ARUP

Town of Medway

Battery Energy Storage Consulting

Guidance for BESS Siting

Reference:

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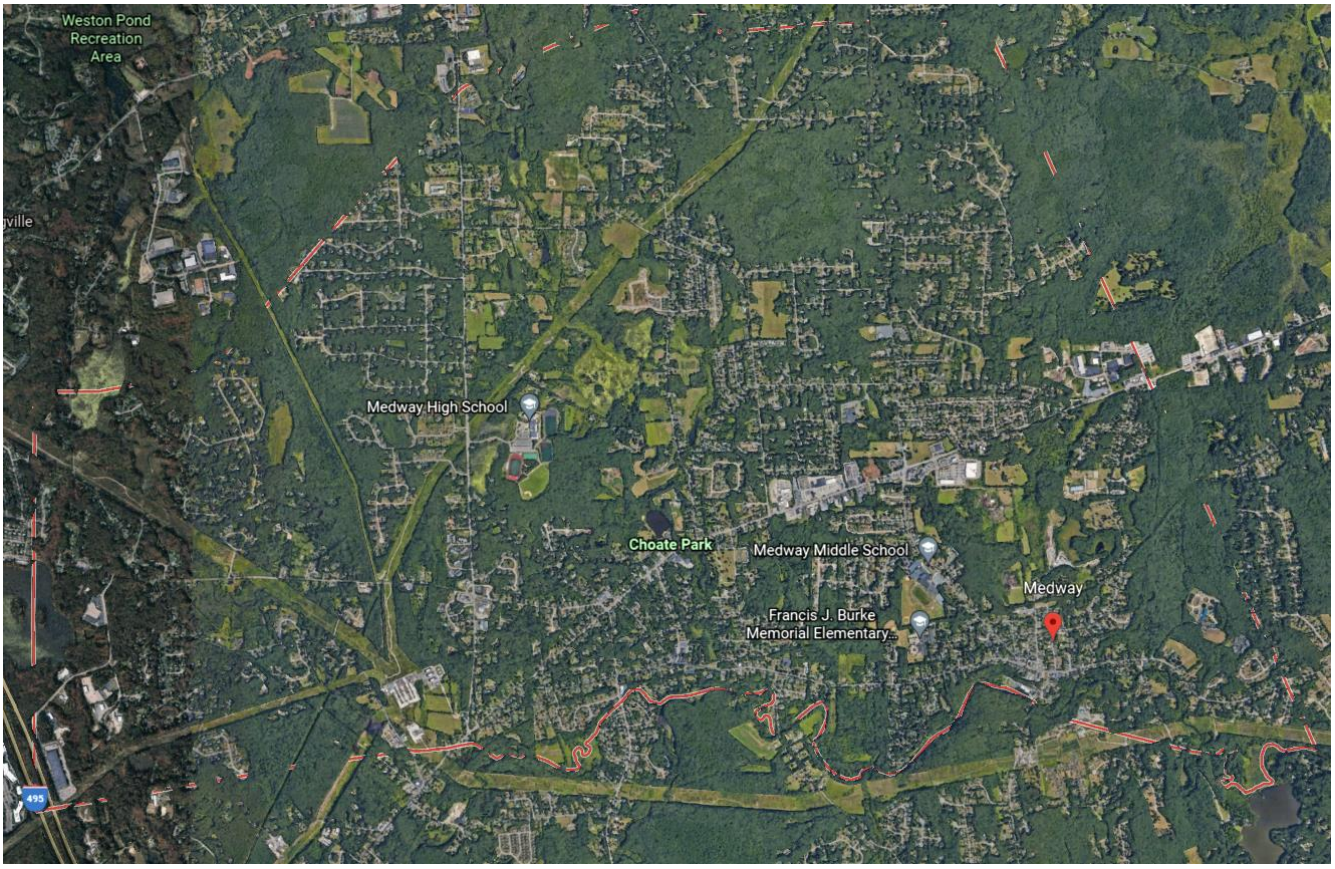

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1. Introduction

As part of the Town of Medway's ongoing efforts to enhance their knowledge of Battery Energy Storage Systems (BESS), this report has been prepared to summarize guidelines and technical information related to the siting of BESS facilities. The objective of the report is to provide technical information related to BESS siting which the Town can reference when considering how to implement BESS within their community. The Town is advised to carefully consider how the information provided in this memorandum could be modified to suit local conditions, comprehensive plans, and existing land use and zoning provisions. This information includes National and Federal Code reviews, Massachusetts state regulations, similar projects, and industry-leading manufacturers.

Although this report provides technical information, it builds off other work that has been performed and is not intended to be a complete reference. BESS installations are highly configurable and can be coordinated to provide stakeholders with a multitude of benefits. Like all energy infrastructure improvements, BESS units do have challenges that should be considered during the design and planning phases.

The report serves primarily as a review of lithium-ion (li-ion) batteries but will also touch on other battery chemistries where relevant to provide context.

2. Setback Distances and Separations

BESS to be installed shall be setback from buildings and property lines, hazardous materials a minimum distance. The setbacks shall be determined by the most restrictive of the following:

1. A minimum of 10 feet as described in NFPA 855
2. As defined in the Town of Medway Zoning Bylaw Section 6, Table 2 Dimensional and Density Regulation

The Zoning Board of Appeals may increase the minimum setback distance as appropriate based on site-specific considerations and technological innovations in the design of BESS systems.

BESS equipment separation shall be 3 feet, unless specifically approved by UL 9540A large-scale test results, as described in NFPA 855.

3. Noise Control

BESS facilities would be required to comply with the existing requirements within Medway Zoning Bylaw 7.3 Environmental Standards, D.2 which imparts restrictions on continuous noise measured both at the property line and at select Sensitive Receptors, as defined by the zoning bylaw. A site-specific noise study and evaluation could be used to evaluate compliance with Medway Zoning Bylaws. The noise study could be requested by the Town of Medway prior to zoning approval of a BESS project and should be in accordance with the provisions outlined in the Town of Medway Zoning Bylaw, Section 7.3.

Noise studies generally begin with noise measurements taken at the site to collect information on the ambient or baseline noise level. The expected noise generated is then calculated for the specific equipment to be located on site and compared against zoning regulations. It should be noted that the term "ambient noise" is defined within Medway Zoning Bylaw 7.3 Environmental Standards, D.2.

Potential sources of noise generation associated with BESS facilities include:

- **BESS cooling fans**. The primary source of noise generated by the facility when it is operational is the mechanical cooling fans that serve BESS containers. These fans are similar in size and operation to standard mechanical Heating, Ventilation and Air Conditioning (HVAC) units provided for buildings and are expected to generate similar levels of noise. Each outdoor BESS container would be expected to contain its own exhaust fan on the roof or sides of the container.
- **Electrical support infrastructure**. Electrical equipment will be needed to support BESS facilities. Electrical support equipment include transformers, substations, and the BESS units themselves.

Common methods to provide noise control for BESS and electrical facilities are described below.

- **Barriers or walls.** Barriers such as walls, deflectors, or noise-absorbing panels can be placed between noise-generating equipment and adjacent properties or locations where noise is a concern.
- **Separation distance.** Move noise-generating equipment away from sensitive receptors.
- **Site Location.** Locating BESS facilities within existing areas with high ambient noise levels will lessen the impact of a BESS facility on its surroundings.

Two common examples of noise barriers include product solutions and stick-built solutions.

- Product solutions are manufacturer-provided noise barriers designed to be placed between noise sources and sensitive receptors. Barriers typically are provided with absorptive materials or lightweight modular panels or louvers. An example of a product solution noise barrier is shown in **Figure 1**.

Figure 1: Example of Product Solution Noise Barrier[1]

[1] Figure courtesy of https://noisebarriers.com/barrier-walls.htlm

- Stick-build solutions are constructed in-field and generally involve concrete, brick, or block wall construction that is designed to have low-performance sound transmission required to adequately isolate noise from the equipment to the surrounding environment. Weather-resistant sound absorbing material is normally provided on the interior wall face to control noise buildup within the enclosure or behind the barrier. Where Product solutions build this into the product, stick-built generally provide these materials on the inside of the walls. An example of a stick-build noise barrier is shown in **Figure 2**.

Figure 2: Example of Stick-Built Noise Barrier Solution[2]

The height of noise barriers is typically determined as a function of distance. The closer the noise-generating equipment is to property lines or other sensitive receptors, the taller the noise barrier will need to be in order to reduce noise generation at the point of measurement.

4. Feasibility of Electrical Interconnection

BESS facilities to be located and laid out to facilitate interconnection with the local utility or facility. Wherever possible incoming electrical feeders and connections should be below-grade. Below-grade connections result in higher overall levels of resiliency as above-ground connections could be impacted by storms, wind, and other environmental factors.

5. Vegetation Control

NFPA 855 requires the area for 10 feet surrounding BESS equipment to be cleared of combustible vegetation. The exception to this is for single specimens of trees, shrubs, or plants that may burn but would not otherwise lead to the uncontrolled spread of fire.

Acceptable ground coverings include well-manicured and maintained green grass or other types of non-combustible surfaces.

[2] Figure courtesy of Arup US, Inc.

6. Security and Impact Protection

BESS Facility shall comply with the National Electrical Code (NFPA 70) to limit access to authorized personnel. Equipment with voltage ratings above 1000 VAC shall have a physical barrier (e.g. fences, wall, equipment enclosures) which limits access to authorized personnel while adhering to regulations. Where the BESS components are susceptible to impacts from a vehicle, or equipment mitigation measures must be proposed to protect the BESS Facility.