BLUEWAVE BLUEWAVE

To: Town of Worthington Planning Board

From: BWC Wades Stream, LLC

Date: May 19th, 2026

Subject: Response to Board of Health Questions for the Special Permit Petition and Site Plan Review for BWC Wades Stream, LLC LSGMSPI

Dear Mr. Niswonger and members of the Planning Board:

WSP USA Inc. ("WSP") and BWC Wades Stream, LLC ("BlueWave") received the Worthington Board of Health letter dated 12/31/2025 on 5/7/2026 related to the above referenced project. WSP and BlueWave have prepared the following responses and supporting documentation for consideration by the Board. BlueWave responses are written in red italic text.

Board of Health Letter:

Worthington Board of Health Review of BWC Wades Stream LLC (hereafter BlueWave) Application for a Large-Scale Ground Mounted Solar Photovoltaic Installation (LSGMSPI) located at 1G0 Ridge Rd, Worthington, Massachusetts, Hampshire County

12/31/2025

(1) Rapid Stormwater Runoff. Aggregated agrivoltaic panels can cause rapid runoff because the panels are impervious surfaces. If the underlying soil is compacted, poorly maintained, and/or already saturated , runoff can be problematic leading to impacts on nearby septic systems and wells as well as pooling (see below (2) Climate Disruption). While the Blue Wave application shows 3 infiltration trenches; their location suggests they are designed to primarily handle runoff from the roadway and cement pads, not from the solar panels themselves.

BOH Concerns/Health Issues: The water table in the area of the agrivoltaic installation is already high as shown below in the data from the septic systems and wells of the abutters. Title V requires a minimum of 48" to groundwater. These systems have required special variances to allow for the high groundwater levels in the area.

Map/Lot	Address	Owner	Ground water	Well depth
407-26.2	138 Ridge Road	95 Dalton Ave, Nominee Trust	#1:56" #2: 46" (1996)	

407-28	190 Ridge Road	Tim Sena and Catherine Rude-Sena	#1: 34", #2: 36" #3:44", #4: 40" (2007)	
407-29	140 Buffington Hill Road	Matt and Annie Lagoy	#1: 22"; #2: 23" (2007)	
407-34	141 Buffington Hill Road	Karin Muller	#1: 28" #2: 29" (2003)	
407-35	151 Buffington Hill Road	Former Buffington Hill Partnership		45 ft. (DEP, 2004, now abandoned)
407-134	Worthington Golf Links	David and Helen Pollard	32-36" (estimated) (2017)	175 ft.
407-143	370 Huntington Road	Henry family	4 feet(estimated; based on dry basement)	
407-145	110 Buffington Hill Road	Stephen Szewczyk	#1: 44" #2: 36" (1993)	
407-147	87 Ridge Road	Michael C Kiersten Marich	>72" (estimated) (2017)	

(1) Rapid runoff can cause septic system flooding that could impact effectiveness and cause backups and failures. A flooded septic system can leak untreated wastewater into nearby water bodies, wells, or yards, posing a variety of health threats.

(2) Rapid runoff can cause pollution/contamination of nearby private wells and the public water supply. The data suggest that the prevention of negative impacts depends on effective site management that integrates farming and industrial practices. This coordinated approach to managing (the agrivoltaic installation is not identified in the plan.

The BOH requests (1) Perc tests with deep holes at several different locations within the site to determine current permeability of soils and depth to groundwater. (2) DEP determination of the safety of the Ridge Road installation for the adjacent public water supply.

BlueWave/WSP Response:

An initial geotechnical analysis has been completed, and additional pre-construction testing is planned as specified in the Stormwater Management Report and recommended in the Massachusetts Stormwater Handbook. The most up to date version of the Stormwater Management Report, dated 02/18/2026, was shared with the Planning Board and Third-Party Reviewer.

The MassDEP Wetlands Program Policy 17-1 section 4 explicitly excludes solar panels from all impervious surface calculations. The only proposed impervious areas are from the road, the concrete pads, the fence posts and the solar panel racking posts, all of which have been analyzed and accounted for in the Stormwater Management Report dated 02/18/026 provided to the Planning Board. Aside from these additions, the remaining land will maintain its existing ground cover and permeability. The three proposed trenches are designed to handle runoff from the roadway and cement pads as required by the Massachusetts Stormwater Standards. The overall site design as specified in the Stormwater Management Report results in lower peak flow rates leaving the site compared to the existing conditions. Other concerns regarding groundwater, pollutants, and water quality are also addressed in this report.
The Town Water Department issued a letter detailing the location of wellheads, noting that there is no IWPA on site, attached in Appendix A.

(2) Climate Disruption: Worthington lies on the east slope of the Berkshires. According to a Mass.gov site (www.mass.gov/info-details/top-impacts-in-the-berkshires- and-hilltowns-region#most-urgent-impacts---human-sector 2022)), ongoing hazards include temperature extremes and changes in precipitation patterns with accompanying changes in patterns of both soil conditions and surface and ground water flows. In addition, acid rain continues to be a problem in this area (https://www.umass.edu/water- resources-research/sites/default/files/2025-11/Report%202025_Final.pdf?1764462992), **BOH Questions/Health Concerns.**
(1) Acid rain can accelerate the leaching of zinc and iron from the galvanized iron supports (galvanic corrosion). Farm equipment and maintenance practices can further cause scratching or wear that, in turn, can allow rusting of the steel and lead to iron leaching into soil and water. Because of the large number of panels and the many thousands of support poles, local wells that are fed by groundwater and runoff as well as wells in the recharge area, may have higher levels of both. Symptoms of zinc toxicity include diverse abdominal effects (vomiting, diarrhea), inflections and flu-like symptoms. Symptoms of iron toxicity include abdominal effects and liver damage.
(2) The areas under solar panels are cool, moist and shady with the likelihood of tall grass and/or dense vegetation, the preferred environment for the ticks that carry Lyme and related diseases. The fencing may prevent predators from entering the area and permit an explosion in the populations of vectors such as tick-carrying mice.

(3) Standing water as a result of poor maintenance can lead to a higher incidence of mosquitoes leading to exposure to viral diseases such as West Nile Virus and

Eastern Equine Encephalitis

The BOH would like to see a plan that indicates how the operator would monitor and address issues associated with tick infestations, mosquito-attracting standing water and galvanic corrosion. (see also Rapid Stormwater Runoff above)

BlueWave/WSP Response: The racking utilized for the project are standard galvanized steel components commonly used throughout the construction, utility, transportation, and agricultural industries, including in outdoor applications with long-term environmental exposure. The galvanization process is specifically intended to prevent corrosion and extend the useful life of the steel.

Regarding standing water, the project has been designed in accordance with applicable stormwater management standards to avoid the creation of persistent standing water conditions. The site will maintain vegetated ground cover and stormwater controls intended to promote infiltration and controlled drainage.
As an agrivoltaic facility, the property will remain in active agricultural use and vegetation will be routinely managed through mowing or grazing. These ongoing activities inherently limit the establishment of dense unmanaged brush conditions associated with elevated tick habitat.
The proposed fencing is standard agricultural fixed knot fencing and does not create a sealed environment that excludes all wildlife. Similar fencing is commonly used throughout agricultural operations without resulting in documented public health concerns related to tick populations.

(3) Solar Panel Cleaning. https://www.havells-sylvania.com/solar-farms-and-water-the-surprising-truth-about-water-usage/ (8/20/25): BlueWave agrivoltaic installations require periodic cleaning and regular maintenance to ensure the panels operate at peak efficiency.. Solar panels are generally cleaned every 12 to 18 months to remove dust, bird droppings, and debris that block sunlight. For "agrivoltaic" or "dual-use" projects, where the panels are raised 8 to 10 feet off the ground, specialized cleaning equipment is needed. **BOH Questions/Health Issues: The proposed agrivoltaic installation is surrounded by woodland and open fields, with a high likelihood of significant bird droppings and accumulating debris from trees.**
(1) It seems likely that cleaning will need to occur more often than annually. Is this the case?
(2) Who would operate the needed "special" cleaning equipment?
(3) Does this equipment add to the possibility of damage to the underlying

support structure including scratching and removal of the galvanized material protecting the poles from rust.

(4) Are any chemicals used in the cleaning process and does the water used deplete local water supplies?

The BOH requests answers to these questions.

BlueWave/WSP: The panels do not require cleaning. Dust, dirt, or animal droppings are typically washed away by rain.

Noise and Health Complaints: While agrivoltaic installations are generally considered quiet compared to other power generating systems, there have been noise complaints, especially in residential and rural communities. Noise sources include: (a) the tracking system motors that tilt panels throughout the day (a mechanical sound that can be heard at distances of up to 1,000 meters depending on the number of panels and atmospheric conditions); (b) inverters/transformers (a constant low-frequency "hum" typically around 120 Hz that some have described as "irritating" or like "living in a machine shop").The hum can vary depending on the electric load. (c) cooling fans for heat management (broadband noise) and (d) construction noise including noise from heavy machinery and pile drivers BOH Concerns/Health Issues: The 190 Ridge Road location is both residential and rural. While state regulations (310 CMR 7.10) set noise limits (e.g. no more than 10 dB(A) above ambient or pure tones); response to noise can be highly subjective and can affect both humans and animals (and what affects animalsaffects humans). The Worthington Board of Health is responsible for handling any facility-related noise or other health complaints. Decibel levels are not the only concern: we have received noise complaints related to electric dog fences and other presumably "quiet" sources.

(5) If we do get noise complaints, who is responsible at BlueWave for handling this type of concern and what is their track record for responsiveness?

(6) What if there are other physiological complaints (e.g. nausea, headaches etc.)

(7) Might the agricultural requirements coincident with the solar panels and their infrastructure, require noisier than typical farming equipment?

(8) Might there be construction noise as part of maintenance or repair/replacement of panels and electric equipment?.

The BOH requests copies of any noise study conducted during operations and over time from a similar agrivoltaic system. Also, information about any noise complaints BlueWave may have received associated with their agrivoltaics installations. The BOH would also like the health officer from BlueWave identified,

with information about background, experience, and availability.

BlueWave/WSP Response: Any issues during the operation of the project may be directed to the BlueWave Asset Management team. The contact information for the team will be posted on the site and is accessible in the Emergency Response Plan. A site-specific noise study was conducted for this project, attached in Appendix B of this response.

(4) Security, becoming an "attractive nuisance": In Massachusetts, an attractive nuisance is a dangerous, human-made condition on private property that entices children to trespass, making the landowner liable for injuries even if the child is trespassing, provided the owner knew or should have known about the risk and failed to take reasonable care to protect kids, who often don't recognize the danger. Key examples include unfenced pools, machinery, or construction sites**. BOH Concerns/Health issues: The facility is located within easy walking distance of the Russel H. Conwell elementary school. There is no equivalent, heavily fenced industrial site in Worthington. Injuries can come from trying to breach the security fence; vandalism of the solar panels and the other electrical equipment leading to cuts or burns.**

The BOH requests that BlueWave delineate their approaches to preventing vandalism and access to the site by curious children.

BlueWave/WSP Response: The solar facility will be enclosed by a code-compliant security fence with locked access gates and warning signage. Electrical equipment associated with the project is designed and installed in accordance with the National Electrical Code (NEC), utility interconnection requirements, and applicable state and local safety standards.

Buried Electrical Lines: Most agrivoltaic installations require electricity transmission between panels and other system components using buried electrical lines contained in PVC or other sheathing. BOH Concerns/Health: There is no indication of how many lines there would be, how deeply they would be laid, and how they would be protected from damage from weather conditions (freezing and thawing) or mechanical factors (agricultural activities, cleaning and maintenance activities). They can cause system failures (see below), and/or pollute the agricultural land preventing later use if they are not properly disposed of or maintained. This can affect food supplies should there be an effort to return the

land to food production.The BOH requests details about these buried lines and how they will be monitored and maintained.

BlueWave/WSP Response: Buried conduit is a standard component of electrical infrastructure and will be installed in accordance with the National Electrical Code. Final trenching details will be developed prior to construction.

(5) Transformers and Inverters: These are required to both convert the DC current produced by the solar panels to usable AC current as well as to boost the solar cell production for efficient long-distance transmission. BlueWave uses both in its installations.

BOH Concerns/Health issues: Transformers contain oils and other toxic chemicals. Oil spills/releases (even of presumably "non-toxic" oils) can pollute water supplies and require costly and difficult cleanup. Oils can also cause fires. Inverters can fail as a result of overheating, power surges and outages that cause grid instability, arcing, etc. They can have circuit boards that use heavy metals, and can generate significant heat leading to fires, toxic smoke, soil and water contamination, and hazardous waste. Specific risks depend on the specific transformer or inverter used and have been well- detailed elsewhere.

The BOH requests that Blue Wave identify the specific transformers and inverters likely to be used, including information about their potential toxicity as well as details about maintenance procedures and pollution monitoring and mitigation approaches.

BlueWave/WSP Responses: For illustrative purposes, an inverter specification sheet was shared in Attachment B on 10/21/2025. An illustrative transformer specification sheet is attached in Appendix C. This transformer utilizes a non-toxic bio-based fluid. Final equipment selection depends on market conditions and supply constraints at procurement, and is typically finalized during the building permit phase. All aspects of the project are remotely monitored 24/7. A draft Operations and Maintenance Plan is shared in Appendix D.

(6) BESS (battery storage). The BOH shares in the many concerns related to function and maintenance of the battery electrical storage units (fires, toxic releases to both air and water, injuries that have been clearly laid out by Beth S. Greenblatt (Beacon Integrated Systems) in her Nov. 18, 2025, review of the BlueWave application as well as by many others both in Worthington and elsewhere.

The BOH requests answers to the questions raised by Beth S. Greenblatt in her review and well as by many other concerned local citizens.

BlueWave/WSP Response: Responses to Beacon Integrated Systems comments were shared on 1/2/2026 and 2/5/2026.

(G) Waste Disposal. The agrivoltatic facility has an estimated lifespan of 20-25 years. The applicant; however, indicates that the rapidity of technological change prevents the identification of specific core components (e.g. the Inverter and BESS units) because construction is not likely to occur for several years and designs change. **BOH Questions/Health Issues: The likelihood of repairs and updates suggest that waste disposal could become an issue well in advance of the 15-20 year time frame indicated by the applicant. If discarded infrastructure is stored on site or simply abandoned, this could cause both physical endangerment and environmental pollution, including affecting future agricultural viability of the site. Among the questions:**

(1) How often are solar panels likely to need replacement because of either damage or changes in technology?

(2) How would discarded equipment be stored and/or disposed of?

(3) Would any infrastructure (e.g., conduits and buried transmission wires) be left to pollute the area?

The BOH requests a disposal plan that takes into account both final disposal as well as any interim disposal needs with delineations of approaches to address soil and water-polluting toxicants that may result from waste storage and/or disposal

BlueWave/WSP Response: Replacement of the full system is unlikely. In the event that an individual module is broken, they are replaced by BlueWave's Asset Management team and recycled. To decommission the site at the end of its life, per the Lease and Easement Agreement, shared as Attachment A of the 12/21/2025 submittal, all above-ground and below-ground (up to a depth of three feet below grade) equipment shall be removed. Materials on site including fencing, racking, modules, and conduits can be recycled. Glass composes most of the weight of a solar panel (about 75 percent), and glass recycling is already a well-established industry. Other materials that are easily recyclable include the aluminum frames, copper wiring, and plastic junction boxes. Modules also have the ability to be reused as well, albeit at reduced operating efficiency, but at a lower price point attractive to certain buyers.

(10) Overall Maintenance: Underlying many of these concerns is the fact that there is no detailed maintenance plan provided in the application for either the solar array or the agricultural portion of the project. BlueWave Solar primarily acts as a developer. In

the past, they sold built projects to long-term owners/operators who then managed the ongoing operation and maintenance. **BOH Questions/Health Concerns:**

(1) Would BlueWave remain the operator?

(2) Who is responsible for assuring that the agricultural activities required as part of the project are properly conducted; i.e., they (a) do not damage the panels or their supports, (b) do not allow the soils under the panels to compact and flood or accrue standing water and (c) do not allow the use of toxic pesticides/herbicides etc. to be used on the property.

The BOH requests a detailed maintenance plan that takes into account the concerns outlined in items (1) – (9) above.

BlueWave/WSP Response: BlueWave will remain the long-term asset manager of the project throughout its lifetime and will be responsible for ongoing operations and maintenance of both the solar production and agricultural agreements. A draft Operations and Maintenance Plan is shared in Appendix D.

Prepared by Diane Brenner, Dr.P.H.
for the Worthington (Massachusetts) Board of Health

BLUEWAVE

Appendix A: Letter from Prime Water Operator

116 HUNTINGTON AVENUE • SUITE 601 • BOSTON, MASSACHUSETTS 02116
BLUEWAVE.ENERGY **T**: 617.209.3122

WORTHINGTON FIRE DISTRICT
BOARD OF WATER COMMISSIONERS
PO BOX 533
WORTHINGTON, MA 01098

April 30. 2026

Bart Niswonger
Planning Board Chairman
PO Box 247
Worthington, MA 01098

Dear Bart:

On behalf of the Worthington Fire District, I wish to correct the map you presented at the various meetings regarding some of the water recharge area for our wells. I spoke to Robert Walden yesterday, and he told me that he spoke to DEP and has received the same information. I spoke to Charles Rose yesterday and again about a month ago, so he could inform you of the correction that must be made.

On Wednesday, April 29, Stephen and I marked off zone one and WIPA of combination Well 2 and spring number 1, which are the closest water well and spring to the proposed solar systems on Ridge Road. Zone one, which is the most protected, has a radius of 233 feet and the Interim Well Head Protection Area of a total of 533 feet.

There is a telephone pole marked at the 233 foot which is the zone of well 2 and spring one and a tree sprayed with blue paint that shows the IWPA at 533 feet, in front of 265 Ridge Road. This mark is centered on the left build of 265 Ridge Road. Therefore, our recharge zone does not consider the entire property at 265 Ridge Road, nor does it even touch the property of Paul Sena, where the Christmas trees are planted. Our IWPA is quite distance from Buffington Hill Road and definitely no way near the proposed solar field.

I have enclosed a copy of the Source and Source Protection page from the Department of Environment Protection so you may have a correct identification of our water sources. Wells #09G, 010G, O11g, as well as Springs 06G and 07G are on the upper side of Ridge Road.

Sincerely.

John F. Sullivan
Prime Water operator, Commissioner

Stephen Schulze
Treasurer, Commissioner

Cc: Town Selectmen
file

SECTION 7: SOURCE AND SOURCE PROTECTION

The protection of a groundwater recharge area is critical to maintaining a safe and ample supply of water to the Worthington Fire District customers. Protection zones become more critical to water quality, and the activities within the zone more restrictive, as the wellhead is approached. Zone I is the most vulnerable and restrictive protection zone around a well. Depending upon pumping volume, a Zone I ranges from a radius of 100 to 400 feet around the wellhead. The Regulations at 310 CMR 22.21 (3) specify that only activities that are directly related to the water system and/or non-threatening to water quality occur within this zone. Zone I should be owned or controlled by the water supplier. The Zone II or Interim Wellhead Protection Area (IWPA) encompasses a larger area around a wellhead. Zone IIs are established using pumping test observations and groundwater modeling to estimate the contributing area to a groundwater source. The following Table lists the sources and the dimensions of their wellhead protection zones.

Suffix	Source Name	Wellhead Protection Rate	Units	Zone I (ft.)	Method	IWPA (ft.)
01G	WELL 1 (01G)	6,000	GPD	217	Pump Test	533
02G	WELL 2 (02G)	6,000	GPD	217	Pump Test	533
03G	WELL 3 (03G)	21,999	GPD	301	Pump Test	889
04G	WELL 4 (04G)	6,000	GPD	217	Pump Test	533
05G	SPRING #1 (05G)	1,440	GPD		Unknown	
06G	SPRING #2 (06G)	1,440	GPD		Unknown	
07G	SPRING #3 (07G)	1,440	GPD		Unknown	
09G	WELL 5 (09G)	2,700	GPD	165	Pump Test	460
10G	WELL 6 (10G)	7,560	GPD	232	Pump Test	568
11G	WELL 7 (11G)	10,800	GPD	255	Pump Test	640

Wellhead Protection Zones

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Appendix B: Acoustic Analysis

116 HUNTINGTON AVENUE • SUITE 601 • BOSTON, MASSACHUSETTS 02116
BLUEWAVE.ENERGY **T**: 617.209.3122

May 5, 2026

Ms. Brie Fortmuller
BlueWave Energy
116 Huntingdon Avenue, Suite 601
Boston, MA 02116

SUBJECT: Acoustic Analysis - Proposed Solar Facility (revised)
Ridge Road, Worthington, MA

Dear Ms. Fortmuller,

Cavanaugh Tocci Associates has evaluated the environmental sound impact associated with the proposed 2 MWAC solar installation located at 190 Ridge Road in Worthington, Massachusetts. The objectives of this evaluation were:

- To define acoustic design goals based on applicable noise regulations, and the results of a baseline sound survey.
- To estimate and evaluate the acoustic impact of the proposed project in the surrounding community.
- To provide sound control concepts as needed to mitigate acoustic impacts.

Results of the evaluation are summarized herein. Appendix A provides a glossary of acoustic terminology used in this report.

Baseline Sound Survey

Sound is a feature of all environments. Sound is only objectionable when it is inconsistent with its environment; by being either too loud or by being distinctive in character (i.e. tonally or temporally varying). The goal of acoustic design is to render facility noise consistent with the level and character of other sounds in the environment. To this end, the following environmental noise analysis evaluates sound produced by the proposed Project in light of existing environmental sound levels.

In order to document typical background sound levels in the project area, we performed continuous sound monitoring at the Project site for a weeklong period (March 11 through March 17, 2026). Figure 1 is an aerial photograph indicating the Project area and the location of the sound monitors SM-1 and SM-2. The results of the survey allow both quantitative and qualitative analyses of the acoustic environment surrounding the Project.

Figures 2 and 3 present the results of the continuous sound monitoring. Due to weather events during the monitoring period, we calculated background sound levels by averaging the sound level during periods of relatively low wind speed and precipitation rate. The calculated levels were 30 dBA during daytime hours (7 AM – 7 PM, when inverters are likely to be active), and 25 dBA during the remaining hours.

Applicable Environmental Noise Regulations

Massachusetts Department of Environmental Protection (MADEP)

Commonwealth of Massachusetts requirements under 310 CMR Section 7.10 qualitatively prohibit noise under some circumstances. Interpretation is provided in the Massachusetts Department of Environmental Quality Engineering's Policy 90-001[1] dated February 1, 1990; and in the Department of Environmental Protection (DEP) Form BWP AQ Sound. The Massachusetts policy limits new noise intrusions to 10 dBA over the existing ambient (L_{90}) sound level. Tonal sound, defined as any octave band level which exceeds the levels in adjacent octave bands by 3 dB or more, is also not allowed. These DEP noise guidelines are applicable both at the property lines and at the nearest inhabited buildings.

The DEP noise policy enumerated above is strictly applied to protect residences, other sensitive receptors (e.g. schools, hospitals), and land that could be developed for acoustically sensitive use. However, a new noise source that would be located in an area that is not likely to be developed for residential use in the future, or in a commercial or industrial area with no sensitive receptors may not be required to mitigate noise impacts on those areas, even if projected to cause noise levels at the facility's property line to exceed existing background sound levels by more than 10 dBA.

Town of Worthington Zoning By-law

The Zoning By-law of the Town of Worthington[2] specifically regulates large-scale ground-mounted solar photovoltaic installations (LSCMSPI) in section 8.5. Safety and Environmental Standards are presented in 8.5.6. Standard D states "The sound levels under normal operating conditions, measured at the boundary of the lot on which the installation is sited, shall not be more than 10 decibels greater than would otherwise exist in the absence of such a facility." The standard does not provide a metric for establishing existing sound levels. We conservatively use L_{90} in our evaluation, consistent with the above MADEP policy.

Project Acoustic Design Goals

To fully comply with the MADEP noise policy and the Town of Worthington Zoning By-law, sound from the project may not exceed the lowest measured background sound level L_{A90} by 10 dBA, as measured at nearby residential properties or facility property boundaries. In addition, a pure-tone condition may not exist at these locations. Table 1 provides a summary of measured sound levels and resulting project sound level limits.

Table 1
Measured Sound Levels and Limits (dBA)

Sound Monitor	Nominally Lowest L_{A90} (day/night)	MADEP Limit (day/night)
SM-1	30 / 25	40 / 35
SM-2	30 / 25	40 / 35

[1] https://www.mass.gov/doc/massdep-noise-policy/download

[2] https://worthington-ma.us/wp-content/uploads/2024/08/Worthington-ZBL-5-4-24.pdf

Project Sound Analysis

Project-related sound impacts that are associated with facility equipment have been calculated using CadnaA environmental sound modeling software (Version 2026 MR1 DataKustic GmbH). The CadnaA sound modeling software uses algorithms and procedures described in International Standard ISO 9613-2:1996 "Acoustics- Attenuation of sound during propagation outdoors – Part 2: General method of calculation". This standard and its associated methodology are the most universally accepted approach for environmental sound modeling of industrial and transit sound sources. The methodology described in this standard provides estimates of A-weighted sound levels for meteorological conditions that are favorable for the propagation of sound (downwind with a wind speed of 1-5 meters/sec). This methodology is also valid for sound propagation under well-developed moderate ground-based temperature profile inversions, which commonly occur on clear calm nights.

Our analysis includes the following equipment:

- Fourteen Solectria XGI-1500 125 kW inverters, with field measurement data provided by Acentech (daytime operation only).
- Two WEG 2.5 MVA transformers, with sound data provided by the manufacturer.
- Two e-STORAGE SolBank-3 BESS modules, with sound data provided by the manufacturer.
- Ninety FlexRack tracking drives, with sound data provided by the manufacturer.

Equipment layouts have not yet been determined, but all inverters, transformers, and BESS units will be located on the three equipment pads, while tracking drives will be located throughout the photovoltaic array.

Figure 4 presents the results of the acoustic modeling for the proposed Project. Table 2 provides a summary of our estimates of Project A-weighted sound levels at relevant receptors. Daytime sound levels exceed MADEP limits at one of the modeled receivers. For compliance with the applicable regulations, sound mitigation measures are warranted.

TABLE 2
Estimate of Project Sound Levels at Surrounding Properties (dBA)

Location	Description	Facility Sound Level (day/night)	MADEP Limit (day/night)
R1	**Landowner residence**	37 / 28	**40 / 35**
R2	**Residence Northeast**	30 / 25	**40 / 35**
R3	**Residence East**	***41*** / 30	**40 / 35**
R4	**Residence Southeast**	29 / 25	**40 / 35**
C1	**Commercial (clubhouse)**	25 / 20	-

Noise Control

Full compliance with the applicable noise regulations will require mitigation. We recommend implementing sound barriers as shown in Figure 5. The barriers on the east side of the central and south inverter banks, with height 2 feet above the top of the inverter units.

Inverter bank configuration has not yet been determined, but the barrier segments should be located on the sides of the inverter bank indicated, and positioned as close to inverters as allowed by equipment clearance requirements. We will provide updated barrier configuration when equipment pad layout is determined.

Modeling results are presented in Table 3 and Figure 6. Facility sound levels are compliant with MADEP limits at all modeled locations. In addition, sound levels are compliant with the Worthington Zoning By-Law at all facility property boundaries.

TABLE 3
Estimate of Project Sound Levels at Surrounding Properties (dBA)
With Noise Controls

Location	Description	Facility Sound Level (day/night)	MADEP Limit (day/night)
R1	**Landowner residence**	37 / 28	**40 / 35**
R2	**Residence Northeast**	29 / 25	**40 / 35**
R3	**Residence East**	38 / 30	**40 / 35**
R4	**Residence Southeast**	29 / 25	**40 / 35**
C1	**Commercial (clubhouse)**	25 / 20	-

Conclusion

Based on our review of the data presented in Table 3, it is our professional opinion that sound produced by the proposed solar facility on Ridge Road in Worthington, Massachusetts will comply with the most stringent requirements of the state and local noise regulations with implementation of barriers as recommended. Furthermore, with implementation of these measures, sound emitted by the project would not produce a noticeable impact on the acoustic environment and would not have an unreasonable adverse effect at any surrounding properties.

Sincerely,
CAVANAUGH TOCCI

Bradley M. Dunkin, *Associate Principal Consultant*
25050/BlueWave Solar Ridge Road Worthington MA Sound Study.docx

FIGURES

Aerial Photograph of Project Area Indicating Location of Sound Monitors

Figure 1

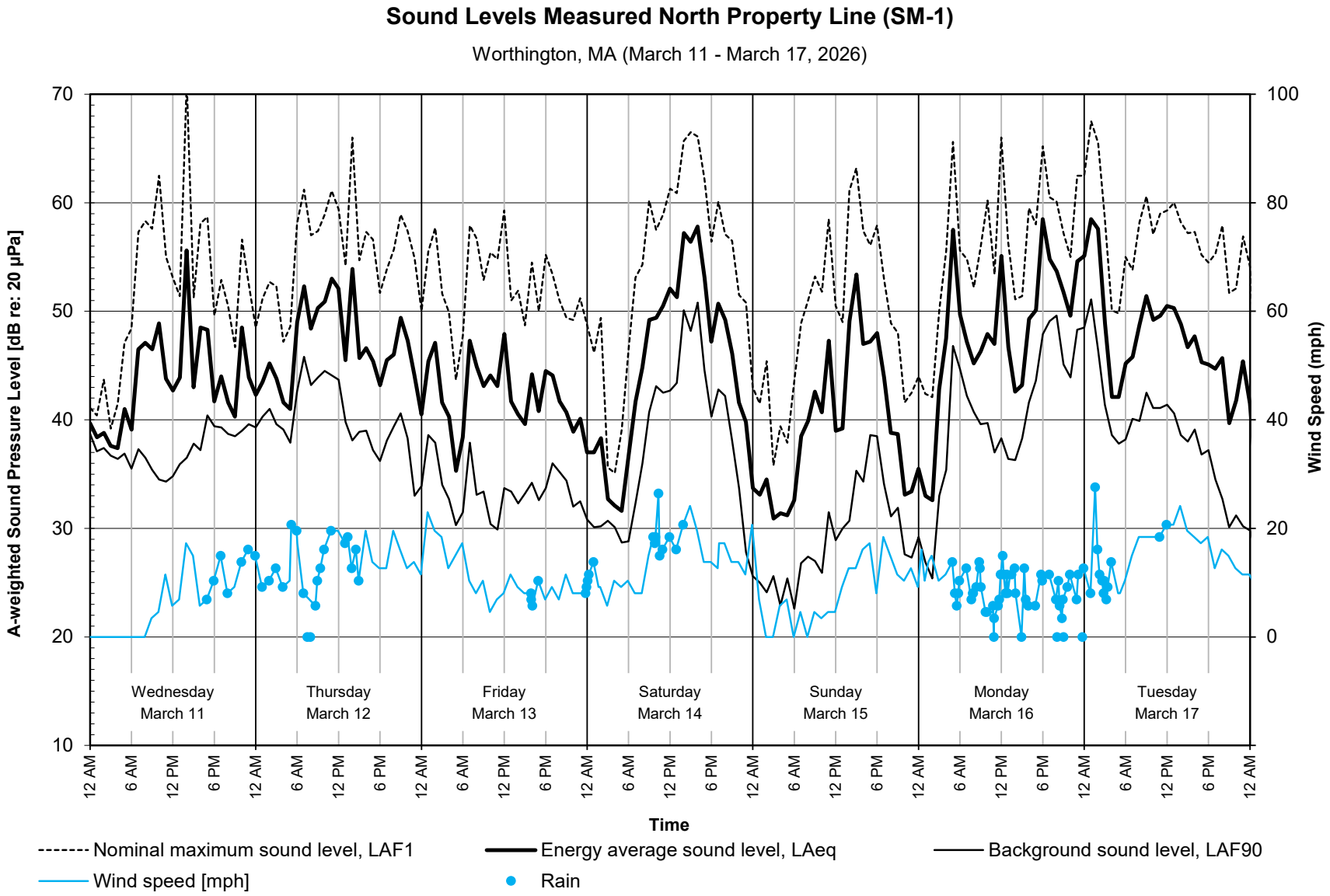

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Figure 2

CAVANAUGHTOCCI

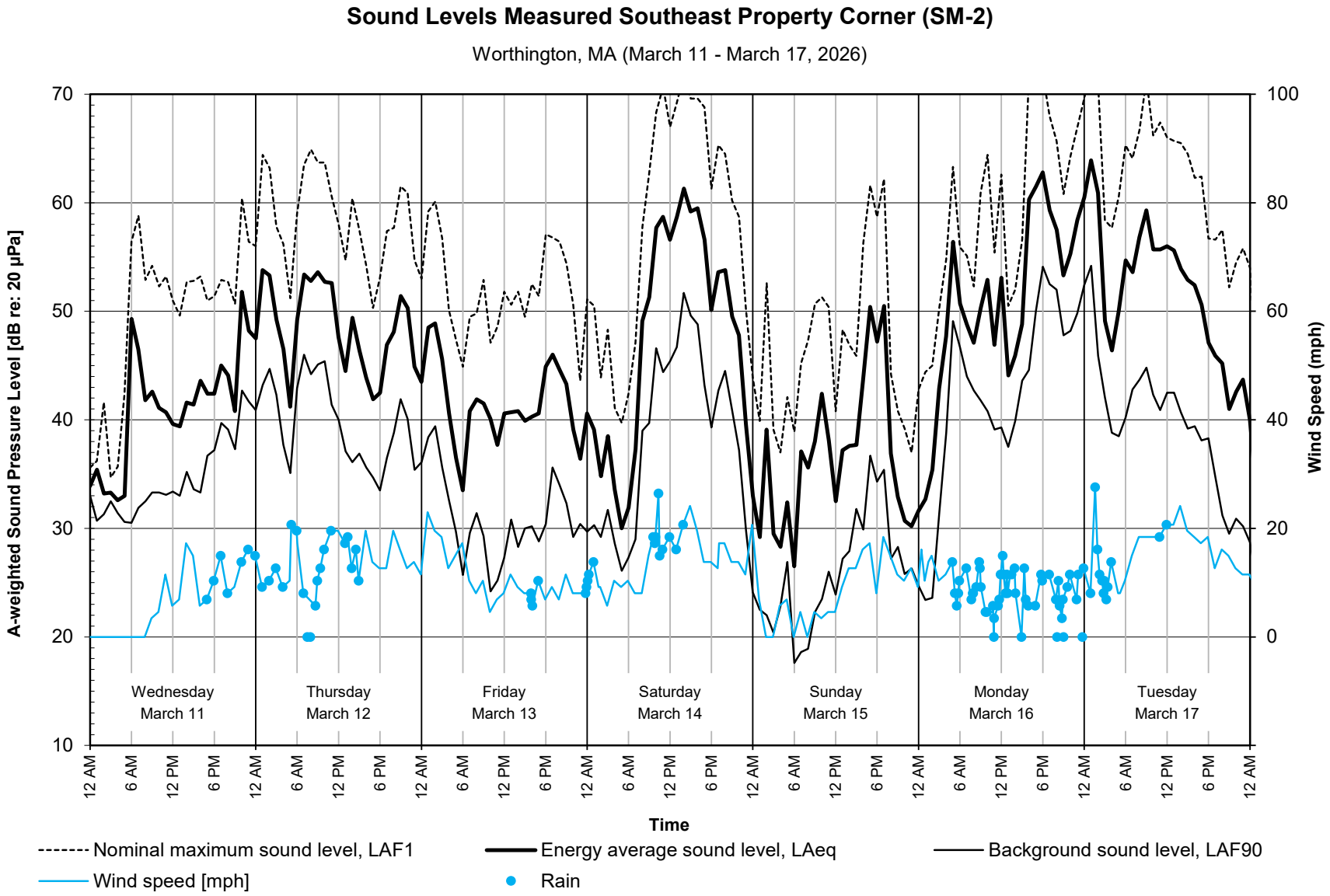

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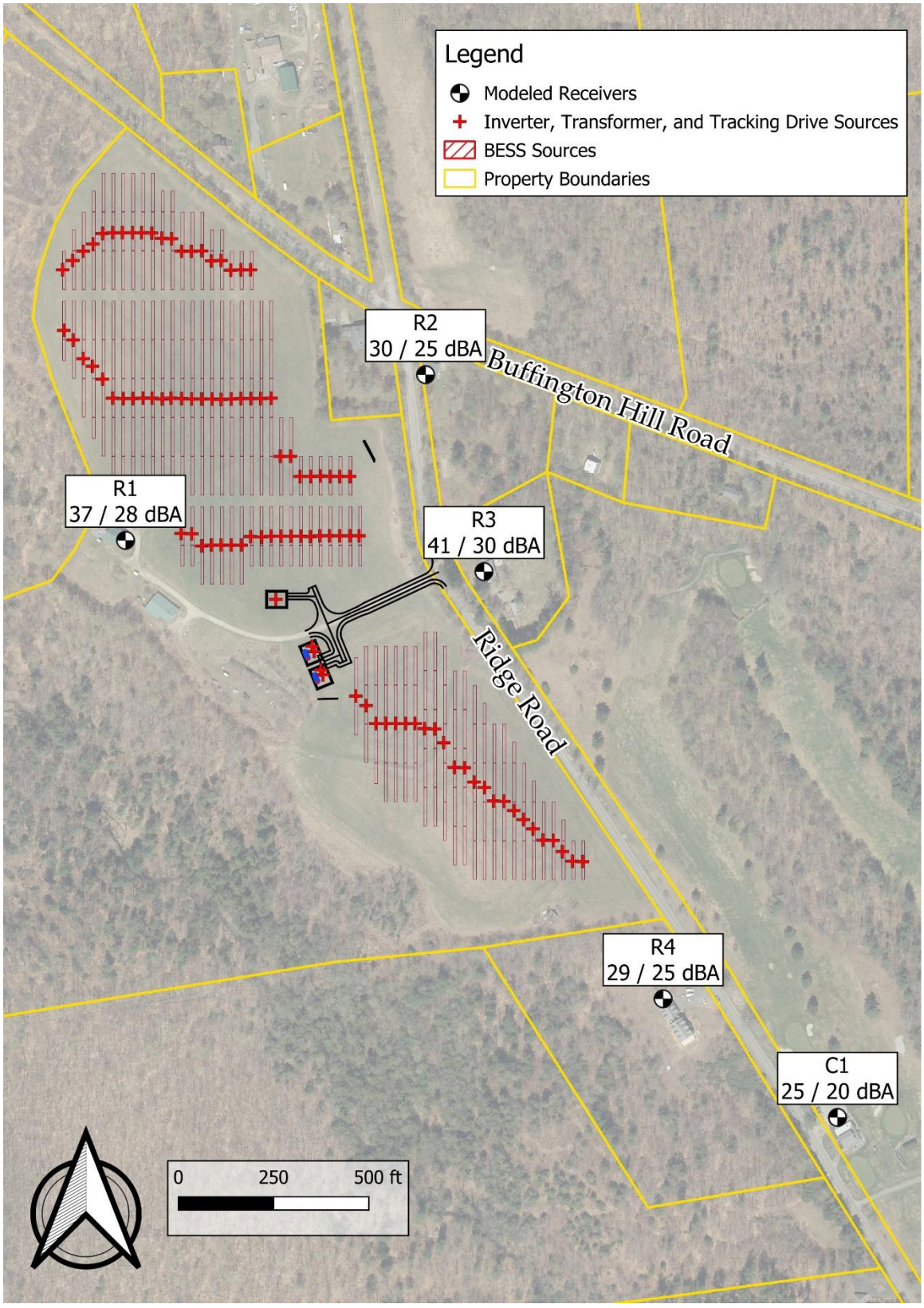
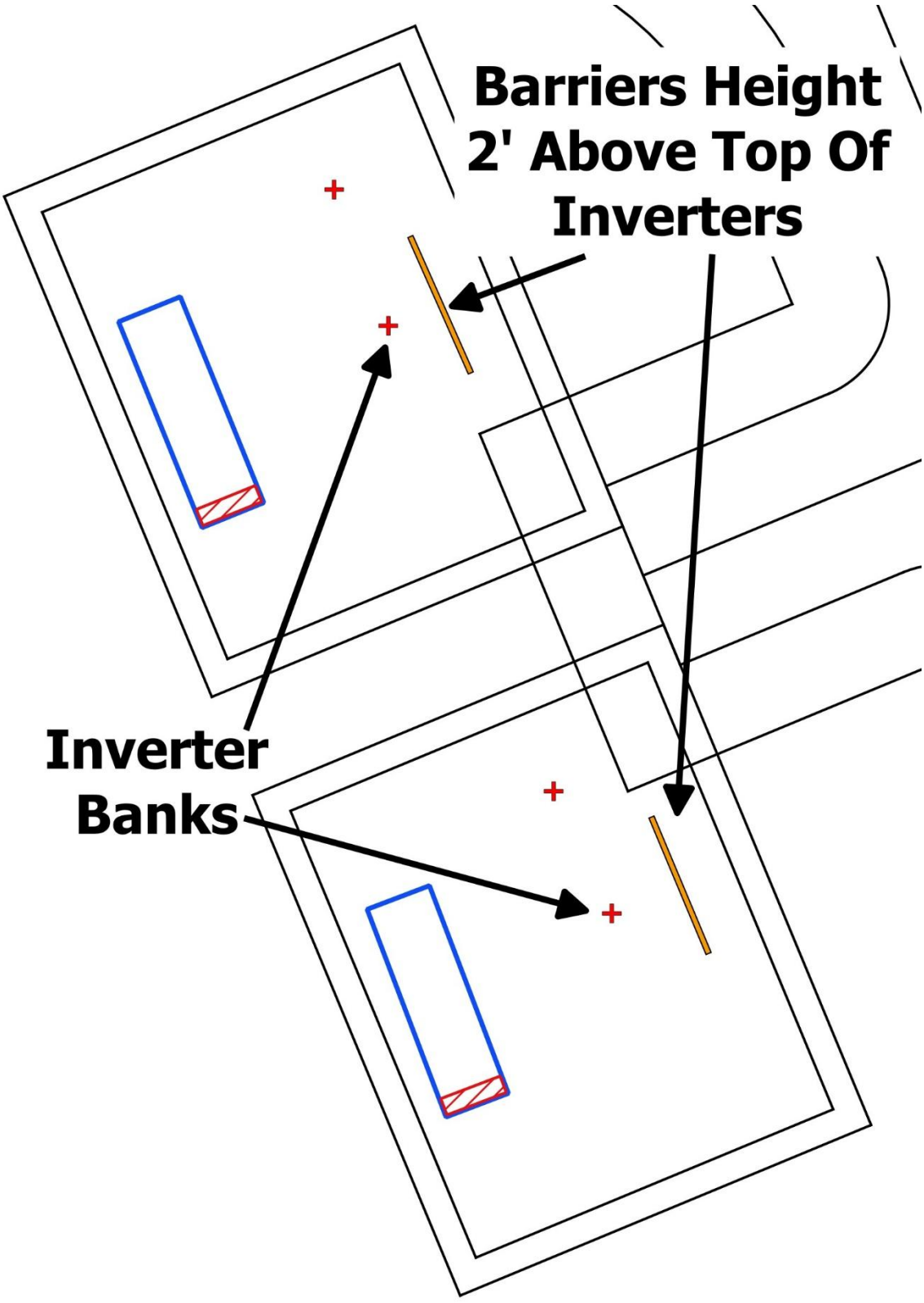
Figure 3

CAVANAUGHTOCCI



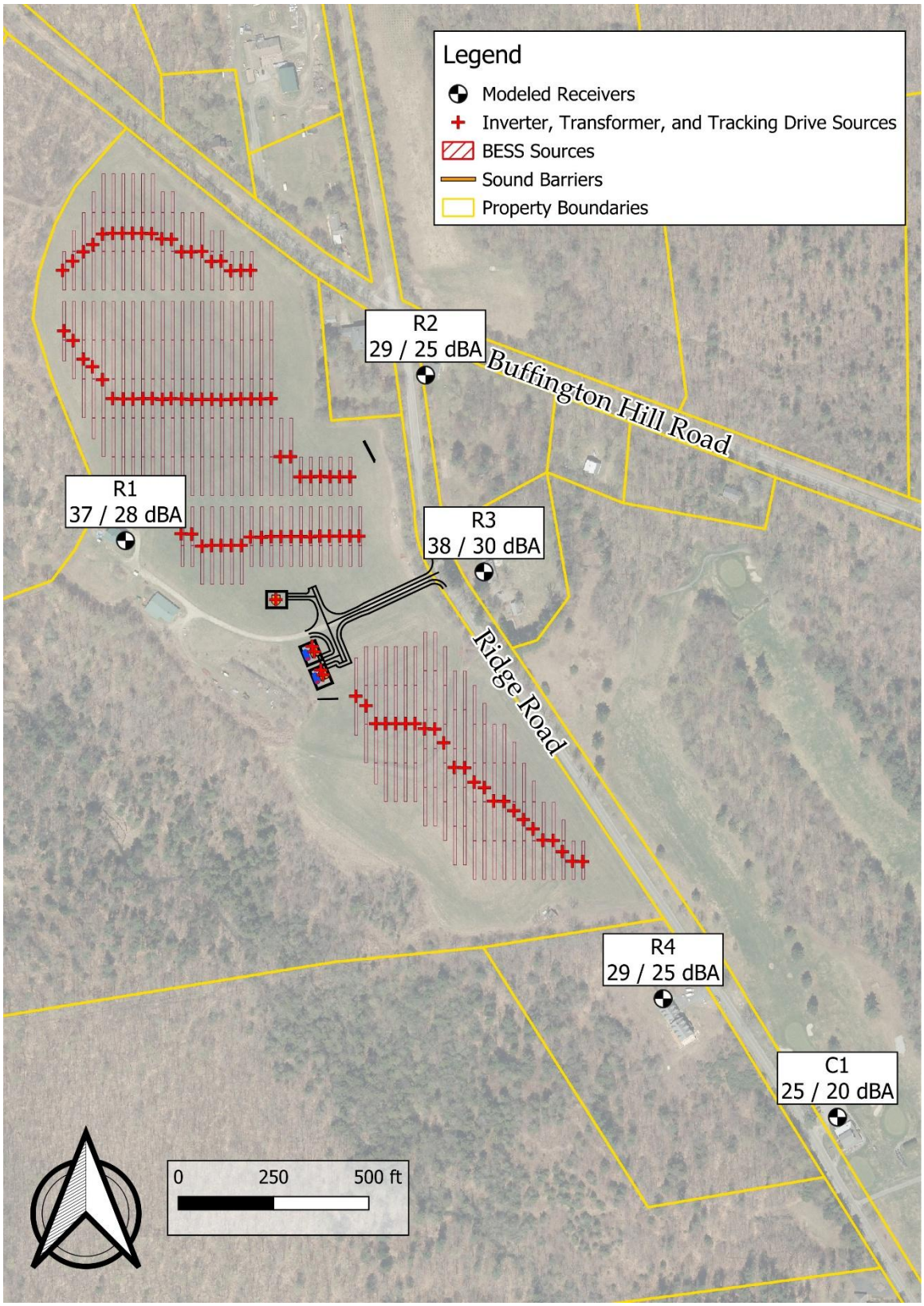
Estimated Sound Levels (day/night) Produced by the Project at Nearest Properties

Figure 4



Recommended Sound Barrier Design

Figure 5



Estimated Sound Levels (day/night) Produced by the Project at Nearest Properties With Sound Barriers

Figure 6

Appendix A

Sound Measurement Terminology

SOUND MEASUREMENT TERMINOLOGY

In order to quantify the amplitude, frequency, and temporal characteristics of sound, various acoustical descriptors are used. The following is an introduction to acoustic terminology that is used in this report.

Sound Level

Sound levels are typically quantified using a logarithmic decibel (dB) scale. The use of a logarithmic scale helps to compress the wide range of human sensitivity to sound amplitude into a scale that ranges from approximately 0 to 180 dB. Note however, that the use of the logarithmic scale prevents simple arithmetic operations when combining the cumulative impact of sources. For example, two sources of equal sound level operated simultaneously results in a combined sound level that is only 3 dB higher than if only one source was operated alone. An important feature of the human perception of continuous sound is that an increase or decrease in sound pressure level by 3 dB or less is barely perceptible, and an increase or decrease by 10 dB is perceived as a doubling or halving of noise level.

A-weighting

Generally, the sensitivity of human hearing is restricted to the frequency range of 20 Hz to 20,000 Hz. However, the human ear is most sensitive to sound in the 500 Hz to 5,000 Hz frequency range. Above and below this range, the ear becomes progressively less sensitive. To account for this feature of human hearing, sound level meters incorporate filtering of acoustic signals that corresponds to the varying sensitivity of the human ear to sound at different frequencies. This filtering is called A-weighting. Sound level measurements that are obtained using this filtering are referred to as A-weighted sound levels and are signified by the identifier, dBA. A-weighted sound levels are widely used for evaluating human exposure to environmental sounds. To help place A-weighted sound levels in perspective, Figure A-1 contains a scale showing typical sound levels for common interior and environmental sound sources.

Spectral Characteristics – Octave and 1/3 Octave Band Sound Levels

To characterize a sound, it is often necessary to evaluate the frequency distribution of the sound energy. As mentioned before, the frequencies of most interest where human exposure is concerned range between 20 Hz and 20,000 Hz. This frequency range is commonly divided into octave bands, where an octave band is a range of frequencies. Each octave band is referred to by its center frequency and has a bandwidth of one octave (a doubling of frequency). To cover the full range of human hearing, it is necessary to measure sound in 10 separate octave bands. Typically, the lowest frequency band measured has a center frequency of 31.5 Hz. The next frequency band has a center frequency of 63 Hz. This geometric series continues to the highest frequency band that has a center frequency of 16,000 Hz. A set of octave band sound levels to describe a particular sound is called an octave band spectrum. Covering the full range of hearing, an octave band spectrum would have 10 values, one for each band. Under certain

circumstances, more frequency resolution in acoustical data is needed to identify the presence of tonal sounds. A 1/3 octave band spectrum uses filters that divide each octave band into 3 separate frequency bands. Note that octave band and 1/3 octave band sound levels are not usually A-weighted, with their units being dB.

Environmental Noise Descriptors

Sound levels in the environment are continuously fluctuating and it is difficult to quantify these time-varying levels with single number descriptors. Statistical approaches, which use *percentile sound levels* and *equivalent sound levels*, are often used to quantify the temporal characteristics of environmental sound.

Percentile sound levels (L_n) are the A-weighted sound levels that are exceeded for specific percentages of time within a noise measurement interval. For example if a measurement interval is one hour long, the 50th percentile sound level (L_{50}) is the A-weighted sound level that is exceeded for 30 minutes of that interval.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. The 90th percentile sound level represents the nominally lowest level reached during the monitoring interval and is typically influenced by sound of relatively low level, but nearly constant duration, such as distant traffic or continuously operating industrial equipment. The L_{90} is often used in standards to quantify the existing background or residual sound level.

- L_{50} is the median sound level: the sound level in dBA exceeded 50 percent of the time during the measurement period.

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

By using percentile sound levels, it is possible to characterize the sound environment in terms of the steady-state background sound (L_{90}) and occasional transient sound (L_{10}).

The equivalent sound level (L_{eq}) is the energy average of the A weighted sound level for the measurement interval. Sounds of low level and long duration, as well as sounds of high level and short duration influence this sound level descriptor.

Noise levels at night generally produce greater annoyance than do the same levels which occur during the day. It is generally agreed that a given level of environmental noise during the day would appear to be 10 dBA louder at night – at least in terms of potential for causing community concern. The day night average sound level (Ldn) is a 24 hour average A-weighted sound level where a 10 dB “penalty” is applied to sound occurring between the hours of

10:00 p.m. and 7:00 a.m. The 10 dB penalty accounts for the heightened sensitivity of a community to noise occurring at night.

When a steady continuous sound is measured, the L_{10}, L_{50}, L_{90} and L_{eq} are all equal. For a constant sound level, such as from a power plant operating continuously for a 24-hour period, the L_{dn} is approximately 6 dBA higher than the directly measured sound level.

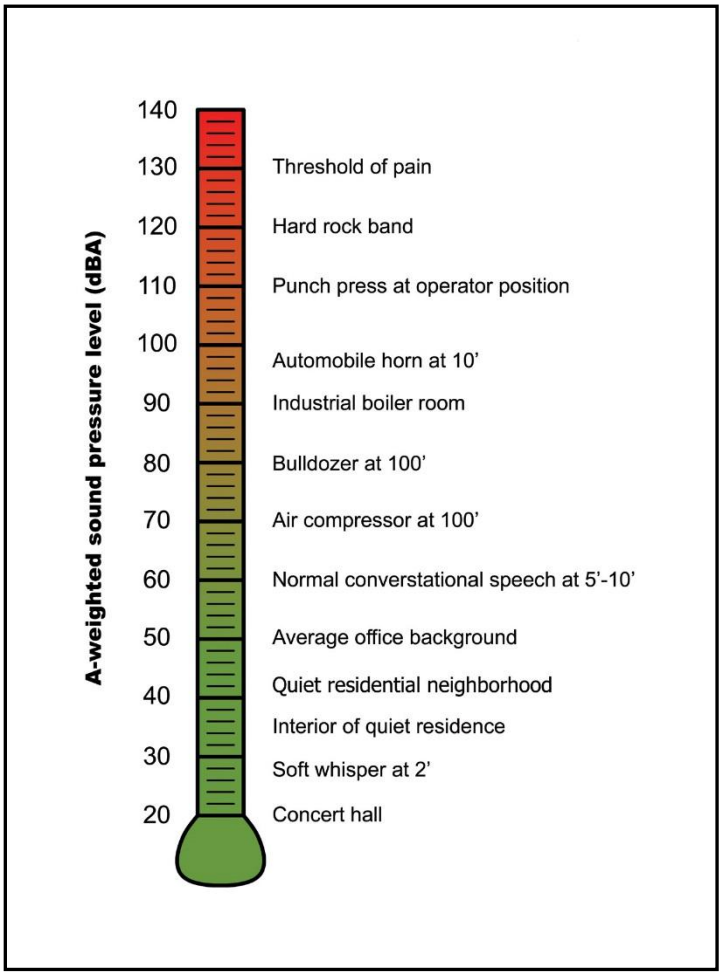


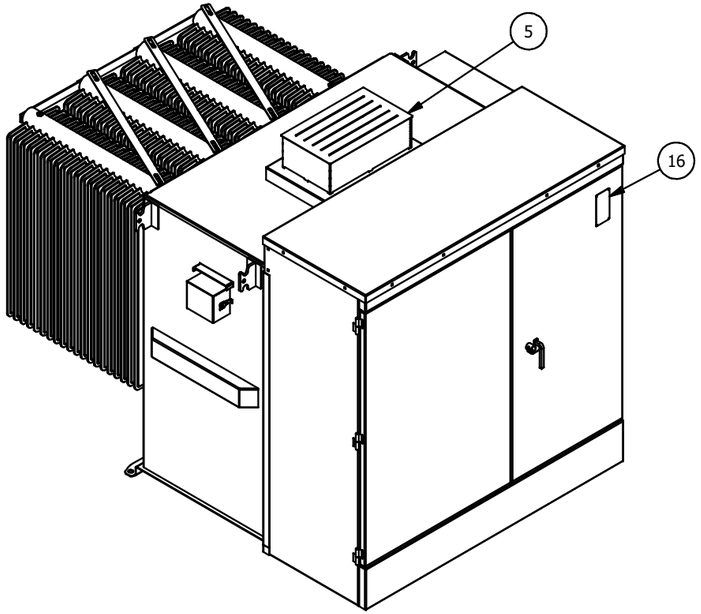
Figure A-1
Typical Sound Levels for Common Interior and Environmental Sources

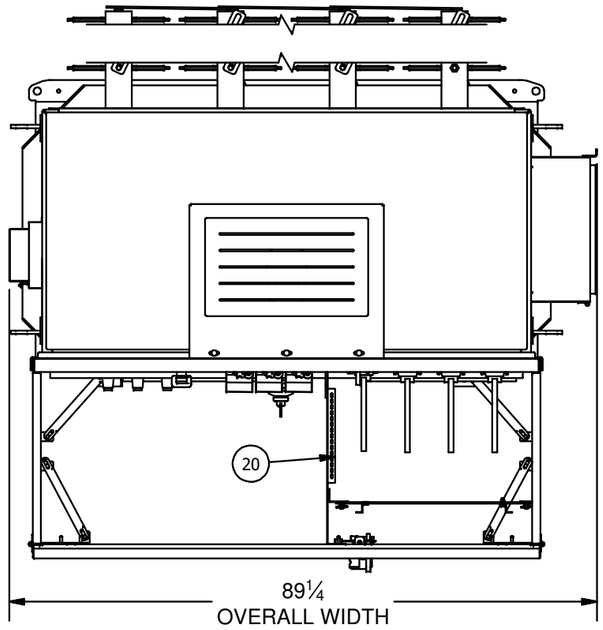
BLUEWAVE

Appendix C: Transformer Specification Sheet

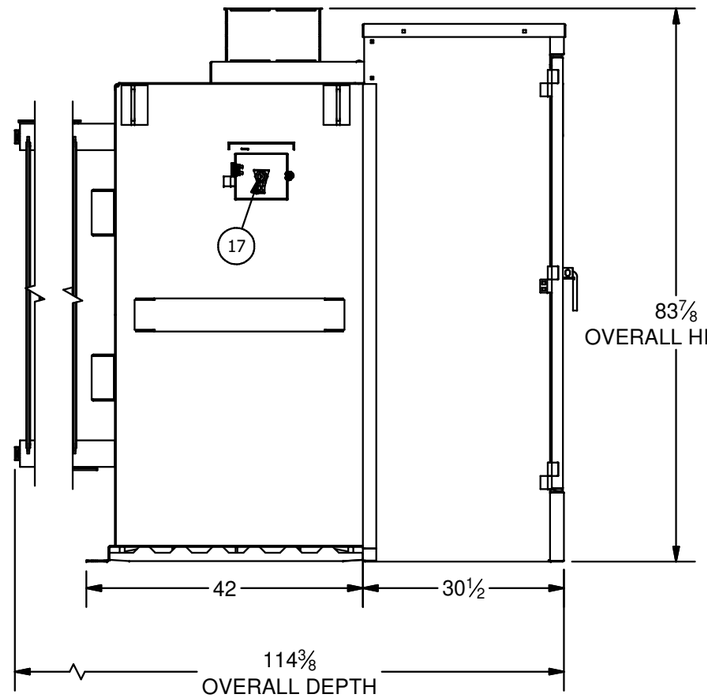
***For illustrative purposes, subject to change**

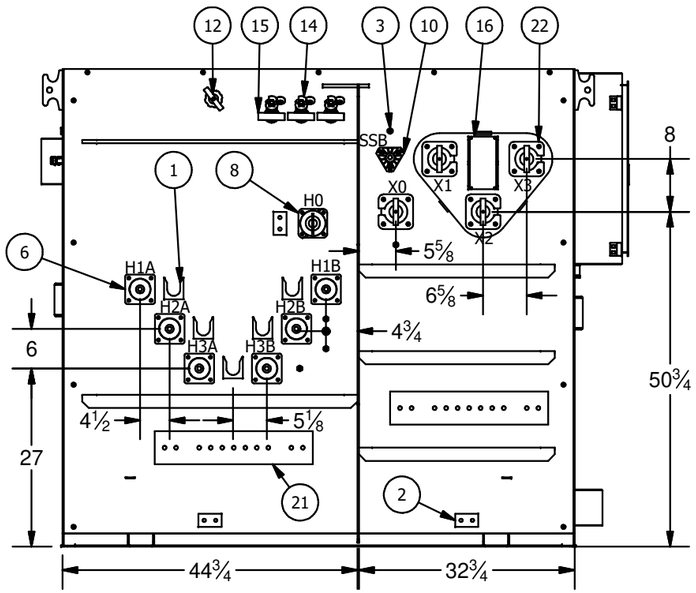
116 HUNTINGTON AVENUE • SUITE 601 • BOSTON, MASSACHUSETTS 02116
BLUEWAVE.ENERGY **T**: 617.209.3122

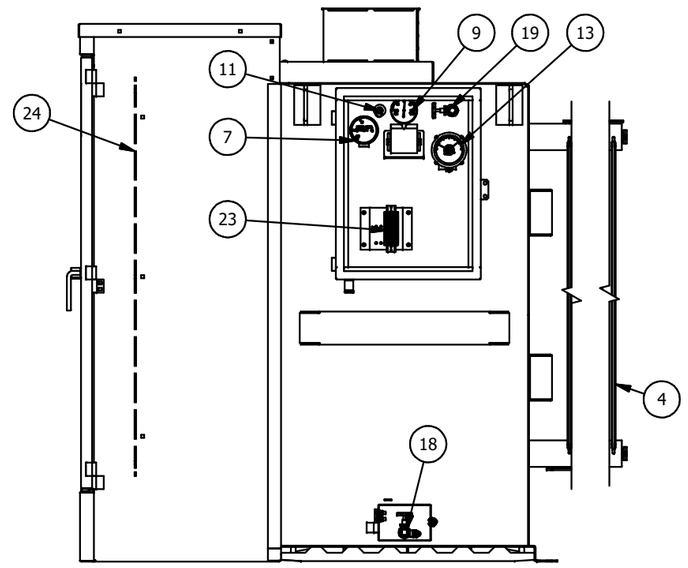




ITEM	QTY	DESCRIPTION
1	5	PARKING STAND
2	3	2 HOLE GROUND PAD
3	5	GROUNDING WELD NUT
4	4	RADIATORS
5	1	COVER-MOUNTED PRESSURE RELIEF DEVICE 10 PSI
6	6	HV BUSHING NON-LOADBREAK 125 BIL 600A
7	1	LIQUID LEVEL GAUGE WITH 1 CONTACT
8	1	H0 BUSHING 95 BIL 2 HOLE SPADE, GROUNDED
9	1	PRESSURE VACUUM GAUGE WITH 2 CONTACTS & SCHRADER VALVE
10	1	STATIC SHIELD BUSHING 30 BIL, GROUNDED
11	1	PRESSURE RELIEF VALVE WITH MANUAL PULL RING 10 PSI
12	1	TAP CHANGER 138A 200KV
13	1	LIQUID TEMPERATURE GAUGE WITH 2 CONTACTS
14	3	BAYONET FUSE 100A
15	3	PLASTIC DRIP SHIELD
16	3	STAINLESS STEEL NAMEPLATE (2 STANDARD, 1 IN GAUGE BOX FOR CONTROLS)
17	1	4 POSITION LOADBREAK SWITCH 150BIL 200A IN PADLOCKABLE BOX
18	1	DRAIN VALVE WITH SIDE SAMPLER IN PADLOCKABLE BOX
19	1	FILL VALVE
20	1	LV SPADE SUPPORT
21	2	COPPER GROUND BAR IN HV & LV COMPARTMENTS - 7 HOLES EACH
22	4	LV EPOXY BUSHINGS 30 BIL 12 HOLE SPADE, SUPPORTED, X0 GROUNDED
23	1	TERM BLOCK 18 POLE
24	1	LV LEXAN FRONT BARRIER







CUSTOMER: BLUEWAVE SOLAR - 13.2KV	
S.O.# 496922232-010 (-020,-030,-040,-050)	MODEL# ZUM0217914-0200
KVA: 2500/2800	
PRIMARY VOLTAGE: 13200Y/7620, 95 BIL WINDINGS, 125 BIL ACCESSORIES	
SECONDARY VOLTAGE: 600Y/347, 45 BIL WINDINGS, 30 BIL ACCESSORIES	
PAINT: GREEN (MUNSELL 7.0GY3.29/1.5)	
FLUID: ENVIROTEMP FR3	
OIL VOLUME: 740 GAL	
TOTAL WEIGHT: 16661 LBS	

INTERNAL
- 6 UNDER-OIL CURRENT LIMITING FUSES - 8.3KV 200A (HITECH #HTSS232200)

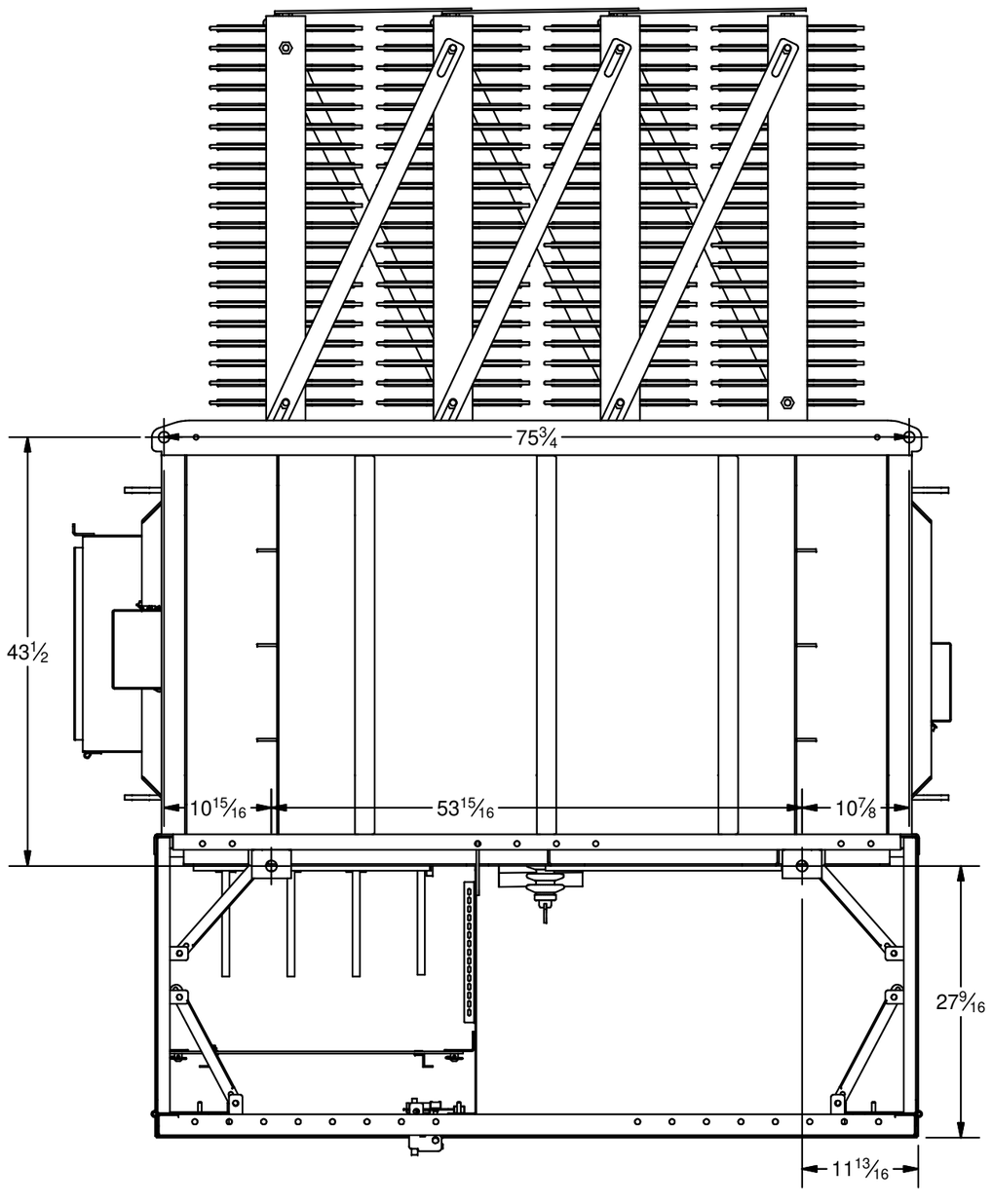
EXTERNAL
- 3 ELBOW ARRESTERS SHIPPED WITH TRANSFORMER - 10KV 8.4MCOV 15CL (HUBBELL #215ELA10)

DGA TEST TO BE PERFORMED

DIVISION	TITLE			
DT	3ph Pad Transformer			
TOLERANCE	PART NUMBER	MATERIAL		
mm / in.	TopLevel			
STD ± 3 / ± 0.10	DRAWN BY	APPROVED	DATE	SCALE	UNITS
* ± 1 / ± 0.04	kalebj		3/24/2026	NTS	IN
** ± 0.5 / ± 0.02					
ANGULAR ± 2°					

IDW - ANSI - A

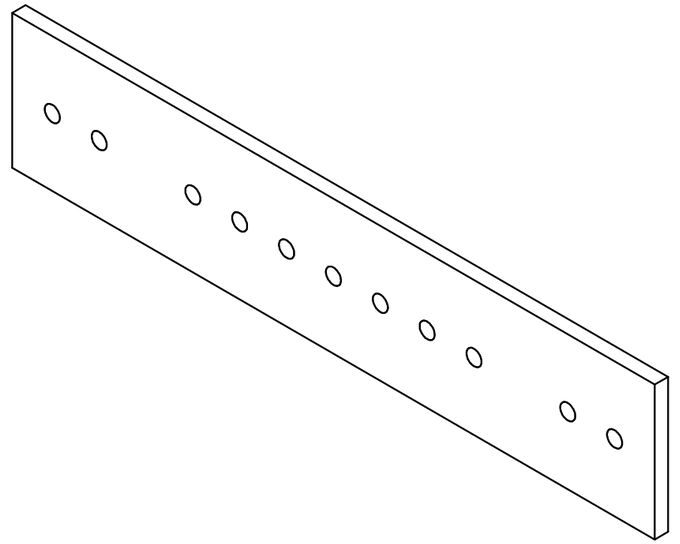
BOTTOM OF TRANSFORMER
SEISMIC ANCHORING HOLE LOCATIONS
Ø1.125" QTY. 4

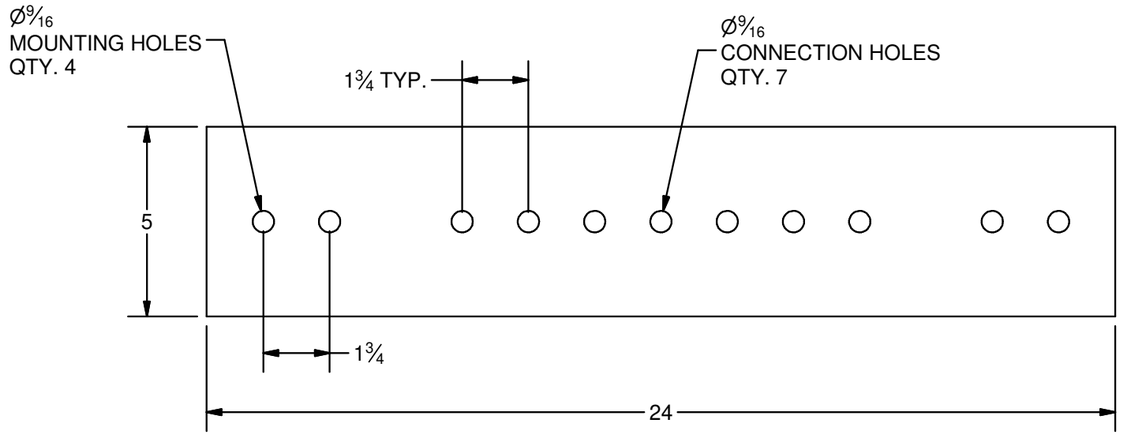


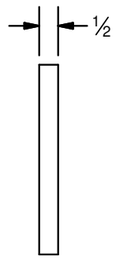
DIVISION			TITLE				
DT			3ph Pad Transformer				
TOLERANCE			PART NUMBER		MATERIAL		
	mm	in.	TopLevel				
STD	± 3	± 0.10					
*	± 1	± 0.04	DRAWN BY	APPROVED	DATE	SCALE	UNITS
**	± 0.5	± 0.02	kalebj		3/24/2026	NTS	IN
ANGULAR		± 2°					

IDW - ANSI - A

COPPER GROUND BAR IN HV & LV COMPARTMENTS







DIVISION			TITLE				
DT			CU BAR TIN PLATED 24L 5W 0.5 THICK CONDUCTOR 0L 0W				
TOLERANCE			PART NUMBER		MATERIAL		
	mm	in.	ZU50852-982		Copper		
STD	± 3	± 0.10					
*	± 1	± 0.04					
**	± 0.5	± 0.02	DRAWN BY	APPROVED	DATE	SCALE	UNITS
ANGULAR		± 2°	kalebj		3/24/2026	NTS	IN

IDW - ANSI - A

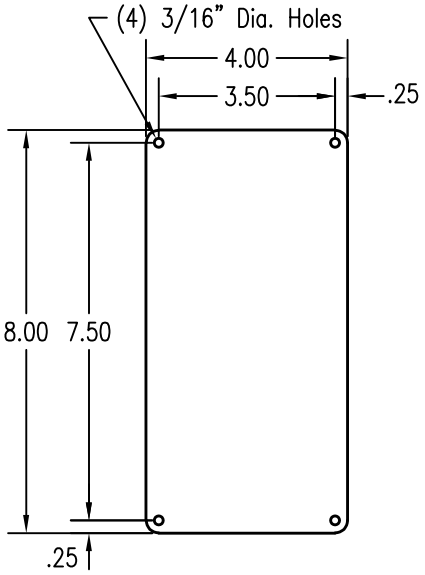
S.O.# 496922232-1

Design X/R
7.11

Design Impedance
5.74 %

Approval Block

- ☐ Approved as Submitted
- ☐ Approved as Noted
- ☐ Resubmit Sign & Date



MATERIAL: SST
(4).1875" DIA. MTG. HOLES ON CENTERLINE 3.5" x 7.5" APART. SIZE OF PLATE 4.0" x 8.0" WITH .25" CORNER RADIUS.

SWITCH ON SEG 2
K-2 RATED
55°/65°C
ENVIROTEMP FR3
FUSE DESIGNATION
NON DOE COMPLIANT

MANUFACTURED IN WASHINGTON MO 63090 USA

THREE PHASE TRANSFORMER 55/65 °C RISE 60 HZ CLASS KNAN ENVIROTEMP FR3 FLUID

2500/2800 kVA HV (AL) 13200Y/7620
LV (AL) 600Y/347

S/N
MODEL M0217914-02

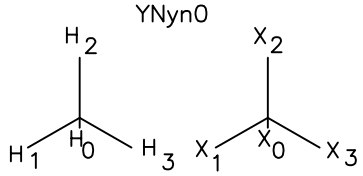
CORE & COIL (UNTANKING)	6912 LBS
TANK & FITTINGS	4068 LBS
LIQUID 740 GAL	5681 LBS
TOTAL	16661 LBS
DATE OF MFG.	---

%IMP

DETC SWITCH POSITION	LINE-LINE VOLTAGE (V)	LINE TOP CURRENT (A)
A OR 1	13860	116.6
B OR 2	13530	119.5
C OR 3	13200	122.5
D OR 4	12870	125.6
E OR 5	12540	129.0
	600	2694

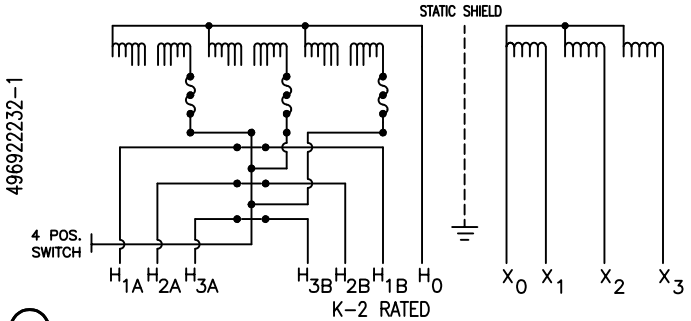
FUSE BAY: COOPER 4000358C16CB QTY 1/PHASE
FUSE CLF: HITECH HTSS232200 QTY 2/PHASE
HV BIL WNDGS/ACCSS: 95/125 KV
LV BIL WNDGS/ACCSS: 45/30 KV

YNyn0



c UL LISTED
Liquid Immersed
Distribution Transformer
16LR No.E239762

LIQUID CONTAINS LESS THAN 1 PPM PCB's AT TIME OF MANUFACTURE.
LIQUID LEVEL AT 25°C IS 7" BELOW TOP OF HANDHOLE FLANGE.
LIQUID LEVEL CHANGES 0.5" PER 10°C CHANGE IN LIQUID TEMPERATURE.
OPERATING PRESSURES OF PRESERVATION SYSTEM ARE 7 PSIG MAX & -2 PSIG MIN.
TANK IS DESIGNED FOR 3 PSIG VACUUM FILLING AND MUST BE SOLIDLY GROUNDED.
BEFORE INSTALLATION AND OPERATION READ INSTRUCTION BOOK. +7-1801



K-2 RATED
NON-DOE COMPLIANT
DESIGN FOR STEP-UP OPERATION @ < 3300 FT ASL

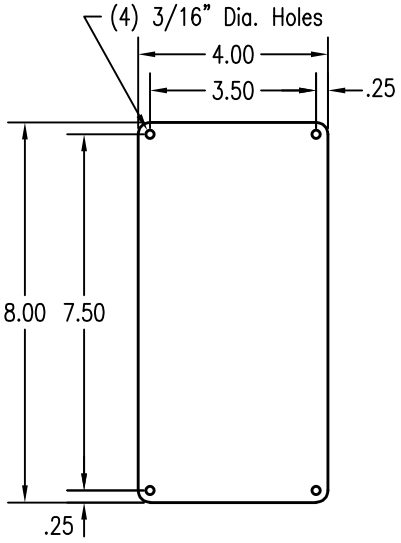
R0	PR	ZW	----	3/19/26
FOR APPROVAL				

WASHINGTON, MO 63090, USA

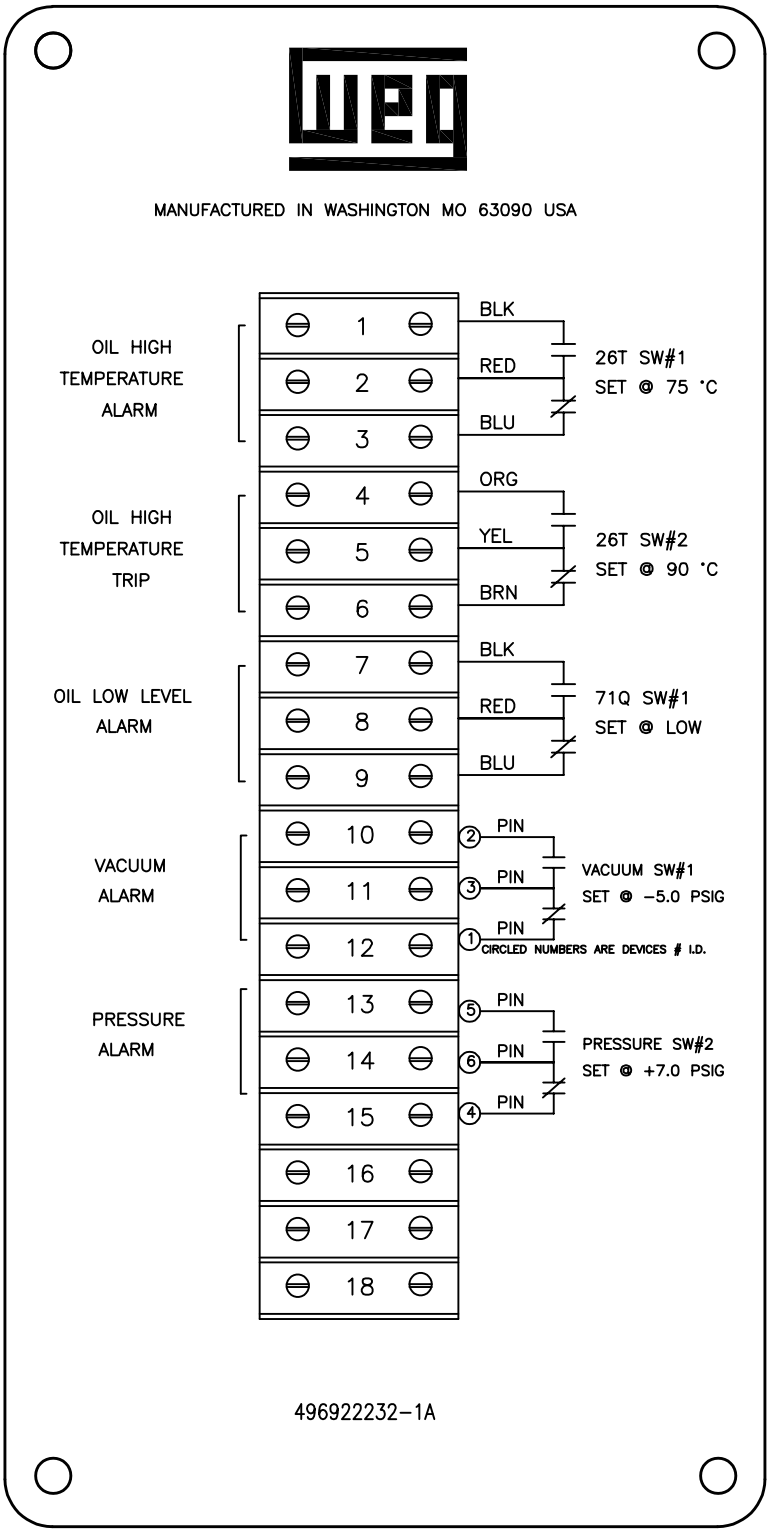
NAME: WEG NAMEPLATE						
MAT'L: 38018693A01						
DATE: 3/19/2026	PART NUMBER: 496922232-1					REV: 0
DECIMAL ± .032	ANGULAR ± 2°	FRACTIONAL ± 1/32	SCALE NTS	TOLERANCES (except as noted) ± .032	DRAWN BY: PR	APPROVED ZW

1EA

Approval Block	
☐ Approved as Submitted	
☐ Approved as Noted	
☐ Resubmit	Sign & Date



MATERIAL: SST
(4).1875" DIA. MTG. HOLES ON CENTERLINE 3.5" x 7.5" APART. SIZE OF PLATE 4.0" x 8.0" WITH .25" CORNER RADIUS.



R0	PR	ZW	----	6/9/25
FOR APPROVAL				

WASHINGTON, MO 63090, USA

NAME:	WEG CONTROL NAMEPLATE
MAT'L:	38018693A01
DATE:	6/9/25
PART NUMBER:	496922232-1A
REV:	0

DECIMAL	ANGULAR	FRACTIONAL	SCALE	TOLERANCES (except as noted)	DRAWN BY:	APPROVED
± .032	± 2°	± 1/32	1:1	± .032	PR	ZW

BLUEWAVE

Appendix D: Draft Operations and Maintenance Plan

116 HUNTINGTON AVENUE • SUITE 601 • BOSTON, MASSACHUSETTS 02116
BLUEWAVE.ENERGY **T**: 617.209.3122

BLUEWAVE

PRELIMINARY GROUND MOUNTED SOLAR SYSTEM OPERATIONS & MAINTENANCE PLAN

1. GENERAL PROTOCOL

1.1 Contact Information

Owner

BWC Wades Steam, LLC with a facility address of 190 Ridge Rd, Worthington, MA
BlueWave
Phone: 617-209-3122 (General phone number listed here to be updated with project specific number between Mechanical Completion and Substantial Completion)
Email: assetmgmt@bluewave.energy

1.2 OPERATION & MAINTENANCE ANNUAL SCHEDULE

Task	Schedule
Full Site Visual Inspection & Report	Annually
Production Performance Report	Annually
Inverter Preventative Maintenance	Annually
Medium Voltage Gear Maintenance	Annually
String Voc/Imp	As needed
IV Curve Tracing	As needed
Thermal Imaging Combiners, Inverters, Disconnects	100%, Annually
Warranty Enforcement	As needed
Issue Tracking of Unscheduled Service Dispatches	As needed
24/7 Monitoring	24/7
Dispatch Commitment	48 hrs.
Vegetation Management	As needed

1.3 EXHIBIT A – SYSTEM SERVICES

1.3.1 PREVENTIVE MAINTENANCE SITE VISITS

One time, annually, additional at request and expense of Project Owner for:

- System testing (voltage/amperage)
- System visual inspection and necessary corrections, excluding cost of replacement components:
- Inspect for stolen, broken or damaged PV modules, record damage and location. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect PV wiring for loose connections and wire condition. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect for wires in contact with the structure or hanging loose from racking. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check mechanical attachment of the PV modules to the racking. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check attachment of racking components to each other and the structure. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Verify proper system grounding is in place from panels to the inverter. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check conduits and raceways for proper anchorage to structures. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.

- Inspect all metallic parts for corrosion. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check combiner boxes for proper fuse size and continuity. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect all wiring connection for signs of poor contact at terminals (burning, discoloration, etc.). Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect disconnection for proper operation. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Survey entire jobsite for debris or obstructions. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project.
- Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect fasteners for proper torque and corrosion. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect inverter pad for cracking or settling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect electrical hardware for proper warning and rating labeling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Review as built documentation as needed and update as built documentation as changes are required.
- Inspect alignment of arrays and racking to identify settling foundation or loose attachments. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.

- Inspect operation of tracking hinges, pivots, motors and actuators if present. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check proper operation and reporting of monitoring hardware. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect sealed electrical components for condensation buildup. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect wiring and hardware for signs of damage from vandalism or animal damage. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Routine system maintenance to include correction of loose electrical connections, ground connections, replacement of defective modules found during testing, other minor maintenance repair work. Tree trimming, and plant trimming work not included.
- Routine DAS maintenance to include sensor calibration and data integrity check.

1.3.2 TROUBLESHOOTING, INSPECTION AND ADDITIONAL REPAIRS

- Dispatch of field services resources within two business days for repairs up to three times per year or as deemed necessary by Operator.
- Major system repairs, not to include mid-voltage switchgear or transformers.
- The Project Owner agrees to permit Town staff to enter the property at reasonable times and in a reasonable manner for the purpose of inspection.

1.3.3 REPORTING

- Monthly Production report will be available online to the Project Owner personnel.
- Annual Performance report will be sent electronically to the Project Owner personnel.
- O&M Manual updates. Complete versions of new editions to be delivered electronically to the Project Owner staff as they become available.
- As Built drawing updates, as necessary.

1.3.4 OTHER SYSTEM SERVICES

Facility staff training, one time per site which will include the follow basic training items:

- General Inspection: A full visual and physical inspection of all systems components and their immediate surroundings carried out in accordance with inspection checklists.

- Safety: Operator will train Project Owner staff on how to safely shut down the system.
- Tree Trimming/Plant Trimming: Operator will train Project Owner staff on what vegetation near structures that need to be trimmed as required by local site conditions.
- Structure Maintenance: Necessary preventive maintenance may be performed on system structural components to ensure continued safe and effective operation.
- The basics of performing a visual inspection: Checklist review with Operator.
- Performance characterization, as determined by Operator.
- O&M Manuals – additional copies, as needed. Updated editions of O&M manuals will be sent electronically to the Project Owner as they become available.
- Management of long-term service and warranty agreements, ongoing. Operator shall provide Project Owner local DFD/AFSD with updates as required.

1.3.5 INVERTER REPAIR

Component replacement and refurbishment as required, in the event of a failure.

INVERTER INSPECTION AND REGULAR SERVICING

As required under inverter manufacturer's warranty specifications. Include but are not limited to the following, one time annually:

- Check appearance/cleanliness of the cabinet, ventilation system and all exposed surfaces.
- Inspect, clean/replace air filter elements.
- Check for corrosion on all terminals, cables and enclosure.
- Check all fuses.
- Perform a complete visual inspection of all internally mounted equipment including subassemblies, wiring harness, contractors, power supplies and all major components.
- Check condition of all the AC and DC surge suppressors.
- Torque terminals and all fasteners in electrical power connections.
- Check the operation of all safety devices (E-stop, door switches)
- Record all operating voltages and current readings via the front display panel.
- Record all inspections completed.
- Inform Manufacturer of all deficiencies identified.
- Manufacture will be responsible for the In-Warranty replacement of failed inverter components, parts and labor.

1.3.6 SERVICES UNDER THE FOLLOWING WARRANTIES

- 20-year warranty for inverters.
- 25-year warranty for PV Modules.

Final O&M plans are subject to revision based on O&M provider or Original Equipment Manufacturer recommendations without notice

BLUEWAVE

PRELIMINARY BATTERY ENERGY STORAGE SYSTEM OPERATIONS AND MAINTENANCE PLAN

1 GENERAL PROTOCOL

1.1 Contact Information

The primary points of contact for operations & maintenance related issues are as follows:

Owner

BWC Wades Stream, LLC with a facility address of 190 Ridge Rd, Worthington, MA
BlueWave
Phone: 617-209-3122 (General phone number listed here to be updated with project specific number between Mechanical Completion and Substantial Completion)
Email: assetmgmt@bluewave.energy

[Manufacturer]

XXXXXX (To be finalized prior to construction)
(XXX) XXX-XXXX (To be finalized prior to construction)
XXXX@XXXX.com (To be finalized prior to construction)

1.2 Safety Guidelines & Equipment

In the event of an emergency, immediately call 911 to alert local first responders. Emergency signage will be posted on-site for both the Local Fire Department and the contact of the Owner/Operator.

Owner/Operator will dispatch designated operational staff within 2 hours in the event of an emergency, and approximately 12 hours in the event of a non-emergency. In the event of an emergency, the Emergency Response Plan (ERP) on file with the Municipality and Local Fire Department should be referenced and appropriate procedures followed.

The Battery Energy Storage System (BESS) contains a number of high voltage AC and DC components and equipment. Only certified and [Manufacturer] approved technicians are authorized to conduct maintenance work on the system. Before performing work on the system, necessary Lockout-Tagout (LOTO) procedures should be followed to de-energize the system and fully disconnect the system from AC power. Proper procedures for de-energization should be referenced in the comprehensive Maintenance Manual provided by the system manufacturer prior to performing any maintenance tasks.

Equipment

All technicians and personnel performing work on the system are required to wear personal protective equipment (PPE) including but not limited to:

- Long pants and shirt (FR rated)
- Insulated gloves (See Arc Flash Study for required Protective Category)
- High visibility safety vest (FR Rate)
- Hardhat
- Eye protection
- Safety toe boots
- Arc Flash Personal Protective Equipment as needed or required by manufacturer

The following equipment and hand tools are required when performing work on the system, including but not limited to:

- 1,000V Multimeter
- 1,5000 Vdc Multimeter
- Proving Unit
- Test Leads
- Data Cable Test Unit
- Infrared Camera
- Electrostatic Discharge (ESD) Ground Wristband
- Insulated wrenches, ratches, and screwdrivers and other tools meeting IEC 60900

Additional equipment and safety procedures may be required and implemented during the operation of the system. All equipment must have valid calibration certifications if applicable.

2 OPERATION & MAINTENANCE ANNUAL SCHEDULE

O&M ANNUAL SCHEDULE		
Component Category	Service Descriptions	Frequency
Thermal Management System	Thermal management system inspection	Semi-Annual
	Thermal management system maintenance	Semi-Annual
	Motor Lubrication	Semi-Annual
	Clean Filters by rinsing with Water	Semi-Annual
	Electric Heater - Dust accumulation on the coil, signs of overheating on the heater frame, traces of water or rust on the electric heater control box.	Semi-Annual
	Coolant tester Visual inspection	Annual
Fire Safety System	Fire alarm and detection system inspection	Annual
	Fire alarm and detection system maintenance	Annual
	Fire suppression System Inspection	Annual
Battery	Set battery maintenance (system check, cell balancing)	Annual

	Battery cable, appearance, grounding, dust removal	Annual
	Inspect battery management system alarms	Annual
	Visual inspection of all electrical terminations using thermal imager	Semi-Annual
Enclosure	Dust removal	Annual
	Inspect cable entry, grounding, sealing, dust removal	Annual
Reporting and Diagnostics	Inspection, maintenance reports and recommendations	Monthly
	Technical support and fault diagnosis	As required
	Data server connectivity check	Monthly
	Inspect battery running status, provide operating recommendations and maintain battery	Monthly
	System configuration check	Annual
General/ Miscellaneous	Auxiliary equipment maintenance and inspection	Annual
	Critical sensor calibration check	Annual
	Maintenance report	Annual
24/7 Monitoring	System is remote monitored 24/7 at the cell and enclosure level for voltage, temperature, and atmospheric conditions.	N/A

Dispatch Commitment	24 hrs. In emergency, first responders will dispatch to site once fire alarm signal received, owner dispatch to follow as soon as possible.	
Three (3) Corrective Maintenance Troubleshooting Dispatches (total of 24 hrs.)	Baseline assumptions of 3 corrective maintenance visits per year	Annually

3 PREVENTATIVE MAINTENANCE AND SYSTEM SERVICES

3.1 Lifetime System Services

PREVENTIVE MAINTENANCE SITE VISITS

One time, annually, additional at request and expense of Project Owner for:

- System testing (voltage/amperage)
- System visual inspection and necessary corrections, excluding cost of replacement components:
- Inspect for stolen, broken or damaged equipment, record damage and location. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect wiring for loose connections and wire condition. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect string controllers for damage and general condition. Inspect AC and DC fuses for replacement if needed. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect HVAC unit components for rust, damage, and general condition. Check condensate drain lines and refrigerant levels as required. Inspect exhaust outlets and bottom of unit for pooling, inspect and replace all filters as needed. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner,

present proposal and wait for authorization on a course of action from the Project Owner.

- Verify proper system grounding is in place from enclosures to the inverter. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check conduits and raceways for proper anchorage to structures. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect all enclosure metallic parts for corrosion. Inspect ESS labels and insure they match subpanel interior break. Verify that all enclosure doors, hinges and seals are in proper working order. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect all wiring connection for signs of poor contact at terminals (burning, discoloration, etc.). Verify all conductor connections and network cables are tight and solidly connected. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Visually inspect all interior components of the ESS enclosures for signs of damage, discoloration, water ingress, or deterioration. Inspect all batteries and battery management systems for signs of damage, discoloration, water ingress, or deterioration. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect disconnection for proper operation. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Survey entire jobsite for debris or obstructions. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal, and wait for authorization on a course of action from the Project Owner.
- Inspect fasteners for proper torque and corrosion. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner,

present proposal and wait for authorization on a course of action from the Project Owner.

- Inspect inverter pad for cracking or settling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect electrical hardware for proper warning and rating labeling. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Review as built documentation as needed and update as built documentation as changes are required.
- Inspect enclosure footings, anchor bolts, and alignment to identify settling foundation or loose attachments. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Check proper operation and reporting of monitoring hardware. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect sealed electrical components for condensation buildup. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Inspect wiring and hardware for signs of damage from vandalism or animal damage. Operator to resolve issues as needed under the terms of this O&M contract, the EPC Contract or Manufacturer's Warranty. If any costs are to be incurred by the Project Owner, Operator will notify the Project Owner, present proposal and wait for authorization on a course of action from the Project Owner.
- Routine system maintenance to include correction of loose electrical connections, ground connections, replacement of defective fuses, other minor maintenance repair work. Tree trimming, and plant trimming work not included.
- Routine DAS maintenance to include sensor calibration and data integrity check.

TROUBLESHOOTING, INSPECTION AND ADDITIONAL REPAIRS

- Dispatch of field services resources within 12 hours for repairs up to three times per year or as deemed necessary by Operator.
- Major system repairs, not to include mid-voltage switchgear or transformers.
- The Project Owner agrees to permit Town staff to enter the property at reasonable times

and in a reasonable manner for the purpose of inspection.

REPORTING

- Monthly Production report will be available online to the Project Owner personnel.
- Annual Performance report will be sent electronically to the Project Owner personnel.
- O&M Manual updates. Complete versions of new editions to be delivered electronically to the Project Owner staff as they become available.
- As Built drawing updates, as necessary.

OTHER SYSTEM SERVICES

Facility staff training, one time per site which will include the follow basic training items:

- General Inspection: A full visual and physical inspection of all systems components and their immediate surroundings carried out in accordance with inspection checklists.
- Safety: Operator will train Project Owner staff on how to safely shut down the system.
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- Structure Maintenance: Necessary preventive maintenance may be performed on system structural components to ensure continued safe and effective operation.
- The basics of performing a visual inspection: Checklist review with Operator.
- Performance characterization, as determined by Operator.
- O&M Manuals – additional copies, as needed. Updated editions of O&M manuals will be sent electronically to the Project Owner as they become available.
- Management of long-term service and warranty agreements, ongoing. Operator shall provide Project Owner local DFD/AFSD with updates as required.
- Stormwater and Drainage Structure Maintenance: See Stormwater Report and associated BMP O&M and Long-Term Maintenance Plan on file with the Municipality for proper stormwater BMP maintenance schedule and procedures.

NVERTER REPAIR

Component replacement and refurbishment as required, in the event of a failure.

NVERTER INSPECTION AND REGULAR SERVICING

As required under inverter manufacturer's warranty specifications. Include but are not limited to the following, one time annually:

- Check appearance/cleanliness of the cabinet, ventilation system and all exposed surfaces.
- Inspect, clean/replace air filter elements.
- Check for corrosion on all terminals, cables and enclosure.
- Check all fuses.
- Perform a complete visual inspection of all internally mounted equipment including subassemblies, wiring harness, contractors, power supplies and all major components.

- Check condition of all the AC and DC surge suppressors.
- Torque terminals and all fasteners in electrical power connections.
- Check the operation of all safety devices (E-stop, door switches)
- Record all operating voltages and current readings via the front display panel.
- Record all inspections completed.
- Inform Manufacturer of all deficiencies identified.
- Manufacture will be responsible for the In-Warranty replacement of failed inverter components, parts and labor.

SERVICES UNDER THE FOLLOWING WARRANTIES

- 20-year warranty for inverters & batteries.

3.2 Notice of Transfer

Should the property or any portion of the property be transferred to another owner, the relevant Authorized Administrative Agency will be notified. The new owner will be notified of the presence of this Operation and Maintenance Plan and be held responsible for the implementation of this plan and financing as it pertains to their property.

Final O&M plans are subject to revision based on O&M provider or Original Equipment Manufacturer recommendations without notice