

## ACOUSTIC MONITORING NOISE STUDY

Beulah Road Mulch Site

Town of Vienna, Virginia

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SUBMITTED BY:

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### 1.0 INTRODUCTION

### 1.1 Project Description

Whitman, Requardt and Associates, LLP (WRA) conducted an acoustic monitoring study associated with the Town of Vienna's Beulah Road Mulch Site. The main purpose of this study is to determine the existing ambient sound levels associated with the operation of the leaf grinding facility which was in operation from January 11-21, 2022.

This report contains a discussion of the following items:

- A description of noise terminology;
- The results of ambient noise monitoring efforts;
- An evaluation of the noise reduction of the existing noise barrier;
- A prediction of sound levels for the site;
- A comparison to the results of the 2004 and 2018 noise studies; and
- A discussion of the Town of Vienna's noise ordinance as it related to the operation of the mulch site.


### 2.0 NOISE FUNDAMENTALS AND TERMINOLOGY

### 2.1 Sound, Noise, and Decibels

Airborne sound occurs by a rapid fluctuation of air pressure above and below atmospheric pressure. Sound pressure levels are usually measured and expressed in decibels (dB). The decibel scale is logarithmic and expresses the ratio of the sound pressure unit being measured to a standard reference level. Sound consists of three components: source, path, and receiver. All three components must be present for sound to exist. Without a source, no sound pressure waves would be produced. Similarly, without a medium, sound pressure waves would not be transmitted. Finally, sound must be received-a hearing organ, sensor, or other object must be present to perceive, register, or be affected by sound.

Most sounds occurring in the environment do not consist of a single frequency, but rather a broad band of differing frequencies. The intensities of each frequency add to generate sound. Because the human ear does not respond to all frequencies equally, the method commonly used to quantify environmental noise consists of evaluating all of the frequencies of a sound according to a weighting system. The A-weighted filter on a sound level meter, which includes circuits to differentially measure selected audible frequencies, best approximates the frequency response of the human ear. Consequently, A-weighted decibels (dBA) were primarily used for the noise monitoring efforts.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. To describe the time-varying character of environmental noise, a statistical noise descriptor called the equivalent hourly sound
level, or $L_{E Q}(h)$, is commonly used. $L_{E Q}(h)$ describes a noise sensitive receptor's cumulative exposure from all noise-producing events over a one-hour period (herein referenced as "Lea"). Unless otherwise noted, all sound levels presented in this report should be considered to be $\mathrm{L}_{\mathrm{EQ}}$ values, unless otherwise noted.

Most environmental noise also includes a conglomeration of noise from distant sources, creating a relatively steady background noise in which no particular source is identifiable. The $\mathrm{L}_{90}$ is a statistical descriptor of the sound level exceeded $90 \%$ of the time of the measurement period ( t ). The $L_{90}$ is considered to best represent the background noise contribution, without the source in question.

Noise is generally defined as unwanted or annoying sound. Although the terms "sound" and "noise" are often used interchangeably, the perceptions of sound and noise are highly subjective. This subjectivity can be highlighted by using terms "louder" and "quieter". Sounds that are perceived to "loud" to some people, may be perceived as "quiet" to others. To address this subjectivity, all results are discussed in terms of sound levels, reported in dBA.

A range of noise levels associated with common indoor and outdoor activities is shown in Figure 2-1. It should also be noted that 0 dB (or 0 dBA ) shown on the decibel scale is generally accepted to be the lowest threshold of human hearing. Sound pressure levels of negative decibel ranges are inaudible to humans. On the other extreme, the decibel scale can also exceed the values shown in Figure 2-1. For example, gunshots, explosions, and rocket engines can reach or exceed 140 dBA or higher at close range. However, Noise levels approaching 140 dBA are nearing the threshold of pain for humans.

### 2.2 Sound Propagation

Between the source to receiver, changes occur both in overall sound levels (dBA) and the frequency spectrum. The most obvious change is that the overall sound levels decrease as the distance from the source increases. The manner in which sound levels decrease with distance depends on the following important factors:

- Geometric spreading from point and line sources;
- Ground absorption;
- Atmospheric effects and refraction: and

Shielding by natural and manmade features, noise barriers, diffraction, and reflection.

Figure 2-1: Noise Levels Associated with Common Indoor/Outdoor Activities


### 2.2.1 Geometric spreading from point and line sources

For the purposes of this acoustic study, the overall sound levels reflect contributions from several sources. Moreover, sound propagates differently based on the source type. As such, stationary sound sources such as generators, grinders, excavators, and loaders act as "point" sources. Noise generated by vehicle pass-bys and rail events are categorized as "line" sources.

### 2.2.1.1 Point Sources

Sound from a small, localized point sources (e.g., grinders, generators) radiate uniformly outward as it travels away from the source in a spherical pattern. For these sources, the sound level attenuates or drops off at a rate of 6 dBA for each doubling of the distance ( $6 \mathrm{dBA} / \mathrm{DD}$ ). This decrease, resulting from the geometric spreading of the energy over an ever-increasing area, is referred to as the inverse square law.

### 2.2.1.2 Line Sources

However, highway traffic noise is not a single, stationary point source. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over a time interval. This results in cylindrical spreading rather than spherical spreading. Because the change in surface area of a cylinder only increases by two times for each
doubling of the radius instead of the four times associated with spheres, The sound level attenuates or drops off at a rate of 3 dBA for each doubling of the distance ( $6 \mathrm{dBA} / \mathrm{DD}$ ).

### 2.2.2 Ground absorption

Most often, the path between the sound source and receptor (i.e., residences) is very close to the ground. Noise attenuation (reduction) from ground absorption and reflective wave cancellation adds to the attenuation from geometric spreading. The sum of the geometric spreading attenuation and excess ground attenuation (if any) is referred to as the attenuation or dropoff rate. The amount of excess ground attenuation depends on the height of the noise path and characteristics of the intervening ground or site. In practice, excess ground attenuation may vary from 0 to $10 \mathrm{dBA} / \mathrm{DD}$ or more. The complexity of terrain also influences the propagation of sound by potentially increasing the number of ground reflections.

For the purposes of this study, site geometry plays a vital role as the mulch site is generally located at a lower elevation than the surrounding residential neighborhood. On the Beulah Road side, the mulch site is effectively at least 15 feet lower than the roadway, resulting in more ground absorption. In addition, the piles of leaves (or processed mulch) at the site also would provide attenuation, in the same way as an earthen berm would reduce noise.

### 2.2.3 Atmospheric effects and refraction

Atmospheric conditions can have a profound effect on noise levels. Wind has shown to be the most important meteorological factor within close proximity to the receptor, while vertical air temperature gradients are more important over longer distances. Other factors such as air temperature, humidity, and turbulence also can have significant effects.

### 2.2.4 Shielding by natural and manmade features, noise barriers, diffraction, and reflection

A large object in the path between a noise source and receiver can significantly attenuate noise levels at the receiver. The amount of attenuation provided by this shielding depends on the size of the object and frequencies of the noise levels. Also, natural terrain features such as hills and manmade features, such as buildings and walls, can significantly alter noise levels. Sound walls are often used specifically to reduce noise. It should also be stated that it is uncommon for trees and vegetation to result in a noticeable reduction in noise. There is evidence of a psychological effect ("out of sight, out of mind") of vegetation on noise. Also, depending on site geometry, the first row of houses or buildings in line of sight with any noise source may shield the successive rows of homes. This often occurs where the facility is at-grade or depressed. The amount of noise reduction varies with building sizes, spacing of buildings, and site geometry. Generally, for an atgrade facility in an average residential area where the first-row houses cover at least $40 \%$ of total area (i.e., no more than $60 \%$ spacing), the reduction provided by the first row is reasonably assumed to be 3 dBA , with 1.5 dBA for each additional row.

### 2.3 Frequency, Wavelength, and Hertz

In its most basic form, a continuous sound can be described by its frequency or wavelength (pitch) and amplitude (loudness). For any given single pitch, sound pressure waves are characterized by a sinusoidal periodic (i.e., recurring with regular intervals) wave, as shown in Figure 2-2. The upper curve shows how sound pressure varies above and below the ambient atmospheric pressure with distance at a given time. The lower curve shows how particle velocity varies above 0 (molecules moving right) and below 0 (molecules moving left). The particle velocity shown in the figure describes the motion of the air molecules in response to the pressure waves. However, it does not reflect the velocity of the waves, as this is otherwise known as the speed of sound. The distance between crests of both curves is the wavelength of the sound, represented by $\lambda$.

Frequency is defined as the number of times per second that the wave passes from a period of compression through a period of rarefaction and starts another period of compression and is shown in Figure 2-3.

Figure 2-2: Sound Pressure vs. Particle Velocity


Figure 2-3: Frequency and Wavelength


Frequency is expressed in cycles per second, or hertz (Hz): 1 Hz equals one cycle per second. High frequencies are sometimes more conveniently expressed in units of kilohertz (kHz) or thousands of hertz. The extreme range of frequencies that can be heard by the healthiest human ears spans from 16 to 20 Hz on the low end to about $20,000 \mathrm{~Hz}(20 \mathrm{kHz})$ on the high end. Frequencies are heard as the pitch or tone of sound. High-pitched sounds produce high frequencies, and low-pitched sounds produce low frequencies. Very-low-frequency airborne sound of sufficient amplitude may be felt before it can be heard and is often confused with earthborne vibrations. Sound less than 16 Hz is referred to as infrasound, while high frequency sound above $20,000 \mathrm{~Hz}$ is called ultrasound. Both infrasound and ultrasound are not audible to humans, but many animals can hear or sense frequencies extending well into one or both of these regions. Ultrasound also has various applications in industrial and medical processes, specifically cleaning, imaging, and drilling.

Figure 2-3 also shows that as the frequency of a sound pressure wave increases, its wavelength decreases, and vice versa. The relationship between frequency and wavelength is linked by the speed of sound, as shown in the following equation:

$$
\lambda=\frac{c}{\boldsymbol{f}}
$$

Where: $\lambda=$ wavelength in feet;
$\mathrm{c}=$ speed of sound $\left(1,126.5 \mathrm{ft} / \mathrm{s}\right.$ at $\left.68^{\circ} \mathrm{F}\right)$; and
$\mathrm{f}=$ frequency in Hertz (Hz).
Using this equation, Table 2-1 was developed showing frequencies and their associated wavelengths.

Table 2-1: Wavelengths of Various Frequencies

| Frequency (Hz) | Wavelength (ft) at 68 |
| :---: | :---: |
| 16 | 70 |
| 31.5 | 36 |
| 63 | 18 |
| 125 | 9 |
| 250 | 4.5 |
| 500 | 2.3 |
| 1,000 | 1.1 |
| 2,000 | 0.6 |
| 4,000 | 0.3 |
| 8,000 | 0.1 |

Wavelengths can also be used to assess the effectiveness of noise barriers. Lower frequencies and their associated longer wavelengths can easily pass over and around existing noise barriers, with little loss in intensity. For example, a $16-\mathrm{Hz}$ noise with a wavelength of 70 feet will tend to pass over a 16 -foot-high noise barrier. As discussed later, noise barriers are less effective at blocking lower frequencies and more effective at blocking higher ones.

### 2.4 Octave and One-Third-Octave Bands and Frequency Spectra

Very few sounds are pure tones (i.e., consisting of a single frequency). To represent the complete characteristics of a sound properly, it is often necessary to divide the total sound into its frequency components (i.e., determine sound pressure levels for each frequency). This representation of frequency and their associated sound pressure levels is called a frequency spectrum. Spectra usually consist of 8 to 10 octave bands, spanning the frequency range of human hearing ( 20 to $20,000 \mathrm{~Hz}$ ). Just as with a piano keyboard, an octave represents the frequency interval between a given frequency and twice that frequency. Octave bands are internationally standardized and identified by their "center frequencies". Because octave bands are rather broad, they are frequently subdivided into thirds to create one-third-octave bands. These are also standardized. For convenience, one-third-octave bands are sometimes numbered from $1(1.25-\mathrm{Hz}$ one-thirdoctave center frequency, which cannot be heard by humans) to $43(20,000-\mathrm{Hz}$ one-third-octave center frequency). Within the extreme range of human hearing there are 30 one-third-octave bands ranging from band 13 ( $20-\mathrm{Hz}$ one-third-octave center frequency) to band 42 ( $16,000-\mathrm{Hz}$ one-third-octave center frequency). Table 2-2 shows the ranges of the standardized octave and one-third-octave bands, as well as band numbers. In the table, one-third octave band center frequencies are shown in bold and are reported in the noise monitoring octave band analysis, discussed later in this report.

Table 2-2: Standardized Band Numbers, Center Frequencies, One-Third-Octave and Octave Bands, and Octave Band Ranges

| Frequency Band | Center Frequency <br> $(\mathrm{Hz})$ | One-Third Octave <br> Band (Hz) | Octave Band Range <br> $(\mathrm{Hz})$ |
| :---: | :---: | :---: | :---: |
| 12 | 16 | $14.1-17.8$ | $11.2-22.4$ |
| 13 | $\mathbf{2 0}$ | $17.8-22.4$ |  |
| 14 | $\mathbf{2 5}$ | $22.4-28.2$ |  |
| 15 | $\mathbf{3 1 . 5}$ | $28.2-35.5$ | $22.4-44.7$ |
| 16 | $\mathbf{4 0}$ | $35.5-44.7$ |  |
| 17 | $\mathbf{5 0}$ | $44.7-56.2$ | $46.2-70.8$ |
| 18 | $\mathbf{6 3}$ | $70.8-89.1$ |  |
| 19 | $\mathbf{8 0}$ | $89.1-112$ | $112-141$ |
| 20 | $\mathbf{1 0 0}$ | $141-178$ |  |
| 21 | $\mathbf{1 2 5}$ | $178-224$ |  |
| 22 | $\mathbf{1 6 0}$ | $224-282$ |  |
| 23 | $\mathbf{2 5 0}$ | $282-355$ | $178-355$ |
| 24 | $\mathbf{3 1 5}$ | $355-447$ |  |
| 25 | $\mathbf{4 0 0}$ | $447-562$ |  |
| 26 | 500 |  | $355-708$ |
| 27 |  |  |  |


| Frequency Band | Center Frequency <br> $(\mathrm{Hz})$ | One-Third Octave <br> Band (Hz) | Octave Band Range <br> $(\mathrm{Hz})$ |
| :---: | :---: | :---: | :---: |
| 28 | $\mathbf{6 3 0}$ | $562-708$ |  |
| 29 | $\mathbf{8 0 0}$ | $708-891$ |  |
| 30 | $\mathbf{1 , 0 0 0}$ | $891-1,120$ | $708-1,410$ |
| 31 | $\mathbf{1 , 2 5 0}$ | $1,120-1,410$ |  |
| 32 | $\mathbf{1 , 6 0 0}$ | $1,410-1,780$ |  |
| 33 | $\mathbf{2 , 0 0 0}$ | $1,780-2,240$ | $1,410-2,820$ |
| 34 | $\mathbf{2 , 5 0 0}$ | $2,240-2,820$ |  |
| 35 | $\mathbf{3 , 1 5 0}$ | $2,820-3,550$ |  |
| 36 | $\mathbf{4 , 0 0 0}$ | $3,550-4,470$ | $2,820-5,620$ |
| 37 | $\mathbf{5 , 0 0 0}$ | $4,470-5,620$ |  |
| 38 | $\mathbf{6 , 3 0 0}$ | $5,620-7,080$ |  |
| 39 | $\mathbf{8 , 0 0 0}$ | $7,080-8,910$ | $5,620-11,200$ |
| 40 | $\mathbf{1 2 , 0 0 0}$ | $8,910-11,200$ |  |
| 41 | $\mathbf{1 6 , 0 0 0}$ | $11,200-14,100$ |  |
| 42 | $\mathbf{2 0 , 0 0 0}$ | $14,100-17,800$ | $11,200-22-400$ |
| 43 |  | $17,800-22,400$ |  |

Additionally, frequency spectra are often used in the transportation/construction noise acoustics field to understand sound propagation from the noise source to the receptor, and for designing effective noise control measures.

Sound is also affected by many frequency-dependent physical and environmental factors, such as atmospheric conditions, site characteristics, and construction materials. Sound propagating through the air is affected by air temperature, humidity, wind and temperature gradients, vicinity and type of ground surface, obstacles, and terrain features. These factors are also all dependent on each individual frequency. The ability of a material to transmit noise depends on the type of material (concrete, wood, glass, etc.) and its thickness. Effectiveness of different materials at transmitting noise depends on the frequency of the noise.

### 2.5 Human Response to Changes in Noise Levels

The concept of A-weighting and the reasons for describing noise in terms of dBA were discussed previously in Section 2.1. It is also generally accepted that the average healthy ear, however, can barely perceive a noise level change of 3 dBA . Additionally, the human response curve of frequencies in the audible range is simply not linear (i.e., humans do not hear all frequencies equally well). It also appears that the human perception of loudness is also not linear, either in terms of decibels or in terms of acoustical energy. Human perception is further complicated due to that there appears to be no simple correlation with acoustical energy. Two noise sources do not sound twice as loud as one noise source. Because decibels are logarithmic units, sound levels cannot be added by ordinary arithmetic means. However, based on known relationships
between changes in acoustical energy, dBA, and human perception Table 2-3 shows the relationship between changes in dBA, and average human ear.

Table 2-3: Relationship between the Noise Level Change (dBA) and Percieved Change to the Human Ear

| Noise Level Change (dBA) | Descriptive Change in Perception to Average <br> Human Ear |
| :---: | :---: |
| +30 | Eight Times as Loud |
| +20 | Four Times as Loud |
| +10 | Twice as Loud |
| +5 | Readily Perceptible Increase |
| +3 | Barely Perceptible Increase |
| 0 | No Change |
| -3 | Barely Perceptible Decrease |
| -5 | Readily Perceptible Decrease |
| -10 | One-Half as Loud |
| -20 | One-Quarter as Loud |
| -30 | One-Eighth as Loud |

### 3.0 EXISTING NOISE ENVIRONMENT

To assess the existing noise conditions at the mulch site, short term noise monitoring was conducted. Noise monitoring was conducted in the vicinity of noise-sensitive land uses (i.e. residences) near the mulch site.

### 3.1 Short-term Noise Monitoring

Short-term noise measurements of 10 minutes duration were obtained by WRA at multiple sites at and/or near the mulch facility on January 11, 2022. Eight short-term measurements were collected (in four monitoring sessions) using two Rion NL-52 Type 1 (precision) sound level meters. Prior to the noise monitoring sessions, the noise meter was calibrated to 94 dB using a Rion NC-74 precision acoustic calibrator.

Readings were taken on the A-weighted scale and reported in dBA. The data collection procedure involved the collection of equivalent continuous sound level measurements (LEQ), in consecutive 10 -second intervals. This method allows individual time intervals to be correlated with witnessed noise events. Data collected by the sound level meter included time, $\mathrm{L}_{\mathrm{EQ}}$, minimum noise level ( $L_{\text {Min }}$ ), maximum noise level ( $L_{\text {max }}$ ), percentile sound levels (e.g. $L_{5}, L_{10}, L_{50}, L_{90}, L_{95}$ ), and onethird octave band center frequency sound levels.

A summary of the short-term noise monitoring results is presented in Table 3-1. For each site, the table lists the assigned monitoring site number; the location of the monitoring site; the
monitoring session number; monitored sound levels ( $\mathrm{L}_{\mathrm{EQ}}, \mathrm{L}_{\mathrm{MIN}}, \mathrm{L}_{\mathrm{MAX}}$, and $\mathrm{L}_{90}$ ); and the dominant sources of noise at each site.

The location of each noise monitoring site in relation to the grinder site is shown on Figure 3-1. Appendix A contains the calibration certificates for the sound level meters and the NC-74 calibration unit. The raw data logger outputs for each monitoring session are included as Appendix B. Appendix C contains histograms for each monitoring site, showing the $L_{E Q}, L_{M I N}$, $\mathrm{L}_{\text {max }}$, and $\mathrm{L}_{90}$ by one-third octave bands.

Table 3-1: Short-term Noise Monitoring Summary

| Site | Monitoring Session | Chart Reference | Location | Dominant Sources of Noise | $\begin{aligned} & L_{E Q} \\ & (d B A) \end{aligned}$ | $\begin{gathered} L_{M I N} \\ (\mathrm{dBA}) \end{gathered}$ | $\begin{aligned} & L_{\text {max }} \\ & (\mathrm{dBA}) \end{aligned}$ | $\begin{aligned} & L_{90} \\ & (\mathrm{dBA}) \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ST1 | 1 | Chart 3-1; <br> Chart 3-2; <br> Appendix C <br> Chart C-1 | Located approximately 20 feet from Beulah Road | Traffic on Beulah Road | 61.7 | 57.4 | 64.9 | 58.0 |
| ST2 | 1 | Chart 3-1; <br> Chart 3-2; <br> Appendix C Chart C-2 | Located approximately 60 feet from grinder | Portable Generator | 58.8 | 58.4 | 59.6 | 58.4 |
| ST1 | 2 | Chart 3-3; <br> Chart 3-4; <br> Appendix C <br> Chart C-3 | Located approximately 20 feet from Beulah Road | Traffic on <br> Beulah <br> Road, <br> Grinder <br> (Idling) | 59.9 | 55.5 | 64.3 | 55.8 |
| ST2 | 2 | Chart 3-3; <br> Chart 3-4; <br> Appendix C <br> Chart C-4 | Located approximately 60 feet from grinder | Grinder (Idling) | 73.2 | 72.9 | 73.4 | 73.0 |
| ST1 | 3 | Chart 3-5; <br> Chart 3-6; <br> Appendix C <br> Chart C-5 | Located approximately 20 feet from Beulah Road | Grinder <br> (Full <br> Throttle) | 67.2 | 65.2 | 69.4 | 65.6 |
| ST2 | 3 | Chart 3-5; <br> Chart 3-6; <br> Appendix C <br> Chart C-6 | Located approximately 60 feet from grinder | Grinder (Full <br> Throttle) | 87.0 | 85.3 | 88.6 | 85.6 |
| ST3 | 4 | Chart 3-7; <br> Chart 3-8; <br> Appendix C <br> Chart C-7 | Located approximately 25 feet behind the noise barrier | Grinder <br> (Full <br> Throttle) | 63.3 | 62.1 | 64.7 | 62.3 |
| ST4 | 4 | Chart 3-7; <br> Chart 3-8; <br> Appendix C <br> Chart C-8 | Located approximately 25 feet in front of the noise barrier | Grinder (Full <br> Throttle) | 76.6 | 74.8 | 78.6 | 75.1 |

Figure 3-1: Monitoring Site Locations


Chart 3-1: Monitoring Session \#1: - Comparison of 1/3 Octave Band Sound Levels at ST1 and ST2


Chart 3-2: Monitoring Session \#1: Comparison of Sound Levels Noise Events at ST1 and ST2

## Session \#1 -Comparison of Sound Levels Noise Events at ST1 and ST2 over

Time


Chart 3-3: Monitoring Session \#2: Comparison of 1/3 Octave Band Sound Levels at ST1 and ST2
Session \#2-9:29 AM - 9:39 AM - AM - Comparison of 1/3 Octave Band Sound Levels at ST1 and ST2


Chart 3-4: Monitoring Session \#2: Comparison of Sound Levels Noise Events at ST1 and ST2

## Session \#2 - Comparison of Sound Levels Noise Events at ST1 and ST2 over

 Time

Chart 3-5: Monitoring Session \#3: Site Comparison of 1/3 Octave Band Sound Levels at ST1 and ST2


Chart 3-6: Monitoring Session \#3: Comparison of Sound Levels Noise Events at ST1 and ST2

## Session \#3 Comparison of Sound Levels Noise Events at ST1 and ST2 over Time



Chart 3-7: Monitoring Session \#4: Comparison of 1/3 Octave Band Sound Levels at ST3 and ST4


Chart 3-8: Monitoring Session \#4: Comparison of Sound Levels Noise Events at ST1 and ST2


### 3.2 Presentation and Interpretation of the Monitoring Results

Charts 3-1, 3-3, 3-5 and 3-7 show a comparison of the overall sound levels ( $L_{E Q}$ ) and individual one-third octave bands, for each monitoring session, and are discussed in the following sections. While Table 3-1 shows the overall sound levels ( $L_{E Q}$ ) for each monitoring session, charts were created for each of the four monitoring sessions that show a more detailed breakdown of the events over the time of the monitoring session and their associated monitored sound levels (see Charts 3-2, 3-4, 3-6, and 3-8). For monitoring sessions \#1-3, site ST2, represented the reference level for the grinder and represents the operations within the center of the mulch site (inside the existing noise barrier). Monitoring session \#4 was conducted to assess the effectiveness of the existing noise barrier.

### 3.3 Summary of Monitoring Session \#1

Monitoring Session \#1 was conducted from 8:55-9:05 AM. This session represents a baseline sound level for activities that occur at the mulch site when the grinder is not in operation. While the grinder was not in operation during this session, the contractor started up a portable generator that was located in the bed of his pickup truck just prior to the beginning of the session. Due to this, a background noise level was not originally obtained for ST2 (near the grinder). However, a determination of background noise levels for ST1 and ST2 are discussed Section 3.3.1. Sound levels were collected during favorable atmospheric conditions ( $18^{\circ}$ Fahrenheit (F.), calm winds, and mostly sunny skies).

Dominant Noise Sources by Monitoring Site:

- ST1 - Traffic on Beulah Road; (see Photo 3-1)
- ST2 - Portable Generator.

Photo 3-1: Monitoring Site ST-1 Setup with Sound Level Meter and Video Camera


Observations about Chart 3-1, Chart 3-2, and Table 3-1.

- Chart 3-1 - The combined $\mathrm{L}_{\mathrm{EQ}}$ (see MAIN column) show that the sound levels generated from traffic from Beulah Road (ST1) are generally higher than sound levels generated from the portable generator at ST2;
- Chart 3-1 - Sound levels generated from the portable generator (at ST2) are noticeably higher in the $31.5 \mathrm{~Hz}, 125 \mathrm{~Hz}$ frequencies bands, and the frequencies from 6.3 KHz through 20 KHz ;
- Chart 3-2 - The portable generator is the dominant source of noise at ST2, but is not dominant at ST1;
- The noise contribution from the generator at ST1 is further discussed in Section


### 3.3.1.

- Chart 3-2 - Traffic noise from Beulah Road is the dominant noise source at ST1;
- Chart 3-2 - Sound levels from the generator (at ST2) do not vary with the function of time;
- Chart 3-2 - There were no acoustically significant events that occurred during this 10minute monitoring session.


### 3.3.1 Determination of Background Levels at ST1 and ST2

In order to determine the background sound levels for ST1 and ST2, (when no site operations were occurring), the comparison of the monitoring data for sessions \#1 and \#2 was essential in assessing the actual background levels, since the contractor turned on a portable generator prior to monitoring session \#1. Using the noise propagation dropoff rates for point and line sources (discussed in Sections 2.2.1.1. and 2.2.1.2) and the monitoring data summarized in Table 3-1 and Charts 3-2 and 3-4 the following observations were made:

- Initially, it was assumed that the portable generator had influenced the background noise levels at ST1, because the generator was in operation. However, after reviewing the data from session \#2, it was determined that the portable generator had no influence on the sound levels observed at ST1 as discussed below.
- The reference noise level of the portable generator at ST2 during session \#1 was 58.8 dBA . Since the reference level at ST2 was located approximately 50 feet from the generator and ST1, which measured $61.7 \mathrm{dBA} \mathrm{L}_{\mathrm{EQ}}$, was located 350 feet from the generator, due to the drop off rate of 6 dBA for each doubling of the distance for point sources, the generator's calculated noise contribution at ST1 would be 46.8 dBA . By logarithmically subtracting 46.8 dBA from the 61.7 dBA , the resultant $L_{E Q}$ would be 61.6 dBA . This means that the generator's effect was 0.1 dBA or less to the $\mathrm{L}_{\mathrm{EQ}}$ observed at ST1 during session \#1. As such, the 61.7 dBA observed at ST1 during session \#1 is an appropriate representation of the sound levels without the generator contribution, and the L90 of 58.0 dBA at ST1 would represent the background sound level, without the traffic or generator contributions.
- Similarly, Since the Leo with the traffic noise contribution from Beulah Road is 61.7 dBA $L_{\text {EQ }}$ during session \#1, and traffic noise is a line source, sound levels would be expected to drop off at a rate of 3 dBA for each doubling of distance. This means that if the generator was not in operation, only the traffic noise from Beulah Road would potentially influence the sound levels at ST2. Since the Leo at ST1 (session \#1) is 61.7 dBA , the traffic noise contribution would be expected to drop off at least 6 dBA at ST2 (session \#1). Additionally, since the generator contribution was the dominant noise source during session \#1, the generator noise contribution can also be logarithmically subtracted. As such, the background noise level at ST2, without the traffic noise contribution from Beulah Road is approximately $60.4 \mathrm{~L}_{\mathrm{EQ}} \mathrm{dBA}$. Additionally, by further subtracting the generator noise contribution ( 58.8 dBA ) from 60.4 dBA , the resultant background sound level at ST2 (without the traffic or generator noise contributions) would be approximately 55.3 dBA.


### 3.4 Summary of Monitoring Session \#2:

Monitoring Session \#2 was conducted from 9:29-9:39 AM. This session represents sound levels for activities that occur when the grinder was in an idling state (or in the process of warming up) but not in grinding operation. Sound levels were collected during favorable atmospheric conditions ( $18^{\circ} \mathrm{F}$., calm winds, and mostly sunny skies).

Dominant Noise Sources by Monitoring Site:

- ST1 - Traffic on Beulah Road;
- ST2 -Bobcat (Idling) (see Photo 3-2), Grinder (Idling) (Photo 3-3)

Photo 3-2: Bobcat Loader (Model S650)


Photo 3-3: Grinder (MP2 Rotochopper) - in Full Operation


Observations about Chart 3-3, Chart 3-4, and Table 3-1.

- Chart 3-3 and 3-4 - The combined $\mathrm{L}_{\mathrm{EQS}}$ (see MAIN column) show that the sound levels from traffic from Beulah Road (ST1) are less than the sound levels from Session \#1, which would show that traffic noise is the dominant noise source, not the idling grinder;
- Chart 3-3-The combined $L_{E Q S}$ (see MAIN column) show that the sound levels from from idling grinder (at ST2) increased by approximately 14 dBA . Additionally, sound levels for all frequencies from 31.5 Hz to 20 KHz are higher than the traffic noise contributions encountered at ST1;
- Chart 3-3 - The idling grinder is the dominant source of noise at ST2, but does not appear to influence the levels at ST1, as sound levels are lower than monitored levels from Session \#1; and
- Chart 3-4 - Sound levels from the idling grinder (at ST2) do not vary with the function of time.

Based on Chart 3-4, there were two noticeable events that were witnessed during this 10-minute monitoring session:

- Event \#1 represents a helicopter fly-by that was audibly heard at both sites; however, it only had a noticeable effect on noise levels at ST1; and
- Event \#2 represents a cluster of vehicles passing by the sound level meter at ST1, including several medium and heavy trucks.


### 3.5 Monitoring Session \#3

Monitoring Session \#3 was conducted from 10:20-10:30 AM. This session represents sound levels for activities that occur when the grinder is in full operation. Sound levels were collected during favorable atmospheric conditions ( $19^{\circ} \mathrm{F}$., calm winds, and mostly sunny skies).

Dominant Noise Sources by Monitoring Site:

- ST1 -Bobcat (backup alarm), Grinder (full throttle/operation)
- ST2 -Bobcat (backup alarm), Grinder (full throttle/operation)

Observations about Chart 3-5, Chart 3-6, and Table 3-1.

- Chart 3-5 - The combined LeQS (see MAIN column) show that the sound levels from the grinder (full operation) are approximately 5-7 dBA higher than the traffic noise generated from Sessions \#1 and \#2 at ST1.
- Chart 3-5 - The combined $\mathrm{L}_{\mathrm{EQ}}$ (see MAIN column) show that the sound levels generated by the grinder in full operation at ST2 increased by approximately 14 dBA , over the noise levels from the idling grinder. Also, the grinder in full operation is approximately 28 dBA higher than the noise levels from Session \#1. Additionally, noise levels for all frequencies are considerably higher than the traffic noise contributions encountered at ST1;
- Chart 3-5 - For areas on the open end of the existing noise barrier (near Beulah Road), the sound levels appear to be 20 dBA lower at the property line, than near the grinder at ST2. This is most likely due to a combination of the dropoff rate for point sources (of 6 dBA/DD), ground attenuation (absorption) effects, and the site's geometry, as the grinder is located approximately 15 feet lower in elevation than Beulah Road.
- Chart 3-6 - The grinder (full throttle) is the dominant source of noise at both ST1 and ST2;
- Chart 3-6 - Sound levels from the grinder (full throttle) at ST2 appear to show similar noise level increases/decreases at both sites. Noise level increases and decreases can most likely be attributed to intermittent periods of leaf grinding and Bobcat use (including backup alarms). The backup alarms on the Bobcat were observed to generate noise levels over 90 dBA at ST2.
- Chart 3-6 - There were no acoustically significant events that occurred during this 10minute monitoring session.


### 3.6 Monitoring Session \#4

Monitoring Session \#4 was conducted from 10:45-10:55 AM. This session represents an acoustic assessment of the effectiveness of the existing noise barrier for activities that occur when the grinder is in full operation. Sound levels were collected during favorable atmospheric conditions ( $20^{\circ} \mathrm{F}$., 2-3 miles per hour (mph) winds, and mostly sunny skies).

Dominant Noise Sources by Monitoring Site:

- ST3 (see Photo 3-4) - Bobcat (backup alarm), Grinder (full throttle/operation)
- ST4 (see Photo 3-5 and Photo 3-6) - Bobcat (backup alarm), Grinder (full throttle/operation)

Photo 3-4: Location of Monitoring Site ST-3 (Residential Side of Existing Noise Wall)


Photo 3-5: Location of Monitoring Site ST-4 (In Front of Existing Noise Wall - Facing Wall)

Photo 3-6: Location of Monitoring Site ST-4 (In Front of Existing Noise Wall - Facing Grinder)


Observations about Chart 3-7, Chart 3-8, and Table 3-1.

- Chart 3-7 - The combined $\mathrm{L}_{\mathrm{EQ}}$ (see MAIN column) show that the insertion loss (noise reduction) provided by the barrier is approximately 13 dBA, between ST3 and ST4 (located approximately 25 feet in front and behind the barrier);
- Chart 3-7-Noise levels behind the barrier are 3-5 dBA lower than on the open end of the noise barrier at ST1 (near Beulah Road);
- Chart 3-7 - The existing noise barrier has limited effectiveness blocking frequencies under 40 Hz , but show noticeable reductions in the center frequency bands from 40 Hz to 20 KHz.
- Chart 3-8 - The grinder (full throttle) is the dominant source of noise at both ST3 and ST4;
- Chart 3-8 - Sound levels from the grinder (full throttle) at ST4 appear to show similar noise level decreases at ST3. Noise level increases and decreases can most likely be attributed to intermittent periods of leaf grinding and Bobcat use (including backup alarms).
- Chart 3-6 - There were no acoustically significant events that occurred during this 10minute monitoring session.


### 4.0 PREDICTED NOISE LEVELS

Since monitoring could not be conducted at all residential sites, directly adjacent to the mulch site, existing sound levels associated with the mulch site operations were predicted using FHWA's Construction Noise Model (RCNM), for the adjacent residences within the nearby vicinity. Receptors were modeled at the property lines for residences located on Broadleaf Drive, Holloway Court, Glyndon Street, Ainstree Court, Sherwood Drive, and Beulah Road.

### 4.1 Equipment and Work Site Operations

Noise modeling was assessed under normal worksite conditions and equipment which include:

- The grinder (MP2 Rotochopper);
- Specifications with $L_{\text {max }}$ of 96 dBA at 10 feet.
- Bobcat S650 loader;
- No sound level data available from manufacturer.
- One mulch truck (model F450 or equivalent) (per hour); and
- Two gasoline powered pickups (per hour).

The Bobcat S650 also come equipped with standard back-up warning alarms that were also incorporated into the analysis. The back-up alarms are standard and are rated at $112 \mathrm{~dB} \mathrm{~L}_{\mathrm{mAx}}($ at 5 feet) at a center frequency of 1,200 Hertz (Hz). 112 dB converts to approximately 112.6 dBA and would be approximately 86 dBA at 80 feet. The warning horn specifications in RCNM were adjusted to reflect this reference noise level.

Other assumptions for the modeling effort included the following:

- The noise modeling was conducted for the worst-case noise scenario (i.e., with the grinder in full operation).
- Since the modeling effort was focused on the grinder operations at the mulch site, traffic noise from surface roadways and other background noise sources were not included in the analysis;
- The location of the grinder was modeled in the center of the mulch site (shifted approximately 20 feet from the location used in the monitoring effort);
- The presence of the leaf piles (or processed mulch piles) were excluded, although they would attenuate (reduce) noise in the same manner as an earthen berm. The piles are temporary in nature and would have significant changes in location during the leaf grinding effort; and
- As discussed in Section 2.2.4:
- Modeling sites behind the existing noise barrier were assessed a 13 dBA shielding effect in RCNM (based on the field observations from Session \#4);
- Additional shielding effects were assessed for existing rows of buildings; and
- Additional shielding effects were assessed for significant changes in elevation.


### 4.2 Presentation of Modeled Results

The modeled results are presented in Table 4-1 as a range. Figure 4-1 shows the location of the noise contours, using a 5 dBA interval.

Table 4-1: Summary of Predicted Sound Levels

| Roadway | Range of Predicted Sound Levels Leo (dBA) |
| :---: | :---: |
| Beulah Road (North Side of Road) | $59-67$ |
| Beulah Road (South Side of Road) | $66-76$ |
| Broadleaf Drive NE (East Side of <br> Road) | $59-66$ |
| Holloway Court NE (North Side of <br> Road) | $57-59$ |
| Holloway Court NE (South Side of <br> Road) / Glyndon Street NE | $48-52$ |
| Sherwood Drive (West Side of <br> Road) | $56-59$ |
| Sherwood Drive (East Side of <br> Road) | $48-50$ |
| Ainstree Court NE | $49-58$ |

Figure 4-1: Sound Level Countours


### 5.0 COMPARISON OF RESULTS WITH 2004 AND 2018 NOISE STUDIES

In 2004, Miller, Beam \& Paganelli, Inc. performed an acoustical analysis for potential noise impacts from leaf mulching operations at the Beulah Road Mulch Site on the surrounding community. Based on this report, a proposed 12-foot high noise barrier was predicted to reduce noise from the grinder by more than $5 \mathrm{~dB}(\mathrm{~A})$ at the surrounding properties, roughly reducing projected noise levels without a barrier in the $60-65 \mathrm{~dB}(\mathrm{~A})$ range to the $55-60 \mathrm{~dB}(\mathrm{~A})$ range with a barrier. The report concluded that the installation of the proposed barrier around the work area would provide a noticeable reduction in noise from the leaf grinder, mulch trucks, and loaders. The sound coating, enclosures, and silencers would further reduce noise from the grinder, which was determined to be the loudest of the noise sources. The combination of these noise reduction procedures would achieve the desired goal of reducing the noise in the community surrounding the Beulah Road property to a reasonable level while still allowing use of the leaf grinder.

In 2005, Miller, Beam \& Paganelli, Inc. prepared an interim report which documented the results of their monitoring effort. However, A comparison to the monitored sound results in this report is not appropriate as the 2005 measurements were conducted before the proposed barrier was constructed and thus represent different site conditions.

In 2018, Whitman, Requardt and Associates, LLP (WRA) conducted noise monitoring to assess the existing noise levels in the surrounding residential neighborhood. Additional noise monitoring was conducted to assess the noise reduction provided by the noise barrier that was constructed that currently surrounds the mulch site.

The 2018 Noise Report confirmed through modeling activities and operations at the mulch site, that predicted noise levels would range from $51-59 \mathrm{~dB}(\mathrm{~A})$ at the residential property lines, immediately adjacent to the mulch site. As such these predicted results are very consistent with the previous analysis.

As a result of the current study, similar conclusions can be made regarding the effectiveness of the existing noise barrier and the predicted sound levels adjacent to the mulch site. Table 5-1 shows a comparison of monitored and predicted sound levels between the 2018 and 2022 noise studies, and a descriptive change perception to the average human ear (see Table 2-3).

Table 5-1: Comparison of Monitored and Predicted Sound Levels

| Sound Level Type and Location | Range of Predicted Sound Levels LEQ (dBA) |  | Noise Level Change (dBA) | Range of Predicted Sound Levels $L_{E Q}$ (dBA) |
| :---: | :---: | :---: | :---: | :---: |
|  | 2018 | 2022 |  |  |
| Grinder (reference sound level) monitored at 50 feet from source | 77-80 | 85-89 | 8-9 | Readily Perceptible Increase to Twice as Loud |
| Calculated Insertion Loss <br> (Noise Reduction) <br> of Noise Barrier (from <br> Monitoring Effort) | 16 | 13 | -3 | Barely Perceptible Decrease |
| Broadleaf Drive $\mathrm{NE}^{1}$ | 53-59 | 59-64 ${ }^{1}$ | 5-6 | Readily Perceptible Increase |
| Holloway Court $\mathrm{NE}^{1}$ | 53-54 | 57-59 ${ }^{1}$ | 4-5 | Readily Perceptible Increase |
| Glyndon Street $\mathrm{NE}^{1}$ | 48-49 | 48-52 ${ }^{1}$ | 0-3 | No Change to Barely Perceptible Increase |
| Sherwood Drive ${ }^{1}$ | 51-55 | 48-59 ${ }^{1}$ | 3 | Barely Perceptible Increase |
| Ainstree Court $\mathrm{NE}^{1}$ | 51-53 | 49-58 ${ }^{1}$ | 3-5 | Barely Perceptible Increase to Readily Perceptible Increase |

${ }^{1}$ Modeled receptor locations in this table were only reported behind the barrier for consistency with the 2018 report.
Based on Table 5-1, the following comparisons the following conclusions can be made:

- Grinder - While the sound levels experienced in close proximity to the grinder are approximately 8-9 dBA higher than the 2018, it can be directly attributed to the different grinder. Additionally, this increase is localized to inside the boundaries of the existing noise barrier;
- Noise Reduction from Noise Barrier - While the acoustic noise reduction of the noise barrier was observed to be less than experienced during the 2018 study, this change is most attributable to the different frequency spectra (i.e., probable higher sound levels of frequencies of 31.5 or less) of the different grinder. Additionally, a noise reduction of 13 dBA is excellent by acoustic standards, as it was only originally designed to provide a 5 dBA reduction, based on the 2004 report.
- Predicted Sound Levels at Residences (adjacent to mulch site) - While sound levels are predicted to increase by $0-6 \mathrm{dBA}$ at adjacent residential property lines, the perception of the sound levels to the human ear range from no change to barely perceptible increase, with only a few sites predicted to experience a readily perceptible (or noticeable) increase. None of the residences are predicted to experience sound levels that are twice as loud as the previous grinder that was used in 2018. Predicted residential sound levels presented in Table 5-1 (and Table 4-1) reflect the outdoor (exterior) use area of the residence, modeled at the property line. These exterior sound levels only reflect the acoustic environment for residents that are actively using their backyard. However, due to the time
of year when the leaf grinding activities are occurring, outdoor activities are less frequent and interior sound levels may be a better indicator. Predicted interior sound levels would be expected to be much lower, as most modern structures provide an additional 20-25 decibels of noise reduction (based on the exterior levels) due to the type of building construction material (e.g., wood, brick) and the type of windows. For example, if exterior sound levels are predicted to be 65 dBA , the corresponding interior sound levels would be reduced by approximately 20 dBA , resulting in interior sound levels of approximately 45 dBA . As a result, the sound levels experienced inside the house would be anticipated to be similar to the noise levels generated by normal household appliances (see Figure 11).


### 6.0 COMPLIANCE WITH TOWN OF VIENNA'S NOISE ORDINANCE

Section 10-20.1 of the Town's Code, often referred to as the "Noise Ordinance", provides regulations in order to reduce the impact of "excessive, unnecessary or unusually loud noises" that are "unusual and unnatural in their time and place" on residential areas. Excerpts from the Noise Ordinance are attached in Appendix D, specifically pertaining to operations at the mulch site.

### 6.1 Noise Ordinance Compliance

WRA has determined that the activities and operations at the mulch site do not violate or cause an exceedance of the Town of Vienna's Noise Ordinance because they do not create or maintain "excessive, unnecessary or unusual loud noises, unusual and unnatural in their time and place and which disturb the usual peace, quietude, tranquility and normal enjoyable use of any residential area; are detrimental to the public health, safety, convenience, welfare and prosperity of the residents of the Town of Vienna, and constitute a public nuisance," as outlined in Section 10-20.1(c) of the Noise Ordinance. All activities and operations occur within normal time of day restrictions, and therefore do not constitute a public nuisance, consistent with the Town of Vienna's Noise Ordinance.

## Appendix A - Calibration Certificates

CALIBRATION LABORATORY
ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1 ACCREDITED by NVLAP (an ILAC MRA signatory)


## Calibration Certificate No. 46104

| Instrument: | Sound Level Meter |
| :--- | :--- |
| Model: | NL52 |
| Manufacturer: | Rion |
| Serial number: | 00410018 |
| Tested with: | Microphone UC-59 s/n 11200 |
|  | Preamplifier NH25 s/n 10011 |
| Type (class): | 1 |
| Customer: | Scantek, Inc. |
| Tel/Fax: | $\mathbf{4 1 0 - 2 9 0 - 7 7 2 6 / 4 1 0 - 2 9 0 - 9 1 6 7 ~}$ |


| Date Calibrated:3/8) |  | 3/8 |
| :---: | :---: | :---: |
| Status: | Received | Sent |
| In tolerance: | X | X |
| Out of tolerance: |  |  |
| See comments: |  |  |
| Contains non-accr | ed tests: | X N |
| Calibration service | _Basic X | dard |
| Address: 6430 | bin Road, MD 210 |  |

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM \& Dosimeters - Acoustical Tests, Scantek Inc., Rev. 7/6/2011
Instrumentation used for calibration: Nor-1504 Norsonic Test System:

| Instrument - Manufacturer | Description | S/N | Cal. Date | Traceability evidence | Cal. Due |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Cal. Lab / Accreditation |  |
| 483B-Norsonic | SME Cal Unit | 31061 | Jul 31, 2020 | Scantek, Inc./ NVLAP | Jul 31, 2021 |
| DS-360-SRS | Function Generator | 61646 | Dec 3, 2020 | ACR Env. / A2LA | Dec 3, 2022 |
| 34401A-Agilent Technologies | Digital Voltmeter | MY41022043 | Dec 04, 2020 | ACR Env./ A2LA | Dec 04, 2021 |
| HM30-Thommen | Meteo Station | 1040170/39633 | Dec 7, 2021 | ACR Env./ A2LA | Dec 7, 2022 |
| PC Program 1019 Norsonic | Calibration software | v.6.1T | $\begin{gathered} \hline \text { Validated Nov } \\ 2014 \\ \hline \end{gathered}$ | Scantek, Inc. | - |
| 1251-Norsonic | Calibrator | 30878 | Oct 26, 2020 | Scantek, Inc./ NVLAP | Oct 26, 2021 |

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

| Temperature $\left({ }^{\circ} \mathrm{C}\right)$ | Barometric pressure $(\mathrm{kPa})$ | Relative Humidity $(\%)$ |
| :---: | :---: | :---: |
| 23.2 | 101.69 | 37.2 |


| Calibrated by: | Ronnie Buchanan | Authorized signatory: | William D Gallagher |
| :---: | :---: | :---: | :---: |
| Signature | Pmme Buchanonn | Signature | Whello gulegig |
| Date | $3 / 8 / 2021$ | Date | $3 / 8 / 2021$ |

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Page 1 of 2

Results summary: Device complies with following clauses of mentioned specifications:

| $\qquad$ | RESULT ${ }^{2,3}$ | $\begin{gathered} \text { EXPANDED } \\ \text { UNCERTAINTY } \\ \text { (coverage factor 2) [dB] } \end{gathered}$ |
| :---: | :---: | :---: |
| INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED. 2 CLAUSE 10 | Passed | 0.15 |
| SELF-GENERATED NOISE - IEC 61672-3 ED. 2 CLAUSE 11 | Passed | 0.3 |
| FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | 0.2 |
| FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | 0.2 |
| FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | 0.2 |
| FREQUENCY ANO TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14 | Passed | 0.2 |
| LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED. 2 CLAUSE 16 | Passed | 0.25 |
| TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18 | Passed | 0.3 |
| PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19 | Passed | 0.35 |
| OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20 | Passed | 0.25 |
| HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21 | Passed | 0.1 |
| LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15 | Passed | 0.1 |
| COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | See test report |

1 The results of this calibration apply only to the instrument type with serial number identified in this report.
2 Parameters are certified at actual environmental conditions.
3 The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

| Microphone: | Rion UC-59 s/n 11200 for acoustical test |
| :--- | :--- |
| Preamplifier: | Rion $\mathrm{NH} 25 \mathrm{~s} / \mathrm{n} 10011$ for all tests |
| Other: line adaptor ADP005 (18pF) for electrical tests |  |
| Accompanying acoustical calibrator: none |  |
| Windscreen: none |  |

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Ph/Fax: 410-290-7726/-9167
Columbia, MD 21045 USA
callab@scantekinc.com
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Page 2 of 2

## Scantek, Inc.

## Calibration Certificate No. 45961

| Instrument: | Sound Level Meter |
| :--- | :--- |
| Model: | NL52 |
| Manufacturer: | Rion |
| Serial number: | $\mathbf{0 0 3 7 5 6 2 3}$ |
| Tested with: | Microphone UC-59 s/n 11098 |
|  | Preamplifier NH25 s/n 65750 |
| Type (c/äss): | 1 |
| Customer: | Scantek, Inc. |
| Tel/Fax: | $\mathbf{4 1 0 - 2 9 0 - 7 7 2 6 / 4 1 0 - 2 9 0 - 9 1 6 7}$ |

Date Calibrated:2/11/2021 Cal Due: 2/11/2022
Status: $\quad$ Received Sent

In tolerance:
Out of tolerance:
See comments:
Contains non-accredited tests:__Yes X No
Calibration service: __Basic X Standard
Address: 6430 Dobbin Road, Suite C, Columbia, MD 21045

- Tested in accordance with the following procedures and standards:

Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM \& Dosimeters - Acoustical Tests, Scantek Inc., Rev. 7/6/2011

- Instrumentation used for calibration: Nor-1504 Norsonic Test System:

| Instrument - Manufacturer | Description | S/N | Cal. Date | Traceability evidence | Cal. Due |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  |  | Cal. Lab/Acereditation |  |  |  |
| 483B-Norsonic | SME Cal Unit | 31061 | Jul 31, 2020 | Scantek, Inc./ NVLAP | Jul 31, 2021 |
| OS-360-SRS | Function Generator | 61646 | Dec 3, 2020 | ACR Env./A2LA | Dec 3, 2022 |
| 34401A-Agilent Technologies | Digital Voltmeter | MY41022043 | Dec 04, 2020 | ACR Env./A2LA | Dec 04, 2021 |
| HM30-Thommen | Meteo Station | $1040170 / 39633$ | Dec 7, 2021 | ACR Env./A2LA | Dec 7, 2022 |
| PC Program 1019 Norsonic | Calibration software | v.6.1T | Validated Nov <br> 2014 | Scantek, Inc. |  |
| 1251-Norsonic | Calibrator | 30878 | Oct 26, 2020 | Scantek, Inc./ NVLAP | Oct 26, 2021 |

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

| Temperature $\left({ }^{\circ} \mathrm{C}\right)$ | Barometric pressure $(\mathrm{kPa})$ | Relative Humidity $(\%)$ |
| :---: | :---: | :---: |
| 21.9 | 100.96 | 39.5 |


| Calibrated by: | Ronnie Buchanan | Authorized signatory: | Wifliam D. Gallagher |
| :---: | :---: | :---: | :---: |
| Signature | Rousio Buchaman | Signature | Wunwh Machac |
| Date | $2 / 11 / 2021$ | Date | $2 / 12 / 2021$ |

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Results summary: Device complies with following clauses of mentioned specifications:

| CLAUSES ${ }^{1}$ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES: | RESULT ${ }^{2,3}$ | EXPANDED UNCERTAINTY (coverage factor 2 ) $[\mathrm{dB}]$ |
| :---: | :---: | :---: |
| INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED. 2 CLAUSE 10 | Passed | 0.15 |
| SELF-GENERATED NOISE - IEC 61672-3 ED. 2 CLAUSE 11 | Passed | 0.30 |
| FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | 0.20 |
| FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | 0.20 |
| FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | 0.20 |
| FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14 | Passed | 0.20 |
| LEVEL LINEARITY ON•THE REFERENCE LEVEL RANGE - IEC 61672-3 ED. 2 CLAUSE 16 | Passed | 0.25 |
| TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18 | Passed | 0.30 |
| PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19 | Passed | 0.35 |
| OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20 | Passed | 0.25 |
| HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21 | Passed | 0.1 |
| LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15 | Passed | 0.1 |
| COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13 | Passed | See test report |

1 The results of this calibration apply only to the instrument type with serial number identified in this report.
2 Parameters are certified at actual environmental conditions.
3 The tests marked with (*) are not covered by the current NVLAP accreditation.

> Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC $61672-3$, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC $61672-2$, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC $61672-1$.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.
Tests made with the following attachments to the instrument:

| Microphone: | Rion UC-59 $\mathrm{s} / \mathrm{n} 11098$ for acoustical test |
| :--- | :--- |
| Preamplifier: | Rion NH25 $/ \mathrm{n} 65750$ for all tests |
| Other: line adaptor ADPO05 (18pF) for electrical tests |  |
| Accompanying acoustical calibrator: none |  |
| Windscreen: none |  |

Measured Data: in Test Report \#
45961 of $7+1$ pages.
.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C Ph/Fax: 410-290-7726/-9167
Columbia, MD 21045 USA $\quad$ callab@scantekinc.com
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Page 2 of 2

# Scantek, Inc. 

CALIBRATION LABORATORY
ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1 ACCREDITED by NVLAP (an ILAC MRA signatory)


## Calibration Certificate No. 46105



Tested in accordance with the following procedures and standards:
Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015
Instrumentation used for calibration: N-1504 Norsonic Test System:

| Instrument - Manufacturer | Description | S/N | Cal. Date | Traceability evidence | Cal. Due |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Cal. Lab / Accreditation |  |
| 4838-Norsonic | SME Cal Unit | 31061 | Jul 31, 2020 | Scantek, Inc./ NVIAP | Jul 31, 2021 |
| DS-360-SRS | Function Generator | 61646 | Dec 3, 2020 | ACR Env./A2LA | Dec 3, 2022 |
| 34401A-Agilent Technologies | Digital Voltmeter | MY41022043 | Dec 04, 2020 | ACR Env./ A2LA | Dec 04, 2021 |
| HM30-Thommen | Meteo Station | 1040170/39633 | Dec 7, 2021 | ACR Env./ A2LA | Dec 7, 2022 |
| PC Program 1017 Norsonic | Calibration software | v.6.1T | Validated Nov 2014 | Scantek, Inc. | - |
| 1253-Norsonic | Calibrator | 28326 | Oct 26, 2020 | Scantek, Inc./ NVLAP | Oct 26, 2021 |
| 1203-Norsonic | Preamplifier | 21270 | Jan 15, 2021 | Scantek, Inc./ NVIAP | Jan 15, 2022 |
| 4180-Brüel\&Kjær | Microphone | 2246115 | Oct 1, 2019 | DPLA / DANAK | Oct 24, 2021 |

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

| Calibrated by: | Ronnie Buchanan | Authorized signatory: | William 0.Gállagher |
| :---: | :---: | :---: | :---: |
| Signature | Romice Preharam | Signature | weilusk xelyd |
| Date | $3 / 8 / 2001$ | Date | 3101202 |

[^0]Results summary: Device was tested and complies with following clauses of mentioned specifications:

| CLAUSES / METHODS ${ }^{1}$ FROM PROCEDURES |  | $\mathrm{MET}^{2,3}$ | NOT MET | $\begin{aligned} & \text { NOT } \\ & \text { TESTED } \end{aligned}$ | MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Open circuit sensitivity (insert voltage method, 250 Hz ) |  | X |  |  | See below |
| Frequency response | Actuator response | X |  |  | $\begin{gathered} 63-200 \mathrm{~Hz}: 0.3 \mathrm{~dB} \\ 200-8000 \mathrm{~Hz}: 0.2 \mathrm{~dB} \\ 8-10 \mathrm{kHz}: 0.5 \mathrm{~dB} \\ 10-20 \mathrm{kHz}: 0.7 \mathrm{~dB} \\ 20-50 \mathrm{kHz}: 0.9 \mathrm{~dB} \\ 50-100 \mathrm{kHz}: 1.2 \mathrm{~dB} \\ \hline \end{gathered}$ |
|  | FF/Diffuse field responses | X |  |  | $\begin{gathered} 63-200 \mathrm{~Hz}: 0.3 \mathrm{~dB} \\ 200-4000 \mathrm{~Hz}: 0.2 \mathrm{~dB} \\ 4-10 \mathrm{kHz}: 0.6 \mathrm{~dB} \\ 10-20 \mathrm{kHz}: 0.9 \mathrm{~dB} \\ 20-50 \mathrm{kHz}: 2.2 \mathrm{~dB} \\ 50-100 \mathrm{kHz}: 4.4 \mathrm{~dB} \\ \hline \end{gathered}$ |
|  | Scantek, Inc. acoustical method |  |  | X | $\begin{gathered} 31.5-125 \mathrm{~Hz}: 0.16 \mathrm{~dB} \\ 250,1000 \mathrm{~Hz}: 0.12 \mathrm{~dB} \\ 2-8 \mathrm{kHz}: 0.8 \mathrm{~dB} \\ 12.5-16 \mathrm{kHz}: 2.4 \mathrm{~dB} \end{gathered}$ |

1 The results of this calibration apply only to the instrument type with serial number identified in this report.
2 Parameters are certified at actual environmental conditions.
${ }^{3}$ The tests marked with (*) are not covered by the current NVLAP accreditation.
Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

| Temperature $\left({ }^{\circ} \mathrm{C}\right)$ | Barometric pressure $(\mathrm{kPa})$ | Relative Humidity $(\%)$ |
| :---: | :---: | :---: |
| $22.0 \pm 0.0$ | $101.69 \pm 0.000$ | $35.4 \pm 0.0$ |

Main measured parameters:

| Tone frequency $(\mathrm{Hz})$ | Measured $^{4} /$ Acceptable <br> Open circuit sensitivity $(\mathrm{dB}$ re $1 \mathrm{~V} / \mathrm{Pa})$ | Sensitivity $(\mathrm{mV} / \mathrm{Pa})$ |
| :---: | :---: | :---: |
| 250 | $-26.03 \pm 0.12 /-27.0 \pm 2.0$ | 49.93 |

${ }^{4}$ The reported expanded uncertainty is calculated with a coverage factor $\mathrm{k}=2.00$

Tests made with following attachments to instrument and auxiliary devices:

## Protection grid mounted for sensitivity measurements

Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report \# 46105 of one page.

Place of Calibrațion: Scantek, Inc.
6430 Dobbin Road, Suite C Ph/Fax: 410-290-7726/-9167
Columbia, MD 21045 USA
callab@scantekinc.com
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## Scanteh, Inc. <br> CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1 ACCREDITED by NVLAP (an ILAC MRA signatory)

## Calibration Certificate No. 45962

Instrument:<br>Model:<br>Microphone<br>UC-59<br>Rion<br>Manufacturer:<br>Serial number:<br>11098<br>Composed of:<br>Customer:<br>Scantek, Inc.<br>410-290-7726/410-290-9167

| Date Calibrated: 2/11/2021 Cal Due: 2/11/2022 |  |  |
| :---: | :---: | :---: |
| Status: | Received | Sent |
| In tolerance: | X | X |
| Out of tolerance: |  |  |
| See comments: |  |  |
| Contains non-accredited tests: __Yes X No |  |  |
| Address: $\begin{aligned} & 6430 \\ & \\ & \\ & \text { Colum }\end{aligned}$ | bbin Road <br> a, MD 210 |  |

Tested in accordance with the following procedures and standards:
Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015
Instrumentation used for calibration: $\mathrm{N}-1504$ Norsonic Test System:

| Instrument - Manufacturer | Description | S/N | Cal. Date | Traceability evidence | Cal. Due |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Cal. Lab / Accreditation |  |
| 483B-Norsonic | SME Cal Unit | 31061 | Jul 31, 2020 | Scantek, Inc./ NVLAP | Jul 31, 2021 |
| DS-360-SRS | Function Generator | 61646 | Dec 3, 2020 | ACR Env./ ALLA | Dec 3, 2022 |
| 34401A-Agilent Technologies | Digital Voltmeter | MY41022043 | Dec 04, 2020 | ACR Env./A2LA | Dec 04, 2021 |
| HM30-Thommen | Meteo Station | 1040170/39633 | Dec 7, 2021 | ACR Env./ ALLA | Dec 7, 2022 |
| PC Program 1017 Norsonic | Calibration software | v.6.1T | Validated Nov 2014 | Scantek, Inc. |  |
| 1253-Norsonic | Calibrator | 28326 | Oct 26, 2020 | Scantek, Inc./ NVLAP | Oct 26, 2021 |
| 1203-Norsonic | Preamplifier | 21270 | Jan 15, 2021 | Scantek, Inc./ NVLAP | Jan 15, 2022 |
| 4180-Brüel\&Kjær | Microphone | 2246115 | Oct 1, 2019 | DPLA / DANAK | Oct 24, 2021 |

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

| Calibrated by: | Ronnie Buchanan | Authorized signatory: | William Q. Gallagher |
| :---: | :---: | :---: | :---: |
| Signature | Kouno Buehanan | Signature | Werler inally |
| Date | $2 / 11 / 200^{21}$ | Date | 211.621 |

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Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

| CLAUSES / METHODS ${ }^{1}$ FROM PROCEDURES |  | $\mathrm{MET}^{2,3}$ | NOT MET | $\begin{aligned} & \text { NOT } \\ & \text { TESTED } \end{aligned}$ | MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Open circult sensitivity (insert voltage method, 250 Hz ) |  | X |  |  | See below |
| Frequency response | Actuator response | X |  |  | $\begin{gathered} 63-200 \mathrm{~Hz}: 0.3 \mathrm{~dB} \\ 200-8000 \mathrm{~Hz}: 0.2 \mathrm{~dB} \\ 8-10 \mathrm{kHz}: 0.5 \mathrm{~dB} \\ 10-20 \mathrm{kHz}: 0.7 \mathrm{~dB} \\ 20-50 \mathrm{kHz}: 0.9 \mathrm{~dB} \\ 50-100 \mathrm{kHz}: 1.2 \mathrm{~dB} \end{gathered}$ |
|  | FF/Diffuse field responses | X |  |  | $\begin{gathered} 63-200 \mathrm{~Hz}: 0.3 \mathrm{~dB} \\ 200-4000 \mathrm{~Hz}: 0.2 \mathrm{~dB} \\ 4-10 \mathrm{kHz}: 0.6 \mathrm{~dB} \\ 10-20 \mathrm{kHz}: 0.9 \mathrm{~dB} \\ 20-50 \mathrm{kHz}: 2.2 \mathrm{~dB} \\ 50-100 \mathrm{kHz}: 4.4 \mathrm{~dB} \end{gathered}$ |
|  | Scantek, Inc. acoustical method |  |  | X | $\begin{gathered} 31.5-125 \mathrm{~Hz}: 0.16 \mathrm{~dB} \\ 250,1000 \mathrm{~Hz}: 0.12 \mathrm{~dB} \\ 2-8 \mathrm{kHz}: 0.8 \mathrm{~dB} \\ 12.5-16 \mathrm{kHz}: 2.4 \mathrm{~dB} \end{gathered}$ |

1 The results of this calibration apply only to the instrument type with serial number identified in this report.
2 Parameters are certified at actual environmental conditions.
3 The tests marked with ( ${ }^{*}$ ) are not covered by the current NVLAP accreditation.
Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

| Temperature $\left({ }^{\circ} \mathrm{C}\right)$ | Barometric pressure $(\mathrm{kPa})$ | Relative Humidity $(\%)$ |
| :---: | :---: | :---: |
| $21.9 \pm 0.0$ | $100.96 \pm 0.000$ | $39.5 \pm 0.0$ |

Main measured parameters:

| Tone frequency ( Hz ) | Measured $^{4} /$ Acceptable <br> Open circuit sensitivity (dB re $1 \mathrm{~V} / \mathrm{Pa})$ | Sensitivity (mV/Pa) |
| :---: | :---: | :---: |
| 250 | $-26.63 \pm 0.12 /-27 \pm-0.02$ | 46.62 |

${ }^{4}$ The reported expanded uncertainty is calculated with a coverage factor $\mathrm{k}=2.00$
Tests made with following attachments to instrument and auxiliary devices:
Protection grid mounted for sensitivity measurements
Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report \# 45962 of one page.
Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Ph/Fax: 410-290-7726/-9167
Columbia, MD 21045 USA
callab@scantekinc.com
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CALIBRATION LABORATORY
ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1 ACCREDITED by NVLAP (an ILAC MRA signatory)

## Calibration Certificate No. 45936

Instrument:
Model:
Manufacturer:
Serial number:
Class (IEC 60942):
Barometer type:
Barometer s/n:
Customer:
Tel/Fax:

Acoustical Calibrator
NC-74
Rion
50941326
1

Scantek, Inc. 410-290-7726 / 410-290-9167

Date Calibrated: 2/5/2021 Cal Due: 2/5/2022 Status:
In tolerance:
Out of tolerance:
See comments:
Contains non-accredited tests:__Yes X_No
Address: 6430 Dobbin Road, Suite C, Columbia, MD 21045

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010
Instrumentation used for calibration: Nor-1504 Norsonic Test System:

| Instrument - Manufacturer | Description | S/N | Cal. Date | Traceability evidence | Cal. Due |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Cal. Lab / Accreditation |  |
| 4838-Norsonic | SME Cal Unit | 31061 | Jul 31, 2020 | Scantek, Inc./ NVLAP | Jul 31, 2021 |
| DS-360-SRS | Function Generator | 61646 | Dec 3, 2020 | ACR Env./ A2LA | Dec 3, 2022 |
| 34401A-Agilent Technologies | Digital Voltmeter | MY41022043 | Dec 04, 2020 | ACR Env./ A2LA | Dec. 04, 2021 |
| HM30-Thommen | Meteo Station | 1040170/39633 | Dec 7, 2021 | ACR Env./ A2LA | Dec 7, 2022 |
| 140-Norsonic | Real Time Analyzer | 1403978 | Mar 20, 2020 | Scantek, Inc. / NVLAP | Mar 20, 2021 |
| PC Program 1018 Norsonic | Calibration software | v.6.1T | Validated Nov $2014$ | Scantek, Inc. | - |
| 4192-Brüel\&Kjær | Microphone | 2854675 | Jan 15, 2021 | Scantek, Inc. / NVLAP | Jan 15, 2022 |
| 1203-Norsonic | Preamplifier | 21270 | Jan 15, 2021 | Scantek, Inc./ NVLAP | Jan 15, 2022 |

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

| Calibrated by: | Ronnie Buchanan | Authorized signatory: | William D. Gallagher, |
| :---: | :---: | :---: | :---: |
| Signature | Kounce Buhanan | Signature | unurd Axalar |
| Date | $2 / 5 / 2021$ | Date | $2 / 6 / 2021$ |

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Results summary: Device was tested and complies with following clauses of mentioned specifications:

| CLAUSES ${ }^{1}$ FROM STANDARDS REFERENCED IN PROCEDURES: | MET ${ }^{2}$ | NOT MET | COMMENTS |
| :---: | :---: | :---: | :---: |
| Manufacturer specifications |  |  |  |
| Manufacturer specifications: Sound pressure level | X |  |  |
| Manufacturer specifications: Frequency | X |  |  |
| Manufacturer specifications: Total harmonic distortion | X |  |  |
| Current standards |  |  |  |
| ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary Inspection | x |  |  |
| ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level | X |  |  |
| ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability | - | - |  |
| ANSI S1.40:2006 8.4.5 / IEC 60942: 2003 B.3.5-Frequency | $x$ |  |  |
| ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion | X |  |  |

1 The results of this calibration apply only to the instrument type with serial number identified in this report.
2 The tests marked with (*) are not covered by the current NVLAP accreditation.
Main measured parameters ${ }^{3}$ :

| Measured $^{4} /$ Acceptable $^{5}$ <br> Tone frequency $(\mathrm{Hz}):$ | Measured $^{4} /$ Acceptable $^{5}$ <br> Total Harmonic Distortion $(\%):$ | Measured $^{4} /$ Acceptable Level $^{5}$ <br> $(\mathrm{~dB}):$ |
| :---: | :---: | :---: |
| $1001.28 \pm 1.0 / 1000.0 \pm 10.0$ | $1.31 \pm 0.10 /<3$ | $94.01 \pm 0.12 / 94.0 \pm 0.4$ |

3 The stated level is valid at measurement conditions.
4 The above expanded uncertainties for frequency and distortion are calculated with a coverage factor $k=2$; for level $k=2.00$
5 Acceptable parameters values are from the current standards

## Environmental conditions:

| Temperature $\left({ }^{\circ} \mathrm{C}\right)$ | Barometric pressure $(\mathrm{kPa})$ | Relative Humidity $(\%)$ |
| :---: | :---: | :---: |
| $22.0 \pm 0.0$ | $99.20 \pm 0.000$ | $44.2 \pm 0.0$ |

Tests made with following attachments to instrument:

| Calibrator $1 / 2^{\prime \prime}$ Adaptor Type: NC-74-002 |
| :--- |
| Other: |

## Adjustments: Unit was not adjusted.

Comments: The instrument was tested and met all specifications found in the referenced procedures.
Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.
Measured Data: in Acoustical Calibrator Test Report \# 45936 of one page.
Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Ph/Fax: 410-290-7726/-9167
Columbia, MD 21045 USA
callab@scantekinc.com
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## Appendix B - Data Logger Outputs

|  | Main | 12.5 Hz | 16 Hz | 20 | 25 | 31.5 Hz | 40 Hz | 50 Hz | Hz | 80 Hz | 100 Hz | 125 Hz | 160 Hz | 200 Hz | 250 Hz | 315 Hz | 400 Hz | 500 Hz | 630 Hz | 800 Hz | 1 kHz | krz | 1.6 kHz | 2 kHz | Hz | Hz | 4 kHz | 5 kHz | kHz | 8 kHz | Hz | kHz | 2 | 20 kHz |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Leq | 61.7 | 53.6 | 53.4 | 53.2 | 54.1 | 57.3 | 55.7 | 56.7 | 60.9 | 60.9 | 55.3 | 55.2 | 51.6 | 49.4 | 49.7 | 48.6 | 47.5 | 48.6 | 51.7 | 54.4 | 53.9 | 53.6 | 52.5 | 50.2 | 47.9 | 44.6 | 41.2 | 38.8 | 35.8 | 33.2 | 29.5 | 25.9 | 21.5 | 13.5 |
| LE | 71.7 | 63.6 | 63.4 | 63.2 | 64.1 | 67.3 | 65.7 | 66.7 | 70.9 | 70.9 | 65.3 | 65.2 | 61.6 | 59.4 | 59.7 | 58.6 | 57.5 | 58.6 | 61.7 | 64.4 | 63.9 | 63.6 | 62.5 | 60.2 | 57.9 | 54.6 | 51.2 | 48.8 | 45.8 | 43.2 | 39.5 | 35.9 | 31.5 | 23.5 |
| $L_{\text {max }}$ | 64.9 | 61.9 | 61.4 | 61.4 | 62.6 | 64.2 | 63.3 | 63.8 | 69.4 | 69.2 | 62.7 | 63.2 | 59.6 | 56.7 | 57.0 | 56.3 | 54.8 | 58.0 | 62.3 | 61.3 | 59.4 | 58.6 | 58.2 | 55.9 | 53.5 | 50.2 | 47.3 | 45.1 | 42.6 | 39.7 | 36.4 | 33.3 | 29.3 | 20.3 |
| $L_{\text {min }}$ | 57.4 | 40.1 | 42.5 | 43.2 | 43.6 | 48.4 | 45.5 | 48.2 | 49.9 | 48.9 | 45.6 | 46.0 | 41.9 | 41.3 | 42.0 | 41.2 | 40.3 | 41.6 | 44.2 | 47.9 | 48.0 | 48.3 | 47.1 | 43.8 | 40.8 | 36.9 | 33.3 | 30.0 | 27.2 | 24.3 | 20.8 | 16.9 | 12.5 | 7.6 |
| 15 | 65.3 | 58.6 | 57.9 | 57.9 | 58.6 | 61.2 | 60.8 | 61.3 | 68.0 | 66.8 | 60.1 | 61.0 | 57.0 | 54.1 | 54.0 | 53.1 | 51.8 | 53.8 | 57.3 | 58.3 | 57.3 | 56.8 | 56.0 | 54.0 | 51.8 | 48.6 | 45.4 | 43.3 | 40.2 | 37.7 | 34.1 | 30.8 | 27.0 | 18.1 |
| 110 | 65.3 | 58.6 | 57.9 | 57.9 | 58.6 | 61.2 | 60.8 | 61.3 | 68.0 | 66.8 | 60.1 | 61.0 | 57.0 | 54.1 | 54.0 | 53.1 | 51.8 | 53.8 | 57.3 | 58.3 | 57.3 | 56.8 | 56.0 | 54.0 | 51.8 | 48.6 | 45.4 | 43.3 | 40.2 | 37.7 | 34.1 | 30.8 | 27.0 | 18.1 |
| 150 | 61.3 | 52.0 | 52.4 | 52.1 | 53.1 | 56.3 | 54.1 | 55.2 | 56.7 | 56.2 | 53.9 | 52.9 | 49.1 | 48.1 | 48.7 | 47.9 | 47.0 | 47.5 | 50.3 | 54.0 | 53.7 | 53.5 | 52.1 | 49.7 | 47.4 | 44.0 | 40.5 | 37.7 | 34.8 | 32.2 | 28.4 | 24.5 | 19.7 | 12.3 |
| 190 | 58.0 | 47.8 | 49.0 | 49.5 | 49.9 | 54.0 | 50.9 | 52.6 | 54.3 | 52.3 | 49.8 | 49.5 | 45.3 | 44.6 | 45.4 | 44.2 | 43.1 | 44.2 | 47.2 | 50.6 | 50.4 | 50.3 | 49.1 | 45.9 | 43.2 | 39.5 | 35.9 | 32.7 | 30.0 | 27.3 | 23.4 | 19.4 | 14.8 | ${ }^{8.6}$ |
| 195 | 57.2 | 45.7 | 48.1 | 48.6 | 49.0 | 53.2 | 50.1 | 51.6 | 53.6 | 51.8 | 48.7 | 48.6 | 44.3 | 43.6 | 44.3 | 43.5 | 42.2 | 43.4 | 46.0 | 49.7 | 49.5 | 49.6 | 48.4 | 45.1 | 42.1 | 38.3 | 34.7 | 31.4 | 28.7 | 26.0 | 22.3 | 18.2 | 13.9 | 8.2 |
| Site ST1 - Session 1-Sound Level over Time |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Main | 12.5 Hz | 16 Hz | 20 Hz | 25 Hz | 31.5 Hz | 40 Hz | 50 Hz | 63 Hz | 80 Hz | 100 Hz | 125 Hz | 160 Hz | 200 Hz | 250 Hz | 315 Hz | 400 Hz | 500 Hz | 63 Hz | 800 Hz | 1 kHz | 1.25 kHz | 1.6 kHz | 2 kHz | 2.5 kHz | 3.15 kH | 4 kHz | 5 kHz | 6.3 kHz | 8 kHz | 10 kHz | 12.5 kH | 16 kH | kHz |
| 8:55:02 AM | 66.9 | 53.0 | 54.3 | 53.3 | 51.2 | 55.7 | 59.9 | 56.4 | 59.8 | 59.7 | 68.3 | 60.0 | 55.7 | 56.2 | 57.7 | 55.0 | 55.3 | 57.0 | 58.0 | 59.3 | 58.0 | 58.4 | 56.8 | 54.9 | 53.4 | 51.2 | 48.3 | 47.2 | 44.0 | 41.2 | 38.1 | 35.2 | 31.7 | 23.2 |
| 8:55:12 AM | 64.9 | 50.5 | 50.4 | 52.8 | 52.6 | 54.5 | 54.4 | 54.3 | 55.7 | 57.4 | 57.7 | 51.4 | 53.0 | 49.2 | 50.0 | 54.4 | 47.1 | 55.0 | 61.2 | 57.2 | 56.4 | 54.1 | 56.2 | 52.3 | 46.3 | 43.0 | 42.1 | 36.8 | 34.8 | 33.3 | 29.1 | 25.4 | 19.9 | 12.2 |
| 8.55:22 AM | 62.2 | 55.7 | 54.0 | 52.5 | 51.5 | 55.8 | 54.0 | 55.3 | 55.5 | 52.5 | 53.8 | 50.0 | 47.4 | 49.9 | 49.6 | 48.1 | 48.0 | 47.5 | 50.2 | 54.7 | 54.6 | 54.2 | 53.8 | 51.1 | 48.6 | 45.0 | 41.7 | 39.2 | 36.4 | 34.3 | 31.0 | 26.7 | 21.4 | 13.6 |
| 8.55:32 AM | 62.7 | 48.4 | 50.9 | 52.9 | 53.4 | 56.6 | 55.1 | 54.5 | 55.2 | 54.2 | 51.9 | 50.6 | 51.2 | 50.8 | 51.0 | 50.1 | 48.3 | 49.2 | 52.9 | 56.2 | 54.8 | 54.7 | 53.3 | 51.0 | 48.8 | 45.2 | 41.2 | 38.4 | 35.9 | 33.3 | 29.9 | 25.8 | 20.8 | 13.3 |
| 8.55:42 AM | 62.6 | 51.2 | 51.6 | 52.9 | 52.8 | 56.3 | 55.0 | 57.0 | 56.4 | 53.9 | 53.3 | 57.4 | 52.8 | 49.7 | 51.4 | 46.8 | 47.3 | 48.5 | 52.1 | 56.0 | 55.2 | 54.0 | 52.8 | 51.2 | 49.2 | 45.9 | 41.7 | 39.0 | 36.2 | 33.1 | 30.1 | 26.6 | 21.2 | 13.5 |
| 8.55:52 AM | 59.6 | 55.0 | 53.6 | 51.8 | 50.8 | 55.2 | 54.1 | 61.2 | 54.7 | 50.1 | 51.4 | 46.7 | 43.5 | 42.6 | 44.6 | 44.5 | 43.2 | 43.8 | 46.2 | 50.8 | 53.3 | 51.3 | 49.9 | 49.5 | 47.5 | 43.9 | 39.6 | 34.9 | 30.8 | 29.0 | 26.2 | 20.7 | 16.1 | 9.8 |
| 8:56:02 AM | 62.5 | 50.9 | 52.7 | 52.9 | 52.1 | 54.5 | 51.2 | 53.3 | 55.7 | 58.7 | 50.2 | 48.4 | 44.9 | 46.4 | 47.4 | 46.6 | 46.8 | 47.1 | 51.2 | 55.7 | 55.2 | 54.8 | 53.3 | 51.4 | 48.7 | 45.0 | 40.5 | 36.4 | 32.5 | 29.1 | 24.9 | 24.1 | 21.8 | 10.6 |
| 8:56:12 AM | 62.5 | 50.4 | 51.8 | 51.7 | 52.6 | 56.4 | 55.2 | 55.5 | 59.9 | 70.5 | 53.2 | 50.9 | 49.7 | 48.9 | 50.9 | 48.1 | 47.7 | 48.8 | 51.8 | 56.0 | 54.8 | 54.4 | 53.0 | 50.2 | 47.9 | 44.8 | 41.5 | 38.8 | 36.1 | 32.8 | 28.1 | 23.7 | 18.5 | 11.5 |
| 8:56:22 AM | 62.9 | 56.3 | 53.3 | 57.0 | 57.4 | 59.9 | 56.9 | 59.0 | 76.4 | 75.9 | 57.1 | 57.9 | 57.7 | 53.3 | 52.9 | 52.0 | 50.9 | 49.9 | 51.3 | 54.1 | 53.8 | 53.5 | 52.0 | 50.4 | 49.4 | 46.1 | 43.8 | 42.9 | 39.4 | 36.5 | 32.8 | 29.4 | 25.4 | 17.3 |
| 8:56:32 AM | 59.7 | 47.8 | 51.5 | 51.8 | 52.2 | 55.2 | 52.2 | 53.5 | 61.2 | 62.4 | 54.3 | 52.0 | 49.0 | 48.6 | 48.6 | 48.7 | 47.6 | 47.7 | 49.4 | 53.6 | 51.7 | 51.2 | 50.4 | 47.5 | 44.9 | 41.5 | 37.6 | 35.2 | 33.0 | 30.2 | 26.8 | 22.8 | 18.7 | 11.6 |
| 8:56:42 AM | 50.8 | 51.6 | 51.2 | 52.4 | 51.5 | 55.0 | 52.3 | 53.7 | 56.6 | 51.5 | 49.0 | 47.5 | 42.2 | 40.1 | 38.8 | 37.9 | 37.6 | 38.3 | 41.1 | 45.1 | 43.4 | 42.3 | 40.9 | 37.6 | 34.2 | 30.1 | 27.2 | 25.6 | 27.3 | 25.3 | 20.9 | 17.7 | 13.8 | 8.3 |
| 8:56:52 AM | 54.1 | 48.7 | 49.2 | 51.3 | 49.5 | 54.2 | 49.9 | 50.4 | 57.1 | 59.5 | 46.8 | 47.0 | 42.2 | 37.4 | 35.8 | 35.3 | 34.6 | 37.4 | 43.6 | 45.5 | 44.9 | 49.7 | 44.7 | 39.9 | 36.1 | 32.0 | 31.2 | 27.4 | 27.4 | 25.9 | 24.1 | 20.4 | 15.8 | 9.6 |
| 8:57:02 AM | 50.7 | 52.9 | 51.8 | 50.9 | 49.6 | 54.3 | 48.9 | 49.3 | 51.8 | 58.2 | 49.3 | 45.4 | 38.7 | 36.2 | 36.2 | 37.1 | 35.2 | 36.5 | 43.8 | 39.4 | 41.2 | 45.6 | 39.9 | 38.3 | 34.9 | 28.3 | 28.0 | 25.0 | 24.6 | 23.6 | 20.5 | 17.7 | 13.0 | 7.8 |
| 8:57:12 AM | 45.7 | 50.0 | 50.9 | 50.7 | 49.0 | 54.0 | 48.4 | 48.4 | 51.4 | 45.5 | 43.9 | 45.1 | 39.0 | 36.1 | 36.5 | 35.7 | 33.6 | 35.9 | 38.8 | 37.7 | 37.8 | 35.0 | 34.9 | 33.6 | 32.2 | 28.5 | 28.6 | 23.4 | 23.0 | 22.2 | 18.3 | 14.7 | 11.0 | 7.1 |
| 8.577.22 AM | 58.6 | 47.9 | 50.3 | 49.9 | 48.9 | 54.4 | 51.0 | 51.9 | 51.8 | 48.8 | 48.0 | 47.3 | 43.6 | 43.3 | 45.0 | 44.1 | 41.8 | 43.7 | 46.6 | 49.8 | 52.6 | 50.3 | 50.0 | 47.4 | 43.8 | 41.5 | 38.9 | 36.4 | 34.0 | 32.1 | 27.2 | 20.6 | 15.0 | 8.7 |
| 8.57:32 AM | 59.0 | 49.8 | 52.1 | 53.1 | 51.2 | 54.2 | 52.4 | 53.9 | 54.2 | 53.1 | 50.0 | 59.9 | 49.5 | 47.4 | 48.8 | 46.3 | 46.3 | 45.1 | 49.4 | 53.1 | 51.2 | 50.7 | 49.2 | 45.7 | 43.6 | 40.3 | 37.8 | 35.8 | 34.4 | 31.3 | 26.3 | 22.6 | 17.5 | 10.9 |
| 8:57:42 AM | 60.8 | 50.5 | 52.9 | 52.1 | 51.5 | 65.7 | 58.7 | 54.8 | 56.7 | 57.4 | 58.1 | 56.1 | 49.5 | 51.6 | 50.2 | 47.6 | 47.9 | 48.6 | 52.1 | 54.5 | 53.1 | 52.7 | 50.7 | 48.0 | 45.7 | 41.9 | 38.7 | 36.5 | 34.0 | 31.1 | 26.5 | 22.7 | 17.7 | 10.8 |
| 8.577.52 AM | 63.8 | 51.2 | 54.4 | 54.2 | 59.1 | 59.3 | 59.0 | 58.8 | 55.9 | 56.6 | 57.2 | 53.8 | 50.8 | 51.9 | 53.8 | 51.5 | 49.7 | 51.9 | 55.6 | 57.2 | 56.3 | 55.8 | 53.8 | 50.8 | 48.4 | 44.9 | 42.0 | 40.0 | 37.1 | 34.1 | 29.9 | 25.5 | 20.6 | 13.6 |
| 8:58:02 AM | 62.8 | 47.4 | 51.3 | 51.3 | 56.1 | 56.0 | 56.1 | 54.9 | 53.4 | 50.9 | 49.2 | 49.0 | 46.9 | 46.8 | 48.1 | 46.9 | 44.9 | 47.6 | 51.2 | 55.6 | 55.6 | 54.9 | 54.1 | 51.9 | 49.2 | 45.6 | 41.4 | 37.8 | 35.0 | 32.0 | 26.8 | 21.2 | 15.8 | 9.3 |
| 8:58:12 AM | 63.3 | 50.8 | 52.2 | 52.5 | 51.2 | 55.0 | 54.2 | 57.8 | 57.7 | 51.0 | 49.7 | 50.7 | 50.4 | 49.6 | 49.8 | 48.7 | 47.2 | 49.9 | 51.4 | 55.9 | 55.7 | 54.8 | 54.6 | 52.6 | 50.5 | 47.0 | 43.0 | 40.1 | 37.4 | 34.7 | 29.9 | 24.9 | 19.1 | 11.2 |
| 8:58:22 AM | 61.6 | 50.2 | 52.5 | 52.2 | 53.4 | 55.3 | 55.7 | 53.3 | 59.7 | 52.2 | 48.0 | 48.4 | 44.8 | 45.9 | 46.6 | 46.7 | 45.6 | 46.9 | 49.2 | 52.7 | 52.8 | 53.5 | 53.5 | 51.6 | 50.1 | 46.7 | 42.5 | 38.8 | 35.1 | 32.2 | 27.4 | 22.6 | 16.2 | 9.5 |
| 8:58:32 AM | 65.0 | 50.0 | 53.0 | 54.9 | 55.9 | 61.0 | 63.0 | 55.9 | 55.3 | 52.7 | 49.1 | 49.5 | 48.1 | 48.4 | 50.2 | 49.5 | 48.2 | 50.7 | 52.8 | 57.2 | 57.7 | 57.1 | 56.4 | 54.5 | 52.0 | 47.8 | 43.4 | 40.3 | 37.5 | 34.4 | 30.0 | 25.3 | 19.7 | 12.4 |
| 8:58:42 AM | 58.7 | 47.9 | 51.8 | 52.8 | 55.5 | 56.7 | 52.0 | 53.2 | 55.5 | 49.5 | 48.3 | 48.0 | 45.3 | 46.4 | 46.8 | 45.0 | 44.0 | 45.7 | 48.4 | 51.9 | 50.9 | 51.1 | 49.9 | 46.5 | 43.8 | 40.6 | 37.8 | 35.2 | 32.4 | 29.9 | 25.7 | 21.0 | 15.7 | 9.4 |
| 8:58:52 AM | 60.8 | 48.2 | 51.3 | 52.8 | 53.9 | 56.5 | 52.4 | 53.8 | 54.7 | 49.1 | 48.5 | 47.0 | 44.8 | 46.2 | 46.9 | 45.5 | 45.4 | 47.7 | 50.0 | 54.1 | 53.7 | 53.3 | 51.5 | 48.3 | 45.7 | 43.3 | 39.6 | 36.7 | 33.9 | 31.7 | 28.3 | 25.2 | 19.6 | 11.9 |
| 8:59:02 AM | 55.6 | 47.4 | 51.1 | 51.4 | 51.4 | 54.9 | 51.2 | 52.4 | 55.3 | 49.1 | 47.4 | 46.6 | 41.7 | 40.3 | 40.9 | 39.1 | 40.1 | 41.0 | 43.9 | 48.3 | 47.1 | 48.9 | 47.7 | 43.7 | 40.8 | 36.1 | 32.3 | 28.9 | 26.5 | 25.2 | 21.7 | 17.1 | 12.2 | 7.5 |
| 8:59:12 AM | 59.7 | 47.0 | 52.1 | 51.4 | 52.3 | 58.4 | 53.6 | 54.0 | 57.4 | 50.5 | 47.4 | 48.7 | 50.0 | 47.8 | 46.7 | 44.6 | 46.4 | 47.1 | 48.9 | 53.7 | 51.2 | 52.0 | 50.7 | 47.4 | 45.2 | 42.0 | 38.5 | 35.3 | 32.8 | 30.2 | 25.6 | 21.4 | 16.5 | 9.7 |
| 8:59:22 AM | 63.3 | 49.1 | 52.1 | 52.6 | 51.9 | 57.8 | 52.9 | 54.8 | 57.1 | 51.9 | 51.9 | 60.0 | 56.4 | 50.4 | 50.6 | 49.7 | 48.2 | 52.6 | 54.4 | 58.0 | 55.7 | 54.6 | 53.1 | 49.8 | 48.1 | 44.6 | 40.7 | 38.3 | 35.6 | 33.0 | 28.9 | 24.7 | 19.1 | 11.9 |
| 8:59:32 AM | 58.8 | 49.6 | 52.2 | 51.7 | 51.5 | 56.2 | 55.2 | 55.1 | 55.1 | 50.2 | 48.7 | 48.7 | 46.4 | 46.3 | 47.5 | 46.8 | 44.1 | 45.6 | 48.2 | 51.4 | 50.2 | 51.0 | 50.4 | 47.7 | 45.4 | 41.8 | 38.4 | 35.8 | 33.0 | 30.5 | ${ }^{26.8}$ | 23.1 | 17.3 | 10.5 |
| 8.59:42 AM | 60.0 | 52.2 | 52.5 | 52.1 | 50.6 | 56.1 | 50.8 | 54.7 | 55.6 | 61.9 | 58.4 | 55.0 | 49.7 | 49.9 | 51.7 | 48.8 | 48.2 | 46.7 | 49.8 | 53.0 | 52.4 | 52.1 | 50.1 | 47.4 | 45.2 | 42.1 | 38.7 | 37.7 | 34.9 | 31.5 | 27.6 | 25.1 | 21.5 | 15.1 |
| 8:59:52 AM | 59.1 | 59.2 | 57.5 | 52.4 | 50.3 | 55.3 | 51.0 | 52.2 | 55.7 | 61.8 | 57.5 | 49.8 | 49.0 | 50.7 | 51.0 | 46.9 | 46.9 | 47.2 | 48.6 | 50.9 | 52.0 | 51.5 | 49.7 | 46.6 | 44.1 | 40.8 | 37.7 | 36.0 | 32.2 | 29.1 | 25.7 | 23.2 | 19.2 | 12.3 |
| 9:00:02 AM | 63.5 | 65.1 | 63.5 | 61.7 | 59.5 | 58.3 | 59.4 | 55.9 | 57.6 | 59.1 | 50.4 | 51.7 | 48.9 | 48.5 | 49.3 | 47.7 | 47.1 | 49.6 | 51.7 | 55.9 | 55.0 | 55.9 | 55.2 | 52.4 | 49.9 | 46.3 | 42.7 | 39.7 | 36.8 | 34.2 | 30.4 | 25.4 | 19.8 | 12.6 |
| 9:00:12 AM | 59.8 | 58.2 | 56.3 | 55.6 | 52.1 | 57.8 | 62.1 | 51.4 | 60.2 | 51.1 | 46.3 | 49.6 | 44.8 | 43.7 | 45.1 | 44.7 | 43.5 | 45.5 | 49.9 | 51.8 | 52.6 | 52.8 | 50.6 | 47.8 | 45.2 | 42.3 | 37.9 | 35.7 | 32.3 | 29.5 | 25.9 | 21.6 | 17.3 | 11.0 |
| 9:00:22 AM | 59.9 | 56.9 | 54.3 | 53.4 | 52.4 | 55.1 | 50.7 | 52.3 | 57.3 | 49.2 | 46.1 | 47.6 | 44.3 | 44.5 | 45.3 | 45.3 | 43.6 | 44.6 | 46.2 | 50.1 | 51.2 | 51.6 | 51.7 | 50.6 | 49.1 | 45.2 | 40.9 | 37.2 | 33.0 | 29.5 | 26.1 | 21.2 | 15.8 | 9.5 |
| 9:00:32 AM | 60.3 | 52.1 | 51.1 | 49.9 | 52.7 | 55.6 | 51.4 | 51.3 | 56.1 | 51.0 | 46.8 | 46.7 | 44.1 | 43.4 | 43.9 | 43.9 | 43.3 | 45.1 | 48.0 | 52.6 | 52.6 | 52.3 | 52.1 | 50.2 | 47.7 | 42.7 | 38.3 | 34.2 | 31.2 | 28.2 | 23.9 | 20.5 | 14.7 | 8.5 |
| 9:00:42 AM | 62.2 | 48.1 | 48.7 | 49.4 | 51.9 | 56.0 | 54.1 | 52.7 | 56.2 | 54.6 | 50.8 | 52.7 | 52.9 | 49.4 | 49.2 | 49.2 | 48.1 | 48.2 | 52.3 | 56.1 | 54.9 | 54.7 | 52.2 | 48.7 | 46.7 | 44.2 | 41.1 | 38.8 | 35.8 | 32.6 | 29.1 | 25.0 | 20.1 | 13.2 |
| 9:00:52 AM | 60.3 | 58.0 | 54.5 | 52.8 | 52.3 | 56.4 | 52.2 | 52.7 | 56.1 | 51.5 | 55.4 | 59.5 | 52.7 | 50.5 | 48.0 | 47.6 | 45.8 | 46.8 | 49.8 | 52.9 | 53.3 | 53.2 | 50.6 | 46.8 | 43.9 | 41.2 | 38.6 | 36.7 | 34.6 | 32.1 | 28.3 | 26.2 | 19.5 | 12.3 |
| 9:01:02 AM | 60.3 | 46.8 | 49.3 | 48.6 | 51.7 | 58.2 | 57.0 | 52.6 | 55.4 | 50.3 | 56.9 | 50.3 | 50.2 | 49.6 | 48.4 | 47.6 | 47.1 | 47.3 | 50.2 | 54.0 | 52.0 | 52.6 | 51.4 | 47.7 | 45.0 | 41.7 | 38.7 | 35.8 | ${ }^{33.1}$ | 30.1 | 25.7 | 22.2 | 17.3 | 10.4 |
| 9:01:12 AM | 60.4 | 61.1 | 60.7 | 56.9 | 57.4 | 57.6 | 57.7 | 52.9 | 55.2 | 50.0 | 48.8 | 47.9 | 44.3 | 44.4 | 44.4 | 44.0 | 43.2 | 44.4 | 46.9 | 50.8 | 52.9 | 52.1 | 51.9 | 51.2 | 49.2 | 45.3 | 40.5 | 36.1 | 31.7 | 28.8 | 24.8 | 21.2 | 17.4 | 10.7 |
| 9:01:22 AM | 59.4 | 54.3 | 52.8 | 51.7 | 50.9 | 54.5 | 56.4 | 61.4 | 55.1 | 49.6 | 49.9 | 47.6 | 46.3 | 45.2 | 46.4 | 44.4 | 42.9 | 44.4 | 46.2 | 49.7 | 52.3 | 51.4 | 51.0 | 49.7 | 46.8 | 42.2 | 38.1 | 34.3 | 30.9 | 29.1 | 25.1 | 20.8 | 16.1 | 9.9 |
| 9:01:32 AM | 64.1 | 51.5 | 51.8 | 51.9 | 53.8 | 55.9 | 55.1 | 59.0 | 60.3 | 59.3 | 52.7 | 52.9 | 48.1 | 48.0 | 49.8 | 49.3 | 48.1 | 49.3 | 52.8 | 57.0 | 55.0 | 56.4 | 55.5 | 53.1 | 50.9 | 47.4 | 43.5 | 40.2 | 36.9 | 33.6 | 28.8 | 23.9 | 18.9 | 11.2 |
| 9:01:42 AM | 60.8 | 52.1 | 50.2 | 48.5 | 51.8 | 53.8 | 56.2 | 63.2 | 58.1 | 61.4 | 52.5 | 50.7 | 46.9 | 46.8 | 47.1 | 46.3 | 45.4 | 46.3 | 50.0 | 53.6 | 52.7 | 53.4 | 52.0 | 49.4 | 46.5 | 42.4 | 38.1 | 35.0 | 32.2 | 29.5 | 25.8 | 21.8 | 17.6 | 11.9 |
| 9:01:52 AM | 56.5 | 50.4 | 47.7 | 48.2 | 50.9 | 54.0 | 49.6 | 57.3 | 53.8 | 52.8 | 48.3 | 47.2 | 45.1 | 44.8 | 45.8 | 45.9 | 42.5 | 42.8 | 44.8 | 48.1 | 48.6 | 49.0 | 48.0 | 45.3 | 43.3 | 39.5 | 35.9 | 32.5 | 30.0 | 27.2 | 22.6 | 17.2 | 12.8 | 8.1 |
| 9:02:02 AM | 61.1 | 53.2 | 52.0 | 52.4 | 59.4 | 58.9 | 52.3 | 55.8 | 55.7 | 53.9 | 49.9 | 49.2 | 48.7 | 50.6 | 50.3 | 49.8 | 48.4 | 48.5 | 51.9 | 54.2 | 52.8 | 53.2 | 52.1 | 49.2 | 46.5 | 43.1 | 40.1 | 37.9 | 35.6 | 32.9 | 29.0 | 25.0 | 22.5 | 14.7 |
| 9:02:12 AM | 64.3 | 53.4 | 51.6 | 53.0 | 54.6 | 60.0 | 54.4 | 55.5 | 56.3 | 52.5 | 50.6 | 49.1 | 48.1 | 48.2 | 48.3 | 47.9 | 47.7 | 49.1 | 53.2 | 57.4 | 56.5 | 56.7 | 55.7 | 53.4 | 50.5 | 46.1 | 41.9 | 38.4 | 35.4 | 32.5 | 28.1 | 23.4 | 17.3 | 10.1 |
| 9:02:22 AM | 60.6 | 51.3 | 52.0 | 53.0 | 56.6 | 56.6 | 58.8 | 57.9 | 54.9 | 50.6 | 48.4 | 48.7 | 47.2 | 48.0 | 48.2 | 48.2 | 46.0 | 46.0 | 48.2 | 52.7 | 53.4 | 52.4 | 52.2 | 49.6 | 47.1 | 43.6 | 39.8 | 36.2 | 32.6 | 29.9 | 26.1 | 21.7 | 17.1 | 11.0 |
| 9:02:32 AM | 61.8 | 46.2 | 48.3 | 49.6 | 52.0 | 55.3 | 52.8 | 56.7 | 60.3 | 51.6 | 48.2 | 49.6 | 48.2 | 48.8 | 48.3 | 48.1 | 46.9 | 47.3 | 50.0 | 54.7 | 55.5 | 53.4 | 52.3 | 50.3 | 47.7 | 44.7 | 41.6 | 39.0 | 35.9 | 33.0 | 28.9 | 24.1 | 18.3 | 11.1 |
| 9:02:42 AM | 61.5 | 47.2 | 48.0 | 49.7 | 51.7 | 54.9 | 55.6 | 55.9 | 54.2 | 49.7 | 48.3 | 48.1 | 46.6 | 46.3 | 47.3 | 46.2 | 45.2 | 46.8 | 49.3 | 53.7 | 54.5 | 53.5 | 52.8 | 50.9 | 48.4 | 44.4 | 40.6 | 37.5 | 34.0 | 31.3 | 28.0 | 24.5 | 19.4 | 11.9 |
| 9:02:52 AM | 63.6 | 51.1 | 50.1 | 49.4 | 51.6 | 55.8 | 54.0 | 58.5 | 55.3 | 50.2 | 50.1 | 49.6 | 47.5 | 48.5 | 49.0 | 48.3 | 48.9 | 48.9 | 52.2 | 56.9 | 55.8 | 55.4 | 55.0 | 52.8 | 50.1 | 46.1 | 42.6 | 39.1 | 36.3 | 33.7 | 29.1 | 25.1 | 19.2 | 11.9 |
| 9:03:02 AM | 51.2 | 53.2 | 51.5 | 50.2 | 50.5 | 54.2 | 50.3 | 51.3 | 53.1 | 49.8 | 47.3 | 45.1 | 39.7 | 40.0 | 36.7 | 36.0 | 36.1 | 36.5 | 38.9 | 43.4 | 44.5 | 44.1 | 42.9 | 39.0 | 34.8 | 29.5 | 26.0 | 24.2 | 23.3 | 21.8 | 19.6 | 16.7 | 12.7 | 8.0 |
| 9:03:12 AM | 59.4 | 49.6 | 48.5 | 50.1 | 51.2 | 58.0 | 53.6 | 52.2 | 54.4 | 52.9 | 51.4 | 49.0 | 46.0 | 51.0 | 47.9 | 46.7 | 46.8 | 46.8 | 50.7 | 51.3 | 51.6 | 52.3 | 49.8 | 46.8 | 44.4 | 41.1 | 37.9 | 35.8 | 33.4 | 30.8 | 28.7 | 27.1 | 23.4 | 15.7 |
| 9:03:22 AM | 62.8 | 49.1 | 49.6 | 53.7 | 54.5 | 56.9 | 57.4 | 52.9 | 62.7 | 56.6 | 53.0 | 61.7 | 50.6 | 47.4 | 48.4 | 49.0 | 54.1 | 48.3 | 52.2 | 55.7 | 55.3 | 55.0 | 52.9 | 50.7 | 48.4 | 44.8 | 40.7 | 38.2 | 36.1 | 32.7 | 29.3 | 25.4 | 19.8 | 13.0 |
| 9:03:32 AM | 66.1 | 54.4 | 57.8 | 61.4 | 62.2 | 62.8 | 60.2 | 58.5 | 63.5 | 60.2 | 61.9 | 64.3 | 59.7 | 55.2 | 57.3 | 56.9 | 53.0 | 54.2 | 57.2 | 58.4 | 57.3 | 57.4 | 55.3 | 54.4 | 53.0 | 50.8 | 48.2 | 46.7 | 44.6 | 43.0 | 39.9 | 33.6 | 32.8 | 22.7 |
| 9:03:42 AM | 61.6 | 47.2 | 50.2 | 51.3 | 53.7 | 54.9 | 51.7 | 58.8 | 57.9 | 55.6 | 60.2 | 54.9 | 55.1 | 57.9 | 50.6 | 49.3 | 48.8 | 49.1 | 52.7 | 54.3 | 53.4 | 53.8 | 51.3 | 48.6 | 46.6 | 44.3 | 41.6 | 39.6 | 36.3 | 32.5 | 29.2 | 26.0 | 21.1 | 13.7 |
| 9:03:52 AM | 64.5 | 50.1 | 53.7 | 52.9 | 54.5 | 58.0 | 58.2 | 65.5 | 59.4 | 58.8 | 57.0 | 63.2 | 62.9 | 53.2 | 53.4 | 51.6 | 49.6 | 51.3 | 53.8 | 56.9 | 55.9 | 56.2 | 55.2 | 52.7 | 51.0 | 48.5 | 45.6 | 43.3 | 39.9 | 36.8 | 34.0 | 30.1 | 25.3 | 17.5 |
| 9:04:02 AM | 63.7 | 48.0 | 51.8 | 52.1 | 53.6 | 57.3 | 57.8 | 62.8 | 56.4 | 65.1 | 59.9 | 65.3 | 57.1 | 52.9 | 53.6 | 51.6 | 49.6 | 50.8 | 52.8 | 55.2 | 55.9 | 55.5 | 53.9 | 52.0 | 50.5 | 48.1 | 44.5 | 43.5 | 38.4 | 35.0 | 31.4 | 28.4 | 24.1 | 17.0 |
| 9:04:12 AM | 62.5 | 49.4 | 50.7 | 51.4 | 56.0 | 56.8 | 56.9 | 57.1 | 54.4 | 50.7 | 50.0 | 50.7 | 47.0 | 48.0 | 49.8 | 49.5 | 48.9 | 49.5 | 52.3 | 56.5 | 54.7 | 54.1 | 53.1 | 50.7 | 48.0 | 45.0 | 42.0 | 39.3 | 36.8 | 34.0 | 29.8 | 25.2 | 20.0 | 12.3 |
| 9:04:22 AM | 59.9 | 46.4 | 48.8 | 50.2 | 52.0 | 54.8 | 52.8 | 53.2 | 54.4 | 51.2 | 49.5 | 48.9 | 45.7 | 45.6 | 46.1 | 45.2 | 44.6 | 45.6 | 48.3 | 52.4 | 51.8 | 52.0 | 51.7 | 49.1 | 47.0 | 43.0 | 38.8 | 35.2 | 31.6 | 29.0 | 25.1 | 21.8 | 16.6 | 9.9 |
| 9:04:32 AM | 62.0 | 47.9 | 50.4 | 51.6 | 52.0 | 56.0 | 53.7 | 53.7 | 56.1 | 53.4 | 50.0 | 51.6 | 49.6 | 47.3 | 48.3 | 47.2 | 47.6 | 48.3 | 51.4 | 54.8 | 53.7 | 54.2 | 53.1 | 50.8 | 48.8 | 45.7 | 41.6 | 38.1 | 35.0 | 31.7 | 27.3 | 23.5 | 22.4 | 11.6 |
| 9:00:42 AM | 61.0 | 45.8 | 47.4 | 47.7 | 50.4 | 55.1 | 52.3 | 55.1 | 54.6 | 53.5 | 51.3 | 51.4 | 48.2 | 45.3 | 47.1 | 47.1 | 45.4 | 45.7 | 47.8 | 52.4 | 53.2 | 53.1 | 52.3 | 50.8 | 49.5 | 45.1 | 41.2 | 38.9 | 35.2 | 32.5 | 29.6 | 26.4 | 20.2 | 12.8 |
| 9:04:52 AM | 58.9 | 44.5 | 48.0 | 48.4 | 55.0 | 60.9 | 50.4 | 53.2 | 54.6 | 50.2 | 51.4 | 48.9 | 45.4 | 46.2 | 48.4 | 50.0 | 45.6 | 46.4 | 49.2 | 52.8 | 49.8 | 51.3 | 49.5 | 45.9 | 44.1 | 42.0 | 39.7 | 38.6 | 36.8 | 34.3 | 30.3 | 26.4 | 19.5 | 11.6 |



|  | Main | 12.5 Hz | 16 Hz | 20 Hz | 25 Hz | 31.5 Hz | 40 Hz | 50 Hz | 63 Hz | 80 Hz | 100 Hz | 125 Hz | 160 Hz | 200 Hz | 250 Hz | 315 Hz | 400 Hz | 500 Hz | 630 Hz | 800 Hz | 1 kHz | 1.25 kHz | 1.6 kHz | 2 kHz | 2.5 kHz | 3.15 kHz | 4 kHz | 5 kHz | 6.3 kHz | 8 kHz | 10 kHz | 12.5 kHz | 16 kHz | 20 kHz |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Leq | 58.8 | 49.0 | 48.2 | 48.7 | 51.2 | 62.4 | 48.6 | 50.1 | 59.5 | 52.4 | 57.8 | 64.3 | 54.2 | 51.3 | 48.7 | 51.0 | 48.0 | 49.7 | 47.6 | 47.3 | 50.4 | 49.7 | 48.3 | 46.5 | 45.4 | 42.9 | 41.5 | 39.3 | 37.8 | 38.0 | 36.5 | 34.3 | 29.6 | 23.1 |
| LE | 68.8 | 59.0 | 58.2 | 58.7 | 61.2 | 72.4 | 58.6 | 60.1 | 69.5 | 62.4 | 67.8 | 74.3 | 64.2 | 61.3 | 58.7 | 61.0 | 58.0 | 59.7 | 57.6 | 57.3 | 60.4 | 59.7 | 58.3 | 56.5 | 55.4 | 52.9 | 51.5 | 49.3 | 47.8 | 48.0 | 46.5 | 44.3 | 39.6 | 33.1 |
| $L_{\text {max }}$ | 59.6 | 53.1 | 51.9 | 52.6 | 54.1 | 63.2 | 51.3 | 52.8 | 60.5 | 55.6 | 58.6 | 64.8 | 55.2 | 52.6 | 50.6 | 52.7 | 49.7 | 51.2 | 49.9 | 49.7 | 51.2 | 50.6 | 49.4 | 48.6 | 46.2 | 44.0 | 43.0 | 40.8 | 38.9 | 39.1 | 37.6 | 35.4 | 31.0 | 24.5 |
| ${ }^{\text {min }}$ | 58.4 | 44.5 | 44.6 | 45.5 | 48.8 | 61.7 | 46.4 | 47.4 | 58.6 | 49.3 | 57.0 | 63.9 | 53.3 | 50.3 | 47.6 | 50.0 | 46.6 | 48.7 | 46.3 | 46.2 | 49.6 | 48.8 | 47.4 | 45.6 | 44.8 | 42.2 | 40.7 | 38.6 | 37.1 | 37.2 | 35.6 | 33.4 | 28.6 | 22.0 |
| 15 | 59.9 | 53.3 | 52.1 | 52.9 | 54.4 | 63.2 | 51.5 | 53.0 | 60.6 | 55.7 | 58.7 | 64.8 | 55.2 | 52.5 | 50.5 | 52.8 | 49.8 | 51.3 | 50.5 | 49.8 | 51.2 | 50.7 | 49.6 | 49.0 | 46.4 | 44.1 | 43.2 | 40.9 | 39.0 | 39.2 | 37.7 | 35.5 | 31.0 | $\stackrel{24.6}{ }$ |
| 110 | 59.9 | 53.3 | 52.1 | 52.9 | 54.4 | 63.2 | 51.5 | 53.0 | 60.6 | 55.7 | 58.7 | 64.8 | 55.2 | 52.5 | 50.5 | 52.8 | 49.8 | 51.3 | 50.5 | 49.8 | 51.2 | 50.7 | 49.6 | 49.0 | 46.4 | 44.1 | 43.2 | 40.9 | 39.0 | 39.2 | 37.7 | 35.5 | 31.0 | 24.6 |
| 150 | 58.7 | 48.2 | 47.6 | 48.0 | 50.8 | 62.4 | 48.3 | 50.0 | 59.5 | 51.6 | 57.8 | 64.4 | 54.1 | 51.2 | 48.6 | 50.9 | 47.8 | 49.6 | 47.3 | 47.0 | 50.4 | 49.8 | 48.2 | 46.2 | 45.3 | 42.8 | 41.4 | 39.2 | 37.8 | 37.9 | 36.5 | 34.2 | 29.6 | 23.0 |
| 190 | 58.4 | 45.0 | 45.1 | 46.0 | 49.3 | 61.9 | 46.9 | 47.9 | 58.8 | 49.7 | 57.3 | 64.0 | 53.6 | 50.4 | 47.8 | 50.3 | 46.9 | 49.0 | 46.6 | 46.4 | 49.8 | 49.0 | 47.6 | 45.8 | 44.9 | 42.4 | 40.8 | 38.7 | 37.2 | 37.3 | 35.8 | 33.5 | 28.8 | 22.2 |
| 195 | 58.4 | 43.5 | 44.1 | 44.8 | 48.7 | 61.7 | 46.3 | 47.1 | 58.5 | 49.3 | 57.0 | 63.9 | 53.3 | 50.1 | 47.5 | 50.0 | 46.6 | 48.7 | 46.3 | 46.2 | 49.7 | 48.8 | 47.4 | 45.6 | 44.8 | 42.2 | 40.7 | 38.5 | 37.0 | 37.1 | 35.5 | 33.2 | 28.5 | 21.9 |

$\frac{\text { Site ST2 - Session } 1 \text { - Sound Level over Time }}{\text { Start }}$






$\qquad$
$\qquad$
$\qquad$

$$
\begin{array}{l|l|l|l|l}
58.1 \\
58.5 & 56.0 & 5.7 & 4.4 .8 & 49.3 \\
58.3 & 53.1 & 50.3 & 48.5 & 50.9 \\
\hline
\end{array}
$$

$\qquad$
$\qquad$

8:59:20 AN

8:59:30 AM
8.59:40 AM


$$
\begin{aligned}
& \text { 9:00:10 AM } \\
& \hline 9: 00: 20 \mathrm{AM}
\end{aligned}
$$

$$
\begin{array}{l|l|l|l|l}
58.9 & 49.6 & 48.0 & 50.7 & 50.5 \\
\hline 58.9 & 54.0 & 53.7 & 54.8 & 55.2 \\
\hline 58.8 & 49.4 & 47.9 & 47.2 & 49.8 \\
\hline 58.7 & 46.1 & 47.6 & 48.8 & 51.4 \\
\hline 500 & 4.4 & 15.0 \\
\hline 150.0
\end{array}
$$

$\qquad$

$$
\begin{array}{l|l|l|l|l|l|l|l|l|l|l|}
\hline 59.7 & 48.2 & 45.8 & 46.8 & 51.2 & 62.3 & 47.2 & 48.8 & 60.1 & 50.3 & 58.0 \\
\hline 59.4 & 47.5 & 46.9 & 47.0 & 55.0 & 62.4 & 48.2 & 48.9 & 60.0 & 50.3 & 58.0 \\
\hline 58.8 & 45.8 & 45.5 & 47.5 & 51.1 & 62.6 & 49.0 & 51.5 & 59.9 & 50.6 & 57.9 \\
\hline 59.3 & 48.4 & 48.2 & 47.9 & 55.0 & 62.5 & 50.5 & 52.2 & 5.4 & 50.4 & 57.9 \\
\hline 58.7 & 47.3 & 47.9 & 50.4 & 50.6 & 62.2 & 49.9 & 50.9 & 59.7 & 51.4 & 57.5 \\
\hline
\end{array}
$$

$\qquad$

|  | Main | 12.5 Hz | 16 Hz | 20 Hz | 25 Hz | 31.5 Hz | 40 Hz | 50 Hz | 63 | 80 Hz | 100 Hz | 125 Hz | 160 Hz | 200 Hz | 250 Hz | 315 Hz | 400 Hz | 500 Hz | Hz | 800 Hz | Hz | 1.25 kHz | 1.6 kHz | 2 kHz | Hz | 3.15 kHz | 4 kHz | 5 kHz | 6.3 kHz | 8 kHz | kHz | 12.5 kHz | 16 kHz | 20 kHz |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Leq | 59.9 | 60.1 | 58.5 | 56.4 | 56.0 | 58.3 | 61.3 | 63.0 | 58.2 | 57.8 | 57.3 | 53.7 | 51.3 | 48.7 | 47.5 | 49.2 | 47.3 | 47.6 | 50.3 | 52.6 | 52.0 | 51.5 | 50.5 | 48.2 | 46.1 | 43.0 | 40.3 | 37.7 | 35.5 | 33.9 | 29.5 | 26.3 | 21.0 | 13.4 |
| LE | 69.9 | 70.1 | 68.5 | 66.4 | 66.0 | 68.3 | 71.3 | 73.0 | 68.2 | 67.8 | 67.3 | 63.7 | 61.3 | 58.7 | 57.5 | 59.2 | 57.3 | 57.6 | 60.3 | 62.6 | 62.0 | 61.5 | 60.5 | 58.2 | 56.1 | 53.0 | 50.3 | 47.7 | 45.5 | 43.9 | 39.5 | 36.3 | 31.0 | 23.4 |
| $L_{\text {max }}$ | 63.9 | 68.1 | 66.1 | 65.2 | 63.8 | 64.5 | 65.5 | 66.7 | 64.8 | 63.5 | 62.1 | 58.7 | 57.0 | 55.5 | 54.4 | 57.9 | 54.6 | 57.9 | 61.9 | 62.2 | 59.3 | 57.3 | 57.9 | 55.6 | 53.3 | 51.0 | 51.3 | 48.0 | 45.1 | 44.0 | 39.8 | 36.9 | 32.2 | 21.8 |
| $L_{\text {min }}$ | 55.5 | 47.5 | 45.7 | 44.0 | 46.5 | 48.9 | 57.6 | 59.8 | 49.8 | 52.8 | 53.1 | 49.8 | 46.4 | 42.0 | 39.8 | 40.3 | 39.9 | 40.2 | 42.1 | 45.5 | 45.9 | 46.0 | 44.1 | 40.7 | 37.8 | 34.1 | 31.8 | 29.1 | 26.8 | 24.4 | 21.8 | 18.3 | 13.9 | 8.4 |
| 15 | 64.3 | 64.9 | 62.9 | 61.4 | 60.4 | 61.8 | 63.4 | 64.6 | 62.6 | 61.1 | 59.8 | 56.0 | 54.2 | 52.8 | 51.6 | 54.6 | 51.7 | 53.4 | 56.6 | 57.9 | 56.1 | 55.3 | 55.3 | 53.0 | 50.9 | 48.2 | 46.1 | 42.8 | 40.0 | 40.1 | 34.1 | 31.3 | 26.0 | 17.4 |
| 110 | 64.3 | 64.9 | 62.9 | 61.4 | 60.4 | 61.8 | 63.4 | 64.6 | 62.6 | 61.1 | 59.8 | 56.0 | 54.2 | 52.8 | 51.6 | 54.6 | 51.7 | 53.4 | 56.6 | 57.9 | 56.1 | 55.3 | 55.3 | 53.0 | 50.9 | 48.2 | 46.1 | 42.8 | 40.0 | 40.1 | 34.1 | 31.3 | 26.0 | 17.4 |
| 150 | 59.1 | 59.4 | 57.8 | 54.7 | 55.1 | 57.7 | 61.1 | 62.8 | 57.2 | 57.5 | 57.0 | 53.5 | 50.7 | 48.0 | 46.8 | 47.4 | 46.3 | 45.8 | 48.1 | 51.2 | 51.1 | 50.8 | 49.5 | 47.1 | 44.5 | 41.5 | 38.6 | 36.3 | 34.5 | 31.9 | 28.3 | 25.1 | 19.6 | 12.6 |
| 190 | 55.8 | 54.9 | 53.8 | 50.8 | 52.4 | 55.3 | 60.1 | 61.9 | 54.3 | 55.7 | 55.6 | 52.4 | 49.2 | 45.2 | 43.8 | 43.9 | 42.9 | 42.7 | 44.4 | 47.8 | 48.0 | 48.0 | 46.1 | 43.3 | 40.7 | 36.4 | 34.2 | 31.4 | 31.1 | 28.6 | 25.0 | 21.4 | 16.5 | 9.8 |
| 195 | 55.1 | 53.8 | 51.0 | 49.3 | 51.4 | 54.1 | 59.8 | 61.7 | 53.5 | 55.1 | 55.2 | 52.0 | 48.8 | 44.5 | 43.1 | 43.0 | 42.2 | 42.0 | 43.8 | 47.0 | 47.3 | 47.3 | 45.4 | 42.1 | 39.2 | 35.5 | 32.8 | 30.1 | 28.1 | 25.7 | 22.9 | 19.5 | 14.9 | 9.0 |
| Site ST1- Session 2-Sound Level over Time |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Start Time | Main | 12.5 Hz | 16 Hz | 20 Hz | 25 Hz | 1.5 Hz | 40 Hz | 50 Hz | 63 Hz | 80 Hz | 100 Hz | 125 Hz | 160 Hz | 200 Hz | 250 Hz | 315 Hz | 400 Hz | 500 Hz | 630 Hz | 800 Hz | 1 kHz | 1.25 kHz | 1.6 kH | 2 kHz | 2.5 kHz | 3.15 kH | 4 kHz | 5 kHz | 6.3 kHz | 8 kHz | 10 kHz | 12.5 kH | 16 kHz | 20 kHz |
| 9:29:02 AM | 66.5 | 57.6 | 55.4 | 54.4 | 55.0 | 58.0 | 62.5 | 63.7 | 59.2 | 57.6 | 54.3 | 55.1 | 54.0 | 50.2 | 51.0 | 54.1 | 49.7 | 57.5 | 61.1 | 59.9 | 55.7 | 55.5 | 58.5 | 54.6 | 50.3 | 47.5 | 47.3 | 40.3 | 37.8 | 36.6 | 32.7 | 29.6 | 25.4 | 17.1 |
| 9:29:12 AM | 56.9 | 48.3 | 48.4 | 49.0 | 50.7 | 56.7 | 61.9 | 63.6 | 54.1 | 58.3 | 56.5 | 54.8 | 51.0 | 46.8 | 44.1 | 44.3 | 41.8 | 43.2 | 45.8 | 48.7 | 49.1 | 49.9 | 48.0 | 44.5 | 41.5 | 37.6 | 34.4 | 32.5 | 31.0 | 28.6 | 25.3 | 21.6 | 17.2 | 10.5 |
| 9:29:22 AM | 57.7 | 47.8 | 48.5 | 48.8 | 50.8 | 56.1 | 62.0 | 63.8 | 55.1 | 57.0 | 54.8 | 53.8 | 50.2 | 45.1 | 43.3 | 42.4 | 41.9 | 43.8 | 44.9 | 48.9 | 49.8 | 50.4 | 49.2 | 46.7 | 43.9 | 40.1 | 36.9 | 35.3 | 33.5 | 32.2 | 30.6 | 27.1 | 22.0 | 14.8 |
| 9:29:32 AM | 58.8 | 50.1 | 50.4 | 47.1 | 49.5 | 55.4 | 61.9 | 63.6 | 55.1 | 55.7 | 55.3 | 53.7 | 50.8 | 45.0 | 46.0 | 48.3 | 45.4 | 44.8 | 46.0 | 49.4 | 51.6 | 51.0 | 49.7 | 48.3 | 46.1 | 41.8 | 37.4 | ${ }^{34.1}$ | 30.8 | 28.8 | 25.1 | 21.2 | 16.2 | 9.6 |
| 9:29:42 AM | 59.8 | 49.3 | 50.7 | 49.3 | 51.6 | 55.9 | 61.7 | 63.1 | 53.9 | 56.5 | 55.8 | 53.9 | 51.0 | 48.0 | 48.6 | 47.9 | 46.9 | 47.4 | 48.9 | 52.8 | 52.3 | 51.8 | 50.7 | 47.6 | 44.7 | 41.8 | 39.3 | 37.0 | 34.6 | 32.1 | 28.5 | 24.7 | 19.8 | 12.2 |
| 9:29:52 AM | 59.6 | 49.9 | 50.5 | 48.0 | 51.9 | 56.0 | 61.2 | 63.6 | 54.8 | 55.9 | 56.0 | 53.8 | 50.3 | 46.2 | 45.6 | 46.7 | 44.8 | 45.4 | 47.9 | 51.1 | 50.8 | 51.4 | 50.8 | 49.2 | 47.7 | 44.8 | 41.3 | ${ }^{37.6}$ | 33.9 | 31.3 | 28.0 | 23.9 | 18.8 | 11.4 |
| 9:30:02 AM | 60.0 | 53.2 | 54.2 | 49.5 | 50.3 | 56.3 | 61.2 | 63.7 | 57.8 | 56.6 | 56.6 | 54.3 | 50.3 | 46.7 | 44.8 | 44.2 | 43.5 | 45.4 | 48.8 | 52.0 | 50.6 | 52.4 | 52.2 | 49.1 | 46.7 | 43.0 | 39.5 | ${ }^{36.8}$ | 33.7 | 31.2 | 28.0 | 25.5 | 20.0 | 10.9 |
| 9:30:12 AM | 61.4 | 64.3 | 62.0 | 60.1 | 57.9 | 58.3 | 61.1 | 63.7 | 61.2 | 58.4 | 57.3 | 55.2 | 51.3 | 47.4 | 47.3 | 46.5 | 44.9 | 46.7 | 49.6 | 54.1 | 54.6 | 52.8 | 52.1 | 50.6 | 48.2 | 44.8 | 41.3 | 38.6 | 35.5 | 32.5 | 29.0 | 24.8 | 19.7 | 12.4 |
| 9:30:22 AM | 60.8 | 66.7 | 64.4 | 60.7 | 60.0 | 65.7 | 61.9 | 67.4 | 65.9 | 65.8 | 65.0 | 59.2 | 55.0 | 54.3 | 52.4 | 55.1 | 54.6 | 52.1 | 48.4 | 51.0 | 53.3 | 51.6 | 49.6 | 47.6 | 45.0 | 41.5 | 39.2 | 37.3 | 36.1 | 34.3 | 31.2 | 26.9 | 22.0 | 14.6 |
| 9:30:32 AM | 61.9 | 68.0 | 70.3 | 64.9 | 64.7 | 68.4 | 65.7 | 67.2 | 63.5 | 62.3 | 60.6 | 57.0 | 58.0 | 57.6 | 53.8 | 56.9 | 55.5 | 54.6 | 52.2 | 53.9 | 54.1 | 52.4 | 49.8 | 47.2 | 43.7 | 40.4 | 38.2 | 38.0 | 37.6 | 33.9 | 30.9 | 26.5 | 20.8 | 13.5 |
| 9:30:42 AM | 60.6 | 72.1 | 66.1 | 59.3 | 67.0 | 62.5 | 65.4 | 63.7 | 58.3 | 62.0 | 55.8 | 56.9 | 58.7 | 57.2 | 57.9 | 59.1 | 57.6 | 52.9 | 53.7 | 51.9 | 49.9 | 48.1 | 43.6 | 39.8 | 37.3 | 34.3 | 33.4 | 32.2 | 30.8 | 29.6 | 26.9 | 23.5 | 18.9 | 11.8 |
| 9:30:52 AM | 54.3 | 67.1 | 64.9 | 61.7 | 62.9 | 57.9 | 62.5 | 62.5 | 56.0 | 55.9 | 52.8 | 55.5 | 51.4 | 47.4 | 48.5 | 51.4 | 51.2 | 46.1 | 44.1 | 44.9 | 43.5 | 45.1 | 41.0 | 37.5 | 35.9 | 33.8 | 33.3 | 32.6 | 31.0 | 29.7 | 27.5 | 24.3 | 19.7 | 12.7 |
| 9:31:02 AM | 62.1 | 64.3 | 61.2 | 59.4 | 57.6 | 56.8 | 62.4 | 63.3 | 56.6 | 56.2 | 55.1 | 54.9 | 50.8 | 47.6 | 46.5 | 48.5 | 49.6 | 48.4 | 51.3 | 54.6 | 55.6 | 54.4 | 52.9 | 49.8 | 47.2 | 43.6 | 40.9 | 39.6 | 37.2 | 33.7 | 30.2 | 26.7 | 22.3 | 14.6 |
| 9:31:12 AM | 54.0 | 61.2 | 59.6 | 58.0 | 54.1 | 55.1 | 61.4 | 62.8 | 53.1 | 55.3 | 55.7 | 53.3 | 49.1 | 43.3 | 40.8 | 41.7 | 41.2 | 40.6 | 42.5 | 47.4 | 46.1 | 46.9 | 44.1 | 40.0 | 37.2 | 34.1 | 33.6 | 32.4 | 31.0 | 29.5 | 27.5 | 24.3 | 19.6 | 12.6 |
| 9:31:22 AM | 53.1 | 55.3 | 52.2 | 51.7 | 50.6 | 53.3 | 60.5 | 62.5 | 52.1 | 55.6 | 56.5 | 52.9 | 48.8 | 42.0 | 40.2 | 40.3 | 40.2 | 40.1 | 44.2 | 46.7 | 45.0 | 45.4 | 42.6 | 38.5 | 36.5 | 33.0 | 31.6 | 29.6 | 27.4 | 25.4 | 22.8 | 19.6 | 15.2 | 9.1 |
| 9:31:32 AM | 52.2 | 49.9 | 49.2 | 48.0 | 49.0 | 54.5 | 60.7 | 62.5 | 55.3 | 55.8 | 55.8 | 53.1 | 49.0 | 44.3 | 40.8 | 40.9 | 39.4 | 39.4 | 42.7 | 45.1 | 43.6 | 44.8 | 41.8 | 37.8 | 35.9 | 33.3 | 31.7 | 29.2 | 26.8 | 24.3 | 22.0 | 18.8 | 14.8 | 9.0 |
| 9:31:42 AM | 60.3 | 51.0 | 47.9 | 49.3 | 49.7 | 55.6 | 60.9 | 62.4 | 54.0 | 56.1 | 58.5 | 54.4 | 51.1 | 48.1 | 47.7 | 46.2 | 46.2 | 48.3 | 50.4 | 53.7 | 52.2 | 52.1 | 50.5 | 48.6 | 46.6 | 43.8 | 40.5 | 37.7 | 35.0 | 31.3 | 29.4 | 32.3 | 18.9 | 11.4 |
| 9:31:52 AM | 60.1 | 47.1 | 46.5 | 47.6 | 48.8 | 54.2 | 60.5 | 62.4 | 51.8 | 55.3 | 55.5 | 52.2 | 48.6 | 41.6 | 38.6 | 39.3 | 39.8 | 46.7 | 56.3 | 53.8 | 54.4 | 46.7 | 47.0 | 44.6 | 42.3 | 43.8 | 40.5 | 35.4 | 31.0 | 24.3 | 21.7 | 18.3 | 13.9 | 8.2 |
| 9:32:02 AM | 58.9 | 49.9 | 49.1 | 49.4 | 49.8 | 56.1 | 60.9 | 62.5 | 54.1 | 56.2 | 56.1 | 52.8 | 48.9 | 45.9 | 45.7 | 42.8 | 43.0 | 43.6 | 48.6 | 53.7 | 48.2 | 48.9 | 48.5 | 46.0 | 45.4 | 45.8 | 47.0 | 43.0 | 37.4 | 35.1 | 33.1 | 28.8 | 24.4 | 15.4 |
| 9:32:12 AM | 58.4 | 65.7 | 65.7 | 62.6 | 59.0 | 59.5 | 61.2 | 62.3 | 55.6 | 55.9 | 56.4 | 52.8 | 49.4 | 48.2 | 46.4 | 44.4 | 43.6 | 43.6 | 47.0 | 50.2 | 51.5 | 50.6 | 49.3 | 46.8 | 44.2 | 40.0 | 36.8 | 34.1 | 32.1 | 30.1 | 27.7 | 24.2 | 19.5 | 12.5 |
| 9:32:22 AM | 52.1 | 56.6 | 54.8 | 52.9 | 53.1 | 54.6 | 60.1 | 62.0 | 52.2 | 55.2 | 55.9 | 52.2 | 48.6 | 43.5 | 39.7 | 39.5 | 38.6 | 38.6 | 40.9 | 43.1 | 43.7 | 45.3 | 42.9 | 38.4 | 35.9 | 32.9 | 32.0 | 30.9 | 29.9 | 28.4 | 26.7 | 23.5 | 18.4 | 11.9 |
| 9:32:32 AM | 57.0 | 55.8 | 52.6 | 51.9 | 51.5 | 54.5 | 60.2 | 61.9 | 53.8 | 55.5 | 56.2 | 52.8 | 48.7 | 44.6 | 44.1 | 40.9 | 41.1 | 44.5 | 47.1 | 51.2 | 47.9 | 48.4 | 48.2 | 43.6 | 42.4 | 39.9 | 38.2 | 36.5 | 35.0 | 32.6 | 29.9 | 26.7 | 22.0 | 15.2 |
| 9:32:42 AM | 54.2 | 52.0 | 48.4 | 48.1 | 52.1 | 56.0 | 60.2 | 61.9 | 55.6 | 55.5 | 56.2 | 52.4 | 49.2 | 45.1 | 43.5 | 41.1 | 40.8 | 41.4 | 44.3 | 47.6 | 46.1 | 45.8 | 44.3 | 40.8 | 38.9 | 36.6 | 34.8 | 33.0 | 32.2 | 31.7 | 28.3 | 25.5 | 20.8 | 13.3 |
| 9:32:52 AM | 50.5 | 48.7 | 51.2 | 47.9 | 49.3 | 53.8 | 60.1 | 61.8 | 53.9 | 55.2 | 55.9 | 52.2 | 48.1 | 40.6 | 37.6 | 37.1 | 36.3 | 36.8 | 39.4 | 42.4 | 42.3 | 43.3 | 40.2 | 35.7 | 33.7 | 31.6 | 30.9 | 29.3 | 28.2 | 26.9 | 25.6 | 22.0 | 16.8 | 10.1 |
| 9:33:22 AM | 52.2 | 44.9 | 51.2 | 46.7 | 47.2 | 53.8 | 60.4 | 62.0 | 54.4 | 55.4 | 56.3 | 52.6 | 48.3 | 41.1 | 38.6 | 38.3 | 37.5 | 38.8 | 41.3 | 45.1 | 44.7 | 45.1 | 42.4 | 37.7 | 34.7 | 30.8 | 29.9 | 27.3 | 25.0 | 23.2 | 20.9 | 17.7 | 13.6 | 8.2 |
| 9:33:12 AM | 61.5 | 49.9 | 50.0 | 49.6 | 50.7 | 55.0 | 61.7 | 62.7 | 61.2 | 56.1 | 56.1 | 54.3 | 50.5 | 48.7 | 49.0 | 48.0 | 47.2 | 48.1 | 51.6 | 55.1 | 53.5 | 53.5 | 52.2 | 49.7 | 47.2 | 43.7 | 40.3 | 37.7 | 34.8 | 32.2 | 28.3 | 24.2 | 19.2 | 12.0 |
| 9:33:22 AM | 56.1 | 58.2 | 56.5 | 55.0 | 53.4 | 57.3 | 62.2 | 62.1 | 56.3 | 55.2 | 56.0 | 52.8 | 49.0 | 45.5 | 43.9 | 42.0 | 41.9 | 42.5 | 44.8 | 49.6 | 48.6 | 48.7 | 46.6 | 43.4 | 40.2 | 36.2 | 33.2 | 30.2 | 27.5 | 25.3 | 21.9 | 18.7 | 14.5 | 8.7 |
| 9:33:32 AM | 52.3 | 56.6 | 55.3 | 50.6 | 50.4 | 55.3 | 60.7 | 62.3 | 53.3 | 56.0 | 56.9 | 52.6 | 48.9 | 42.2 | 38.1 | 38.2 | 37.7 | 38.7 | 40.5 | 44.2 | 44.7 | 44.6 | 41.9 | 38.7 | 36.5 | 35.5 | 34.6 | 33.4 | 32.0 | 29.8 | 28.0 | 24.2 | 18.8 | 11.9 |
| 9:33:42 AM | 55.3 | 58.3 | 55.5 | 52.1 | 51.4 | 55.4 | 60.6 | 62.3 | 61.3 | 57.1 | 57.2 | 55.2 | 49.9 | 44.1 | 41.1 | 40.4 | 41.3 | 43.6 | 46.0 | 49.2 | 46.4 | 47.5 | 45.8 | 41.6 | 38.4 | 34.7 | 32.4 | 30.5 | 28.6 | 26.4 | 23.8 | 20.3 | 15.7 | 9.7 |
| 9:33:52 AM | 61.1 | 65.3 | 63.0 | 61.5 | 60.9 | 60.9 | 62.1 | 62.2 | 64.2 | 63.6 | 58.3 | 55.0 | 52.8 | 49.4 | 46.7 | 45.7 | 47.3 | 47.9 | 51.1 | 54.8 | 53.7 | 53.0 | 51.5 | 49.0 | 46.2 | 42.1 | 38.5 | 36.1 | 33.8 | 31.1 | 28.4 | 24.7 | 20.1 | 14.2 |
| 9:34:02 AM | 61.6 | 54.2 | 54.5 | 52.1 | 51.5 | 54.3 | 60.6 | 62.0 | 55.2 | 57.6 | 58.4 | 53.5 | 50.1 | 46.0 | 43.9 | 44.0 | 45.2 | 45.2 | 48.5 | 54.5 | 54.9 | 54.1 | 52.6 | 50.1 | 47.0 | 42.5 | 38.8 | ${ }^{35.6}$ | 33.2 | 31.4 | 28.2 | 23.8 | 18.8 | 11.5 |
| 9:34:12 AM | 59.0 | 53.4 | 51.8 | 51.2 | 51.3 | 54.4 | 59.6 | 62.8 | 54.3 | 56.3 | 57.3 | 53.0 | 49.8 | 47.0 | 47.7 | 45.8 | 45.3 | 45.6 | 48.5 | 52.1 | 50.7 | 50.4 | 50.0 | 47.6 | 45.5 | 42.3 | 39.0 | 35.9 | 32.6 | 29.9 | 27.0 | 23.8 | 19.2 | 12.4 |
| 9:34:22 AM | 54.2 | 54.1 | 52.8 | 50.5 | 49.4 | 54.3 | 60.5 | 61.9 | 54.7 | 56.8 | 57.8 | 52.4 | 49.0 | 45.6 | 42.1 | 40.6 | 40.0 | 40.8 | 44.4 | 47.9 | 46.4 | 46.3 | 44.1 | 40.4 | 37.5 | 34.1 | 31.4 | 27.9 | 25.2 | 22.3 | 19.4 | 16.4 | 12.2 | 7.6 |
| 9:34:32 AM | 56.9 | 52.6 | 48.9 | 49.0 | 49.7 | 55.5 | 59.9 | 61.9 | 57.4 | 58.5 | 57.4 | 53.5 | 49.2 | 44.4 | 43.1 | 42.2 | 43.7 | 45.8 | 44.7 | 47.9 | 49.4 | 49.7 | 46.7 | 44.2 | 44.1 | 42.3 | 39.0 | 35.9 | 33.1 | 30.6 | 27.8 | 23.9 | 18.9 | 12.0 |
| 9:34:42 AM | 58.8 | 57.6 | 52.3 | 52.4 | 52.1 | 54.8 | 59.8 | 61.7 | 55.0 | 56.7 | 57.8 | 52.7 | 48.3 | 43.3 | 38.8 | 38.7 | 41.4 | 47.3 | 52.2 | 54.4 | 48.7 | 47.5 | 48.0 | 47.7 | 44.3 | 40.4 | 39.6 | 39.7 | 33.5 | 27.4 | 24.8 | 21.3 | 16.4 | 10.0 |
| 9:34:52 AM | 60.7 | 56.9 | 55.4 | 54.4 | 52.8 | 55.6 | 59.8 | 62.0 | 54.2 | 57.0 | 58.2 | 52.9 | 49.9 | 46.9 | 47.9 | 48.2 | 45.2 | 46.2 | 48.8 | 52.8 | 53.5 | 52.6 | 51.5 | 50.2 | 46.8 | 43.5 | 41.5 | 39.8 | 37.7 | 35.5 | 32.4 | 29.6 | 24.2 | 16.3 |
| 9:35:02 AM | 55.5 | 63.9 | 62.4 | 60.7 | 59.1 | 57.5 | 60.6 | 61.9 | 55.4 | 55.8 | 56.9 | 52.0 | 48.4 | 42.8 | 40.9 | 40.4 | 39.6 | 41.5 | 44.3 | 47.8 | 47.0 | 48.5 | 46.5 | 43.3 | 40.3 | 37.2 | 36.1 | 35.8 | 34.8 | 33.2 | 31.2 | 28.2 | 22.5 | 15.3 |
| 9:35:12 AM | 59.6 | 56.4 | 55.7 | 54.0 | 51.8 | 55.3 | 60.4 | 62.9 | 55.4 | 56.6 | 57.8 | 52.1 | 49.0 | 45.0 | 43.9 | 43.4 | 43.6 | 44.7 | 48.9 | 53.0 | 51.4 | 51.9 | 50.7 | 48.1 | 45.8 | 41.8 | 37.6 | 34.1 | 32.3 | 30.0 | 26.3 | 22.4 | 17.3 | 10.3 |
| 9:35:22 AM | 51.2 | 49.6 | 46.6 | 47.7 | 49.6 | 55.0 | 59.8 | 61.2 | 54.4 | 56.0 | 57.0 | 51.4 | 47.8 | 41.8 | 37.8 | 38.2 | 38.1 | 38.9 | 40.2 | 43.3 | 43.8 | 43.4 | 40.7 | 37.1 | 34.6 | 31.2 | 30.9 | 29.5 | 29.1 | 27.9 | 24.2 | 20.3 | 15.2 | 9.1 |
| 9:35:32 AM | 60.4 | 54.7 | 52.6 | 53.3 | 53.1 | 58.2 | 59.7 | 61.5 | 57.1 | 55.9 | 56.2 | 52.9 | 49.8 | 47.8 | 46.1 | 46.9 | 46.6 | 46.4 | 49.9 | 52.8 | 52.6 | 52.5 | 50.6 | 49.2 | 47.5 | 44.1 | 40.9 | 37.8 | 34.8 | 32.2 | 28.6 | 24.5 | 19.9 | 12.7 |
| 9:35:42 AM | 56.9 | 54.8 | 51.6 | 51.2 | 51.8 | 56.2 | 59.9 | 62.0 | 54.9 | 55.6 | 56.1 | 52.1 | 48.3 | 46.7 | 42.3 | 42.0 | 43.1 | 43.1 | 48.0 | 51.0 | 49.1 | 48.2 | 47.1 | 44.1 | 41.6 | 38.6 | 36.1 | 33.8 | 31.8 | 29.4 | 26.6 | 23.3 | 18.6 | 11.9 |
| 9:35:52 AM | 59.2 | 55.8 | 54.3 | 52.5 | 51.4 | 54.1 | 59.9 | 62.3 | 58.0 | 56.7 | 57.8 | 53.9 | 50.9 | 45.5 | 43.6 | 44.0 | 45.1 | 45.0 | 46.1 | 49.6 | 52.2 | 51.5 | 50.5 | 48.7 | 46.2 | 41.5 | 37.9 | 34.9 | 32.1 | 30.1 | 27.0 | 23.0 | 17.8 | 10.5 |
| 9:36:02 AM | 63.2 | 55.4 | 53.9 | 53.1 | 53.0 | 55.4 | 62.3 | 61.4 | 53.9 | 56.5 | 56.8 | 52.6 | 48.8 | 46.0 | 48.7 | 47.3 | 46.3 | 47.0 | 49.3 | 53.1 | 55.8 | 55.4 | 54.9 | 53.7 | 51.5 | 47.1 | 42.8 | 39.4 | 36.5 | 33.9 | 30.6 | 26.6 | 21.6 | 13.9 |
| 9:36:12 AM | 63.5 | 62.0 | 59.6 | 57.8 | 55.6 | 62.5 | 62.3 | 61.8 | 54.4 | 57.9 | 55.9 | 53.0 | 50.4 | 48.9 | 49.8 | 48.9 | 50.7 | 51.2 | 51.9 | 55.6 | 55.9 | 55.5 | 54.7 | 52.8 | 50.4 | 46.6 | 43.1 | 40.1 | 37.1 | 34.1 | 30.2 | 25.7 | 20.5 | 12.9 |
| 9:36:22 AM | 61.2 | 57.3 | 53.4 | 52.2 | 51.9 | 55.2 | 60.1 | 61.2 | 57.8 | 60.3 | 56.5 | 52.1 | 48.7 | 46.8 | 46.8 | 46.8 | 46.2 | 46.9 | 50.1 | 53.6 | 53.8 | 52.9 | 51.6 | 50.7 | 48.3 | 44.7 | 40.1 | 36.9 | 34.7 | 31.6 | 27.4 | 22.9 | 17.6 | 10.5 |
| 9:36:32 AM | 60.5 | 48.1 | 47.3 | 48.1 | 50.0 | 58.0 | 60.6 | 61.6 | 52.8 | 56.2 | 56.7 | 52.0 | 48.9 | 45.9 | 46.2 | 44.1 | 44.8 | 45.8 | 49.6 | 53.8 | 52.9 | 52.9 | 52.0 | 48.3 | 45.4 | 42.0 | 39.6 | 36.9 | 34.9 | 32.1 | 27.5 | 23.1 | 18.1 | 10.5 |
| 9:36:42 AM | 57.0 | 47.7 | 48.4 | 48.3 | 54.8 | 55.7 | 59.7 | 62.2 | 52.6 | 56.2 | 57.2 | 52.2 | 48.4 | 45.5 | 44.9 | 42.8 | 42.3 | 43.7 | 45.0 | 49.9 | 49.7 | 49.0 | 47.9 | 44.7 | 42.6 | 39.8 | 37.1 | 34.9 | 32.0 | 29.6 | 25.8 | 21.1 | 15.7 | 9.7 |
| 9:36:52 AM | 56.2 | 44.8 | 45.0 | 46.2 | 50.6 | 53.8 | 59.5 | 64.6 | 53.7 | 56.2 | 56.8 | 51.9 | 48.0 | 43.3 | 43.8 | 43.3 | 40.7 | 41.9 | 43.8 | 47.3 | 48.5 | 48.8 | 47.0 | 45.3 | 43.4 | 38.9 | 35.3 | 32.0 | 28.0 | 25.9 | 23.3 | 19.7 | 15.1 | 9.1 |
| 9:37:02 AM | 55.0 | 49.8 | 48.3 | 46.3 | 49.9 | 54.9 | 60.2 | 61.4 | 54.0 | 55.9 | 56.5 | 52.5 | 48.4 | 44.5 | 42.1 | 42.8 | 40.1 | 41.4 | 44.3 | 46.7 | 46.4 | 48.3 | 45.4 | 43.1 | 40.9 | 37.1 | ${ }^{33.7}$ | 30.6 | 27.6 | 24.6 | 22.0 | 18.7 | 14.2 | 8.4 |
| 9:37:12 AM | 57.5 | 49.3 | 47.1 | 50.0 | 52.3 | 55.3 | 60.5 | 62.3 | 54.5 | 55.9 | 58.0 | 52.4 | 49.5 | 45.4 | 45.3 | 43.5 | 43.5 | 45.1 | 48.4 | 50.7 | 48.9 | 50.2 | 47.5 | 45.0 | 43.2 | 40.3 | 36.4 | ${ }^{34.1}$ | 31.6 | 29.1 | 26.9 | 23.0 | 18.1 | 11.0 |
| 9:37:22 AM | 59.5 | 54.4 | 52.0 | 51.4 | 51.9 | 56.8 | 60.8 | 61.7 | 61.7 | 59.5 | 58.9 | 53.3 | 50.9 | 48.2 | 47.9 | 46.9 | 45.8 | 47.3 | 50.4 | 53.1 | 50.9 | 51.9 | 49.9 | 46.1 | 43.7 | 40.9 | 38.2 | 35.9 | 33.4 | 30.6 | 26.8 | 23.0 | 18.1 | 11.2 |
| 9:37.32 AM | 60.5 | 51.6 | 47.5 | 48.5 | 50.8 | 56.4 | 61.9 | 61.9 | 54.6 | 57.0 | 56.7 | 51.3 | 50.1 | 45.3 | 44.5 | 45.4 | 44.4 | 46.2 | 48.5 | 52.8 | 52.2 | 52.4 | 52.1 | 50.2 | 48.2 | 44.6 | 39.9 | ${ }^{36.3}$ | 34.0 | 31.1 | 27.4 | 23.9 | 19.3 | 11.9 |
| 9:37:42 AM | 61.4 | 49.9 | 49.3 | 48.6 | 49.8 | 55.1 | 60.4 | 62.2 | 55.1 | 56.4 | 56.7 | 51.8 | 50.1 | 47.2 | 46.6 | 44.7 | 44.6 | 46.3 | 50.2 | 54.9 | 54.0 | 53.6 | 52.1 | 50.0 | 47.6 | 44.1 | 40.2 | 36.7 | 33.5 | 31.0 | 26.8 | 22.6 | 17.3 | 10.4 |
| 9:37:52 AM | 57.6 | 45.0 | 47.8 | 49.9 | 49.7 | 54.7 | 60.5 | 62.0 | 54.0 | 56.3 | 56.8 | 51.8 | 49.4 | 44.0 | 41.6 | 41.0 | 42.0 | 43.4 | 46.3 | 51.7 | 49.5 | 50.1 | 48.4 | 44.5 | 42.6 | 38.8 | 36.1 | 34.6 | 32.7 | 29.0 | 24.2 | 18.7 | 13.4 | 7.9 |
| 9:38:22 AM | 60.0 | 53.0 | 58.8 | 61.0 | 54.6 | 59.0 | 60.6 | 62.0 | 58.4 | 56.2 | 56.9 | 52.5 | 51.8 | 48.1 | 45.2 | 45.0 | 45.3 | 47.5 | 49.5 | 54.1 | 52.4 | 51.5 | 50.2 | 48.0 | 45.6 | 42.2 | 39.5 | 38.0 | 36.1 | 32.8 | 27.3 | 22.2 | 17.0 | 10.3 |
| 9:38:12 AM | 62.3 | 49.4 | 56.0 | 58.7 | 55.5 | 55.4 | 61.6 | 63.4 | 66.1 | 57.1 | 56.8 | 53.6 | 51.4 | 49.3 | 48.0 | 47.2 | 46.4 | 48.6 | 50.4 | 54.8 | 55.2 | 53.9 | 53.1 | 51.5 | 49.1 | 46.2 | 42.6 | 39.7 | 36.6 | 33.3 | 28.8 | 24.5 | 18.9 | 11.6 |
| 9:38:22 AM | 67.8 | 57.1 | 61.6 | 66.0 | 61.2 | 62.1 | 63.1 | 68.3 | 65.4 | 58.7 | 59.3 | 56.5 | 57.8 | 57.7 | 54.6 | 61.2 | 53.2 | 54.8 | 58.7 | 59.5 | 59.7 | 58.2 | 57.3 | 56.3 | 55.9 | 53.6 | 50.9 | 49.3 | 48.4 | 48.3 | 41.6 | 38.9 | 33.6 | 24.9 |
| 9:38:32 AM | 63.4 | 54.2 | 54.4 | 56.3 | 52.9 | 63.4 | 63.9 | 62.5 | 57.9 | 59.5 | 57.7 | 55.7 | 54.2 | 52.6 | 50.8 | 50.8 | 50.0 | 49.9 | 52.4 | 55.8 | 56.1 | 55.1 | 53.9 | 52.5 | 50.4 | 46.9 | 43.5 | 41.0 | 38.1 | 35.2 | 31.4 | 27.2 | 21.6 | 13.6 |
| 9:38:42 AM | 58.8 | 50.4 | 51.1 | 52.8 | 50.8 | 55.6 | 61.0 | 62.1 | 57.3 | 57.4 | 56.4 | 52.5 | 51.4 | 49.2 | 47.2 | 46.4 | 44.8 | 45.1 | 47.5 | 51.4 | 50.6 | 51.5 | 49.6 | 46.7 | 44.6 | 41.2 | 37.9 | 35.4 | 33.4 | 31.0 | 28.5 | 25.1 | 20.4 | 13.0 |
| 9:38:52 AM | 60.3 | 51.0 | 51.5 | 52.0 | 52.3 | 56.0 | 61.2 | 62.7 | 58.9 | 59.1 | 57.3 | 52.8 | 50.7 | 47.0 | 45.7 | 45.8 | 46.7 | 46.9 | 49.5 | 53.7 | 52.5 | 52.9 | 50.2 | 47.9 | 46.1 | 43.3 | 40.6 | 38.8 | 36.4 | 34.1 | 31.3 | 27.9 | 22.5 | 14.7 |


|  | Main | 12.5 Hz | 16 Hz | 20 Hz | 25 Hz | 1.5 Hz | 40 Hz | 50 Hz | 63 Hz | 80 Hz | 100 Hz | 125 Hz | 160 Hz | 200 Hz | 250 Hz | 315 Hz | 400 Hz | 500 Hz | 630 Hz | 800 Hz | 1 kHz | 1.25 kHz | 1.6 kHz | 2 kHz | 2.5 kHz | 3.15 kHz | 4 kHz | 5 kHz | 6.3 kHz | 8 kHz | 10 kHz | 12.5 kHz | 16 kHz | 20 kHz |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Leq | 73.2 | 58.4 | 56.7 | 54.7 | 56.6 | 63.7 | 72.6 | 74.6 | 65.4 | 78.6 | 81.0 | 75.9 | 68.3 | 65.6 | 63.5 | 59.8 | 61.6 | 62.0 | 63.9 | 64.3 | 64.3 | 62.3 | 63.0 | 61.3 | 59.7 | 56.4 | 55.8 | 53.6 | 48.9 | 45.2 | 42.2 | 40.5 | 40.7 | 27.1 |
| L | 83.2 | 68.4 | 66.7 | 64.7 | 66.6 | 73.7 | 82.6 | 84.6 | 75.4 | 88.6 | 91.0 | 85.9 | 78.3 | 75.6 | 73.5 | 69.8 | 71.6 | 72.0 | 73.9 | 74.3 | 74.3 | 72.3 | 73.0 | 71.3 | 69.7 | 66.4 | 65.8 | 63.6 | 58.9 | 55.2 | 52.2 | 50.5 | 50.7 | 37.1 |
| $L_{\text {max }}$ | 73.4 | 63.5 | 61.4 | 58.7 | 59.1 | 65.3 | 73.3 | 74.9 | 67.2 | 78.9 | 81.6 | 76.4 | 69.0 | 66.5 | 64.5 | 60.9 | 62.5 | 62.8 | 64.5 | 64.9 | 64.9 | 62.8 | 63.4 | 61.7 | 60.1 | 56.8 | 56.3 | 54.4 | 49.4 | 46.1 | 43.1 | 41.7 | 42.3 | 28.4 |
| Lmin | 72.9 | 51.3 | 49.9 | 51.6 | 54.4 | 62.2 | 71.8 | 74.2 | 63.9 | 78.2 | 80.2 | 75.4 | 67.6 | 64.8 | 62.5 | 58.7 | 60.7 | 61.2 | 63.2 | 63.7 | 63.8 | 61.8 | 62.5 | 60.8 | 59.3 | 56.0 | 55.3 | 52.9 | 48.4 | 44.7 | 41.6 | 39.9 | 39.3 | 26.2 |
| 15 | 73.4 | 63.3 | 61.3 | 59.0 | 59.1 | 65.3 | 73.4 | 74.9 | 67.1 | 78.9 | 81.6 | 76.4 | 69.0 | 66.4 | 64.6 | 61.0 | 62.5 | 62.9 | 64.5 | 64.9 | 64.9 | 62.8 | 63.4 | 61.7 | 60.1 | 56.8 | 56.3 | 54.4 | 49.5 | 46.2 | 43.1 | 41.7 | 42.3 | 28.5 |
| 110 | 73.4 | 63.3 | 61.3 | 59.0 | 59.1 | 65.3 | 73.4 | 74.9 | 67.1 | 78.9 | 81.6 | 76.4 | 69.0 | 66.4 | 64.6 | 61.0 | 62.5 | 62.9 | 64.5 | 64.9 | 64.9 | 62.8 | 63.4 | 61.7 | 60.1 | 56.8 | 56.3 | 54.4 | 49.5 | 46.2 | 43.1 | 41.7 | 42.3 | 28.5 |
| 150 | 73.2 | 56.6 | 56.3 | 54.0 | 56.4 | 63.7 | 72.6 | 74.6 | 65.4 | 78.7 | 81.1 | 76.0 | 68.3 | 65.7 | 63.5 | 59.7 | 61.7 | 62.1 | 63.9 | 64.4 | 64.4 | 62.3 | 63.0 | 61.3 | 59.7 | 56.4 | 55.8 | 53.7 | 48.9 | 45.1 | 42.2 | 40.5 | 40.8 | 27.0 |
| 190 | 73.0 | 52.6 | 50.9 | 52.1 | 55.1 | 62.6 | 72.0 | 74.4 | 64.2 | 78.4 | 80.5 | 75.5 | 67.8 | 65.0 | 62.8 | 59.0 | 61.0 | 61.5 | 63.5 | 63.9 | 63.9 | 62.0 | 62.6 | 61.0 | 59.4 | 56.1 | 55.5 | 53.1 | 48.6 | 44.8 | 41.8 | 40.1 | 39.6 | 26.4 |
| 195 | 72.9 | 51.7 | 49.0 | 51.3 | 54.2 | 62.2 | 71.8 | 74.3 | 63.8 | 78.2 | 80.1 | 75.4 | 67.6 | 64.8 | 62.5 | 58.6 | 60.7 | 61.2 | 63.2 | 63.6 | 63.8 | 61.8 | 62.5 | 60.8 | 59.3 | 56.0 | 55.3 | 52.9 | 48.4 | 44.7 | 41.6 | 39.8 | 39.1 | 26.2 |
| Site ST2-Session 2 - Sound Level over Time |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Start Time | Main | 12.5 Hz | 16 Hz | 20 Hz | 25 Hz | 31.5 Hz | 40 Hz | 50 Hz | 63 Hz | 80 Hz | 100 Hz | 125 Hz | 160 Hz | 200 Hz | 250 Hz | 315 Hz | 400 Hz | 500 Hz | 630 Hz | 800 Hz | 1 kHz | 1.25 kHz | 1.6 kHz | 2 kHz | 2.5 kHz | 3.15 kHz | 4 kHz | 5 kHz | 6.3 kHz | 8 kHz | 10 kHz | 12.5 kHz | 16 kHz | 20 kHz |
| 9:29:01 AM | 74.7 | 48.0 | 48.2 | 50.8 | 54.2 | 64.1 | 73.9 | 75.9 | 64.5 | 78.4 | 80.7 | 75.2 | 68.0 | 65.2 | 63.2 | 59.6 | 60.9 | 64.4 | 66.8 | 65.3 | 65.0 | 65.4 | 64.6 | 63.2 | 61.7 | 59.2 | 58.2 | 56.3 | 51.1 | 48.1 | 45.2 | 42.0 | 41.0 | 27.3 |
| 9:29:11 AM | 74.5 | 45.4 | 49.0 | 50.2 | 53.8 | 64.3 | 73.7 | 75.9 | 64.5 | 78.3 | 80.9 | 74.9 | 67.8 | 65.4 | 63.4 | 60.5 | 61.0 | 64.0 | 66.7 | 65.3 | 64.9 | 65.0 | 64.4 | 62.9 | 61.6 | 58.9 | 57.8 | 56.1 | 50.8 | 47.7 | 44.5 | 41.6 | 41.1 | 26.9 |
| 9:29:21 AM | 74.3 | 46.2 | 49.3 | 50.7 | 54.0 | 64.6 | 73.7 | 75.8 | 64.0 | 78.5 | 81.0 | 74.8 | 67.9 | 66.0 | 63.4 | 60.4 | 61.1 | 64.0 | 66.0 | 64.6 | 64.5 | 64.5 | 64.5 | 62.5 | 61.4 | 58.4 | 57.2 | 56.3 | 50.7 | 48.0 | 45.0 | 42.7 | 42.6 | 29.4 |
| 9:29:31 AM | 73.9 | 47.1 | 49.9 | 50.6 | 54.7 | 64.6 | 73.9 | 76.2 | 64.0 | 78.1 | 80.6 | 75.3 | 68.1 | 66.1 | 62.9 | 60.3 | 63.0 | 64.1 | 64.5 | 65.0 | 65.0 | 63.1 | 64.5 | 62.0 | 60.7 | 57.2 | 56.0 | 55.8 | 49.5 | 46.4 | 43.2 | 41.0 | 41.9 | 29.4 |
| 9:29:41 AM | 73.8 | 51.1 | 51.2 | 51.9 | 54.0 | 63.7 | 74.2 | 76.2 | 63.9 | 78.0 | 80.2 | 75.3 | 67.4 | 66.5 | 64.0 | 60.0 | 61.6 | 62.5 | 65.0 | 65.1 | 65.1 | 63.4 | 64.3 | 61.8 | 60.3 | 56.7 | 56.0 | 55.9 | 49.6 | 46.3 | 43.1 | 40.8 | 40.6 | 27.2 |
| 9:29:51 AM | 73.8 | 53.3 | 52.9 | 52.9 | 55.6 | 64.0 | 73.8 | 76.0 | 63.6 | 78.0 | 80.4 | 74.9 | 67.1 | 66.4 | 64.2 | 59.7 | 61.2 | 62.2 | 64.9 | 65.1 | 65.2 | 63.2 | 64.1 | 62.0 | 60.6 | 56.5 | 56.1 | 56.2 | 49.5 | 45.7 | 42.6 | 40.6 | 41.9 | 26.6 |
| 9:30:02 AM | 74.0 | 46.6 | 50.7 | 51.3 | 55.9 | 63.3 | 73.8 | 75.9 | 63.9 | 78.1 | 80.4 | 75.0 | 67.2 | 66.5 | 64.4 | 59.1 | 61.5 | 62.2 | 65.2 | 65.0 | 65.5 | 63.4 | 64.6 | 62.2 | 60.8 | 56.9 | 56.2 | 56.3 | 49.5 | 45.8 | 42.6 | 40.5 | 41.1 | 26.5 |
| 9:30:11 AM | 74.2 | 64.9 | 61.5 | 58.4 | 58.3 | 64.6 | 73.7 | 75.9 | 65.0 | 78.6 | 80.9 | 76.4 | 69.3 | 66.1 | 61.6 | 60.0 | 62.8 | 61.6 | 64.6 | 66.1 | 65.4 | 63.6 | 64.4 | 62.2 | 61.0 | 56.8 | 56.3 | 55.8 | 49.3 | 45.8 | 42.7 | 40.6 | 40.8 | 26.8 |
| 9:30:21 AM | 74.3 | 68.6 | 64.9 | 61.7 | 59.6 | 68.4 | 73.6 | 76.5 | 69.4 | 78.7 | 81.1 | 76.2 | 69.1 | 66.3 | 62.4 | 60.4 | 63.1 | 61.8 | 65.0 | 6.0 | 65.5 | 63.5 | 64.7 | 62.4 | 60.8 | 57.1 | 56.6 | 57.0 | 49.4 | 45.8 | 42.7 | 40.5 | 40.7 | 26.9 |
| 9:30:31 AM | 73.9 | 60.8 | 70.1 | 53.3 | 58.1 | 70.7 | 74.5 | 76.1 | 68.0 | 78.2 | 79.7 | 75.4 | 68.6 | 67.1 | 63.6 | 60.4 | 63.0 | 62.9 | 64.9 | 65.5 | 64.9 | 63.3 | 64.5 | 62.0 | 60.7 | 57.0 | 56.1 | 56.4 | 49.1 | 45.7 | 42.5 | 40.5 | 40.4 | 26.7 |
| 9:30:41 AM | 74.2 | 72.1 | 66.4 | 55.3 | 64.1 | 65.5 | 74.3 | 75.6 | 65.6 | 78.9 | 80.3 | 76.5 | 69.4 | 65.5 | 62.6 | 61.8 | 64.6 | 62.1 | 65.2 | 65.8 | 65.3 | 63.3 | 64.5 | 62.0 | 60.8 | 56.7 | 56.3 | 56.5 | 49.2 | 45.7 | 42.5 | 40.6 | 40.8 | 26.9 |
| 9:30:51 AM | 74.1 | 64.7 | 51.0 | 51.1 | 58.8 | 63.2 | 74.8 | 75.3 | 64.0 | 78.6 | 79.5 | 76.6 | 68.7 | 65.3 | 61.3 | 60.2 | 63.5 | 60.9 | 65.4 | 65.4 | 65.7 | 63.0 | 64.3 | 62.4 | 61.0 | 56.8 | 56.3 | 56.3 | 49.1 | 45.7 | 42.7 | 40.9 | 40.5 | 27.5 |
| 9:31:01 AM | 74.0 | 58.0 | 47.7 | 50.6 | 55.0 | 63.1 | 74.3 | 75.3 | 63.6 | 78.7 | 80.1 | 76.3 | 68.1 | 64.5 | 61.9 | 60.5 | 62.5 | 61.1 | 65.8 | 64.9 | 65.1 | 63.0 | 64.6 | 62.3 | 61.0 | 56.9 | 56.5 | 56.4 | 49.2 | 45.8 | 42.8 | 41.1 | 40.5 | 27.6 |
| 9:31:12 AM | 73.9 | 55.3 | 49.2 | 49.5 | 53.5 | 63.1 | 73.5 | 75.4 | 64.1 | 78.8 | 80.9 | 76.1 | 67.8 | 64.1 | 63.2 | 61.1 | 62.0 | 61.1 | 65.4 | 64.8 | 65.1 | 63.1 | 64.3 | 62.1 | 60.8 | 56.8 | 56.2 | 54.9 | 48.9 | 45.4 | 42.1 | 40.5 | 40.7 | 26.9 |
| 9:31:21 AM | 73.7 | 49.8 | 49.3 | 50.1 | 52.9 | 62.6 | 73.4 | 75.6 | 64.0 | 78.6 | 81.0 | 76.0 | 67.8 | 64.0 | 62.7 | 61.0 | 61.0 | 61.6 | 65.1 | 64.9 | 65.0 | 63.0 | 63.9 | 61.8 | 60.8 | 56.6 | 56.2 | 54.6 | 48.7 | 45.1 | 41.8 | 40.2 | 40.3 | 26.5 |
| 9:31:31 AM | 73.5 | 47.8 | 47.9 | 49.2 | 52.9 | 62.5 | 72.9 | 75.3 | 63.8 | 78.5 | 81.0 | 75.8 | 67.4 | 63.9 | 63.5 | 60.8 | 60.5 | 61.5 | 64.6 | 64.8 | 65.1 | 62.5 | 63.6 | 61.7 | 60.5 | 56.5 | 56.4 | 54.1 | 49.0 | 45.2 | 41.8 | 40.2 | 40.4 | 26.5 |
| 9:31:41 AM | 73.7 | 48.3 | 48.8 | 49.6 | 53.2 | 62.6 | 72.9 | 75.4 | 63.5 | 78.5 | 81.1 | 75.7 | 67.4 | 63.9 | 64.4 | 60.6 | 60.2 | 62.4 | 64.3 | 64.8 | 65.5 | 62.9 | 64.0 | 61.7 | 60.5 | 56.5 | 55.9 | 54.0 | 48.8 | 45.2 | 42.1 | 40.4 | 41.4 | 26.9 |
| 9:31:51 AM | 73.7 | 48.6 | 49.9 | 51.4 | 54.2 | 63.6 | 72.9 | 75.3 | 63.7 | 78.4 | 80.9 | 75.4 | 67.6 | 65.2 | 64.4 | 59.8 | 61.2 | 61.9 | 64.6 | 64.8 | 65.5 | 63.0 | 63.2 | 62.1 | 60.5 | 56.5 | 56.4 | 53.6 | 49.1 | 45.1 | 41.9 | 40.2 | 40.3 | 26.2 |
| 9:32:01 AM | 73.5 | 51.9 | 50.8 | 52.5 | 54.4 | 63.5 | 72.7 | 75.0 | 63.4 | 78.4 | 80.9 | 75.3 | 67.7 | 65.4 | 64.2 | 59.2 | 61.2 | 61.8 | 64.8 | 64.4 | 65.1 | 62.6 | 63.5 | 61.9 | 60.4 | 56.4 | 56.3 | 54.1 | 48.9 | 44.9 | 41.6 | 39.8 | 40.3 | 26.0 |
| 9:32:11 AM | 73.4 | 54.2 | 52.6 | 52.7 | 54.4 | 63.2 | 72.5 | 75.0 | 63.6 | 78.5 | 81.1 | 75.3 | 67.9 | 65.6 | 64.0 | 59.3 | 61.1 | 61.5 | 64.3 | 64.3 | 65.2 | 62.6 | 63.6 | 61.7 | 60.2 | 56.3 | 56.0 | 53.8 | 48.6 | 45.0 | 41.8 | 40.1 | 40.3 | 26.5 |
| 9:32:22 AM | 73.3 | 57.6 | 55.2 | 55.5 | 55.9 | 63.3 | 72.5 | 74.9 | 63.3 | 78.6 | 81.1 | 75.4 | 67.8 | 65.7 | 64.3 | 59.3 | 61.0 | 61.7 | 64.1 | 64.0 | 64.8 | 62.4 | 63.2 | 61.6 | 60.0 | 56.3 | 55.9 | ${ }_{5}^{53.8}$ | 48.6 | 44.9 | 41.5 | 40.0 | 40.1 | 26.4 |
| 9:32:31 AM | 73.1 | 57.3 | 55.8 | 53.2 | 54.2 | 62.9 | 72.8 | 74.8 | 63.7 | 78.6 | 80.8 | 75.5 | 67.8 | 65.6 | 64.1 | 59.1 | 60.8 | 61.9 | 64.0 | 63.9 | 64.6 | 62.0 | 63.5 | 61.3 | 59.9 | 56.3 | 55.6 | 53.7 | 48.5 | 44.8 | 41.5 | 40.1 | 40.6 | 26.5 |
| 9:32:41 AM | 73.2 | 54.4 | 53.7 | 52.6 | 54.7 | 63.2 | 72.5 | 74.7 | 63.9 | 78.5 | 80.8 | 75.6 | 67.7 | 65.6 | 64.1 | 59.1 | 60.7 | 62.1 | 64.2 | 63.9 | 64.1 | 61.9 | 63.8 | 61.6 | 59.9 | 56.5 | 55.7 | 53.9 | 48.5 | 44.8 | 41.6 | 40.1 | 40.8 | 26.6 |
| 9:32:51 AM | 73.0 | 52.6 | 52.3 | 51.2 | 53.3 | 62.6 | 72.6 | 74.7 | 64.0 | 78.6 | 80.9 | 75.7 | 67.8 | 65.7 | 64.1 | 58.8 | 60.7 | 61.6 | 64.2 | 63.7 | 64.4 | 62.1 | 62.7 | 61.3 | 60.0 | 56.0 | 55.7 | 52.7 | 48.8 | 44.7 | 41.6 | 40.1 | 41.0 | 26.7 |
| 9:33:22 AM | 73.1 | 50.2 | 53.3 | 51.4 | 53.7 | 63.3 | 73.0 | 74.9 | 63.8 | 78.7 | 80.9 | 75.7 | 67.7 | 64.7 | 63.8 | 59.0 | 60.7 | 62.5 | 63.9 | 63.7 | 64.6 | 62.2 | 62.9 | 61.3 | 59.7 | 56.1 | 55.7 | 52.9 | 48.8 | 44.7 | 41.4 | 39.9 | 40.1 | 26.5 |
| 9:33:11 AM | 72.9 | 51.1 | 49.9 | 52.5 | 54.9 | 62.8 | 73.1 | 74.9 | 63.8 | 78.6 | 80.7 | 75.8 | 67.3 | 63.0 | 62.8 | 59.6 | 60.9 | 62.4 | 63.6 | 63.9 | 64.3 | 62.0 | 63.0 | 61.3 | 59.5 | 56.2 | 55.6 | 52.8 | 48.3 | 44.2 | 41.0 | 39.6 | 39.7 | 26.1 |
| 9:33:21 AM | 73.0 | 52.4 | 51.0 | 54.0 | 56.0 | 62.9 | 73.0 | 74.7 | 63.8 | 78.5 | 80.5 | 75.6 | 67.3 | 63.5 | 63.4 | 59.9 | 60.0 | 62.2 | 63.8 | 64.4 | 64.6 | 62.1 | 62.7 | 61.2 | 59.4 | 56.2 | 55.7 | 52.4 | 48.6 | 44.2 | 40.9 | 39.5 | 41.3 | 25.7 |
| 9:33:32 AM | 72.8 | 56.9 | 58.0 | 54.7 | 55.9 | 63.0 | 72.8 | 74.7 | 63.9 | 78.6 | 80.8 | 75.7 | 67.5 | 64.5 | 63.7 | 59.6 | 60.8 | 62.3 | 63.3 | 63.5 | 64.0 | 62.0 | 62.6 | 61.2 | 59.4 | 56.2 | 55.8 | 52.3 | 48.6 | 44.3 | 41.1 | 39.7 | 39.8 | 26.0 |
| 9:33:41 AM | 73.0 | 54.5 | 51.5 | 53.7 | 54.4 | 62.6 | 72.5 | 74.5 | 63.7 | 78.7 | 80.9 | 76.1 | 67.7 | 65.6 | 64.3 | 59.0 | 61.1 | 62.6 | 63.3 | 63.8 | 64.0 | 62.3 | 62.7 | 61.4 | 59.4 | 56.1 | 55.4 | 52.5 | 48.4 | 44.6 | 41.5 | 39.9 | 39.8 | 26.5 |
| 9:33:51 AM | 72.9 | 57.6 | 54.8 | 53.7 | 55.8 | 62.6 | 72.3 | 74.5 | 63.9 | 78.5 | 80.9 | 76.0 | 67.9 | 65.8 | 63.8 | 59.4 | 61.0 | 62.6 | 63.0 | 63.6 | 64.1 | 62.4 | 62.6 | 61.2 | 59.5 | 56.1 | 55.5 | 52.2 | 48.5 | 44.6 | 41.7 | 40.3 | 40.5 | 26.9 |
| 9:34:01 AM | 72.8 | 48.0 | 49.3 | 53.3 | 56.2 | 62.5 | 72.3 | 74.5 | 63.7 | 78.8 | ${ }^{81.3}$ | 76.3 | 67.7 | 65.1 | 64.0 | 59.5 | 60.9 | 61.9 | 63.2 | 63.4 | 63.7 | 61.9 | 62.5 | 61.0 | 59.4 | 56.1 | 55.6 | 52.4 | 48.8 | 45.4 | 42.7 | 41.2 | 41.3 | 28.5 |
| 9:34:12 AM | 72.9 | 51.1 | 50.1 | 52.9 | 54.7 | 63.1 | 72.3 | 74.6 | 63.9 | 79.0 | 81.6 | 76.4 | 67.8 | 65.2 | 64.0 | 60.2 | 60.8 | 62.2 | 63.4 | 63.5 | 63.7 | 62.1 | 62.5 | 61.3 | 59.5 | 56.4 | 55.9 | 52.6 | 48.7 | 44.6 | 41.5 | 40.0 | 40.5 | 26.6 |
| 9:34:21 AM | 72.7 | 44.0 | 46.5 | 53.2 | 55.5 | 62.4 | 72.3 | 74.4 | 63.5 | 78.7 | 81.1 | 75.6 | 67.1 | 67.0 | 65.0 | 58.5 | 61.0 | 62.4 | 62.7 | 63.3 | 63.8 | 61.6 | 62.3 | 61.0 | 59.4 | 56.1 | 55.5 | 52.1 | 48.7 | 44.7 | 41.6 | 40.3 | 41.4 | 27.0 |
| 9:34:31 AM | 72.6 | 50.5 | 49.8 | 53.3 | 55.9 | 62.5 | 72.2 | 74.5 | 64.0 | 78.8 | 81.2 | 75.6 | 67.3 | 66.4 | 65.1 | 58.4 | 61.5 | 62.2 | 62.5 | 63.5 | 63.7 | 61.6 | 62.0 | 60.8 | 58.9 | 55.9 | 55.6 | 51.8 | 48.6 | 44.5 | 41.4 | 40.1 | 40.3 | 26.7 |
| 9:34:41 AM | 72.6 | 49.8 | 48.8 | 52.7 | 55.3 | 62.5 | 72.2 | 74.3 | 63.5 | 78.8 | 81.2 | 76.1 | 67.8 | 65.9 | 63.9 | 58.6 | 61.2 | 62.3 | 62.9 | 63.9 | 63.3 | 61.3 | 62.2 | 60.7 | 58.9 | 55.8 | 55.2 | 52.0 | 48.3 | 44.6 | 41.6 | 40.3 | 40.1 | 27.0 |
| 9:34:51 AM | 72.6 | 49.2 | 48.7 | 53.3 | 55.8 | 62.1 | 72.0 | 74.2 | 63.6 | 78.6 | 81.2 | 76.0 | 67.8 | 65.8 | 64.1 | 58.9 | 61.0 | 62.2 | 62.6 | 63.9 | 63.6 | 61.4 | 62.0 | 60.6 | 59.0 | 55.8 | 55.5 | 51.8 | 48.5 | 44.4 | 41.5 | 40.2 | 40.7 | 26.7 |
| 9:35:01 AM | 72.6 | 46.4 | 47.6 | 53.8 | 56.2 | 62.6 | 72.0 | 74.1 | 63.2 | 78.7 | 81.1 | 75.9 | 67.8 | 66.0 | 64.2 | 59.0 | 60.9 | 62.1 | 62.5 | 64.0 | 63.4 | 61.6 | 62.1 | 60.6 | 59.1 | 55.9 | 55.3 | 52.1 | 48.6 | 44.6 | 41.7 | 40.3 | 39.8 | 27.0 |
| 9:35:11 AM | 72.6 | 52.3 | 50.6 | 54.9 | 56.9 | 62.3 | 71.8 | 74.0 | 62.1 | 78.8 | 81.3 | 76.1 | 68.0 | 66.2 | 64.6 | 58.7 | 60.5 | 61.9 | 62.6 | 64.2 | 63.5 | 61.4 | 61.9 | 60.7 | 59.0 | 56.0 | 55.4 | 52.2 | 48.6 | 44.8 | 42.0 | 40.6 | 40.7 | 27.4 |
| 9:35:22 AM | 72.5 | 52.5 | 51.0 | 55.9 | 58.4 | 62.7 | 72.1 | 73.8 | 62.2 | 78.7 | 80.9 | 76.0 | 67.8 | 66.2 | 64.7 | 58.8 | 60.8 | 62.0 | 62.4 | 63.8 | 63.7 | 61.4 | 61.7 | 60.5 | 58.7 | 56.2 | 55.6 | 52.4 | 48.7 | 45.1 | 42.1 | 40.5 | 41.5 | 27.1 |
| 9:35:31 AM | 72.5 | 54.0 | 59.0 | 61.8 | 58.7 | 62.7 | 71.5 | 73.9 | 63.7 | 78.8 | 81.6 | 75.6 | 67.7 | 65.6 | 64.5 | 58.9 | 60.7 | 61.9 | 62.2 | 63.7 | 63.6 | 61.3 | 61.7 | 60.5 | 58.9 | 56.0 | 55.3 | 52.1 | 48.4 | 44.6 | 42.0 | 40.5 | 40.6 | 27.4 |
| 9:35:41 AM | 72.4 | 48.8 | 47.7 | 55.3 | 57.5 | 63.1 | 71.8 | 73.5 | 63.2 | 78.6 | 81.3 | 75.3 | 67.7 | 65.6 | 64.4 | 58.8 | 60.6 | 61.9 | 62.2 | 63.4 | 63.9 | 61.4 | 61.6 | 60.5 | 58.6 | 55.7 | 55.2 | 51.9 | 48.3 | 44.6 | 41.7 | 40.4 | 40.3 | 27.2 |
| 9:35:51 AM | 72.4 | 46.7 | 48.3 | 54.9 | 57.5 | 62.8 | 71.2 | 73.5 | 63.1 | 78.9 | 81.6 | 75.6 | 67.7 | 65.9 | 64.5 | 59.0 | 60.5 | 62.2 | 62.1 | 63.2 | 63.4 | 61.3 | 61.6 | 60.7 | 58.7 | 55.7 | 55.4 | 52.4 | 48.4 | 44.5 | 41.7 | 40.5 | 40.7 | 27.1 |
| 9:36:01 AM | 72.1 | 51.3 | 50.2 | 55.0 | 56.8 | 62.5 | 71.7 | 73.3 | 63.3 | 78.9 | 80.9 | 75.5 | 67.4 | 65.7 | 64.4 | 58.9 | 60.4 | 62.0 | 61.9 | 62.9 | 63.2 | 61.0 | 61.2 | 60.1 | 58.3 | 55.6 | 55.1 | 51.8 | 48.3 | 44.2 | 41.5 | 40.2 | 40.5 | 26.9 |
| 9:36:11 AM | 72.3 | 49.4 | 48.8 | 54.9 | 57.1 | 62.4 | 71.1 | 73.4 | 63.0 | 78.6 | 81.4 | 75.3 | 67.2 | 65.5 | 64.5 | 59.1 | 60.8 | 62.4 | 61.8 | 63.3 | 63.5 | 61.2 | 61.6 | 60.3 | 58.5 | 55.7 | 55.0 | 51.9 | 48.2 | 44.1 | 41.2 | 39.8 | 40.4 | 26.5 |
| 9:36:21 AM | 72.3 | 52.1 | 51.8 | 54.1 | 55.7 | 63.0 | 71.7 | 73.4 | 68.5 | 79.1 | 81.0 | 76.2 | 68.3 | 65.1 | 62.9 | 59.2 | 61.5 | 61.2 | 62.1 | 63.1 | 63.5 | 60.9 | 61.4 | 60.4 | 58.5 | $\stackrel{55.7}{5}$ | 55.3 | 51.9 | 48.4 | 44.5 | 41.9 | 40.3 | 40.1 | 27.3 |
| 9:36:32 AM | 72.6 | 48.0 | 50.1 | 54.2 | 57.4 | 64.2 | 71.5 | 73.3 | 67.0 | 79.2 | 81.8 | 76.2 | 68.6 | 65.2 | 61.8 | 60.3 | 62.0 | 61.2 | 62.7 | 63.6 | 63.7 | 61.1 | 61.8 | 60.4 | 58.7 | 55.8 | 55.2 | 51.8 | 48.6 | 44.6 | 42.0 | 40.6 | 40.5 | 27.3 |
| 9:36:41 AM | 72.3 | 56.1 | 52.0 | 54.1 | 55.6 | 62.9 | 71.2 | 73.0 | 63.4 | 79.1 | 81.4 | 76.2 | 68.1 | 64.6 | 61.7 | 60.2 | 61.1 | 61.4 | 62.5 | 63.3 | 63.6 | 60.7 | 61.3 | 60.4 | 58.4 | 55.7 | 55.3 | 51.8 | 48.6 | 44.4 | 41.6 | 40.3 | 41.1 | 27.0 |
| 9:36:51 AM | 72.6 | 50.6 | 49.0 | 53.8 | 56.7 | 62.7 | 70.8 | 73.0 | 63.2 | 79.3 | 82.0 | 76.0 | 68.1 | 65.0 | 61.9 | 59.0 | 61.6 | 61.8 | 62.4 | 64.1 | 63.6 | 61.4 | 62.0 | 60.5 | 58.6 | 56.0 | 55.6 | 52.1 | 48.5 | 44.2 | 41.5 | 40.2 | 40.9 | 26.9 |
| 9:37:01 AM | 72.9 | 47.6 | 47.8 | 54.8 | 56.5 | 62.5 | 71.9 | 73.0 | 66.7 | 79.1 | 81.2 | 76.3 | 69.1 | 65.5 | 61.4 | 59.8 | 62.5 | 61.5 | 63.0 | 64.5 | 64.2 | 61.9 | 62.2 | 61.1 | 59.0 | 56.1 | 55.8 | 52.4 | 48.5 | 44.8 | 42.2 | 40.8 | 41.2 | 27.8 |
| 9:37:11 AM | 73.1 | 47.6 | 48.8 | 56.3 | 58.1 | 63.3 | 70.6 | 73.3 | 67.5 | 77.9 | 81.7 | 76.2 | 69.9 | 65.9 | 61.7 | 60.0 | 62.9 | 61.6 | 63.0 | 65.0 | 64.5 | 61.9 | 62.3 | 61.0 | 59.1 | 56.1 | 55.6 | 52.0 | 48.9 | 45.0 | 42.3 | 40.9 | 40.8 | 27.8 |
| 9:37:21 AM | 72.8 | 51.7 | 50.8 | 54.6 | 57.0 | 63.5 | 70.4 | 72.8 | 68.0 | 78.5 | 81.4 | 76.5 | 69.8 | 65.9 | 61.9 | 59.5 | 62.5 | 61.3 | ${ }^{62.5}$ | ${ }^{64.8}$ | 64.1 | 61.5 | 61.8 | 60.4 | 58.6 | 55.9 | 55.2 | ${ }^{51.3}$ | 48.8 | 44.9 | 42.3 | 40.9 | 41.1 | 27.9 |
| 9:37:31 AM | 72.7 | 58.7 | 55.3 | 56.5 | 57.1 | 63.1 | 71.1 | 73.3 | 68.0 | 78.9 | ${ }^{81.3}$ | 76.9 | 69.9 | 65.9 | 61.4 | 60.3 | 62.9 | 60.9 | 63.3 | 63.9 | 63.7 | 61.2 | 61.8 | 60.5 | 58.7 | 56.0 | 55.2 | 51.3 | 48.8 | 44.7 | 42.1 | 40.6 | 40.7 | 27.5 |
| 9:37:42 AM | 72.6 | 60.9 | 58.6 | 56.9 | 58.3 | 63.6 | 71.3 | 73.3 | 68.9 | 78.9 | 81.2 | 76.9 | 70.0 | 66.1 | 61.4 | 60.6 | 62.9 | 61.0 | 63.0 | 64.0 | 63.5 | 61.1 | 61.6 | 60.5 | 58.4 | 55.7 | 55.0 | 51.4 | 48.5 | 44.6 | 41.7 | 40.5 | 40.9 | 26.9 |
| 9:37:51 AM | 72.6 | 55.1 | 54.4 | 55.6 | 57.2 | 63.4 | 71.2 | 73.3 | 68.2 | 78.7 | 81.1 | 76.9 | 70.2 | 66.0 | 61.6 | 60.1 | 62.9 | 61.4 | 62.7 | 64.3 | 63.4 | 61.2 | 61.9 | 60.4 | 58.7 | 55.9 | 55.1 | 51.4 | 48.6 | 44.9 | ${ }^{41.6}$ | 40.5 | ${ }^{40.3}$ | 27.3 |
| 9:38:01 AM | 72.4 | 50.1 | 51.5 | 55.8 | 57.1 | 63.5 | 71.0 | 73.1 | 68.3 | 78.6 | 81.0 | 76.6 | 69.6 | 65.6 | 62.2 | 60.7 | 62.1 | 60.5 | 63.4 | 63.5 | 63.4 | 61.3 | 61.2 | 60.1 | 58.5 | 55.9 | 55.1 | 51.1 | 48.5 | 44.4 | 41.6 | 40.5 | 40.6 | 26.9 |
| 9:38:11 AM | 72.5 | 50.3 | 52.5 | 58.0 | 57.9 | 62.9 | 71.2 | 73.3 | 68.7 | 78.7 | 81.0 | 76.5 | 69.2 | 65.6 | 62.9 | 60.5 | 61.7 | 60.8 | 63.4 | 63.8 | 63.7 | 61.3 | 61.4 | 60.2 | 58.7 | 55.9 | 55.2 | 51.2 | 48.7 | 46.8 | 43.3 | 42.6 | 41.4 | 27.0 |
| 9:38:22 AM | 72.4 | 49.6 | 53.5 | 56.8 | 57.4 | 63.3 | 70.8 | 72.9 | 68.2 | 78.4 | 80.7 | 76.0 | 68.9 | 66.6 | 64.5 | 59.3 | 60.9 | 61.5 | 62.9 | 64.3 | 63.3 | 61.3 | 61.5 | 60.0 | 58.4 | 55.7 | 55.0 | 50.9 | 48.4 | 44.7 | 42.0 | 40.6 | ${ }^{40.5}$ | 27.4 |
| 9:38:31 AM | 72.5 | 49.9 | 52.1 | 56.3 | 57.1 | 63.7 | 71.0 | 73.1 | 67.6 | 78.2 | 80.7 | 76.0 | 69.1 | 66.6 | 65.0 | 59.9 | 61.2 | 61.8 | 63.0 | 64.4 | 63.2 | 61.4 | 61.7 | 60.2 | 58.7 | 55.8 | 55.1 | 51.2 | 48.5 | 44.7 | 42.1 | 40.6 | 40.7 | 27.3 |
| 9:38:41 AM | 72.6 | 48.1 | 50.8 | 54.0 | 57.2 | 63.4 | 71.1 | 73.1 | 68.3 | 78.7 | 81.1 | 76.8 | 69.8 | 66.1 | 62.4 | 59.7 | 62.2 | 61.3 | 62.6 | 64.0 | 63.7 | 61.6 | 61.6 | 60.2 | 58.3 | 55.7 | 55.1 | 51.3 | 48.6 | 44.7 | 42.1 | 40.8 | 40.4 | 27.3 |
| 9:38:52 AM | 72.5 | 50.7 | 53.3 | 55.1 | 57.0 | 63.5 | 71.1 | 73.3 | 68.3 | 78.6 | 81.0 | 76.4 | 69.4 | 65.9 | 62.2 | 59.9 | 62.3 | 60.8 | 63.5 | 63.5 | 63.6 | 61.2 | 61.6 | 60.1 | 58.6 | 55.8 | 54.8 | 51.0 | 48.5 | 44.6 | 42.0 | 40.7 | 40.6 | 27.3 |




Site ST3-Session 4-Sound Level Summary





Site 53 - Session 4 - Sound Level over Tiim
Start Time


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$\frac{10.44 .5 \mathrm{AM}}{\text { 10:47 }}$

| $10: 47: 01 \mathrm{AM}$ |
| :--- |
| $10: 47: 11 \mathrm{~A}$ |



## 




$\qquad$ | 74.3 | 50.4 | 61.1 | 56.1 | 61.3 |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 75.2 | 49.7 | 61.7 | 57.7 | 62.3 |  |
| 74.8 | 49.7 |  |  |  |  |



199:01 A
$\qquad$


10:49:11 AM

| 10:49:31 AM |
| :--- |
| 10:49:41 |
| 10:9 |


| 76.4 |
| :--- |
| 74.2 |
| 74.8 |
| 7 |




$\qquad$





$\qquad$
$\qquad$





## Appendix C - Detailed Noise Monitoring Results

Chart C-1: Monitoring Session \#1: Site ST1

## Session 1 - Site ST1-8:55 AM - 9:05 AM - Near Beulah Road



Chart C-2: Monitoring Session \#1: Site ST2
Session 1 - Site ST2-8:55 AM - 9:05 AM - 50 Feet from Grinder


Chart C-3: Monitoring Session \#2: Site ST1

## Session 2-Site ST1-9:29 AM - 9:39 AM - Near Beulah Road (Leq) (dBA)



Chart C-4: Monitoring Session \#2: Site ST2
Session 2-Site ST2-9:29 AM - 9:39 AM - 50 Feet from Grinder


Chart C-5: Monitoring Session \#3: Site ST1

## Session 3-Site ST1-10:20 AM - 10:30 AM - Near Beulah Road (Leq) (dBA)



Chart C-6: Monitoring Session \#3: Site ST2
Session 3-Site ST2-10:20 AM - 10:30 AM - 50 feet from Grinder


Chart C-7: Monitoring Session \#4: Site ST3


Chart C-8: Monitoring Session \#4: Site ST4


## Appendix D - Excerpts from Town of Vienna's Noise Ordinance

## Sec. 10-20.1. Noise ${ }^{1}$.

(a) It is declared as a matter of legislative determination and public policy that the making, creation or maintenance of excessive, unnecessary or unusual loud noises, unusual and unnatural in their time and place and which disturb the usual peace, quietude, tranquility and normal enjoyable use of any residential area are detrimental to the public health, safety, convenience, welfare and prosperity of the residents of the Town of Vienna and constitute a public nuisance.
(b) Any person, firm or corporation which permits, allows or suffers any such excessive, unnecessary, loud or unusual noise or noises as referred to in subsection_10-20.1(a) above, to emanate from his property or place of business so as to disturb the usual peace, quietude, tranquility and normal enjoyable use of any residence or residences in the Town shall be guilty of a civil offense with a penalty of $\$ 250.00$ for the first offense and $\$ 500.00$ for each subsequent offense. This section shall not apply to noise generated in connection with a business conducted on property zoned CM or CMP. ${ }^{2}$
(c) In addition to any other excessive, unnecessary or unusually loud noises as referred to in subsection 10-20.1 (a) above, and not to the exclusion of such, the following acts are specifically declared to be excessive, unnecessary and unusually loud noises, unusual and unnatural in their time and place and disturbing to the usual peace, quietude, tranquility and normal enjoyable use of residential area; are detrimental to public health, safety, and welfare of the residents of the Town of Vienna, and constitute a public nuisance:
(1) The loading or unloading of commercial vehicles within 300 feet of any residence between the hours of 11:00 p.m. and 6:00 a.m. Monday through Saturday, or between 11:00 p.m. and 8:00 a.m. on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas Day;
. . ${ }^{3}$
(4) The operation between the hours of 8:00 p.m. and 7:00 a.m., or between 8:00 p.m. and 9:00 a.m. on Saturday, Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas Day of any pile driver, hammer, chain saw, steam, diesel, or gasoline powered shovel, derrick or hoist, lawnmowers, lawn maintenance equipment, or other equipment, the use of which is attended by loud and unusual noise, except during any emergency caused necessity to protect the public health and safety as determined by the director of public works, chief of police, Town Manager or his/her designee, Fairfax County Building Inspector, or Fairfax County Fire Marshal or his/her designee. The time limitations for Saturday, Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas Day shall not apply to usual and customary maintenance activities associated with recreational uses as defined in Town Code section 18-4. Notwithstanding the foregoing, no contractor or person performing the activities listed above for remuneration, except when it relates to a recreational use, shall be permitted to engage in such activity on Sunday;

[^1](5) The operation of any propulsion engine of a commercial motor vehicle for more than three minutes when the vehicle is parked, left unattended, or is stopped for other than traffic or maintenance reasons;
(6)
(d) Any person, firm or corporation which permits, allows or suffers any such acts set forth in subsection 10-20.1 (c) shall be guilty of maintaining a public nuisance and, upon conviction thereof, shall be punished as provided in section 10-20 of this Code.


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[^1]:    ${ }^{1}$ (Code 1969, § 10-20.1; Ord. of 12-5-1977; Ord. of 2-25-1991; Ord. of 3-2008; Ord. of 6-6-2011(2), § 1)
    ${ }^{2}$ This section applies because the mulch site is zoned Local Commercial (C-1) (Town of Vienna GIS, 2012)
    ${ }^{3}$ This section of the noise ordinance was not included in the report because it does not apply to the activities and operations at the mulch site.

