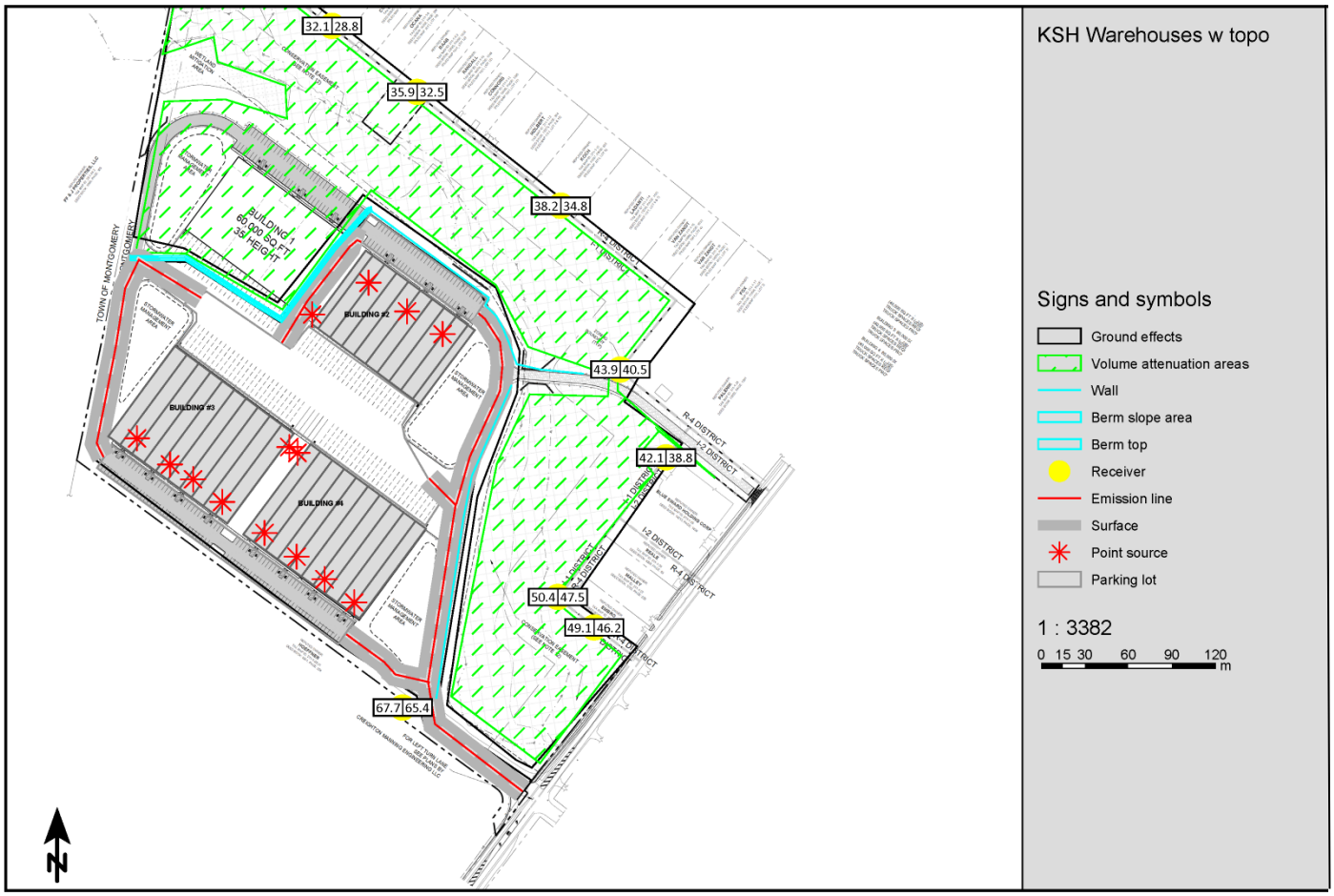


FIGURE 2 - Noise Analysis – Fully Operational

FIGURE 3 - Noise Analysis – Operational with Phased Construction



APPENDIX A

Existing Condition Measurement Reports[21]

[21] September 2023. April 2023 measurement data sheets occur in the B. Laing Associates, Inc. April 2023 report.

Cirrus Research plc

Measurement Summary Report

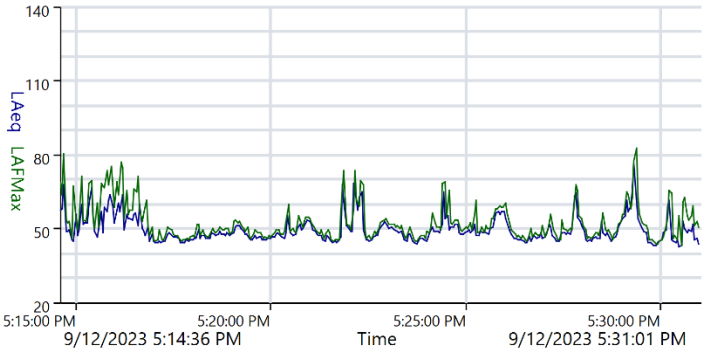
Name	54			
Time	9/12/2023 5:14:36 PM	**Person**	**Place**	**Project**
Duration	00:16:25		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

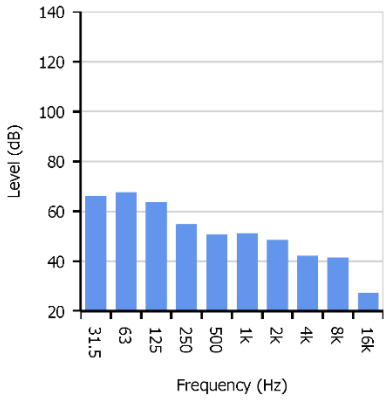
Calibration

Before	9/12/2023 5:13 PM	Offset	0.29 dB	**After**	9/14/2023 7:09 AM	Offset	0.31 dB

Basic Values	
LAeq	56.1 dB
LAE	86.0 dB
LAFMax	82.5 dB

Statistical Levels (Ln)	
LAS1	67.7 dB
LAS5	60.7 dB
LAS10	57.1 dB
LAS50	48.0 dB
LAS90	44.8 dB
LAS95	44.4 dB
LAS99	43.4 dB





Notes
WEAVER STREET PEAK PM

ReportId

MFF200100000010 Cirrus Research NoiseTools Page 1 of 1

Cirrus Research plc

Measurement Summary Report

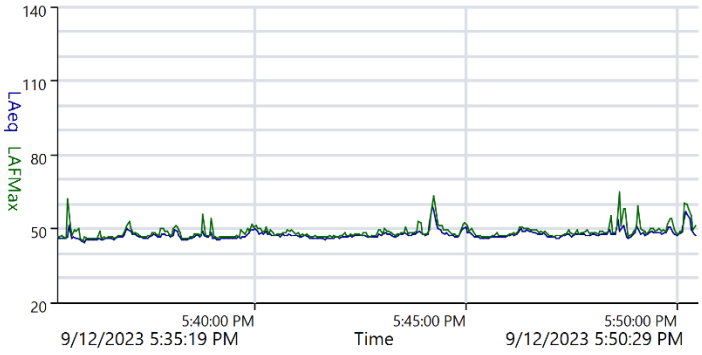
Name	55			
Time	9/12/2023 5:35:19 PM	**Person**	**Place**	**Project**
Duration	00:15:10		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

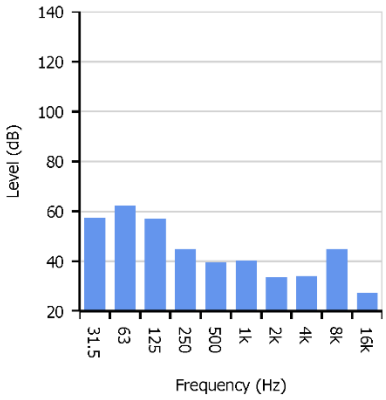
Calibration

Before	9/12/2023 5:13 PM	Offset 0.29 dB	**After**	9/14/2023 7:09 AM	Offset 0.31 dB

Basic Values	
LAeq	48.0 dB
LAE	77.6 dB
LAFMax	64.9 dB

Statistical Levels (Ln)	
LAS1	55.9 dB
LAS5	50.0 dB
LAS10	49.0 dB
LAS50	47.0 dB
LAS90	45.8 dB
LAS95	45.6 dB
LAS99	45.1 dB





Notes
WEAVER STREET REAR YARD PM PEAK

ReportId

MFF200100000011 Cirrus Research NoiseTools Page 1 of 1

Cirrus Research plc

Measurement Summary Report

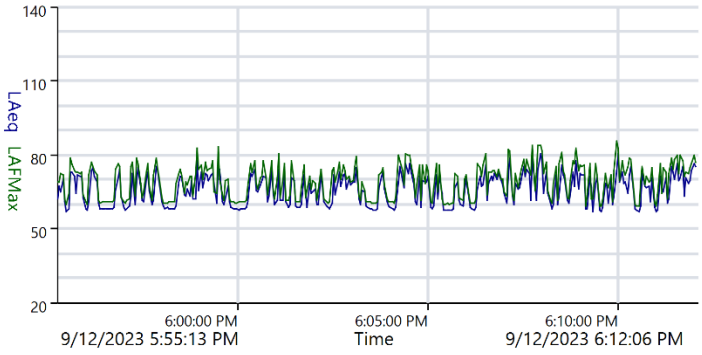
Name	56			
Time	9/12/2023 5:55:13 PM	**Person**	**Place**	**Project**
Duration	00:16:53		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

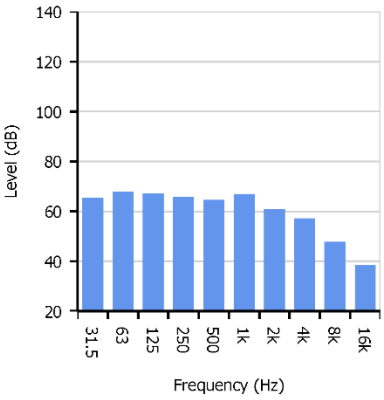
Calibration

Before	9/12/2023 5:13 PM	Offset 0.29 dB	**After**	9/14/2023 7:09 AM	Offset 0.31 dB

Basic Values	
LAeq	69.5 dB
LAE	99.6 dB
LAFMax	85.5 dB

Statistical Levels (Ln)	
LAS1	78.6 dB
LAS5	74.9 dB
LAS10	73.3 dB
LAS50	65.6 dB
LAS90	58.0 dB
LAS95	57.6 dB
LAS99	57.0 dB





Notes
RT 211 PEAK PM

ReportId

MFF200100000012 Cirrus Research NoiseTools Page 1 of 1

Cirrus Research plc

Measurement Summary Report

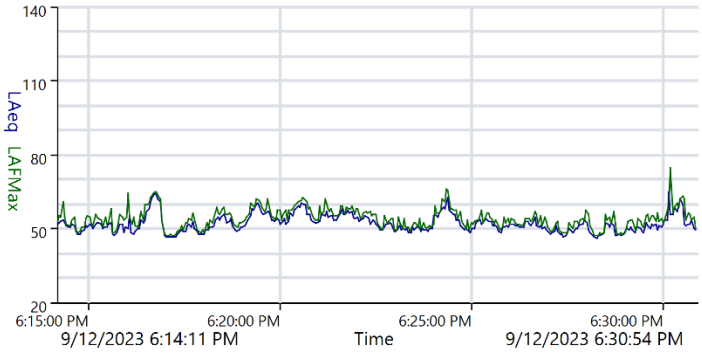
Name	57			
Time	9/12/2023 6:14:11 PM	**Person**	**Place**	**Project**
Duration	00:16:43		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

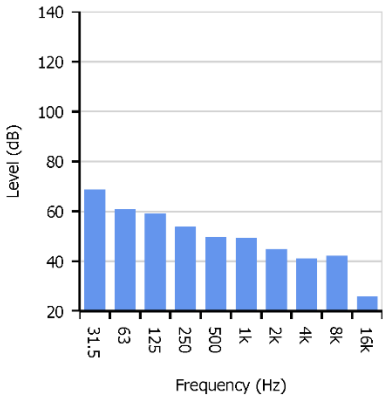
Calibration

Before	9/12/2023 5:13 PM	Offset 0.29 dB	**After**	9/14/2023 7:09 AM	Offset 0.31 dB

Basic Values	
LAeq	53.9 dB
LAE	83.9 dB
LAFMax	74.8 dB

Statistical Levels (Ln)	
LAS1	62.7 dB
LAS5	59.0 dB
LAS10	57.0 dB
LAS50	51.4 dB
LAS90	48.0 dB
LAS95	47.3 dB
LAS99	46.5 dB





Notes

SOUTHERN PROPERTY LINE- ROTUE 211 PEAK PM

ReportId

Cirrus Research plc

Measurement Summary Report

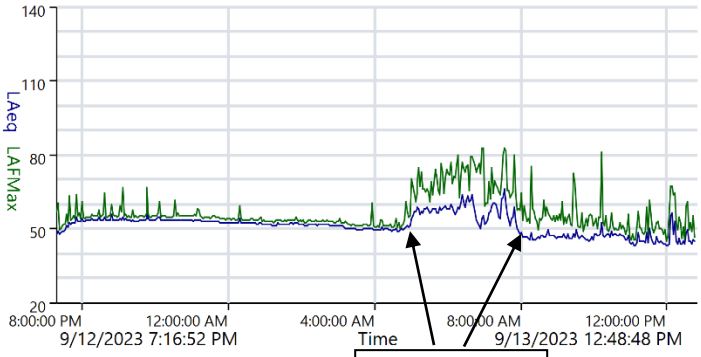
Name	58			
Time	9/12/2023 7:16:52 PM	**Person**	**Place**	**Project**
Duration	17:31:56		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

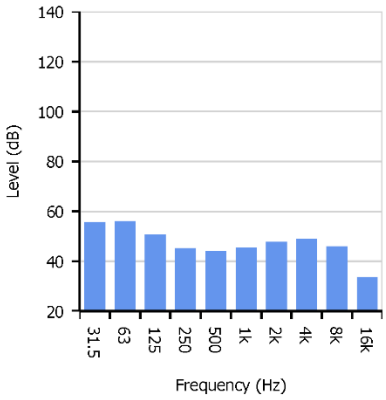
Calibration

Before	9/12/2023 5:13 PM	Offset	0.29 dB	**After**	9/14/2023 7:09 AM	Offset	0.31 dB

Basic Values	
LAeq	53.6 dB
LAE	101.6 dB
LAFMax	82.7 dB

Statistical Levels (Ln)	
LAS1	62.8 dB
LAS5	58.5 dB
LAS10	56.7 dB
LAS50	51.7 dB
LAS90	45.4 dB
LAS95	43.9 dB
LAS99	42.8 dB





Weaver St. Backyard Overnight - Thunderstorms 5 Am to 8 AM Do not use.

Weaver St. Backyard Overnight to Mid-day

ReportId

Cirrus Research plc

Measurement Summary Report

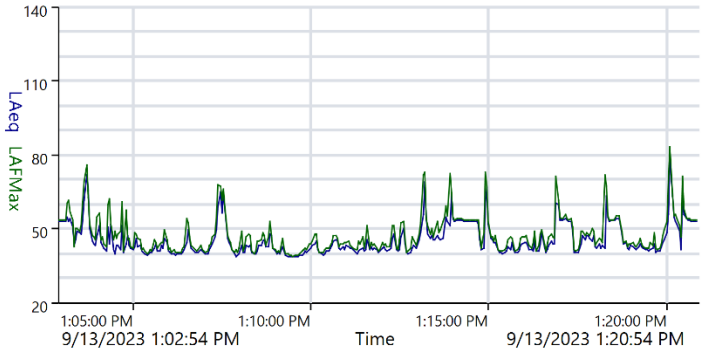
Name	59			
Time	9/13/2023 1:02:54 PM	**Person**	**Place**	**Project**
Duration	00:18:00		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

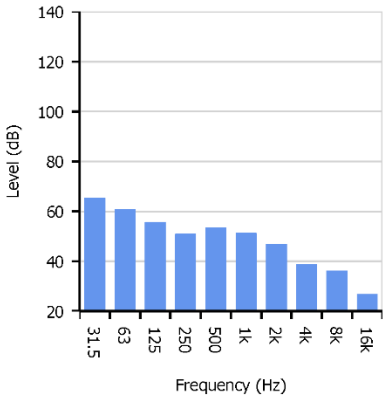
Calibration

Before 9/12/2023 5:13 PM Offset 0.29 dB **After** 9/14/2023 7:09 AM Offset 0.31 dB

Basic Values	
LAeq	55.4 dB
LAE	85.7 dB
LAFMax	83.0 dB

Statistical Levels (Ln)	
LAS1	67.5 dB
LAS5	57.6 dB
LAS10	53.4 dB
LAS50	43.0 dB
LAS90	40.0 dB
LAS95	39.5 dB
LAS99	38.5 dB





Weaver St.
Front Yard
Mid-day

ReportId

MFF200100000015 Cirrus Research NoiseTools

Weaver St.

Cirrus Research plc

Measurement Summary Report

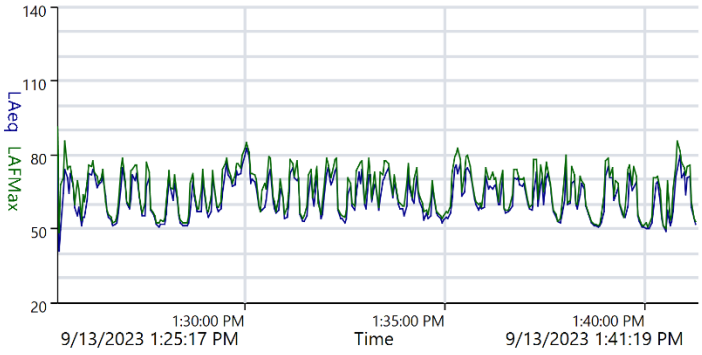
Name	60			
Time	9/13/2023 1:25:17 PM	**Person**	**Place**	**Project**
Duration	00:16:02		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

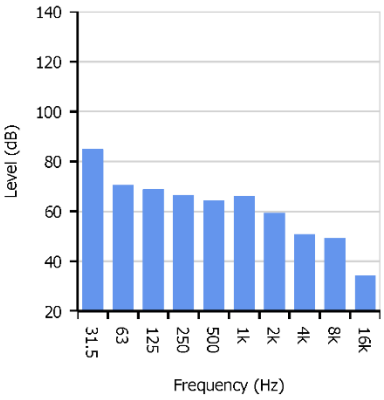
Calibration

Before	9/12/2023 5:13 PM	Offset 0.29 dB	**After**	9/14/2023 7:09 AM	Offset 0.31 dB

Basic Values	
LAeq	68.6 dB
LAE	98.4 dB
LAFMax	91.4 dB

Statistical Levels (Ln)	
LAS1	79.1 dB
LAS5	74.5 dB
LAS10	72.6 dB
LAS50	61.9 dB
LAS90	52.7 dB
LAS95	51.2 dB
LAS99	49.9 dB





NY State
Rt. 211
Frontage
Mid-day

ReportId

MFF200100000016 Cirrus Research NoiseTools

Cirrus Research plc

Measurement Summary Report

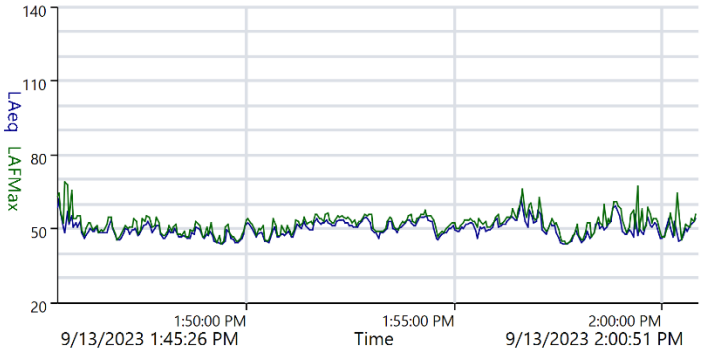
Name	61			
Time	9/13/2023 1:45:26 PM	**Person**	**Place**	**Project**
Duration	00:15:25		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

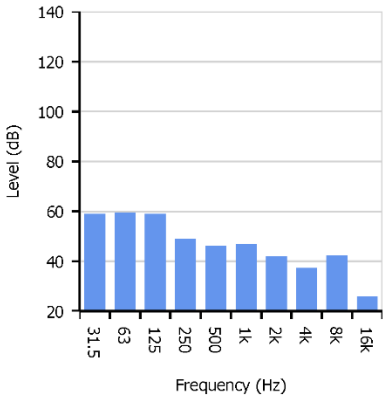
Calibration

Before	9/12/2023 5:13 PM	Offset 0.29 dB	**After**	9/14/2023 7:09 AM	Offset 0.31 dB

Basic Values	
LAeq	51.3 dB
LAE	81.0 dB
LAFMax	68.8 dB

Statistical Levels (Ln)	
LAS1	59.4 dB
LAS5	54.9 dB
LAS10	53.6 dB
LAS50	49.7 dB
LAS90	45.8 dB
LAS95	44.8 dB
LAS99	43.8 dB





NY State
Rt. 211
Rear Yard
Mid-day

ReportId

MFF200100000017 Cirrus Research NoiseTools

Cirrus Research plc

Measurement Summary Report

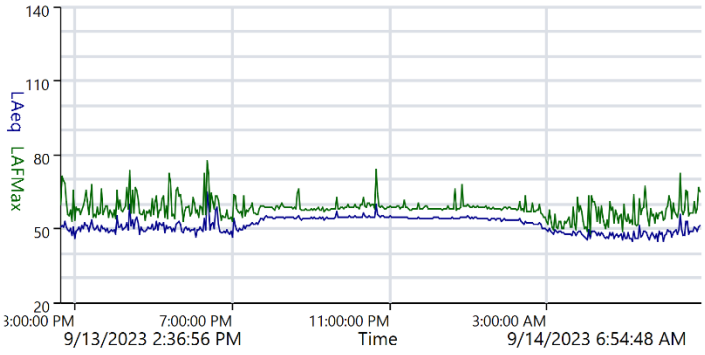
Name	62			
Time	9/13/2023 2:36:56 PM	**Person**	**Place**	**Project**
Duration	16:17:52		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

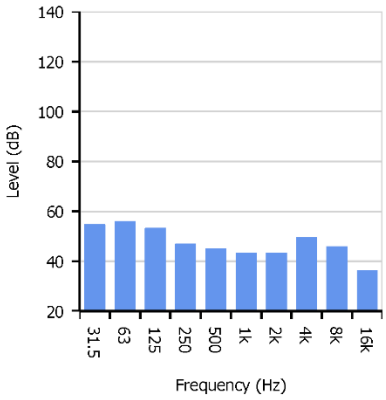
Calibration

Before	9/12/2023 5:13 PM	Offset 0.29 dB	**After**	9/14/2023 7:09 AM	Offset 0.31 dB

Basic Values	
LAeq	52.6 dB
LAE	100.3 dB
LAFMax	77.7 dB

Statistical Levels (Ln)	
LAS1	57.7 dB
LAS5	55.2 dB
LAS10	54.8 dB
LAS50	51.7 dB
LAS90	45.9 dB
LAS95	45.1 dB
LAS99	43.8 dB





ReportId

Route 211 Rear Yard Night

MFF200100000018 Cirrus Research NoiseTools

Cirrus Research plc

Measurement Summary Report

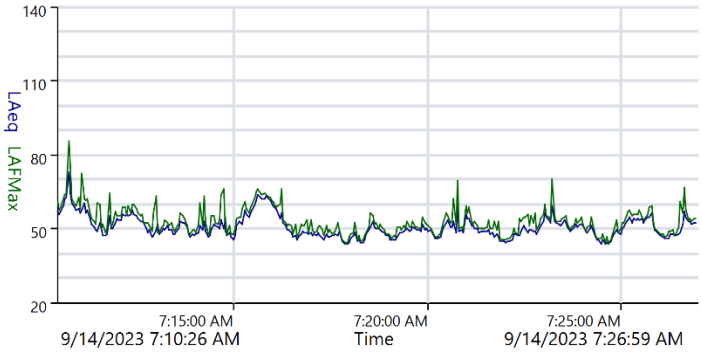
Name	63			
Time	9/14/2023 7:10:26 AM	**Person**	**Place**	**Project**
Duration	00:16:33		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

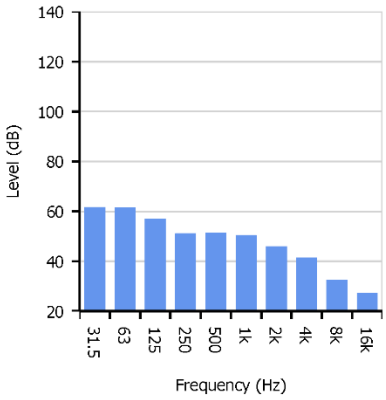
Calibration

Before	9/14/2023 7:09 AM	Offset	0.31 dB	**After**	9/14/2023 8:16 AM	Offset	0.31 dB

Basic Values	
LAeq	54.3 dB
LAE	84.3 dB
LAFMax	85.4 dB

Statistical Levels (Ln)	
LAS1	62.9 dB
LAS5	59.6 dB
LAS10	56.6 dB
LAS50	49.6 dB
LAS90	45.8 dB
LAS95	45.0 dB
LAS99	43.8 dB





Notes

ROUTE 211 REAR YARD SOUTHERN PROPERTY LINE AM PEAK

ReportId

MFF200100000019

Cirrus Research NoiseTools

Page 1 of 1

Cirrus Research plc

Measurement Summary Report

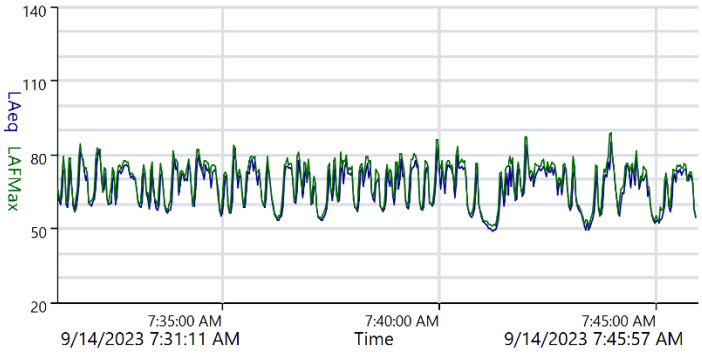
Name	64			
Time	9/14/2023 7:31:11 AM	**Person**	**Place**	**Project**
Duration	00:14:46		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

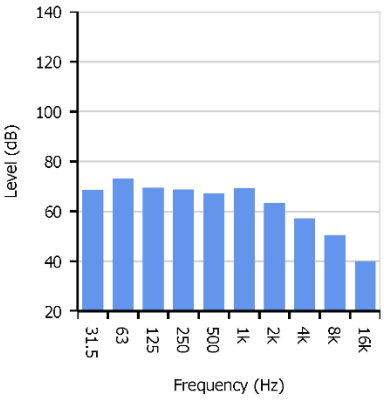
Calibration

Before	9/14/2023 7:09 AM	Offset	0.31 dB	**After**	9/14/2023 8:16 AM	Offset	0.31 dB

Basic Values	
LAeq	71.8 dB
LAE	101.3 dB
LAFMax	88.6 dB

Statistical Levels (Ln)	
LAS1	80.8 dB
LAS5	76.7 dB
LAS10	75.2 dB
LAS50	68.6 dB
LAS90	56.4 dB
LAS95	53.5 dB
LAS99	49.7 dB





Notes
ROUTE 211 AM PEAK

ReportId

MFF20010000001A Cirrus Research NoiseTools Page 1 of 1

Cirrus Research plc

Measurement Summary Report

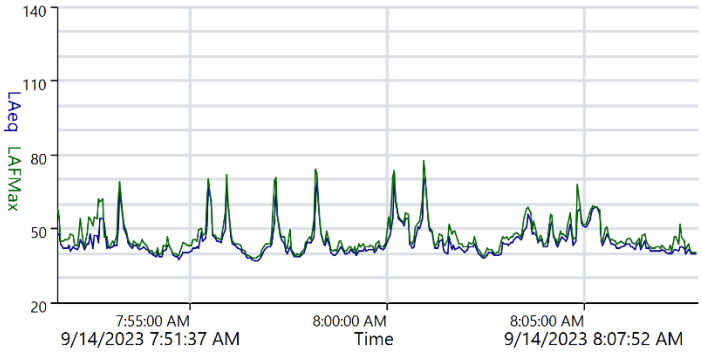
Name	65			
Time	9/14/2023 7:51:37 AM	**Person**	**Place**	**Project**
Duration	00:16:15		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

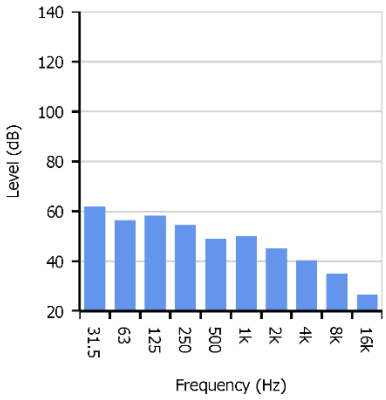
Calibration

Before	9/14/2023 7:09 AM	Offset	0.31 dB	**After**	9/14/2023 8:16 AM	Offset	0.31 dB

Basic Values	
LAeq	53.7 dB
LAE	83.6 dB
LAFMax	77.6 dB

Statistical Levels (Ln)	
LAS1	67.6 dB
LAS5	57.8 dB
LAS10	52.9 dB
LAS50	42.7 dB
LAS90	39.4 dB
LAS95	38.6 dB
LAS99	37.3 dB





Notes

WEAVER STREET FRONTAGE AM PEAK

ReportId

MFF20010000001B

Cirrus Research NoiseTools

Page 1 of 1

Cirrus Research plc

Measurement Summary Report

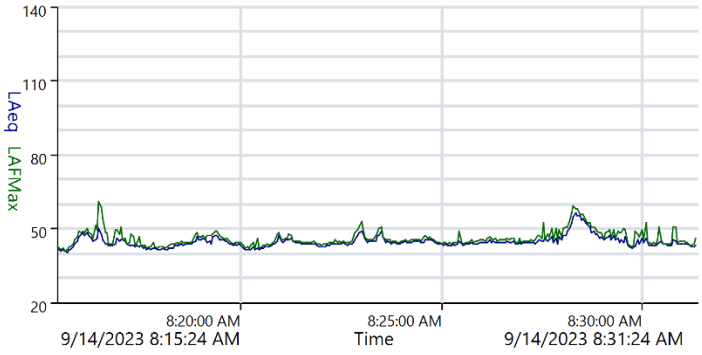
Name	66			
Time	9/14/2023 8:15:24 AM	**Person**	**Place**	**Project**
Duration	00:16:00		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

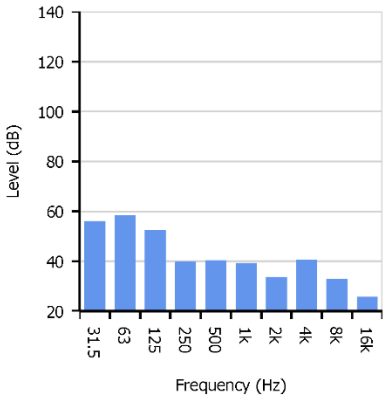
Calibration

Before	9/14/2023 7:09 AM	Offset	0.31 dB	**After**	9/14/2023 8:16 AM	Offset	0.31 dB

Basic Values	
LAeq	45.5 dB
LAE	75.3 dB
LAFMax	61.1 dB

Statistical Levels (Ln)	
LAS1	54.3 dB
LAS5	48.5 dB
LAS10	47.0 dB
LAS50	44.0 dB
LAS90	42.2 dB
LAS95	41.6 dB
LAS99	40.9 dB

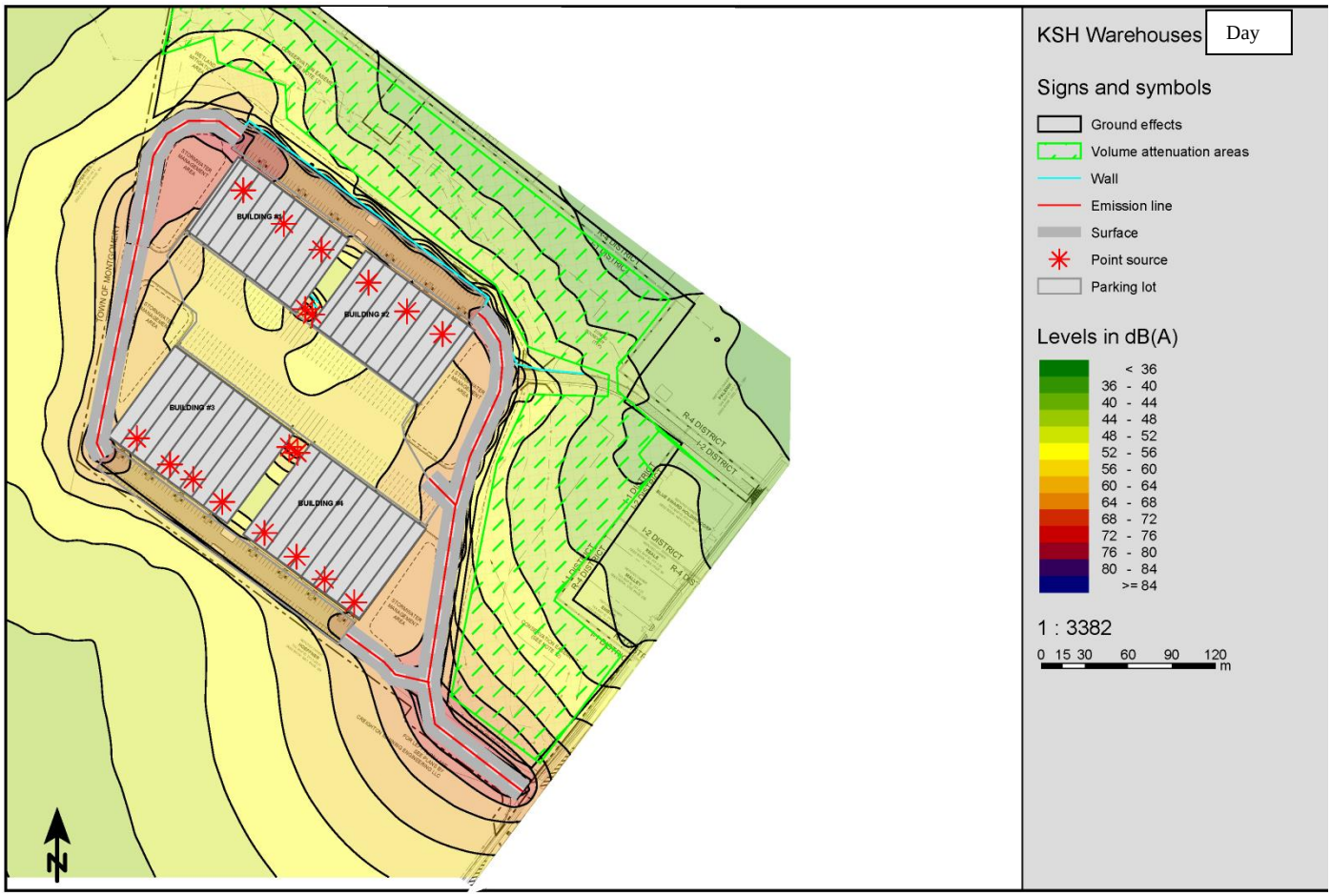


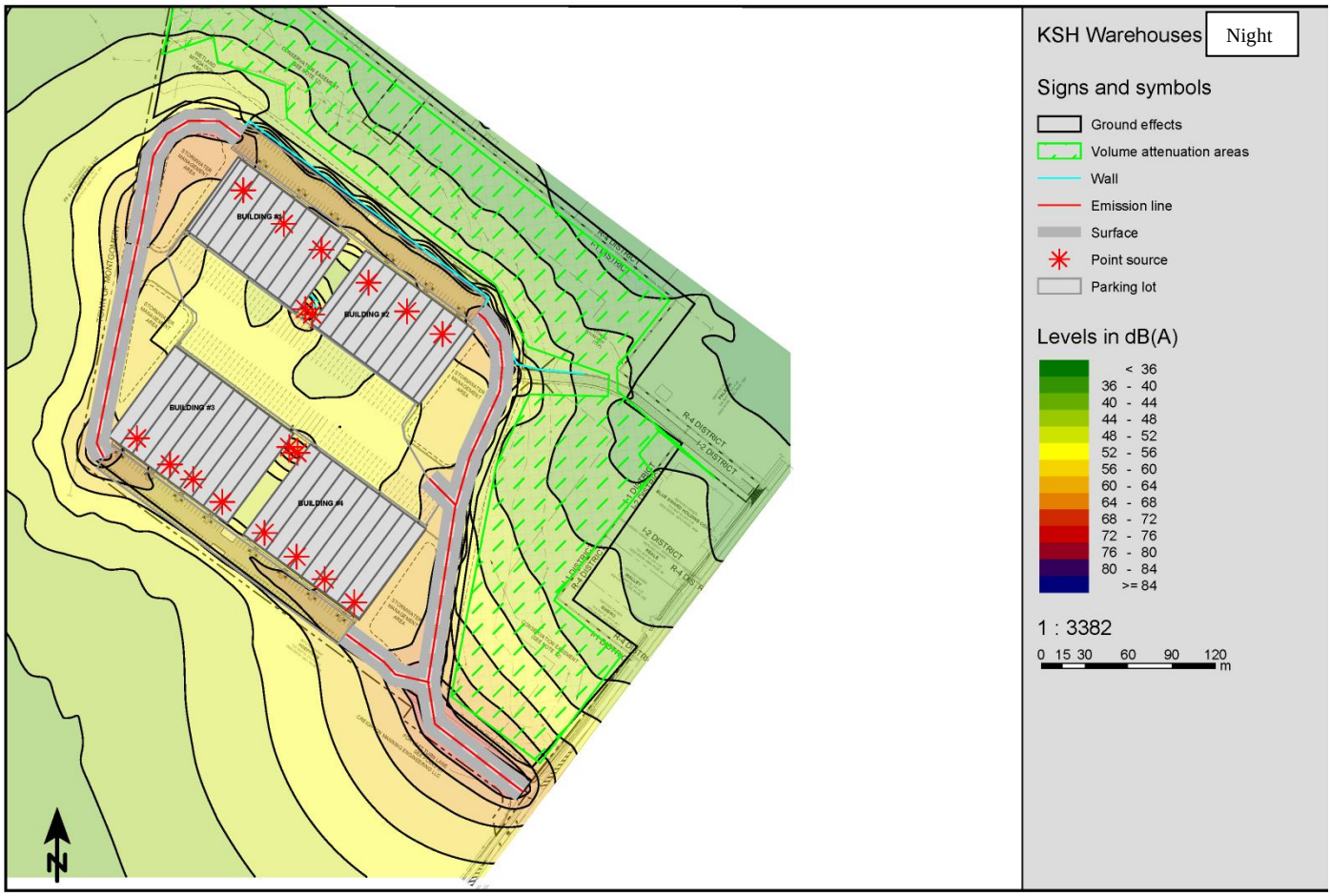


Notes
WEAVER STREET REAR YARD AM PEAK

ReportId

APPENDIX B1 – FULL OPERATION - SoundPLAN Modeling


KSH Warehouses
Day
Signs and symbols
Ground effects
Volume attenuation areas
Wall
Emission line
Surface
Point source
Parking lot
Levels in dB(A)
< 36
36 - 40
40 - 44
44 - 48
48 - 52
52 - 56
56 - 60
60 - 64
64 - 68
68 - 72
72 - 76
76 - 80
80 - 84
>= 84
1 : 3382
0 15 30 60 90 120
m
BUILDING #1
BUILDING #2
BUILDING #3
BUILDING #4
R-4 DISTRICT
I-2 DISTRICT
N


KSH Warehouses
Night
Signs and symbols
Ground effects
Volume attenuation areas
Wall
Emission line
Surface
Point source
Parking lot
Levels in dB(A)
< 36
36 - 40
40 - 44
44 - 48
48 - 52
52 - 56
56 - 60
60 - 64
64 - 68
68 - 72
72 - 76
76 - 80
80 - 84
>= 84
1 : 3382
0 15 30 60 90 120
m
BUILDING #1
BUILDING #2
BUILDING #3
BUILDING #4
R-4 DISTRICT
L-2 DISTRICT
N

Noise emissions of industry sources

Source name	Reference	Level		Corrections		
		Day	Night	Cwall	CI	CT
		dB(A)	dB(A)	dB	dB	dB
1	Lw/unit	75.0	75.0	-	-	-
1	Lw/unit	75.0	75.0	-	-	-
1	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
5	Lw/unit	75.0	75.0	-	-	-
14	Lw/unit	81.0	81.0	-	-	-
14	Lw/unit	81.0	81.0	-	-	-
14	Lw/unit	81.0	81.0	-	-	-
14	Lw/unit	81.0	81.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-

B Laing Associates Inc. 103 Fort Salonga Road #5 Fort Salonga, NY 11768 USA

Noise emissions of parking lot traffic

Name	Parking lot type	Size	Movements per hour		Road surface	Separated method	Lw,ref
			Day	Night			dB(A)
Truck Bays	Bays (Trucks)	102 Parking bays	0.220	0.110	Asphaltic driving lanes	no	102.0
Parking Lot North	Visitors and staff	133 Parking bays	0.800	0.360	Asphaltic driving lanes	no	89.5
Parking Lot South	Visitors and staff	133 Parking bays	0.800	0.400	Asphaltic driving lanes	no	89.5
			per bay	per bay			At 100% Turnover

Noise emissions of road traffic

Station km	ADT Veh/24h	Traffic values: Vehicles type	Vehicle name	day Veh/h	night Veh/h	Speed km/h	Control device	Constr. Speed km/h	Affec. veh. %	Road surface	Gradient Min / M %
2		Traffic direction: in entry direction									
0+256	2520	Total	-	128	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	22	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+290	2696	Total	-	139	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	100	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	22	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+358	2120	Total	-	106	53	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	45	-					
		Medium trucks	-	11	5	-					
		Heavy trucks	-	-	-	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
2		Traffic direction: in entry direction									
0+256	2520	Total	-	128	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	22	-	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
0+274	2168	Total	-	106	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	-	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+295	2168	Total	-	106	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	-	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+312	2168	Total	-	106	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	-	-	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
4		Traffic direction: in entry direction									
0+256	1736	Total	-	89	39	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	22	5	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					

Noise emissions of road traffic

Station km	ADT Veh/24h	Traffic values: Vehicles type	Vehicle name	day Veh/h	night Veh/h	Speed km/h	Control device	Cons Speed km/h	Affec veh. %	Road surface	Gradien Min / M %
0+326	1536	Total	-	78	36	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	24					
		Medium trucks	-	11	5	24					
		Heavy trucks	-	11	3	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+395	1480	Total	-	73	39	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	6	5	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
5		Traffic direction: in entry direction									
0+256	1560	Total	-	78	39	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	11	5	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+300	1328	Total	-	66	34	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	-					
		Medium trucks	-	5	3	-					
		Heavy trucks	-	5	3	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
1		Traffic direction: in entry direction									
0+000	3000	Total	-	150	75	-	none	-	-	Average (of DGAC an	1.0 / 1.3
		Automobiles	-	100	50	24					
		Medium trucks	-	22	11	24					
		Heavy trucks	-	22	11	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
1		Traffic direction: in entry direction									
0+000	2384	Total	-	117	64	-	none	-	-	Average (of DGAC an	0.9 / 2.2
		Automobiles	-	89	50	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	11	5	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					

Contribution levels of the receivers

Source name		Traffic lane	Level Day	Level Night
			dB(A)	
1	1.Fl		42.7	37.6
1		-	24.0	20.8
1		-	14.9	11.9
		-		
		-		
		-		
2		-	33.4	29.4
2		-	41.4	35.3
4		-	0.8	0.8
4		-	0.9	0.9
4		-	23.4	19.3
4		-	16.5	16.5
4		-	2.2	2.2
4		-	2.3	2.3
4		-	3.4	3.4
4		-	1.0	1.0
4		-	6.8	6.8
4		-	16.3	16.3
4		-	1.7	1.7
5		-	4.2	1.8
5		-	15.5	15.5
14		-	5.2	5.2
14		-	3.0	3.0
14		-	17.9	17.9
14		-	8.8	8.8
Parking Lot North		-	32.4	28.9
Parking Lot South		-	7.4	4.4
Truck Bays		-	25.9	22.9
2	1.Fl		40.8	36.4
1		-	29.4	26.2
1		-	28.7	25.7
		-		
		-		
		-		
2		-	36.2	31.7
2		-	36.2	30.1
4		-	6.6	6.6
4		-	6.8	6.8
4		-	10.2	5.3
4		-	12.9	12.9
4		-	1.2	1.2
4		-	1.2	1.2
4		-	1.4	1.4
4		-	1.2	1.2
4		-	0.8	0.8
4		-	11.2	11.2
4		-	1.2	1.2
5		-	21.9	19.4
5		-	9.2	9.2
14		-	7.2	7.2
14		-	2.8	2.8
14		-	5.0	5.0
14		-	7.3	7.3
Parking Lot North		-	31.1	27.7
Parking Lot South		-	7.7	4.7
Truck Bays		-	27.6	24.6
3	1.Fl		45.3	40.9
1		-	40.8	37.4
		-	35.1	32.1
		-		
		-		
1		-		
2		-	41.0	33.8

Contribution levels of the receivers

Source name	Traffic lane	Level Day	Level Night
		dB(A)	
2	-	32.8	26.6
4	-	8.2	8.2
4	-	6.2	6.2
4	-	9.5	4.3
4	-	12.5	12.5
4	-	9.5	9.5
4	-	8.6	8.6
4	-	8.5	8.5
4	-	6.9	6.9
4	-	3.9	3.9
4	-	9.3	9.3
4	-	7.5	7.5
5	-	23.3	20.5
5	-	8.3	8.3
14	-	3.3	3.3
14	-	22.7	22.7
14	-	16.7	16.7
14	-	6.1	6.1
Parking Lot North	-	28.7	25.2
Parking Lot South	-	10.2	7.2
Truck Bays	-	34.5	31.5
4 1.Fl		43.7	39.5
1	-	40.2	37.0
1	-	33.3	30.3
	-		
	-		
	-		
2	-	36.9	26.9
2	-	35.1	30.1
4	-	8.7	8.7
4	-	7.3	7.3
4	-	9.0	3.7
4	-	10.0	10.0
4	-	5.2	5.2
4	-	5.0	5.0
4	-	4.8	4.8
4	-	6.0	6.0
4	-	4.3	4.3
4	-	9.1	9.1
4	-	5.6	5.6
5	-	26.5	24.1
5	-	8.5	8.5
14	-	13.2	13.2
14	-	13.4	13.4
14	-	13.5	13.5
14	-	9.2	9.2
Parking Lot North	-	26.5	23.0
Parking Lot South	-	10.9	7.9
Truck Bays	-	31.1	28.0
5 1.Fl		50.7	47.5
1	-	49.5	46.3
1	-	40.9	37.9
	-		
	-		
	-		
2	-	36.0	28.7
2	-	28.1	25.4
4	-	13.4	13.4
4	-	12.4	12.4
4	-	25.4	19.9
4	-	7.8	7.8
4	-	2.2	2.2
4	-	1.5	1.5

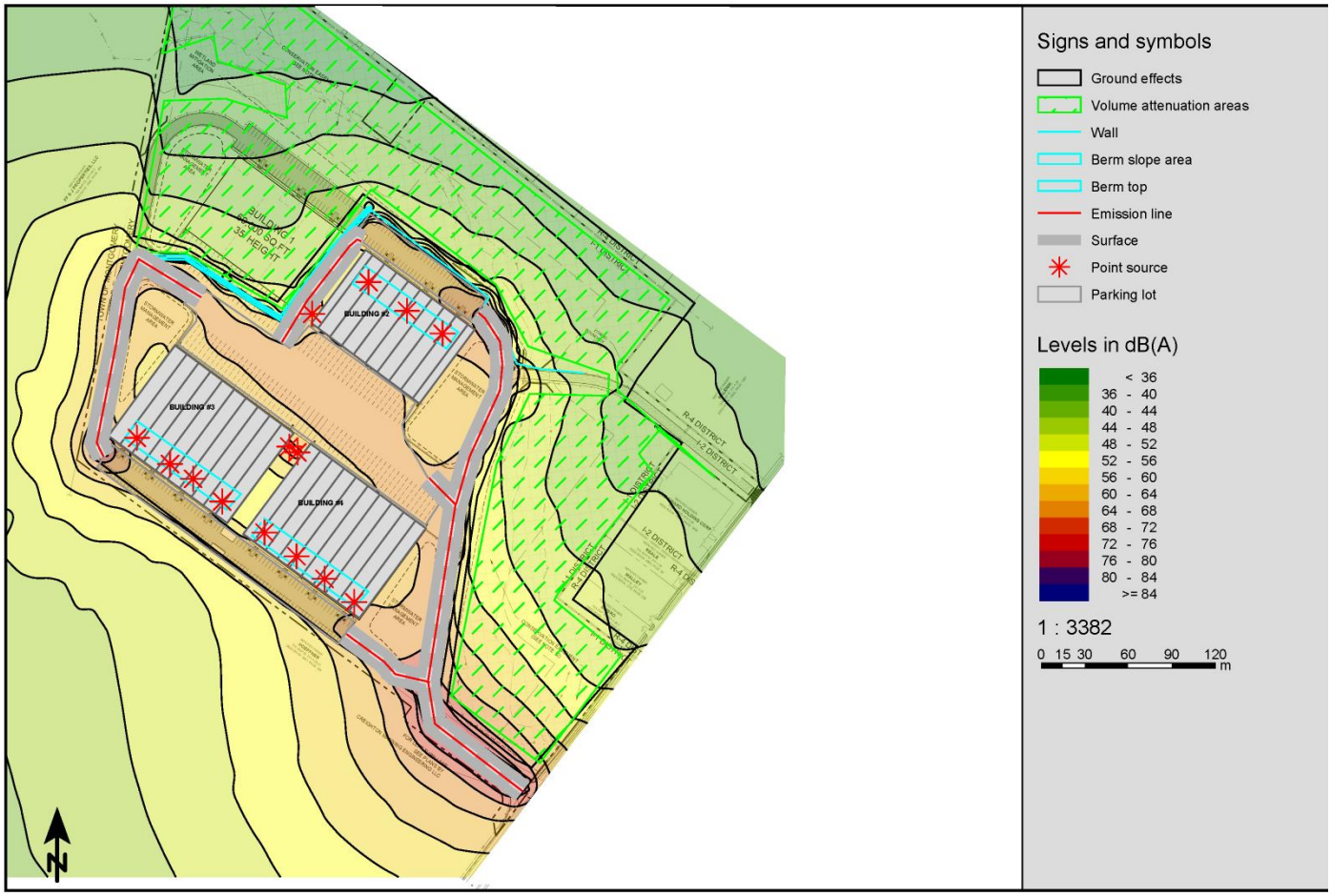
Contribution levels of the receivers

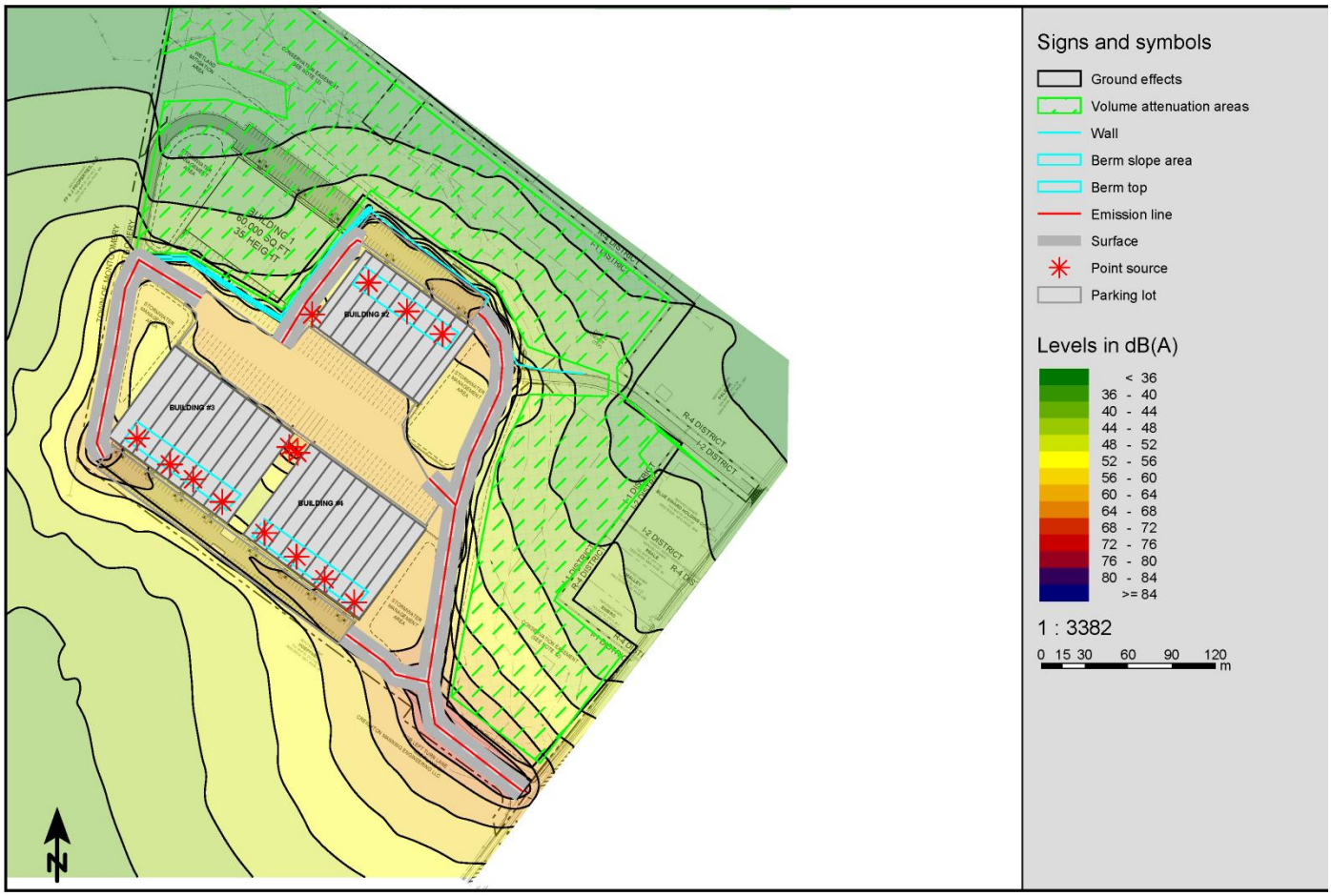
Source name		Traffic lane	Level Day	Level Night
			dB(A)	
4		-	2.2	2.2
4		-	7.9	7.9
4		-	0.2	0.2
4		-	7.1	7.1
4		-	5.5	5.5
5		-	38.6	36.2
5		-	6.3	6.3
14		-	3.3	3.3
14		-	3.2	3.2
14		-	12.8	12.8
14		-	13.1	13.1
Parking Lot North		-	17.0	13.6
Parking Lot South		-	20.3	17.3
Truck Bays		-	34.5	31.5
6	1.Fl		49.2	45.9
1		-	48.3	45.1
1		-	37.4	34.3
		-		
		-		
		-		
2		-	34.5	27.8
2		-	26.8	24.1
4		-	11.6	11.6
4		-	10.9	10.9
4		-	23.2	17.6
4		-	6.9	6.9
4		-	2.7	2.7
4		-	2.3	2.3
4		-	2.1	2.1
4		-	7.7	7.7
4		-	1.1	1.1
4		-	6.2	6.2
4		-	5.8	5.8
5		-	36.3	33.9
5		-	5.4	5.4
14		-	1.7	1.7
14		-	1.5	1.5
14		-	11.7	11.7
14		-	11.9	11.9
Parking Lot North		-	17.1	13.6
Parking Lot South		-	19.3	16.3
Truck Bays		-	32.6	29.6
7	1.Fl		68.2	65.2
1		-	67.1	63.9
1		-	55.6	52.6
		-		
		-		
		-		
2		-	45.0	39.0
2		-	27.1	24.4
4		-	19.7	19.7
4		-	17.6	17.6
4		-	34.9	31.9
4		-	0.9	0.9
4		-	11.9	11.9
4		-	10.7	10.7
4		-	9.6	9.6
4		-	17.5	17.5
4		-	10.5	10.5
4		-	-0.1	-0.1
4		-	16.2	16.2
5		-	60.3	58.0
5		-	1.9	1.9

Contribution levels of the receivers

Source name	Traffic lane	Level Day	Night
		dB(A)	
14	-	6.5	6.5
14	-	6.5	6.5
14	-	5.6	5.6
14	-	2.9	2.9
Parking Lot North	-	19.9	16.5
Parking Lot South	-	41.8	38.8
Truck Bays	-	30.6	27.5
8 1.Fl		45.7	38.1
1	-	16.8	13.7
1	-	9.4	6.4
	-		
	-		
	-		
2	-	29.5	26.0
2	-	45.3	37.2
4	-	0.1	0.1
4	-	-0.6	-0.6
4	-	25.9	20.4
4	-	14.0	14.0
4	-	0.5	0.5
4	-	0.7	0.7
4	-	0.4	0.4
4	-	-0.5	-0.5
4	-	0.7	0.7
4	-	15.3	15.3
4	-	-0.3	-0.3
5	-	4.1	1.7
5	-	16.6	16.6
14	-	7.3	7.3
14	-	-5.9	-5.9
14	-	4.4	4.4
14	-	6.2	6.2
Parking Lot North	-	30.4	26.9
Parking Lot South	-	6.3	3.3
Truck Bays	-	22.9	19.9

APPENDIX B2 – PHASED OPERATION SoundPLAN Modeling


BUILDING #1
BUILDING #2
BUILDING #3
BUILDING #4
R-4 DISTRICT
I-2 DISTRICT
N
Signs and symbols
Ground effects
Volume attenuation areas
Wall
Berm slope area
Berm top
Emission line
Surface
Point source
Parking lot
Levels in dB(A)
< 36
36 - 40
40 - 44
44 - 48
48 - 52
52 - 56
56 - 60
60 - 64
64 - 68
68 - 72
72 - 76
76 - 80
80 - 84
>= 84
1 : 3382
0 15 30 60 90 120
m


BUILDING #1
60,000 SQ.FT.
35' HEIGHT
BUILDING #2
BUILDING #3
BUILDING #4
R-4 DISTRICT
I-2 DISTRICT
N
Signs and symbols
Ground effects
Volume attenuation areas
Wall
Berm slope area
Berm top
Emission line
Surface
Point source
Parking lot
Levels in dB(A)
< 36
36 - 40
40 - 44
44 - 48
48 - 52
52 - 56
56 - 60
60 - 64
64 - 68
68 - 72
72 - 76
76 - 80
80 - 84
>= 84
1 : 3382
0 15 30 60 90 120
m

Noise emissions of industry sources

Source name	Reference	Level		Corrections		
		Day	Night	Cwall	CI	CT
		dB(A)	dB(A)	dB	dB	dB
1	Lw/unit	75.0	75.0	-	-	-
1	Lw/unit	75.0	75.0	-	-	-
1	Lw/unit	75.0	75.0	-	-	-
14	Lw/unit	81.0	81.0	-	-	-
14	Lw/unit	81.0	81.0	-	-	-
14	Lw/unit	81.0	81.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-
4	Lw/unit	75.0	75.0	-	-	-

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Noise emissions of parking lot traffic

Name	Parking lot type	Size	Movements per hour		Road surface	Separated method	Lw,ref
			Day	Night			dB(A)
Truck Bays	Bays (Trucks)	102 Parking bays	0.220	0.110	Asphaltic driving lanes	no	102.0
Parking Lot North	Visitors and staff	133 Parking bays	0.800	0.360	Asphaltic driving lanes	no	89.5
Parking Lot South	Visitors and staff	133 Parking bays	0.800	0.400	Asphaltic driving lanes	no	89.5
			per bay	per bay			At 100% Turnover

B Laing Associates Inc. 103 Fort Salonga Road #5 Fort Salonga, NY 11768 USA

Noise emissions of road traffic

Station km	ADT Veh/24h	Traffic values: Vehicles type	Vehicle name	day Veh/h	night Veh/h	Speed km/h	Control device	Cons Speed km/h	Affec veh. %	Road surface	Gradien Min / M %
2		Traffic direction: in entry direction									
0+256	2520	Total	-	128	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	22	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+290	2696	Total	-	139	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	100	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	22	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+358	2120	Total	-	106	53	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	45	-					
		Medium trucks	-	11	5	-					
		Heavy trucks	-	-	-	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
2		Traffic direction: in entry direction									
0+256	2520	Total	-	128	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	22	-	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
0+274	2168	Total	-	106	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	-	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+295	2168	Total	-	106	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	-	-	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+312	2168	Total	-	106	59	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	89	50	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	-	-	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
4		Traffic direction: in entry direction									
0+256	1736	Total	-	89	39	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	22	5	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					

Noise emissions of road traffic

Station km	ADT Veh/24h	Traffic values: Vehicles type	Vehicle name	day Veh/h	night Veh/h	Speed km/h	Control device	Const Speed km/h	Affect veh. %	Road surface	Gradient Min / M %
0+326	1536	Total	-	78	36	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	24					
		Medium trucks	-	11	5	24					
		Heavy trucks	-	11	3	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+395	1480	Total	-	73	39	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	6	5	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
5		Traffic direction: in entry direction									
0+256	1560	Total	-	78	39	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	24					
		Medium trucks	-	11	6	24					
		Heavy trucks	-	11	5	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
0+300	1328	Total	-	66	34	-	none	-	-	Average (of DGAC an	0.0
		Automobiles	-	50	25	-					
		Medium trucks	-	5	3	-					
		Heavy trucks	-	5	3	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					
1		Traffic direction: in entry direction									
0+000	3000	Total	-	150	75	-	none	-	-	Average (of DGAC an	1.0 / 1.3
		Automobiles	-	100	50	24					
		Medium trucks	-	22	11	24					
		Heavy trucks	-	22	11	24					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	24					
		Auxiliary vehicle	-	-	-	-					
1		Traffic direction: in entry direction									
0+000	2384	Total	-	117	64	-	none	-	-	Average (of DGAC an	0.9 / 2.2
		Automobiles	-	89	50	-					
		Medium trucks	-	11	6	-					
		Heavy trucks	-	11	5	-					
		Buses	-	-	-	-					
		Motorcycles	-	6	3	-					
		Auxiliary vehicle	-	-	-	-					

B Laing Associates Inc. 103 Fort Salonga Road #5 Fort Salonga, NY 11768 USA

Contribution levels of the receivers

Source name		Traffic lane	Level Day	Level Night
			dB(A)	
1	1.Fl		42.7	37.6
1		-	24.0	20.8
1		-	14.9	11.9
		-		
		-		
		-		
2		-	33.4	29.4
2		-	41.4	35.3
4		-	0.8	0.8
4		-	0.9	0.9
4		-	23.4	19.3
4		-	16.5	16.5
4		-	2.2	2.2
4		-	2.3	2.3
4		-	3.4	3.4
4		-	1.0	1.0
4		-	6.8	6.8
4		-	16.3	16.3
4		-	1.7	1.7
5		-	4.2	1.8
5		-	15.5	15.5
14		-	5.2	5.2
14		-	3.0	3.0
14		-	17.9	17.9
14		-	8.8	8.8
Parking Lot North		-	32.4	28.9
Parking Lot South		-	7.4	4.4
Truck Bays		-	25.9	22.9
2	1.Fl		40.8	36.4
1		-	29.4	26.2
1		-	28.7	25.7
		-		
		-		
		-		
2		-	36.2	31.7
2		-	36.2	30.1
4		-	6.6	6.6
4		-	6.8	6.8
4		-	10.2	5.3
4		-	12.9	12.9
4		-	1.2	1.2
4		-	1.2	1.2
4		-	1.4	1.4
4		-	1.2	1.2
4		-	0.8	0.8
4		-	11.2	11.2
4		-	1.2	1.2
5		-	21.9	19.4
5		-	9.2	9.2
14		-	7.2	7.2
14		-	2.8	2.8
14		-	5.0	5.0
14		-	7.3	7.3
Parking Lot North		-	31.1	27.7
Parking Lot South		-	7.7	4.7
Truck Bays		-	27.6	24.6
3	1.Fl		45.3	40.9
1		-	40.8	37.4
		-	35.1	32.1
		-		
		-		
1		-		
2		-	41.0	33.8

Contribution levels of the receivers

Source name	Traffic lane	Level Day	Level Night
		dB(A)	
2	-	32.8	26.6
4	-	8.2	8.2
4	-	6.2	6.2
4	-	9.5	4.3
4	-	12.5	12.5
4	-	9.5	9.5
4	-	8.6	8.6
4	-	8.5	8.5
4	-	6.9	6.9
4	-	3.9	3.9
4	-	9.3	9.3
4	-	7.5	7.5
5	-	23.3	20.5
5	-	8.3	8.3
14	-	3.3	3.3
14	-	22.7	22.7
14	-	16.7	16.7
14	-	6.1	6.1
Parking Lot North	-	28.7	25.2
Parking Lot South	-	10.2	7.2
Truck Bays	-	34.5	31.5
4 1.Fl		43.7	39.5
1	-	40.2	37.0
1	-	33.3	30.3
	-		
	-		
	-		
2	-	36.9	26.9
2	-	35.1	30.1
4	-	8.7	8.7
4	-	7.3	7.3
4	-	9.0	3.7
4	-	10.0	10.0
4	-	5.2	5.2
4	-	5.0	5.0
4	-	4.8	4.8
4	-	6.0	6.0
4	-	4.3	4.3
4	-	9.1	9.1
4	-	5.6	5.6
5	-	26.5	24.1
5	-	8.5	8.5
14	-	13.2	13.2
14	-	13.4	13.4
14	-	13.5	13.5
14	-	9.2	9.2
Parking Lot North	-	26.5	23.0
Parking Lot South	-	10.9	7.9
Truck Bays	-	31.1	28.0
5 1.Fl		50.7	47.5
1	-	49.5	46.3
1	-	40.9	37.9
	-		
	-		
	-		
2	-	36.0	28.7
2	-	28.1	25.4
4	-	13.4	13.4
4	-	12.4	12.4
4	-	25.4	19.9
4	-	7.8	7.8
4	-	2.2	2.2
4	-	1.5	1.5

Contribution levels of the receivers

Source name	Traffic lane	Level Day	Night
		dB(A)	
4	-	2.2	2.2
4	-	7.9	7.9
4	-	0.2	0.2
4	-	7.1	7.1
4	-	5.5	5.5
5	-	38.6	36.2
5	-	6.3	6.3
14	-	3.3	3.3
14	-	3.2	3.2
14	-	12.8	12.8
14	-	13.1	13.1
Parking Lot North	-	17.0	13.6
Parking Lot South	-	20.3	17.3
Truck Bays	-	34.5	31.5
6 1.Fl		49.2	45.9
1	-	48.3	45.1
1	-	37.4	34.3
	-		
	-		
	-		
2	-	34.5	27.8
2	-	26.8	24.1
4	-	11.6	11.6
4	-	10.9	10.9
4	-	23.2	17.6
4	-	6.9	6.9
4	-	2.7	2.7
4	-	2.3	2.3
4	-	2.1	2.1
4	-	7.7	7.7
4	-	1.1	1.1
4	-	6.2	6.2
4	-	5.8	5.8
5	-	36.3	33.9
5	-	5.4	5.4
14	-	1.7	1.7
14	-	1.5	1.5
14	-	11.7	11.7
14	-	11.9	11.9
Parking Lot North	-	17.1	13.6
Parking Lot South	-	19.3	16.3
Truck Bays	-	32.6	29.6
7 1.Fl		68.2	65.2
1	-	67.1	63.9
1	-	55.6	52.6
	-		
	-		
	-		
2	-	45.0	39.0
2	-	27.1	24.4
4	-	19.7	19.7
4	-	17.6	17.6
4	-	34.9	31.9
4	-	0.9	0.9
4	-	11.9	11.9
4	-	10.7	10.7
4	-	9.6	9.6
4	-	17.5	17.5
4	-	10.5	10.5
4	-	-0.1	-0.1
4	-	16.2	16.2
5	-	60.3	58.0
5	-	1.9	1.9

Contribution levels of the receivers

Source name	Traffic lane	Level Day	Night
		dB(A)	
14	-	6.5	6.5
14	-	6.5	6.5
14	-	5.6	5.6
14	-	2.9	2.9
Parking Lot North	-	19.9	16.5
Parking Lot South	-	41.8	38.8
Truck Bays	-	30.6	27.5
8 1.Fl		45.7	38.1
1	-	16.8	13.7
1	-	9.4	6.4
	-		
	-		
	-		
2	-	29.5	26.0
2	-	45.3	37.2
4	-	0.1	0.1
4	-	-0.6	-0.6
4	-	25.9	20.4
4	-	14.0	14.0
4	-	0.5	0.5
4	-	0.7	0.7
4	-	0.4	0.4
4	-	-0.5	-0.5
4	-	0.7	0.7
4	-	15.3	15.3
4	-	-0.3	-0.3
5	-	4.1	1.7
5	-	16.6	16.6
14	-	7.3	7.3
14	-	-5.9	-5.9
14	-	4.4	4.4
14	-	6.2	6.2
Parking Lot North	-	30.4	26.9
Parking Lot South	-	6.3	3.3
Truck Bays	-	22.9	19.9

APPENDIX C
Generator Specifications