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October 27, 2022

Ms. Tanowa Troupe, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, Ohio 43215-3797

Re: Case Nos. 19-1881-EL-BGN and 21-508-EL-BGA - In the Matter of the Application of Madison Fields Solar Project, LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Madison County, Ohio.

Certificate Compliance Condition 15 – Sound Level Assessment Report

Dear Ms. Troupe:

Madison Fields Solar Project, LLC's ("Applicant") is certified to construct a solar-powered electric generation facility in Madison County, Ohio, in accordance with the orders issued by the Ohio Power Siting Board ("OPSB") in Case Nos. 19-1881-EL-BGN and 21-508-EL-BGA on January 21, 2021, and October 21, 2021, respectively.

At this time, the Applicant is filing the attached Sound Level Assessment Report in compliance with Condition 15 of the Joint Stipulation and Recommendation approved by the OPSB's January 21, 2021 order in Case No. 19-1881-EL-BGN. This document was provided to the Staff of the OPSB on October 27, 2022.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

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4872-7908-8641 v1 [88534-2]

SOUND LEVEL ASSESSMENT REPORT

Madison Fields Solar Project
Madison County, Ohio

Prepared for:

Madison Fields Solar Project, LLC
422 Admiral Boulevard
Kansas City, MO 64106

Prepared by:

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October 24, 2022

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

1.0 EXECUTIVE SUMMARY

Madison Fields Solar Project, LLC (the Project Company) is a wholly owned subsidiary of Savion, LLC. The Madison Fields Solar Project (Project) is a proposed solar power generation facility with a total capacity of approximately 180 megawatts (MW). The Project site includes approximately 1,932 acres of private land; however, the Project footprint will only span an area of approximately 1,305 acres (Project Area) in Madison County, Ohio. Epsilon Associates, Inc. (Epsilon) has been retained by the Project Company to conduct a pre-construction sound level assessment for this Project.

This sound level assessment has been designed based on requirements identified in the Ohio Power Siting Board's (OPSB) Certificate Applications for Electric Generation Facilities. The assessment included a sound monitoring program to determine existing background sound levels in the vicinity of the Project, computer modeling to predict cumulative worst-case future sound levels from the Project, and modeling to predict sound levels due to construction. The operational sound analysis includes a total of sixty-three (63) photovoltaic (PV) inverters, each with an individual capacity of 2,500 kW, and one transformer at the collector substation with a capacity of 210 mega volt amps (MVA). The construction sound analysis includes three expected phases (site clearing & grading, pile driving, and crane/trucking activities).

There are no state or local noise limits applicable to the Project. Although not a requirement, predicted sound levels from the operation of the Project were compared to the OPSB sound level limit for wind power generation facilities of five (5) dBA over existing ambient levels. For this analysis, 74 receptors (residences, churches, or schools) within one half mile of the Project Boundary were included in the modeling and evaluated against the five (5) dBA over ambient limit. Average daytime ambient sound levels in the project area range from 44 to 51 dBA, resulting in daytime limits of 49 to 56 dBA. Average nighttime ambient sound levels in the project area range from 36 to 43 dBA, resulting in nighttime limits of 41 to 48 dBA.

The broadband project only L_{eq} sound levels range from 26 to 41 dBA and represent the worst-case future sound levels produced solely by PV inverters and the collector substation associated with the Project. At all modeled receptor locations, sound levels are at or below the wind energy limit. Therefore, even under a conservative nighttime evaluation, the Project meets the five (5) dBA sound level increase limit for wind energy projects applied as an evaluation criterion for this Project.

The closest receptor to an inverter is ID# 33 at a distance of 824 feet. The existing nighttime ambient sound level at this location is 36 dBA, resulting in a limit of 41 dBA. The worst-case cumulative Project only sound level at this location is 41 dBA. The closest receptor to the substation is ID# 37 at a distance of 3,684 feet. The existing nighttime ambient sound level at this location is 38 dBA, resulting in a limit of 43 dBA. The worst-case cumulative Project only sound level at this location is 38 dBA. The Project is a solar facility, and therefore worst-case sound from project equipment will only occur when generating electricity (i.e. during the daytime, when the sun may be shining).

The worst-case construction sound levels produced by the Project were predicted through modeling. These L_{eq} sound levels ranged from 54 to 87 dBA. During the majority of the time, these levels will be much lower as equipment moves further away from Project property lines. Construction will be limited to daytime hours when practical, in order to mitigate sound level impacts.

2.0 INTRODUCTION

The proposed Project to be located in Madison County, Ohio will consist of sixty-three (63) 2,500 kW PV inverters, a collector substation, interconnection, collection lines, a generation tie-in transmission line, and solar panel arrays. The Project site includes approximately 1,932 acres of private land; however, the Project footprint will only span an area of approximately 1,305 acres (Project Area) in Madison County, Ohio. Figure 2-1 shows the locations of the proposed inverters, the solar panel arrays, collector substation, interconnection, and the project boundary over aerial imagery in Madison County.

Ground-mounted solar array PV inverters and substation transformers produce their maximum sound levels during time periods when sunlight is shining onto the panels, when the array generates electricity. In the project area, the longest day of the year occurs on June 21st. On this day, daylight occurs between sunrise at 6:04 a.m., and sunset, at 9:03 p.m. At night, or when there is no sunlight shining on the panels, the inverters do not produce any operational sound, although the project substation may still be energized. The PV inverter model proposed for the project produces a sound level of approximately 79 dBA at a distance of 1 meter (3.3 feet).

This report presents the findings of an ambient measurement program and a sound level modeling analysis for the Project. The operational sound of the PV inverters and the associated collector substation were modeled in Cadna/A using sound data from the inverter manufacturer and sound power level calculations. The construction activities associated with the Project were also modeled using empirical data and standard sound levels of common construction equipment. The results of this analysis are found within this report.

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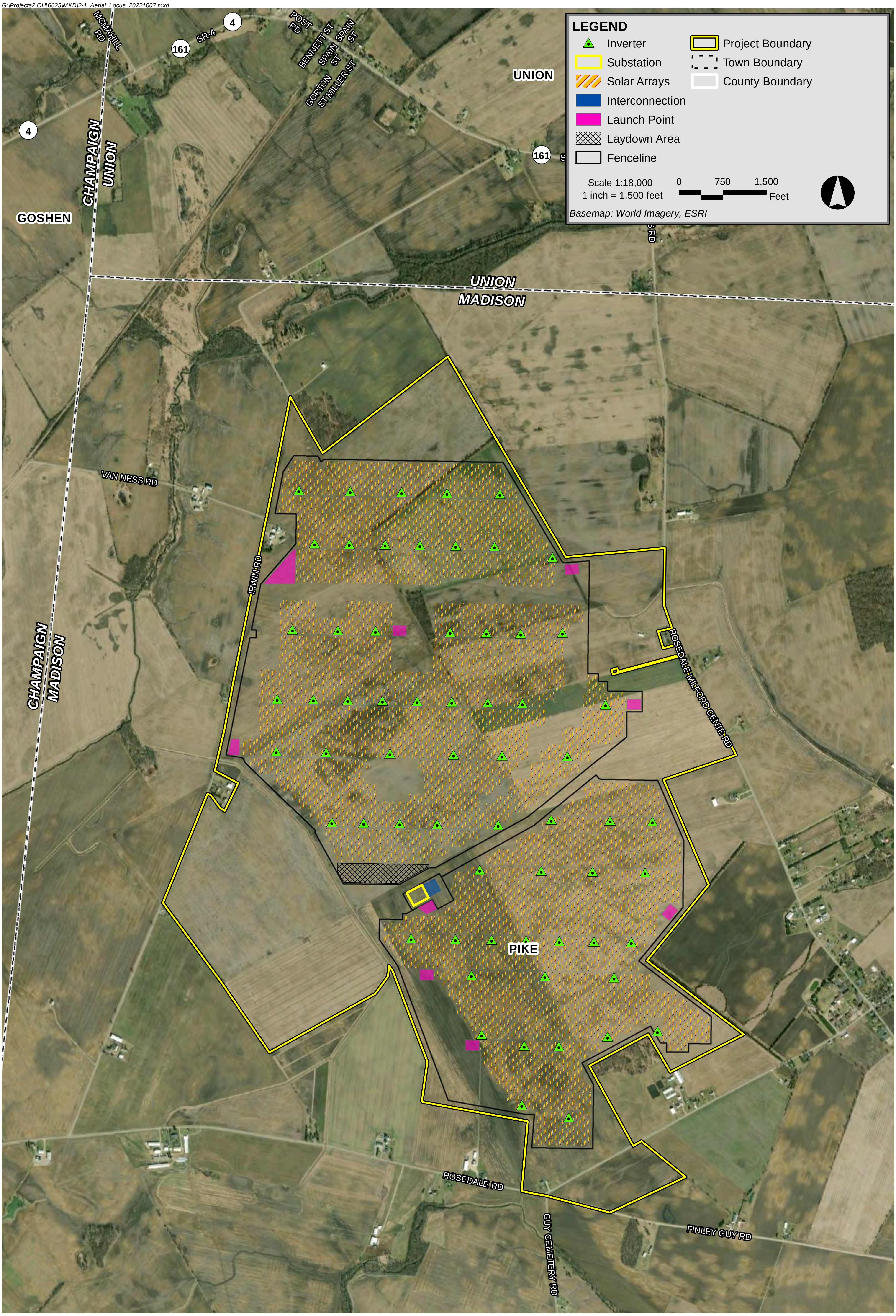

Madison Fields Solar **Madison County, Ohio**

Figure 2-1
Aerial Locus

3.0 SOUND TERMINOLOGY

There are several ways in which sound levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the sound level terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. A property of the decibel scale is that the sound pressure levels of two or more separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a 3 dB increase (53 dB), which is equal to doubling in sound energy, but not equal to a doubling in decibel quantity (100 dB). Thus, every 3 dB change in sound level represents a doubling or halving of sound energy. The human ear does not perceive changes in the sound pressure level as equal changes in loudness. Scientific research demonstrates that the following general relationships hold between sound level and human perception for two sound levels with the same or very similar frequency characteristics[1]:

- 3 dB increase or decrease results in a change in sound that is just perceptible to the average person,
- 5 dB increase or decrease is described as a clearly noticeable change in sound level, and
- 10 dB increase or decrease is described as twice or half as loud.

Another mathematical property of decibels is that if one source of sound is at least 10 dB louder than another source, then the total sound level is simply the sound level of the higher-level source. For example, a sound source at 60 dB plus another sound source at 47 dB is equal to 60 dB.

A sound level meter (SLM) that is used to measure sound is a standardized instrument.[2] It contains "weighting networks" (e.g., A-, C-, Z-weightings) to adjust the frequency response of the instrument. Frequencies, reported in Hertz (Hz), are detailed characterizations of sounds, often addressed in musical terms as "pitch" or "tone". The most commonly used weighting network is the A-weighting because it most closely approximates how the human ear responds to sound at various frequencies. The A-weighting network is the accepted scale used for community sound level measurements; therefore, sounds are frequently reported as detected with a sound level meter using this weighting. A-weighted sound levels emphasize middle frequency sounds (i.e., middle pitched – around 1,000 Hz), and de-emphasize low and high frequency sounds. These sound levels are reported in decibels designated as "dBA". The C-weighting network has a nearly flat response for frequencies between 63 Hz and 4,000 Hz and is noted as dBC. Z-weighted sound levels are measured sound levels without any weighting curve

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1 Bies, David, and Colin Hansen. 2009. *Engineering Noise Control: Theory and Practice*, 4th Edition. New York: Taylor and Francis.

2 *American National Standard Specification for Sound Level Meters*, ANSI S1.4-1983 (R2006), published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

and are otherwise referred to as "unweighted". Sound pressure levels for some common indoor and outdoor environments are shown in Figure 3-1.

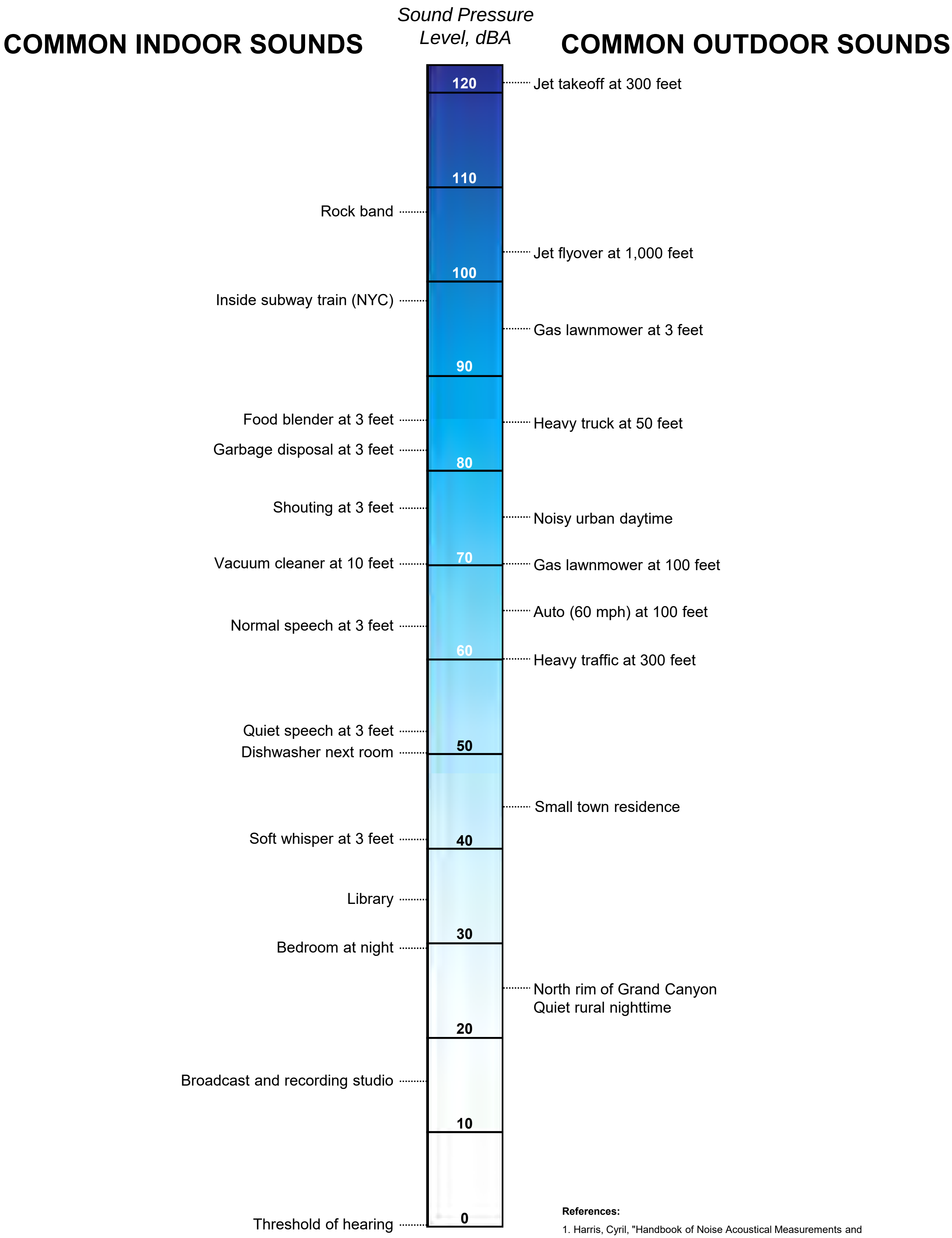
Because the sounds in our environment vary with time they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are exceedance levels and the equivalent level, both of which are derived from some number of moment-to-moment A-weighted sound level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value between 0 and 100 in terms of percentage. Several sound level metrics that are reported in community sound monitoring are described below.

- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the intrusive sound level because it is caused by occasional louder sounds like those from passing motor vehicles.

- L_{50} is the sound level exceeded 50 percent of the time. It is the median level observed during the measurement period. The L_{50} is affected by occasional louder sounds like those from passing motor vehicles; however, it is often found comparable to the equivalent sound level under relatively steady sound level conditions.

- L_{90} is the sound level exceeded 90 percent of the time during the measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the residual sound level, which is the sound level observed when there are no obvious nearby intermittent sound sources.

- L_{eq}, the equivalent level, is the level of a hypothetical steady sound that would have the same energy (*i.e.,* the same time-averaged mean square sound pressure) as the actual fluctuating sound observed. The equivalent level is designated L_{eq} and is typically A-weighted. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with linear mean square sound pressure values, the L_{eq} is mostly determined by loud sounds if there are fluctuating sound levels.



References:

1. Harris, Cyril, "Handbook of Noise Acoustical Measurements and Noise Control", p 1-10., 1998
2. "Controlling Noise", USAF, AFMC, AFDTC, Elgin AFB, Fact Sheet, August 1996
3. California Dept. of Trans., "Technical Noise Supplement", Oct, 1998

Figure 3-1

Common Indoor and Outdoor Sound Levels

4.0 NOISE REGULATIONS

4.1 Federal Regulations

There are no federal community noise regulations applicable to this project.

4.2 Ohio State Regulations

There are no state noise limits applicable to this solar project. However, the Project is seeking a certificate from the Ohio Power Siting Board (OPSB) which requires a noise study as described in *Chapter 4906-4-08 Health and safety, land use and ecological information* of the Ohio Administrative Code, which states:

> **(Section A, Part 3) Noise.** The applicant shall provide information on noise from the construction and operation of the facility.
>
> **(a)** Describe the construction noise levels expected at the nearest property boundary. The description shall address:
>
> (i) Blasting activities.
>
> (ii) Operation of earth moving equipment.
>
> (iii) Driving of piles, rock breaking or hammering, and horizontal directional drilling.
>
> (iv) Erection of structures.
>
> (v) Truck traffic.
>
> (vi) Installation of equipment.
>
> **(b)** Describe the operational noise levels expected at the nearest property boundary. The description shall address:
>
> (i) Operational noise from generation equipment.
>
> (ii) Processing equipment.
>
> (iii) Associated road traffic.
>
> **(c)** Indicate the location of any noise-sensitive areas within one mile of the facility, and the operational noise level at each habitable residence, school, church, and other noise-sensitive receptors, under both day and nighttime operations. Sensitive receptor, for the purposes of this rule, refers to any occupied building.
>
> **(d)** Describe equipment and procedures to mitigate the effects of noise emissions from the proposed facility during construction and operation, including limits on the time of day at which construction activities may occur.

(e) Submit a preconstruction background noise study of the project area that includes measurements taken under both day and nighttime conditions.

Although there are no noise limits applicable to this solar project, wind energy projects in the state of Ohio are required to comply with Chapter 4906-4-09 of the Ohio Administrative Code, which states:

> **(Section F, Part 2)**. The facility shall be operated so that the facility noise contribution does not result in noise levels at any non-participating sensitive receptor within one mile of the project boundary that exceed the project area ambient nighttime average sound level (Leq) by five A-weighted decibels (dBA). During daytime operation only (seven a.m. to ten p.m.), the facility may operate at the greater of: the project area ambient nighttime Leq plus five dBA; or the validly measured ambient L_{eq} plus five dBA at the location of the sensitive receptor.

4.3 Madison County Regulations

There are no quantitative county noise regulations applicable to this solar project.

4.4 Evaluation Criteria

Although not required, the sound levels from the operation of project equipment were evaluated against the five (5) dBA increase over ambient sound levels limit for wind energy facilities at noise-sensitive receptors in the vicinity of the solar arrays.

5.0 EXISTING SOUND LEVELS

5.1 Overview

The Project is to be located in the northwest corner of Madison County, Ohio, in Pike Township. The solar arrays will be constructed to the north and south of Route 22 in agricultural areas roughly bounded by Irwin Road to the west and Rosedale Milford Center Road to the east. Around the remainder of the project boundary, there are homes and farmland.

5.2 Sound Level Environment

An ambient sound level survey was conducted to characterize the current acoustical environment in the community surrounding and within the Project Area. Existing sound sources include vegetation rustle, birds, insects, traffic along local roads, occasional aircraft, wind, HVAC sounds from existing structures, and the general soundscape associated with agriculture and farming.

5.3 Sound Level Measurement Locations

Five sound level measurement locations were selected based on the Project layout and permission from landowners. Location 1 was chosen as a monitoring location due to the proximity of the solar arrays and inverters along the northern portion of the Project area. Location 2 and Location 3 were chosen due to their proximity of the solar arrays and inverters along the eastern edge of the Project. Location 4 was chosen to cover the southern portion of the Project area with their associated solar arrays and inverters nearby. Location 5 was chosen due to the proximity of the collector substation area, solar arrays, and inverters along the western edge of the Project area. All five of these locations (Location 1 through Location 5), are shown over aerial imagery of the Project area in Figures 5-1.

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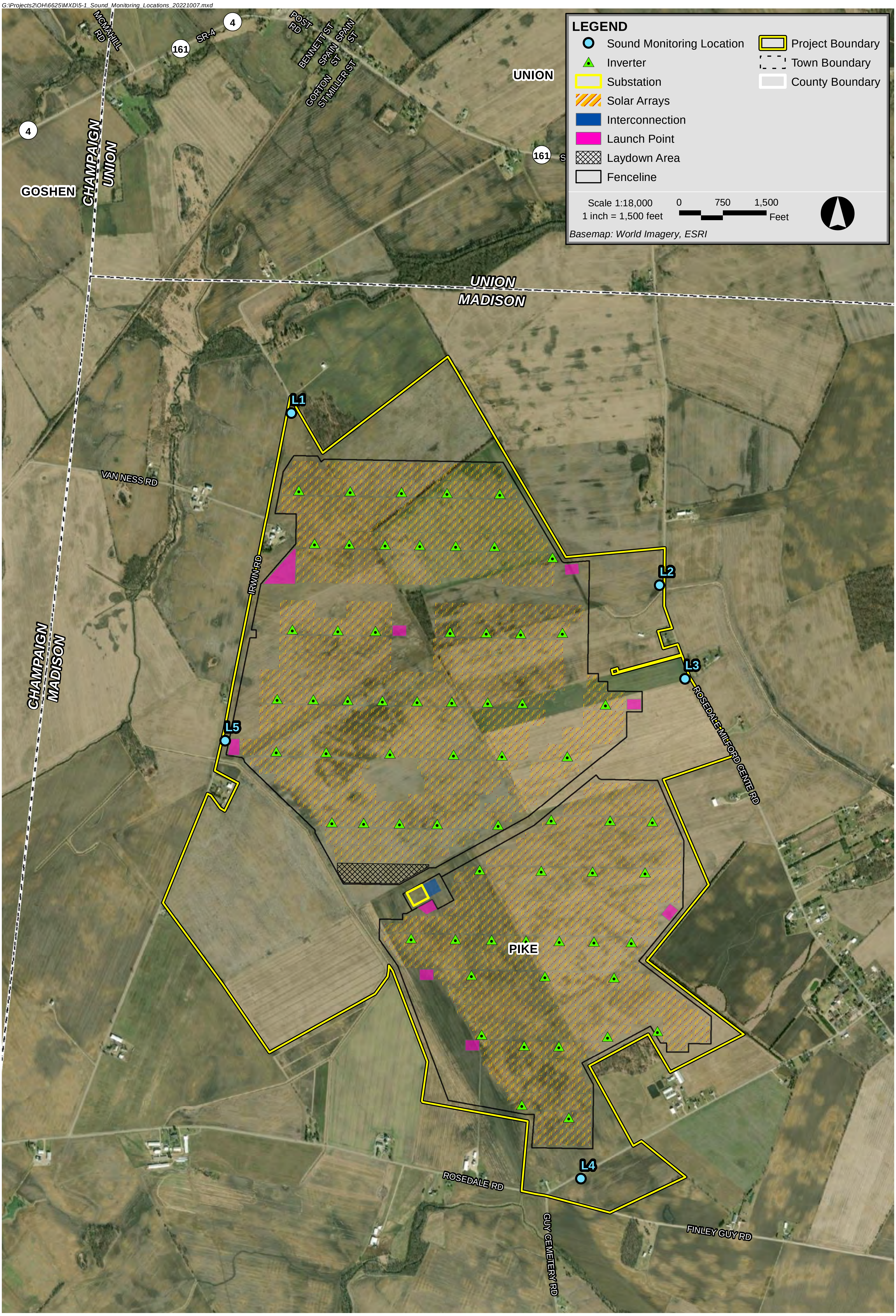


Madison Fields Solar **Madison County, Ohio**

Epsilon ASSOCIATES INC.

Figure 5-1
Sound Monitoring Locations

5.3.1 Monitoring Locations

The selection of the sound monitoring locations was intended to be representative of the nearby surrounding receptors both inside and outside of the Project boundary. Each measurement location is described below. The coordinates for the five sound monitoring locations were obtained by Epsilon staff using satellite imagery and are presented in UTM NAD83 Zone 17N in Table 5-1. Photographs of the five locations are included in Figures 5-2 through 5-6, respectively.

- Location 1

  This location was in a field to the east of Irwin Road, at the northern edge of the Project boundary. It was representative of receptors to the north of the Project.

- Location 2

  This location was in a field to the west of Route 11, just south of 11455 County Hwy 11. and is representative of receptors in the eastern portion of the Project.

- Location 3

  This location was in a field to the west of Route 11, across from 10955 Co Hwy 11. This location was representative of receptors to the east of the Project.

- Location 4

  This location was in a field to the south of Route 25 and North of Route 123. This location was representative of residential receptors in the southern area of the Project boundary.

- Location 5

  This location was in a field along Irwin Road, and was representative of the residences in the western portion of the Project and near the collector substation location.

Figure 5-2 Photo of Sound Level Measurement Location 1

Figure 5-3 Photo of Sound Level Measurement Location 2

Figure 5-4 Photo of Sound Level Measurement Location 3

Figure 5-5 Photo of Sound Level Measurement Location 4

Figure 5-6 Photo of Sound Level Measurement Location 5

Table 5-1 GPS Coordinates – Sound Level Measurement Locations

Location	Coordinates UTM NAD83 Zone 17N, Meters	
	East	North
1	287670.52	4442408.17
2	289595.15	4441509.50
3	289728.75	4441021.94
4	289183.87	4438409.92
5	287324.88	4440698.61

5.4 Sound Measurement Methodology

Ambient sound measurements were made at a total of five locations. A continuous programmable unattended sound level meter was placed at each location for approximately one week from October 9, 2019 to October 17, 2019. Each sound level meter collected data continuously and logged data every ten minutes.

Sound levels were measured at a height of approximately five feet above the ground at all locations where there were no large reflective surfaces to affect the measured levels. In addition to the collection of sound level data, ground-level wind speeds were continuously measured and logged at a single location (Location 3) throughout the entire monitoring period.

5.5 Measurement Equipment

5.5.1 Sound Level Equipment

Four Larson Davis (LD) model 831 sound level meters, equipped with a PCB Piezotronics Type 1 preamplifier, a PCB 377B20 or 377C20 half-inch microphone, and an environmental protection kit was used to collect continuous broadband and octave-band sound pressure level data at Locations 1-4. Location 5 used a Norsonic model NOR 140 sound level meter equipped with a Norsonic Nor1209 preamplifier and a G.R.A.S. 40AN half-inch microphone along with an environmental protection kit. The microphones were tripod-mounted at a height of five feet above the ground with 7-inch diameter windscreens. The meters logged data every 10-minutes, along with a one-second time history for the following A-weighted parameters: L_{10}, L_{50}, L_{90}, L_{max}, L_{min}, and L_{eq}.

All meters meet Type 1 ANSI S1.4-1983 (R2006) standards for sound level meters and were calibrated and certified as accurate to standards set by the National Institute of Standards and Technology. These calibrations were conducted by an independent laboratory within the prior 12 months of the measurement program. Additionally, all sound level measurement equipment was calibrated in the field before and after the surveys with the manufacturer’s acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI/ASA S1.40-2006 (R2016).

5.5.2 Meteorological Equipment

Wind speed can have a strong influence on ambient sound levels. To understand how the existing sound levels are influenced by wind speed, continuous wind speed data was recorded at

Location 3. A HOBO H21-002 micro-weather station (manufactured by Onset Computer Corporation) was used to continuously measure the wind speed. The wind sensor was mounted at a height of approximately six feet above ground level and data was logged every 10-minutes to be synced with the sound level measurements. This sensor has a measurement range of 0 to 45 m/s (100 mph) and an accuracy of ±1.1 m/s (2.4 mph). The starting threshold is ≤1.0 m/s (2.2 mph).

5.6 Measured Ambient Sound Levels

Data from each location were processed post measurement program. Measurement periods where the ground level wind (monitored at Location 3) was greater than 5 meters per second (m/s) or in which there was precipitation were considered invalid and were not included in the calculations. Publicly available meteorological data from the Union County Airport in Marysville, OH were used to determine when periods with precipitation occurred. Data from this weather station is provided in Table C1 of Appendix C. Data were further divided by daytime and nighttime hours. Daytime hours were considered to be from 7 am to 10 pm. Table 5-2 presents the average L_{eq} for each valid period, as well as the valid daytime and nighttime periods respectively. The number of overall measurement periods as well as the total number of valid measurement periods are also presented. Graphs showing measured and valid L_{eq} values as well as wind speed and precipitation for each location are at each location are presented in Appendix A.

Table 5-2 Averaged Ambient Sound Levels

Location	Leq (dBA)	Leq (dBA, Daytime Only)	Leq (dBA, Nighttime Only)	Total Measurement Periods	Total Valid Measurement Periods
1	42	44	36	1142	899
2	48	50	43	1141	896
3	46	48	41	1138	891
4	47	51	41	1131	882
5	42	45	38	1133	884

5.7 Assignment of Ambient Sound Levels to Modeling Locations

Measured ambient data were assigned to each modeling receptor based on proximity between the measurement points and the modeling receptor. The modeling receptors were not visited during the measurement program to confirm similarities between the soundscapes observed at monitoring locations and each modeling receptor. Appendix B presents the sound modeling receptors with their assigned ambient measurement location.

6.0 OPERATIONAL SOUND LEVELS

6.1 Sound Sources

The operational acoustic modeling conservatively assumed cumulative impacts from a total of sixty-three (63) inverters, and a collector substation. There are no sound producing components planned at the interconnection area. The sound levels produced by the inverters and substation used for acoustic modeling are described below.

6.1.1 Photovoltaic Inverters

The operational sound level analysis for the Project conservatively includes all project inverters (63) operating at full load. For this analysis, all 63 of the units are assumed to have an individual capacity of 2,500 kW. The PV units will be approximately ten feet in height. Epsilon reviewed a technical report provided by Savion[3]. The report presented measured broadband and octave band sound pressure levels at distances close to an inverter unit of similar capacity to the proposed units operating at full load. The technical report is presented in Appendix D. The sound pressure level data was then converted to a sound power level and entered into the acoustic model. The resulting broadband sound power level of the inverter unit used for acoustic modeling was 96 dBA. Table 6-1 below summarizes the sound power level data used for all inverters in the modeling.

Table 6-1 Modeled Photovoltaic Inverter Sound Power Levels

		Sound Power Levels per Octave-Band Center Frequency [Hz]								
Type	Broadband	31.5	63	125	250	500	1k	2k	4k	8k
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
SG3150 UD	96	84	88	98	96	92	88	86	89	80

6.1.2 Collector Substation Transformer

In addition to the PV inverters, there will be a collector substation associated with the Project in Madison County. The substation location will be located on the east side of Irwin Road as shown in Figure 6-1. One 210 megavolt-ampere (MVA) transformer will be located at the substation. Epsilon has estimated the broadband and octave-band sound power levels using the MVA rating provided and techniques in the Electric Power Plant Environmental Noise Guide (Edison Electric Institute)[4], Table 4.5 Sound Power Levels of Transformers. Table 6-2 below summarizes the sound power level data used for the transformer in the modeling.

3 Sungrow Noise Test Report. Test date May 13, 2019.

4 Bolt Beranek and Newman Inc. (1984). *Electric Power Plant Environmental Noise Guide*, 2nd Edition. Edison Electric Institute, NY

Table 6-2 Modeled Substation Transformer Sound Power Levels

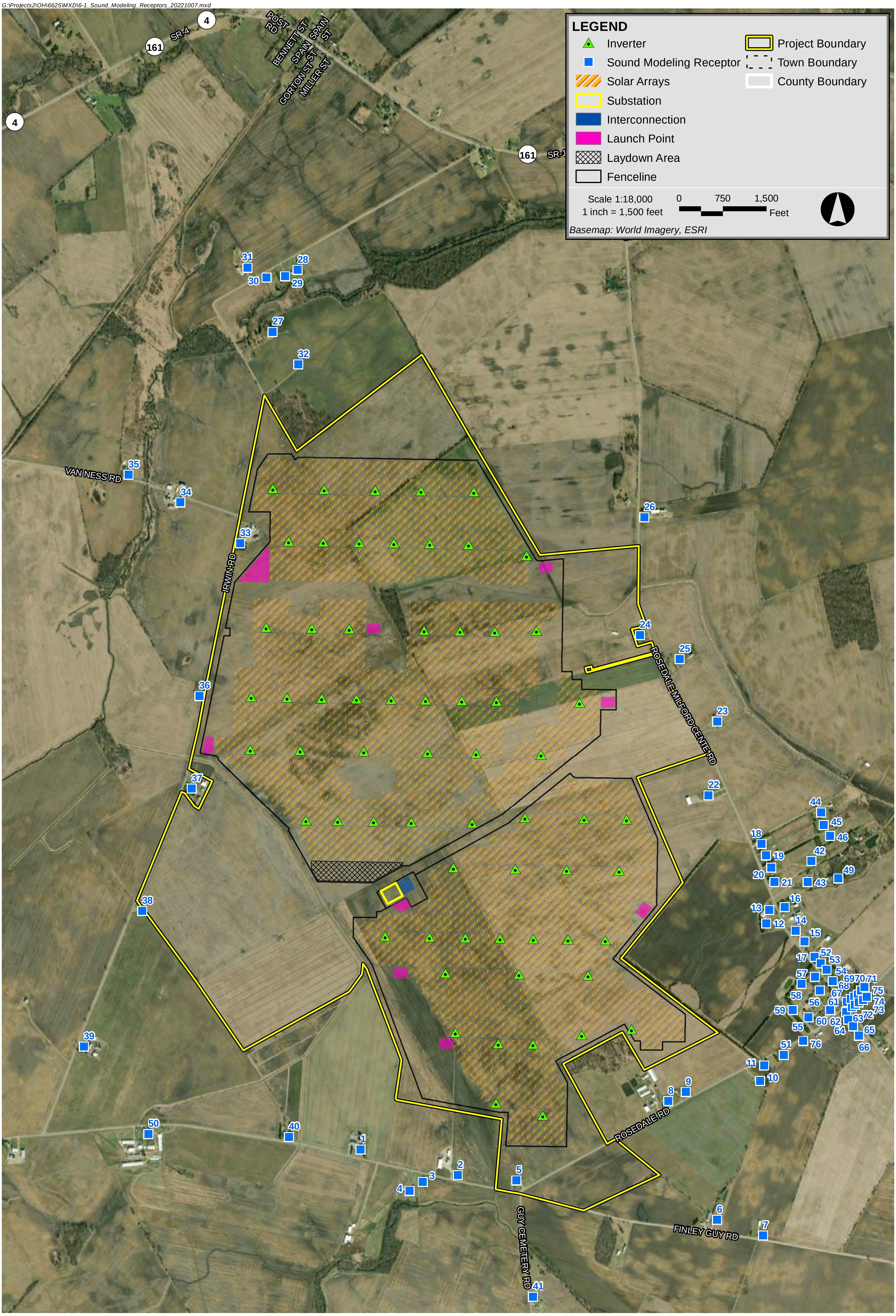
		Sound Power Levels per Octave-Band Center Frequency [Hz]								
Maximum Rating	**Broadband dBA**	**31.5 dB**	**63 dB**	**125 dB**	**250 dB**	**500 dB**	**1k dB**	**2k dB**	**4k dB**	**8k dB**
210 MVA	103	100	106	108	103	103	97	92	87	80

6.2 Modeling Methodology

The sound impacts associated with the proposed inverters and substation were predicted using the Cadna/A sound level calculation software developed by DataKustik GmbH. This software uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation). The benefits of this software are a more refined set of computations due to the inclusion of topography, ground attenuation, multiple building reflections (if applicable), drop-off with distance, and atmospheric absorption. The Cadna/A software allows for octave band calculation of sound from multiple sources as well as computation of diffraction.

Inputs and significant parameters employed in the model are described below:

- *Project Layout:* A Project layout was provided by Savion on October 3, 2022. The 63 proposed inverters were input into the model along with the location of the transformer located at the collector substation. The proposed inverters, solar panel array, substation, interconnection, and project boundary are identified in Figures 6-1.
- *Modeling Receptor Locations:* A dataset containing receptors within a half-mile of the Project Boundary was provided by Savion on May 21, 2020. These receptors represent the closest residences, churches, and schools to the project site. All of the 74 provided receptors were input into the Cadna/A model. The receptor ID numbering is up to a count of 76, as receptor ID# 47 & ID# 48 were removed from the analysis. Initially these two receptors were within a half-mile of the Project Boundary and are no longer. All modeling receptors were modeled as discrete points at a height of 1.5 meters above ground level to mimic the ears of a typical standing person. All modeling receptors are identified in Figures 6-1 and are labeled with their modeling ID number.
- *Terrain Elevation:* Elevation contours for the modeling domain were directly imported into Cadna/A which allowed for consideration of terrain shielding where appropriate. The terrain height contour elevations for the modeling domain were generated from elevation information derived from the National Elevation Dataset (NED) developed by the U.S. Geological Survey.
- *Source Sound Levels:* Sound power levels used in the modeling were described in Section 6.1.



Madison Fields Solar Madison County, Ohio

Epsilon Associates Inc.

Figure 6-1

Sound Modeling Receptors

- *Meteorological Conditions:* A temperature of 10ºC (50ºF) and a relative humidity of 70% was assumed in the model.

- *Ground Attenuation:* Spectral ground absorption was calculated using a G-factor of 0.5 which corresponds to "mixed ground" consisting of both hard and porous ground cover. This method yields more conservative results (i.e., higher sound levels) as the vast majority of the area is agricultural.

Several modeling assumptions inherent in the ISO 9613-2 calculation methodology, or selected as conditional inputs by Epsilon, were implemented in the Cadna/A model to ensure conservative results (i.e., higher sound levels), and are described below:

- All modeled sources were assumed to be operating simultaneously at their maximum load corresponding to the greatest sound level impacts

- As per ISO 9613-2, the model assumed favorable conditions for sound propagation, corresponding to a moderate, well-developed ground-based temperature inversion, as might occur on a calm, clear night or equivalently downwind propagation.

- Meteorological conditions assumed in the model (T=10°C/RH=70%) were selected to minimize atmospheric attenuation in the 500 Hz and 1 kHz octave bands where the human ear is most sensitive.

- No additional attenuation due to tree shielding, air turbulence, or wind shadow effects was considered in the model.

6.3 Sound Level Modeling Results

All modeled sound levels, as output from Cadna/A are A-weighted equivalent sound levels (L_{eq}, dBA). Table B-1 & Table B-1.1 in Appendix B shows the predicted Project Only broadband (dBA) sound levels at the 74 receptors. These broadband L_{eq} sound levels range from 26 to 41 dBA and represent the worst-case future L_{eq} sound levels produced solely by PV inverters and substation associated with the Project.

The closest receptor to an inverter is ID# 33 at a distance of 824 feet. The existing nighttime ambient sound level at this location is 36 dBA, resulting in a limit of 41 dBA. The worst-case cumulative Project only sound level at this location is 41 dBA. The closest receptor to the substation is ID# 37 at a distance of 3,684 feet. The existing nighttime ambient sound level at this location is 38 dBA, resulting in a limit of 43 dBA. The worst-case cumulative Project only sound level at this location is 38 dBA. In addition to these discrete modeling points, sound level isolines generated from the modeling grid are presented in Figure 6-2.

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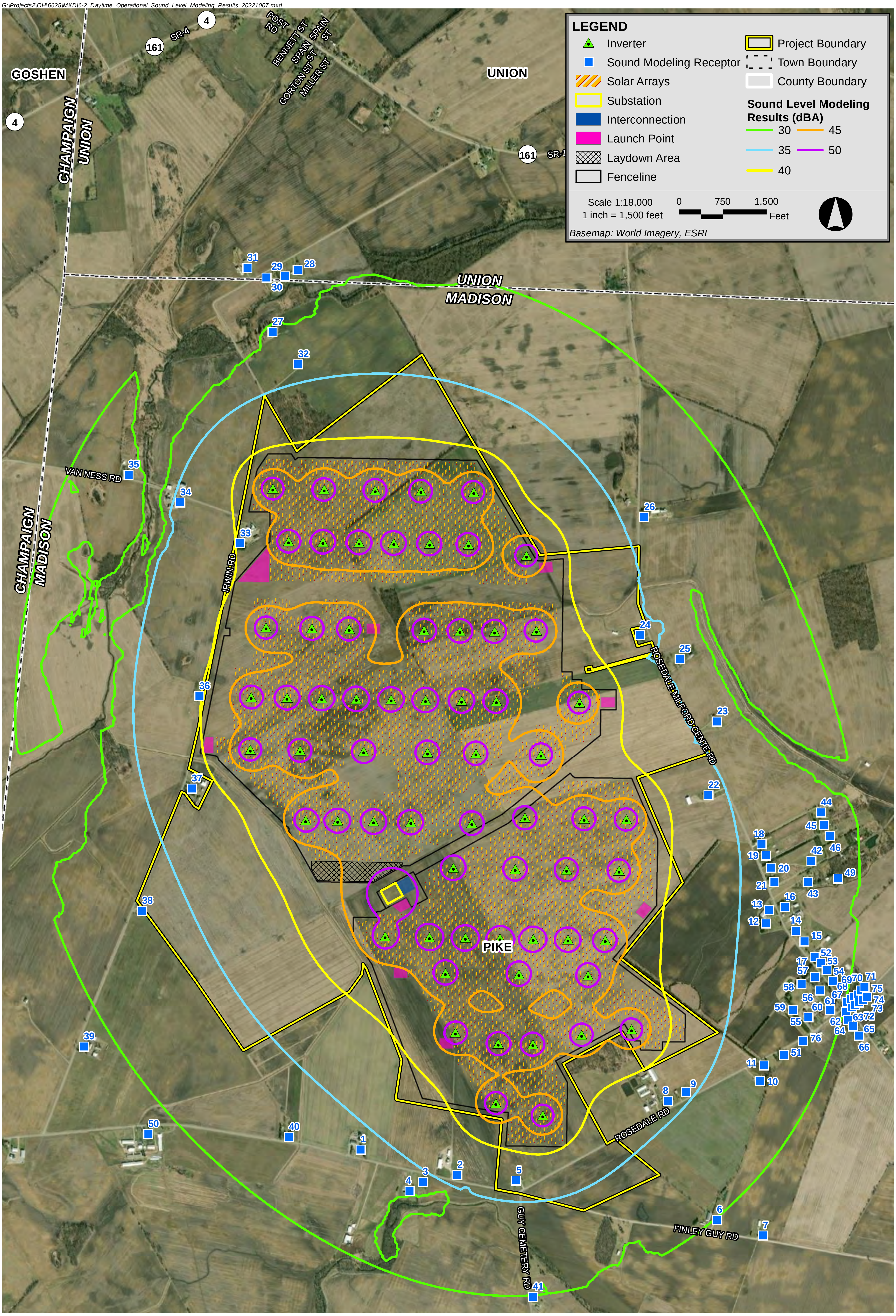


Madison Fields Solar   Madison County, Ohio

Epsilon

Figure 6-2

Daytime Operational Sound Level Modeling Results

7.0 EVALUATION OF OPERATIONAL SOUND LEVELS

Although not required, sound levels from the operation of the Madison Fields Solar Project equipment were compared to the Ohio Power Siting Board (OPSB) 5-dBA increase over existing ambient limit for wind energy facilities.

For operational sound from the Project, the worst-case sound level increases at receptors have been conservatively evaluated against the existing nighttime sound levels. The existing background sound levels for each receptor were determined as described in Section 5.0. The facility will only produce maximum sound levels during the daytime when the sun may be shining, and therefore evaluating sound levels against a nighttime limit is conservative.

7.1 Sound Level Modeling Results Compared to Existing Ambient Levels

The predicted Project Only broadband (dBA) sound levels at the 74 sound modeling receptors were conservatively compared to the existing nighttime measured ambient sound levels. At all modeling receptors, the Project sound levels are at or below the 5 dBA increase over ambient limit for wind energy facilities.

At modeling receptors near monitoring location 1, the receptor with the highest modeled sound level was ID #33 at 41 dBA. The existing average nighttime ambient sound level at this location is 36 dBA, resulting in a limit of 41 dBA. At modeling receptors near monitoring location 2, the receptor with the highest modeled sound level was ID #26 at 34 dBA. The existing average nighttime ambient sound level at this location is 43 dBA, resulting in a limit of 48 dBA. At modeling receptors near monitoring location 3, the receptor with the highest modeled sound level was ID #24 at 37 dBA. The existing average nighttime ambient sound level at this location is 41 dBA, resulting in a limit of 46 dBA. At modeling receptors near monitoring location 4, the receptor with the highest modeled sound level was ID #5 at 37 dBA. The existing average nighttime ambient sound level at this location is 41 dBA, resulting in a limit of 46 dBA. At modeling receptors near monitoring location 5, the receptor with the highest modeled sound level was ID #36 at 40 dBA. The existing average nighttime ambient sound level at this location is 38 dBA, resulting in a limit of 43 dBA.

In summary, the modeled sound levels are all at or below the wind energy limit. Therefore, even under a conservative nighttime evaluation, the Project meets the five (5) dBA sound level increase limit for wind energy projects applied as an evaluation criteria for this Project. A summary of the existing measured nighttime sound levels, predicted Project Only sound levels, and resulting sound level limits at each location are presented in Appendix B.

7.2 Noise Mitigation

The maximum predicted sound levels resulting from the operation of the Madison Fields Solar Project equipment at all nearby receptors is below the most restrictive existing sound level increase limits applicable to other energy projects. The Project will only produce maximum sound levels during daytime hours when background sound levels are at their highest, therefore, additional mitigation options were not examined for this Project.

8.0 CONSTRUCTION SOUND LEVELS

8.1 Construction Activities

Based on Epsilon's experience, construction activities related to the installation of the solar array and inverters will generally consist of three principal phases, including:

- Site clearing and grading
- Pile driving, and
- Erection (solar panel array installation)

It is assumed that the primary noise-producing equipment for the first phase of construction includes a backhoe, bulldozer, and dump truck. The primary equipment for the second phase is an impact pile driver. During the third phase, construction equipment will include operation of a crane and a flatbed truck. Construction of the Project is expected to last approximately 12 months.

8.2 Modeling Methodology

The sound impacts associated with construction of the Project were predicted using the Roadway Construction Noise Model[5] (RCNM) sound level calculation software developed by the Federal Highway Administration (FHWA). This software predicts noise from construction operations based on a compilation of empirical data and the application of acoustical propagation formulas.

For each phase of construction, sound levels produced by the equipment group associated with that phase were predicted assuming the equipment was located at the closest solar array to a property line and the closest modeling receptor. Therefore, the distances evaluated for construction noise impacts are: 1) 115 feet and 2) 522 feet.

At times when construction activity is occurring further away from property boundaries and receptors, sound levels will be less than those predicted in this analysis.

8.3 Sound Level Modeling Results

All modeled sound levels, as output from RCNM are presented as both A-weighted equivalent sound levels (L_{eq}, dBA) and A-weighted maximum sound levels (L_{max}, dBA).

5 Federal Highway Administration's Roadway Construction Noise Model (RCNM) Software Version 1.1, 12/08/2008. US Department of Transportation Research and Innovative Technology Administration.

Tables 8-1 through 8-3 below show the predicted sound levels at the two receptors for each phase of construction. The broadband L_{eq} sound levels range from 54 to 87 dBA. The broadband L_{max} sound levels range from 60 to 94 dBA and represent the worst-case sound levels produced during construction activity associated with the project.

Table 8-1 Sound Level During Phase 1 (Site Grading)

Receptor	Distance from Activity to Receptor	L_{max} (dBA)	L_{eq} (dBA)
Closest Property Line	115 ft	74	73
Closest Modeling Receptor	522 ft	61	60

Table 8-2 Sound Level During Phase 2 (Pile Driving)

Receptor	Distance from Activity to Receptor	L_{max} (dBA)	L_{eq} (dBA)
Closest Property Line	115 ft	94	87
Closest Modeling Receptor	522 ft	81	74

Table 8-3 Sound Level During Phase 3 (Panel Erection)

Receptor	Distance from Activity to Receptor	L_{max} (dBA)	L_{eq} (dBA)
Closest Property Line	115 ft	73	67
Closest Modeling Receptor	522 ft	60	54

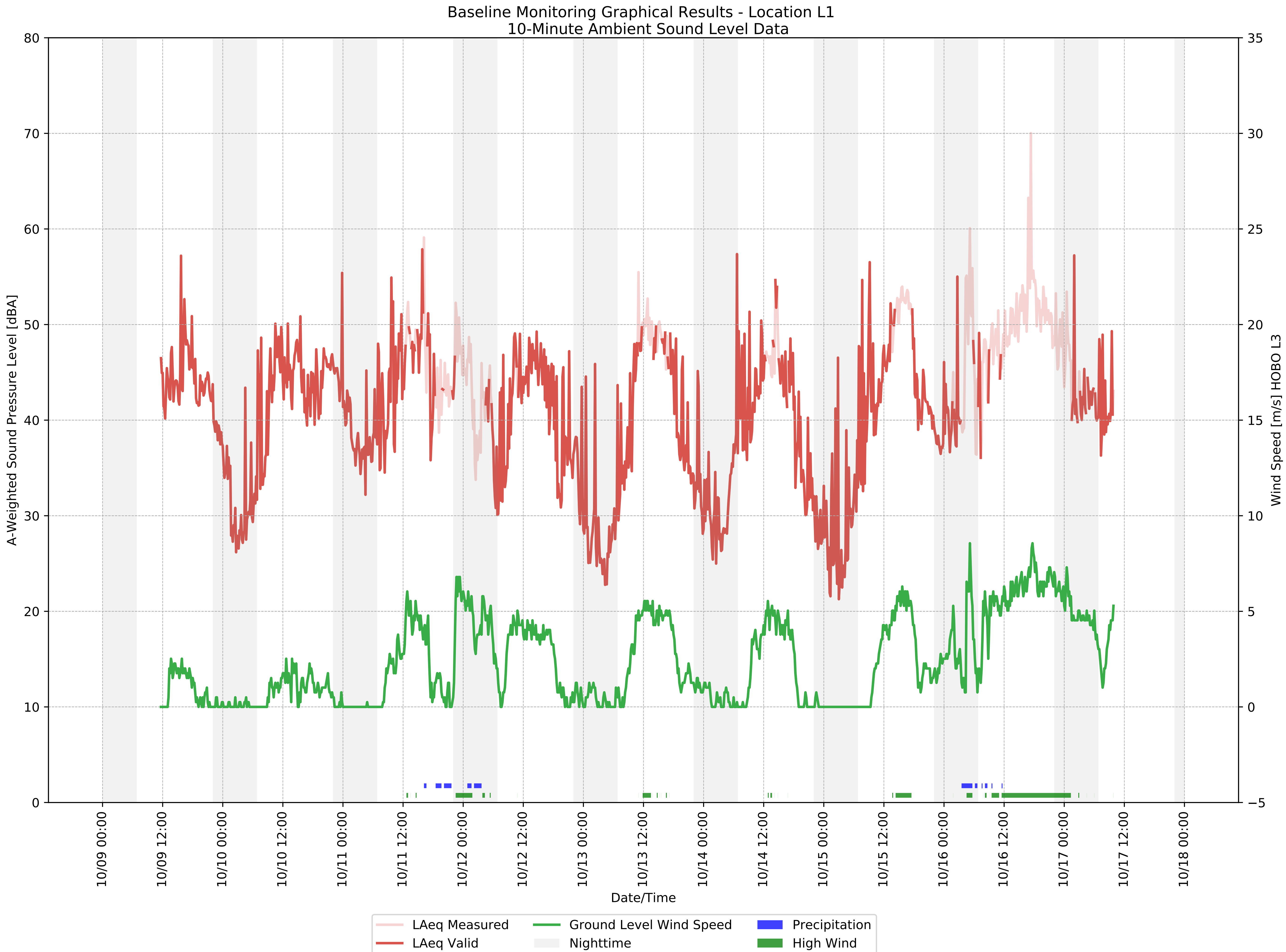
9.0 CONCLUSIONS

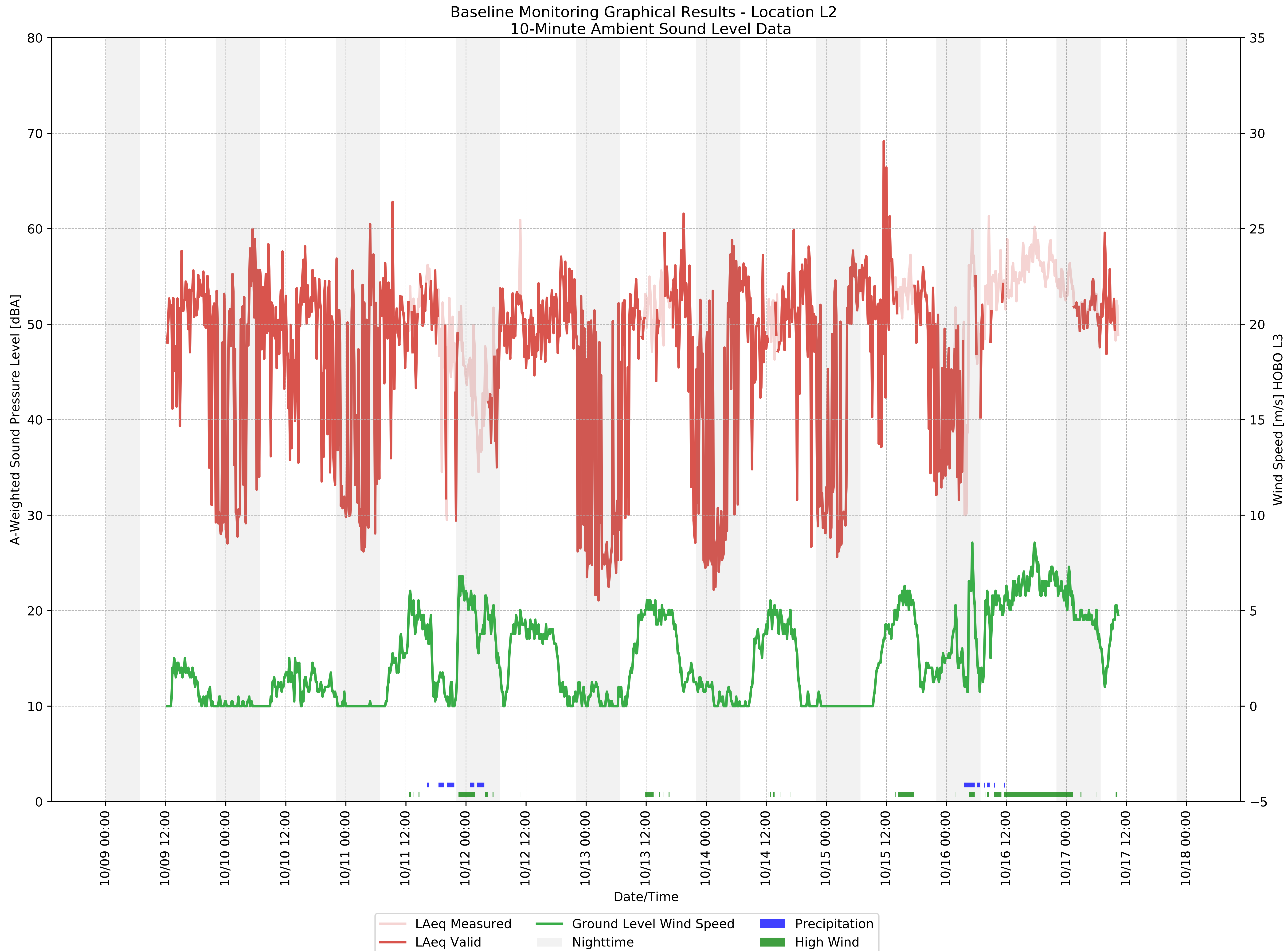
A comprehensive sound level modeling assessment was conducted for the Madison Fields Solar Project in Madison County, Ohio. In addition, ambient sound levels were measured at five locations to characterize the existing ambient sound levels within the area.

Although there are no sound level limits applicable to the Project, the highest predicted worst-case Project Only operational sound levels at a modeling receptor were compared to the most restrictive OPSB wind turbine facility sound limits of 5 dBA over existing nighttime ambient sound levels. At all modeling receptors, sound levels due to the operation of the Project are predicted to be at or below these limits.

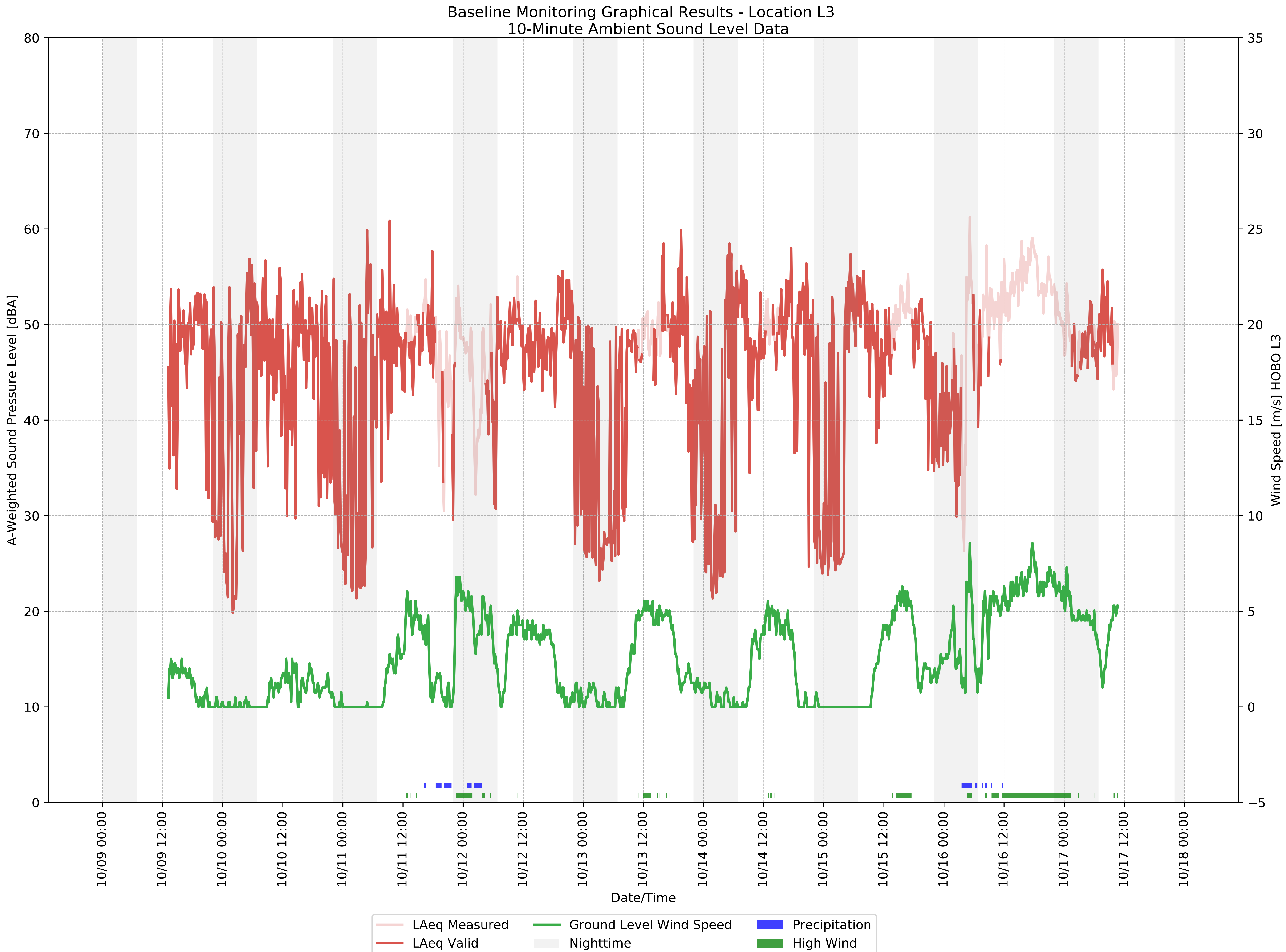
Appendix A

Ambient Sound Level Monitoring Data

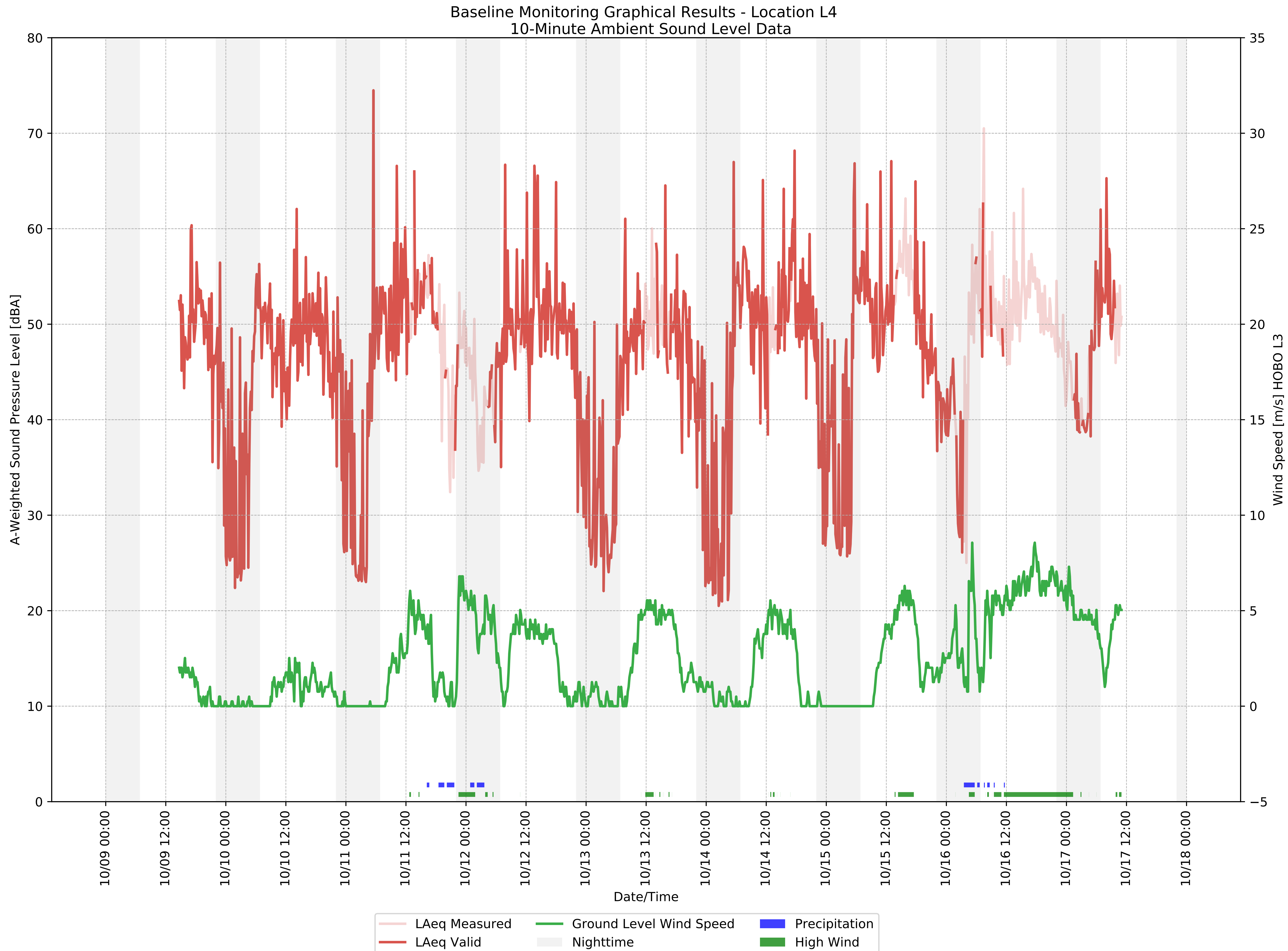

Baseline Monitoring Graphical Results - Location L1
10-Minute Ambient Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s] HOBO L3
Date/Time
10/09 00:00
10/09 12:00
10/10 00:00
10/10 12:00
10/11 00:00
10/11 12:00
10/12 00:00
10/12 12:00
10/13 00:00
10/13 12:00
10/14 00:00
10/14 12:00
10/15 00:00
10/15 12:00
10/16 00:00
10/16 12:00
10/17 00:00
10/17 12:00
10/18 00:00
LAeq Measured
LAeq Valid
Ground Level Wind Speed
Nighttime
Precipitation
High Wind



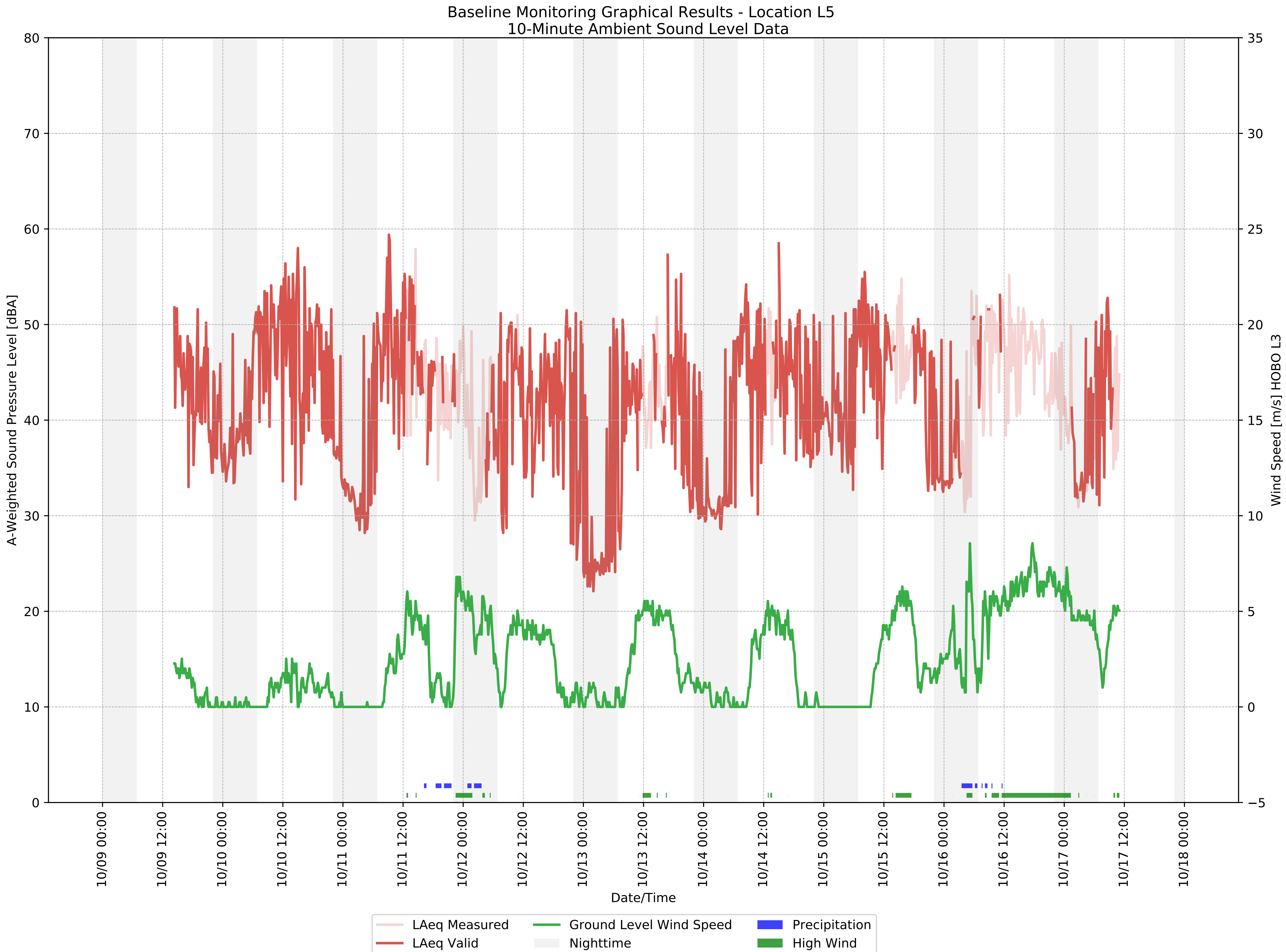
Baseline Monitoring Graphical Results - Location L2
10-Minute Ambient Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s] HOBO L3
Date/Time
10/09 00:00
10/09 12:00
10/10 00:00
10/10 12:00
10/11 00:00
10/11 12:00
10/12 00:00
10/12 12:00
10/13 00:00
10/13 12:00
10/14 00:00
10/14 12:00
10/15 00:00
10/15 12:00
10/16 00:00
10/16 12:00
10/17 00:00
10/17 12:00
10/18 00:00
LAeq Measured
LAeq Valid
Ground Level Wind Speed
Nighttime
Precipitation
High Wind



Baseline Monitoring Graphical Results - Location L3
10-Minute Ambient Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s] HOBO L3
Date/Time
0
10
20
30
40
50
60
70
80
-5
0
5
10
15
20
25
30
35
10/09 00:00
10/09 12:00
10/10 00:00
10/10 12:00
10/11 00:00
10/11 12:00
10/12 00:00
10/12 12:00
10/13 00:00
10/13 12:00
10/14 00:00
10/14 12:00
10/15 00:00
10/15 12:00
10/16 00:00
10/16 12:00
10/17 00:00
10/17 12:00
10/18 00:00
LAeq Measured
LAeq Valid
Ground Level Wind Speed
Nighttime
Precipitation
High Wind



Baseline Monitoring Graphical Results - Location L4
10-Minute Ambient Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s] HOBO L3
Date/Time
0
10
20
30
40
50
60
70
80
−5
0
5
10
15
20
25
30
35
10/09 00:00
10/09 12:00
10/10 00:00
10/10 12:00
10/11 00:00
10/11 12:00
10/12 00:00
10/12 12:00
10/13 00:00
10/13 12:00
10/14 00:00
10/14 12:00
10/15 00:00
10/15 12:00
10/16 00:00
10/16 12:00
10/17 00:00
10/17 12:00
10/18 00:00
LAeq Measured
LAeq Valid
Ground Level Wind Speed
Nighttime
Precipitation
High Wind



Baseline Monitoring Graphical Results - Location L5
10-Minute Ambient Sound Level Data
A-Weighted Sound Pressure Level [dBA]
Wind Speed [m/s] HOBO L3
Date/Time
10/09 00:00
10/09 12:00
10/10 00:00
10/10 12:00
10/11 00:00
10/11 12:00
10/12 00:00
10/12 12:00
10/13 00:00
10/13 12:00
10/14 00:00
10/14 12:00
10/15 00:00
10/15 12:00
10/16 00:00
10/16 12:00
10/17 00:00
10/17 12:00
10/18 00:00
LAeq Measured
LAeq Valid
Ground Level Wind Speed
Nighttime
Precipitation
High Wind

Appendix B

Sound Level Modeling Results at Receptors

Table B-1: Sound Level Modeling Results at Discrete Points– Sorted by Receptor ID

Receptor ID	Coordinates UTM NAD83 Zone 17N		Assigned Monitoring Location	Nighttime Average Ambient L_{eq} Sound Level (dBA)	OPSB Wind Turbine Sound Level Limit (dBA)	Project Only Broadband L_{eq} Sound Level (dBA)
	X (m)	Y (m)				
1	288166.80	4438552.42	4	41	46	34
2	288674.06	4438417.55	4	41	46	36
3	288491.55	4438383.02	4	41	46	34
4	288424.01	4438335.20	4	41	46	34
5	288981.62	4438390.68	4	41	46	37
6	290029.06	4438184.74	4	41	46	30
7	290270.42	4438102.92	4	41	46	28
8	289774.71	4438804.84	4	41	46	36
9	289866.01	4438851.60	4	41	46	36
10	290255.69	4438909.38	4	41	46	32
11	290276.31	4438990.54	4	41	46	32
12	290287.24	4439732.34	3	41	46	34
13	290302.99	4439802.55	3	41	46	34
14	290441.33	4439694.94	3	41	46	32
15	290486.56	4439638.30	3	41	46	32
16	290382.65	4439819.04	3	41	46	33
17	290540.29	4439557.21	3	41	46	31
18	290262.85	4440146.80	3	41	46	34
19	290285.89	4440088.39	3	41	46	34
20	290312.87	4440024.16	3	41	46	33
21	290329.25	4439949.24	3	41	46	33
22	289985.33	4440402.29	3	41	46	36
23	290030.98	4440787.55	3	41	46	34
24	289627.03	4441239.34	3	41	46	37
25	289834.89	4441113.53	3	41	46	33
26	289650.23	4441854.31	2	43	48	34
27	287706.94	4442822.62	1	36	41	32
28	287837.90	4443146.88	1	36	41	28
29	287773.35	4443113.94	1	36	41	27
30	287675.22	4443106.66	1	36	41	27
31	287576.44	4443157.72	1	36	41	26
32	287840.63	4442652.73	1	36	41	34
33	287538.18	4441718.17	1	36	41	41
34	287226.22	4441932.28	1	36	41	36
35	286954.01	4442077.08	1	36	41	32
36	287324.80	4440920.47	5	38	43	40
37	287284.77	4440436.62	5	38	43	38
38	287026.34	4439798.52	5	38	43	33
39	286720.79	4439089.54	5	38	43	29
40	287792.65	4438617.92	4	41	46	32
41	289067.38	4437782.66	4	41	46	30
42	290523.41	4440059.02	3	41	46	32
43	290503.96	4439949.44	3	41	46	32
44	290573.77	4440312.72	3	41	46	31
45	290588.22	4440246.64	3	41	46	31
46	290620.97	4440189.59	3	41	46	31
49	290663.41	4439967.52	3	41	46	31
50	287058.13	4438633.34	5	38	43	29

Table B-1: Sound Level Modeling Results at Discrete Points– Sorted by Receptor ID

Receptor ID	Coordinates UTM NAD83 Zone 17N		Assigned Monitoring Location	Nighttime Average Ambient L_{eq} Sound Level (dBA)	OPSB Wind Turbine Sound Level Limit (dBA)	Project Only Broadband L_{eq} Sound Level (dBA)
	X (m)	Y (m)				
51	290379.29	4439045.53	4	41	46	32
52	290572.29	4439524.54	3	41	46	31
53	290603.36	4439490.77	3	41	46	31
54	290634.73	4439431.68	4	41	46	31
55	290508.19	4439241.63	4	41	46	31
56	290567.75	4439381.84	4	41	46	31
57	290541.43	4439454.63	4	41	46	31
58	290471.92	4439417.92	4	41	46	32
59	290426.18	4439280.92	4	41	46	32
60	290620.46	4439281.06	4	41	46	31
61	290709.14	4439323.58	4	41	46	30
62	290704.25	4439269.43	4	41	46	30
63	290735.13	4439296.24	4	41	46	30
64	290715.48	4439229.56	4	41	46	30
65	290741.80	4439195.60	4	41	46	30
66	290772.27	4439146.59	4	41	46	29
67	290729.67	4439337.78	4	41	46	30
68	290747.07	4439350.27	4	41	46	30
69	290765.35	4439361.86	4	41	46	30
70	290782.91	4439383.17	4	41	46	30
71	290801.28	4439400.49	4	41	46	30
72	290750.75	4439307.44	4	41	46	30
73	290770.36	4439319.89	4	41	46	30
74	290793.05	4439331.85	4	41	46	29
75	290813.19	4439349.15	4	41	46	29
76	290480.48	4439119.03	4	41	46	31

Table B-1.1: Sound Level Modeling Results at Discrete Points– Sorted by Sound Level

Receptor ID	Coordinates UTM NAD83 Zone 17N		Assigned Monitoring Location	Nighttime Average Ambient L_{eq} Sound Level (dBA)	OPSB Wind Turbine Sound Level Limit (dBA)	Project Only Broadband L_{eq} Sound Level (dBA)
	X (m)	Y (m)				
33	287538.18	4441718.17	1	36	41	41
36	287324.80	4440920.47	5	38	43	40
37	287284.77	4440436.62	5	38	43	38
5	288981.62	4438390.68	4	41	46	37
24	289627.03	4441239.34	3	41	46	37
22	289985.33	4440402.29	3	41	46	36
8	289774.71	4438804.84	4	41	46	36
2	288674.06	4438417.55	4	41	46	36
9	289866.01	4438851.60	4	41	46	36
34	287226.22	4441932.28	1	36	41	36
3	288491.55	4438383.02	4	41	46	34
1	288166.80	4438552.42	4	41	46	34
23	290030.98	4440787.55	3	41	46	34
32	287840.63	4442652.73	1	36	41	34
18	290262.85	4440146.80	3	41	46	34
26	289650.23	4441854.31	2	43	48	34
4	288424.01	4438335.20	4	41	46	34
12	290287.24	4439732.34	3	41	46	34
19	290285.89	4440088.39	3	41	46	34
13	290302.99	4439802.55	3	41	46	34
20	290312.87	4440024.16	3	41	46	33
21	290329.25	4439949.24	3	41	46	33
38	287026.34	4439798.52	5	38	43	33
25	289834.89	4441113.53	3	41	46	33
16	290382.65	4439819.04	3	41	46	33
11	290276.31	4438990.54	4	41	46	32
40	287792.65	4438617.92	4	41	46	32
10	290255.69	4438909.38	4	41	46	32
14	290441.33	4439694.94	3	41	46	32
35	286954.01	4442077.08	1	36	41	32
15	290486.56	4439638.30	3	41	46	32
27	287706.94	4442822.62	1	36	41	32
43	290503.96	4439949.44	3	41	46	32
59	290426.18	4439280.92	4	41	46	32
42	290523.41	4440059.02	3	41	46	32
58	290471.92	4439417.92	4	41	46	32
51	290379.29	4439045.53	4	41	46	32
17	290540.29	4439557.21	3	41	46	31
57	290541.43	4439454.63	4	41	46	31
44	290573.77	4440312.72	3	41	46	31
45	290588.22	4440246.64	3	41	46	31
52	290572.29	4439524.54	3	41	46	31
55	290508.19	4439241.63	4	41	46	31
76	290480.48	4439119.03	4	41	46	31
46	290620.97	4440189.59	3	41	46	31
56	290567.75	4439381.84	4	41	46	31
53	290603.36	4439490.77	3	41	46	31
49	290663.41	4439967.52	3	41	46	31

Table B-1.1: Sound Level Modeling Results at Discrete Points– Sorted by Sound Level

Receptor ID	Coordinates UTM NAD83 Zone 17N X (m)	Coordinates UTM NAD83 Zone 17N Y (m)	Assigned Monitoring Location	Nighttime Average Ambient L_{eq} Sound Level (dBA)	OPSB Wind Turbine Sound Level Limit (dBA)	Project Only Broadband L_{eq} Sound Level (dBA)
54	290634.73	4439431.68	4	41	46	31
60	290620.46	4439281.06	4	41	46	31
6	290029.06	4438184.74	4	41	46	30
41	289067.38	4437782.66	4	41	46	30
61	290709.14	4439323.58	4	41	46	30
62	290704.25	4439269.43	4	41	46	30
67	290729.67	4439337.78	4	41	46	30
63	290735.13	4439296.24	4	41	46	30
64	290715.48	4439229.56	4	41	46	30
68	290747.07	4439350.27	4	41	46	30
69	290765.35	4439361.86	4	41	46	30
72	290750.75	4439307.44	4	41	46	30
65	290741.80	4439195.60	4	41	46	30
70	290782.91	4439383.17	4	41	46	30
71	290801.28	4439400.49	4	41	46	30
73	290770.36	4439319.89	4	41	46	30
74	290793.05	4439331.85	4	41	46	29
75	290813.19	4439349.15	4	41	46	29
66	290772.27	4439146.59	4	41	46	29
39	286720.79	4439089.54	5	38	43	29
50	287058.13	4438633.34	5	38	43	29
7	290270.42	4438102.92	4	41	46	28
28	287837.90	4443146.88	1	36	41	28
29	287773.35	4443113.94	1	36	41	27
30	287675.22	4443106.66	1	36	41	27
31	287576.44	4443157.72	1	36	41	26

Appendix C

Meteorological Data (KMRT- Marysville, OH)

Table C1

Station: KMRT
Station Name: Marysville Union County Airport
Latitude: 40.22 N
Longitude 83.35 W
Elevation (ft): 1,021
State: OH

Date & Time	Hourly Dew Point Temperature	Hourly Dry Bulb Temp	Hourly Precipitation	Hourly Relative Humidity	Hourly Sky Conditions	Hourly Station Pressure
2019-10-07T00:15:00	55	56		96	OVC:08 60	29.05
2019-10-07T00:35:00	55	56	0.01	96	OVC:08 70	29.07
2019-10-07T00:59:00	55	56	0.01	96	OVC:08 70	29.05
2019-10-07T01:18:00	55	56		96	OVC:08 70	29.05
2019-10-07T01:36:00	55	56		96	OVC:08 70	29.05
2019-10-07T01:55:00	55	56		96	OVC:08 70	29.05
2019-10-07T02:15:00	55	56		96	OVC:08 80	29.05
2019-10-07T02:39:00	55	56		96	OVC:08 80	29.05
2019-10-07T02:57:00	55	56		96	OVC:08 80	29.05
2019-10-07T03:15:00	54	56		96	OVC:08 70	29.05
2019-10-07T03:35:00	54	56		96	OVC:08 70	29.07
2019-10-07T03:55:00	54	56	0.01	95	BKN:07 70 OVC:08 85	29.05
2019-10-07T04:19:00	54	55		95	BKN:07 95 BKN:07 120	29.07
2019-10-07T04:37:00	54	56		95	BKN:07 95 BKN:07 120	29.07
2019-10-07T04:55:00	54	55		95	BKN:07 95 OVC:08 120	29.07
2019-10-07T05:15:00	54	55		96	SCT:04 95	29.07
2019-10-07T05:35:00	54	55		96	BKN:07 95	29.08
2019-10-07T05:59:00	54	55		96	BKN:07 95	29.08
2019-10-07T06:17:00	54	55		96	BKN:07 95	29.08
2019-10-07T06:35:00	54	55	0.01	96	BKN:07 95	29.08
2019-10-07T06:55:00	54	55	0.01	96	SCT:04 95	29.08
2019-10-07T07:15:00	54	55		96	CLR:00	29.08
2019-10-07T07:39:00	54	55		96	CLR:00	29.08
2019-10-07T07:57:00	54	55		95	CLR:00	29.08
2019-10-07T08:15:00	54	56		95	CLR:00	29.08
2019-10-07T08:35:00	54	56		92	CLR:00	29.08
2019-10-07T08:55:00	54	57		92	CLR:00	29.1
2019-10-07T09:18:00	54	57	0.01	91	CLR:00	29.1
2019-10-07T09:37:00	54	57	0.01	90	CLR:00	29.1
2019-10-07T09:55:00	54	57	0.01	90	CLR:00	29.1
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2019-10-11T10:15:00	56			70	SCT:04 60 BKN:07 70 OVC:08 90	28.98
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2019-10-11T10:39:00	56			63	OVC:08 60	28.97
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2019-10-11T11:15:00	56			61	BKN:07 60 OVC:08 100	28.96
2019-10-11T11:35:00	57			58	SCT:04 60 OVC:08 100	28.95
2019-10-11T11:55:00	55			48	SCT:04 100	28.94
2019-10-11T12:19:00	55			44	SCT:04 50 SCT:04 60 SCT:04 85	28.93
2019-10-11T12:37:00	55			46	SCT:04 55 SCT:04 70 SCT:04 85	28.92
2019-10-11T12:55:00	56			46	SCT:04 55 SCT:04 70 SCT:04 110	28.91
2019-10-11T13:15:00	56			46	SCT:04 55 SCT:04 70 SCT:04 80	28.9
2019-10-11T13:35:00	56			48	BKN:07 60 BKN:07 70	28.89
2019-10-11T13:58:00	56			47	SCT:04 60 BKN:07 70 BKN:07 85	28.89
2019-10-11T14:16:00	55			47	BKN:07 60 BKN:07 75 BKN:07 85	28.89
2019-10-11T14:35:00	56			49	BKN:07 49 BKN:07 60 OVC:08 85	28.89
2019-10-11T14:55:00	56			51	OVC:08 47	28.89
2019-10-11T15:15:00	56			52	BKN:07 45 OVC:08 50	28.89
2019-10-11T15:38:00	58			58	BKN:07 47 OVC:08 60	28.88
2019-10-11T15:56:00	58			63	OVC:08 43	28.89
2019-10-11T16:15:00	58			65	OVC:08 41	28.89
2019-10-11T16:35:00	62		0.02	87	SCT:04 20 OVC:08 37	28.89
2019-10-11T16:55:00	62		0.03	90	SCT:04 22 BKN:07 35 OVC:08 55	28.88
2019-10-11T17:18:00	62			90	SCT:04 35 OVC:08 60	28.88
2019-10-11T17:36:00	62			91	SCT:04 37 BKN:07 60 OVC:08 90	28.88
2019-10-11T17:55:00	63			93	BKN:07 80 OVC:08 110	28.86
2019-10-11T18:15:00	63			91	SCT:04 80 OVC:08 100	28.86
2019-10-11T18:35:00	62			90	BKN:07 45 BKN:07 50 OVC:08 100	28.85
2019-10-11T18:58:00	62		0.01	89	SCT:04 22 BKN:07 40 OVC:08 50	28.85
2019-10-11T19:16:00	62		0.01	90	BKN:07 44 BKN:07 50 OVC:08 55	28.85
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2019-10-11T19:55:00	63		0.01	93	OVC:08 42	28.85

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2019-10-11T21:35:00	62		0.01	93	SCT:04 14 BKN:07 43 OVC:08 50	28.85
2019-10-11T21:59:00	53		0.01	88	SCT:04 7 BKN:07 13 OVC:08 43	28.87
2019-10-11T22:17:00	51			92	BKN:07 9 OVC:08 15	28.88
2019-10-11T22:36:00	51			93	OVC:08 7	28.89
2019-10-11T22:55:00	47			89	SCT:04 7 OVC:08 12	28.9
2019-10-11T23:15:00	46			87	BKN:07 12 OVC:08 22	28.91
2019-10-11T23:39:00	45			89	BKN:07 12 OVC:08 22	28.92
2019-10-11T23:57:00	45			90	OVC:08 10	28.92
2019-10-12T00:15:00	44			91	OVC:08 8	28.92
2019-10-12T00:35:00	43			93	BKN:07 8 OVC:08 32	28.92
2019-10-12T00:55:00	42			93	BKN:07 8 BKN:07 14 OVC:08 32	28.93
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2019-10-12T01:55:00	42		0.02	94	BKN:07 10 OVC:08 15	28.94
2019-10-12T02:15:00	40			90	BKN:07 10 OVC:08 15	28.94
2019-10-12T02:35:00	40		0.01	89	BKN:07 12 OVC:08 18	28.95
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2019-10-12T02:59:00	40		0.01	90	OVC:08 10	28.95
2019-10-12T03:17:00	40		0.01	91	OVC:08 10	28.95
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2019-10-12T03:55:00	38		0.01	87	OVC:08 16	28.96
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2019-10-12T07:35:00	32			84	CLR:00	29.04
2019-10-12T07:58:00	32			80	CLR:00	29.05
2019-10-12T08:16:00	32			79	CLR:00	29.05
2019-10-12T08:35:00	32			76	CLR:00	29.05
2019-10-12T08:55:00	31			70	CLR:00	29.05
2019-10-12T09:15:00	31			67	SCT:04 25	29.05
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2019-10-12T10:55:00	30			55	CLR:00	29.05
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2019-10-12T12:58:00	30			45	CLR:00	29.03
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2019-10-12T13:55:00	27			39	CLR:00	29.02
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2019-10-12T14:38:00	27			35	CLR:00	29.01
2019-10-12T14:56:00	26			35	CLR:00	29
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2019-10-12T15:35:00	26			35	CLR:00	28.99
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2019-10-12T16:55:00	26			35	CLR:00	28.99
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2019-10-14T05:55:00	35			93	CLR:00	28.93
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2019-10-14T06:55:00	34			95	CLR:00	28.94

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2019-10-14T23:35:00	35			91	CLR:00	29.03
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2019-10-15T06:15:00	34			95	CLR:00	29.03
2019-10-15T06:35:00	32			97	CLR:00	29.03
2019-10-15T06:55:00	34			97	CLR:00	29.02
2019-10-15T07:18:00	33			97	CLR:00	29.02
2019-10-15T07:37:00	34			97	CLR:00	29.02
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2019-10-15T08:35:00	40			76	CLR:00	29.02
2019-10-15T08:58:00	40			67	CLR:00	29
2019-10-15T09:17:00	40			59	CLR:00	29
2019-10-15T09:35:00	39			55	CLR:00	29
2019-10-15T09:55:00	39			51	CLR:00	28.99
2019-10-15T10:15:00	39			46	CLR:00	28.99
2019-10-15T10:38:00	37			40	CLR:00	28.97
2019-10-15T10:56:00	35			35	CLR:00	28.96
2019-10-15T11:15:00	34			31	CLR:00	28.95
2019-10-15T11:16:00	33			31	CLR:00	28.95
2019-10-15T11:35:00	32			29	CLR:00	28.94
2019-10-15T11:55:00	32			28	CLR:00	28.93
2019-10-15T12:18:00	31			26	CLR:00	28.91
2019-10-15T12:36:00	31			25	CLR:00	28.89

2019-10-15T12:55:00	31			24	CLR:00	28.88
2019-10-15T13:15:00	31			23	CLR:00	28.86
2019-10-15T13:16:00	31			23	CLR:00	28.86
2019-10-15T13:35:00	31			24	CLR:00	28.83
2019-10-15T13:58:00	31			22	CLR:00	28.83
2019-10-15T14:16:00	31			22	CLR:00	28.82
2019-10-15T14:35:00	31			22	CLR:00	28.8
2019-10-15T14:55:00	34			24	CLR:00	28.78
2019-10-15T15:15:00	33			24	CLR:00	28.78
2019-10-15T15:38:00	35			25	CLR:00	28.77
2019-10-15T15:56:00	38			27	CLR:00	28.77
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2019-10-15T16:59:00	41			33	CLR:00	28.77
2019-10-15T17:18:00	41			35	CLR:00	28.77
2019-10-15T17:36:00	42			39	CLR:00	28.77
2019-10-15T17:55:00	43			42	CLR:00	28.77
2019-10-15T18:15:00	43			45	CLR:00	28.75
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2019-10-15T18:57:00	44			47	OVC:08 70	28.74
2019-10-15T19:16:00	44			44	OVC:08 70	28.74
2019-10-15T19:35:00	44			45	OVC:08 70	28.74
2019-10-15T19:55:00	45			49	OVC:08 75	28.74
2019-10-15T20:19:00	46			53	BKN:07 75	28.73
2019-10-15T20:37:00	46			55	BKN:07 75	28.73
2019-10-15T20:55:00	47			56	SCT:04 55 SCT:04 75 BKN:07 80	28.73
2019-10-15T21:15:00	47			60	SCT:04 85	28.71
2019-10-15T21:35:00	48			62	CLR:00	28.71
2019-10-15T21:59:00	49			64	CLR:00	28.71
2019-10-15T22:17:00	49			66	SCT:04 50	28.69
2019-10-15T22:35:00	50			68	CLR:00	28.69
2019-10-15T22:56:00	50			67	SCT:04 45	28.69
2019-10-15T23:15:00	51			67	BKN:07 41 OVC:08 48	28.68
2019-10-15T23:39:00	52			70	SCT:04 37 OVC:08 48	28.67
2019-10-15T23:57:00	52			72	SCT:04 37 OVC:08 48	28.66
2019-10-16T00:15:00	53			72	SCT:04 34 BKN:07 42 OVC:08 48	28.66
2019-10-16T00:35:00	54			72	SCT:04 28 SCT:04 34 OVC:08 50	28.66
2019-10-16T00:55:00	54			73	BKN:07 26 BKN:07 36 OVC:08 50	28.66
2019-10-16T01:19:00	55			74	SCT:04 26	28.64
2019-10-16T01:37:00	55			75	SCT:04 120	28.64
2019-10-16T01:55:00	55			77	SCT:04 120	28.64
2019-10-16T02:15:00	55			79	SCT:04 20 SCT:04 100	28.62
2019-10-16T02:35:00	56			80	CLR:00	28.62
2019-10-16T02:58:00	56			80	BKN:07 22	28.6
2019-10-16T03:17:00	56			81	BKN:07 24 BKN:07 55	28.6
2019-10-16T03:35:00	56			85	SCT:04 16 OVC:08 25	28.6
2019-10-16T03:55:00	49		0.02	88	BKN:07 13 OVC:08 21	28.61
2019-10-16T04:15:00	45		0.01	82	SCT:04 13 SCT:04 19 OVC:08 29	28.63
2019-10-16T04:38:00	46		0.02	90		28.66
2019-10-16T04:57:00	46		0.03	92	BKN:07 13 BKN:07 22 OVC:08 49	28.65
2019-10-16T05:15:00	45		0.01	91		28.63
2019-10-16T05:35:00	45		0.02	91	SCT:04 40 BKN:07 65 OVC:08 80	28.62
2019-10-16T05:55:00	45		0.03	91	SCT:04 15 BKN:07 65 OVC:08 75	28.62
2019-10-16T06:18:00	45			93	BKN:07 15 BKN:07 24 OVC:08 33	28.63
2019-10-16T06:36:00	45		0.01	93	OVC:08 15	28.63
2019-10-16T06:55:00	45		0.02	92	BKN:07 15 BKN:07 19 OVC:08 110	28.62
2019-10-16T07:15:00	43			85	SCT:04 14 BKN:07 26 OVC:08 110	28.64
2019-10-16T07:35:00	43			87	SCT:04 14 BKN:07 24 BKN:07 120	28.65
2019-10-16T07:58:00	41		0.01	85	SCT:04 14 BKN:07 22	28.66
2019-10-16T08:16:00	40			83	BKN:07 22 BKN:07 26	28.67
2019-10-16T08:35:00	40		0.01	83	BKN:07 17 BKN:07 28	28.68
2019-10-16T08:55:00	40		0.01	80		
2019-10-16T08:56:00	40		0.01	80	BKN:07 19 BKN:07 24 OVC:08 35	28.69
2019-10-16T09:15:00	40			79	BKN:07 19 BKN:07 27 OVC:08 33	28.69
2019-10-16T09:39:00	40			78	BKN:07 19 BKN:07 27 OVC:08 33	28.69
2019-10-16T09:57:00	39		0.01	75	BKN:07 23 OVC:08 28	28.7
2019-10-16T10:16:00	38			75	OVC:08 23	28.7
2019-10-16T10:35:00	38			74	OVC:08 25	28.71
2019-10-16T10:55:00	38			74	OVC:08 21	28.71
2019-10-16T11:19:00	38			76	OVC:08 21	28.71
2019-10-16T11:37:00	39			73	SCT:04 21 SCT:04 27 OVC:08 34	28.71
2019-10-16T11:55:00	39		0.01	71	SCT:04 22 SCT:04 27 OVC:08 34	28.71
2019-10-16T12:15:00	39			70	OVC:08 25	28.71
2019-10-16T12:16:00	39			70	OVC:08 25	28.71
2019-10-16T12:35:00	38			71	OVC:08 23	28.71
2019-10-16T12:59:00	39			73	OVC:08 23	28.71
2019-10-16T13:17:00	39			72	BKN:07 23 OVC:08 29	28.7
2019-10-16T13:35:00	39			72	BKN:07 25 OVC:08 29	28.7
2019-10-16T13:55:00	40			69	BKN:07 25 OVC:08 32	28.7
2019-10-16T14:15:00	39			71	OVC:08 26	28.7
2019-10-16T14:39:00	40			71	BKN:07 24 OVC:08 48	28.7
2019-10-16T14:57:00	40			72	BKN:07 26 BKN:07 33 OVC:08 48	28.71
2019-10-16T15:15:00	40			76	BKN:07 23 OVC:08 28	28.71
2019-10-16T15:35:00	40			74	OVC:08 21	28.71
2019-10-16T15:55:00	40			75	OVC:08 21	28.71
2019-10-16T16:19:00	40			78	OVC:08 21	28.71
2019-10-16T16:37:00	41			81	BKN:07 19 OVC:08 24	28.73
2019-10-16T16:55:00	40			79	OVC:08 19	28.73
2019-10-16T17:15:00	40			78	OVC:08 19	28.73
2019-10-16T17:35:00	40			77	OVC:08 19	28.74
2019-10-16T17:59:00	41			81	OVC:08 19	28.74

2019-10-16T18:17:00	40			79	OVC:08 19	28.74
2019-10-16T18:35:00	40			78	BKN:07 21 OVC:08 29	28.74
2019-10-16T18:55:00	40			77	BKN:07 22 BKN:07 28 OVC:08 55	28.75
2019-10-16T19:15:00	40			78	SCT:04 22 BKN:07 47 OVC:08 55	28.77
2019-10-16T19:38:00	40			76	BKN:07 26 OVC:08 47	28.77
2019-10-16T19:57:00	39			74	BKN:07 25 OVC:08 30	28.77
2019-10-16T20:15:00	39			74	OVC:08 26	28.77
2019-10-16T20:35:00	39			72	OVC:08 27	28.77
2019-10-16T20:55:00	38			72	SCT:04 25 SCT:04 31 OVC:08 43	28.78
2019-10-16T21:18:00	38			71	SCT:04 25 SCT:04 30 OVC:08 43	28.78
2019-10-16T21:36:00	38			73	SCT:04 25 SCT:04 30 OVC:08 38	28.79
2019-10-16T21:55:00	38			74	SCT:04 25 OVC:08 38	28.79
2019-10-16T22:15:00	38			73	BKN:07 25 OVC:08 36	28.79
2019-10-16T22:35:00	38			74	SCT:04 25 OVC:08 34	28.79
2019-10-16T22:58:00	38			72	BKN:07 25 OVC:08 36	28.8
2019-10-16T23:16:00	38			73	BKN:07 25 OVC:08 29	28.8
2019-10-16T23:35:00	38			75	SCT:04 25 BKN:07 31	28.79
2019-10-16T23:55:00	38			74	BKN:07 24 BKN:07 29 BKN:07 35	28.79
2019-10-17T00:15:00	38			74	OVC:08 24	28.8
2019-10-17T00:38:00	38			76	OVC:08 24	28.8
2019-10-17T00:56:00	38			78	BKN:07 22 OVC:08 50	28.8
2019-10-17T01:15:00	38			79	SCT:04 22 OVC:08 50	28.8
2019-10-17T01:38:00	37			76	OVC:08 48	28.8
2019-10-17T01:56:00	38			77	BKN:07 42 OVC:08 48	28.8
2019-10-17T02:15:00	38			79	SCT:04 42	28.8
2019-10-17T02:35:00	38			79	SCT:04 24 SCT:04 48	28.8
2019-10-17T02:55:00	38			78	SCT:04 24 BKN:07 46	28.8
2019-10-17T03:18:00	38			74	SCT:04 26 OVC:08 46	28.8
2019-10-17T03:36:00	38			75	BKN:07 27 BKN:07 38 OVC:08 46	28.8
2019-10-17T03:55:00	38			75	BKN:07 25 OVC:08 35	28.81
2019-10-17T04:15:00	38			74	BKN:07 25 OVC:08 30	28.81
2019-10-17T04:35:00	38			74	BKN:07 25 BKN:07 30 OVC:08 41	28.81
2019-10-17T04:58:00	38			74	BKN:07 25 OVC:08 41	28.82
2019-10-17T05:16:00	37			75	SCT:04 25 BKN:07 41	28.82
2019-10-17T05:35:00	37			74	SCT:04 25 BKN:07 37 BKN:07 44	28.82
2019-10-17T05:55:00	37			76	OVC:08 33	28.83
2019-10-17T06:15:00	37			77	SCT:04 33 OVC:08 41	28.83
2019-10-17T06:38:00	37			80	BKN:07 41	28.83
2019-10-17T06:56:00	37			81	SCT:04 41	28.83
2019-10-17T07:15:00	38			83	CLR:00	28.83
2019-10-17T07:35:00	38			82	CLR:00	28.84
2019-10-17T07:59:00	38			79	SCT:04 30	28.85
2019-10-17T08:18:00	38			76	SCT:04 30	28.85
2019-10-17T08:36:00	37			71	CLR:00	28.86
2019-10-17T08:55:00	37			67	CLR:00	28.85
2019-10-17T09:15:00	36			66	SCT:04 25	28.86
2019-10-17T09:39:00	37			66	BKN:07 25	28.86
2019-10-17T09:57:00	37			66	OVC:08 25	28.86
2019-10-17T10:16:00	37			66	BKN:07 25 OVC:08 30	28.86
2019-10-17T10:35:00	37			64	OVC:08 27	28.86
2019-10-17T10:55:00	36			63	OVC:08 29	28.86
2019-10-17T11:19:00	37			64	OVC:08 27	28.86
2019-10-17T11:37:00	38			63	OVC:08 27	28.86
2019-10-17T11:56:00	37			61	BKN:07 27	28.86
2019-10-17T12:15:00	38			61	BKN:07 27 BKN:07 33 BKN:07 120	28.86
2019-10-17T12:35:00	38			58	BKN:07 29 BKN:07 36 BKN:07 120	28.86
2019-10-17T12:59:00	38			56	OVC:08 31	28.86
2019-10-17T13:17:00	38			58	BKN:07 33	28.86
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2019-10-17T14:39:00	38			57	BKN:07 35 OVC:08 44	28.85
2019-10-17T14:57:00	38			56	BKN:07 35 OVC:08 42	28.85
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2019-10-17T15:35:00	38			57	SCT:04 36 OVC:08 42	28.85
2019-10-17T15:55:00	38			56	BKN:07 36 BKN:07 43	28.85
2019-10-17T16:19:00	37			57	OVC:08 38	28.86
2019-10-17T16:37:00	38			58	BKN:07 38 OVC:08 46	28.86
2019-10-17T16:55:00	37			58	SCT:04 38 OVC:08 46	28.86
2019-10-17T17:15:00	37			58	SCT:04 38 OVC:08 48	28.86
2019-10-17T17:35:00	37			58	SCT:04 38 OVC:08 48	28.86
2019-10-17T17:59:00	37			60	BKN:07 43 BKN:07 49 OVC:08 120	28.87
2019-10-17T18:17:00	37			62	BKN:07 41 OVC:08 47	28.87
2019-10-17T18:35:00	38			63	BKN:07 38 OVC:08 44	28.88
2019-10-17T18:55:00	38			64	BKN:07 37 OVC:08 50	28.88
2019-10-17T19:15:00	38			66	BKN:07 37 OVC:08 48	28.89
2019-10-17T19:39:00	38			68	SCT:04 35 OVC:08 50	28.9
2019-10-17T19:57:00	39			70	SCT:04 33 OVC:08 50	28.9
2019-10-17T20:15:00	39			70	BKN:07 33 OVC:08 39	28.91
2019-10-17T20:35:00	39			70	SCT:04 33 BKN:07 39 OVC:08 50	28.91
2019-10-17T20:55:00	38			70	SCT:04 35 SCT:04 41 OVC:08 48	28.91
2019-10-17T21:19:00	38			71	SCT:04 48	28.92
2019-10-17T21:37:00	38			72	SCT:04 48	28.92
2019-10-17T21:55:00	38			73	SCT:04 50	28.92
2019-10-17T22:15:00	38			76	CLR:00	28.92
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2019-10-17T22:58:00	37			81	CLR:00	28.92
2019-10-17T23:17:00	37			82	CLR:00	28.93
2019-10-17T23:35:00	36			85	CLR:00	28.93
2019-10-17T23:55:00	34			86	CLR:00	28.93
2019-10-18T00:15:00	36			85	CLR:00	28.92

2019-10-18T00:38:00	37			85	CLR:00	28.93
2019-10-18T00:56:00	37			84	CLR:00	28.93
2019-10-18T01:16:00	36			86	CLR:00	28.93
2019-10-18T01:35:00	36			86	CLR:00	28.93
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2019-10-18T02:36:00	36			87	CLR:00	28.94
2019-10-18T02:55:00	36			88	CLR:00	28.94
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2019-10-18T04:55:00	36			90	CLR:00	28.96
2019-10-18T05:19:00	36			90	CLR:00	28.97
2019-10-18T05:38:00	36			91	CLR:00	28.98
2019-10-18T05:56:00	36			91	CLR:00	28.99
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2019-10-18T06:35:00	36			92	CLR:00	28.99
2019-10-18T06:59:00	35			92	CLR:00	29
2019-10-18T07:17:00	35			94	CLR:00	29.01
2019-10-18T07:36:00	36			92	CLR:00	29.01
2019-10-18T07:55:00	37			89	CLR:00	29.02
2019-10-18T08:15:00	38			88	CLR:00	29.02
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2019-10-18T08:57:00	39			81	CLR:00	29.03
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2019-10-18T09:36:00	39			73	CLR:00	29.03
2019-10-18T09:55:00	38			69	CLR:00	29.03
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2019-10-18T10:37:00	37			62	CLR:00	29.03
2019-10-18T10:55:00	38			60	CLR:00	29.02
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2019-10-18T11:35:00	37			54	CLR:00	29.01
2019-10-18T11:59:00	37			54	CLR:00	29.01
2019-10-18T12:17:00	36			51	CLR:00	29
2019-10-18T12:35:00	36			48	VV:09 7	29
2019-10-18T12:55:00	36			49	CLR:00	28.99
2019-10-18T13:15:00	36			47	CLR:00	28.97
2019-10-18T13:39:00	35			45	CLR:00	28.97
2019-10-18T13:57:00	35			45	CLR:00	28.96
2019-10-18T14:15:00	35			43	VV:09 2	28.96
2019-10-18T14:35:00	35			43	CLR:00	28.96
2019-10-18T14:55:00	36			44	CLR:00	28.96
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2019-10-18T15:55:00	34			41	CLR:00	28.95
2019-10-18T16:15:00	34			41	CLR:00	28.95
2019-10-18T16:35:00	34			41	CLR:00	28.95
2019-10-18T16:58:00	34			42	CLR:00	28.95
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2019-10-18T17:35:00	35			48	CLR:00	28.94
2019-10-18T17:55:00	36			58	CLR:00	28.94
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2019-10-18T18:38:00	36			72	CLR:00	28.94
2019-10-18T18:56:00	36			75	CLR:00	28.94
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2019-10-18T19:16:00	36			76	CLR:00	28.94
2019-10-18T19:35:00	35			81	CLR:00	28.94
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2019-10-18T20:18:00	35			81	CLR:00	28.94
2019-10-18T20:36:00	35			88	CLR:00	28.93
2019-10-18T20:55:00	35			87	CLR:00	28.94
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2019-10-18T21:16:00	33			87	CLR:00	28.94
2019-10-18T21:35:00	33			89	CLR:00	28.93
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2019-10-18T22:16:00	34			93	CLR:00	28.94
2019-10-18T22:35:00	35			91	CLR:00	28.94
2019-10-18T22:55:00	34			93	CLR:00	28.94
2019-10-18T23:15:00	34			94	CLR:00	28.93
2019-10-18T23:38:00	32			93	CLR:00	28.93
2019-10-18T23:56:00	32			92	CLR:00	28.93
2019-10-19T00:15:00	32			94	CLR:00	28.93
2019-10-19T00:35:00	32			94	CLR:00	28.93
2019-10-19T00:59:00	34			94	CLR:00	28.92
2019-10-19T01:18:00	32			96	CLR:00	28.92
2019-10-19T01:36:00	32			96	CLR:00	28.92
2019-10-19T01:55:00	33			96		
2019-10-19T02:15:00	32			97	CLR:00	28.92
2019-10-19T02:39:00	33			95	CLR:00	28.92
2019-10-19T02:57:00	33			92		
2019-10-19T03:16:00	33			97	CLR:00	28.92
2019-10-19T03:35:00	30			94	CLR:00	28.91
2019-10-19T03:55:00	32			97		
2019-10-19T04:19:00	33			97	CLR:00	28.91
2019-10-19T04:37:00	32			97	CLR:00	28.91
2019-10-19T04:55:00	32			98		
2019-10-19T05:16:00	31			96	CLR:00	28.91
2019-10-19T05:35:00	31			97	CLR:00	28.92

2019-10-19T05:59:00	29			96		
2019-10-19T06:17:00	29			96	CLR:00	28.92
2019-10-19T06:35:00	29			96	CLR:00	28.92
2019-10-19T06:55:00	30			98		
2019-10-19T07:15:00	30			98	CLR:00	28.91
2019-10-19T07:39:00	31			98	CLR:00	28.91
2019-10-19T07:57:00	33			97		
2019-10-19T08:15:00	38			95	CLR:00	28.91
2019-10-19T08:35:00	38			85	CLR:00	28.91
2019-10-19T08:55:00	39			78		
2019-10-19T09:19:00	39			69	CLR:00	28.91
2019-10-19T09:37:00	40			64	CLR:00	28.91
2019-10-19T09:55:00	39			57		
2019-10-19T10:15:00	38			55	CLR:00	28.91
2019-10-19T10:35:00	38			51	CLR:00	28.91
2019-10-19T10:58:00	38			47		
2019-10-19T11:16:00	37			44	CLR:00	28.89
2019-10-19T11:35:00	36			43	CLR:00	28.88
2019-10-19T11:55:00	36			39		
2019-10-19T12:15:00	36			39	CLR:00	28.86
2019-10-19T12:38:00	36			38	CLR:00	28.85
2019-10-19T12:56:00	36			37		
2019-10-19T13:15:00	36			37	CLR:00	28.83
2019-10-19T13:16:00	36			37	CLR:00	28.83
2019-10-19T13:35:00	36			36	CLR:00	28.83
2019-10-19T13:55:00	36			36		
2019-10-19T14:18:00	36			36	CLR:00	28.81
2019-10-19T14:36:00	36			37	CLR:00	28.81
2019-10-19T14:55:00	36			35		
2019-10-19T15:15:00	36			36	CLR:00	28.8
2019-10-19T15:35:00	36			36	CLR:00	28.79
2019-10-19T15:58:00	37			38		
2019-10-19T16:16:00	37			38	CLR:00	28.78
2019-10-19T16:35:00	37			37	CLR:00	28.77
2019-10-19T16:55:00	37			40		
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2019-10-19T17:38:00	38			45	CLR:00	28.77
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2019-10-19T19:55:00	39			75		
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2019-10-19T20:57:00	40			57		
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2019-10-19T21:55:00	41			62		
2019-10-19T22:19:00	41			71	CLR:00	28.77
2019-10-19T22:38:00	42			73	CLR:00	28.77
2019-10-19T22:56:00	42			71		
2019-10-19T23:15:00	42			75	CLR:00	28.77
2019-10-19T23:35:00	43			73	CLR:00	28.77
2019-10-19T23:59:00	43			76		
2019-10-20T00:17:00	42			77	CLR:00	28.75
2019-10-20T00:36:00	43			79	CLR:00	28.75
2019-10-20T00:55:00	43			80		
2019-10-20T01:15:00	43			84	CLR:00	28.75
2019-10-20T01:39:00	42			83	CLR:00	28.74
2019-10-20T01:57:00	43			86		
2019-10-20T02:15:00	42			89	CLR:00	28.74
2019-10-20T02:35:00	43			87	CLR:00	28.74
2019-10-20T02:55:00	43			87		
2019-10-20T03:19:00	42			89	CLR:00	28.74
2019-10-20T03:37:00	42			88	CLR:00	28.74
2019-10-20T03:56:00	42			88		
2019-10-20T04:15:00	42			86	CLR:00	28.74
2019-10-20T04:35:00	43			82	CLR:00	28.74
2019-10-20T04:59:00	42			84		
2019-10-20T05:17:00	42			86	CLR:00	28.75
2019-10-20T05:35:00	42			89	CLR:00	28.77
2019-10-20T05:55:00	42			84		
2019-10-20T06:15:00	41			92	BKN:07 50	28.77
2019-10-20T06:39:00	44			89	OVC:08 50	28.77
2019-10-20T06:57:00	44			86		
2019-10-20T07:15:00	44			83	OVC:08 50	28.77
2019-10-20T07:35:00	45			85	OVC:08 50	28.77
2019-10-20T07:55:00	44			81		
2019-10-20T08:19:00	46			79	SCT:04 50	28.79
2019-10-20T08:37:00	46			77	BKN:07 55	28.8
2019-10-20T08:55:00	46			73		
2019-10-20T09:15:00	47			70	CLR:00	28.8
2019-10-20T09:35:00	48			66	SCT:04 90	28.8
2019-10-20T09:36:00	48			66	SCT:04 90	28.8
2019-10-20T09:59:00	48			63		
2019-10-20T10:17:00	49			62	BKN:07 55	28.82
2019-10-20T10:35:00	49			57	SCT:04 55	28.82
2019-10-20T10:55:00	49			54		

2019-10-20T11:15:00	48			50	SCT:04 47	28.81
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2019-10-20T11:57:00	49			47		
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2019-10-20T12:55:00	48			48		
2019-10-20T13:18:00	49			47	SCT:04 48	28.8
2019-10-20T13:37:00	49			48	SCT:04 48	28.79
2019-10-20T13:55:00	47			40		
2019-10-20T14:15:00	48			41	SCT:04 50	28.8
2019-10-20T14:35:00	47			40	SCT:04 50	28.8
2019-10-20T14:59:00	46			38		
2019-10-20T15:17:00	46			37	CLR:00	28.8
2019-10-20T15:35:00	45			36	CLR:00	28.8
2019-10-20T15:55:00	44			35		
2019-10-20T16:15:00	44			35	CLR:00	28.81
2019-10-20T16:39:00	44			36	CLR:00	28.8
2019-10-20T16:57:00	45			39		
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2019-10-20T17:35:00	46			48	VV:09 7	28.81
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2019-10-20T18:18:00	46			60	BKN:07 55	28.82
2019-10-20T18:37:00	47			65	OVC:08 55	28.83
2019-10-20T18:55:00	49			66		
2019-10-20T19:15:00	48			65	BKN:07 55 OVC:08 70	28.84
2019-10-20T19:35:00	49			69	OVC:08 55	28.85
2019-10-20T19:58:00	49			68		
2019-10-20T20:16:00	48			69	SCT:04 55 BKN:07 65	28.86
2019-10-20T20:35:00	47			65	BKN:07 55 BKN:07 65	28.86
2019-10-20T20:36:00	47			65	BKN:07 55 BKN:07 65	28.86
2019-10-20T20:55:00	47			71	BKN:07 55	28.87
2019-10-20T21:15:00	46			68	SCT:04 55	28.87
2019-10-20T21:38:00	46			66	BKN:07 55	28.88
2019-10-20T21:56:00	46			69		
2019-10-20T22:15:00	46			70	SCT:04 55 BKN:07 65	28.88
2019-10-20T22:35:00	46			67	SCT:04 50 BKN:07 65	28.88
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2019-10-21T00:40:00	42			88	CLR:00	28.87
2019-10-21T00:58:00	43			91		
2019-10-21T01:16:00	45			87	CLR:00	28.87
2019-10-21T01:35:00	45			93	CLR:00	28.87
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2019-10-21T02:38:00	44			92	CLR:00	28.86
2019-10-21T02:56:00	48			95		
2019-10-21T03:15:00	46			94	CLR:00	28.85
2019-10-21T03:35:00	47			95	CLR:00	28.84
2019-10-21T03:59:00	51			97		
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2019-10-21T04:36:00	54			97	OVC:08 1	28.86
2019-10-21T04:55:00	54			97	OVC:08 1	28.85
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2019-10-21T05:39:00	55			97	OVC:08 1	28.86
2019-10-21T05:57:00	55			97		
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2019-10-21T06:35:00	55			97	OVC:08 1	28.85
2019-10-21T06:55:00	55			97	OVC:08 1	28.84
2019-10-21T07:19:00	55			97	OVC:08 1	28.83
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2019-10-21T09:39:00	55			91	OVC:08 5	28.81
2019-10-21T09:58:00	55			89		
2019-10-21T10:16:00	55			85	OVC:08 7	28.79
2019-10-21T10:35:00	55			83	OVC:08 10	28.77
2019-10-21T10:55:00	55			80	OVC:08 12	28.77
2019-10-21T11:19:00	54			70	BKN:07 16 BKN:07 22	28.75
2019-10-21T11:37:00	54			69	BKN:07 19	28.74
2019-10-21T11:56:00	55			63	SCT:04 21	28.74
2019-10-21T12:15:00	54			61	CLR:00	28.71
2019-10-21T12:35:00	53			59	SCT:04 70 SCT:04 100	28.7
2019-10-21T12:59:00	54			62		
2019-10-21T13:17:00	54			63	SCT:04 46 BKN:07 55 OVC:08 70	28.71
2019-10-21T13:36:00	54			65	BKN:07 38 BKN:07 46 OVC:08 75	28.71
2019-10-21T13:55:00	54			63	BKN:07 38 BKN:07 80 BKN:07 95	28.7
2019-10-21T14:15:00	54			58	SCT:04 38	28.69
2019-10-21T14:39:00	54			59	SCT:04 95 SCT:04 120	28.68
2019-10-21T14:57:00	54			61		
2019-10-21T15:15:00	55			58	SCT:04 60 SCT:04 95 BKN:07 120	28.68
2019-10-21T15:36:00	55			59	SCT:04 47 BKN:07 50 OVC:08 120	28.68
2019-10-21T15:55:00	56			59	SCT:04 44 BKN:07 50 BKN:07 60	28.67
2019-10-21T16:19:00	56			60	SCT:04 43 BKN:07 48 OVC:08 120	28.67

2019-10-21T16:37:00	57			61	SCT:04 49 SCT:04 55 BKN:07 120	28.67
2019-10-21T16:55:00	57			61	BKN:07 90 OVC:08 120	28.67
2019-10-21T17:15:00	56			59	SCT:04 55 SCT:04 80 OVC:08 90	28.66
2019-10-21T17:35:00	56			59	SCT:04 49 SCT:04 55 OVC:08 80	28.66
2019-10-21T17:59:00	58			67		
2019-10-21T18:17:00	56		0.02	79	SCT:04 25 BKN:07 45 OVC:08 65	28.69
2019-10-21T18:35:00	58		0.03	85	SCT:04 26 BKN:07 47 OVC:08 60	28.69
2019-10-21T18:55:00	57		0.04	85	SCT:04 48 BKN:07 60 OVC:08 65	28.69
2019-10-21T19:15:00	58		0.01	91	OVC:08 55	28.68
2019-10-21T19:38:00	58		0.02	92	SCT:04 55 OVC:08 65	28.68
2019-10-21T19:57:00	58		0.03	91		
2019-10-21T20:15:00	58		0.01	91	SCT:04 39 BKN:07 45 BKN:07 50	28.69
2019-10-21T20:35:00	58		0.02	91	SCT:04 35 SCT:04 44 BKN:07 50	28.69
2019-10-21T20:55:00	58		0.02	91	SCT:04 16 SCT:04 35 BKN:07 60	28.69
2019-10-21T21:18:00	58		0.01	89	SCT:04 16 BKN:07 65 OVC:08 100	28.7
2019-10-21T21:36:00	58		0.01	91	SCT:04 14 BKN:07 70 OVC:08 100	28.69
2019-10-21T21:55:00	57		0.02	90		
2019-10-21T21:56:00	57		0.02	90	SCT:04 70 BKN:07 90 BKN:07 100	28.69
2019-10-21T22:15:00	57			90	SCT:04 70 SCT:04 90	28.69
2019-10-21T22:35:00	57			90	BKN:07 16 BKN:07 23 BKN:07 60	28.69
2019-10-21T22:58:00	57		0.01	90		
2019-10-21T23:16:00	57			91	OVC:08 14	28.68
2019-10-21T23:35:00	57			90	OVC:08 17	28.69
2019-10-21T23:55:00	57		0.01	89	BKN:07 15 OVC:08 19	28.68
2019-10-22T00:15:00	57			89	OVC:08 15	28.69
2019-10-22T00:38:00	57			89	OVC:08 15	28.69
2019-10-22T00:56:00	56			89		
2019-10-22T01:15:00	56		0.01	89	BKN:07 17 OVC:08 23	28.69
2019-10-22T01:35:00	56		0.01	89	BKN:07 17 OVC:08 24	28.69
2019-10-22T02:00:00	56			89		
2019-10-22T02:18:00	56			88	BKN:07 20 BKN:07 27 OVC:08 32	28.68
2019-10-22T02:36:00	55			87	BKN:07 22 BKN:07 32	28.68
2019-10-22T02:55:00	55			88	BKN:07 22	28.67
2019-10-22T03:15:00	54			89	BKN:07 22 BKN:07 26	28.67
2019-10-22T03:39:00	54			89	SCT:04 22 SCT:04 26 SCT:04 120	28.66
2019-10-22T03:57:00	53			90		
2019-10-22T04:16:00	51			82	SCT:04 15 BKN:07 22 BKN:07 28	28.65
2019-10-22T04:35:00	44			67	SCT:04 15 SCT:04 22 BKN:07 50	28.68
2019-10-22T04:55:00	45			72	CLR:00	28.69
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2019-10-22T05:37:00	45			77	CLR:00	28.69
2019-10-22T05:55:00	44			77	CLR:00	28.67
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2019-10-22T06:35:00	44			75	CLR:00	28.67
2019-10-22T06:59:00	43			71		
2019-10-22T07:17:00	43			73	CLR:00	28.68
2019-10-22T07:35:00	44			76	CLR:00	28.68
2019-10-22T07:56:00	49			82		
2019-10-22T08:15:00	51			84	CLR:00	28.67
2019-10-22T08:39:00	50			78	CLR:00	28.68
2019-10-22T08:57:00	50			74		
2019-10-22T09:15:00	48			67	SCT:04 30	28.68
2019-10-22T09:35:00	48			69	BKN:07 30 BKN:07 36 OVC:08 45	28.68
2019-10-22T09:55:00	45			64	BKN:07 30 BKN:07 36 BKN:07 44	28.68
2019-10-22T10:19:00	44			62	SCT:04 38 SCT:04 46	28.68
2019-10-22T10:37:00	44			59	CLR:00	28.68
2019-10-22T10:55:00	43			58	SCT:04 38 SCT:04 48	28.68
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2019-10-22T11:35:00	41			52	SCT:04 48	28.69
2019-10-22T11:59:00	40			52		
2019-10-22T12:17:00	40			51	BKN:07 46 BKN:07 49	28.69
2019-10-22T12:35:00	40			50	SCT:04 47	28.69
2019-10-22T12:55:00	39			46	BKN:07 50	28.68
2019-10-22T13:15:00	40			48	SCT:04 48 SCT:04 50	28.68
2019-10-22T13:38:00	39			45	CLR:00	28.67
2019-10-22T13:57:00	39			45		
2019-10-22T14:15:00	38			45	BKN:07 49 BKN:07 55	28.69
2019-10-22T14:35:00	38			47	BKN:07 49 OVC:08 55	28.69
2019-10-22T14:55:00	39			48	SCT:04 50 BKN:07 55	28.7
2019-10-22T15:18:00	38			48	BKN:07 55	28.71
2019-10-22T15:37:00	38			47	BKN:07 55 BKN:07 70	28.71
2019-10-22T15:55:00	38			46	BKN:07 55	28.71
2019-10-22T16:15:00	37			47	SCT:04 49 BKN:07 55	28.73
2019-10-22T16:35:00	37			48	SCT:04 50 BKN:07 55	28.73
2019-10-22T16:58:00	37			48		
2019-10-22T17:17:00	37			51	SCT:04 65	28.74
2019-10-22T17:35:00	38			53	BKN:07 65 BKN:07 75	28.74
2019-10-22T17:55:00	38			53	OVC:08 65	28.74
2019-10-22T18:15:00	38			54	SCT:04 55 OVC:08 65	28.75
2019-10-22T18:38:00	38			56	SCT:04 55 OVC:08 65	28.77
2019-10-22T18:56:00	38			58		
2019-10-22T19:15:00	39			60	BKN:07 65	28.77
2019-10-22T19:16:00	39			60	BKN:07 65	28.77
2019-10-22T19:35:00	39			61	SCT:04 50 BKN:07 65	28.78
2019-10-22T19:55:00	39			62	SCT:04 50 SCT:04 55 BKN:07 65	28.79
2019-10-22T20:18:00	39			64	SCT:04 48 BKN:07 70	28.79
2019-10-22T20:36:00	39			62	SCT:04 48 SCT:04 65 BKN:07 80	28.8
2019-10-22T20:55:00	39			66	SCT:04 46 SCT:04 65 SCT:04 75	28.81
2019-10-22T21:15:00	38			72	CLR:00	28.81
2019-10-22T21:16:00	38			72	CLR:00	28.81
2019-10-22T21:35:00	38			75	CLR:00	28.81

2019-10-22T21:58:00	38			73	CLR:00	28.82
2019-10-22T22:16:00	37			77	CLR:00	28.82
2019-10-22T22:35:00	37			81	CLR:00	28.82
2019-10-22T22:55:00	38			78	CLR:00	28.81
2019-10-22T23:15:00	39			79	SCT:04 55 SCT:04 65 SCT:04 80	28.81
2019-10-22T23:38:00	39			77	BKN:07 50 BKN:07 65 BKN:07 80	28.82
2019-10-22T23:56:00	39			75		
2019-10-23T00:15:00	39			77	CLR:00	28.82
2019-10-23T00:35:00	38			76	CLR:00	28.82
2019-10-23T00:59:00	38			80		
2019-10-23T01:18:00	38			77	CLR:00	28.83
2019-10-23T01:36:00	38			78	CLR:00	28.84
2019-10-23T01:55:00	38			77	CLR:00	28.85
2019-10-23T02:15:00	37			76	CLR:00	28.85
2019-10-23T02:39:00	37			79	CLR:00	28.85
2019-10-23T02:57:00	37			79		
2019-10-23T03:16:00	37			80	CLR:00	28.86
2019-10-23T03:35:00	36			80	CLR:00	28.86
2019-10-23T03:55:00	36			81	CLR:00	28.87
2019-10-23T04:19:00	36			80	CLR:00	28.88
2019-10-23T04:37:00	36			80	CLR:00	28.89
2019-10-23T04:55:00	36			79	CLR:00	28.9
2019-10-23T05:15:00	36			79	CLR:00	28.9
2019-10-23T05:35:00	36			80	CLR:00	28.9
2019-10-23T05:59:00	35			82		
2019-10-23T06:17:00	34			83	CLR:00	28.91
2019-10-23T06:35:00	33			85	CLR:00	28.92
2019-10-23T06:55:00	33			87		
2019-10-23T06:56:00	33			87	CLR:00	28.93
2019-10-23T07:15:00	34			86	CLR:00	28.94
2019-10-23T07:39:00	35			81	CLR:00	28.95
2019-10-23T07:57:00	36			77	CLR:00	28.96
2019-10-23T08:15:00	36			74	CLR:00	28.98
2019-10-23T08:35:00	36			69	CLR:00	28.98
2019-10-23T08:36:00	36			69	CLR:00	28.98
2019-10-23T08:55:00	35			63	CLR:00	28.99
2019-10-23T09:19:00	35			59	CLR:00	28.99
2019-10-23T09:37:00	34			55	CLR:00	29
2019-10-23T09:55:00	33			51	CLR:00	29.01
2019-10-23T10:15:00	32			45	CLR:00	29.02
2019-10-23T10:35:00	31			42	CLR:00	29.02
2019-10-23T10:55:00	30			39	CLR:00	29.02
2019-10-23T11:15:00	30			37	CLR:00	29.01
2019-10-23T11:35:00	29			35	CLR:00	29.01
2019-10-23T11:58:00	30			35	CLR:00	29.01
2019-10-23T12:16:00	30			34	CLR:00	29.02
2019-10-23T12:35:00	30			33	CLR:00	29.01
2019-10-23T12:55:00	30			32	CLR:00	29.01
2019-10-23T13:15:00	31			33	CLR:00	29.01
2019-10-23T13:38:00	30			31	CLR:00	29
2019-10-23T13:57:00	30			31	CLR:00	29
2019-10-23T14:15:00	30			31	CLR:00	29
2019-10-23T14:35:00	31			31	CLR:00	29
2019-10-23T14:55:00	31			31	CLR:00	29
2019-10-23T15:18:00	31			31	CLR:00	29
2019-10-23T15:36:00	30			30	CLR:00	29
2019-10-23T15:55:00	30			30	CLR:00	29
2019-10-23T16:15:00	30			31	CLR:00	28.99
2019-10-23T16:35:00	30			31	CLR:00	29
2019-10-23T16:58:00	30			33	CLR:00	29
2019-10-23T17:16:00	30			34	CLR:00	29
2019-10-23T17:35:00	31			36	CLR:00	29
2019-10-23T17:55:00	31			38	CLR:00	29
2019-10-23T18:15:00	31			40	CLR:00	29.01
2019-10-23T18:38:00	32			43	CLR:00	29.01
2019-10-23T18:56:00	32			44	CLR:00	29.02
2019-10-23T19:15:00	32			45	CLR:00	29.03
2019-10-23T19:35:00	33			47	CLR:00	29.03
2019-10-23T19:55:00	33			47	CLR:00	29.02
2019-10-23T20:18:00	33			49	CLR:00	29.03
2019-10-23T20:36:00	33			50	CLR:00	29.04
2019-10-23T20:55:00	34			52	CLR:00	29.04
2019-10-23T21:15:00	34			54	CLR:00	29.05
2019-10-23T21:39:00	34			54	CLR:00	29.05
2019-10-23T21:58:00	34			53	CLR:00	29.05
2019-10-23T22:16:00	34			53	CLR:00	29.05
2019-10-23T22:35:00	34			53	CLR:00	29.05
2019-10-23T22:55:00	33			53	CLR:00	29.04
2019-10-23T23:19:00	33			54	CLR:00	29.04
2019-10-23T23:37:00	34			56	CLR:00	29.04
2019-10-23T23:56:00	34			58		
2019-10-24T00:15:00	34			58	CLR:00	29.05
2019-10-24T00:35:00	34			57	CLR:00	29.05
2019-10-24T00:59:00	34			57		
2019-10-24T01:17:00	34			58	CLR:00	29.07
2019-10-24T01:35:00	34			57		
2019-10-24T01:55:00	34			58		
2019-10-24T02:15:00	34			59		
2019-10-24T02:39:00	34			60	CLR:00	29.05
2019-10-24T02:57:00	33			59		
2019-10-24T03:15:00	33			60	CLR:00	29.05

2019-10-24T03:35:00	33			59	CLR:00	29.05
2019-10-24T03:55:00	33			58		
2019-10-24T04:19:00	34			60	CLR:00	29.05
2019-10-24T04:37:00	34			60	CLR:00	29.07
2019-10-24T04:55:00	34			63		
2019-10-24T05:15:00	34			65	CLR:00	29.08
2019-10-24T05:35:00	34			65	CLR:00	29.08
2019-10-24T05:36:00	34			66	CLR:00	29.08
2019-10-24T05:59:00	34			62		
2019-10-24T06:17:00	34			62	CLR:00	29.08
2019-10-24T06:35:00	34			62	CLR:00	29.08
2019-10-24T06:55:00	34			63		
2019-10-24T07:15:00	34			66	CLR:00	29.1
2019-10-24T07:39:00	35			68	CLR:00	29.1
2019-10-24T07:57:00	35			68		
2019-10-24T08:15:00	35			64	CLR:00	29.12
2019-10-24T08:35:00	36			58	CLR:00	29.12
2019-10-24T08:55:00	35			53		
2019-10-24T09:18:00	36			47	BKN:07 100	29.13
2019-10-24T09:36:00	36			43	BKN:07 100	29.13
2019-10-24T09:55:00	36			43		
2019-10-24T10:15:00	37			43	OVC:08 100	29.13
2019-10-24T10:35:00	37			44	BKN:07 100	29.14
2019-10-24T10:58:00	37			44		
2019-10-24T11:17:00	38			45	BKN:07 100	29.15
2019-10-24T11:35:00	38			46	BKN:07 100	29.15
2019-10-24T11:55:00	38			45		
2019-10-24T12:15:00	39			45	BKN:07 100	29.14
2019-10-24T13:16:00	40			45	OVC:08 90	29.13
2019-10-24T13:35:00	41			46	BKN:07 90	29.12
2019-10-24T13:55:00	41			46		
2019-10-24T14:18:00	42			48	OVC:08 90	29.12
2019-10-24T14:36:00	42			47	SCT:04 90	29.12
2019-10-24T14:55:00	41			46		
2019-10-24T15:15:00	42			45	SCT:04 90	29.12
2019-10-24T15:35:00	42			48	CLR:00	29.13
2019-10-24T15:58:00	42			49		
2019-10-24T16:16:00	42			49	CLR:00	29.13
2019-10-24T16:35:00	42			50	SCT:04 100	29.13
2019-10-24T16:55:00	42			51		
2019-10-24T17:15:00	42			53	CLR:00	29.13
2019-10-24T17:38:00	42			54	CLR:00	29.13
2019-10-24T17:56:00	43			57		
2019-10-24T18:15:00	43			59	BKN:07 110	29.15
2019-10-24T18:35:00	44			60	OVC:08 110	29.15
2019-10-24T18:59:00	44			63		
2019-10-24T19:18:00	45			64	OVC:08 110	29.16
2019-10-24T19:36:00	45			66	BKN:07 110	29.16
2019-10-24T19:55:00	44			66		
2019-10-24T20:15:00	44			67	SCT:04 85 OVC:08 110	29.16
2019-10-24T20:39:00	44			69	SCT:04 120	29.16
2019-10-24T20:58:00	44			70		
2019-10-24T21:16:00	43			72	CLR:00	29.19
2019-10-24T21:35:00	43			72	CLR:00	29.19
2019-10-24T21:55:00	43			75		
2019-10-24T22:19:00	43			75	CLR:00	29.19
2019-10-24T22:37:00	43			77	CLR:00	29.19
2019-10-24T22:56:00	43			80		
2019-10-24T23:15:00	43			80	CLR:00	29.19
2019-10-24T23:35:00	43			81	CLR:00	29.19
2019-10-24T23:59:00	43			82		
2019-10-25T00:17:00	43			83	CLR:00	29.19
2019-10-25T00:36:00	43			84	CLR:00	29.19
2019-10-25T00:55:00	43			84		
2019-10-25T01:15:00	42			84	SCT:04 120	29.19
2019-10-25T01:39:00	43			84	BKN:07 120	29.19
2019-10-25T01:57:00	43			84		
2019-10-25T02:15:00	43			84	OVC:08 120	29.19
2019-10-25T02:35:00	43			83	OVC:08 110	29.18
2019-10-25T02:55:00	43			83		
2019-10-25T03:19:00	44			84	OVC:08 110	29.17
2019-10-25T03:37:00	43			83	OVC:08 110	29.18
2019-10-25T03:55:00	44			85		
2019-10-25T04:15:00	44			86	OVC:08 110	29.18
2019-10-25T04:35:00	44			85	BKN:07 95 OVC:08 120	29.19
2019-10-25T04:59:00	44			85		
2019-10-25T05:17:00	44			85	OVC:08 110	29.2
2019-10-25T05:35:00	44			85	BKN:07 55 OVC:08 100	29.21
2019-10-25T05:55:00	44			85		
2019-10-25T06:15:00	44			85	SCT:04 90	29.2
2019-10-25T06:39:00	44			85	BKN:07 90	29.2
2019-10-25T06:57:00	44			85		
2019-10-25T07:15:00	44			86	BKN:07 90	29.19
2019-10-25T07:35:00	44			85	OVC:08 90	29.2
2019-10-25T07:55:00	44			86		
2019-10-25T08:18:00	44			85	OVC:08 100	29.19
2019-10-25T08:37:00	44			83	OVC:08 110	29.19
2019-10-25T08:55:00	44			82		
2019-10-25T09:15:00	45			81	SCT:04 110	29.19
2019-10-25T09:35:00	45			79	CLR:00	29.19
2019-10-25T09:58:00	45			74		

2019-10-25T10:16:00	44			72	SCT:04 120	29.18
2019-10-25T10:35:00	44			71	CLR:00	29.18
2019-10-25T10:36:00	44			71	CLR:00	29.18
2019-10-25T10:55:00	45			69		
2019-10-25T11:15:00	45			69	BKN:07 110	29.18
2019-10-25T11:38:00	45			67	SCT:04 75 BKN:07 110	29.18
2019-10-25T11:56:00	45			67		
2019-10-25T12:15:00	45			66	OVC:08 75	29.17
2019-10-25T12:36:00	45			65	SCT:04 75 BKN:07 110	29.15
2019-10-25T12:55:00	45			65		
2019-10-25T13:18:00	46			65	SCT:04 100	29.14
2019-10-25T13:36:00	45			64	BKN:07 100	29.13
2019-10-25T13:55:00	45			63		
2019-10-25T14:15:00	45			62	SCT:04 80 BKN:07 120	29.12
2019-10-25T14:39:00	46			62	BKN:07 120	29.12
2019-10-25T15:16:00	45			62	SCT:04 120	29.12
2019-10-25T15:35:00	45			61	SCT:04 70 SCT:04 120	29.12
2019-10-25T15:55:00	46			65		
2019-10-25T16:19:00	45			67	CLR:00	29.12
2019-10-25T16:37:00	45			68	BKN:07 120	29.11
2019-10-25T17:15:00	45			69	OVC:08 120	29.12
2019-10-25T17:35:00	44			70	SCT:04 110	29.12
2019-10-25T17:59:00	44			72		
2019-10-25T18:17:00	44			71	OVC:08 100	29.14
2019-10-25T18:35:00	44			73	BKN:07 100	29.14
2019-10-25T18:55:00	43			74		
2019-10-25T19:15:00	43			75	CLR:00	29.15
2019-10-25T19:39:00	43			77	CLR:00	29.15
2019-10-25T20:15:00	43			80	CLR:00	29.14
2019-10-25T20:35:00	43			81	CLR:00	29.14
2019-10-25T21:19:00	43			82	CLR:00	29.14
2019-10-25T21:37:00	43			82	CLR:00	29.14
2019-10-25T21:55:00	43			83		
2019-10-25T22:15:00	43			84	CLR:00	29.12
2019-10-25T22:35:00	43			86	CLR:00	29.13
2019-10-25T22:59:00	43			88		
2019-10-25T23:17:00	42			87	CLR:00	29.12
2019-10-25T23:35:00	43			89	CLR:00	29.11
2019-10-25T23:55:00	43			89		

Appendix D

Inverter Noise Test Report

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Noise Test Report

TYPE TEST SHEET

This Type Test sheet shall be used to record the results of the type testing of Generating Unit			
Type Tested reference number		SG3150U	
Generating Unit technology		Grid-connected PV Inverter	
System supplier name		Sungrow Power Supply Co., Ltd.	
Address		No.1699 Xiyou Rd., New & High Technology Industrial Development Zone, Hefei, P.R. China	
Tel	+86 551 65327834	Fax	+86 551 6532 7800
E:mail	info@sungrow.cn	Web site	www.sungrowpower.com
Maximum export capacity, use separate sheet if more than one connection option.	N/A	kW single phase, single, split or three phase system	
		kW three phase	
	N/A	kW two phases in three phase system	
	N/A	kW two phases split phase system	
Compiled by		On behalf of	Sungrow Power Supply Co., Ltd.
		Test Date	2019-5-13
Note that testing can be done by the manufacturer of an individual component, by an external test house, or by the supplier of the complete system, or any combination of them as appropriate. Where parts of the testing are carried out by persons or organisations other than the supplier then the supplier shall keep copies of all test records and results supplied to them to verify that the testing has been carried out by people with sufficient technical competency to carry out the tests.			

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

SUNGROW

The aim of this test is to determine the noise level when the PV Grid inverter in rated working condition

Used settings of the measurement device for Noise measurement

Measurement device	Date of measurement
AWA6228	2019-5-13

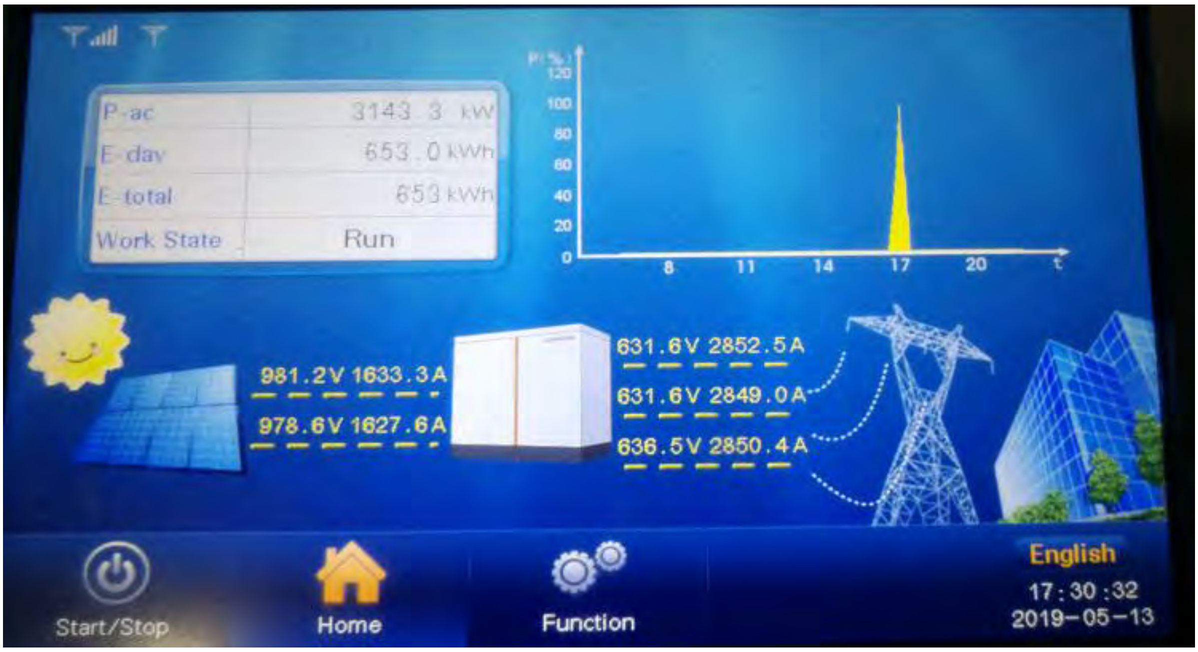
The condition s during testing are specified below:

PGU operation mode	Rated Working Condition
Voltage range	800-1300V
Grid frequency range	50Hz/ 45-55Hz
Distance	1m
Date	2019-5-13

The system noise level please check the table below.

Orientation	Noise (dB)
Front	77.2
Behind	77.5
Left	78.1
Right	79

Photo:
Operation Condition:



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Front Test :

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	53.9	1k	68.7
31.5	56.3	2k	66.6
63	69.3	4k	71.8
125	80.7	8k	59.6
250	76.8	16k	42.4
500	71.8	**W_A**	**77.2**

Behind:

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	55.9	1k	70.6
31.5	64.8	2k	68.3
63	69.5	4k	69.7
125	77.6	8k	59.6
250	77.4	16k	43.1
500	74.4	**W_A**	**77.5**

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Website: www.sungrowpower.com

Left:

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	56.3	1k	70.7
31.5	67.7	2k	68.4
63	69.7	4k	71.3
125	78.6	8k	62.5
250	78.8	16k	52.9
500	73.1	**W_A**	**78.1**

Sungrow Power Supply Co., Ltd.
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Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Right:

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	57.1	1k	71.7
31.5	67.9	2k	69.6
63	72.7	4k	71.4
125	81.4	8k	63.9
250	78.4	16k	53.2
500	75.4	**W_A**	**79.0**

Additional comments