

Guy Corbosiero, Chair
Winchendon Planning Board
109 Front Street, Dept 10
Winchendon, Massachusetts 01475

March 27, 2023

RE: Project Impact Statement
Solar Energy Storage System (ESS)
ZP Battery DevCo, LLC
#256 Murdock Avenue (Map 2D2/11)

Dear Mr. Corbosiero,

On behalf of our client, ZP Battery DevCo, LLC, Hannigan Engineering, Inc. is submitting the following Impact Statement as is required for Site Plan Approval for the application to construct a Solar Energy Storage System (ESS) at #256 Murdock Avenue in Winchendon, Massachusetts (Map/Parcel 2D2/11). We offer our review of the project below with additional information associated with this project included in the Appendix.

Existing Conditions

The property currently contains an existing industrial building with applicable gravel and paved access and parking areas. The periphery of the property is comprised of woodlands and wetland resource areas. Areas subject to protection under the Wetlands Protection Act were reviewed by LEC Environmental Consultants and are depicted on the Site Plans. These areas include Bordering Vegetated Wetlands (BVW) located along the westerly side of the property as well as a smaller area located along the easterly side, these two wetland areas are not hydraulically connected to one another. As such a filing with the Winchendon Conservation Commission is being concurrently There are no documented areas subject to the Natural Heritage review nor any documented FEMA Flood Areas.

The portion of the site where the systems will be located (Parcel 5A2/26) generally slopes in a westerly direction towards the aforementioned wetland area along the westerly property line. there is a second BVW area located to the east of the development which the site does not discharge towards.

Per Natural Resource Conservation Service (NRCS), the property is generally underlain with loamy lodgment glacial till, typical of the area, with a Hydrological Soil Group classification of C (HSG-C). Reference is made to *Table 1: Soil Classification* for the list of mapped soils.

Table 1: Soil Classification.

<u>Soil Designation</u>	<u>Soil Name</u>	<u>Hydrological Group Class</u>	<u>Parent Material (Per NRCS)</u>
908C	Becket-Skerry Association	C	Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist
917B	Pillsbury-Peacham Association	C/D	Friable coarse-loamy eolian deposits over dense coarse-loamy lodgment till derived from granite and gneiss

On-site soil excavations were performed to observe the in-situ soil conditions of the site. These were performed by this office in February of this year. Soil observations generally confirmed the mapped soils with an Estimated Seasonal High Groundwater Table (ESHGWT) of approximately 40" within the project area. Soil logs are provided in Appendix A.

Proposed Development

The project entails the construction of a standalone solar Energy Storage System (ESS) with an estimated capacity of approximately 5-Megawatt AC on the property. The proposed storage systems will be located along rear portion of the existing structure at the northern corner of the property. Unlike ground-mounted Solar Energy Systems that involve the generation of energy, this facility is utilized purely for the storage of energy generated from area solar systems connected to the grid.

As part of the initial site preparation, appropriate erosion control measures will be installed to prevent the transport of soils and sediments to the lower elevations of the site. The site development will consist of the installation of four (4) concrete pads on which the eight (8) ESS units will be situated. Additional electrical components and transformer pads will also be installed to allow the eventual interconnection to the grid. The electrical equipment has been isolated into a single fenced in area. The overall layout of the development has been designed to accommodate larger vehicle traffic, utilized for deliveries as well as emergency vehicles. The total area of alteration associated with the project will be approximately 25,000 square feet.

Specific area tabulations are provided below within *Table #2: Proposed Development Calculations*.

Table 2: Proposed Development Calculations

Total Site Area	<u>Lot 2D2/11</u>	
	3.75 Acres	
	Total Area	% of Lot Area
Wetland Areas	0 sf	0%
Drainage Area	630 sf	7.9%
Existing Impervious Coverage*	128,224sf	78.4%
Proposed Impervious Coverage*	132,356 sf	81.0%
Open Space	30,994 sf	19.0%
Total Area of Disturbance	25,000 sf	15.3%

*Impervious coverage is defined as *Low Impact Development (LID) Regulations for the Town of Winchendon Section 2 Definitions*; IMPERVIOUS SURFACE: Any material or structure on or above the ground that prevents water from infiltrating through the underlying soil. Impervious surface is defined to include, without limitation: paved parking lots, sidewalks, roof tops, driveways, patios, paved recreation areas and paved, gravel and compacted dirt surfaced roads.

The anticipated list of permits required for this development area as listed below:

- Site Plan Approval- *Town of Winchendon Planning Board*
- Low Impact Development (LID)- *Town of Winchendon Planning Board*
- Order of Conditions (OOC) -*Town of Winchendon Conservation Commission*
- General Construction Permit (CGP) – *Environmental Protection Agency (EPA)*
- Building Permit - *Town of Winchendon Building Department*

Transportation

Access to the site will be provided via the existing gravel/paved loading area at the rear of the existing building. A 24-foot-wide gravel driveway is proposed to extend easterly into the development. This driveway will provide access to a single fenced area, that contains the applicable electrical components. The gravel driveway is intended to provide access to the site on a periodic basis for general maintenance and inspections of the facility. This access drive will allow for smaller emergency vehicles or service vehicles to enter the site. If in the event of a larger emergency vehicle entering the area, they would utilize the existing loading area to gain access to the project as it is in close proximity to the area.

Due to the nature of the development upon the completion of construction, it is expected that the vehicle traffic will be limited to a few trips per month to perform maintenance on the stormwater and electrical infrastructure and to inspect the overall site for deficiencies. As such vehicular traffic for this development is expected to be minimal.

Construction

It is anticipated that the construction of the project will occur in a single phase and take approximately three to six months to complete. Construction activity will occur during typical business hours Monday through Friday as allowed by the Bylaws and as permitted by the Planning Board. The construction will commence with the clearing of the site and installation of erosion control measures. The site work would then continue with the installation of site utilities and infrastructure including the installation of drainage facilities depicted on the plans. Electrical conduit runs and subsurface equipment pads including containment pads as may be required will be installed as part of this work.

During construction, the entire perimeter of the construction area will be bounded by straw wattle and silt-fence to provide sedimentation and erosion control. Additionally at the entry points of the construction area a construction tracking pad will be installed to mitigate tracking of sediment onto Murdock Avenue. Upon the completion of daily earth moving operations, the roadway will be cleared of any sediment present. Street sweeping will be performed if conditions warrant. The site would then be finished with the installation of the gravel drives, concrete pads, and stabilization with loam products.

During construction it is expected that earthen materials will be live loaded or temporarily stockpiled near the center of the development for export. Any stockpiling of earthen materials will be surrounded by an additional line of straw wattles to prevent migration. Should stockpiles be anticipated to be in place for any period of 14 days or more during dry conditions, this may result in excessive dust. In this case, the stockpiles shall be stabilized with appropriate measures which may include temporary mulching or hydroseeding. Upon the completion of earth moving activities the disturbed areas will be immediately stabilized with crushed stone or loam and seed depending on location.

Based upon preliminary volumetric analysis it is expected that approximately 80 cy of additional material will be required to facilitate the construction to subgrade. It is anticipated that approximately 360-cubic yards of materials would be imported to the site consisting of gravel, crushed stone and concrete. Materials to remain on site for final grading as well as materials brought to the site for construction will be stored appropriately with additional erosion control measures as needed. It is anticipated that new materials will be purchased from local suppliers. Reference is made to Appendix B for the cut-fill analysis.

Upon the completion of construction, the site will be graded as to prevent any ponding, and runoff will be transmitted to a rain garden feature to provide mitigation of stormwater impacts. To prevent erosion from stormwater discharges a rip-rap apron has been provided and sized per the Connecticut DOT Drainage Manual to accommodate the anticipated flows from the 100-year storm event.

At this time, the final construction costs have not been determined. Final anticipated construction costs will be provided to the Town via the Building Department prior to Construction for review to determine if a performance bond is warranted.

Public Utility

Due to the nature of the development, there is no need for water supply or sewage disposal for the project. Additionally, the need for solid waste disposal facility (dumpster) is not anticipated for the project. Upon the completion of construction, the ESS does not require these amenities. Relative to stormwater, the project has been designed with an on-site drainage system to accommodate post development flows. Reference is made to the Stormwater Drainage Analysis and Report for review of the drainage system and its compliance with local and state regulations.

Conservation and Recreation

The property currently contains an existing industrial building with applicable gravel and paved access and parking areas. The periphery of the property is comprised of woodlands and wetland resource areas. Areas subject to protection under the Wetlands Protection Act were reviewed by LEC Environmental Consultants and are depicted on the Site Plans. These areas include Bordering Vegetated Wetlands (BVW) located along the westerly side of the property as well as a smaller area located along the easterly side, these two wetland areas are not hydraulically connected to one another. As such a filing with the Winchendon Conservation Commission is being concurrently There are no documented areas subject to the Natural Heritage review nor any documented FEMA Flood Areas.

The portion of the site where the systems will be located (Parcel 5A2/26) generally slopes in a westerly direction towards the aforementioned wetland area along the westerly property line. there is a second BVW area located to the east of the development which the site does not discharge towards.

Per Natural Resource Conservation Service (NRCS), the property is generally underlain with loamy lodgment glacial till, typical of the area, with a Hydrological Soil Group classification of C (HSG-C). Reference is made to *Table 1: Soil Classification* for the list of mapped soils. On-site soil excavations were performed to observe the in-situ soil conditions of the site. These were performed by this office in February of this year. Soil observations generally confirmed the mapped soils with an Estimated Seasonal High Groundwater Table (ESHGWT) of approximately 40" within the project area. There was no evidence of ledge within the excavations performed. Soil logs are provided in Appendix A.

Surface runoff from the site will be captured and treated with a stormwater management system that complies with state and local regulations. Additionally, there are no direct wastewater discharges into the subsurface soils as part of the development. As such it is expected that the impacts to surface and subsurface water quality will be mitigated. Areas outside of the limits of disturbance are intended to remain in their natural state as a woodland.

Sustainable Energy Element

The project entails the construction of Solar Energy Storage System (ESS) which directly provides an enhancement to the development of sustainable energy. The purpose of the system is to capture excess energy within the grid during peak solar hours, which are typically during the middle of the day when the sun is at its highest point in the sky. This time also correlates to lower residential energy use as most residential users are at their place of employment. This is the predominant disconnect with solar energy systems. The time of day they produce the most energy is not necessarily the time of day when the most energy is utilized. The ESS systems tie directly into the grid and allow the excess energy to be captured and stored during these peak solar hours. These systems then allow for the control release of the energy during the off-peak solar hours which usually occur in the morning and evening times of day. This translates into a more efficient use of solar energy within the grid.

Aesthetics

The proposed ESS System is comprised of metal storage containers utilized to store the battery systems and does not contain any structures intended for occupancy. These units will be located within a fenced area near the rear of the existing building and will not be visible from Murdock Avenue. The other sides of the project will rely on the remaining woodland areas to provide a visual barrier to the site. Additionally, typical surface lighting is not anticipated for the project aside from a motion activated light near the electrical components. As typical maintenance activities occur during daylight hours, the need for additional lighting is not required. Reference is Made to Appendix C for Typical Rendering of an ESS System.

Neighborhood and Community Element

The area around the project is a general mix of uses. To the south there are few residential properties; to the existing land of the surrounding area is generally vacant. The project is located on a dead-end portion of Murdock Avenue with the terminal end leading to the existing industrial building. As such traffic within this area is limited to the traffic associated with the industrial building. As the project is relatively secluded, impacts to the neighborhood and surrounding area are not anticipated.

Impacts to the Town of Winchendon School system are not anticipated as there is not a residential component to the project. The project also does not anticipate a significant requirement for police services. Potential vandalism of the site has been considered and mitigated with the project being encompassed by a security fence which would inhibit unauthorized access to the components.

The project does require the specialized training of fire department personnel relative to the appropriate methods of controlling a fire on site if it were to occur. Emergency power shut offs are provided outside of the fenced area for immediate action. A dry-hydrant fire suppression system is provided to each of the containers within the battery storage system. These are also located outside of fenced area and are marked with designations to allow the fire department personnel to immediately apply fire suppressants to the specific container. Knox Boxes are provided at all gate entry points to allow for immediate access if so required.

As part of the project submittals, a draft Emergency Response Plan is provided for the project. Prior to Certificate of Occupancy, this Emergency Response Plan will be finalized and reviewed with appropriate Town Departments to address potential emergency situations as they may arise.

The project works in conjunction with the Master Plan of the Town by providing and improving green development within the Town. Deficiencies in the existing electrical grid system in this area will be enhanced with

improvements in the efficiency of the solar energy system. This reduces the need to rely on conventional energy sources.

Social-Economic Element

It is not anticipated that the project will result in an increase in population or housing as there is not an associated residential component. Furthermore, upon the completion of construction the occupational force present on the property will be reduced to periodic maintenance. As such, the project does not add to the housing need within the Town or the region.

Municipal Benefit/Cost Element

The project is expected to provide a significant benefit without financial impacts on the Town. The project would bring additional tax dollars to the Town in the form of increased property value. As discussed, the project does not have a residential component that could result in school age children. Thus, there would be no financial impact on the school system. Additionally due to the general innocuous use to the project, significant traffic generation or requirement for municipal services is not anticipated. The combination of additional tax dollars without significant expenses on the Town provides for an overall benefit.

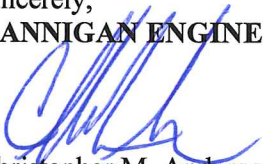
Waste Generation and Disposal

Upon the completion of construction, the site will not generate a regular waste stream which will require disposal. During construction a waste dumpster will be provided to dispose of trash and debris generated during construction. This dumpster will be emptied on a periodic basis as needed and will be removed from the site upon completion of construction. Additionally, the project is not expected to generate hazardous waste materials.

Hannigan Engineering, Inc. is submitting this information in association with the Site Plan Approval application with the Planning Board. Should you require additional information prior to the meeting, please do not hesitate to contact this office. We appreciate your continued assistance in this process as we look forward to working with you to obtain the anticipated approval of this project.

Sincerely,

HANNIGAN ENGINEERING, INC



Christopher M. Anderson, PE
Project Engineer



William D. Hannigan, PE
President

pc: Pete Forte, ZP Battery DevCo,LLC
Tom Corbett, ZP Battery DevCo,LLC

J:\My Documents\PROJECTS\3100+3101-ZP Winchendon\Planning\Site A\3101-Planning Impact Statement.docx

Appendix A
Soil Observation Logs



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

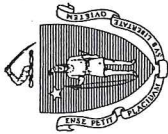
BOSTWICK REALTY TRUST
 Owner Name
 256 MURDOCK AVENUE
 Street Address
 WINCHENDON
 City
 MA
 State
 01475
 Zip Code
 2D2/11
 Map/Lot #

B. Site Information

- (Check one) New Construction Upgrade
- Soil Survey NRCS Source 908C Soil Map Unit
 MORRAINE NONE Soil Series
 Landform Soil Limitations
- Soil Parent material LODGMNT GLACIAL TILL
 Surficial Geological Report
 Year Published/Source Map Unit

Description of Geologic Map Unit:

- Flood Rate Insurance Map Within a regulatory floodway? Yes No
- Within a velocity zone? Yes No
- Within a Mapped Wetland Area? Yes No
- Current Water Resource Conditions (USGS): 02/23 Month/Day/ Year
 Range: Above Normal Normal Below Normal
 Wetland Type
- Other references reviewed:
 (Zone II, IWPA, Zone A, EEA Data Portal, etc.)



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 0223-1 Hole # 2/19/23 Date 9:00 Time 9:00 Weather SUN Longitude _____ Latitude _____

1. Land Use WOODLAND DECIDUOUS NEW NONE Slope (%) 0-5
(e.g., woodland, agricultural field, vacant lot, etc.) Vegetation Surface Stones (e.g., cobbles, stones, boulders, etc.)

Description of Location: IN CENTER ISLAND WITHIN LOADING AREA

2. Soil Parent Material: GLACIAL TILL MORRAIN ON SLOPE
Landform Position on Landscape (SU, SH, BS, FS, TS, Plain)

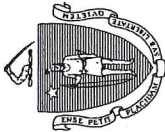
3. Distances from: Open Water Body +100 feet Drainage Way +100 feet Wetlands 80 feet
Property Line 50 feet Drinking Water Well _____ feet Other _____ feet

4. Unsuitable Materials Present: Yes No If Yes: Disturbed Soil/Fill Material Weathered/Fractured Rock Bedrock

5. Groundwater Observed: Yes No If yes: 53 Depth to Weeping in Hole _____ Depth to Standing Water in Hole _____

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	FILL			Cnc : Dpl:							
12-15	B	SA LOAM	7.5YR 5/8	Cnc : Dpl:				MASS	FIRM		
15-20	B/C	SA LOAM	7.5 YR6/6	Cnc : Dpl:				MASS	FIRM		
20-80	C	LO SAND	10YR 6/6	Cnc : Dpl:	41			MASS	FIRM		
				Cnc : Dpl:							
				Cnc : Dpl:							



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Additional Notes:

NO REFUSAL, GWO@53

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: _____

1. Land Use: _____ Hole # _____ Date _____ Time _____ Weather _____ Latitude _____ Longitude _____
 (e.g., woodland, agricultural field, vacant lot, etc.) _____ Vegetation _____ Surface Stones (e.g., cobbles, stones, boulders, etc.) _____ Slope (%) _____

Description of Location: _____

2. Soil Parent Material: _____ Landform _____ Position on Landscape (SU, SH, BS, FS, TS, Plain) _____

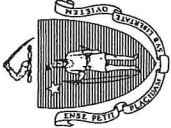
3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Wetlands _____ feet
 Property Line _____ feet Drinking Water Well _____ feet Other _____ feet

4. Unsuitable Materials Present: Yes No If Yes: Disturbed Soil/Fill Material Weathered/Fractured Rock Bedrock

5. Groundwater Observed: Yes No If yes: _____ Depth to Weeping in Hole _____ Depth Standing Water in Hole _____

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						



Commonwealth of Massachusetts
City/Town of WINCHENDON

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

CHRISTOPHER ANDERSON#14005

Typed or Printed Name of Soil Evaluator / License #

2/11/2023

Date

6/30/2025

Expiration Date of License

Name of Approving Authority Witness

Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:

Appendix B
Cut Fill Analysis

Cut/Fill Report

Generated: 2023-03-24 11:47:16

By user: canderson

Drawing: J:\DWG\WINCHENDON\Murdock Avenue\3101-ZP
Battery\J:\DWG\WINCHENDON\Murdock Avenue\3101-ZP Battery\3101-Survey.dwg

Volume Summary							
Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
volume 2	full	1.2500	1.1500	669630	1203.59*	1282.22*	78.63*

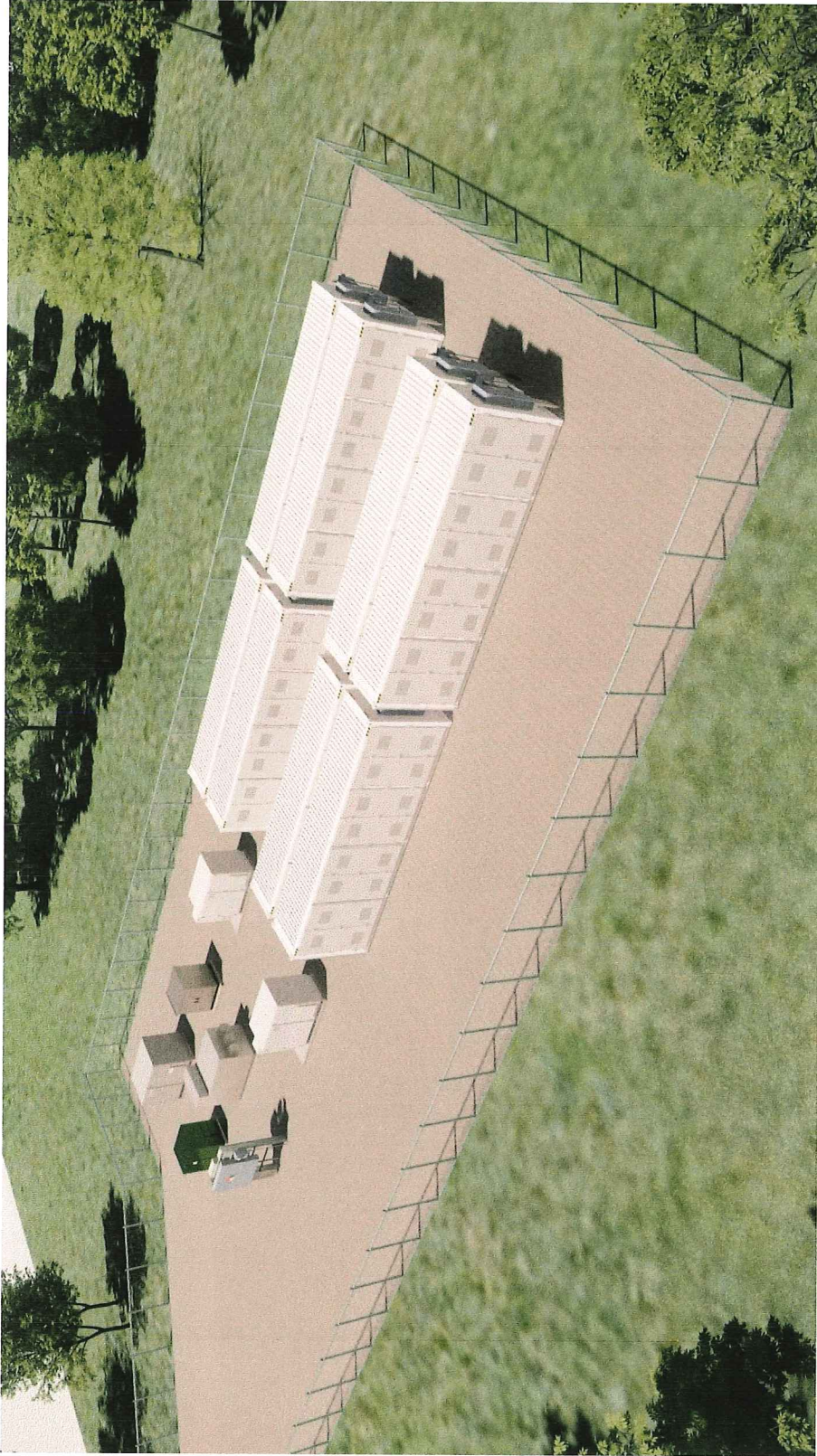
Totals					
		2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total		669630	1203.59*	1282.22*	78.63*

* Value adjusted by cut or fill factor other than 1.0

Appendix C
Visual Rendering

**CONCEPTUAL
RENDERINGS**

Energy Storage System (ESS)



5-Megawatt Facility

Appendix D
Locus Plan

256 MURDOCK AVENUE, WINCHENDON

Property Tax Parcels
USGS Topographic Maps

