NOISE STUDY

850 ROUTE 28, LLC.
TOWN OF KINGSTON, NY

February 2019
Revised Per C&A Comments Received February 15, 2019

Prepared for:
850 Route 28, LLC.
Town of Kingston, New York 12401

In care of:
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H2H Associates

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1.0 INTRODUCTION

H2H Associates, LLC (H2H) is pleased to provide this report for the noise study that was conducted at 850 Route 28, Town of Kingston, Ulster County New York (site) on December 26, 2018.

1.1 PURPOSE

This report has been prepared at the request of Medenbach & Eggers Civil Engineering & Land Surveying, P.C. to identify and evaluate the potential impacts which may result from the proposed site development work by 850 Route 28, LLC. (850 Rt. 28) as part of a phased construction project to build two steel and concrete manufacturing facilities on site. Due to the volume of material being excavated 850 Rt. 28 is proposing to crush, process, and stockpile the excavated consolidated bedrock material on site for future removal. Crushing and processing would be completed using a mobile crushing plant. Mitigative measures have been developed to reduce and/or eliminate any undesirable impacts that may arise from sound levels generated by the proposed actions.

1.2 SCOPE

H2H determined the receptors that could be affected by the project as a function of, distance from site, topography, and vegetative cover. An on-site sound study was conducted to collect ambient sound levels at the property line of each identified receptor, and to determine how sound levels from the site will attenuate to each receptor. Evaluation of the collected sound levels were compared to applicable standards as stated in the NYS Department of Environmental Conservation (NYSDEC) Noise Guidance, "Assessing and Mitigating Noise Impacts", dated October 6, 2000, revised February 2, 2001 (Appendix A).

1.3 EXISTING SITE CONDITIONS

The Site encompasses approximately 110.6 acres, and lies approximately 2,000 west-northwest of the intersection of Route 28 and Waughonk Road (Figure 1). The Site consists of cleared land, access roads, mine faces, mine spoil/tailing piles (bluestone and shale piles), wooded lands and surface water features. The Site is accessed via an approximately 20-foot wide gravel road along the western portion of the site. There is currently one, 60-foot by 100-foot garage on site, with a cleared and level parking area graded around the building. The central portion of the Site is a recently affected bluestone mining area consisting of processing areas, old structural footings, vertical mine faces, mine floor and spoil piles of bluestone (Figure 2).

1.4 APPLICABLE STANDARDS AND GUIDELINES

There are no federal, state, or local noise standards applicable to the existing Site operations. Project impacts have been evaluated based upon the relevant impact criteria contained in a recent NYSDEC noise guidance document that overviews various aspects of noise and provides suggested steps for performing noise assessments. Further, it provides suggestions on evaluating significant increase in noise levels.

The guidance notes an increase in ambient noise of 10 dB (decibels) is perceived by the majority of people to be doubling of the loudness of a sound. For example, if the ambient sound level is 50 dB, and is then increased to 60 dB, most people would perceive the new noise level as twice as loud. The guidance recommends that for non-industrial settings, the sound pressure level, measured in dB, should probably not exceed ambient noise levels by more than six dB at a given receptor. The addition of a noise source, in a non-industrial setting, should not raise the total future ambient noise level above a maximum of 65 dB. This maximum would be considered the upper-end limit because 65 dB is the limit for undisturbed speech at a distance of approximately three feet. Noise levels in industrial or commercial areas should not exceed 79

dB. Although the NYSDEC guidance explicitly states that the six-dB increase is to be used as a general guideline; other factors should be considered. Still lower ambient noise levels may be necessary if there are sensitive receptors nearby.

2.0 AMBIENT NOISE MONITORING

2.1 EXISTING AMBIENT CONDITIONS

An ambient noise monitoring survey was conducted on December 26, 2018. To acoustically characterize the existing environment at and near the site. Specifically, sound level measurements were collected at the property boundary near noise-sensitive receptors to establish real-time sound level measurements or equivalent energy levels (L_{eq}) during operation of equipment and existing background conditions (without operations on site) at and near the Site.

H2H performed the following to define the equivalent sound levels at and near the Site:

- Identified appropriate receptors locations for sound level measurement;
- Determined equivalent sound levels along the Site property boundary adjacent to the closest receptor locations; and
- Measured sound pressure increase and identified characteristic that would represent a significant noise impact at a receptor location.

2.2 SELECTION OF RECEPTORS

The area surrounding the Site was surveyed to identify potentially "noise-sensitive" receptors, which in this area is represented by single family residences to the south of the Site. Abutting land use consists mainly of sparsely populated, rural, wooded residential areas to the south of the Site. The area to the north, east and west of the site is forested and undeveloped, the closest residential receptor in this area would be 2,500 feet to the east.

Dosimeters were placed at strategic locations along the present Site property boundary and close to select noise-sensitive receptor locations (Figure 2). The noise-sensitive receptor locations included two residences closest to the Site's southern property boundary. Figure 2 shows the location of key noise-sensitive receptors that have been identified on the list below. The receptors have been labeled R-1 and R-2.

Key Residences/Structures	Surface Elevation (Feet amsl)
1) R-1 (Andre Weider)	514
2) R-2 (Steve Malloy)	498

Key local receptors were selected based on criteria, such as distance from Phase 1 & 2 site development boundaries, vegetation cover, and changes in elevation. The key receptors listed above were chosen due to their close proximity to the Site, as they lie within approximately 800 feet of the sound source (site development area). The closest residential receptor to the east is approximately 2,000 feet from the sound source. At a distance of 2,000 feet, using natural sound attenuation and the noise levels produced by the on-site equipment, increases in sound levels are considered to be negligible.

Topography can have an effect on sound levels as well. In general sound levels can be attenuated by landforms such as natural slopes, pit faces, hill and valleys. The topography of the Site is depicted on Figure 2.

The Site slopes from the southeast to the northwest with elevations ranging from 540 feet amsl in the southeast portion to 450 feet amsl in the northwest corner of the site. The site has been affected by previous mining activity; a number of 5 to a 50-foot-tall vertical mine faces are found on the property as well as spoil piles of bluestone adding to the topographic relief on site.

2.3 METHODOLOGY

The logging dosimeters were ran for approximately 6 hours (8:00 A.M. to 2:30 P.M.) on Wednesday, December 26, 2018. This was considered sufficient time to collect an accurate representation of local equivalent sound levels with and around the Site area. A Liebherr 586 front end loader loading shot rock into a tractor trailer was in operation on site at logging station 15 from 12:00 P.M. to 2:23 P.M. in order to collect data on how sound generated on site will attenuate to off-site receptors.

2.3.1 Instrumentation

All unattended, long-term sound level measurements were collected with four tripod-mounted Quest SoundPro DL noise logging dosimeters for real-time measurements. This meter complies with Type 2 tolerance requirements of the American National Standards Institute (ANSI). The dosimeters were fitted with an Outdoor Microphone and were field calibrated. Each unit was also laboratory-qualified technician calibrated (Appendix B).

2.4 AMBIENT SURVEY MONITORING RESULTS

Measurements were collected at one-minute intervals over a range of 30 to 140 decibels (dB), with an exchange rate of 3 decibels, fast response, and A weighted. Measurements were also collected under atmospheric conditions typical of low ambient sound levels, including low wind speed, and no precipitation.

2.4.1 Existing Equivalent Sound Levels – Site Area

The appended dosimeter reports (Appendix C) display the unit logging parameters, decibel (dB) statistics chart, exceedance chart, and a logged data chart. Table 2 provides the receptor location, run-time measured equivalent sound levels (L_{eq}), and the run time for each study. Each logging station location is shown on Figure 2.

Table 2: Measured Equivalent Sound Level Data – December 26, 2018

Logging Station #	Location	Date	Session	Total Run Time (Hours)	L_{eq} (dB)
11	near southwest property boundary	12/26/2018	1	3:07	39.3
12*	near mid-southern property boundary	12/26/2018	1	1:13	36.7
			2	1:13	37.7
13	western property boundary	12/26/2018	1	3:09	40.8
14*		12/26/2018	1	1:44	66.6

	adjacent to Site entrance		2	0:38	66.9

* Study broken into two session due to batterers needing to be replace because of cold weather.

Equivalent sound levels (L_{eq}) measured at critical segments of the property line (logging station 11, 12, 13, and 14) during day time periods (8:30 A.M. to 12:30 P.M.) ranging from 36.7 dB (logging station 12) to 66.9 dB (loggings station 14). Average equivalent sound levels collected along the critical segments of the Site property boundary (logging station 11,12, and 13) averaged 38.6 dB. The L_{eq} for the Site was 48.0 dB. The variability in the result is due to a wide variety of factors, such as wind patterns, topography, vegetation, traffic patterns, off-site noise sources.

2.5 SIMULATED OPERATING MONITORING RESULTS

Measurements were collected at one-minute intervals over a range of 40 to 140 decibels (dB), with an exchange rate of 3 decibels, fast response, and A weighted. Measurements were also collected under atmospheric conditions typical of low ambient sound levels, including low wind speed, and no precipitation.

2.5.1 Operating Sound Levels – On Site

The appended dosimeter reports (Appendix C) display the unit logging parameters, decibel (dB) statistics chart, exceedance chart, and a logged data chart. Table 3 provides the receptor location, run-time measured equivalent sound levels (L_{eq}), and the run time for each study. Logging station 11,12, and 13 remained unchanged for the operating portion of the sound study. The dosimeter at logging station 14 was moved to logging station 15 (Figure 1) to monitor the sound produced by A Liebherr 586 front end loader loading shot rock into a tractor trailer, and moving piles of shot rock (simulated sound source) at a distance of 100 feet.

Table 3: Measured Operating Sound Level Data – December 26, 2018

Logging Station #	Location	Date	Session	Total Run Time (Hours)	Leq (dB)	Distance to Source
11	near southwest property boundary	12/26/2018	1	1:24	41.2	1,720
12	near mid-southern property boundary	12/26/2018	1	1:25	42.5	1,340
13	western property boundary	12/26/2018	1	1:24	43.9	1,570
15	100 feet from sound source	12/26/2018	1	1:24	65.7	100

*Distance to Source = distance to simulated sound source

Equivalent sound levels (L_{eq}) measured while the simulated sound source was in operation were recorded at logging stations 11,12,13, and 15 during the daytime periods of (12:26-1:50) ranged from 41.2 dB (logging station 11) to 65.7 dB (logging station 15). Average equivalent sound levels collected along the critical segments (logging station 11,12, and 13) of the Site property line averaged 42.5 dB. The variability in the result is due to a wide variety of factors, such as wind patterns, topography, vegetation, traffic patterns, off-site noise sources. Notes on the predominate sound sources at each location were noted.

Review of dosimeter readings and reports revealed the following additional observations:

Logging Station 11

- Overall, the ambient equivalent sound levels from this location were dominated by noise from nearby State Route 28 located approximately 800 feet to the southeast. The ambient L_{eq} for this logging station was 39.3 dB
- During operating the L_{eq} for this location was 41.2 dB. Sound could be heard from the simulated sound source, but the predominate source of sound was still State Route 28.
- The slight increase of 1.9 dB demonstrates how attenuating features (i.e., topography, vegetation, distance from source etc.) reduce facility-related noise.
- The closest receptor to logging station 11 is R-1 the Steve Malloy residents.

Logging Station 12

- Overall, the ambient equivalent sound levels from this location were dominated by noise from State Route 28 located approximately 1,260 feet to the southeast. The ambient L_{eq} for this station was 37.2 dB, lowest level attained during the sound level measurement survey.
- During operating the L_{eq} for this location was 42.5 dB. Sound could be heard from the simulated sound source, but the predominate source of sound is State Route 28.
- An increase of 5.3 dB was observed between ambient and operating at this location because logging station 12 is 380 feet closer to the simulated sound source, and at the same elevation. This is why the increase in operating dB is larger at this location.
- The closest receptor to logging station 12 is R-2 the Andre Weider residents.

Logging Station 13

- The ambient equivalent sound levels from this location were dominated by noise from State Route 28 located 1,300 feet to the west. The ambient L_{eq} for this station was 40.8 dB.
- During operating the L_{eq} for this location was 43.9 dB. Sound could be heard from the simulated sound source, but the predominate source of sound is State Route 28.
- An increase of 3.1 dB was observed between ambient and operating at this location.
- Logging station 13 is not located within 1,720 feet of a receptor.

Logging Station 14

- Logging station 14 was only in operation during the ambient survey. The dosimeter from this location was moved to logging station 15 for the operating sound study.
- The ambient equivalent sound levels from this location were dominated by noise from State Route 28 located 60 feet to the west. The ambient L_{eq} for this station was 66.8 dB.
- Logging station 14 is not located within 1,270 feet of a receptor.

Logging Station 15

- Logging station 15 was only in operation during the operating portion of the sound study. This station was placed 100 feet from the simulated sound source to measure the sound produced.
- The L_{eq} for this location was 65.7 dB. Sound from State Route 28 could occasionally just be heard over the simulated sound source.
- Logging station 15 is not located within 1,300 feet of a receptor

3.0 PROJECTED IMPACT AT KEY OFF-SITE RECEPTOR LOCATIONS

3.1 PROJECTED SOUND LEVELS AT RECEPTORS

During the site development project, the major source of sound from the site will be related to the excavation, and processing of the consolidated bedrock. Bedrock will be excavated from within Phase 1 & Phase 2 (site development area), the consolidated material will be processed at a mobile processing plant located in the center of the site (Figure 1). The mobile processing plant will be located in the location shown on Figure 1 for the entire length of the site development. No operations will be conducted outside the site development area.

The primary Site noise sources used to project site development sound impacts at receptors are listed below in Table 3. The processing equipment that will be used was not on site while the study was being conducted, in order to calculate the projected sound levels at each receptor historic sound levels collected by H2H of similar equipment in operation are used.

Table 3: Primary Site Development Noise Source Sound Levels (dB) at 100 feet (unobstructed view)

Sound Source	Description	Sound Level (dB)
Crusher	Lipman 30X48" Crusher	96.0
Front-end loader loading haul truck	CAT 980 M Loading Haul Truck	75.0
Blast hole drill rig	Sandvik DP 150 I Pantera	78.0

3.2 PROJECTED SOUND LEVELS AT RECEPTORS

Ambient sound levels in the study area are controlled primarily by traffic on State Route 28, topography, vegetation, and wind. As summarized in Table 3 equivalent sound levels measured for the types of equipment that will be used on Site range from 75.0 to 96.0 dB at a distance of 100 feet.

The crushing and processing of material will be taking place only in the designated area on site shown in Figure 1. The front-end loader will be in operation across the site development area, generally operating at the toe of the excavation face. The blast hole drill rig will occasionally be in operation on site, mostly operating on top of the active excavation face. The projected sound levels from each piece of equipment will be calculated based on if the equipment will be in operation above or below the excavation face, and its operation location on site. H2H has historic measurements of how each attenuating factor affects sound from a source. Table 4 shows the estimated sound levels produced by site development work at each receptor.

Table 4: Estimated Sound Levels (dB) at Receptor Locations – Crushing Plant *

A	B	C	D	E
Receptors	**Distance to Source (feet)**	**Ambient Sound Levels (dB)**	**Projected Sound Levels - Crusher (dB)**	**Change (dB)**
R-1 (logging station 12)	1,550	37.2	48	10.8

R-2 (logging station 11)	1,876	39.7	46.5	6.8

* Projected sound level for the crusher is based on an operating equivalent sound level of 96 dB (Table 3). Based on historic sound level measurements collected by H2H a 10 foot by 15-foot berm will cause a ~14 dB decrease. The NYSDEC guidance document states that 100 feet of vegetation will cause a 3 to 7 dB reduction in sound levels. Given each receptor is separated by greater than 500 feet of vegetation a reduced of 7 dB was used. Using the inverse square law (sound pressure levels change in inverse proportion to the square of the distance from the sound source), and the mitigating effects of vegetation and topography (berm) discussed above the estimated sound levels at each receptor from crushing on site are shown in column D. No additive effects of multiple sound sources running at the same time will be experienced due to the Crushing Plant operating at 10 dB or more than any other equipment on site.

Table 5: Estimated Sound Levels (dB) at Receptor Locations - Blast Hole Drill Rig *

A	B	C	D	E
Receptors	**Distance to Source (feet)**	**Ambient Sound Levels (dB)**	**Projected Sound Levels - Blast Hole Drill Rig (dB)**	**Change**
R-1 (logging station 12)	580	37.2	40.3	3.1
R-2 (logging station 11)	880	39.7	39.7	0.0

* Projected sound level for the blast hole drill rig is based on an operating equivalent sound level of 78.0 dB (Table 3). Based on historic sound level measurements collected by H2H a 10 foot by 15-foot berm will cause a ~14 dB decrease in sound levels. The NYSDEC guidance document states that 100 feet of vegetation will cause a 3 to 7 dB reduction in sound levels. Given each receptor is separated by greater than 500 feet of vegetation a reduced of 7 dB was used. Using the inverse square law (sound pressure levels change in inverse proportion to the square of the distance from the sound source), and the mitigating effects of vegetation and topography (berm) discussed above the estimated sound levels at each receptor from a blast hole drill rig operating on site are shown in column D.

Table 6: Estimated Sound Levels (dB) at Receptor Locations – Front-end Loader *

A	B	C	D	E
Receptors	**Distance to Source (feet)**	**Ambient Sound Levels (dB)**	**Projected Sound Levels - Front-end Loader(dB)**	**Change**
R-1 (logging station 12)	580	37.2	37.3	0.1
R-2 (logging station 11)	880	39.7	39.7	0.0

* Projected sound level for the front-end loader is based on an operating equivalent sound level of 75.0 dB (Table 3). Based on historic sound level measurements collected by H2H a 10’ by 15’ berm will cause a ~14 dB decrease in sound levels. The NYSDEC guidance document states that 100 feet of vegetation will cause a 3 to 7 dB reduction in sound levels. Given each receptor is separated by greater than 500 feet of vegetation a reduced of 7 dB was used. Using the inverse square law (sound pressure levels change in inverse proportion to the square of the distance from the sound source), and the mitigating effects of

vegetation and topography (berm) discussed above the estimated sound levels at each receptor from a front-end loader operating on site are shown in column D.

Table 7: Estimated Sound Levels (dB) at Receptor Locations – Additive Effect of Front-end Loader & Blast Hole Drill Rig *

A	B	C	D	E
Receptors	**Distance to Source (feet)**	**Ambient Sound Levels (dB)**	**Projected Sound Levels - Front-end Loader & Blast Hole Drill Rig (dB)**	**Change**
R-1 (logging station 12)	580	37.2	42.3	5.1
R-2 (logging station 11)	880	39.7	37.4	0

* Projected sound levels of front-end loader & Blast Hole Drill Rig operating at the same time. The operating equivalent sound level of the Front-end Loader is 75.0 dB, and the operating equivalent sound level of the Blast Hole Drill Rig is 78.0 dB. The NYSDEC guidance document states that a 2 to 3 dB difference between two sound levels will cause a 2 dB additive effect. The 2 dB additive effect is added to the higher sound level. The combined operating projected sound level for the Front-end Loader and Blast Hole Drill Rig will be 80.0 dB. Based on historic sound level measurements collected by H2H a 10' by 15' berm will cause a ~14 dB decrease in sound levels. The NYSDEC guidance document states that 100 feet of vegetation will cause a 3 to 7 dB reduction in sound levels. Given each receptor is separated by greater than 500 feet of vegetation a reduced of 7 dB was used. Using the inverse square law (sound pressure levels change in inverse proportion to the square of the distance from the sound source), and the mitigating effects of vegetation and topography (berm) discussed above, the estimated sound levels at each receptor from the operation of the Front-end Loader & Blast Hole Drill Rig simultaneously on site are shown in column D.

Column A represents each receptor. Column B is the distance in feet from the closet location the blast hole drill rig, and front-end loader will be operating to each receptor, and the distance from the area the crusher will be located to each receptor (Figuer1). Column C shows the ambient sound levels collected during the on-site sound study from the closest logging station to each receptor (Figuer1). Column E shows the difference between ambient, and the projected sound levels.

4.0 FINDINGS

The site development project does have the potential to increase the ambient sound levels at Receptor 1 and Receptor 2 based on the information collected during the on-site sound study, and the calculated projected sound levels at each receptor.

4.1 RECEPTOR 1

The largest increase in ambient sound levels will be at Receptor 1 during the operation of the crushing plant, an increase of 10.8 dB was calculated. An increase of 10 dB or more results in a perceived doubling of sound levels according to the NYSDEC guidance document. An increase of 3.1 dB is expected at Receptor 1 while the blast hole drill rig is operation along the southern site development area boundary. A 3.0 dB increase is stated as having no appreciable effect on receptors according to NYSDEC guidance document. Based on the data in Table 6 the front-end loader will have no effect on ambient sound levels at Receptor 1. An increase of 5.1 dB is expected at Receptor 1 while the blast hole drill rig and the Front-end Loader are operating simultaneously along the southern site development area boundary. According to the NYSDEC guidance document an increase of 3-6 dB may have potential for adverse noise impacts.

4.2 RECEPTOR 2

An increase of 6.8 dB was calculated at receptor 2 while the crushing plant is in operation. An increase of 3-6 dB is stated in the NYSDEC guidance document as having the potential for adverse noise impacts. No increase is projected at Receptor 2 while the blast hole drill rig, and front-end loader are in operation along the southern site development boundary.

5.0 LONG TERM SITE OPERATIONS

850 Rt. 28 will be operating a steel and concert manufacturing facility on site once the site development project is completed. The steel and concrete manufacturing process will take place inside each of the proposed buildings on site. The only operations that would take place outside of the proposed processing facilities will be the loading of the manufactured products with a forklift onto on road trucks for distribution. A forklift loading a on road truck will produce a lower L_{eq} dB than the blast hole drill rig discussed in Section 3.2 above. Because of this, and the fact that the proposed manufacturing process including the batch plant will take place inside each of the proposed buildings there should be on adverse noise impact at Receptor 1 and Receptor 2 from the operation of the long term manufacturing facilities onsite.

6.0 MITIGATING MEASUERS

H2H recommends leaving as much of the vegetative buffer as possible between the southern site development area boundary, and the receptors. Overburden that is stripped should be stockpiled in a berm along the southern site development boundary to reduce noise attenuation during the initial development work. Excavation should be done from the north to the south by advancing an east/west trending excavation face. Excavating the site in this manner will greatly reduce sounds levels at each receptor due to the difference in elevation between the sound source and the receptor. H2H recommends moving the crushing plant farther to the north if possible, and to always position the crusher with an east/west trending excavation face between it and the receptors. In addition, H2H also recommends all equipment that require a backup alarm that will be in operation (both during site plan development and long term operation) on-site be outfitted with white noise back up alarms.

7.0 CONCLUSION

The proposed site development project at 850 State Route 28 does have the potential to affect identified Receptors south of the site if the recommended mitigating measures are not followed during site development. The ambient sound levels at Receptor 1 and Receptor 2 are very low 39.3 and 37.2 respectively. The NYSDEC guidance document reports wilderness areas have an ambient sound level of 35 dB. This is the reason for the large increase in ambient sound levels reported in Table 4. The highest projected sound level was at Receptor 1 while the crushing plant is in operation with a value of 48.0 dB (an increase of 10.8 dB above ambient) at the Receptor. Though this is a large increase in sound level, 48.0 dB is still average for a residential area.

Given the fact that the proposed site development project will not be a permanent ongoing operation, and that the highest calculated projected sound level at a Receptor is 48.0 dB H2H believes that with proper mitigating measures described above the proposed site development project can be completed with minimal disturbance to the neighboring Receptors. The long term concrete and steel manufacturing facilities can be operated with no disturbance to the neighboring Receptors with the mitigating measures described above in place for the life of the operation.

FIGURES

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SITE LOCATION MAP

850 ROUTE 28, LLC.

WEST HURLEY — ULSTER COUNTY, NY

H2H Associates

FIGURE 1

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MAP NOTES:
1. CONTOUR INTERVAL = 2'.
2. AERIAL PHOTO BASED ON PHOTOGRAMMETRIC SURVEY COMPLETED 07-07-2017 BY H2H ASSOCIATES, LLC.
3. PROPERTY LINE AND PARCEL INFO FROM ULSTER COUNTY GIS TAX PARCEL SHAPEFILE

LEGEND:

- PROPERTY LINE
- ADJACENT PARCEL
- MAJOR CONTOUR
- MINOR CONTOUR
- WATER BOUNDARY
- PHASE 1 BOUNDARY (WHITE)
- PHASE 2 BOUNDARY (WHITE)
- 12 LOGGING STATION
- 1 RECEPTORS

SCALE IN FEET
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DATE		REVISIONS RECORD/DESCRIPTION
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THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

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ROUTE 28 NOISE STUDY

850 ROUTE 28. LLC.

WEST HURLEY — ULSTER COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 2

SHEET 01 OF 02

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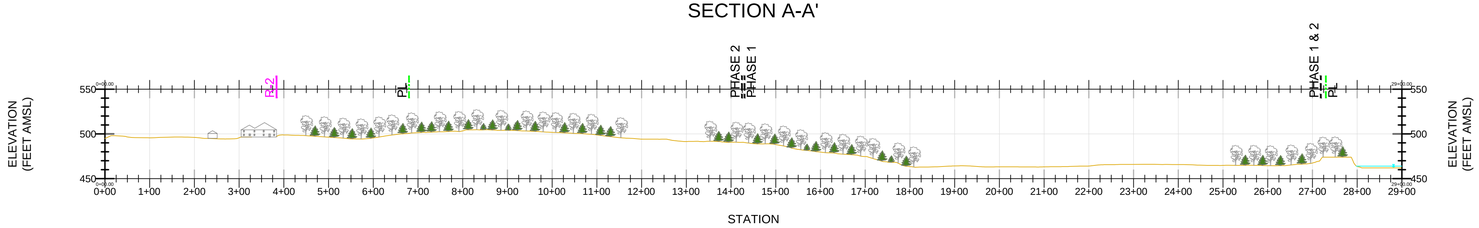
SECTION A-A'



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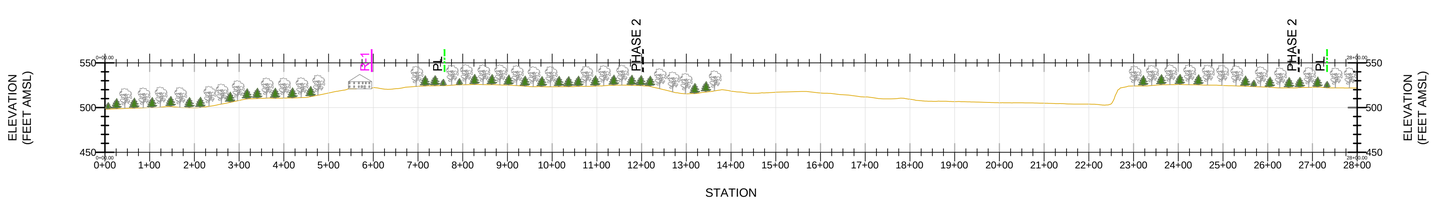
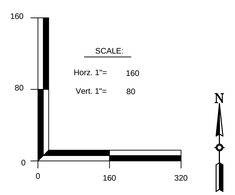


MAP NOTES:
1. AERIAL PHOTO BASED ON PHOTOGRAMMETRIC SURVEY COMPLETED 07-07-2017 BY H2H ASSOCIATES, LLC.
2. PROPERTY LINE AND PARCEL INFO FROM ULSTER COUNTY GIS TAX PARCEL SHAPEFILE

LEGEND:
- PROPERTY LINE
- EXISTING GRADE
- RECEPTORS
- WATER BOUNDARY



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THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

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ROUTE 28 NOISE STUDY - SECTIONS

850 ROUTE 28. LLC.

WEST HURLEY — ULSTER COUNTY, NY

H2H ASSOCIATES
TROY, NY WWW.H2HASSOCIATES.COM

FIGURE 2

SHEET 02 OF 02

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APPENDIX A - NYSDEC - Assessing and Mitigating Noise Impacts

Assessing and Mitigating Noise Impacts

New York State
Department of Environmental Conservation

PROGRAM POLICY	**Department ID: DEP-00-1**	**Program ID: n/a**
Issuing Authority: Environmental Conservation Law Articles 3, 8, 23, 27 Name: Jeffrey Sama Title: Director Signature: /S/ Date: 10/6/00 Issuance Date: October 6, 2000 Revised: February 2, 2001	**Originating Unit: Division of Environmental Permits** Office/Division: Environmental Permits Unit: Phone: (518) 402-9167 Latest Review Date (Office Use):	

Abstract: Facility operations regulated by the Department of Environmental Conservation located in close proximity to other land uses can produce sound that creates significant noise impacts for proximal sound receptors. This policy and guidance presents noise impact assessment methods, examines the circumstances under which sound creates significant noise impacts, and identifies avoidance and mitigative measures to reduce or eliminate noise impacts.

Related References: See references pages 27 and 28.

I. PURPOSE[1]

This policy is intended to provide direction to the staff of the Department of Environmental Conservation for the evaluation of sound levels and characteristics (such as pitch and duration) generated from proposed or existing facilities. This guidance also serves to identify when noise levels may cause a significant environmental impact and gives methods for noise impact assessment, avoidance, and reduction measures. These methods can serve as a reference to applicants preparing environmental assessments in support of an application for a permit. Additionally, this guidance explains the Department's regulatory authority for undertaking noise evaluations and for imposing conditions for noise mitigation measures in the agency's approval

[1] A Program Policy Memorandum is designed to provide guidance and clarify program issues for Division staff to ensure compliance with statutory and regulatory requirements. It provides assistance to New York State Department of Environmental Conservation (DEC) staff and the regulated community in interpreting and applying regulations and statutes to assure that program uniformity is attained throughout the State. Nothing set forth in a Program Policy Memorandum prevents DEC staff from varying from that guidance as specific circumstances may dictate, provided the staff's actions comply with applicable statutory and regulatory requirements. As this guidance document is not a fixed rule, it does not create any enforceable right by any party using the Program Policy Memorandum.

of permits for various types of facilities pursuant to regulatory program regulations and the State Environmental Quality Review Act (SEQR).

II. BACKGROUND

Noise is defined as any loud, discordant or disagreeable sound or sounds. More commonly, in an environmental context, noise is defined simply as unwanted sound. Certain activities inherently produce sound levels or sound characteristics that have the potential to create noise. The sound generated by proposed or existing facilities may become noise due to land use surrounding the facility. When lands adjoining an existing or proposed facility contain residential, commercial, institutional or recreational uses that are proximal to the facility, noise is likely to be a matter of concern to residents or users of adjacent lands.

A. Sources of Noise Generation

The three major categories of noise sources associated with facilities are (1) fixed equipment or process operations; (2) mobile equipment or process operations; and (3) transport movements of products, raw material or waste. The fixed plant may include a very wide range of equipment including: generators; pumps; compressors; crushers of plastics, stone or metal; grinders; screens; conveyers; storage bins; or electrical equipment. Mobile operations may include: drilling; haulage; pug mills; mobile treatment units; and service operations. Transport movements may include truck traffic within the operation, loading and unloading trucks and movement in and out of the facility. Any or all of these activities may be in operation at any one time. Singular or multiple effects of sound generation from these operations may constitute a potential source of noise.

B. Potential for Adverse Impacts

Numerous environmental factors determine the level or perceptibility of sound at a given point of reception. These factors include: distance from the source of sound to receptor; surrounding terrain; ambient sound level; time of day; wind direction; temperature gradient; and relative humidity. The characteristics of a sound are also

important determining factors for considering it as noise. The amplitude (loudness), frequency (pitch), impulse patterns and duration of sound all affect the potential for a sound to be a noise. The combination of sound characteristics, environmental factors and the physical and mental sensitivity of a receptor to a sound determine whether or not a sound will be perceived as a noise. This guidance uses these factors in assessing the presence of noise and the significance of its impacts. It relies upon qualitative and quantitative sound evaluation techniques and sound pressure level impact modeling presented in accepted references on the subject.

C. Mitigation

Mitigation refers to actions that will be taken to reduce the effects of noise or the noise levels on a receptor. Adverse noise effects generated by a facility can be avoided or reduced at the point of generation thereby diminishing the effects of the noise at the point of reception. This guidance identifies various mitigation techniques and their proper application either at the source of noise generation or on a facility's property. Alternative construction or operational methods, equipment maintenance, selection of alternative equipment, physical barriers, siting of activities, set backs, and established hours of construction or operation, are among the techniques that can successfully avoid or reduce adverse noise effects.

D. Decision Making

When an assessment of the potential for adverse noise impacts indicates the need for noise mitigation, it is preferred that specifications for such measures be incorporated in a noise analysis and in the applicant's work or operational plan necessary for a complete application. Presenting a plan that incorporates effective noise mitigation provisions facilitates the Department's technical and environmental review and minimizes or negates the imposition of permit conditions by the Department. Adherence to these plans becomes a condition of a permit.

Noise avoidance and mitigation measures may also be imposed directly as conditions of permit issuance. This guidance will review the statutory authority under which the Department can require the mitigation of noise effects.

III. POLICY

In the review of an application for a permit, the Department of Environmental Conservation is to evaluate the potential for adverse impacts of sound generated and emanating to receptors outside of the facility or property. When a sound level evaluation indicates that receptors may experience sound levels or characteristics that produce significant noise impacts or impairment of property use, the Department is to require the permittee or applicant to employ reasonable and necessary measures to either eliminate or mitigate adverse noise effects. Options to be used to fulfill this guidance should be implemented within the existing regulatory and environmental review framework of the agency.

Regulatory authority for assessing and controlling noise effects are contained in both SEQR and specific Department program regulations. Specific regulatory references are as follows:

Section 3-0301(1)(i) of the Environmental Conservation Law (ECL) states that the commissioner shall have the power to: "i. Provide for prevention and abatement of all water, land and air pollution including but not limited to that related to particulates, gases, dust, vapors, noise, radiation, odor, nutrients and heated liquids."

To comply with Article 8 of the ECL and 6 NYCRR Part 617, State Environmental Quality Review Act, consideration of all relevant environmental issues must be undertaken in making a determination of environmental significance. Noise impact potential is one of many potential issues for consideration in a SEQR review.

Environmental Conservation Law (ECL) Article 23, Title 27, Mined Land Reclamation Law (MLRL), requires applicants for permits to prepare and submit a mined land use plan to the Department for approval. The plan must describe, "the applicant's mining method and measures

to be taken to minimize adverse environmental impacts resulting from the mining operation." The provisions to be incorporated in a Mined Land Use Plan, as specified in 6 NYCRR Section 422.2, include the control of noise as a component of the plan.

The solid waste regulations at 6 NYCRR Subdivision 360-1.14(p), establish A-weighted decibel levels that are not to be exceeded at the property line of a facility.

The Division of Air Resources has regulations in 6 NYCRR Parts 450 through 454 that regulate the allowable sound level limits on certain motor vehicles. The statutory authority for these regulations is found in the New York State Vehicle and Traffic Law, Article 10, Section 386.

This guidance does not supercede any local noise ordinances or regulations.

IV. RESPONSIBILITY

The environmental analyst, acting as project manager for the review of applications for permits or permit modifications and working in concert with the program specialist, is responsible for ensuring that sound generation and noise emanating from proposed or existing facilities are properly evaluated. For new permits or significantly modified permits, there should be a determination as to the potential for noise impacts, and establishment of the requirements for noise impact assessment to be included in the application for permit. Where the Department is lead agency, the analyst is responsible for making a determination of significance pursuant to SEQR with respect to potential noise impacts and include documentation for such determination.

Where impacts are to be avoided or reduced through mitigation measures, the analyst, or where there are program requirements to address noise, the program specialist, should determine the effectiveness and feasibility of those measures and ensure that the permit conditions contain specific details for such measures. It should also be determined if additional measures to control noise are to be imposed as a condition of permitting. Appropriate permit language for the permit conditions should be developed by the program specialist and the analyst. The results of noise impact evaluations and the effectiveness of mitigation measures

shall be incorporated into SEQR documents and, where necessary, permit conditions shall be placed in final permits to ensure effective noise control.

When it is determined that potential noise effects, as well as other issues, warrant evaluation of impacts and mitigation measures in a Draft Environmental Impact Statement (EIS) prepared pursuant to SEQR, the environmental analyst with the Division of Environmental Permits assumes responsibility for determining the level of evaluation needed to assess sound level generation, noise effects, and mitigation needs and feasibility.

For existing facilities, the program specialist will determine the need for additional mitigation measures to control noise effects either in response to complaints or other changes in circumstances such as new noise from existing facilities or a change in land-use proximal to the facility.

The applicant or their agent, in preparing an application for a permit and supporting documentation, is responsible for assessing the potential noise impacts on area receptors. When potential adverse noise impacts are identified, the applicant should incorporate noise avoidance and reduction measures in the construction or operating plans. The applicant's submittal should also assess the effectiveness of proposed mitigation measures in eliminating adverse noise reception. Where noise effects are determined to be a reason in support of a SEQR positive declaration, the applicant shall assess noise impacts, avoidance, and mitigation measures in a Draft EIS using methodologies acceptable to this Department.

V. PROCEDURE

The intent of this section is to: introduce terms related to noise analyses; describe some of the various methods used to determine the impacts of sound pressure levels on receptors; identify some of the various attenuators of noise; and list some of the mitigative techniques that can be used to reduce the effects of noise on a receptor. At the end of the section three levels of analysis are described. The first level determines the potential for adverse noise impacts based on noise characteristics and sound pressure increases solely on noise attenuation over distance between the source and receptor of the noise. The second level factors other considerations such as topography and noise abatement measures in determining if adverse

noise impacts will occur. The third level evaluates noise abatement alternatives and their effectiveness in avoiding or reducing noise impacts.

The environmental effects of sound and human perceptions of sound can be described in terms of four characteristics:

1. Sound Pressure Level (SPL may also be designated by the symbol L_p) or perceived loudness is expressed in decibels (dB) or A-weighted decibel scale dB(A) which is weighted towards those portions of the frequency spectrum, between 20 and 20,000 Hertz, to which the human ear is most sensitive. Both measure sound pressure in the atmosphere.

2. Frequency (perceived as pitch), the rate at which a sound source vibrates or makes the air vibrate.

3. Duration i.e., recurring fluctuation in sound pressure or tone at an interval; sharp or startling noise at recurring interval; the temporal nature (continuous vs. intermittent) of sound.

4. Pure tone which is comprised of a single frequency. Pure tones are relatively rare in nature but, if they do occur, they can be extremely annoying.

Another term, related to the average of the sound energy over time, is the Equivalent Sound Level or $L_{eq.}$ The L_{eq} integrates fluctuating sound levels over a period of time to express them as a steady state sound level. As an example, if two sounds are measured and one sound has twice the energy but lasts half as long, the two sounds would be characterized as having the same equivalent sound level. Equivalent Sound Level is considered to be directly related to the effects of sound on people since it expresses the equivalent magnitude of the sound as a function of frequency of occurrence and time. By its derivation L_{eq} does not express the maximum nor minimum SPLs that may occur in a given time period. These maximum and minimum SPLs should be given in the noise analysis. The time interval over which the L_{eq} is measured should always be given. It is generally shown as a parenthetic; $L_{eq\,(8)}$ would indicate that the sound had been measured for a period of eight hours.

Equivalent Sound Level (L_{eq}) correlates well and can be combined with other types of noise analyses such as Composite Noise Rating, Community Noise Equivalent Level and day-night noise levels characterized by L_{dn} where an $L_{eq(24)}$ is measured and 10 dBA is added to all noise levels measured between 10 pm and 7 am. These different types of noise analyses

basically combine noise measurements into measures of cumulative noise exposure and may weight noise occurring at different times by adding decibels to the actual decibel level. Some of these analyses require more complex noise analysis than is mentioned in this guidance. They may be used in a noise analyses prepared for projects.

Designations for sound levels may also be shown as $L_{(10)}$ or $L_{(90)}$ in a noise analysis. These designations refer to the sound pressure level (SPL) that is exceeded for 10% of the time over which the sound is measured, in the case of $L_{(10)}$, and 90% of the time, in the case of $L_{(90)}$. For example, an $L_{(90)}$ of 70 dB(A) means that 70 dB(A) is exceeded for 90% the time for which the measurement was taken.

A. Environmental Setting and Effects on Noise Levels

1. Sound Level Reduction Over Distance - It is important to have an understanding of the way noise decreases with distance. The decrease in sound level from any single noise source normally follows the "inverse square law." That is, SPL changes in inverse proportion to the square of the distance from the sound source. At distances greater than 50 feet from a sound source, every doubling of the distance produces a 6 dB reduction in the sound. Therefore, a sound level of 70 dB at 50 feet would have a sound level of approximately 64 dB at 100 feet. At 200 feet sound from the same source would be perceived at a level of approximately 58 dB.

2. Additive Effects of Multiple Sound Sources - The total sound pressure created by multiple sound sources does not create a mathematical additive effect. Below Table A is given to assist you in calculating combined noise sources. For instance, two proximal noise sources that are 70 dBA each do not have a combined noise level of 140 dBA. In this case the combined noise level is 73 dBA. Since the difference between the two sound levels is 0 dB, Table A tells us to add 3 dB to the sound level to compensate for the additive effects of the sound. To find the cumulative SPL assess the SPLs starting with the two lowest readings and work up to the difference between the two highest readings. For several pieces of equipment, operating at one

time, calculate the difference first between the two lowest SPLs, check Table A and add the appropriate number of decibels to the higher of the two sound levels. Next, take the sound level that was calculated using Table A and subtract the next lowest sound level to be considered for the operation. Consult Table A again for the additive effect and add this to the higher of the two sound levels. Follow this process until all the sound levels are accounted for. As an example, let us say that an area for a new facility is being cleared. The equipment to be used is: two chainsaws, one operating at 57 dBA and one at 60 dBA; a front end loader at 80 dBA; and a truck at 78 dBA. Start with the two lowest sound levels: 60 dBA - 57 dBA = 3 dBA difference. Consulting the chart add 2 dBA to the higher sound level. The cumulative SPL of the two chainsaws is 62 dBA. Next, subtract 62 dBA from 78 dBA. 78 dBA - 62 dBA = 16 dBA. In this case, 0 dBA is added to the higher level so we end up with 78 dBA. Lastly, subtract 78 dBA from the 80 dBA. 80 dBA - 78 dBA = 2 dBA a difference of 2 dBA adds 2 dBA to the higher SPL or 82 dBA. The SPL from these four pieces of equipment operating simultaneously is 82 dBA.

Table A

Approximate Addition of Sound 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)

3. Temperature and Humidity - Sound energy is absorbed in the air as a function of temperature, humidity and the frequency of the sound. This attenuation can be up to 2 dB over 1,000 feet. Such attenuation is short term and, since it occurs over a great distance, should not be considered in calculations. Higher temperatures tend to increase sound velocity but does

not have an effect on the SPL. Sound waves bend towards cooler temperatures. Temperature inversions may cause temporary problems when cooler air is next to the earth allowing for more distant propagation of sound. Similarly, sound waves will bend towards water when it is cooler than the air and bounce along the highly reflective surface. Consequently large water bodies between the sound source and the receptor may affect noise attenuation over distance.

4. Time of Year - Summer time noises have the greatest potential for causing annoyance because of open windows, outside activities, etc. During the winter people tend to spend more time indoors and have the windows closed. In general, building walls and windows that are closed provide a 15 dB reduction in noise levels. Building walls with the windows open allow for only a 5 dB reduction in SPL.

5. Wind - Wind can further reduce the sound heard at a distance if the receptor is upwind of the sound. The action of the wind disperses the sound waves reducing the SPLs upwind. While it is true that sound levels upwind of a noise source will be reduced, receptors downwind of a noise source will not realize an increase in sound level over that experienced at the same distance without a wind. This dispels the common belief that sound levels are increased downwind due to wind carrying noise.

6. Land forms and structures - In certain circumstances, sound levels can be accentuated or focused by certain features to cause adverse noise impacts at specified locations. At a hard rock mine, curved quarry walls may have the potential to cause an amphitheater effect while straight cliffs and quarry walls may cause an echo. Buildings that line streets in cities can cause a canyon effect where sound can be reflected from the building surfaces similar to what might happen in a canyon. Consideration of noise impacts associated with these types of conditions may require specialized expertise to evaluate impact potential and to formulate suitable mitigation techniques.

Consideration of existing noise sources and sound receptors in proximity to a proposed activity can be important considerations even when the activity under review is not a noise source. Topography, vegetation, structures and the relative location of noise receptors and sources to these features are all aspects of the environmental setting that can influence noise impact potential. As such, land alteration may also indirectly create an adverse noise impact where natural land features or manmade features serve as a noise barrier or provide noise attenuation for existing sources of noise, i.e. highway, railroads, manufacturing activity. Removal of these features, i.e. hills, vegetation, large structures or walls, can expose receptors to increased sound pressure levels causing noise problems where none had previously existed.

B. Impact Assessment

1. Factors to Consider

Factors to consider in determining the impact of noise on humans, are as follows:

a. Evaluation of Sound Characteristics

(1) Ambient noise level - A noise can only intrude if it differs in character or SPL from the normal ambient sound. Most objective attempts to assess nuisance noise adopt the technique of comparing the noise with actual ambient sound levels or with some derived criterion.

(2) Future noise level - The ambient noise level plus the noise level from the new or proposed source.

(3) Increase In Sound Pressure Level - A significant factor in determining the annoyance of a noise is Sound Pressure Level (SPL). SPLs are measured in decibels.

(4) Sharp and Startling Noise - These high frequency and high intensity noises can be extremely annoying. When initially evaluating the effects

of noise from an operation, pay particular attention to noises that can be particularly annoying. One such noise is the back-up beepers required to be used on machinery. They definitely catch one's attention as they were meant to do. Continual beeping by machinery can be mitigated (see Section V.C. Mitigation - Best Management Practices). Another impulse noise source that can be very annoying is the exhaust from compressed air machinery. This exhaust is usually released in loud bursts. Compressed air exhaust can also be mitigated if it causes a noise problem by using readily available mufflers or specifically designed enclosures.

(5) Frequency and Tone - Frequency is the rate at which a sound source vibrates or makes the air vibrate. Frequency is measured in Hertz (Hz). Frequency can also be classified as high ("sharp"), low ("dull"), and moderate. Pure tones are rare in nature. Tonal sounds usually consist of pure tones at several frequencies. Pure tones and tonal sounds are discerned more readily by the human ear. Pure tones and tonal sounds are compensated for in sound studies by adding a calculated number of dB(A) to the measured sound pressure.

(6) Percentile of Sound Levels - Fluctuations of SPLs can be expressed as a percentile level designated as $L_{(n)}$ where a given decibel level is exceeded *n* % of the time. A designation of $L_{(10)}$ = 70 dBA means the measured SPLs exceeded 70 dBA 10% of the time. A designation of $L_{(90)}$ = 70 dBA means the measured SPLs were exceeded 90% of the time. $L_{(90)}$ is often used to designate the background noise level.

(7) Expression of Overall Sound - Part of the overall assessment of sound is the *Equivalent Sound Level* (L_{eq}) which assigns a single value of sound level for a period of time in which varying levels of sound are experienced over that time period. The L_{eq} value provides an indication of the effects of sound on people. It is also useful in establishing the ambient sound levels at a potential noise source.

In order to evaluate the above factors in the appropriate context, one must identify the following: 1) appropriate receptor locations for sound level calculation or measurement; 2) ambient sound levels and characteristics at these receptor locations; and 3) the sound pressure increase and characteristics of the sound that represents a significant noise effect at a receptor location.

b. Receptor Locations

Appropriate receptor locations may be either at the property line of the parcel on which the facility is located or at the location of use or inhabitance on adjacent property. The solid waste regulations require the measurements of sound levels be at the property line. The most conservative approach utilizes the property line. The property line should be the point of reference when adjacent land use is proximal to the property line. Reference points at other locations on adjacent properties can be chosen after determining that existing property usage between the property line and the reference point would not be impaired by noise, i.e., property uses are relatively remote from the property line. The location of the facility should be shown on a map in relation to each potential receptor. Any future expansion should be described in a narrative as well as depicted on a map. The map and narrative should also include the distance of the operation to each point of reception including the distance at the point in time when an expanding operation will be closest to the receptors.

c. Thresholds for Significant Sound Pressure Level (SPL) Increase

The goal for any permitted operation should be to minimize increases in sound pressure level above ambient levels at the chosen point of sound reception. Increases ranging from 0-3 dB should have no appreciable effect on receptors. Increases from 3-6 dB may have potential for adverse noise impact only in cases where the most sensitive of receptors are present. Sound pressure increases of more than 6 dB may require a closer analysis of impact potential depending on

existing SPLs and the character of surrounding land use and receptors. SPL increases approaching 10 dB result in a perceived doubling of SPL. The perceived doubling of the SPL results from the fact that SPLs are measured on a logarithmic scale. An increase of 10 dB(A) deserves consideration of avoidance and mitigation measures in most cases. The above thresholds as indicators of impact potential should be viewed as guidelines subject to adjustment as appropriate for the specific circumstances one encounters.

Establishing a maximum SPL at the point of reception can be an appropriate approach to addressing potential adverse noise impacts. Noise thresholds are established for solid waste management facilities in the Department's Solid Waste regulations, 6 NYCRR Part 360. Most humans find a sound level of 60 - 70 dB(A) as beginning to create a condition of significant noise effect (EPA 550/9-79-100, November 1978). In general, the EPA's "Protective Noise Levels" guidance found that ambient noise levels # 55 dBA $L_{(dn)}$ was sufficient to protect public health and welfare and, in most cases, did not create an annoyance (EPA 550/9-79-100, November 1978). In non-industrial settings the SPL should probably not exceed ambient noise by more than 6 dB(A) at the receptor. An increase of 6 dB(A) may cause complaints. There may be occasions where an increase in SPLs of greater than 6 dB(A) might be acceptable. The addition of any noise source, in a non-industrial setting, should not raise the ambient noise level above a maximum of 65 dB(A). This would be considered the "upper end" limit since 65 dB(A) allows for undisturbed speech at a distance of approximately three feet. Some outdoor activities can be conducted at a SPL of 65 dB(A). Still lower ambient noise levels may be necessary if there are sensitive receptors nearby. These goals can be attained by using the mitigative techniques outlined in this guidance.

Ambient noise SPLs in industrial or commercial areas may exceed 65 dB(A) with a high end of approximately 79 dB(A) (EPA 550/9-79-100, November 1979). In these instances mitigative measures utilizing best management practices should be used in an effort to ensure that a facility's generated sound levels are at a minimum. The goal in an industrial/commercial area, where ambient SPLs are already at a high level, should be not to exceed the ambient SPL. Remember, if a new source

operates at the same noise level as the ambient, then 3 dB(A) must be added to the existing ambient noise level to obtain the future noise level. If the goal is not to raise the future noise levels the new facility would have to operate at 10 dB(A) or more lower than the ambient.(see Table A)

Table B

HUMAN REACTION TO INCREASES IN SOUND PRESSURE LEVEL

Increase in Sound Pressure (dB)	Human Reaction
Under 5	Unnoticed to tolerable
5 - 10	Intrusive
10 - 15	Very noticeable
15 - 20	Objectionable
Over 20	Very objectionable to intolerable

(Down and Stocks - 1978)

Impact assessment will vary for specific project reviews, but must consist of certain basic components for all assessments. Additional examination of sound generation and noise reception are necessary, where circumstances warrant. Sound impact evaluation is an incremental process, with four potential outcomes:

- exemption criteria are met and no noise evaluation is required;
- noise impacts are determined to be non-significant (after first-level evaluation);
- noise impacts are identified as a potential issue but can be readily mitigated (after second level evaluation); or
- noise impacts are identified as a significant issue requiring analysis of alternatives as well as mitigation (third level evaluation).

All levels of evaluation may require preparation of a noise analysis. The required scope of noise impact analysis can be rudimentary to rather sophisticated, depending on circumstances and the results obtained from initial levels of evaluation. Recommendations for each level of evaluation are presented below.

2. Situations in Which No Noise Evaluation is Necessary

When certain criteria are satisfied, the need for undertaking a noise impact analysis at any level is eliminated. These criteria are as follows:

a. The site is contained within an area in which local zoning provides for the intended use as a "right of use". It does not apply to activities that are permissible only after an applicant is granted a special use permit by the local government; and

b. The applicant's operational plan incorporates appropriate best management practices (BMPs [see Section V.C. Mitigation - Best Management Practices]) for noise control for all facets of the operation.

Where activities may be undertaken as a "right of use", it is presumed that noise has been addressed in establishing the zoning. Any residual noise that is present following BMP implementation should be considered an inherent component of the activity that has been found acceptable in consideration of the zoning designation of the site.

3. First Level Noise Impact Evaluation

The initial evaluation for most facilities should determine the maximum amount of sound created at a single point in time by multiple activities for the proposed project. All facets of the construction and operation that produce noise should be included such as land clearing activities (chain saw and equipment operation), drilling, equipment operation for excavating, hauling or conveying materials, pile driving, steel work, material processing, product storage and removal. Land clearing and construction may be only temporary noise at the site whereas the ongoing operation of a facility would be considered permanent noise. An analysis may be required for

various phases of the construction and operation of the project to assure that adverse noise effects do not occur at any phase.

To calculate the sound generated by equipment operation, one can consult the manufacturers' specifications for sound generation, available for various types of equipment. Another option for calculating the sound to be generated by equipment is to make actual measurements of sound generated by existing similar equipment, elsewhere.

Tables C and D summarize noise measurements from some common equipment used in construction and mining. Table E summarizes the noise level, in decibels (dB[A]), from some common sources. This information can be used to assist Department staff in relating potential noise impacts to sound levels produced by commercial and industrial activities. Use of these tables in the first level of analysis will help determine whether or not noise will be an issue and whether actual measurements should be made to confirm noise levels.

Table C

PROJECTED NOISE LEVELS

Noise Source	Measurements	1,000 feet	2,000 feet	3,000 feet
Primary and secondary crusher	89 dB(A) at 100 ft	69.0 dB(A)	63.0 dB(A)	59.5 dB(A)
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 50 ft	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)

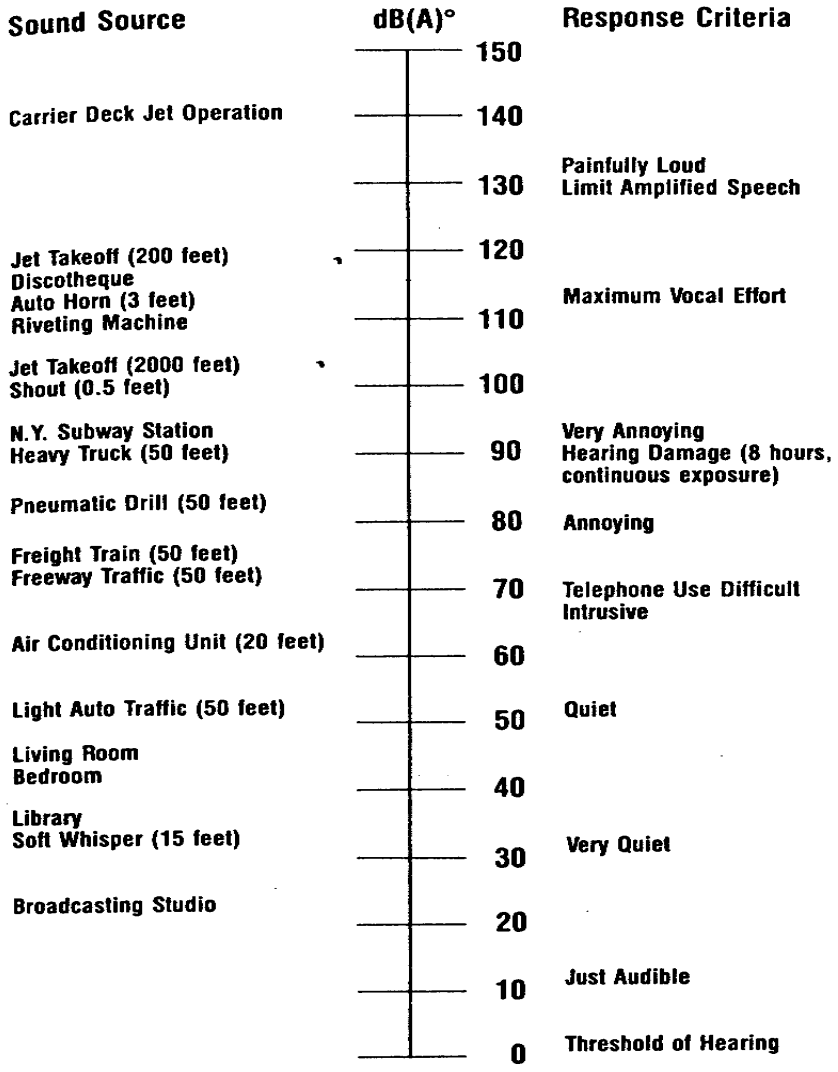
Table D

Common 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
Garbage Truck	71-83	50
Jackhammer	82	50
Paving breaker	82	50
Wood Chipper	89	50
Bulldozer	80	50
Grader	85	50
Truck	91	50
Generator	78	50
Rock drill	98	50

(excerpt and derived from Cowan, 1994)

Table E



(The Aggregate Handbook, 1991)

The sound level at receptor locations should be calculated using the inverse square rule whereby sound is attenuated over distance. Again, each doubling of the distance from the source of a noise decreases the SPL by 6 dB(A) at distances greater than 50 feet. This calculation should first consider the straight line distance between the point of noise generation and the point of noise reception with the presumption that no natural or manmade features exist along the transect between the two points that would further attenuate sound level. Calculations should be performed for each point of reception in all directions being careful to evaluate the worst case noise impact potential by considering activities at the point where they would be closest to a receptor. The sound level calculated for the point of reception should be related to ambient sound levels. Ambient sound levels can be either measured or assumed based on established references for the environmental setting and land use at the point of reception. For estimation purposes, ambient SPLs will vary from approximately 35 dB(A) in a wilderness area to approximately 87 dB(A) in a highly industrial setting. A quiet seemingly serene setting such as rural farm land will be at the lower end of the scale at about 45 dB(A), whereas an urban industrial area will be at the high end of this scale at around 79 dB(A) (EPA 550/9-79-100, November 1978). If there is any concern that levels based on reference values do not accurately reflect ambient SPL, field measurements should be undertaken to determine ambient SPLs.

Where this evaluation indicates that sound levels at the point of reception will not be perceptible, similar to or only slightly elevated as compared to ambient conditions, no further evaluation is required. When there is an indication from this initial analysis that marginal or significant noise impact may occur, further evaluation is required. In determining the potential for an adverse noise impact, consider not only ambient noise levels, but also the existing land use, and whether or not an increased noise level or the introduction of a discernable sound, that is out of character with existing sounds, will be considered annoying or obtrusive. (see B.1.a Evaluation of Sound Characteristics)

4. Second Level Noise Impact Evaluation

Further refine the evaluation of noise impact potential by factoring in any additional noise attenuation that will be provided by existing natural topography, fabricated structures such as buildings, walls or berms or vegetation located between the point of noise generation and noise reception. This analysis may require consideration of future conditions and the loss of natural noise buffers over time.

Dense vegetation that is at least 100 feet in depth will reduce the sound levels by 3 to 7 dB(A). Evergreens provide a better vegetative screen than deciduous trees. Keep in mind that if a vegetative screen does not currently exist, planting a vegetative screen may require 15 or more years of growth before it becomes effective.

The degree to which topography attenuates noise depends on how close the feature is located to the source or the receptor of the noise. Topography can act as a natural screen. The closer a hill or other barrier is to the noise source or the receptor, the larger the sound shadow will be on the side opposite the noise source. Certain operations such as mining and landfills may be able to use topography to maintain a screen between the operation and receptors as they progress. Mining operations may be able to create screens by opening a mine in the center of the site using and maintaining the pit walls as barriers against sound (Aggregate Handbook, 1991).

If after taking into account all the attenuating features the potential still exists for adverse noise impact, other types of noise analyses or modeling should be used to characterize the source. An Equivalent Sound Level (L_{eq}) analysis or a related type of noise analysis may better define activities or sources that require more mitigation or isolation so that noise emanating from these sources will not cause an adverse impact.

Where it is demonstrated that noise absorbing or deflecting features further attenuate sound reception to a level of no significant increase, no further analysis is necessary. Where it is determined that noise level or the character of the noise may

have a significant adverse effect on receptors, other noise mitigation measures should be evaluated in an expanded noise analysis.

5. Third Level - Mitigation Measures

When the above analyses indicate significant noise effects may or will occur, the applicant should evaluate options for implementation of mitigation measures that avoid, or diminish significant noise effects to acceptable levels (see Section V.C. Mitigation - Best Management Practices). Adequate details concerning mitigation measures and an evaluation of the effectiveness of the mitigative measures through additional sound level calculations should be provided in a noise analysis. These calculations are to factor in the noise reduction or avoidance capabilities of the mitigation measures. In circumstances where noise effects cannot readily be reduced to a level of no significance by project design or operational features in the application, the applicant must evaluate alternatives and mitigation measures in an environmental impact statement to avoid or reduce impacts to the maximum extent practicable per the requirements of the State Environmental Quality Review Act (SEQR).

The noise analysis should be part of the application or a supplement to it, and will be part of the SEQR environmental assessment by reference. Duplicative noise analysis information is not required for the permit application and the assessment of impacts under SEQR. A proper analysis can satisfy information needs for both purposes.

C. Mitigation - Best Management Practices (BMP) for Reducing Noise

Various noise abatement techniques are available for reducing frequency of sound, duration of sound or SPLs at receptor locations. The mitigation techniques given below are listed according to what sound characteristic they mitigate.

1. Reduce noise frequency and impulse noise at the source of generation by:

   a. Replacing back-up beepers on machinery with strobe lights (subject to other requirements, e.g., OSHA and Mine Safety and Health Administration, as applicable). This eliminates the most annoying impulse beeping;

   b. Using appropriate mufflers to reduce the frequency of sound on machinery that pulses, such as diesel engines and compressed air machinery;

   c. Changing equipment: using electric motors instead of compressed air driven machinery; using low speed fans in place of high speed fans;

   d. Modifying machinery to reduce noise by using plastic liners, flexible noise control covers, and dampening plates and pads on large sheet metal surfaces; and

2. Reduce noise duration by:

   a. Limiting the number of days of operation, restricting the hours of operation and specifying the time of day and hours of access and egress can abate noise impacts.

   b. Limiting noisier operations to normal work day hours may reduce or eliminate complaints.

Limiting hours of construction or operation can be an effective tool in reducing potential adverse impacts of noise. The impacts of noise on receptors can be

significantly reduced by effectively managing the hours at which the loudest of the operations can take place.

Implementation of hours of operation does not reduce the SPL emanating from a facility. Determining whether or not hours of operation will be effective, mitigation requires consideration of: public safety, for example road construction at night may reduce traffic concerns and facilitate work; duration of the activity, is it a one time event necessary to meet a short term goal or will the activity become an ongoing operation; and surrounding land use, consider what type(s) of land use is proximal to the activity and at what time(s) might a reduction of noise levels be necessary. There may be other factors to consider due to the uniqueness of a given activity or the type of land use adjacent to the activity. Hours of operation should also consider weekend activities and legal holidays that may change the types of land use adjacent to the permitted activity or increase traffic levels in an area.

The best results from using hours of operation as a mitigative measure will be obtained if the hours are negotiated with the owner or operator of the facility. The less noisy aspects of an operation may not have to be subject to the requirements of hours of operation such as preparing, greasing and maintaining machinery for the upcoming day's operation. The more noisy operations can be scheduled to begin when people in the receptor area are less likely to be adversely effected. Hours of operation should be included in the operation plans for a facility that becomes part of the permit, or in the event that there is no operation plan, can be included as a permit condition.

3. Reduce Noise sound pressure levels by:

   a. Increasing the setback distance.
   b. Moving processing equipment during operation further from receptors.
   c. Substituting quieter equipment (example - replacing compressed air fan with an electric fan could result in a 20 dB reduction of noise level).

d. Using mufflers selected to match the type of equipment and air or gas flow on mechanical equipment.
e. Ensuring that equipment is regularly maintained.
f. Enclosing processing equipment in buildings (example - enclosing noisy equipment could result in an 8-10 dB noise level reduction, a 9 inch brick wall can reduce SPL by 45-50 dB).
g. Erecting sound barriers such as screens or berms around the noise generating equipment or near the point of reception. The angle of deflection also increases as the height of a screen or barrier increases. Screens or barriers should be located as close to the noise source or the receptor as possible. The closer the barrier is located to the source or the receptor, the greater the angle of deflection of the sound waves will be creating a larger "sound shadow" on the side opposite the barrier. Stockpiles of raw material or finished product can be an effective sound barrier if strategically placed.
h. phasing operations to preserve natural barriers as long as possible.
i. altering the direction, size, proximity of expanding operations.
j. Designing enclosed facilities to prevent or minimize an SPL increases above ambient levels. This would require a noise analysis and building designed by a qualified engineer that includes adequate ventilation with noise abatement systems on the ventilation system.

Public notification of upcoming loud events can also be used as a form of mitigation although it doesn't fit easily into the categories above. People are less likely to get upset if they know of an upcoming event and know that it will be temporary.

The applicant should demonstrate that the specific mitigation measures proposed will be effective in preventing adverse noise effects on receptors.

D. Decision Making - Conditioning Permits to Limit Noise Impacts

Preferably, the mitigation measures as outlined in the construction and operational plans should be relied upon to mitigate the effects of noise on receptors. The permit should state that the activity will be conducted in accordance with the approved plan. Otherwise, mitigation measures and BMP's can be imposed within specific permit conditions.

It is not the intention of this guidance to require decibel limits to be established for operations where such limits are not required by regulation. There are, however, instances when a decibel limit may be established for an operation to ensure activities do not create unacceptable noise effects, as follows:

1. The review of a draft and final environmental impact statement demonstrates the need for imposition of a decibel limit;
2. A decibel limit is established by the Commissioner's findings after a public hearing has been held on an application;
3. The applicant asks to have a decibel limit to demonstrate the ability to comply; or
4. A program division seeks to establish a decibel limit as a permit condition, when necessary to demonstrate avoidance of unacceptable noise impact.

Ultimately, the final decision must incorporate appropriate measures to minimize or avoid significant noise impacts, as required under SEQR. Any unavoidable adverse effects must be weighed along with other social and economic considerations in deciding whether to approve or deny a permit.

REFERENCES

1) Cowan, James P., Handbook of Environmental Acoustics, Van Nostrand Reinhold, 1994.

2) Down, C.G. and Stocks, J.; Environmental Impact of Mining. Applied Science Publishers Ltd., ISBN 0853347166, 1978.

3) U.S. Dept of Transportation - Federal Highway Administration Office of Research and Development; Highway Noise-A Manual for Highway Noise and Land Use, Nov. 1974.

4) New York State Motor Vehicle Law, Chapter IV, Subchapter E, 450.2, Part 450, "Noise From Heavy Motor Vehicles," 200.701 CN, February 28, 1997.

5) Beranek, L.A. ed., Noise and Vibration Control. Cambridge, MA: Institute of Noise Control Engineering, 1971, pp. 164-174 and 182-191.

6) Barksdale, R.D., editor, 1991. The Aggregate Handbook: National Stone Association (Washington, DC), 1.V.

7) Norman, David K., Wampler , Peter J., Throop, Allen H., Schnitzer, E. Frank, and Roloff, J., 1996. "Best Management Practices for Reclaiming Surface Mines in Washington and Oregon." Oregon Dept. of Geology and Mineral Industries, Open File Report 0-96-2.

8) United States Environmental Protection Agency, Protective Noise Levels, Condensed Version of EPA Levels document, EPA 550/9-79-100, November 1978, Office of Noise Abatement & Control, Washington, D.C.

9) United States Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA 550/9-74-004, March 1974, Office of Noise Abatement and Control, Washington, D.C.

10) City of Davis General Plan, Appendix E Background Information on Environmental Acoustics, November 1996.

11) The Australian National University, “Physics and Psychophysics of Music”, ACAT 1003, David Worrall, http://www.anu.edu.au/ITA/ACAT/drw/PPofM/Intensity2.html, 1998.

12) Danish Wind Turbine Manufacturers Association, Measuring and Calculating Sound Levels, November 18, 1997.

Additional Reading

a. Beranek, Leo L. and Istavan L. Ver, Noise and Vibration Control Engineering, John Wiley & Sons, Inc. New York, 1992.

b. Beranek, Leo L., Noise and Vibration Control, Institute of Noise Control Engineering, Revised Edition, Washington, C.C., 1988.

c. Diehl, George, M., Machinery Acoustics, John Wiley & Sons, New York, 1973.

d. Erwin, J.D., Graf, E. R., Industrial Noise and Vibration Control, Prentice Hall, Englewood Cliffs, New Jersey, 1979.

e. Jensen, Paul, et al, Industrial Noise Control Manual, U.S. Department of Health, Education and Welfare, Public Health Service, Cincinnati, 1978.

APPENDIX B - Instrument Calibration Sheets

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
92 North Main St, Building 20
Windsor, NJ 08561
Toll-free: (800) 301-9663

Pine Environmental Services, Inc.

Instrument ID 17326
Description Quest SoundPro DL2-1/3
Calibrated 12/13/2018 4:25:22PM

Manufacturer Quest
Model Number SoundPro DL-2-1/3
Serial Number/ Lot Number BIJ090030
Location New Jersey
Department

State Certified
Status Pass
Temp °C 19
Humidity % 33

Calibration Specifications

Group # 1
Group Name Calibrated to 114db w/ Quest Sound Source

Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Jennings

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 17326
Description Quest SoundPro DL-2-1/3
Calibrated 4/5/2018

Manufacturer Quest
Model Number SoundPro DL-2-1/3
Serial Number BIJ090030
Location New Jersey
Temp 72

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 25

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	4/24/2017	4/24/2018
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	4/5/2017	4/5/2018

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Cole

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
159 Colonnade Road
Unit 3
Ottawa, Ontario K2E 7L9

Pine Environmental Services, Inc.

Instrument ID 13633
Description Quest SoundPro DL2-1/1-1/3
Calibrated 12/13/2018 8:13:13AM

Manufacturer	Quest	**State Certified**	
Model Number	SoundPro DL2-1/1-1/3	**Status**	Pass
Serial Number/ Lot Number	BIJ060022	**Temp °C**	19
Location	Ottawa	**Humidity %**	31
Department			

Calibration Specifications

Group # 1
Group Name
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Jennings

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 13633
Description Quest SoundPro DL-2-1/3
Calibrated 7/18/2018

Manufacturer	Quest	**Classification**	
Model Number	SoundPro DL-2-1/3	**Status**	pass
Serial Number	BIJ060022	**Frequency**	Yearly EOM
Location	New Jersey	**Department**	Lab
Temp	77	**Humidity**	34

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration

				(As Of Cal Entry Date)	
Test Instrument ID	**Description**	**Manufacturer**	**Serial Number**	**Last Cal Date**	**Next Cal Date**
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	5/10/2018	5/10/2019
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	5/7/2018	5/7/2019

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated David Galego

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
92 North Main St, Building 20
Windsor, NJ 08561
Toll-free: (800) 301-9663

Pine Environmental Services, Inc.

Instrument ID 25284
Description Quest SoundPro DL-2-1/3
Calibrated 12/13/2018 8:21:56AM

Manufacturer Quest
Model Number SoundPro DL-2
Serial Number/ Lot Number BIN030009
Location New Jersey
Department

State Certified
Status Pass
Temp °C 19
Humidity % 31

Calibration Specifications

Group # 1
Group Name
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Jennings

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 25284
Description Quest SoundPro DL-2-1/3
Calibrated 9/18/2018

Manufacturer Quest
Model Number SoundPro DL-2-1/3
Serial Number BIN030009
Location New Jersey
Temp 75

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 40

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	5/10/2018	5/10/2019
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	5/7/2018	5/7/2019

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Cole

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
92 North Main St, Building 20
Windsor, NJ 08561
Toll-free: (800) 301-9663

Pine Environmental Services, Inc.

Instrument ID R11674
Description Quest QC-10
Calibrated 12/13/2018 8:15:11AM

Manufacturer Quest
Model Number QC-10
Serial Number/ Lot Number QIK100021
Location New Jersey
Department

State Certified
Status Pass
Temp °C 19
Humidity % 31

Calibration Specifications

Group # 1
Group Name
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Jennings

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID R11674
Description Quest QC-10 Acoustic Calibrator
Calibrated 5/21/2018

Manufacturer Quest
Model Number QC-10
Serial Number QIK100021
Location New Jersey
Temp 78

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 32

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

				(As Of Cal Entry Date)	
Test Instrument ID	**Description**	**Manufacturer**	**Serial Number**	**Last Cal Date**	**Next Cal Date**
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	5/10/2018	5/10/2019
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	5/7/2018	5/7/2019
SOUNDPRO DL-1-1/3	3M SoundPro DL-1-1/3	Quest Technologies	BLL070002	1/8/2018	1/8/2019

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Cole

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID R10308
Description Quest SoundPro DL-2-1/3
Calibrated 11/12/2018

Manufacturer	Quest	**Classification**	
Model Number	SoundPro DL-2-1/3	**Status**	pass
Serial Number	BIG060002	**Frequency**	Yearly EOM
Location	New Jersey	**Department**	Lab
Temp	71	**Humidity**	25

Calibration Specifications

Group # 1
Group Name Acoustic Tests Performed
Test Performed: Yes **As Found Result: Fail** **As Left Result: Pass**

Test Instruments Used During the Calibration

				(As Of Cal Entry Date)	
Test Instrument ID	**Description**	**Manufacturer**	**Serial Number**	**Last Cal Date**	**Next Cal Date**
B&K 4226	Brüel & Kjær 4226	Brüel & Kjær	2590968	5/10/2018	5/10/2019
B&K 4228	Brüel & Kjær 4228	Brüel & Kjær	2667476	5/7/2018	5/7/2019

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated David Galego

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

APPENDIX C – Sound Data

Session Report

1/18/2019

Information Panel

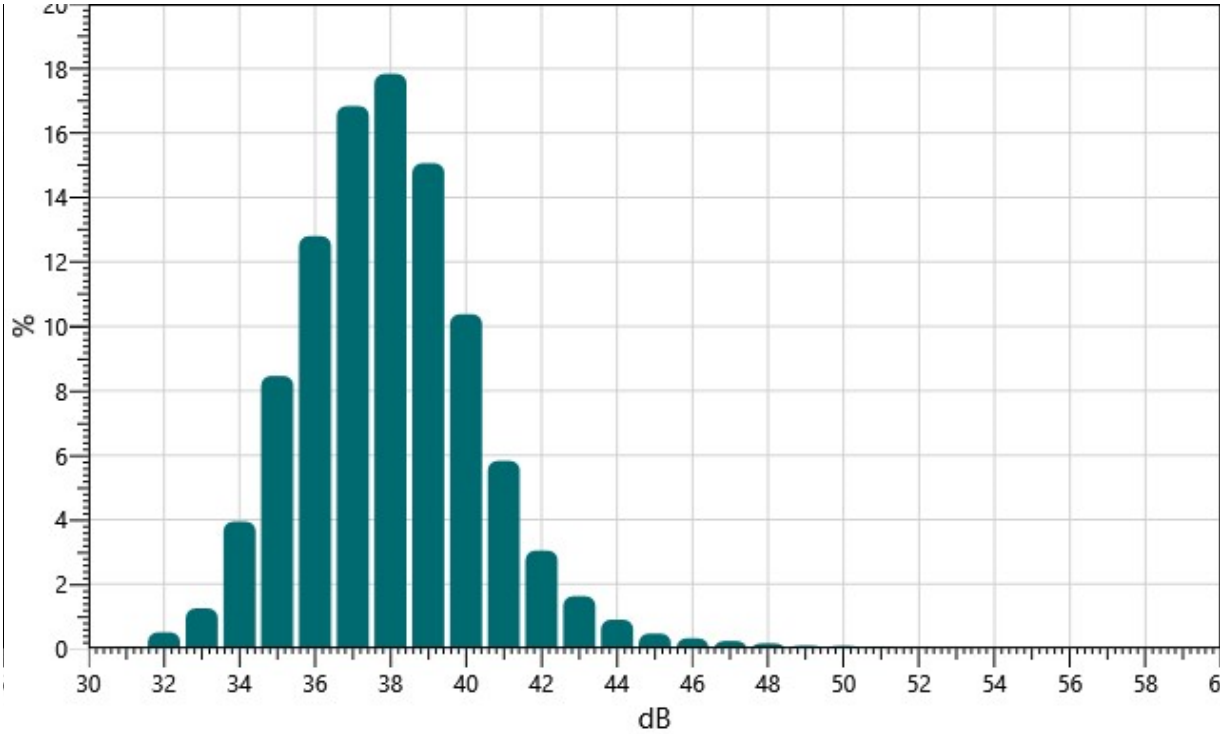
Name	Loggind Station 11
Start Time	12/26/2018 8:46:31 AM
Stop Time	12/26/2018 11:53:51 AM
Device Name	BIN030009
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	39.3 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	1/1
Exchange Rate	2	5 dB	Weighting	2	A
Response	2	FAST			

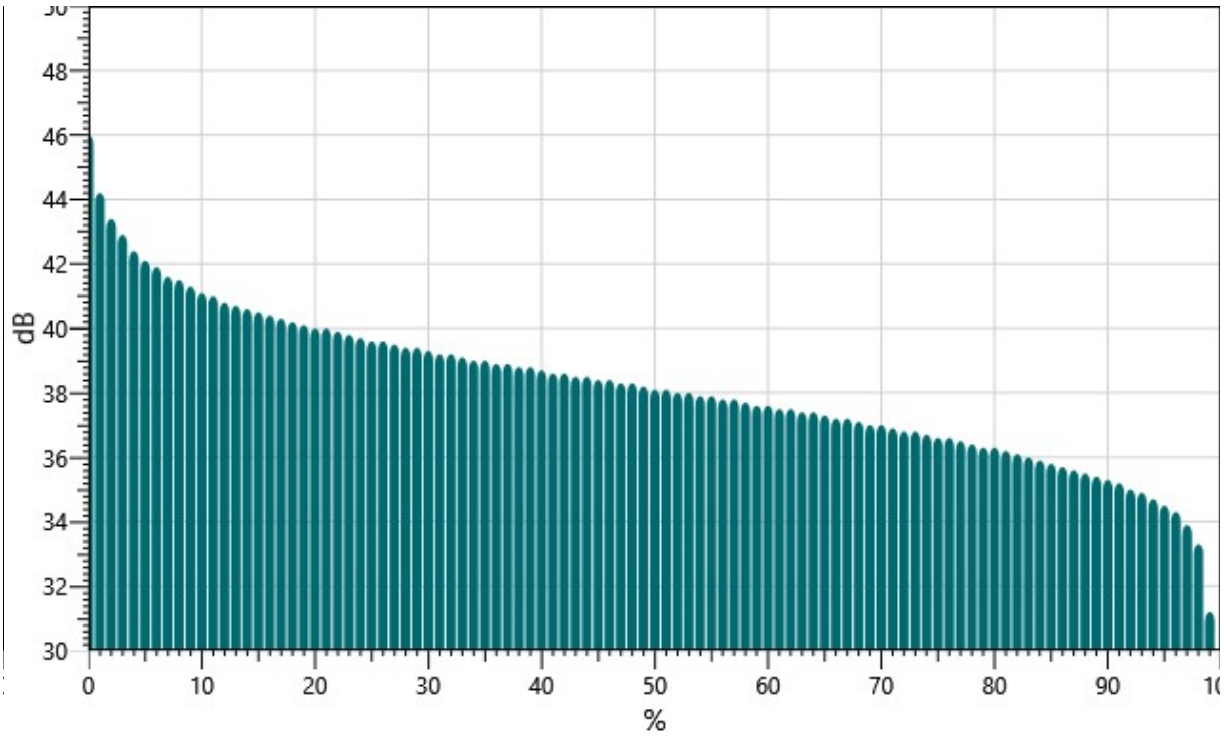
Statistics Chart

Loggind Station 11: Statistics Chart



Exceedance Chart

Loggind Station 11: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
30:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.06
32:	0.03	0.03	0.02	0.03	0.05	0.06	0.07	0.07	0.06	0.08	0.50
33:	0.08	0.08	0.10	0.10	0.11	0.11	0.12	0.16	0.18	0.21	1.25
34:	0.22	0.27	0.32	0.36	0.37	0.39	0.42	0.47	0.54	0.57	3.94
35:	0.66	0.76	0.56	0.55	0.85	0.93	0.98	1.02	1.07	1.08	8.46
36:	1.11	1.15	1.19	1.22	1.27	1.31	1.35	1.36	1.39	1.45	12.80
37:	1.48	1.52	1.57	1.61	1.67	1.71	1.75	1.78	1.84	1.91	16.84
38:	1.98	2.05	1.60	1.10	1.88	1.88	1.87	1.85	1.83	1.79	17.83
39:	1.76	1.72	1.68	1.61	1.54	1.43	1.41	1.35	1.30	1.26	15.06
40:	1.21	1.18	1.10	1.07	1.05	1.04	0.98	0.92	0.91	0.90	10.37
41:	0.86	0.79	0.66	0.31	0.64	0.59	0.55	0.50	0.46	0.45	5.82
42:	0.41	0.39	0.36	0.33	0.31	0.29	0.27	0.23	0.23	0.22	3.04
43:	0.20	0.19	0.17	0.17	0.17	0.15	0.15	0.14	0.14	0.14	1.62
44:	0.12	0.13	0.11	0.04	0.10	0.09	0.08	0.07	0.07	0.07	0.90
45:	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.46
46:	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.32
47:	0.03	0.03	0.03	0.01	0.03	0.02	0.02	0.02	0.02	0.02	0.23
48:	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.16
49:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.10
50:	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.09
51:	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.06
52:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.04
53:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
54:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
55:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
56:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
57:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
58:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

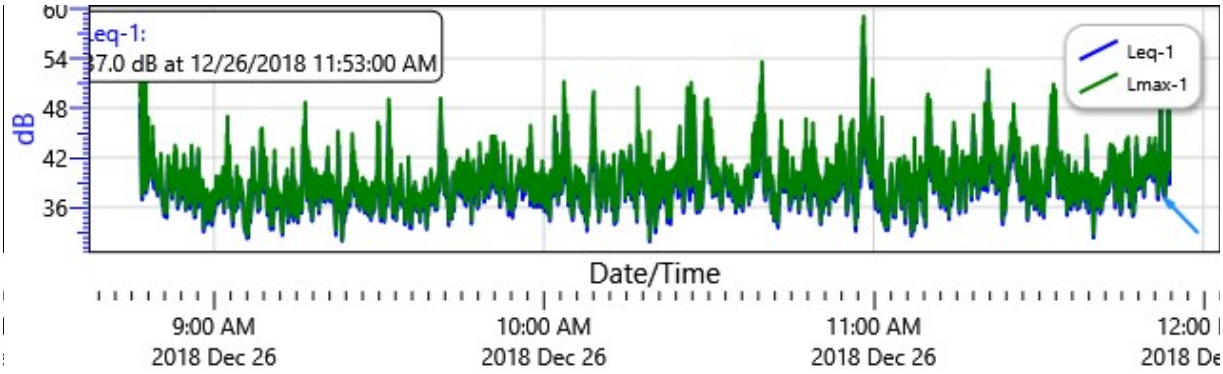
Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9

0%:		46.0	44.2	43.4	42.9	42.4	42.1	41.9	41.6	41.5
10%:	41.3	41.1	41.0	40.8	40.7	40.6	40.5	40.4	40.3	40.2
20%:	40.1	40.0	40.0	39.9	39.8	39.7	39.6	39.6	39.5	39.4
30%:	39.4	39.3	39.2	39.2	39.1	39.0	39.0	38.9	38.9	38.8
40%:	38.8	38.7	38.6	38.6	38.5	38.5	38.4	38.4	38.3	38.3
50%:	38.2	38.1	38.1	38.0	38.0	37.9	37.9	37.8	37.8	37.7
60%:	37.6	37.6	37.5	37.5	37.4	37.4	37.3	37.2	37.2	37.1
70%:	37.0	37.0	36.9	36.8	36.8	36.7	36.6	36.6	36.5	36.4
80%:	36.3	36.3	36.2	36.1	36.0	35.9	35.8	35.7	35.6	35.5
90%:	35.4	35.3	35.2	35.0	34.9	34.7	34.5	34.3	33.9	33.3
100%:	31.2									

Logged Data Chart

Loggind Station 11: Logged Data Chart



Lavg Data Editing Summary

Serial Number: BIN030009
Exchange Rate: 3 dB
Response: Fast

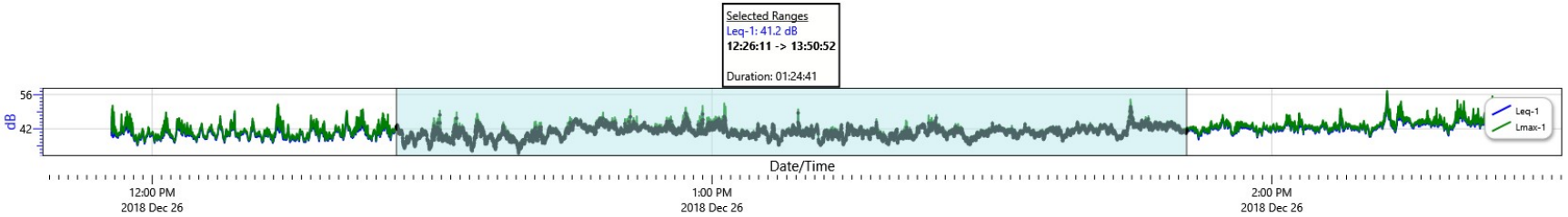
Start Time: 12/26/2018 11:55:37 AM
Stop Time: 12/26/2018 2:23:43 PM

Duration: 02:28:05
Selected: 01:24:42
Weighting: A

Note: Logging Station 11 - Operating

Summary

Item	Edited	Selected	Original
Lavg	41.8 dB	41.2 dB	41.8 dB
SEL	81.3 dB	78.2 dB	81.3 dB
TWA	36.7 dB	33.6 dB	36.7 dB
Dose	0.0%	0.0%	0.0%
Dose [8]	0.0%	0.0%	0.0%



Session Report

1/18/2019

Information Panel

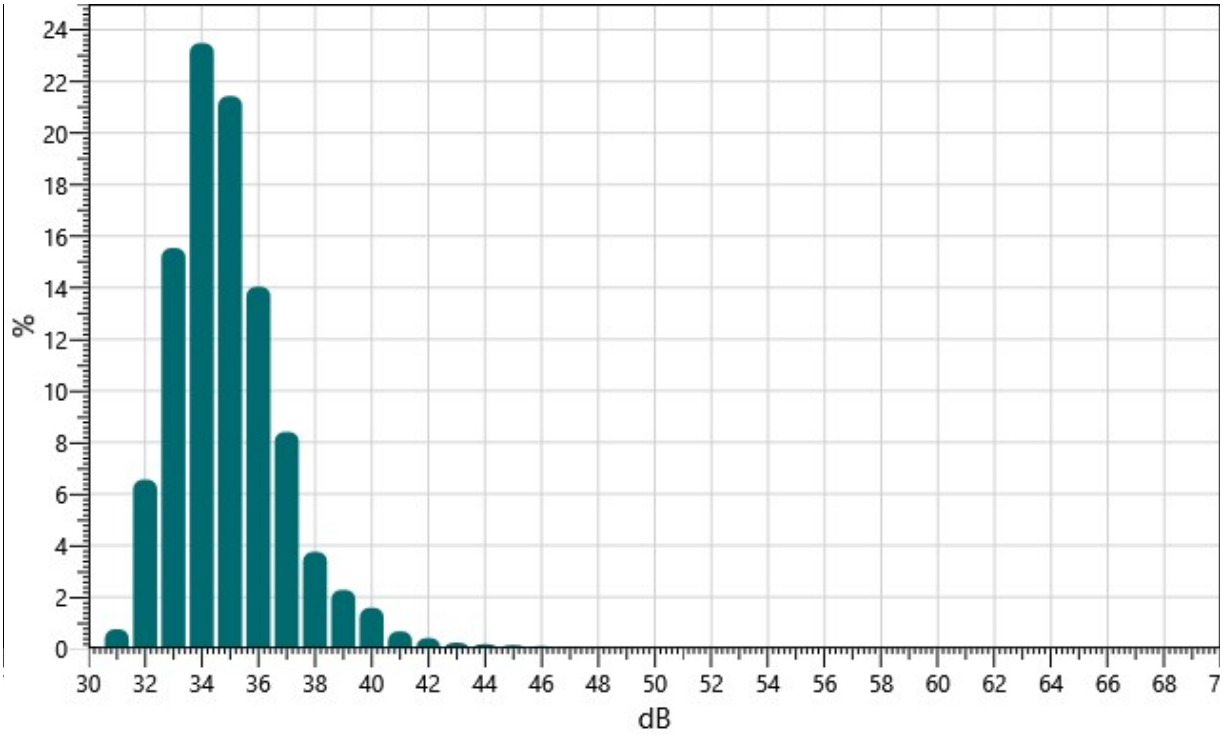
Name	Loggings Station 12A
Start Time	12/26/2018 8:38:52 AM
Stop Time	12/26/2018 9:52:35 AM
Device Name	BIJ090030
Model Type	SoundPro DL
Device Firmware Rev	R.13D
Comments	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	36.7 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	1/1
Exchange Rate	2	5 dB	Weighting	2	C
Response	2	FAST			

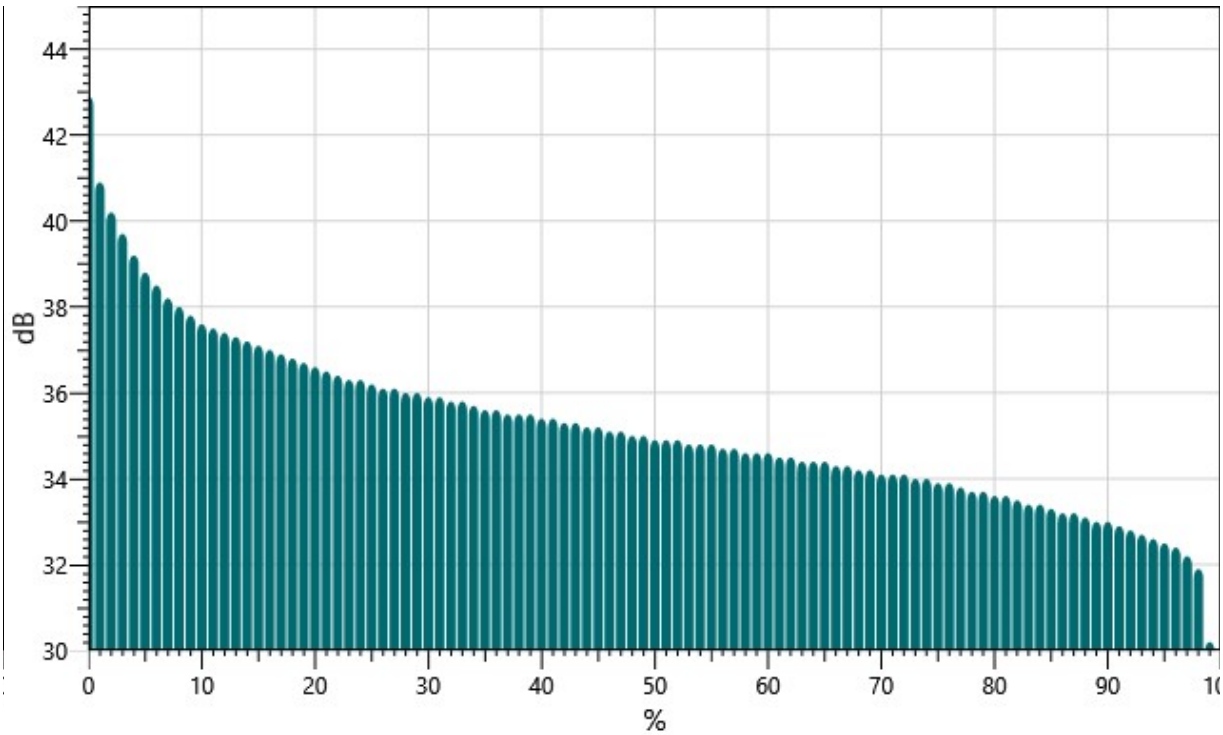
Statistics Chart

Loggings Station 12A: Statistics Chart



Exceedance Chart

Loggings Station 12A: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
30:	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.09
31:	0.03	0.03	0.03	0.02	0.04	0.07	0.09	0.11	0.15	0.18	0.75
32:	0.29	0.38	0.22	0.34	0.59	0.68	0.84	0.98	1.12	1.12	6.56
33:	1.31	1.35	1.48	1.52	1.56	1.55	1.60	1.62	1.71	1.84	15.54
34:	1.94	2.05	2.17	2.29	2.32	2.43	2.52	2.56	2.57	2.64	23.49
35:	2.69	2.78	1.86	1.66	2.35	2.21	2.08	1.98	1.95	1.87	21.43
36:	1.82	1.73	1.66	1.54	1.44	1.29	1.24	1.17	1.09	1.06	14.04
37:	1.04	1.01	0.96	0.91	0.91	0.81	0.76	0.72	0.68	0.61	8.41
38:	0.58	0.55	0.38	0.25	0.41	0.36	0.32	0.31	0.29	0.30	3.75
39:	0.26	0.27	0.25	0.25	0.23	0.23	0.23	0.19	0.19	0.18	2.28
40:	0.17	0.17	0.17	0.17	0.17	0.17	0.15	0.15	0.15	0.12	1.58
41:	0.10	0.10	0.07	0.03	0.07	0.06	0.06	0.06	0.06	0.05	0.67
42:	0.05	0.05	0.04	0.04	0.03	0.04	0.05	0.04	0.03	0.03	0.41
43:	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.23
44:	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.17
45:	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.14
46:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.10
47:	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.06
48:	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.05
49:	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.05
50:	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04
51:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
52:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
53:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
54:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
55:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
56:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
57:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
58:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
59:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
60:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
62:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
63:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
64:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

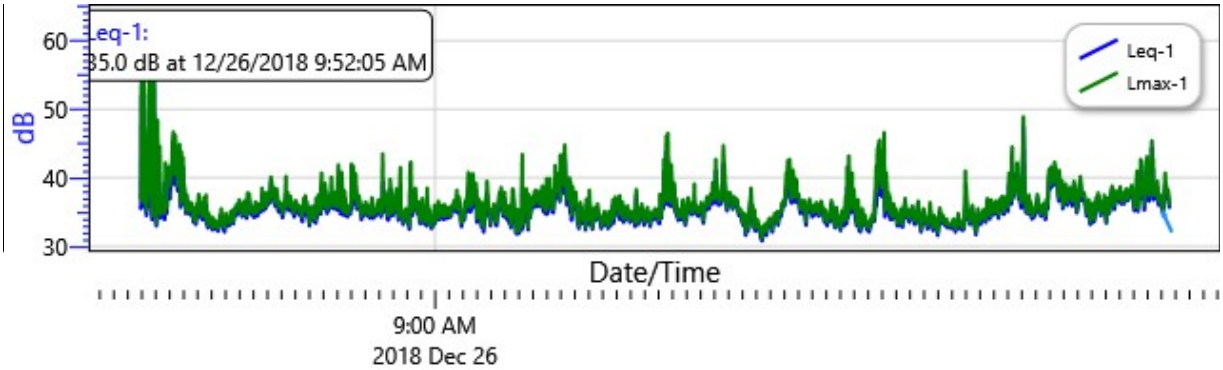
65:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		42.9	40.9	40.2	39.7	39.2	38.8	38.5	38.2	38.0
10%:	37.8	37.6	37.5	37.4	37.3	37.2	37.1	37.0	36.9	36.8
20%:	36.7	36.6	36.5	36.4	36.3	36.3	36.2	36.1	36.1	36.0
30%:	36.0	35.9	35.9	35.8	35.8	35.7	35.6	35.6	35.5	35.5
40%:	35.5	35.4	35.4	35.3	35.3	35.2	35.2	35.1	35.1	35.0
50%:	35.0	34.9	34.9	34.9	34.8	34.8	34.8	34.7	34.7	34.6
60%:	34.6	34.6	34.5	34.5	34.4	34.4	34.4	34.3	34.3	34.2
70%:	34.2	34.1	34.1	34.1	34.0	34.0	33.9	33.9	33.8	33.7
80%:	33.7	33.6	33.6	33.5	33.4	33.4	33.3	33.2	33.2	33.1
90%:	33.0	33.0	32.9	32.8	32.7	32.6	32.5	32.4	32.2	31.9
100%:	30.2									

Logged Data Chart

Loggings Station 12A: Logged Data Chart



Session Report

1/18/2019

Information Panel

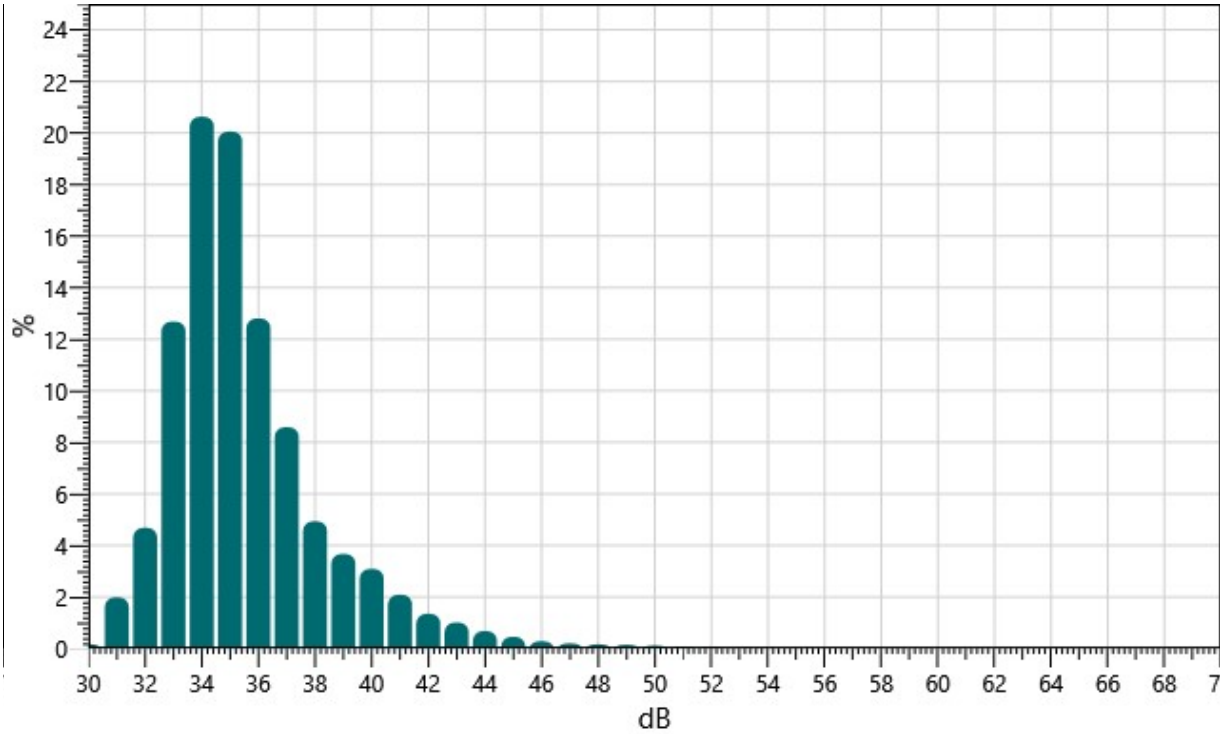
Name	Logging Station 12B - Ambiant
Start Time	12/26/2018 10:33:16 AM
Stop Time	12/26/2018 11:46:32 AM
Device Name	BIJ090030
Model Type	SoundPro DL
Device Firmware Rev	R.13D
Comments	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	37.7 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	1/1
Exchange Rate	2	5 dB	Weighting	2	C
Response	2	FAST			

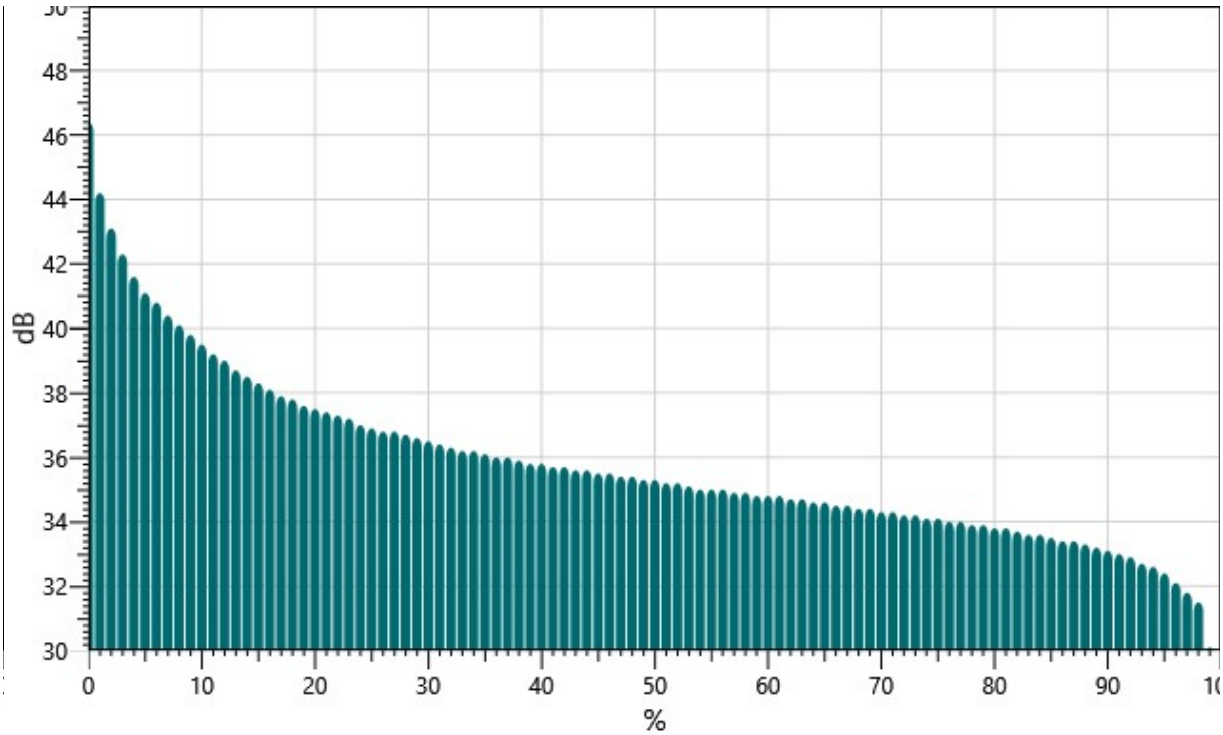
Statistics Chart

Logging Station 12B - Ambiant: Statistics Chart



Exceedance Chart

Logging Station 12B - Ambiant: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
30:	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.17
31:	0.08	0.11	0.14	0.14	0.15	0.18	0.24	0.28	0.29	0.36	1.99
32:	0.40	0.43	0.24	0.31	0.44	0.47	0.51	0.59	0.59	0.69	4.68
33:	0.75	0.88	1.01	1.09	1.18	1.26	1.47	1.57	1.64	1.83	12.68
34:	1.86	1.92	1.94	1.98	2.00	2.04	2.15	2.18	2.24	2.33	20.63
35:	2.46	2.52	1.65	1.46	2.12	2.04	2.02	2.03	1.97	1.79	20.06
36:	1.68	1.54	1.42	1.32	1.23	1.19	1.15	1.11	1.09	1.08	12.80
37:	1.01	0.99	0.96	0.95	0.85	0.82	0.78	0.75	0.74	0.74	8.58
38:	0.68	0.64	0.46	0.32	0.52	0.50	0.49	0.45	0.45	0.42	4.93
39:	0.43	0.42	0.40	0.37	0.35	0.37	0.36	0.34	0.33	0.30	3.67
40:	0.32	0.30	0.33	0.32	0.35	0.30	0.30	0.29	0.29	0.29	3.09
41:	0.28	0.26	0.23	0.11	0.23	0.22	0.20	0.18	0.19	0.17	2.09
42:	0.17	0.15	0.14	0.13	0.14	0.14	0.11	0.13	0.12	0.12	1.35
43:	0.14	0.12	0.11	0.11	0.10	0.09	0.10	0.08	0.08	0.08	1.01
44:	0.09	0.09	0.07	0.03	0.08	0.07	0.07	0.06	0.06	0.06	0.67
45:	0.05	0.06	0.05	0.04	0.04	0.05	0.04	0.04	0.04	0.03	0.46
46:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.29
47:	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.20
48:	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.16
49:	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.14
50:	0.01	0.01	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.12
51:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.08
52:	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.06
53:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
54:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
55:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
56:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
57:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
62:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
63:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
64:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

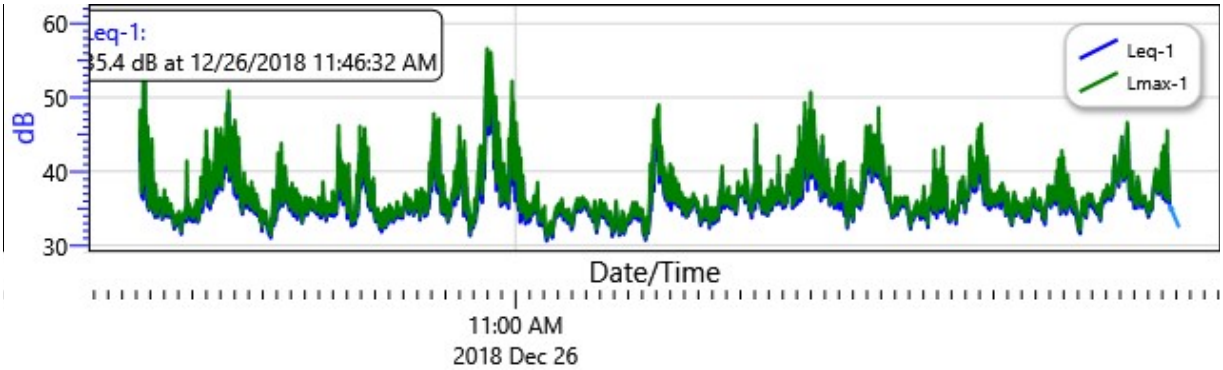
65:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		46.4	44.2	43.1	42.3	41.6	41.1	40.8	40.4	40.1
10%:	39.8	39.5	39.2	39.0	38.7	38.5	38.3	38.1	37.9	37.8
20%:	37.6	37.5	37.4	37.3	37.2	37.0	36.9	36.8	36.8	36.7
30%:	36.6	36.5	36.4	36.3	36.2	36.2	36.1	36.0	36.0	35.9
40%:	35.8	35.8	35.7	35.7	35.6	35.6	35.5	35.5	35.4	35.4
50%:	35.3	35.3	35.2	35.2	35.1	35.0	35.0	35.0	34.9	34.9
60%:	34.8	34.8	34.8	34.7	34.7	34.6	34.6	34.5	34.5	34.4
70%:	34.4	34.3	34.3	34.2	34.2	34.1	34.1	34.0	34.0	33.9
80%:	33.9	33.8	33.8	33.7	33.6	33.6	33.5	33.4	33.4	33.3
90%:	33.2	33.1	33.0	32.9	32.7	32.6	32.4	32.1	31.8	31.5
100%:	30.1									

Logged Data Chart

Logging Station 12B - Ambiant: Logged Data Chart



Lavg Data Editing Summary

Serial Number: BIJ090030
Exchange Rate: 3 dB
Response: Fast

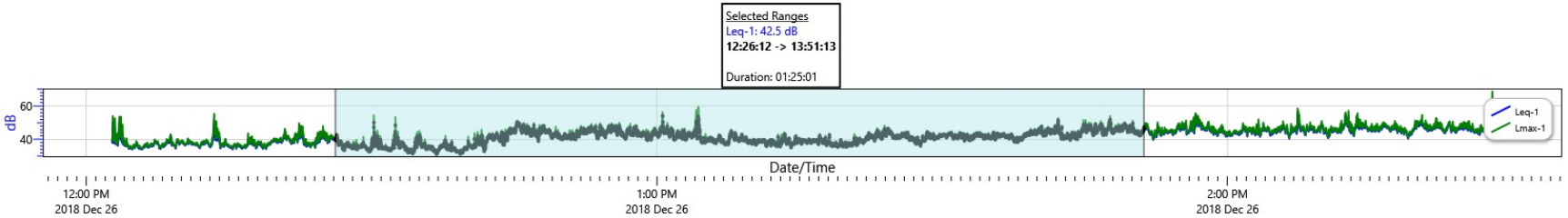
Start Time: 12/26/2018 12:02:40 PM
Stop Time: 12/26/2018 2:27:55 PM

Duration: 02:25:14
Selected: 01:25:02
Weighting: A

Note: Logging Station 12 - Operating

Summary

Item	Edited	Selected	Original
Lavg	43.6 dB	42.5 dB	43.6 dB
SEL	83.0 dB	79.6 dB	83.0 dB
TWA	38.5 dB	35.0 dB	38.5 dB
Dose	0.0%	0.0%	0.0%
Dose [8]	0.0%	0.0%	0.0%



Session Report

1/18/2019

Information Panel

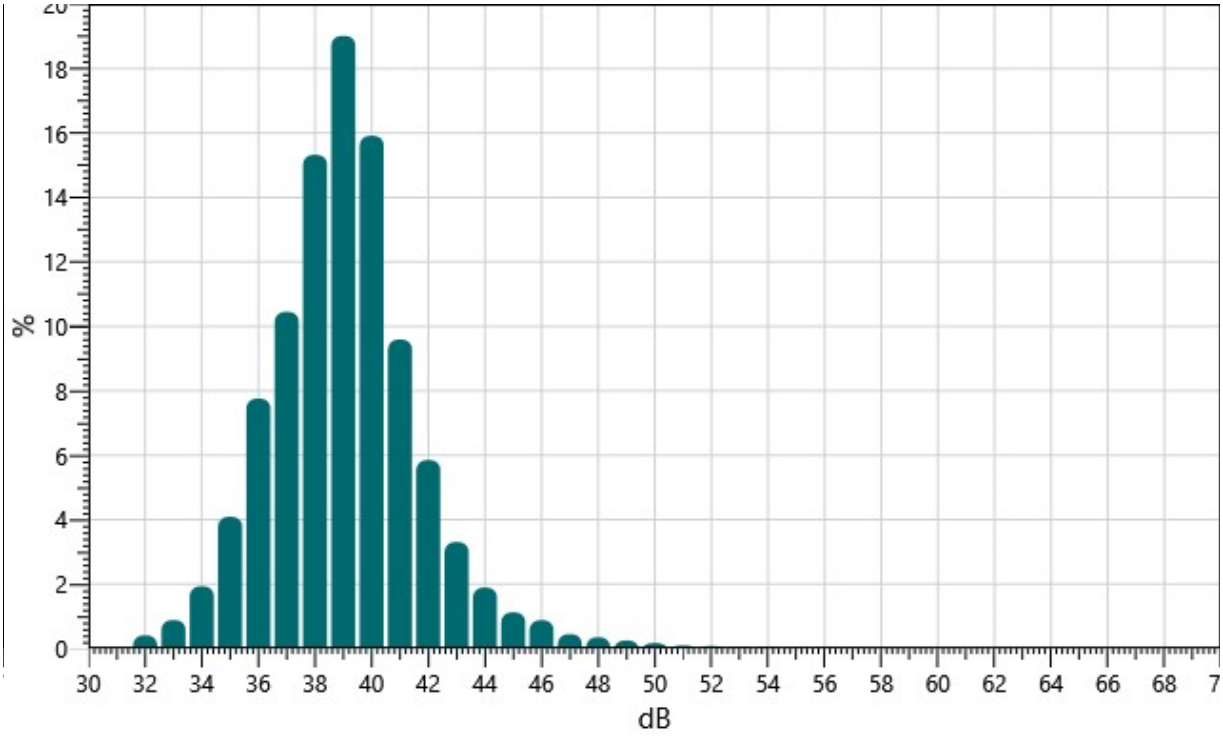
Name	Loggind Station 13 - Ambiant
Start Time	12/26/2018 9:01:34 AM
Stop Time	12/26/2018 12:11:03 PM
Device Name	BIJ060022
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	40.8 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	1/1
Exchange Rate	2	5 dB	Weighting	2	C
Response	2	FAST			

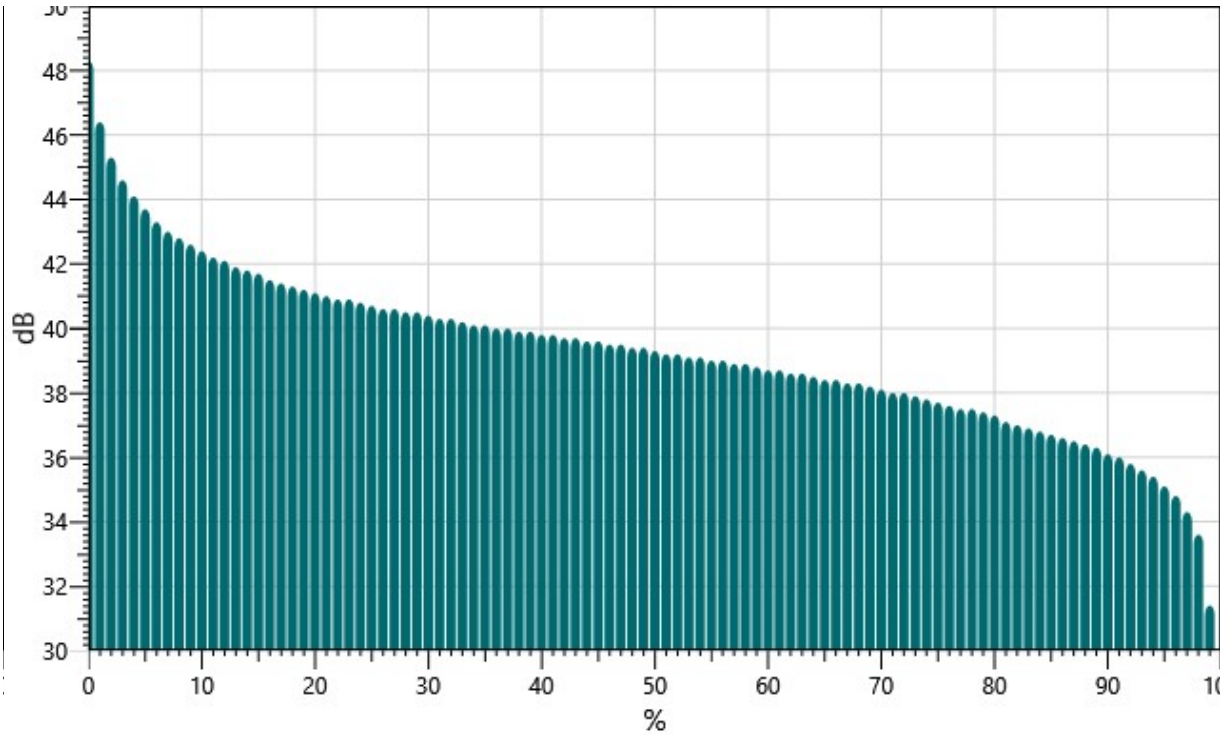
Statistics Chart

Loggind Station 13 - Ambiant: Statistics Chart



Exceedance Chart

Loggind Station 13 - Ambiant: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
30:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
32:	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.08	0.41
33:	0.07	0.07	0.07	0.07	0.08	0.08	0.09	0.10	0.12	0.13	0.88
34:	0.15	0.18	0.18	0.07	0.19	0.21	0.22	0.22	0.24	0.27	1.93
35:	0.30	0.33	0.36	0.37	0.39	0.42	0.44	0.45	0.49	0.54	4.09
36:	0.58	0.62	0.67	0.69	0.74	0.79	0.81	0.91	0.95	1.00	7.75
37:	1.02	1.11	1.16	0.36	1.06	1.09	1.12	1.14	1.18	1.21	10.44
38:	1.27	1.30	1.40	1.49	1.54	1.59	1.62	1.66	1.70	1.74	15.32
39:	1.79	1.80	1.81	1.86	1.88	1.91	1.95	1.98	2.01	2.02	19.01
40:	2.00	2.01	2.02	0.64	1.76	1.64	1.61	1.51	1.40	1.32	15.91
41:	1.23	1.15	1.09	1.02	0.97	0.90	0.87	0.81	0.78	0.77	9.59
42:	0.70	0.66	0.64	0.63	0.60	0.59	0.55	0.51	0.49	0.47	5.85
43:	0.46	0.45	0.43	0.13	0.35	0.33	0.32	0.30	0.26	0.27	3.30
44:	0.26	0.23	0.21	0.20	0.19	0.19	0.17	0.16	0.15	0.15	1.89
45:	0.14	0.13	0.13	0.12	0.12	0.11	0.10	0.10	0.09	0.09	1.12
46:	0.10	0.12	0.11	0.04	0.09	0.10	0.09	0.08	0.07	0.07	0.88
47:	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.45
48:	0.04	0.04	0.03	0.04	0.03	0.04	0.04	0.03	0.04	0.03	0.35
49:	0.03	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.25
50:	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.17
51:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.10
52:	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.08
53:	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.05
54:	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.05
55:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
56:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
57:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
58:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
59:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
60:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
61:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
62:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
63:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
64:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

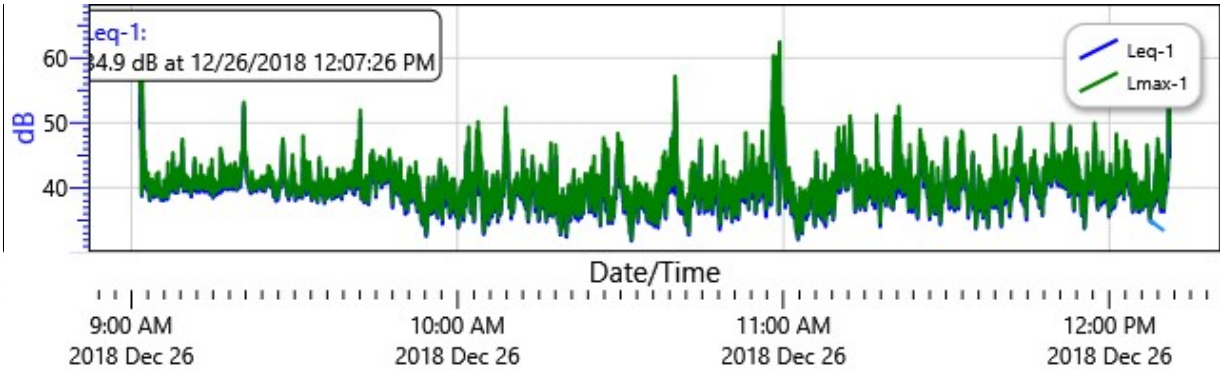
65:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		48.3	46.4	45.3	44.6	44.1	43.7	43.3	43.0	42.8
10%:	42.6	42.4	42.2	42.1	41.9	41.8	41.7	41.5	41.4	41.3
20%:	41.2	41.1	41.0	40.9	40.9	40.8	40.7	40.6	40.6	40.5
30%:	40.5	40.4	40.3	40.3	40.2	40.1	40.1	40.0	40.0	39.9
40%:	39.9	39.8	39.8	39.7	39.7	39.6	39.6	39.5	39.5	39.4
50%:	39.4	39.3	39.2	39.2	39.1	39.1	39.0	39.0	38.9	38.9
60%:	38.8	38.7	38.7	38.6	38.6	38.5	38.4	38.4	38.3	38.3
70%:	38.2	38.1	38.0	38.0	37.9	37.8	37.7	37.6	37.5	37.5
80%:	37.4	37.3	37.1	37.0	36.9	36.8	36.7	36.6	36.5	36.4
90%:	36.3	36.1	36.0	35.8	35.6	35.4	35.1	34.8	34.3	33.6
100%:	31.4									

Logged Data Chart

Loggind Station 13 - Ambiant: Logged Data Chart



Lavg Data Editing Summary

Serial Number: BIJ060022
Exchange Rate: 3 dB
Response: Fast

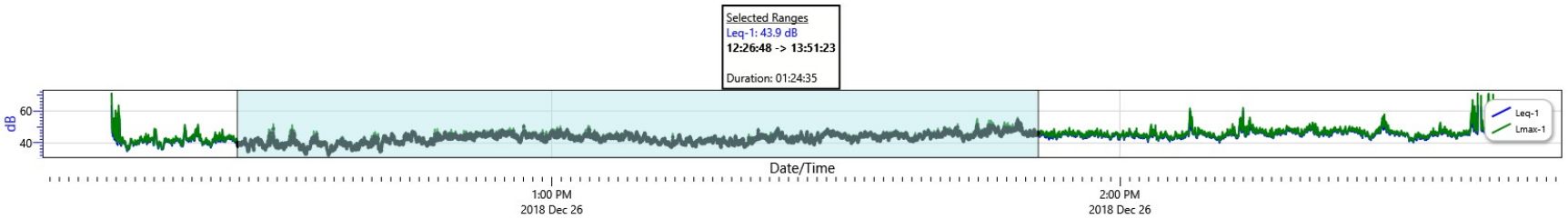
Start Time: 12/26/2018 12:13:29 PM
Stop Time: 12/26/2018 2:39:25 PM

Duration: 02:25:55
Selected: 01:24:36
Weighting: A

Note: Logging Station 13 - Operating

Summary

Item	Edited	Selected	Original
Lavg	45.4 dB	43.9 dB	45.4 dB
SEL	84.8 dB	80.9 dB	84.8 dB
TWA	40.2 dB	36.3 dB	40.2 dB
Dose	0.0%	0.0%	0.0%
Dose [8]	0.0%	0.0%	0.0%



Session Report

1/18/2019

Information Panel

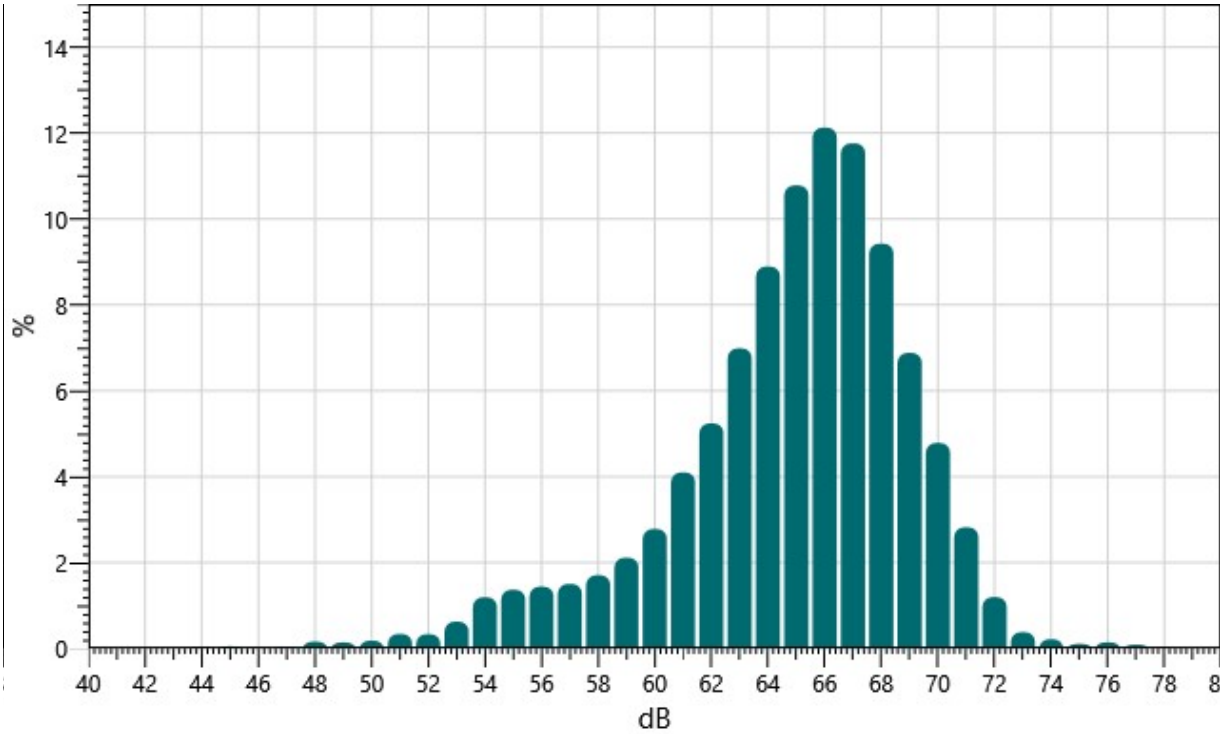
Name	Logging Station 14A - Ambiant
Start Time	12/26/2018 11:39:52 AM
Stop Time	12/26/2018 12:18:10 PM
Device Name	BIG060002
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	
Run Time	00:38:18

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	66.9 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	1/1
Exchange Rate	2	3 dB	Weighting	2	A
Response	2	FAST			

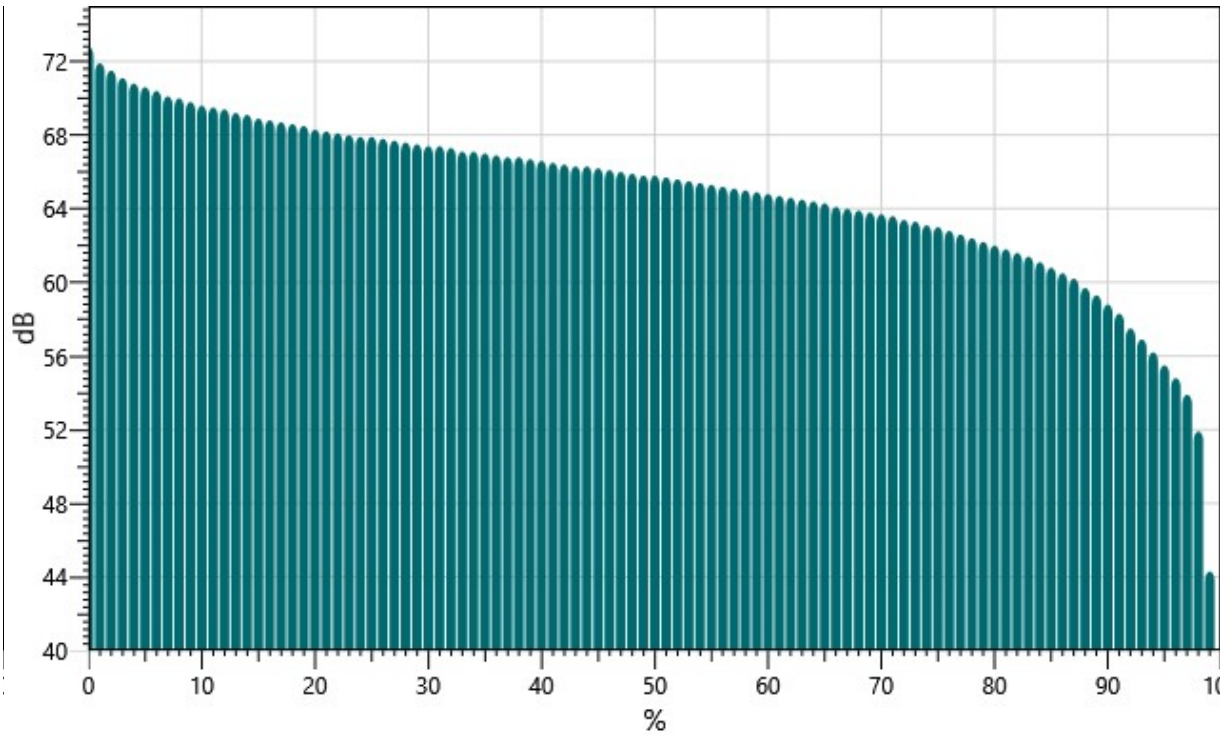
Statistics Chart

Logging Station 14A - Ambiant: Statistics Chart



Exceedance Chart

Logging Station 14A - Ambiant: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
40:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.04
45:	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.05
46:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02
47:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03
48:	0.01	0.02	0.02	0.03	0.02	0.01	0.01	0.01	0.02	0.01	0.16
49:	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.14
50:	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.03	0.18
51:	0.04	0.02	0.02	0.02	0.03	0.05	0.04	0.04	0.04	0.04	0.34
52:	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.34
53:	0.04	0.04	0.03	0.04	0.05	0.08	0.07	0.09	0.08	0.10	0.62
54:	0.11	0.10	0.11	0.10	0.12	0.11	0.15	0.12	0.13	0.13	1.19
55:	0.13	0.14	0.10	0.11	0.16	0.14	0.15	0.15	0.14	0.15	1.37
56:	0.14	0.14	0.14	0.14	0.15	0.16	0.13	0.15	0.14	0.16	1.44
57:	0.13	0.16	0.16	0.19	0.16	0.15	0.13	0.13	0.14	0.16	1.50
58:	0.14	0.15	0.14	0.10	0.19	0.18	0.19	0.20	0.21	0.20	1.71
59:	0.20	0.19	0.19	0.18	0.19	0.22	0.21	0.24	0.24	0.26	2.11
60:	0.23	0.25	0.24	0.23	0.23	0.28	0.29	0.30	0.35	0.39	2.78
61:	0.39	0.42	0.37	0.19	0.42	0.42	0.47	0.47	0.45	0.50	4.10
62:	0.54	0.52	0.53	0.50	0.52	0.53	0.50	0.52	0.54	0.55	5.24
63:	0.58	0.62	0.63	0.63	0.68	0.70	0.72	0.71	0.82	0.90	6.99
64:	0.91	0.99	0.98	0.34	0.92	0.85	0.98	0.96	0.99	0.98	8.89
65:	0.99	1.05	1.05	1.05	1.06	1.07	1.05	1.09	1.19	1.18	10.78
66:	1.22	1.20	1.16	1.23	1.23	1.20	1.20	1.17	1.25	1.26	12.12
67:	1.36	1.31	1.40	0.41	1.27	1.24	1.24	1.21	1.20	1.12	11.76
68:	1.10	1.03	0.99	0.97	1.05	0.91	0.90	0.88	0.81	0.79	9.42
69:	0.77	0.72	0.72	0.69	0.72	0.72	0.68	0.65	0.62	0.59	6.88
70:	0.61	0.62	0.58	0.18	0.53	0.51	0.52	0.45	0.40	0.38	4.78
71:	0.36	0.36	0.31	0.29	0.29	0.28	0.26	0.23	0.22	0.23	2.82
72:	0.19	0.19	0.16	0.14	0.12	0.08	0.09	0.08	0.08	0.06	1.20
73:	0.06	0.05	0.05	0.01	0.04	0.05	0.04	0.03	0.03	0.02	0.38
74:	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.22

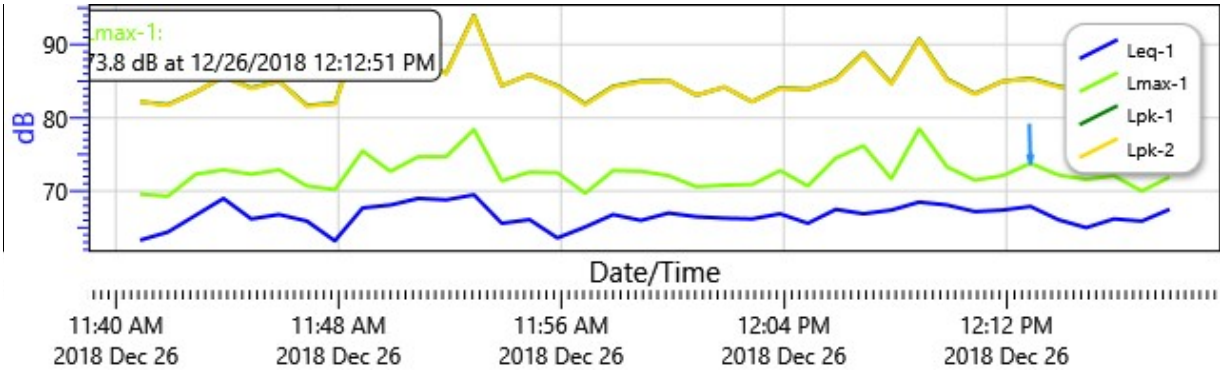
75:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.11
76:	0.02	0.02	0.02	0.00	0.01	0.02	0.01	0.02	0.01	0.01	0.15
77:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.09
78:	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03
79:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		72.8	71.9	71.5	71.1	70.8	70.6	70.4	70.1	70.0
10%:	69.8	69.6	69.5	69.4	69.2	69.1	68.9	68.8	68.7	68.6
20%:	68.5	68.3	68.2	68.1	68.0	67.9	67.9	67.8	67.7	67.6
30%:	67.5	67.4	67.4	67.3	67.1	67.1	67.0	66.9	66.8	66.8
40%:	66.7	66.6	66.5	66.4	66.3	66.3	66.2	66.1	66.0	65.9
50%:	65.8	65.8	65.7	65.6	65.5	65.4	65.3	65.2	65.1	65.0
60%:	64.9	64.8	64.7	64.6	64.5	64.4	64.3	64.1	64.0	63.9
70%:	63.8	63.7	63.6	63.4	63.3	63.1	63.0	62.8	62.6	62.4
80%:	62.2	62.0	61.8	61.6	61.4	61.1	60.8	60.5	60.2	59.7
90%:	59.3	58.8	58.3	57.5	56.9	56.2	55.5	54.8	53.9	51.9
100%:	44.3									

Logged Data Chart

Logging Station 14A - Ambiant: Logged Data Chart



Lavg Data Editing Summary

Serial Number: BIG060002
Exchange Rate: 3 dB
Response: Fast

Start Time: 12/26/2018 12:24:47 PM
Stop Time: 12/26/2018 2:14:48 PM

Duration: 01:49:01
Selected: 01:20:00
Weighting: A

Note: Logging Station 15 - Operating

Summary

Item	Edited	Selected	Original
Lavg	64.5 dB	65.7 dB	64.5 dB
SEL	102.5 dB	102.5 dB	102.5 dB
TWA	57.9 dB	57.9 dB	57.9 dB
Dose	0.2%	0.2%	0.2%
Dose [8]	0.9%	1.2%	0.9%