

The logo for SWCA (Soil Water & Climate Analysis) is positioned vertically on the left side of the page. It consists of the letters 'S', 'W', 'C', and 'A' in a large, stylized, light blue font, stacked one above the other.

Noise and Ground Vibration Technical Report for the Seville 5 Solar Project, Imperial County, California

FEBRUARY 2025

PREPARED FOR

Apex Energy Solutions, LLC

PREPARED BY

SWCA Environmental Consultants

NOISE AND GROUND VIBRATION TECHNICAL REPORT FOR THE SEVILLE 5 SOLAR PROJECT, IMPERIAL COUNTY, CALIFORNIA

Prepared for

Apex Energy Solutions, LLC
604 Sutter Street, Suite 250
Folsom, California 95630

Prepared by

SWCA Environmental Consultants
320 North Halstead Street, Suite 120
Pasadena, California 91107

February 2025

CONTENTS

1	Introduction	1
2	Project Information.....	1
2.1	Project Location and Description	1
2.2	Construction Scheduling and Phasing	5
3	Environmental Setting	5
3.1	Noise Fundamentals	5
3.1.1	Definition of Acoustical Terms	6
3.1.2	Sound Levels of Representative Sounds and Noises	6
3.1.3	Noise Assessment Components	7
3.2	Ground-borne Vibration Fundamentals.....	8
3.2.1	Ground Vibration Terms.....	8
3.2.2	Ground Vibration and Structure Damage	9
3.2.3	Ground Vibration and Human Perception	11
3.2.4	Vibration Assessment Components	11
3.3	Existing Conditions	12
3.4	Existing Land Use and Site Conditions	12
3.4.1	Sensitive Receptors.....	12
3.5	Existing Sound Conditions	12
3.5.1	Measurement Locations	12
3.5.2	Instrument Description	13
3.5.3	Calibration Checks.....	14
3.5.4	Meteorological Data	14
3.5.5	Readings.....	16
3.5.6	Results.....	16
3.5.7	Existing Ground-Borne Vibration Levels.....	17
4	Regulatory Setting.....	17
4.1	Federal	17
4.2	State	18
4.2.1	California Government Code Section 65302.....	18
4.3	Local	19
4.3.1	County of Imperial General Plan	19
5	Thresholds of Significance	21
5.1	Thresholds of Significance	21
5.1.1	Short-Term Construction Noise Criteria.....	22
5.1.2	Short-Term Construction Vibration Criteria.....	22
5.1.3	Long-Term Operational Noise Criteria.....	22
5.1.4	Traffic Noise Criteria.....	22
6	Methodology.....	22
6.1.1	Construction Noise	23
6.1.2	Ground-Borne Vibration.....	25
7	Impacts	25
8	Literature Cited.....	31

Appendices

Appendix A	Data Evaluation Sheet
Appendix B	Weather Data
Appendix C	Histograms
Appendix D	Project Operation Isopleths

Tables

Table 1.	Average Human Ability to Perceive Changes in Sound Levels	6
Table 2.	Sound Levels of Representative Sounds and Noises	7
Table 3.	Effect of Vibration on Materials and Structures	9
Table 4.	Human Response to Ground Vibration.....	11
Table 5.	Noise Monitoring Locations	13
Table 6.	Instrumentation Used.....	13
Table 7.	Weather Conditions during the Noise Survey.....	14
Table 8.	Measured Existing Ambient Noise Levels.....	16
Table 9.	Construction Vibration Impact Criteria for Building Damage	17
Table 10.	Imperial County Property Line Noise Limits	20
Table 11.	Noise Levels for Common Construction Equipment.....	23
Table 12.	Construction Anticipated Schedule, Trips, and Equipment.....	26
Table 13.	Estimated Construction Noise Levels at Nearby Sensitive Receptors.....	27
Table 14.	Equipment Sound Power Levels.....	28
Table 15.	Estimated Noise Levels at the Nearest Receptor	28
Table 16.	Construction Vibration Impacts – Building Damage.....	29
Table 17.	Construction Vibration Impacts – Human Annoyance	30

Figures

Figure 1.	Project site vicinity.	3
Figure 2.	Project site location.	4
Figure 3.	Noise measurement locations.	15
Figure 4.	Land use compatibility for exterior community noise exposure.	19

1 INTRODUCTION

This Noise Technical Report was prepared by SWCA Environmental Consultants (SWCA) in support of the Seville 5 Solar Project (project). SWCA was retained by Apex Energy Solutions, LLC (Apex Energy), to conduct field and desktop studies to provide the technical basis for the assessment of potential impacts to noise resources that may result from implementation of the project. In addition to a description of the existing conditions, this report describes how noise resources will be potentially affected by the construction, operation, and maintenance of the project. This report may be used to support the environmental documentation and evaluation of the project pursuant to the California Environmental Quality Act (CEQA).

2 PROJECT INFORMATION

2.1 Project Location and Description

Apex Energy proposes to construct a 65-megawatt (MW) solar facility with a 130-MW battery energy storage system (BESS) on approximately 267 acres located in unincorporated Imperial County, California (Figure 1). The proposed project is located just south of State Route (SR) 78, approximately 7 miles east of Ocotillo Wells and approximately 9 miles west of SR 86. The project area is also approximately 14 miles from the southern tip of the Salton Sea and 4 miles east of the Imperial County–San Diego County line. The project is located on one privately owned parcel, Imperial County Assessor’s Parcel Number (APN) 018-010-043.

The project area is partially situated on San Felipe Creek, and the general area surrounding the site is either vacant land consisting of sand dunes and local washes or developed solar fields. The project is bound to the north by SR 78, with Ocotillo Wells OHV State Recreation Area on the north side of SR 78. Vacant land is to the east. Developed portions of Seville 1 and Seville 2 Solar facilities are located immediately to the southeast of the project, and the Titan 1 Solar facility is located further southeast. The proposed Seville 4 Solar project is immediately to the south, on currently vacant land. Vacant land is to the west, with the Ocotillo Recreational Vehicle (RV) Resort approximately 0.5 mile west. The site exhibits a generally planar and flat-lying topography, which can be partially attributed to previous agricultural activities that included in-filling of the former creek bottom of San Felipe Creek.

The project area is in Sections 15 and 22, Township 12 South, Range 9 East, as depicted on the U.S. Geological Survey (USGS) Borrego Mountain SE, California, 7.5-minute topographic quadrangle (Figures 1 and 2).

The project applicant proposes improvements for the 65-MW solar project that will consist of solar photovoltaic (PV) arrays, inverter transformer stations, a 130-MW BESS, numerous underground cable raceways, a substation, maintenance access roads, and maintenance buildings. The project proposes to use solar PV technology modules mounted on horizontal single-axis tracker systems. The fixed-frame PV module arrays would be mounted on racks that would be supported by driven piles, arranged in arrays spaced up to 30 feet apart (pile to pile) to maximize performance and to allow access for panel cleaning. Solar modules would be a maximum of 10 feet high. These arrays would be separated from each other and the perimeter security fence by at least 20-foot-wide interior roads to provide access to all areas for maintenance and emergency vehicles.

Electricity generated by the PV modules would be collected by a direct current (DC) collection system routed underground in trenches. This DC power would be delivered to pad-mounted inverters in weatherproof enclosures located within the arrays.

The proposed BESS will be constructed at the southeast corner of the project site, adjacent to the project's solar facilities and will consist of either lithium ion or flow batteries. Underground trenches with conduits would be used to connect the batteries to the control and monitoring systems, and inverters would be used to convert the PV-produced DC power to alternating current (AC) power. From the Seville 5 BESS, the project would connect to a new generation tie (gen-tie) line that extends southeast to the point of interconnection for Seville 5, at the existing Titan 1 Solar project switching station.

Due to the relatively flat-lying topography, site grading is expected to entail minor cuts and fills to provide access roads, site drainage, and building sites for structures. An estimated 90% of ground disturbance would consist of excavation and post installation, as well as trenching for underground utilities and drainage culverts performed using mechanical methods. The remaining 10% of ground disturbance would be caused by overland travel for improvements and maintenance of solar panel blocks with solar PV arrays and various inverter transformer stations.

All proposed treatment areas, including roads, trails, access roads, and staging areas, are located on previously disturbed soils. Ground disturbance is not anticipated to exceed a depth of 8 feet by vibratory pile hammer and is not anticipated to exceed 48 inches for utilities trenching for underground utilities and would be a result of heavy equipment use. The project lifespan is 20 to 25 years.

Buffer zones will be established around all biologically and culturally sensitive resources, as necessary. In addition, a 50-foot-wide buffer will be established around all streams and floodplains.

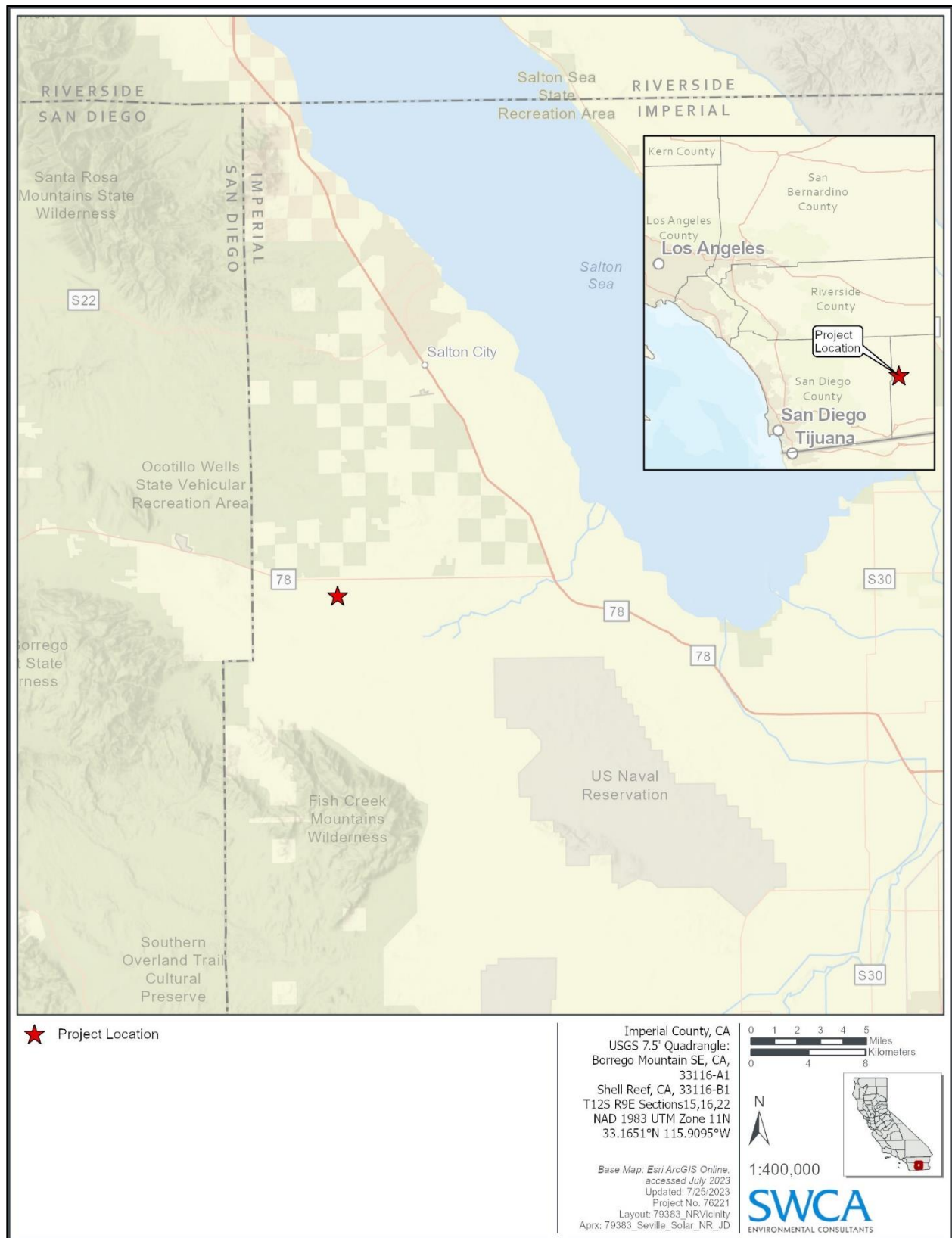


Figure 1. Project site vicinity.

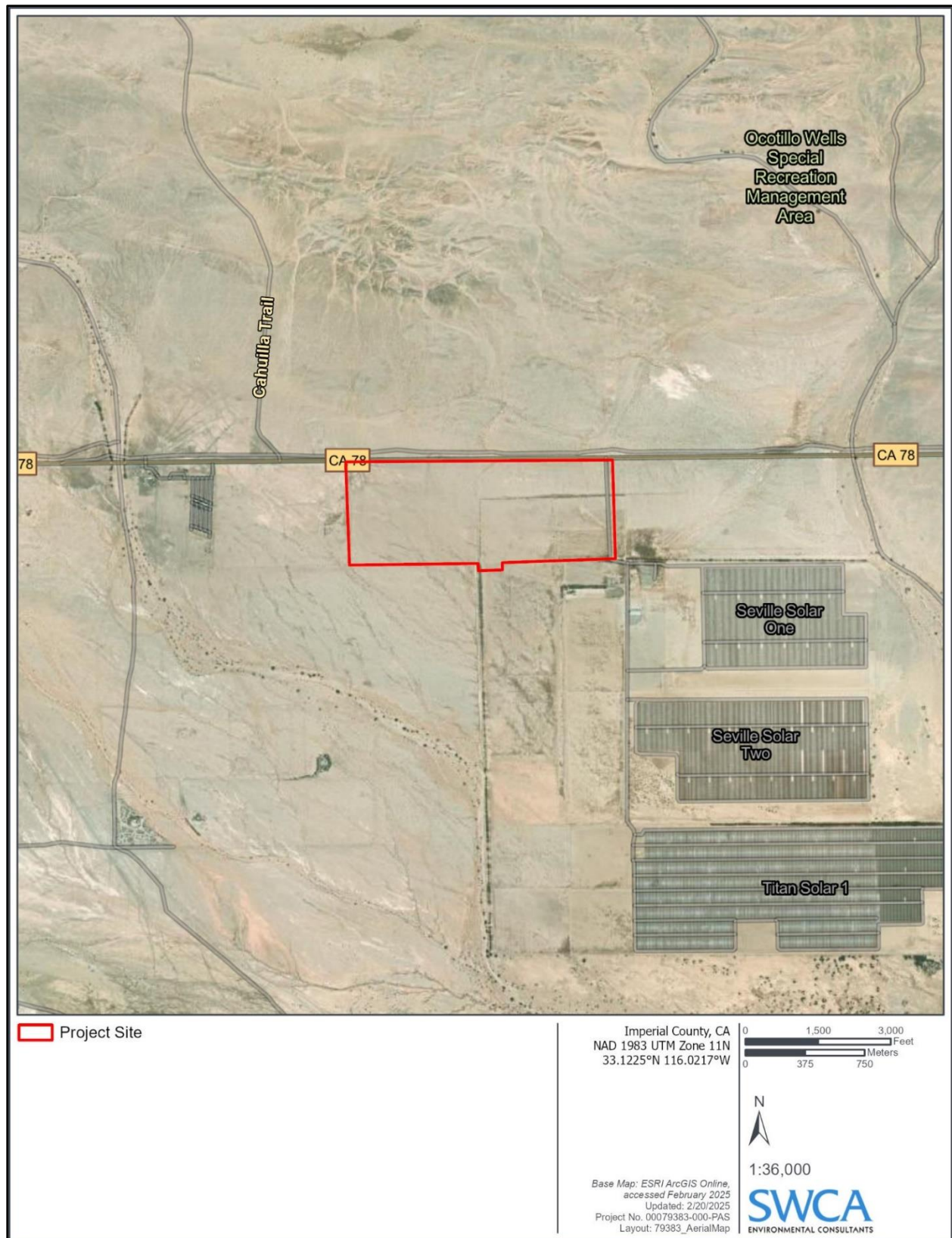


Figure 2. Project site location.

2.2 Construction Scheduling and Phasing

Construction of the project, from mobilization to the site to final completion, is expected to occur over an approximately 12- to 18-month period and will be concurrent with the neighboring Seville 4 solar project. The project would be constructed in four phases: 1) site preparation and grading (including construction equipment delivery, graveling new access roads, grubbing, and grading necessary for construction of the racking system, inverter pads, switching station, substation and energy storage system); 2) trenching and interconnection construction (including the delivery of solar components, trenching for underground electrical conduit, and substation, transmission lines and installation of electrical infrastructure); 3) substation and switching station (installing potential foundations and the substation and switching station apparatus); and 4) solar array installation (including security fencing and finalization). All construction activities, including construction staging of equipment, would be situated entirely within the project site, and access to the site will be from the north on Highway 78. Typical construction equipment would be used during all phases of project construction; would be stored within the staging area; and would potentially include graders, water trucks, forklifts, bulldozers, and backhoes. Grading for solar field construction is expected to be minor because the site is fairly level. However, grading would be necessary for construction of the racking system, inverter pads, switching station, substation, and energy storage system. Water use during construction would be minimal and would be required primarily for dust control. Water would be purchased and trucked onto the site or could potentially be obtained from on-site wells.

Approximately 560 acres (300 acres for Seville 4 and 260 acres for Seville 5) of the existing ground surface would be grubbed and graded and would require excavation of approximately 1,000 cubic yards of cut and fill. All plants would be chipped on-site and added to the base. Grading would require approximately 3 months for Seville 5.

When construction is completed, the project would be an operational 65-MW, 267-acre solar project with 130-MW BESS and will be remotely controlled. No employees would be based at the project site. Primary security-related monitoring would be done remotely. Security personnel may conduct unscheduled security rounds and would be dispatched to the site in response to a fence breach or other alarm. Site maintenance workers would access the project site two times per year to clean the panels, inspect the equipment, and maintain the project area. The public would not have access to the facility. Access to the project site would be infrequent and limited to authorized personnel.

Periodic washing of the PV modules is expected to occur twice a year to remove dust in order to maintain power generation efficiency. The amount of water needed for this purpose is conservatively estimated at a total of up to 15 acre-feet per year. This water would be water purchased and trucked to the site. This estimation is based on amounts needed at both the Seville 4 and 5 solar facilities.

3 ENVIRONMENTAL SETTING

3.1 Noise Fundamentals

This section provides a brief overview of noise fundamentals, noise assessment components, and examples of sound levels from a variety of sources.

3.1.1 Definition of Acoustical Terms

Noise is commonly defined as sound that is undesirable because it interferes with speech communication and hearing, causes sleep disturbance, or is otherwise annoying. The following acoustical terms are used throughout this analysis:

- Ambient sound level is defined as the composite of noise from all sources near and far, i.e., the normal or existing level of environmental noise at a given location.
- Decibel (dB) is the physical unit commonly used to measure sound levels. Technically, a dB is a unit of measurement that describes the amplitude of sound equal to 20 times the base 10 logarithm of the ratio of the reference pressure to the sound of pressure, which is 20 micropascals (μPa).
- Sound measurement is further refined by using an A-weighted decibel (dBA) scale that more closely measures how a person perceives different frequencies of sound; the A-weighting reflects the sensitivity of the ear to low or moderate sound levels.
- Equivalent noise level (L_{eq}) is the energy average A-weighted noise level during the measurement period.
- The root-mean-squared maximum noise level (L_{max}) characterizes the maximum noise level as defined by the loudest single noise event over the measurement period.
- Noise-sensitive land use is defined as a location most likely to be adversely affected by excessive noise levels, or as a place where quiet is an essential element of the land's intended purpose.

3.1.2 Sound Levels of Representative Sounds and Noises

The U.S. Environmental Protection Agency (EPA) has devised an index for evaluating the impact of noise originating from various sources when affecting residential areas. In tranquil rural settings during nighttime, noise typically registers between 32 and 35 dBA. In urban areas with low noise levels during the nighttime, readings typically fall within the range of 40 to 50 dBA. In bustling urban areas during daylight hours, noise levels can frequently escalate to as high as 70 to 80 dBA. Noise levels exceeding 110 dBA are considered unmanageable, while continuous exposure to levels exceeding 80 dBA can lead to hearing impairment. Levels surpassing 70 dBA are often linked to disruptions in tasks, and noise levels ranging from 50 to 55 dBA typically correspond to raised voices during a regular conversation (EPA 1974).

Table 1 provides criteria that have been used to estimate an individual's perception to increases in sound. In general, an average person perceives an increase of 3 dBA or less as barely perceptible. An increase of 10 dBA is perceived as a doubling of the sound.

Table 1. Average Human Ability to Perceive Changes in Sound Levels

Increase in Sound Level (dBA)	Human Perception of Sound
2–3	Barely perceptible
5	Readily noticeable
10	Doubling of the sound
20	Dramatic change

Source: Bolt, Beranek and Newman, Inc. (1973)

Table 2 presents sound levels for some common noise sources and the human response to those decibel levels.

Table 2. Sound Levels of Representative Sounds and Noises

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: California Department of Transportation (2018)

3.1.3 Noise Assessment Components

A noise assessment is based on the following components: a sound-generating source, a medium through which the source transmits, the pathways taken by these sounds, and an evaluation of the proximity to noise receptors. Soundscapes are affected by the following factors:

1. **Source.** The sources of sound are any generators of small back-and-forth motions (i.e., motions that transfer their motional energy to the transmission path where it is propagated). The acoustic characteristics of the sources are very important. Sources must generate sound of sufficient strength, approximate pitch, and duration so that the sound may be perceived and can cause adverse effects, compared with the natural ambient sounds.
2. **“Transmission path” or medium.** The “transmission path” or medium for sound or noise is most often the atmosphere (i.e., air). For the noise to be transmitted, the transmission path must support the free propagation of the small vibratory motions that make up the sound. Atmospheric

conditions (e.g., wind speed and direction, temperature, humidity, precipitation) influence the attenuation of sound. Barriers and/or discontinuities (e.g., existing structures, topography, foliage, ground cover, etc.) that attenuate the flow of sound may compromise the path. For example, sound will travel very well across reflective surfaces such as water and pavement but can attenuate across rough surfaces (e.g., grass, loose soil).

3. Proximity to receptors. A receptor is usually defined as a location where a state of quietness is a basis for use or where excessive noise interferes with the normal use of the location. Typical receptors include residential areas, monuments, schools, hospitals, churches, and libraries.

3.2 Ground-borne Vibration Fundamentals

This chapter describes basic concepts related to ground-borne vibration. Ground-borne vibration is a small, rapidly fluctuating motion transmitted through the ground. When seismic waves are perceptible (when they can be felt), they are called “ground vibrations.” Seismic waves are divided into two classes: body waves and surface waves.

1. Body waves travel across the mass of the rock, penetrating down into the interior of the rock mass. There are two forms of body waves: compressional waves and shear waves. The compressional wave (P-wave) is a push-pull-type wave that produces alternating compression and dilatation in the direction of wave travel. The shear wave (S-wave) is produced when the medium particles oscillate perpendicular to the propagation direction.
2. Surface waves (L-waves) travel over the surface of rock mass but do not travel through it. Surface waves are generated by body waves that are constrained by physical and geometrical conditions from traveling into the rock mass. Surface waves are the large energy carriers and account for the largest ground motions. There are two fundamental types of surface waves: the Raleigh, and the Love waves (Q-wave). Raleigh and Love waves represent the energy measured by a seismograph and are the main component of vibration when examining ground vibration from blasting activities.

The ground vibration from surface waves is measured as the velocity of motion, or how many inches per second the ground is moving. The motion of the ground particles (vibration) happens in three dimensions: radial, transverse, and vertical. During vibration, each particle has a velocity, and the maximum velocity is referred to as the peak particle velocity (PPV). The resulting vector of all three components (i.e., radial, transverse, and vertical) combined is referred to as peak vector sum (PVS).

The industry standard is to use the readings of the PPV as the metric to measure the intensity of the ground vibration. In reporting, the maximum measurement of any of the three components is used rather than the resulting PVS.

3.2.1 Ground Vibration Terms

Ground vibration is described using the following terms:

- Acceleration: the rate at which particle velocity changes
- Crest factor: the ratio of PPV to maximum root mean square (RMS) amplitude in an oscillating signal.
- Displacement: The farthest distance that the ground moves before returning to its original position.

- Frequency: the number of oscillations per second that a particle makes when under the influence of seismic waves
- Hertz (Hz): the unit of acoustic or vibration frequency representing cycles per second
- Peak particle velocity (PPV): the greatest particle velocity associated with an event
- Peak vector sum (PVS): the square root of the sum of the squares of the individual PPV values in all three vector directions
- Particle velocity: the velocity at which the ground moves
- Propagation velocity: the speed at which a seismic wave travels from the blast
- Root mean square (RMS): the square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time.
- Vibration velocity level (LV): ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity.

3.2.2 Ground Vibration and Structure Damage

Ground vibrations have the capacity to induce lasting alterations in the positions of the constituent "particles" making up structures. These enduring alterations, which are undesirable, are informally termed as "damage." The magnitude of the vibration, signifying higher ground movement speeds, amplifies the likelihood of these lasting shifts in particle positions within structures. Table 3 provides an overview of the impacts of PPVs on structures and materials, drawing on documented findings from various researchers and organizations.

Table 3. Effect of Vibration on Materials and Structures

PPV (inches/second)	Application	Effect
0.03	Residential structure	Equivalent to walking on floor
0.3	Residential structure	Equivalent to jumping on floor
0.1–0.5	Residential structure	Equates to normal daily family activity
0.5	Mercury switch	Trips switch
0.5	Residential structure	Equivalent to door slam
0.9	Residential structure	Equivalent to nail driving
<2.0	Residential structure	No damage
<2.0	Residential structure	No damage
2	Plaster	Safe level of vibration
2	Residential structure	Plaster can start to crack
2.8	Residential structure	No damage
1.2–3.0	Residential structure	Equates to daily environmental changes
3	Plaster	Threshold of cosmetic cracking
2.8–3.3	Plaster	Threshold of damage (from close-in blasts)
2.0–4.0	Residential structure	Caution range
2.0–4.0	Residential structure	Plaster cracking (cosmetic)

PPV (inches/second)	Application	Effect
>4.0	Residential structure	Probable damage
4.3	Residential structure	Fine cracks in plaster
4.5	Plaster	Minor cracking
5.4	Plaster	50% probability of minor damage
5.44	Water wells	No change in well performance
6.3	Residential structure	Plaster and masonry walls crack
<6.9	Residential structure	No damage observed
4.0–7.0	Residential structure	Minor damage possible
>7.0	Residential structure	Major damage possible
7.0–8.0	Cased water wells	No adverse effect on well
7.6	Plaster	50% probability of major damage
8	Concrete blocks	Cracking in blocks
8	Plaster	Major cracking
9.1	Residential structure	Serious cracking
<10	Rock	No fracturing of intact rock
>12	Rock	Rock falls in underground tunnels
12	Rock	Rock falls in unlined tunnels
15	Cased drill holes	Horizontal offset
24	Rock	Rock fracturing
10–25	Rock	Minor tensile slabbing
25	Rock	Damage can occur in rock masses
25	Explosive near buried pipe	No damage
40	Mechanical equipment	Shafts misaligned
100	Explosives near concrete	No damage
25–100	Rock	Tensile and some radial cracking
100	Explosives inside concrete	Spalling of fresh grout
>100	Rock	Complete breakup of rock masses
50–150	Explosive near buried pipe	No damage
200	Explosives inside concrete	Spalling of loose/weathered concrete skin
375	Explosives inside concrete	Radial cracks develop in concrete
600	Explosives inside concrete	Mass blowout of concrete

Note: Modified from Table 22, Effect of Blasting Vibration on Materials and Structures (California Department of Transportation 2020).

While ground vibrations can potentially lead to structural damage, observable damage from vibrations often manifests as visible cracks in materials like drywall, plaster, and exterior surfaces such as grout and stucco. Important to note is that such damage may or may not signify structural issues. Cosmetic damage of this nature can also result from factors like settling, temperature fluctuations, and the natural aging of a building. Consequently, the presence of a few hairline cracks in a house does not necessarily imply that vibrations are the root cause.

3.2.3 Ground Vibration and Human Perception

Beyond concerns related to structural damage, ground vibrations can, under specific conditions, startle or irritate individuals. Assessing human reactions to vibration is challenging due to variations in individual perception. Humans can detect ground vibrations at lower levels than those discussed in Section 3.2.2, which can potentially affect structures negatively. The human body is capable of distinctly sensing ground vibrations as low as 0.1 inch per second, and some individuals may even perceive lower levels.

The reason the general public might find ground vibration annoying is that it represents an A-Cultural Vibration, an experience people are unaccustomed to. For instance, vibrations generated by explosions are unique and unexpected, prompting individuals to report them to a greater extent (Konya 2019). Furthermore, the rattling of objects in the immediate vicinity can lead occupants to inspect their homes for cracks, as suggested by Dowding (1996). Table 4 indicates the average human response to vibration that may be anticipated when the person is at rest, situated in a quiet surrounding.

Table 4. Human Response to Ground Vibration

Average Human Response	PPV (inches/second)
Barely to distinctly perceptible	0.020–0.10
Distinctly to strongly perceptible	0.10–0.50
Strongly perceptible to mildly unpleasant	0.50–1.00
Mildly to distinctly unpleasant	1.00–2.00
Distinctly unpleasant to intolerable	2.00–10.00

Source: California Department of Transportation (2020)

3.2.4 Vibration Assessment Components

Vibration energy extends out as it travels through the ground, causing the vibration level to reduce with respect to the distance from the source. High-frequency vibration decreases much more rapidly than low frequencies, so that low frequencies tend to dominate the spectrum at large distances from the source. The propagation of ground-borne vibration is not simple to model due to geological differences in the medium (ground). Geological factors that may influence the propagation of ground-borne vibration include the following:

- Soil conditions. The type of soil has a strong influence on the propagation of ground-borne vibration. Hard, dense, and compacted soil, stiff clay soil, and hard rock transfer vibration more efficiently than loose, soft soils, sand, or gravel.
- Depth to bedrock. Shallow depth to bedrock provides more efficient propagation of ground-borne vibration. Shallow bedrock concentrates the vibration energy near the surface, reflecting vibration waves back toward the surface that would otherwise continue to propagate farther down into the earth.
- Soil strata. Discontinuities in the soil layering can produce diffractions or channeling effects that impact the propagation of vibration over long distances.
- Frost conditions. Seismic waves typically propagate more efficiently in frozen soils than in unfrozen soils.
- Water conditions. The amount of moisture in the soil has an impact on vibration propagation. The depth of the water table in the path of the propagation also has substantial effects on ground-borne vibration levels.

Vibration levels can also be influenced by particular conditions at both the source and receptor locations. For instance, the manner in which the source is linked to the ground (e.g., direct contact or through a structure) or whether the source is situated underground as opposed to on the surface will determine the extent of energy transferred into the ground. Similarly, at the receptor location, variables like building construction and the type of foundation can have an effect on vibration levels.

3.3 Existing Conditions

3.4 Existing Land Use and Site Conditions

Adjacent land uses include the Ocotillo Wells OHV State Recreation Area to the north, Solar Power Panels Power Plant to the east, vacant land and the Tarantula Wash to the west, and the proposed Seville 4 solar site that is currently vacant land to the south. The project site is approximately 0.5 mile east of Ocotillo RV Resort. The project is located on Imperial County Assessor's Parcel Number (APN) 018-010-043 (267 acres). A portion of APN 018-010-043 is owned by the Bureau of Land Management, and the remainder of the project site is owned by Apex Energy (see Figure 1).

In terms of climate, the project site primarily has a desert climate. The local meteorology of the project area and surrounding area is represented by measurements recorded at the National Climatic Data Center (NCDC) Mecca Fire Station meteorological station. The normal annual precipitation is approximately 3.15 inches. January temperatures range from a normal minimum of 40.1°F to a normal maximum of 72.1°F. July temperatures range from a normal minimum of 75.2°F to a normal maximum of 108.7°F (NCDC 2023). The prevailing wind direction is from the west (Western Regional Climate Center 2002).

3.4.1 Sensitive Receptors

People's reactions to noise can differ significantly. Noise at various intensities can disrupt sleep, focus, and communication, and might lead to stress, both physiological and psychological, and even hearing damage. As a result, certain land uses are seen as more vulnerable to environmental noise than others. Residences, schools, hotels, hospitals, and nursing homes, for instance, are usually perceived as highly noise sensitive. Locations like churches, libraries, and cemeteries, where individuals typically engage in prayer, study, or reflection, are also affected by noise. On the contrary, commercial and industrial areas are generally deemed least affected by noise.

The proposed project location is not situated close to any non-residential areas that might be sensitive to noise, such as schools, hospitals, daycare centers, or long-term care establishments. The nearest school identified, Borrego Springs Elementary School, is over 20 miles to the northwest. The closest noise sensitive area (NSA) identified in arial photography to the project location (referenced hereafter as monitoring location NSA 1) is the Ocotillo RV Park, roughly 2,700 feet west of the Seville 5 proposed boundary. An additional NSA (referenced hereafter as monitoring location NSA 2) is located approximately 5,800 feet to the southwest of the project boundary.

3.5 Existing Sound Conditions

3.5.1 Measurement Locations

To determine the baseline or ambient sound levels experienced near the project site and at the closest NSAs, long-term sound monitoring was conducted from July 12 to July 13, 2023, and short-term sound

monitoring was conducted on July 18, 2023, to document the acoustic environment in the area surrounding the proposed project.

One long-term and three short-term noise monitoring location were selected to provide the existing ambient noise levels near and at the project's site. The specific placement of the sound level meters was mainly determined by environmental and logistical constraints, and the location of the closest NSAs. The long-term noise monitor was placed along the western edge of the Seville 5 boundary. Based on the activity in the area, it was determined that this location would be most representative of the NSAs. The short-term monitors were placed as close as possible to the neighboring noise-sensitive land uses (residential home and the Ocotillo RV Park) to provide good coverage of the area surrounding the project site. Figure 3 shows the location of the two noise measurement locations. Table 5 describes the selected noise monitoring sites.

Table 5. Noise Monitoring Locations

Monitoring Location	Description	Approximate Distance from Measuring Location to Nearest Project Site Boundary*
LT-1	Location along eastern boundary of Seville 5. Approximately 1,400 feet south of Highway 78.	Within project boundary.
ST-1	Monitoring location near southeast corner of boundary of Seville 5. Approximately 2,000 feet south of Highway 78.	Approximately 230 feet east of nearest Seville 5 boundary/
ST-2	Monitoring location on public right-of-way just north of NSA 1 (Ocotillo RV Park). Just south of Highway 78.	Approximately 2,700 feet west of nearest Seville 5 boundary.
ST-3	Monitoring location near northeast corner of boundary of Seville 5. Just south of Highway 78.	Within project boundary.

* Distance is estimated using 2022 map data from Google Earth (2023).

3.5.2 Instrument Description

Noise measurements were collected using one Larson Davis Precision Integrating Sound Level Meter Model SoundTrack LxT unit, meeting the requirements of the American National Standards Institute (ANSI) (2013), one PCB PRMLxT1 preamplifier, and one PCB 377B02 free-field microphone (Table 6).

The microphone was fitted with an environmental windscreen and bird spikes and set on a tripod at a height of 5 feet above ground and located as far from the influence of vertical reflective sources as possible. All cables were secured to prevent any sounds due to wiring hitting other objects. All clocks associated with the sound measurement were synchronized using the Larson Davis G4 LD Utility software. Field data sheets were completed during each visit and are provided in Appendix A of this report.

Table 6. Instrumentation Used

Monitoring Location	Sound Level Meter	Preamplifier	1/2-inch Free-Field Microphone
LT-1, ST-1, ST-2, ST-3	Larson Davis SoundTrack LxT (S/N 0007365)	PCB PRMLxT1 (S/N 077679)	377B02

3.5.3 Calibration Checks

The sound level meter was calibrated at the beginning and end of each measurement period using a Larson Davis Model CAL200 Precision Acoustic Calibrator. The Larson Davis CAL200 emits a 1-kilohertz (kHz) tone at 114 dB against which the response can be checked. The calibrator has been designed for both field and laboratory use, and the accuracy has been calibrated to a reference traceable to the National Institute of Standards and Technology. The LD LxT sound level meters showed a response of less than the normal error of 0.50 dB.

3.5.4 Meteorological Data

Meteorological data were not measured at the monitoring sites during the measurement period. Instead, noise data collected during the survey were validated against weather data from the Borrego Springs Station (KCABORRE80), located approximately 7 miles southwest of the project site. Hourly weather information is presented in Appendix B. A summary of the survey's weather conditions is provided in Table 7.

Table 7. Weather Conditions during the Noise Survey

Weather Station	Start	End	Wind Speed (mph)		Temperature (°F)		Humidity (% relative humidity)	
			Range	Average	Range	Average	Range	Average
Borrego Springs (KCABORRE80)	2023-07-12 05:00:00	2023-07-13 06:00:00	0.8 - 16.6	6.6	90.3 - 108.2	95.7	17.3 - 35	24.6
	2023-07-18 02:00:00	2023-07-18 04:00:00	4.4 - 10.2	5.9	97.6 - 98.4	98.0	17 - 21	18.9

Source: Weather Underground (2023)

The ASTM International *Standard Guide for Measurement of Outdoor A-Weighted Noise Levels* (ASTM E1014-12) (ASTM International 2012) specifies that data should not be used when steady wind speeds exceed 20 kilometers per hour (12.4 miles per hour [mph]). Though a few 5-minute wind speed measurements from the Borrego Springs Station indicated wind speeds in excess of this threshold, the hourly average wind speed was not in excess of the threshold. A review of the data collected indicated that wind did not impact noise measurements. As a result, no data was discarded.

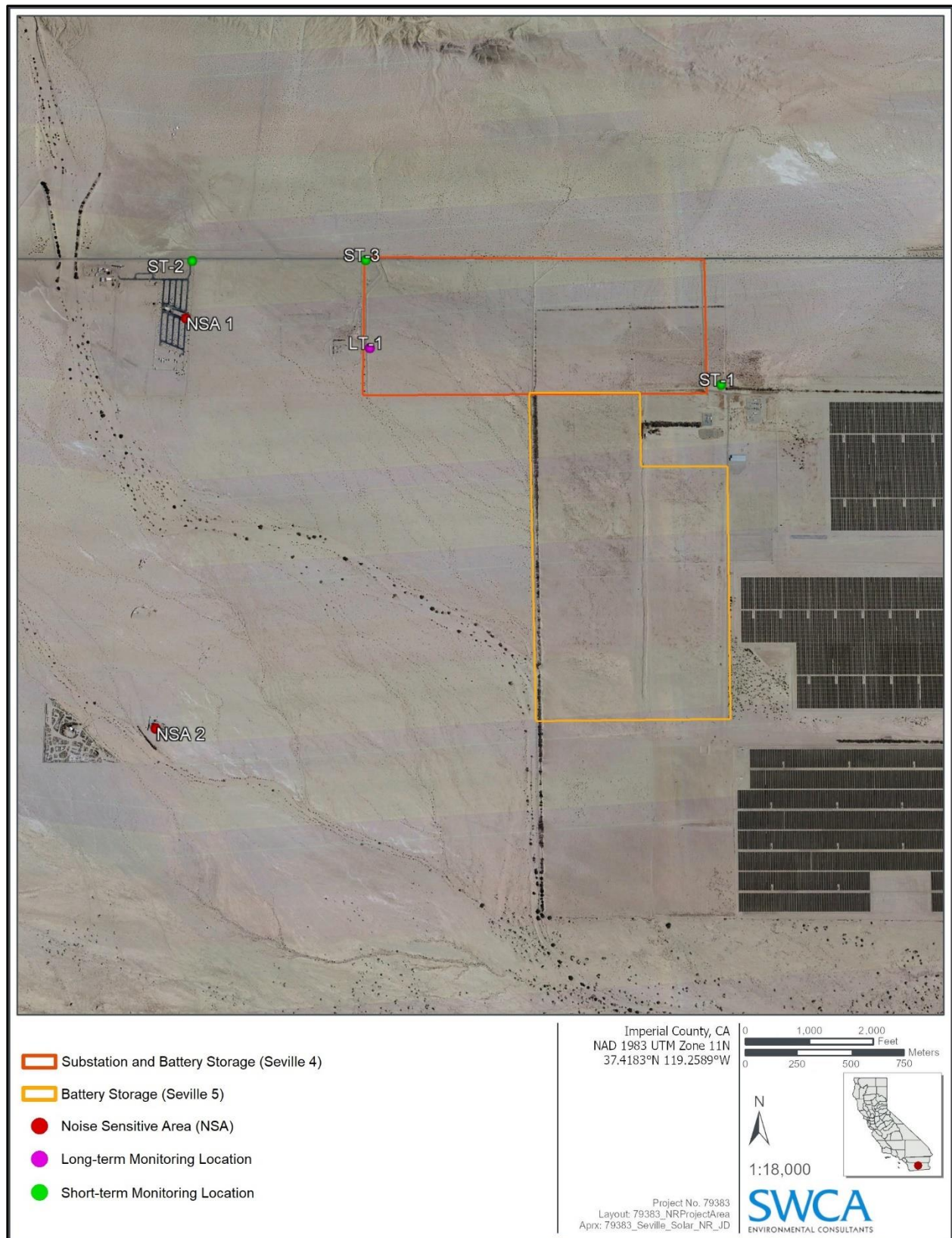


Figure 3. Noise measurement locations.

3.5.5 Readings

Long-term monitoring was conducted from July 12 to July 13, 2023. Sound meter LxT – 0007365 was placed at monitoring location LT-1 from 5:33 a.m. (Pacific Daylight Time [PDT]) on July 12 to 5:33 a.m. (PDT) on July 13. Data were collected for approximately 24 hours; sound levels were recorded over each 1-minute and 1-hour interval.

Short-term monitoring was conducted at three monitoring location. Start and stop times for the single short-term monitoring site are presented in Table 8. Short-term sound levels were recorded for a single 15-minute interval.

The sound level meters were programmed to sample and store A-weighted sound level data including Leq, percentile levels, and community sound parameters. The following gives a brief description of the methodology used for the sound data collection.

- An A-weighted sound level was selected.
- During noise measurements, any dominant background noise source was noted.
- Weather conditions were observed and documented.

Observed sources of background noise that contributed to the existing sound level at the monitoring locations included highway noise. No data points were excluded from the results interference as all the major noise-contributing sources were determined to be representative of the ambient soundscape.

Ambient noise levels for the long-term monitoring sites are represented by the equivalent noise level (Leq) due to the duration of the monitoring period, as it provides a measure of the aggregate sound at a location. Leq represents the level of continuous sound over a given period that would deliver the same amount of energy as the actual.

3.5.6 Results

Data collection at the long-term monitoring site LT-1 began on July 12 and continued through July 13, 2023. Approximately 24 hours of data was collected at LT-1. Data collection at the short-term monitoring sites ST-1, ST-2 and ST-3 occurred on July 18, 2023. Approximately 15 minutes of data was collected at ST-1, ST-2 and ST-3. Table 8 summarizes the measured A-weighted Leq for each of the monitoring locations.

Table 8. Measured Existing Ambient Noise Levels

Monitoring Location	Start Time	Stop Time	Measured Noise Levels (dBA)
			Leq
LT-1	2023-07-12 05:33:31	2023-07-13 05:33:36	50.8
ST-1	2023-07-18 03:27:45	2023-07-18 03:42:48	66.5
ST-2	2023-07-18 03:06:03	2023-07-18 03:21:19	68.6
ST-3	2023-07-18 02:45:23	2023-07-18 03:00:31	78.4

As shown in Table 8, the noise levels in project vicinity ranged between 50.8 and 78.4 dBA Leq. 50.8 dBA was used to represent the ambient noise levels at NSAs, as this would produce the most conservative results that would maximize project-related impacts. Appendix C provides histograms of the hourly Leq levels for the long-term monitor.

3.5.7 Existing Ground-Borne Vibration Levels

The primary ground-borne vibration source at urban settings is vehicular traffic. It is unusual for vibration from traffic sources to be perceptible, as trucks and buses typically generate vibration velocity levels of approximately 63 vibration velocity decibels (VdB) at 50 feet (Federal Transit Administration [FTA] 2018). Normally, 75 VdB is defined as the dividing line between barely perceptible and distinctly perceptible (FTA 2018). It is expected that the existing ground-borne vibration levels at the project vicinity would be below the perceptible level due to the distance from vibration sources (roads).

4 REGULATORY SETTING

Federal, state, and local agencies have set noise and ground-borne vibration regulations and policies to protect the health and welfare of the public, as described below.

4.1 Federal

FTA has established specific vibration impact thresholds to assess the potential effects on noise-sensitive buildings, residences, and institutional land uses.

These thresholds have been designed primarily for evaluating the impacts resulting from the operation of mass transit systems, including heavy and light rail, buses, and similar transportation modes. The vibration impact thresholds specified by the FTA are as follows:

- Residences and buildings where people normally sleep: The threshold for vibration impacts at these locations is set at 80 VdB. This includes nearby residential areas and facilities such as daycare centers, where people reside or regularly sleep.
- Institutional buildings: For institutional buildings such as schools and churches, the threshold for vibration impacts is slightly higher, set at 83 VdB. This recognizes the importance of ensuring minimal disturbance to sensitive activities that take place in such establishments.

When evaluating the potential impacts of ground-borne vibration on buildings and structures, the guidelines provided by FTA are often utilized as a reference. The FTA's *Transit Noise and Vibration Impacts Assessment Manual* serves as a valuable resource in assessing the criteria for determining the potential impact to buildings, particularly during construction activities (FTA 2018).

Table 9 specifically outlines the vibration criteria established by the FTA that are applicable to construction activities. These vibration impact thresholds established by the FTA serve as guidelines for assessing and managing potential impacts from mass transit system operations. They provide a standardized framework to evaluate vibrations and their potential effects on noise-sensitive structures and activities. It is important to note that these specific thresholds developed by the FTA may not directly apply to a solar project located in Imperial County, California. However, no Imperial County vibration thresholds were identified during a regulatory review. As a result, these FTA impact thresholds have been used to assess project-related vibrational impacts.

Table 9. Construction Vibration Impact Criteria for Building Damage

Building Category	PPV (inches/second)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3

Building Category	PPV (inches/second)
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: FTA (2018)

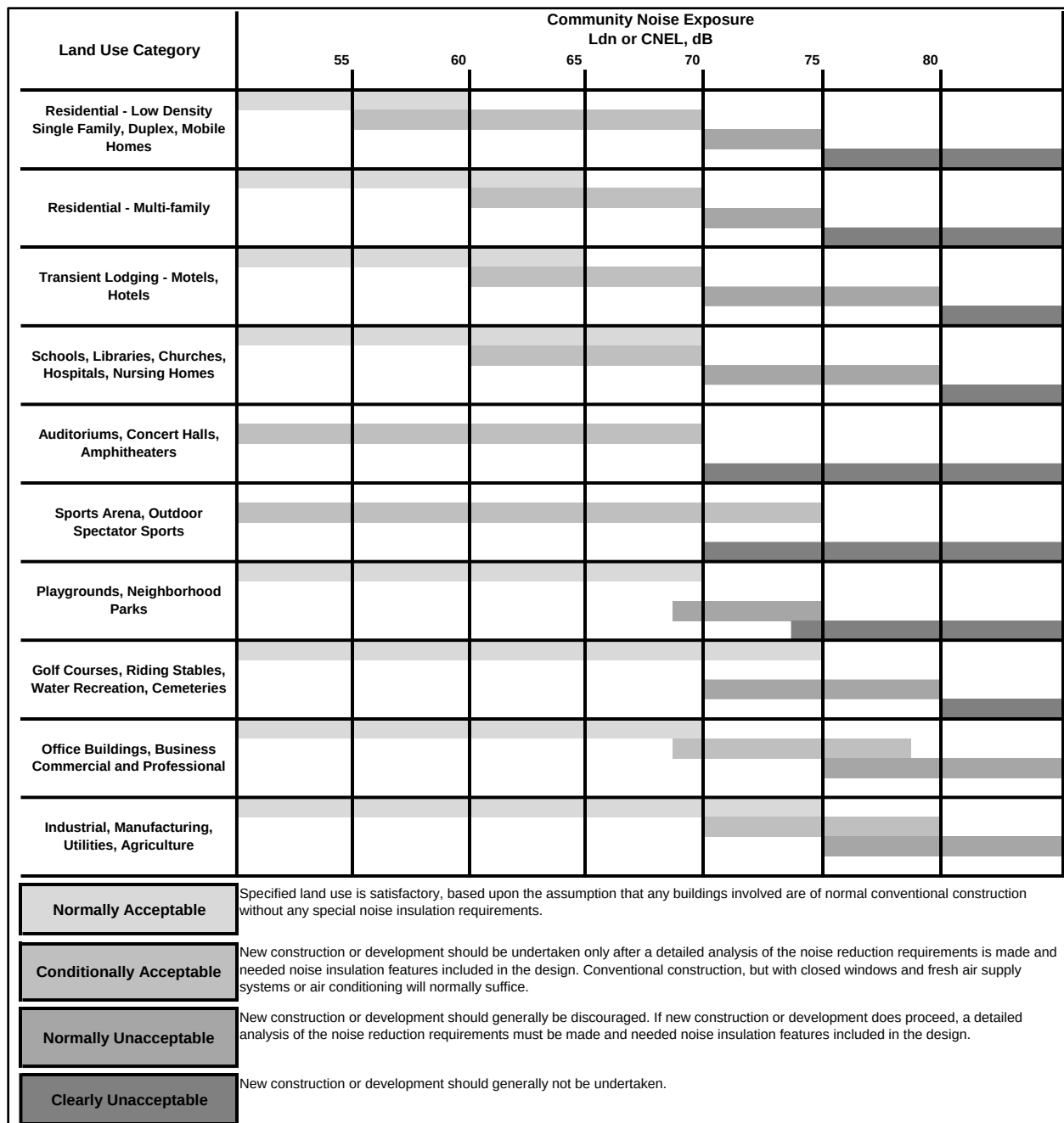
4.2 State

4.2.1 California Government Code Section 65302

The State of California has not adopted statewide regulations or standards for noise. However, the State of California General Plan Guidelines, published and updated by the Governor's Office of Planning and Research (OPR), provides standards and the acceptable noise categories for different land uses (OPR 2017). Figure 4 provides the exterior noise standards associated with the different land uses evaluated by the state.

California also requires each local government entity to perform noise studies and implement a noise element as part of its general plan. The purpose of the noise element is to limit the exposure of the community to excessive noise levels; the noise element must be used to guide decisions concerning land use.

There are no state ground-borne vibration standards that directly apply to the project.



Source: OPR (2017:Appendix D, Figure 2)

Figure 4. Land use compatibility for exterior community noise exposure.

4.3 Local

4.3.1 County of Imperial General Plan

The Noise Element of the Imperial County General Plan identifies and defines existing and future environmental noise levels from sources of noise within or adjacent to the County; establishes goals and objectives to address these impacts, and provides implementation programs to implement these goals and

objectives. While this report analyzes the project's consistency with the General Plan pursuant to State CEQA Guidelines section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

What follows are summaries of the goals and standards provided in the County of Imperial General Plan that are applicable to the project.

Goal 2: Review proposed projects for noise impacts and require design which will provide acceptable indoor and outdoor noise environments.

Objective 2.2 Provide acoustical analysis guidelines which minimize the burden on project proponents and project reviewers.

Objective 2.3 Work with project proponents to utilize site planning, architectural design, construction, and noise barriers to reduce noise impacts as projects are proposed.

Property Line Noise Standards

The Property Line Noise Limits listed in Table 10 shall apply to noise generation from one property to an adjacent property. The standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. These standards do not apply to construction noise.

These standards are intended to be enforced through the County's code enforcement program on the basis of complaints received from persons impacted by excessive noise. It must be acknowledged that a noise nuisance may occur even though an objective measurement with a sound level meter is not available. In such cases, the County may act to restrict disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

Table 10. Imperial County Property Line Noise Limits

Zone	Time	Applicable Limit One-Hour Average Sound Level (Decibels)
Residential Zones	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
Multi-residential Zones	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Commercial Zones	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
Light Industrial/Industrial Park Zones	Anytime	70
General Industrial Zones	Anytime	75

Note: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB Leq.

Construction Noise Standards

Construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB Leq, when averaged over an eight (8) hour period, and measured at the nearest sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB Leq when averaged over a one (1) hour period.

Construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays. In cases of a person constructing or modifying a residence for himself/herself, and if the work is not being performed as a business, construction equipment operations may be performed on Sundays and holidays between the hours of 9 a.m. and 5 p.m. Such non-commercial construction activities may be further restricted where disturbing, excessive, or offensive noise causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

Significant Increase of Ambient Noise Levels

The increase of noise levels generally results in an adverse impact to the noise environment. The Noise/Land Use Compatibility Guidelines are not intended to allow the increase of ambient noise levels up to the maximum without consideration of feasible noise reduction measures. The following guidelines are established by the County of Imperial for the evaluation of significant noise impact.

- a. If the future noise level after the project is completed will be within the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, but will result in an increase of 5 dB CNEL or greater, the project will have a potentially significant noise impact and mitigation measures must be considered.
- b. If the future noise level after the project is completed will be greater than the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, a noise increase of 3 dB CNEL or greater shall be considered a potentially significant noise impact and mitigation measures must be considered.

Projects Which Generate Off-Site Traffic Noise

The acoustical analysis shall identify and evaluate projects which will generate traffic and increase noise levels on off-site roadways. If the project has the potential to cause a significant noise impact to sensitive receptors along those roadways, the acoustical analysis report shall consider noise reduction measures to reduce the impact to a level less than significant, including reduction of the intensity of the proposed project, construction of noise attenuation walls and/or landscaped earth berms, or other changes in project design or its proposed access. For non-residential projects, reduced hours of operation may also be required.

5 THRESHOLDS OF SIGNIFICANCE

5.1 Thresholds of Significance

Based on criteria presented in Appendix G of the CEQA Guidelines, a project would have a significant noise impact if it would result in any one or more of the following:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
2. Generation of excessive ground-borne vibration or ground-borne noise levels; or
3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project site to excessive noise levels.

Because the project site is not located within an airport land use plan, within 2 miles of a public airport or public use airport, or within the vicinity of a private airstrip, the project would not expose project occupants to excessive airport-related noise. Therefore, impacts related to airport-related noise would not occur and are not evaluated any further in this report.

5.1.1 Short-Term Construction Noise Criteria

The County of Imperial General Plan's Construction Noise Standards, as described in Section 4.3.1, provides restrictions on construction noise. To assess whether the project might produce significant construction noise levels at external sensitive receiver sites, the construction noise level criteria from these standards were used.

According to the Construction Noise Standards, a daytime exterior construction noise level of 75 dBA Leq is deemed the threshold for noise-sensitive residential zones. Construction impacts were compared to this threshold. Restrictions on allowable times for construction activities will be adhered to by the applicant.

5.1.2 Short-Term Construction Vibration Criteria

The FTA specifies that vibration levels should not exceed 0.2 inch per second when measured at or beyond the property boundary. As such, in assessing the vibration levels resulting from the project's operation and construction, a PPV vibration standard of 0.2 inch per second is applied. In the absence of specific county level impact thresholds, the FTA's thresholds have been adopted for this analysis.

5.1.3 Long-Term Operational Noise Criteria

The County of Imperial General Plan mandates that noise levels from stationary sources should not surpass 50 dBA in residential areas between 7 a.m. to 10 p.m. and 45 dBA between 10 p.m. to 7 a.m. according to the County of Imperial General Plan, when the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB Leq.

Because the measured ambient noise level was in excess of the Property Line noise standard, the 3 dBA Leq increase in noise was used to assess project impacts.

5.1.4 Traffic Noise Criteria

Relating to roadway noise, the County of Imperial General Plan requires that for projects that have the potential to cause a significant noise impact to sensitive receptors along roadways, the acoustical analysis report shall consider noise reduction measures to reduce the impact to a level less than significant, including reduction of the intensity of the proposed project, construction of noise attenuation walls and/or landscaped earth berms, or other changes in project design or its proposed access. For non-residential projects, reduced hours of operation may also be required.

6 METHODOLOGY

This analysis focuses on the potential change in the current noise levels resulting from the project's implementation. Both construction and operation of the project would generate noise and ground-borne vibration. Estimations for short-term construction, operation, and long-term non-transportation and transportation source noise levels, along with evaluations of ground-borne vibration impacts, were made by combining existing literature with the application of recognized noise and vibration prediction and

propagation methodologies. Employing the assumptions given for the project's construction and operation, the predicted noise and vibration levels were calculated using the methodologies outlined below.

6.1.1 Construction Noise

6.1.1.1 ON-SITE CONSTRUCTION NOISE

The evaluation of potential noise and vibration impacts associated with project construction was based on the construction schedule, phasing, and equipment assumptions provided by the applicant for the project.

Construction-related noise was analyzed using data and modeling methodologies from the Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (FHWA 2011). The Roadway Construction Noise Model is FHWA's national model for the prediction of construction noise. This software is based on actual sound level measurements from various equipment types taken during the Central Artery/Tunnel Project conducted in Boston, Massachusetts, during the early 1990s (FWHA 2011).

Estimates of noise from the construction of the project are based on a roster of the maximum amount of construction equipment used on a given day. Table 11 presents the roster of expected noise generating construction equipment to be used for the construction of the project and their associated noise levels at 50 feet. The Roadway Construction Noise Model has noise levels for various types of equipment preprogrammed into the software; that is, the noise level associated with the equipment is typical for the equipment type and not based on any specific make or model.

The approximate noise generated by construction equipment to be used at the project site has been conservatively calculated based on an estimated project construction equipment roster anticipated to be used at the construction site, without consideration of further attenuation due to atmospheric interference or intervening structures.

The equipment and activities on-site would vary throughout the project, depending on various stages of construction. The predicted noise from construction activity is presented as a worst-case (highest noise level) scenario, where it is assumed that all equipment is present and operating simultaneously on-site for each stage of construction.

To analyze the project's potential noise impacts, the average 1-hour Leq construction noise level generated during each phase of construction was estimated at the analyzed receptor based on its distance to the construction phase activity.

Table 11. Noise Levels for Common Construction Equipment

Equipment Description	Typical Maximum Noise Levels at 50 Feet (dBA)
Aerial Lift	75
Crane	81
Dozer	82
Drill rig truck	79
Excavator	81
Front-end loader	79
Generator	81

Equipment Description	Typical Maximum Noise Levels at 50 Feet (dBA)
Grader	85
Off-highway truck	75
Scraper	84
Tractor	84
Welder/torch	74

Source: Roadway Construction Noise Model Software, Version 1.1 (FHWA 2011)

6.1.1.2 OFF-SITE CONSTRUCTION NOISE

Noise levels would be generated from construction-related traffic associated with worker trips and haul-truck trips on roadways. Due to the project's relatively small workforce in relation to the volume of traffic utilizing Highway 78, the primary route that would be utilized to access the project site, it is not anticipated that increases in noise due to project-related traffic would be likely.

6.1.1.3 ON-SITE OPERATIONAL NOISE

On-site noise levels would be generated by stationary noise sources such as mechanical equipment (inverters, transformers, and BESS enclosures). Impacts from the operation of the mechanical equipment were analyzed using SoundPLAN Essential.

Using noise level data from published sources, impacts from these on-site stationary noise sources are evaluated by estimating the noise levels that each noise source would generate at the nearest noise-sensitive receptors. The estimated noise level from each noise source considers the distance from source to receptor. The nearest receptor to the project site boundary is located approximately one-half mile to the west.

Based on the sound power levels for each of the sources, SoundPLAN estimates noise contours of the overall project in accordance with a variety of standards, primarily International Standards Organization (ISO) 9613-2:1996, Acoustics, standards for noise propagation calculations. All sound propagation losses, such as geometric spreading, air absorption, ground absorption, and barrier shielding, are calculated in accordance with these recognized standards.

The model accounts for reflection, from adjacent structures and the ground. The model uses industry-accepted propagation algorithms and accepts sound power levels (in dB) provided by the manufacturer and other sources. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding.

6.1.1.4 OFF-SITE OPERATIONAL NOISE

After construction is completed and the project site is operational, traffic volumes in the area are expected to be relatively low. The project substation would be uncrewed during operation; however, a small workforce would visit the substation as needed for maintenance, equipment operation, and/or security. Final staffing levels and configuration would be based on the final site configuration and early operating and maintenance experience. Operational staff would be responsible for the cleanliness of the operation and maintenance area. The traffic stemming from the proposed project's operation is not anticipated to increase the current noise levels in the vicinity of the project.

6.1.2 Ground-Borne Vibration

6.1.2.1 CONSTRUCTION GROUND-BORNE VIBRATION

Construction-related vibration resulting from the project was analyzed using data and modeling methodologies provided by the FTA analytical vibration prediction model (FTA 2018). This guidance manual provides typical vibration source levels for various types of construction equipment, as well as methods for estimating the propagation of ground-borne vibration over distance.

The following equation was used to estimate the change in PPV levels over distance:

$$PPV_{\text{equipment}} = PPV_{\text{ref}} \times (100/D_{\text{rec}})^n$$

Where: $PPV_{\text{equipment}}$ is the PPV at a receptor; PPV_{ref} is the reference PPV at 100 feet from the equipment; D_{rec} is the distance from the equipment to the receptor, in feet; and n is the attenuation rate through ground (the default suggested value for n is 1.1). The equation was used to estimate the PPV at each of the closest vibration-sensitive receptors based on the worst-case (closest) distance between each source and receptor.

Vibration emission levels (PPV_{ref}) used are from measurements from several projects, including the Central Artery/Tunnel Project in Boston, and from several published sources, including FTA (2018) and Dowding (1996).

6.1.2.2 OPERATIONAL GROUND-BORNE VIBRATION

The primary source of ground-borne vibration related to the proposed project's operation includes traffic. Humans are not likely to perceive vehicular-induced ground vibration. Therefore, the proposed project's operation would not increase the current vibration levels in the vicinity of the project.

7 IMPACTS

Impact NOI-1 Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies? (Less than Significant)

Construction Noise

Project construction would consist of different activities undertaken in phases through to the operation of the project. For this analysis, project construction is divided into four phases based on the types of equipment required and workload: 1) site preparation/grading; 2) trenching/interconnection construction; 3) substation/switching station construction; and 4) solar panel array installation.

ON-SITE CONSTRUCTION NOISE

Construction activities associated with the project are anticipated to last approximately 18 months based on the construction schedule and phasing provided by the applicant for the project. During this time, temporary increases in noise levels at the project site are expected to occur due to the operation of various large construction equipment within the project site.

Table 12 shows the project's anticipated construction schedule and presents an estimate of the maximum number of pieces of equipment for each construction phase, and conservatively assumes equipment will be operating 10 hours per day, 5 days per week for each construction phase duration.

Table 12. Construction Anticipated Schedule, Trips, and Equipment

Phase (Duration)	Equipment Used			Daily Vehicle Trips
	Type	Number	Hours/Day	
1. Site preparation/Grading (153 working days)	Tractors/loaders/backhoes	2	8	100 one-way worker trips 2 one-way vendor trips 16 one-way on-site haul truck trips 3 mile of on-site truck travel
	Off-highway truck	1	8	
	Scrapers	1	8	
	Excavators	1	8	
	Graders	2	8	
	Rubber-tired bulldozers	1	8	
2. Trenching/Interconnection construction (43 working days)	Cranes	1	8	100 one-way worker trips 2 one-way vendor trips 16 one-way on-site haul truck trips 3 mile of on-site truck travel
	Forklifts	3	8	
	Trenchers	2	8	
	Skid steer loaders	1	8	
	generator sets	2	8	
	Off-highway truck	1	8	
	Aerial lift	1	8	
	Tractors/loaders/backhoes	2	8	
	Welders	1	8	
3. Substation/Switching station (44 working days)	Cranes	1	8	100 one-way worker trips 2 one-way vendor trips 16 one-way on-site haul truck trips 3 mile of on-site truck travel
	Forklifts	3	8	
	Off-highway truck	1	8	
	Generator set	1	8	
	Skid steer loader	1	8	
	Tractors/loaders/backhoes	2	8	
	Welders	1	8	
4. Solar array installation (151 working days)	Cranes	1	8	100 one-way worker trips 2 one-way vendor trips 8 one-way on-site haul truck trips 3 miles of on-site truck travel
	Forklifts	5	8	
	Bore/drill rigs	2	8	
	Skid steer loader	2	8	
	Generator sets	1	8	
	Off-highway truck	1	8	
	Tractors/loaders/backhoes	3	8	
	Welders	1	8	

The highest construction noise levels at each of the analyzed monitoring locations were estimated based on the reference noise levels shown in Table 11 and the distance of each analyzed monitor from the project's construction activities. To more accurately characterize the noise associated with each construction phase, a usage factor for each type of equipment was used to represent those periods when equipment is not operating under full-power conditions. Additionally, the noise levels were estimated to

present a conservative impact analysis, assuming all pieces of equipment operate simultaneously. Furthermore, the model assumes that construction noise is constant when, in reality, construction activities are periodic and change throughout the day.

As discussed in Section 5.1.1, the corresponding significance criterion used in this construction noise analysis is a noise level (Leq) of 75 dBA at the noise-sensitive use. The estimated construction noise levels that would be experienced by the nearby sensitive receptor are shown in Table 13.

Table 13. Estimated Construction Noise Levels at Nearby Sensitive Receptors

Receptor	Measured Daytime Ambient Noise Levels, Leq (dBA)	Estimated Construction Noise Levels by Construction Phases (Ambient plus Construction), Leq (dBA)				Significance Threshold, Leq (dBA)*
		Stage 1	Stage 2	Stage 3	Stage 4	
NSA 1	50.8	53.6	52.3	46.7	52.3	75.0

* Threshold is equivalent to the FTA (2018) *Transit Noise and Vibration Impact Assessment Manual* daytime threshold of 80 dBA.

As shown in Table 13, the highest estimated construction-related noise levels that could result at nearby sensitive receptors throughout the project's construction period would be 53.6 dBA Leq at sensitive receptor NSA 1. The analyzed sensitive receptors near the project site would not be exposed to construction-only noise levels exceeding 75 dBA Leq. Therefore, without employing mitigation, noise impacts associated with the construction activities for the project would be less than significant.

OFF-SITE CONSTRUCTION NOISE

Worker vehicles and haul trucks transporting equipment and materials to and from the project site during construction would increase noise levels on the local roads in the vicinity of the project site. Construction trucks would generally access the project site from nearby Highway 78.

It is anticipated that during the construction period, daily vehicle traffic at the project site will be mainly composed of various types of vehicles, including workers' cars, delivery trucks, and construction equipment. The most frequent trips will be those of construction workers commuting to and from the site.

The project site is located in an undeveloped area adjacent to Highway 78, where the predominant traffic is interstate. Unlike typical urban environments, the area doesn't exhibit standard commute periods.

It is expected that for each construction phase, approximately 100 one-way worker trips, two one-way vendor trips and 16 one-way on-site haul truck trips would occur on a daily basis. This level of traffic increase is not expected to result in noticeable increases in noise and that the estimated noise levels generated by construction off-site traffic would be below the existing daytime ambient noise level at the noise sensitive receptors along the haul routes. Therefore, potential noise impacts from off-site construction traffic would be less than significant.

Operational Noise

To determine the potential noise impact from these sources, detailed noise modeling was conducted. The noise levels at the identified NSAs in the vicinity of the project and at the property boundary from the operation of the project have been predicted and compared with the relevant noise criteria.

OPERATIONAL ACTIVITIES

The primary noise sources anticipated due to operation of the proposed project are the inverters, BESS, and transformers.

NOISE PROFILE

The sound power level (Lpw) for each equipment noise source is listed in Table 14. All equipment sound levels were estimated based on available data from the equipment manufacturers or obtained from other sources or calculations where manufacturer's data were not available.

Table 14. Equipment Sound Power Levels

Equipment	1/1 Octave Spectrum									dBA
	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Main power transformer	84.0	90.0	92.0	87.0	87.0	81.0	76.0	71.0	64.0	88.0
Inverter for PV	51.1	65.3	77.0	83.2	93.3	88.6	87.8	84.4	78.4	49.5 *
BESS	94.0	94.0	94.0	94.0	92.0	87.0	87.0	86.0	80.0	75.2 *

* Values in units of dBA/m². Because the exact layout of the facility's PV Inverters and BESS is not known, SWCA utilized a design from a similar facility utilizing similar equipment and calculated a dBA/m² value. An area source covering the entire project area was used in SoundPLAN modeling with this value to account for noise from the facility in the absence of exact locations.

INTERMITTENT NOISE SOURCES

An intermittent noise source represents any stationary noise source that is periodically or intermittently active during the day or night. Noise-emitting sources with intermittent daily operation of 4 hours or less, or emergency operation only units, were not considered in the model.

SOUND LEVELS AT THE NEAREST RECEPTOR

Table 15 presents the estimated noise levels at the evaluated off-site receptors from the operation of the proposed mechanical noise sources.

Table 15. Estimated Noise Levels at the Nearest Receptor

NSA	Existing Daytime Ambient Noise Levels, Leq (dBA)	Estimated Noise Levels from Equipment Operation, Leq (dBA)	Ambient plus Project Noise Levels, Leq (dBA)	Increase in Noise at NSA (dBA)	Significance Threshold (Noise Increase at NSA in dBA)*
Seville 5 Contribution					
NSA 1	50.8	37.8	51.0	0.2	3
NSA 2	50.8	41.5	51.3	0.5	3
Total Contribution (Seville 4 & 5)					
NSA 1	50.8	39.3	51.1	0.3	3
NSA 2	50.8	42.7	51.4	0.6	3

* Note: When the ambient noise level is equal to or exceeds the Property Line noise standard (50 dB between 7 am and 10 pm and 45 dB between 10 pm and 7 am), the increase of the existing or proposed noise shall not exceed 3 dB Leq. Because the measured ambient noise level was above the Property Line noise standard, 3 dB was used to assess impacts.

As shown in Table 15, the estimated noise levels from the operation of the proposed stationary noise sources are projected to be 37.8 dBA due to the operation of Seville 5 at receptor NSA 1. The estimated noise levels from the operation of the proposed stationary noise sources are projected to be 41.5 dBA due to the operation of Seville 5 at receptor NSA 2. Consequently, these estimated noise levels would fall below the existing daytime ambient noise levels (50.8 dBA) and the thresholds outlined in County of Imperial General Plan. Thus, the project's operation would not result in substantial increases in noise levels at nearby off-site sensitive uses, rendering this impact less than significant.

Noise levels were also estimated for the proposed sources from the Seville 4 solar project located directly south of Seville 5 and will be connected during construction. Operational noise levels from both projects operating simultaneously are estimated to be 39.3 and 42.7 at NSA 1 and NSA 2 respectively. Noise levels at NSA 1 are expected to be 0.3 dBA higher than current ambient levels as a result of operations at both solar projects. Noise levels at NSA 2 are expected to increase by 0.6 dBA. These values indicate that the projects will not result in a noticeable difference in the sound levels at the closest NSA's to the projects. The projects will remain in compliance with all applicable ordinances detailed in this report.

Noise contour grid maps were generated by SoundPLAN software and are presented in Appendix D. The maps depict the extent of noise propagation from the SoundPLAN models that were developed for the noise impact assessment. The noise contour map illustrates the extent of noise associated with the proposed project. It is important to note that the extent of the impacts depicted in these figures does not include the contribution of the existing background noise.

***Impact NOI-2 Would the project result in exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?
(Less than Significant)***

Construction

The operation of heavy construction equipment at the project site would generate ground-borne vibration that could affect structures immediately adjacent to the project site or could also cause an annoyance to people at those locations.

ON-SITE CONSTRUCTION GROUND-BORNE VIBRATION

Ground-borne vibration levels resulting from construction activities occurring within the project site were estimated using data published by the FTA (2018). Construction activities that would have the potential to generate levels of ground-borne vibration within the project site include mobile equipment activities, among others. Project vibration impacts were estimated using the vibration source level of construction equipment and the construction vibration assessment methodology published by the FTA.

Based on the reference vibration levels for the different pieces of equipment and the distances from the primary project construction activities, construction vibration velocity levels were estimated at the different receptors. The estimated vibration velocities were then compared with the building damage criteria in the *Transit Noise and Vibration Impacts Assessment Manual* (FTA 2018). Table 16 shows the estimated PPVs at the off-site receptors and the estimated vibration impacts to buildings.

Table 16. Construction Vibration Impacts – Building Damage

Off-Site Receptor	Estimated Vibration Velocity Levels at the Off-Site Receptors (PPV) (inches/second)	Significance Threshold (inches/second)
ST-1	0.0023	0.2

* FTA construction vibration impact criteria for building damage (FTA 2018).

Table 17 shows the comparison between the estimated ground-vibration levels and the human annoyance threshold.

Table 17. Construction Vibration Impacts – Human Annoyance

Off-Site Receptor	Estimated Vibration Velocity Levels at the Off-Site Receptors (VdB)	Significance Threshold (VdB)
ST-1	51.5	80

* FTA ground-borne vibration impact criteria for residences and buildings where people normally sleep for infrequent vibration events (FTA 2018).

As shown in Table 16 and Table 17, vibration levels generated by the construction equipment at the project site during project construction would not exceed the applicable vibration criteria for building damage or human annoyance at the surrounding structures. Therefore, impacts related to on-site construction ground-borne noise and vibration would be less than significant.

Operation

Operation of the project would not involve any sources capable of generating perceptible levels of vibration in the surrounding area. There would be no permanent source or potential to change vibration levels, except during unscheduled maintenance or repair activities, which would be similar to construction activities. Therefore, impacts related to operational ground-borne noise and vibration would be less than significant.

8 LITERATURE CITED

- American National Standards Institute (ANSI). 2013. *Quantities and Procedures for Description and Measurements with an Observer Present – Part 3: Short-term Measurements with an Observer Present*. ANSI/ASA S12.9-2013/Part 3. Melville, New York: Acoustical Society of America.
- ASTM International. 2012. *E1014-12, Standard Guide for Measurement of Outdoor A-Weighted Noise Levels*. West Conshohocken, Pennsylvania: American Society for Testing and Materials International.
- Bolt, Beranek and Newman, Inc. 1973. *Fundamentals and Abatement of Highway Traffic Noise*. Report Number PB-222-703. Prepared for U.S. Department of Transportation, Federal Highway Administration. Cambridge, Massachusetts: Bolt, Beranek and Newman, Inc.
- California Department of Transportation (Caltrans). 2020. *Transportation and Construction Vibration Guidance Manual*. Sacramento: California Department of Transportation, Division of Environmental Analysis, Environmental Engineering, Hazardous Waste, Air, Noise, & Paleontology Office.
- Dowding, C. 1996. *Construction Vibrations*. Upper Saddle River, New Jersey: Prentice Hall.
- Federal Highway Administration (FHWA). 2004. Traffic Noise Model, Version 2.5. Washington, D.C.: Office of Environment and Planning.
- . 2011. Roadway Construction Noise Model (RCNM). Software Version 1.1.
- Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. Washington, D.C.: U.S. Department of Transportation, Federal Transit Administration, Office of Planning and Environment.
- Google Earth. 2022. V 7.3.4.8642 (March 1, 2022). Available at: <http://www.earth.google.com>. Accessed August 22, 2023.
- Governor’s Office of Planning and Research (OPR). 2017. *State of California General Plan Guidelines*. Available at: <https://www.opr.ca.gov/planning/general-plan/guidelines.html>.
- Konya, C. 2019. *Environmental Factors of Blasting Report for the Proposed Idaho-Maryland Gold Project Nevada County, CA*. Montville, Ohio: Precision Blasting Services.
- U.S. Environmental Protection Agency (EPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. 550-74-004. Available at: <https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF>.
- Weather Underground. 2023. Lake Wainani Station (KCANEWBE16).
- Western Regional Climate Center. 2002. Prevailing Wind Direction. Available at: https://wrcc.dri.edu/Climate/comp_table_show.php?stype=wind_dir_avg. Accessed August 15, 2023.

APPENDIX A

Data Evaluation Sheet

[illegible]

[illegible]

[illegible]

APPENDIX B

Weather Data

Date	Time	Temperature	Dew Point	Humidity	Wind	Speed	Gust	Pressure	Precip. Rate.	Precip. Accum.	Solar
7/12/2023	4:59 PM	108.2	55.5	18	East	13.6	18.3	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	5:04 PM	107.7	55	18	East	16.6	22.6	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	5:09 PM	108.1	55.4	18	East	13.8	19.2	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	5:14 PM	107.9	55.2	18	SE	15.6	21.9	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	5:19 PM	107.3	54.7	18	East	12.6	17	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	5:24 PM	107.6	55	18	ENE	13.3	18.2	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	5:29 PM	107.2	54.6	18	ESE	14.1	19.9	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	5:34 PM	107.2	54.6	18	East	12.9	16.9	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	5:39 PM	106.8	54.6	18	ESE	14.2	18.2	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	5:44 PM	107.1	54.8	18	ESE	13.9	19.6	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	5:49 PM	106.1	54.9	19	ENE	14.1	19.8	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	5:54 PM	106.3	54.4	18	ENE	10	14.5	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	5:59 PM	105.7	54.9	19	East	15.4	20.3	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	6:04 PM	104.6	54	19	East	13.5	18.5	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	6:09 PM	104.7	54.1	19	East	13.3	18.3	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	6:14 PM	104.6	54	19	SE	12.9	16.9	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	6:19 PM	104.6	54	19	ENE	13.1	19.2	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	6:24 PM	104.6	54	19	East	12.1	17.1	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	6:29 PM	104.2	53.7	19	East	15.9	21.4	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	6:34 PM	103.9	53.7	19	SSE	12.4	18.3	29.93 in	0.00 in	0.00 in	w/m²
7/12/2023	6:39 PM	104	54.1	19	East	14.6	19.2	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	6:44 PM	103.7	54.4	20	East	9.9	14.6	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	6:49 PM	103.9	53.7	19	ESE	7.6	12.4	29.94 in	0.00 in	0.00 in	w/m²
7/12/2023	6:54 PM	103.4	54.4	20	SSE	8.3	12.1	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	6:59 PM	103.1	54.2	20	East	8.2	13.2	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	7:04 PM	102.8	53.9	20	SE	6.8	9.6	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	7:09 PM	102.3	53.8	20	East	7.5	12.1	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	7:14 PM	101.5	54.2	21	SSE	8.6	14.7	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	7:19 PM	101.4	54.2	21	East	6.6	9.4	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	7:24 PM	101	53.8	21	East	8.5	13	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	7:29 PM	100.7	53.6	21	ESE	7	9.4	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	7:34 PM	100.3	53.5	21	ESE	7.9	10.9	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	7:39 PM	99.7	54	22	SSE	6	8.6	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	7:44 PM	99.4	53.8	22	ESE	6.2	10.4	29.95 in	0.00 in	0.00 in	w/m²
7/12/2023	7:49 PM	99.2	53.6	22	East	8.5	13.6	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	7:54 PM	98.9	53.6	22	ESE	8.5	13.2	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	7:59 PM	98.7	54.1	23	ESE	7.4	12.4	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	8:04 PM	98.5	54.2	23	East	7.4	10.6	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	8:09 PM	98.2	54	23	SE	5.8	8.6	29.97 in	0.00 in	0.00 in	w/m²
7/12/2023	8:14 PM	98	53.8	23	SSE	7.6	12.5	29.96 in	0.00 in	0.00 in	w/m²
7/12/2023	8:19 PM	97.9	53.7	23	South	7	11	29.97 in	0.00 in	0.00 in	w/m²
7/12/2023	8:24 PM	97.7	53.6	23	SE	6.6	11.4	29.97 in	0.00 in	0.00 in	w/m²
7/12/2023	8:29 PM	97.6	53.5	23	SE	6	9.5	29.97 in	0.00 in	0.00 in	w/m²
7/12/2023	8:34 PM	97.5	53.4	23	SE	6	9.8	29.97 in	0.00 in	0.00 in	w/m²
7/12/2023	8:39 PM	97.5	53.4	23	ESE	6.9	10.3	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	8:44 PM	97.4	53.3	23	East	5.6	8.6	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	8:49 PM	97.2	53.1	23	ESE	8.7	12.6	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	8:54 PM	97	53	23	East	9.8	13.3	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	8:59 PM	96.8	53.3	23	SSE	4.3	6.2	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	9:04 PM	96.6	53.8	24	SE	4.8	6.5	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	9:09 PM	96.5	53.7	24	ENE	7.2	9.3	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	9:14 PM	96.5	53.7	24	South	6.3	9.3	29.98 in	0.00 in	0.00 in	w/m²
7/12/2023	9:19 PM	96.4	53.6	24	WSW	5.9	9.5	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:24 PM	96.2	53.5	24	SE	5.2	7.7	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:29 PM	96.1	53.4	24	East	5.6	7.3	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:34 PM	95.9	53.2	24	NNW	4	5.1	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:39 PM	95.8	53.9	25	SSE	4.8	6.7	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:44 PM	95.8	54.3	25	South	4.9	6.8	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:49 PM	95.8	54.3	25	SE	5.7	8.1	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:54 PM	95.7	54.2	25	SSE	4.9	6.8	29.99 in	0.00 in	0.00 in	w/m²
7/12/2023	9:59 PM	95.6	54.1	25	South	4.6	5.9	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:04 PM	95.6	54.1	25	ESE	5.5	6.8	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:09 PM	95.7	55.1	26	SSE	5.3	8.3	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:14 PM	95.6	55.2	26	SSE	6	7	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:19 PM	95.5	54.9	26	SSE	6.9	9.3	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:24 PM	95.3	54.9	26	SSE	5.7	7.7	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	10:29 PM	95.1	54.8	26	South	4.2	5.8	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:34 PM	94.9	54.6	26	SSE	3.3	4.1	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	10:39 PM	94.8	55.6	27	East	4.4	6.3	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:44 PM	94.7	55.5	27	SE	4.7	6.2	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:49 PM	94.6	55.8	27	SSE	4.9	7.2	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	10:54 PM	94.4	56.2	28	SSE	5.2	7.4	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	10:59 PM	94.4	56.2	28	SSW	4.9	6.6	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	11:04 PM	94.3	56.1	28	SSE	5.3	7.2	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	11:09 PM	94.2	56	28	SSE	5.8	7.2	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	11:14 PM	94	56.5	29	SSE	7.3	10	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	11:19 PM	94.1	56.9	29	SE	8.5	10.5	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	11:24 PM	93.9	56.8	29	SSE	6.6	8.9	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	11:29 PM	93.8	56.7	29	SSE	6.6	8.6	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	11:34 PM	93.8	56.7	29	SSE	6.1	8.4	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	11:39 PM	93.7	56.6	29	ESE	6.4	8	30.01 in	0.00 in	0.00 in	w/m²

Date	Time	Temperature	Dew Point	Humidity	Wind	Speed	Gust	Pressure	Precip. Rate.	Precip. Accum.	Solar
7/12/2023	11:44 PM	93.6	56.5	29	SE	7.2	8.9	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	11:49 PM	93.3	56.4	29	ESE	5	6.8	30.01 in	0.00 in	0.00 in	w/m²
7/12/2023	11:54 PM	93.6	56.5	29	SE	6.2	8.3	30.00 in	0.00 in	0.00 in	w/m²
7/12/2023	11:59 PM	93.6	56.5	29	SE	5.8	7.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	12:04 AM	93.5	56.4	29	SE	4.8	6.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:09 AM	93.2	56.9	30	SE	3.8	5.9	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:14 AM	93.3	57.2	30	SSE	5.8	7.7	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:19 AM	93	56.9	30	SE	5.1	7.2	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:24 AM	93.3	57.2	30	SSE	6	7.5	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:29 AM	93.6	57.4	30	South	6.1	8.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:34 AM	93.4	57.3	30	SSE	4.9	6.8	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:39 AM	93.3	57.6	30	SE	4.3	5.9	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	12:44 AM	93.1	57.9	31	SE	5.4	7.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	12:49 AM	93.4	58.2	31	SSE	5.6	7.7	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	12:54 AM	93.1	57.9	31	South	4	5.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	12:59 AM	93.1	58.6	32	SSE	6.5	9.2	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	1:04 AM	93	58.7	32	SE	6.1	7.5	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:09 AM	93	58.7	32	SSE	6.1	7.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:14 AM	92.5	58.8	33	SSE	5.1	6.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:19 AM	92.5	59.2	33	SE	6.6	8.7	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:24 AM	92.2	58.9	33	South	5.5	7.8	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:29 AM	92.1	59	33	SE	6.5	8.8	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:34 AM	92	59.6	34	SE	5.1	6.9	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:39 AM	92	59.6	34	ESE	5.5	7.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:44 AM	92.1	59.6	34	SE	4.9	6.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:49 AM	92	59.6	34	SE	5.6	7.6	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	1:54 AM	92	59.6	34	SE	5.1	7.8	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	1:59 AM	92.2	59.4	34	SE	5.8	7.5	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:04 AM	92.1	59.6	34	SSE	4.9	7.1	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	2:09 AM	92.1	59.6	34	South	5.9	7.7	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:14 AM	92.1	59.6	34	SSE	6.3	9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	2:19 AM	92	59.6	34	SSE	5.3	6.8	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:24 AM	91.9	59.5	34	SSE	4.7	6.2	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:29 AM	91.9	59.5	34	SSE	5.4	7.2	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:34 AM	91.6	59.2	34	SE	4.4	5.9	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:39 AM	91.5	59.1	34	SSE	5.5	7.3	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:44 AM	91.3	59	34	SSE	4.5	6.3	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	2:49 AM	91.3	59	34	SE	5.4	7	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	2:54 AM	91.3	59	34	ESE	6.6	8.7	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	2:59 AM	91.3	59	34	SE	5.5	7.3	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:04 AM	91.1	59.3	35	East	4.3	5.4	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:09 AM	91.2	59	34	South	6.6	8.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:14 AM	91.2	59.2	34	SE	4.5	6.3	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:19 AM	91.1	59.3	35	East	5.3	7.6	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	3:24 AM	91.2	59.2	34	East	5.6	7.2	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	3:29 AM	90.9	59.4	35	South	5.4	7.4	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:34 AM	90.6	59.2	35	SE	5.8	7.3	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:39 AM	90.3	58.9	35	South	4.2	5.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:44 AM	90.5	59.1	35	SSE	6.2	8.6	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:49 AM	90.5	59.1	35	South	5.3	6.8	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:54 AM	90.6	59.2	35	SSE	5	6.6	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	3:59 AM	90.7	59.3	35	SE	5.1	6.7	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:04 AM	90.8	59.3	35	SSE	5.6	7.8	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:09 AM	90.7	59.2	35	SSE	5.2	6.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:14 AM	90.4	59	35	SE	5.1	7.1	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:19 AM	90.4	59	35	SSE	5.6	7.5	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:24 AM	90.5	58.4	34	SSE	6.1	7.7	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	4:29 AM	90.5	58.3	34	SE	6.6	8.6	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:34 AM	90.7	58.4	34	SE	7.7	10.5	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:39 AM	90.6	58.4	34	SSE	6	7.6	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:44 AM	90.6	58.6	34	SSE	6.7	8.3	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:49 AM	90.8	58.8	34	SSE	6.2	8	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:54 AM	91	58.7	34	SSE	6.7	8.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	4:59 AM	91.2	58.9	34	SSE	5	7.2	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	5:04 AM	91.3	59	34	SE	7.1	8.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	5:09 AM	91.1	58.8	34	SSE	6.2	8.1	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	5:14 AM	91.1	58.8	34	SE	6.3	8.7	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	5:19 AM	91.2	58.7	34	SSE	5.7	7.7	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	5:24 AM	90.9	58.4	34	SSE	5.1	5.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	5:29 AM	90.9	58.1	33	South	6.6	8.6	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	5:34 AM	90.8	58	33	SE	6.6	8.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	5:39 AM	90.7	57.7	33	SSE	9.2	11.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	5:44 AM	90.6	58	34	SSE	6.3	8.6	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	5:49 AM	90.9	57.8	33	SSE	8.2	10.1	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	5:54 AM	91.3	57.4	32	SSE	6	7.9	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	5:59 AM	91.4	57.4	32	SSE	6.3	8.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	6:04 AM	91.6	57.5	32	SSE	6.2	8.3	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	6:09 AM	91.6 °F	57.5	32	South	6.3	8.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	6:14 AM	91.6 °F	57.5	32	SSE	6	7.7	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	6:19 AM	91.4 °F	57.3	32	SSE	5.9	7.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	6:24 AM	91.4 °F	57.3	32	SE	6.8	9	30.00 in	0.00 in	0.00 in	w/m²

Date	Time	Temperature	Dew Point	Humidity	Wind	Speed	Gust	Pressure	Precip. Rate.	Precip. Accum.	Solar
7/13/2023	6:29 AM	91.8 °F	57.3	32	SSE	8.5	11.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	6:34 AM	92.2 °F	57.2	31	SSE	7.5	9.8	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	6:39 AM	92.3 °F	57.2	31	SSE	6.2	8.1	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	6:44 AM	92.5 °F	57.4	31	SSE	7.8	9.8	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	6:49 AM	93.0 °F	57.9	31	SE	7.1	8.6	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	6:54 AM	93.2 °F	57.5	30	SSE	6.2	8	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	6:59 AM	93.5 °F	57.4	30	SSE	6.2	8.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:04 AM	93.6 °F	57.4	30	SE	8.3	10.6	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:09 AM	93.8 °F	57.6	30	SE	7.9	10.2	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:14 AM	94.1 °F	57.7	30	SSE	8.8	10.7	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:19 AM	94.4 °F	57.4	29	SSE	9.6	12.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:24 AM	94.8 °F	57.5	29	SSE	8.6	10.8	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:29 AM	95.2 °F	57.9	29	SE	6.7	8.3	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	7:34 AM	95.7 °F	57.9	29	SSE	7	8.9	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:39 AM	95.8 °F	57.6	28	SSE	8.7	11.3	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:44 AM	96.2 °F	57.8	28	SSE	7.4	9.5	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:49 AM	96.5 °F	58	28	SSE	7.6	9.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:54 AM	97.1 °F	58.3	28	South	6.7	8.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	7:59 AM	97.6 °F	58	27	SE	6.3	8.7	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:04 AM	97.9 °F	58.2	27	SE	7.5	9.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:09 AM	98.5 °F	58.5	27	SE	6.4	8.3	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:14 AM	99.1 °F	58.2	26	SE	5.1	6.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:19 AM	99.5 °F	58.5	26	SSE	5.1	6.6	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	8:24 AM	100.2 °F	58.6	26	SSE	4.4	5.3	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:29 AM	100.9 °F	58.5	25	SE	3.5	4.3	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:34 AM	101.4 °F	59	25	South	3.8	5.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:39 AM	101.8 °F	58.8	25	SE	4.9	6.3	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:44 AM	101.3 °F	58.9	25	SSE	5	6.7	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	8:49 AM	102.4 °F	58.9	24	SSE	4.3	5	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:54 AM	102.2 °F	58.5	24	SE	5	6.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	8:59 AM	102.6 °F	58.8	24	SSE	5.3	7.1	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	9:04 AM	102.6 °F	58.8	24	SSE	5	6.2	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	9:09 AM	103.3 °F	59.4	24	SSE	4.7	5.9	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	9:14 AM	103.9 °F	59.2	23	SSE	3.6	4.4	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	9:19 AM	104.3 °F	59.1	23	South	3.7	4.8	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	9:24 AM	104.9 °F	59.5	23	South	3.7	4.6	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	9:29 AM	105.1 °F	59.7	23	SSE	5.2	6.5	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	9:34 AM	105.6 °F	59.6	23	SSE	3.2	4.1	30.02 in	0.00 in	0.00 in	w/m²
7/13/2023	9:39 AM	105.7 °F	59	22	SSE	3.9	5.1	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	9:44 AM	106.0 °F	59.5	22	South	3.4	4.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	9:49 AM	107.8 °F	59.4	21	SSE	2	2.9	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	9:54 AM	109.4 °F	59.6	20	NNE	3.1	3.8	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	9:59 AM	107.0 °F	59	21	NNE	2.4	3.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:04 AM	108.1 °F	59.6	21	ESE	2.5	3.4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:09 AM	108.6 °F	59.2	20	South	3.2	4	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:14 AM	108.9 °F	59.7	21	SSE	2.5	3.7	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:19 AM	108.4 °F	59.6	21	ENE	3.1	4.3	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:24 AM	109.0 °F	59.3	20		3.9	5.2	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	10:29 AM	108.8 °F	58.8	20	North	5.3	6.6	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	10:34 AM	108.2 °F	59.1	21	NNE	5	6.2	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:39 AM	108.7 °F	59	20	NE	2	2.7	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:44 AM	109.5 °F	59.4	20	NNE	3.5	4.5	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	10:49 AM	109.5 °F	59.4	20	North	4.2	5.8	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	10:54 AM	108.9 °F	58.9	20	North	4.8	5.9	30.01 in	0.00 in	0.00 in	w/m²
7/13/2023	10:59 AM	108.5 °F	59.1	20	ENE	2.8	4.3	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	11:04 AM	110.7 °F	59.5	19	NNW	2.9	4.1	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	11:09 AM	109.8 °F	59.1	20	NE	3.3	4.3	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	11:14 AM	111.4 °F	59.8	19	NW	0.8	1	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	11:19 AM	110.8 °F	59.6	19	NNE	2.7	3.4	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	11:24 AM	109.5 °F	59.1	20	NNE	2.1	2.7	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	11:29 AM	110.6 °F	59.4	19	North	5.5	7	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	11:34 AM	110.6 °F	59.4	19	North	2.5	3.3	30.00 in	0.00 in	0.00 in	w/m²
7/13/2023	11:39 AM	111.7 °F	59.8	19	NE	3.1	3.9	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	11:44 AM	111.8 °F	59.8	19	WNW	3.3	4.2	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	11:49 AM	112.1 °F	60	19	WNW	1.7	2.7	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	11:54 AM	113.0 °F	60.2	19	NE	0.9	1.3	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	11:59 AM	113.5 °F	60.6	19	East	3.4	4.5	29.99 in	0.00 in	0.00 in	w/m²
7/13/2023	12:04 PM	111.1 °F	60.1	20	ENE	4.6	6.2	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:09 PM	111.1 °F	60.1	20	NE	4.5	6.5	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:14 PM	111.6 °F	60	19	ESE	5	7.2	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:19 PM	112.7 °F	60.5	19	South	4	6.2	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:24 PM	112.2 °F	60.2	19	SE	4.3	5.3	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:29 PM	112.2 °F	60.1	19	SE	4	5.2	29.97 in	0.00 in	0.00 in	w/m²
7/13/2023	12:34 PM	112.8 °F	60.4	19	SE	2.8	3.6	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:39 PM	113.7 °F	59.8	18	SSE	3.3	4.7	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:44 PM	113.7 °F	59.8	18	SE	2.7	3.5	29.98 in	0.00 in	0.00 in	w/m²
7/13/2023	12:49 PM	112.8 °F	59.1	18	NE	2.2	3.1	29.97 in	0.00 in	0.00 in	w/m²
7/13/2023	12:54 PM	114.8 °F	59.4	17	SSE	2.1	2.7	29.97 in	0.00 in	0.00 in	w/m²
7/13/2023	12:59 PM	114.7 °F	59	17	SSE	2.2	3	29.96 in	0.00 in	0.00 in	w/m²
7/13/2023	1:04 PM	113.0 °F	59	18	ENE	4.6	5.9	29.96 in	0.00 in	0.00 in	w/m²
7/13/2023	1:09 PM	113.7 °F	58.8	17	ESE	2.1	3	29.96 in	0.00 in	0.00 in	w/m²

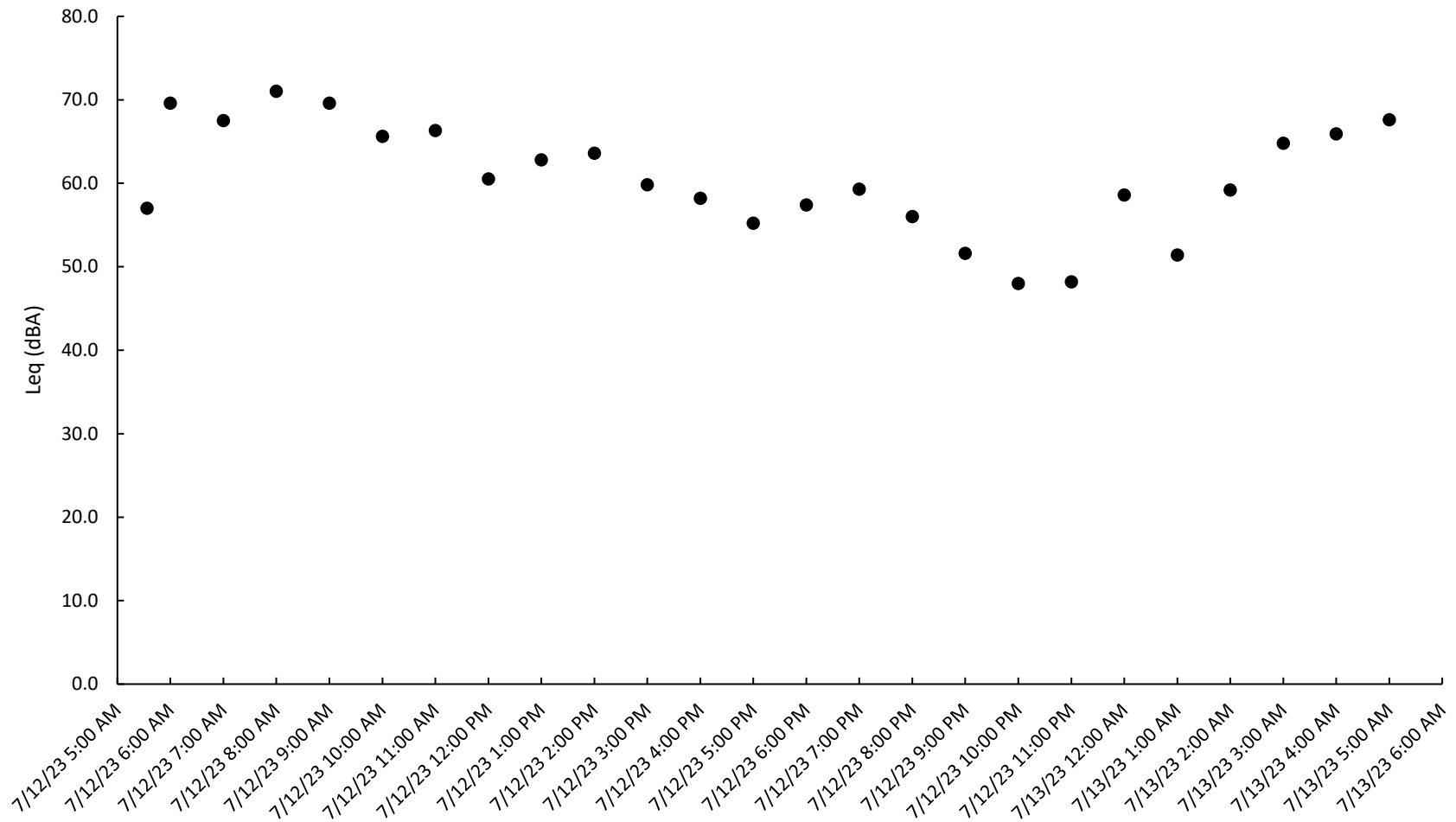
Date	Time	Temperature	Dew Point	Humidity	Wind	Speed	Gust	Pressure	Precip. Rate.	Precip. Accum.	Solar
7/13/2023	1:14 PM	113.4 °F	59.6	18	East	3.2	4.6	29.96 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:19 PM	113.4 °F	59.6	18	NE	4.6	6.2	29.96 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:24 PM	114.2 °F	60.2	18	ESE	4.8	7.6	29.95 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:29 PM	113.0 °F	59.5	18	ESE	6.1	8.6	29.96 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:34 PM	113.3 °F	59.5	18	ENE	2.8	4.2	29.96 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:39 PM	114.9 °F	59.8	17	ENE	2.2	4	29.95 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:44 PM	114.3 °F	60	18		3.2	3.8	29.95 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:49 PM	114.1 °F	60.1	18	ENE	7.8	10.1	29.95 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:54 PM	113.3 °F	59.5	18	NE	3.5	5	29.95 in	0.00 in	0.00 in	w/m ²
7/13/2023	1:59 PM	114.7 °F	60.6	18	ESE	1.8	2.8	29.94 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:04 PM	114.9 °F	60.4	18	SE	2.9	4	29.94 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:09 PM	114.7 °F	60.3	18	NE	4.2	5.2	29.94 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:14 PM	113.8 °F	60.5	18	East	8.6	10.9	29.93 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:19 PM	114.1 °F	60.2	18	ESE	4.6	5.8	29.93 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:24 PM	113.6 °F	59.7	18	ENE	6.1	8.3	29.93 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:29 PM	114.3 °F	59.6	18	SSE	6.5	8.1	29.93 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:34 PM	113.8 °F	59.9	18	SSE	4.5	6.1	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:39 PM	114.2 °F	60.2	18	East	5.7	7.2	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:44 PM	113.6 °F	59.7	18	NE	5	7	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:49 PM	114.5 °F	60.1	18	NNE	4.6	5.9	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:54 PM	115.7 °F	60.1	17	SSE	4.3	6.3	29.91 in	0.00 in	0.00 in	w/m ²
7/13/2023	2:59 PM	114.7 °F	59.7	17	East	5.2	7.8	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:04 PM	113.8 °F	59.6	18	NE	5.5	7	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:09 PM	115.6 °F	59.7	17	ESE	5.7	7.4	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:14 PM	114.3 °F	59.7	18	East	8.8	11.2	29.91 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:19 PM	114.2 °F	59.3	17	ENE	6	7.4	29.92 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:24 PM	114.1 °F	59.1	17	ENE	10.4	12.4	29.91 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:29 PM	113.4 °F	59.3	18	East	7.8	10.3	29.91 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:34 PM	114.2 °F	59.2	17	ESE	7.2	9.6	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:39 PM	114.8 °F	59.1	17	ESE	7.5	10.3	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:44 PM	114.1 °F	58.9	17	East	7.7	11.2	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:49 PM	114.0 °F	58.8	17	ESE	12.5	16.3	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:54 PM	113.2 °F	59.1	18	ESE	10.3	13.9	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	3:59 PM	113.7 °F	59.2	18	ESE	11.1	15	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:04 PM	112.8 °F	59.1	18	East	13.2	17.9	29.89 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:09 PM	112.2 °F	58.6	18	ENE	13.4	17.2	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:14 PM	112.6 °F	58.9	18	ESE	11.8	16	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:19 PM	113.1 °F	59.3	18	East	8.3	13.2	29.89 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:24 PM	112.4 °F	59.1	18	East	9.1	15	29.89 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:29 PM	112.6 °F	59	18	East	7.9	11.8	29.90 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:34 PM	112.1 °F	59.1	18	ESE	12.2	16.9	29.89 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:39 PM	111.8 °F	59.3	19	ENE	11.9	16.7	29.89 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:44 PM	112.1 °F	58.9	18	SSE	8.5	13.9	29.89 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:49 PM	111.4 °F	59.2	19	ESE	12.2	17.4	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:54 PM	110.7 °F	58.9	19	East	15.8	18.6	29.89 in	0.00 in	0.00 in	w/m ²
7/13/2023	4:59 PM	110.8 °F	58.4	19	East	10.3	15.4	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:04 PM	110.8 °F	58.1	18	NNE	9.7	15.9	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:09 PM	110.6 °F	57.3	18	East	13.3	17	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:14 PM	110.4 °F	57.1	18	East	12.5	17	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:19 PM	110.2 °F	57	18	ESE	10.2	15.5	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:24 PM	110.0 °F	56.8	18	East	8.7	11.9	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:29 PM	109.5 °F	56.5	18	ESE	13.1	18.2	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:34 PM	109.0 °F	56.1	18	East	13.4	18.1	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:39 PM	108.7 °F	55.8	18	East	15.7	21.9	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:44 PM	108.3 °F	55.5	18	ENE	13.8	18.3	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:49 PM	108.6 °F	55.7	18	East	11.7	16.7	29.87 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:54 PM	108.4 °F	55.5	18	ESE	14	19.5	29.87 in	0.00 in	0.00 in	w/m ²
7/13/2023	5:59 PM	108.5 °F	55.7	18	SSE	9.8	16.3	29.88 in	0.00 in	0.00 in	w/m ²
7/13/2023	6:04 PM	107.8 °F	55.1	18	East	10.4	15.5	29.87 in	0.00 in	0.00 in	w/m ²

Date	Time	Temperature	Dew Point	Humidity	Wind	Speed	Gust	Pressure	Precip. Rate.	Precip. Accum.	Solar
7/18/2023	1:59 AM	97.8	51.2	21	SSE	7.3	8.7 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:04 AM	98.2	50.7	20	SSE	7.1	9.0 mph	29.98 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:09 AM	98.3	50.3	20	SE	6.4	8.1 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:14 AM	98.3	50	20	ESE	6.7	8.4 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:19 AM	98	48.7	19	SSE	10.2	12.7 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:24 AM	98.1	48.7	19	SSE	6.3	8.6 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:29 AM	98.4	47.5	18	SSE	6.4	8.0 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:34 AM	98.2	47.1	18	SSE	6	7.6 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:39 AM	98.3	46.2	17	SSE	5.7	6.9 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:44 AM	98.1	46.4	17	South	5.9	7.7 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:49 AM	98.2	46.8	18	SSE	6.1	7.8 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:54 AM	98	47.2	18	SSE	6.7	8.6 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	2:59 AM	98.1	47.3	18	SSE	6.3	8.2 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:04 AM	97.9	47.1	18	SSE	5.3	7.1 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:09 AM	98.2	47.3	18	SSE	5.9	8.3 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:14 AM	98.3	47.5	18	SSE	5.7	8.1 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:19 AM	98.2	47.7	18	SSE	4.9	6.4 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:24 AM	98.2	48.8	19	SSE	4.8	6.6 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:29 AM	97.9	48.6	19	SE	4.6	6.2 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:34 AM	97.8	49.1	19	SE	5.3	6.6 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:39 AM	97.9	50	20	South	5.4	7.1 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:44 AM	97.8	49.9	20	SE	4.8	6.4 mph	29.97 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:49 AM	97.6	49.7	20	South	5.4	7.4 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:54 AM	97.7	49.3	20	SSE	5.4	6.8 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	3:59 AM	97.6	49.1	20	ESE	4.6	6.8 mph	29.96 in	0.00 in	0.00 in	w/m ²
7/18/2023	4:04 AM	97.7	49.5	20	SSE	4.4	5.4 mph	29.97 in	0.00 in	0.00 in	w/m ²

APPENDIX C

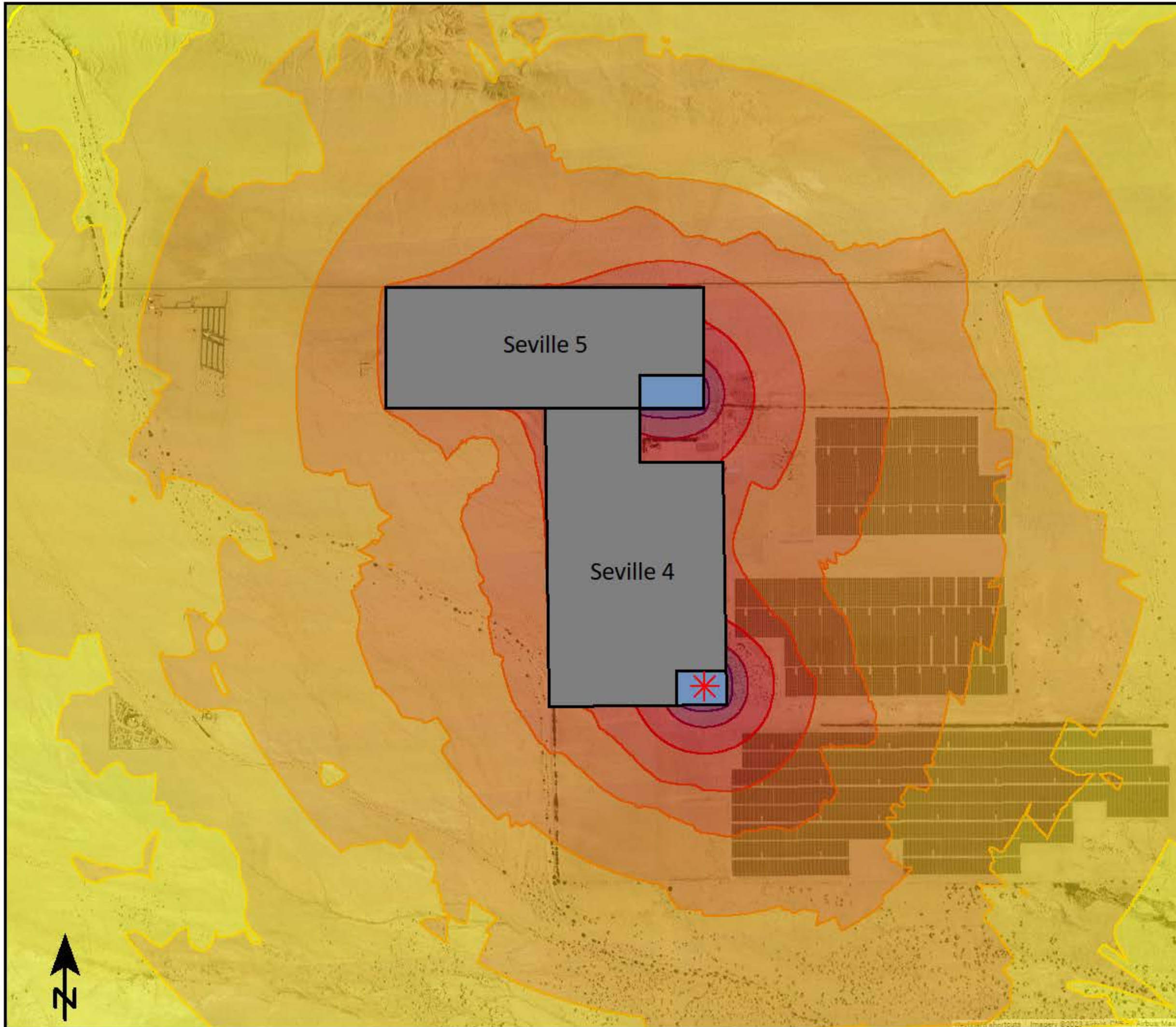
Histograms

LT-1 Hourly Average Leq Measurements



APPENDIX D

Project Operation Isopleths

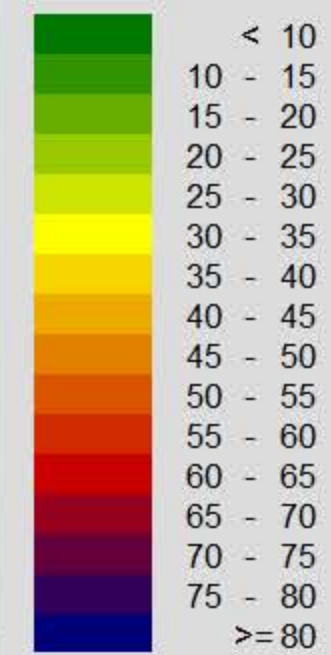


Seville 4 and 5

Signs and symbols

-  Transformer Point Source
-  Inverter Area Source
-  BESS Area Source

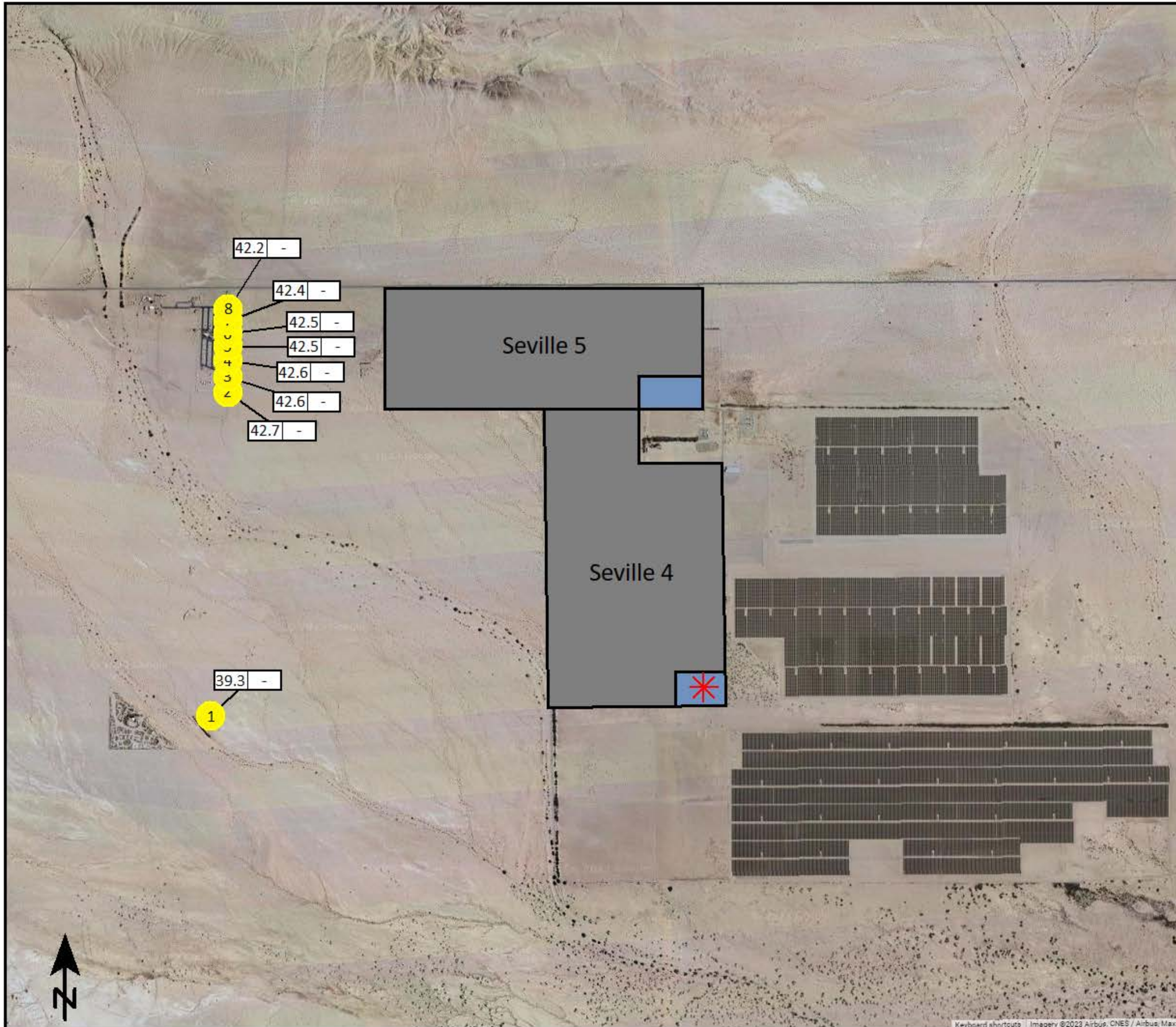
Levels in dB(A)



1 : 30000



Seville 4 and 5



Signs and symbols

-  Transformer Point Source
-  Inverter Area Source
-  BESS Area Source

1 : 30000

