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August 5th, 2022

Karen Apuzzo-Langton
Chairperson – Town of Holliston Planning Board
703 Washington Street
Holliston, MA 01746

**RE: BlueWave Holliston Battery Energy Storage Project
600 Central Street, Holliston MA
Special Permit/Site Plan Approval Application**

Dear Ms. Apuzzo-Langton,

BWC Bogastow Brook, LLC, c/o BlueWave Solar (BlueWave) is proposing to construct and operate the Holliston Battery Energy Storage Project (the Project), an approximately 5-megawatt alternating current (MWAC) Battery Energy Storage Facility located at 600 Central Street. The Project will be located on an approximately 0.2-acre portion of the parcel (Holliston Board of Assessor's Parcel ID 009.0-0004-0062.0) (Project parcel). The southwestern portion of the parcel fronting Central Street is currently occupied by a church and its associated parking lot, and the remainder of the parcel is forested open space (see maps in Attachments 1 and 2). The Project will be located on the northwestern portion of the lot, with a proposed access road to the battery storage Project tying into the existing church parking lot. The Project will connect to an existing New England Power Company (NEP) distribution line on Central Street.

On behalf of BlueWave, TRC is providing this Special Permit/Site Plan Approval package to the Town of Holliston for approval by the Planning Board. We understand that the Planning Board will send out public notice once the application is accepted at least 10 days prior to the public meeting. Bluewave and TRC are available any time to answer questions that the Planning Board or other town staff may have about this Project.

TRC and Bluewave thank you for the opportunity to provide this overview of the Project with supporting materials for the Planning Board to review and approve. We would be pleased to answer any questions you may have or to provide additional Project details. Please contact me at either (603) 391-1040 or TSudhalter@TRCcompanies.com and I will be happy to provide you with any additional information that you need.

Sincerely,

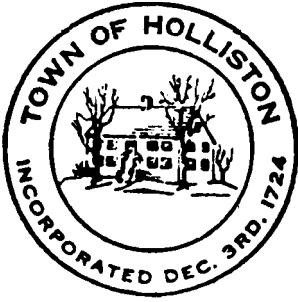
Tracy Sudhalter
Wetland and Wildlife Biologist/Project Manager

A handwritten signature in blue ink, appearing to read "Tracy Sudhalter", written over a light blue horizontal line.

Enclosures

cc:

Josh Lariscy (BlueWave)



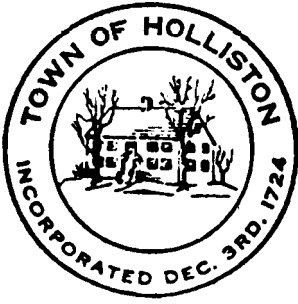
**TOWN OF HOLLISTON
PLANNING BOARD**

703 Washington Street
Holliston, MA 01746
(508)429-0635

SITE PLAN AND/OR SPECIAL PERMIT APPLICATION CHECKLIST

- ☒ **Completed** signed application (Original and 14 copies)
- ☒ Eight (8) full size plan and six 11" x 17" (6) copies of the plan set sets
(See Section 7.3)
 - Site Plan
 - Building elevations and plans
 - Depiction of proposed signs
 - Landscaping Plan
 - Lighting Plan
 - Traffic Impact Report (if applicable)
- ☒ Two drainage reports
- ☒ Certified abutters list (1 copy)
- ☒ Two sets of stamped envelopes to all abutters and six surrounding towns.
Also include one stamped envelope addressed to the Owner and Applicant
(if different than the Owner) and one certified stamped envelope. Labels
will be supplied by the Assessor's office.
- ☒ Filing Fee (Refer to fee schedule)

Please note: Failure to submit a complete application can result in a hearing continuance until the Planning Board receives all information.



TOWN OF HOLLISTON
PLANNING BOARD
TOWN HALL
HOLLISTON, MASSACHUSETTS 01746

**APPLICATION FOR GRANT OF SITE PLAN
REVIEW AND SPECIAL PERMIT**

Date Filed: _____

Applicant's Name: _____

Applicant's Address: _____

Applicant's Phone Number: _____

Owner's Name: _____

Owner's Address: _____

The Owner hereby appoints _____ to act as his/her/its agent for the purposes of submitting and processing this application for a special permit.

The Owner's title to the land that is the subject matter of this application is derived

under deed from _____, dated

And recorded in _____ Registry of Deeds, Book _____, Page _____

Or Land Court Certificate of Title No. _____, registered in

District Book _____, Page _____.

The land is shown in the Assessor's records as Lot _____ on Map _____, Block _____

And has an address of or is located at _____.

Nature and subject matter of Special Permit:

Section of Zoning Bylaw that permits this use by grant of Special Permit:

The Applicant presents the following evidence that supports the grant the Special Permit:

a. The use is in harmony with the general purpose and intent of the bylaw because:

b. The general or specific provisions of a grant of a special permit, as set forth in the zoning bylaw are satisfied because:

c. The following evidence is offered in support of the petition's compliance with the provisions of Rules and Regulations Section 7.4 Performance Standards for Non-Residential Development with regard to Aesthetics, Lighting, Landscaping and Screening, Stormwater Management Site Development Standards, Traffic Management, utilities, Security and Emergency systems and Fiscal Impact:

Designer's Certificate

I hereby certify that the plan entitled BWC Bogastow Brook BESS Project
And accompanying data is true and correct to the accuracy required by the Rules and
Regulations of the Holliston Planning Board, and my source of information about the
location of boundaries shown on said plan were one or more of the following:

- a. Deed dated _____ and recorded at the Registry of Deeds
in Book _____ Page _____;
- b. Other plans, as follows: Existing Conditions Plan, 600 Central Street in
Holliston, MA. Prepared by Land Planning Inc (MA PLS#41786)

- c. Detail and topography has been established by _____ aerial survey,
____X____ on-ground survey, other _____,
- d. Other sources, including: _____

Signed: _____

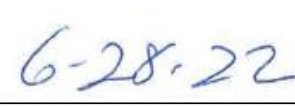
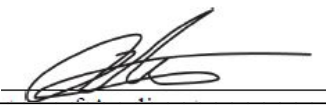


Digitally signed by Thomas N. Daniels, Jr.
DN: C=US, E=tdaniels@trccompanies.com, CN=Thomas N. Daniels, Jr.
Reason: I have reviewed this document
Date: 2022.06.04 16:43:06-04'00'

(Registered Professional Engineer or Land Surveyor)

Address: 249 Western Ave, Augusta, ME 04330 _____

Signatures

	
Signature of Owner	date
	8/4/2022
Signature of Applicant	date

**HOLLISTON PLANNING BOARD
SITE PLAN REVIEW
DEVELOPMENT IMPACT STATEMENT (DIS)**

Please type or print information in blanks below.

1. Name of Proposed Development _____
2. Location _____
3. Name of Applicant(s) _____
4. Brief Description of the Proposed Project _____

5. Name of Individual Preparing this DIS _____
Address _____
Business Phone _____

A. Site Description

7. Present permitted and actual land uses by percentage of the site.

Uses	Percentage
Industrial	
Commercial	
Residential	
Forest	
Agricultural	
Other (specify) Church	

8. Total acreage on the site: _____ acres.

Approximate Acreage	At Present	After Completion
Meadow or Brushland (non agriculture)		
Forested		
Agricultural (includes orchards, cropland, pasture)		
Wetland		
Water Surface Area		
Flood Plain		
Unvegetated (rock, earth, or fill)		
Roads, buildings and other impervious surfaces		
Other (indicate type) Church		

Development Impact Statement (Continued)

9. List the zoning districts in which the site is located and indicate the percentage of the site in each district. *Note: be sure to include overlay zoning districts.*

<i>District</i>	<i>Percentage</i>

10. Predominant soil type(s) on the site: _____

Soil drainage (Use the US Soil Conservation Service's definition)

<i>Soil Type</i>	<i>% of the Site</i>
Well drained	
Moderately well drained	
Poorly drained	

11. Are there bedrock outcroppings on the site? ____yes ____no

12. Approximate percentage of proposed site with slopes between:

<i>Slope</i>	<i>% of the Site</i>
0 - 10%	
10 - 15%	
greater than 15%	

13. What percentage of the site is located in the Groundwater Protection District?
_____%

How close is the site to a public well? _____ feet

To a surface water body? _____feet

14. Does the project site contain any species of plant or animal life that is identified as rare or endangered? (Consult with the Massachusetts National Heritage Program and the Holliston Conservation Commission).

____yes

____no

If yes, specify:

Development Impact Statement (Continued)

15. Are there any unusual or unique features on the site such as trees larger than 30 inches D.B.H., bogs, kettle ponds, eskers, drumlins, quarries, distinctive rock formations?

____yes ____no

If yes, specify: _____

16. Are there any established foot paths running through the site or railroad right of ways?

____yes ____no

If yes, specify: _____

17. Is the site presently used by the community or neighborhood as an open space or recreation area? ____yes ____no

Is the site adjacent to conservation land or a recreation area? ____yes ____no

If yes, specify: _____

18. Does the site include scenic views or will the proposed development cause any scenic vistas to be obstructed from view? ____yes ____no

If yes, specify: _____

19. Are there wetlands, lakes, ponds, streams, or rivers within or contiguous to the site?

____yes ____no

If yes, specify resources found on site or contiguous to site: _____

If yes, have the required permits been granted or applied for? Please list permits and status. _____

20. Is there any farmland or forest land on the site protected under Chapter 61A or 61B of the Massachusetts General Laws? ____yes ____no

If yes, specify: _____

21. Has the site ever been used for the disposal of hazardous waste? Has a 21E Study been conducted for the site? ____yes ____no

If yes, specify results: _____

Development Impact Statement (Continued)

22. Will the proposed activity require use and/or storage of hazardous materials, or generation of hazardous waste? ☐yes ☐no

If yes, specify_____

23. Does the project contain any buildings or sites of historic or archaeological significance? (Consult with the Holliston Historic Commission or the Holliston Historical Society.)

☐yes ☐no

If yes, please describe_____

24. Is the project contiguous to or does it contain a building in a national register district?

☐yes ☐no

B. Circulation System

(Is a Traffic Impact Report required -- > or = 100 vehicle trips per day? See s.7.3.4)

25. What is the average weekday traffic and peak hour traffic volumes generated by the proposal?

Average weekday traffic	
Average peak hour volumes morning	
Average peak hour volumes evening	

26. Existing intersection(s): list intersections located within 1000 feet of any access to the proposed development (Any within 20 feet? See s. V-C(3)(f) of Zoning):

Name of ways _____

27. Location of existing sidewalks within 1000 feet of the proposed site? _____

28. Are there parcels of undeveloped land adjacent to the site? ☐yes ☐no

Will access to these undeveloped parcels be provided within the proposed site?

☐yes ☐no

If yes, please describe_____

If no, please explain why _____

Development Impact Statement (Continued)

C. Utilities

29. Storm Drainage

a. Describe nature, location and surface water body receiving current surface water of the site: _____

b. Describe the proposed storm drainage system and how it will be altered by the proposed development: _____

c. Will a NPDES Permit be required? ___yes ___ no

30. Sewage Disposal - Describe nature of sewage disposal service proposed for the site.

If a tertiary treatment facility is proposed, will it have any excess capacity?

___yes ___no



Special Permit and Site Plan Approval Application Narrative

August 2022

Holliston Battery Energy Storage Project

**600 Central Street
Holliston, Massachusetts**

Prepared By:

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, Massachusetts 01854

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ATTACHMENTS

Attachment A: Site Locus Figure

Attachment B: Abutters List

Attachment C: Permitting Plan Set

Attachment D: Battery Specifications

Attachment E: Fire Suppression System Specifications

Attachment F: Stormwater Management Plan

1.0 Introduction

BlueWave proposes a 5 MWAC battery storage system on an approximately 0.2-acre portion of a parcel located at 600 Central Street. This proposed Project will provide increased local grid reliability as well as opportunities for lowered electricity costs during peak demand times. The Project has been designed to minimize site impacts to the greatest extent practicable. No stream or wetland impacts will result from the construction of this project.

The limit of disturbance associated with the Project is approximately 1.9 acres. The energy storage system has been designed to avoid direct impacts to wetlands and streams and to preserve forested buffers along streams and property lines, where applicable. Massachusetts Department of Environmental Protection (MassDEP) and Holliston Conservation Commission approval is not required for this project. However, BlueWave is also submitting a Request for Determination (RDA) to the Holliston Conservation Commission to confirm the Project is not within jurisdictional areas.

Construction is expected to last approximately 4-6 months and will generate typical construction noise, traffic, and dust. The contractor will be responsible for maintaining safe and secure conditions, including installing and maintaining proper erosion control measures, and managing movement of construction equipment and materials. Once operational, the Project will require preventative maintenance visits once per quarter, for a total of four visits per year at minimum. Other maintenance visits may take place in response to any abnormal site conditions, snow removal, or other events that require on-site response.

Additional Project details and descriptions are included in the remainder of this letter. TRC has also included several attachments, as listed above, to provide the Planning Board with necessary information about the Project.

2.0 Existing Conditions

The Project site is currently comprised of undeveloped forested land and is located in the northeastern portion of the parcel at 600 Central Street, which currently contains an active church and associated parking lot. The project site will be located in the undeveloped area of the parcel and access to the site will connect to the existing church parking lot. The site is gently sloping to the northeast and drains to a MassDEP mapped wetland located off-site.

The parcel is bounded to the east by a maintained transmission line right-of-way, to the south by Central Street, and to the north and west by residential properties off Central Street and Pilgrim Road. In the surrounding areas, land is mostly low-density residential and undeveloped, forested land. The parcel is privately owned by Christ the King Lutheran Church and will be leased to BlueWave for the proposed battery storage Project.

There are no state mapped or delineated wetlands or streams within the project site or within the parcel. The nearest named stream is Bogastow Brook, which is located approximately 1,100 feet from the northeast corner of the parcel. MassDEP mapped wetlands border the parcel to the northeast.

3.0 Project Description

3.1 Layout and Electrical Connection

The proposed Project includes installation of a 16-foot-wide gravel access drive with an underground electric line to the facility, electrical connection facilities, four equipment pads with inverters and auxiliary equipment, battery units stored in 2 rows of 15 interconnected units each with two additional collection units located at the ends of the rows. Three of the proposed battery segments will not be initially installed but are depicted on the plan as they will be reserved as space for future battery augmentation. A chain-link security fence will be installed around the perimeter of the facility that will be 57' x 140'. The proposed Project will be located on a crushed stone yard regraded to a maximum slope of 1 percent. Stormwater from the Project area will be directed to a Stormwater BMP to provide treatment of proposed impervious surfaces and changes in land cover. Stormwater from the surrounding area will be diverted around the crushed stone yard. A culvert will be located under the facility access drive where it connects to the crushed stone yard to convey flow from surrounding areas. At the confluence of the access road and facility yard, a 20-foot vehicle gate with provisions for a Knox Box will be located. Within the site, the access road will connect to a T-shaped NFPA compliant vehicle turnaround.

The proposed Project will result in an increase in impervious areas of approximately 23,170 square feet (SF) due to the access drive, crushed stone yard, and battery storage equipment. Approximately 21,200 SF of this will be crushed stone in the facility yard and access road, and approximately 1,970 SF of this will be concrete pad or metal electrical storage equipment. The site design effectively uses the existing grades to the maximum extent practical to minimize earthwork, but localized grading is needed to partially flatten areas of uneven terrain, work around exposed ledge, and provide a maximum slope of 1 percent. No blasting is anticipated. Preliminary site grading provided in the IFP Civil Drawing Set (Attachment C) provides a balanced site, and therefore, mass import or export of earthen material is not anticipated.

The battery storage containers will be arranged within two rows oriented east-west with the gravel access road constructed along the northern edge of the facility area. The containers within each row will be connected via Powin's Centipede modular battery energy storage platform. Each battery segment will be approximately 11 feet tall, 8 feet long, and 5 feet wide. Within each segment, the Powin system is designed to hold up to twenty-one battery stacks. In this design, 1 stack will be installed in each segment. Stacks are comprised of two strings, 14 battery packs per string, 3 modules per pack, and 10 cells per module. In total, there will be 840 battery cells per stack and per segment. The dimensions of each complete row will be 81' x 8' x 11'. The rows will be separated by 10 feet of crushed stone yard.

The Project will connect to the town's electrical distribution system via underground distribution cables to be installed underneath and along the access route. There will be a 145-foot-long overhead generation lead connecting the underground electric line to the town distribution line located on Central Street. There will be no direct electrical connection to the church located on the parcel.

Electrical wiring will connect the battery storage containers with pad-mounted inverters, where the electricity will be converted to the appropriate voltage for compatibility with the existing utility distribution system. The electrical wiring between the battery storage containers and the inverters will be located underground, as will the majority of the electrical wiring between the inverters and the existing distribution line.

The electrical equipment and battery containers will be set back from property lines to limit potential off-site noise impacts. While noise resulting from typical construction activities will last approximately 4-6 months during construction, the system will operate quietly for the rest of its lifetime. Noise associated with normal operation of the storage system will be limited to HVAC and inverter activities. This HVAC noise would be at a similar level to residential or commercial HVAC equipment noise. An inverter sound study commissioned by the Mass Clean Energy Center determined that storage systems will not produce any noise above 60 dBA from the inverters.

The Project's perimeter will be surrounded by a 7-foot-high chain-link fence. The fence will be designed and constructed to meet applicable safety and security requirements. If alternate fencing or screening solutions are required by the Town for either visual or sound screening purposes, these will be incorporated into final Project design. The fence fabric will be installed at least six inches above the ground to allow for wildlife movement through the site, unless this conflicts with Town screening or fencing requirements. There will be a minimum setback of 12 feet between the inverters and storage containers and the perimeter fence to provide full access for maintenance vehicles.

3.2 Battery and Equipment Specifications

The Project will include two inverters that will convert the DC electricity from the batteries to AC electricity to then be transmitted to the local distribution circuit. The inverters also provide ground fault protection and system statistics, including voltage and current on AC and DC circuits, energy production, and maximum power point tracking. The Project also includes an electric transformer that regulates AC voltage before the electricity leaves the site and enters the grid. The inverters and transformer are mounted on concrete foundations and will be within the secure fenced portion of the Project.

The Powin battery storage containers will have a maximum energy capacity of 750 kWh DC per segment (for a total maximum energy capacity of 5 MWAC). The lifetime of the batteries will equal approximately 20 years, which amounts to 7,300 charge-discharge cycles. The chemistry within the battery storage containers will be Lithium Iron Phosphate (LFP) cells, which is a common type of Lithium-Ion battery chemistry. The Material Data Safety Sheet for the battery cells that will be installed in the Project is included in Attachment D.

The chemicals within the battery cells are contained in a sealed Aluminum-plastic film. Risk of exposure occurs only if the battery is mechanically or electrically abused. The batteries are not classified as hazardous under the Classification, Labelling and Packaging (CLP) Regulation. Under conditions of normal use, respiratory protection is not required for working around the

battery cells. When promptly used or disposed, the battery does not present an environmental hazard.

At the end of each row of containers, there will be a Control Room containing a DC disconnect cabinet, AC load panel, HVAC controls, fire detection panel, hydrogen detection, and Comms and Controls. To the side of the Control Room, an HVAC unit will be wall-mounted on each end of the enclosure. The fire suppression and HVAC system will operate independently for each row. Each individual segment will contain its own integrated digital display, clean agent fire suppression canisters placed above each grouping of battery stacks, two forced air HVAC systems that duct air directly to the intake fans of each stack, and Hydrogen-activated emergency ventilation that exhausts gases from inside the containers and brings in fresh air. The segments are designed to be installed in rows of up to 21 segments each. The segments will arrive on-site pre-assembled, which will reduce the duration of on-site construction traffic and noise.

Battery segments and HVAC equipment will be grounded via engineering designs contained in Attachment C. The grounding grid will be installed in place prior to concrete foundation pouring. Battery storage segments will be installed atop a grade-A flame retardant rock wool layer, and the polyurethane insulation layer surrounding the tops of the containers is a grade B1-B flame retardant. AC power will be connected for HVAC system setup and tested by local authorities prior to battery stack installation.

3.3 Overview of Operations and Maintenance

When completed and operational, the proposed Project will be unmanned and remotely monitored. If the system performance appears to be deviating from normal operations, the system has the ability to shut itself off under certain abnormal operating conditions, and it is also equipped with remote shutoff and will alert the project owner. The proposed Project will generally not be illuminated at night, except for motion activated site lighting for rare occasions when night work might be required. The proposed Project will not have any bathrooms, nor generate any wastewater. Stormwater from the parcel will be directed around the site, and stormwater generated within the crushed stone yard will be directed through stormwater controls. Traffic associated with the Project will be minimal except during inspections or maintenance. Inspections and maintenance will occur on a quarterly basis. Inspections, maintenance, repairs, or adjustment to battery storage equipment will be conducted by Powin-certified or other authorized personnel.

3.4 Fire Suppression System

The battery storage system will be equipped with Stat-X fire suppression system devices. There will be at least one heat detector and one smoke detector located in every segment, and some segments will contain multiple heat and smoke detectors depending on battery stack layout. Two Stat-X e-generators (to release aerosols in the event of a fire) will be located between each segment. Within the Control Room of each row will be located a Key Releasing Disable Switch, a Manual Pull Station, an Abort Switch, and a horn, strobe, and bell.

Stat-X aerosol generators will be mounted to the ceiling of each segment. The positioning of their mounting will provide an unobstructed discharge path and will not allow direct discharge onto

walls, ceiling, or equipment. No obstructions will be located within 2 meters from the direction of discharge. The horn and strobe alarm systems will be mounted above the Control Room door in a weatherproof casing. Wiring diagrams for the Stat-X fire suppression system are available upon request.

In the event of a Stat-X Aerosol Fire Suppression discharge, instructions for post discharge clean-up and system re-commissioning are provided in Attachment E. This process involves a ten-minute hold time prior to ventilating the hazard space, on-hand backup portable fire extinguishers, and smoke ejectors or exhaust blowers fitted with non-collapsible extraction ducting for forced air ventilation. Following ventilation of the system, the segments will be de-humidified to a safe operating level and fire suppression residue will be thoroughly cleaned and removed from the unit. Stat-X aerosol agent residue is water soluble and will be cleaned with a mixture of acetic acid solution and water. Stat-X systems will be inspected, replaced, and re-commissioned by a trained and authorized Stat-X fire suppression distributor in the event of discharge.

In addition to Stat-X operations and maintenance instructions, Powin Energy has a Fire Alarm Standard Operating Procedure (SOP) to define the steps that should be taken in response to any fire alarm event in the segments. This SOP will be used in conjunction with the Emergency Response Plan (ERP) developed by BlueWave. BlueWave will develop the ERP based on the U.S. Energy Storage Association Draft Emergency Response Plan and in coordination with the Town during and post-permitting. For more details on the fire response steps, please refer to the Powin Fire Alarm SOP in Attachment E.

4.0 Construction Sequence

Prior to any construction activity, sensitive resources, buffers, access points, limits of disturbance, and other significant features will be flagged in the field. Construction limits will be surveyed including limits of clearing. Erosion and sedimentation controls will be installed around the limits of disturbance. Materials and equipment delivery may begin before site work and will continue throughout the construction.

The 16-foot-wide gravel access road will be installed connecting off of the existing church parking lot on the parcel. A stabilized construction entrance consisting of geotextile and crushed rock will be installed over the apron of the access road for a distance of up to 50 feet for stability and to minimize mud being tracked onto the church parking lot during construction. The setup area for the inverters and a small staging area will be graded and reinforced with gravel.

The proposed battery storage containers will be installed on individual gravel foundations. The foundations will be installed following minor grading to ensure a level platform for safe operation of the battery storage system. The inverters will be installed as the battery storage containers are installed. Concurrent with the battery storage containers, the buried electrical lines connecting the storage containers to the inverters will be installed. Trench excavations will be backfilled to match existing grades, and then exposed soils will be temporarily stabilized via mulch cover. The entire site, excluding the access road and vehicle turnaround, will be enclosed by a chain link security fence.

All exposed soils on the Project will be seeded, mulched, and stabilized following construction. Final fence installation will be completed, and the construction site staging areas will be removed. All electrical components will be tested and subsequently commissioned, and the Project will start storing and supplying energy to the grid. Project construction is expected to take approximately 4-6 months.

5.0 Holliston Performance Standards

The Proposed Battery Storage Project to be located at 600 Central Street in Holliston has been designed to meeting the performance standards addressed in both the Town of Holliston Zoning Standards as well as the intention of the Town of Holliston Master Plan.

A. Aesthetics.

The Project will meet the performance standards for aesthetics within the Agricultural Residential District B zoning district which is where the battery storage project is proposed. The project will include battery storage containers which are 10'8" at their max height. These containers are substantially smaller than the height of an average home. Additionally, the project design has incorporated plantings around the battery storage area to screen the project and reduce visibility from surrounding properties and the Church that is currently located on the property. The small size of the development combined with the proposed design allows the Project to be compatible with and not adversely affect the livability of abutting properties. The Project has also considered the natural environment during design and has remained outside of natural resource buffers zones where applicable to prevent any unnecessary impacts to those resources.

B. Lighting.

The Project will meet the performance standards for lighting within the Agricultural Residential District B which is where the battery storage project is proposed. Light fixtures will not be mounted any higher than 15 feet above grade, and sodium vapor or metal halide lighting will not be used. The proposed Project will generally not be illuminated during the day or at night, except for motion activated site lighting for rare occasions when night work might be required.

C. Landscaping and Screening.

The Project will meet the performance standards for landscaping and screening within the Agricultural Residential District B which is where the battery storage project is proposed. A landscaping plan has been developed in accordance with setback and screening requirements documented in the Town of Holliston regulations. Chain-link fencing around the facility will be required for safety and security, and fence design details are included in the permitting plan set for review of the Planning Board. Elevation changes or grading of greater than 6 feet are not expected and retaining walls will not be constructed. The Project will be screened from view of adjacent properties by already existing forest cover. All landscaping for the project will be inspected and maintained during the quarterly facility inspections, at least four times per year.

D. Stormwater Management

The Project will meet the performance standards for stormwater management within the Agricultural Residential District B which is where the battery storage project is proposed. One infiltration basin is proposed to provide storage, attenuate peak discharges, exfiltrate the required recharge volume, and treat the required water quality volume. Stormwater pretreatment sediment forebays will be located to the southeast of the proposed facility, and the infiltration basin will be located to the north of the facility. Stormwater will from the rest of the site will be diverted around the facility crushed stone yard.

E. Site Development Standards.

The Project will meet the performance standards for site development standards within the Agricultural Residential District B which is where the battery storage project is proposed. The Project will involve land disturbance totaling less than 2 acres, and a natural forested buffer will screen most of the construction activity from abutting properties. Endangered species and wetland consultation has been initiated to ensure that the Project will not cause disturbance to environmentally sensitive areas. There are no archaeological or historical resources within view of the Project. A contiguous vegetated buffer will remain between the Project area and the property boundary, and this vegetated buffer will be surrounded by protective fencing during construction. During grading, topsoil and excavated materials will be surrounded by erosion controls to avoid discharges to adjacent waterbodies and properties and finished graded slopes will equal one percent. Additional plantings will be added post construction to further reduce visibility of the Project.

F. Traffic Management.

The Project will meet the performance standards for traffic management within the Agricultural Residential District B which is where the battery storage project is proposed. The Project does not involve construction of a new driveway and no curb cuts will be required. During normal operation of the facility, no pedestrian or vehicular access will be required, and traffic will not be affected. Vehicular traffic associated with the Project will be limited to quarterly inspections and as-needed maintenance. There will be no traffic-related hazards from these inspections.

G. Utilities, Security, and Emergency Systems.

The Project will meet the performance standards for utilizes, security, and emergency systems within the Agricultural Residential District B which is where the battery storage project is proposed. The Project will connect to the public utility system via underground wiring and will be accessible to local safety and emergency authorities. Wastewater will not be generated by the Project and no sewer or septic system will be constructed. A security fence will be constructed around the perimeter of the Project, and a fire alarm and suppression system will be adopted as detailed in Attachment E.

H. Fiscal Impact.

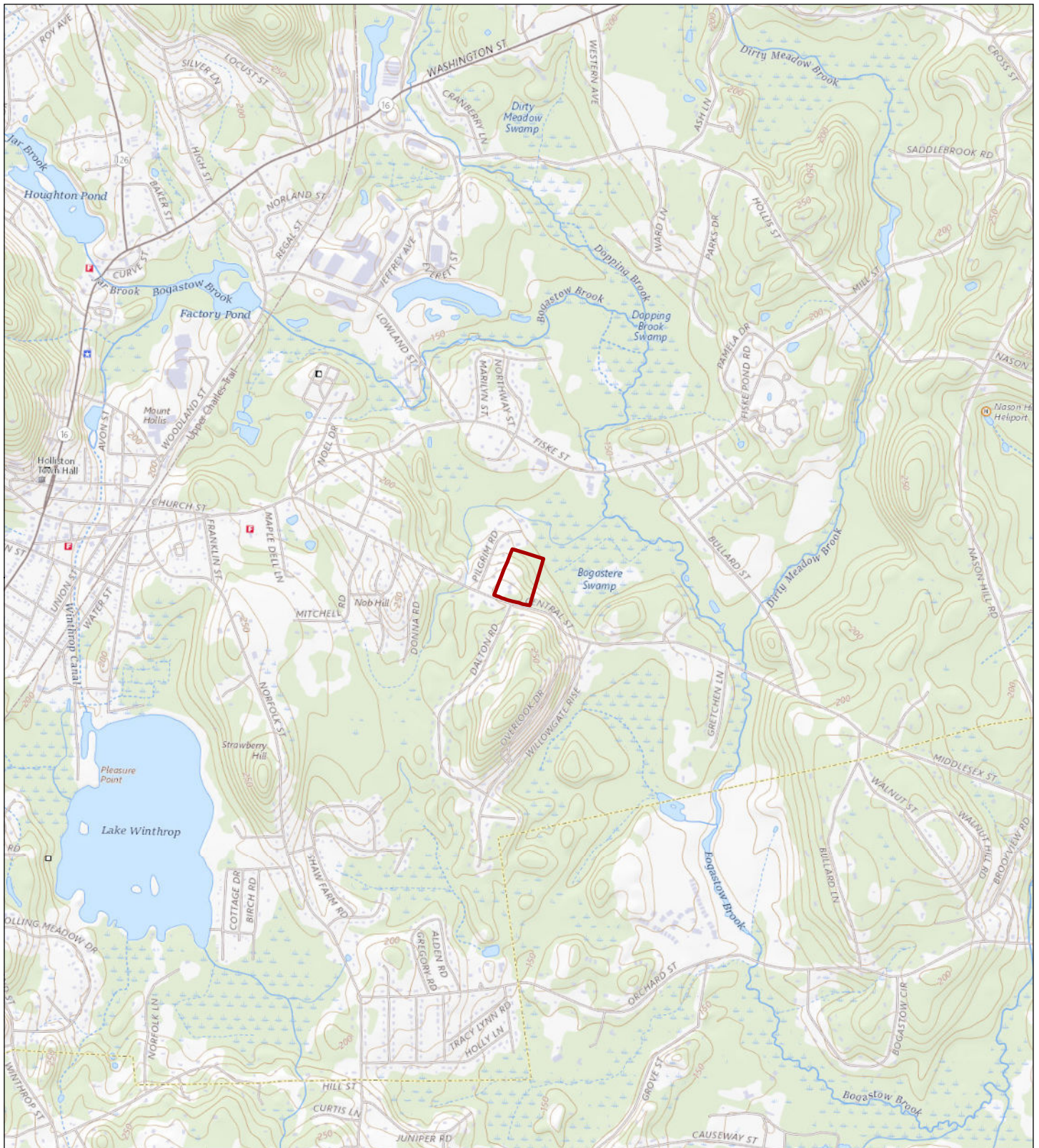
The Project will meet the performance standards for traffic management within the Agricultural Residential District B which is where the battery storage project is proposed.

The Project will maintain a positive net fiscal position for the long term by reducing peak electricity costs for Town inhabitants. The Project will not cause growth in municipal service costs.

6.0 Conclusion

The battery storage system proposed by BlueWave on the parcel at 600 Central Street in Holliston has been designed to minimize impacts and comply with Holliston site development performance standards to the maximum extent feasible. The proposed Project will increase local grid reliability and will lower electricity costs during peak demand times for all electrical grid users in Holliston. When complete and fully operational, there will be no significant traffic, aesthetic, or noise impacts for surrounding properties. The attachments below contain further details on proposed technology and engineering designs.

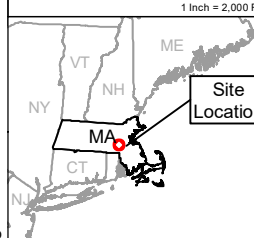
Attachment A: Site Locus Figure



 PROJECT AREA



0 1,000 2,000
Feet
1:24,000
1 Inch = 2,000 Feet



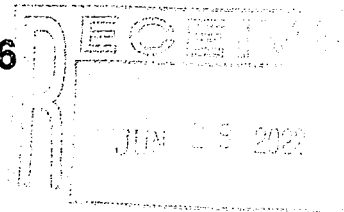
PROJECT: BLUEWAVE	
BATTERY STORAGE - HOLLISTON	
TITLE: LOCATION MAP HOLLISTON, MA	
DRAWN BY: S. MOTUR	PROJECT NO: 4125899.0000.0001
CHECKED BY: S. TRACY	
APPROVED BY: S. TRACY	FIGURE 1
DATE: JUNE 2022	
	
Wannalancit Mills 650 Suffolk Street Lowell, MA 01854 (978-970-5600)	

Base Map: USGS Topo Map

Attachment B: Abutters List

HOLLISTON, MASSACHUSETTS 01746
BOARD OF ASSESSORS

COPY



ABUTTER CERTIFICATION REQUEST

DATE 6/28/2022

APPLICANT'S NAME: Tracy Sudhalter on behalf of Bluewave Energy

APPLICANT'S ADDRESS: 670 North Commercial St. Manchester, NH

APPLICANT'S PHONE: 603-724-0720

SUBJECT PROPERTY ADDRESS: 600 Central St. Holliston, MA

MAP 009 BLOCK 004 LOT 0062

ASSOCIATED PERMIT/APPROVAL (e.g., Special Permit):

Special Permit

PERMIT GRANTING AUTHORITY (e.g., Planning Board)

Planning Board

RADIUS FOR NOTICE (e.g., 100 feet, 300 feet) 300

FEE (made payable to the Town of Holliston): \$50.00 minimum¹

Signed under the pains and penalties of perjury:

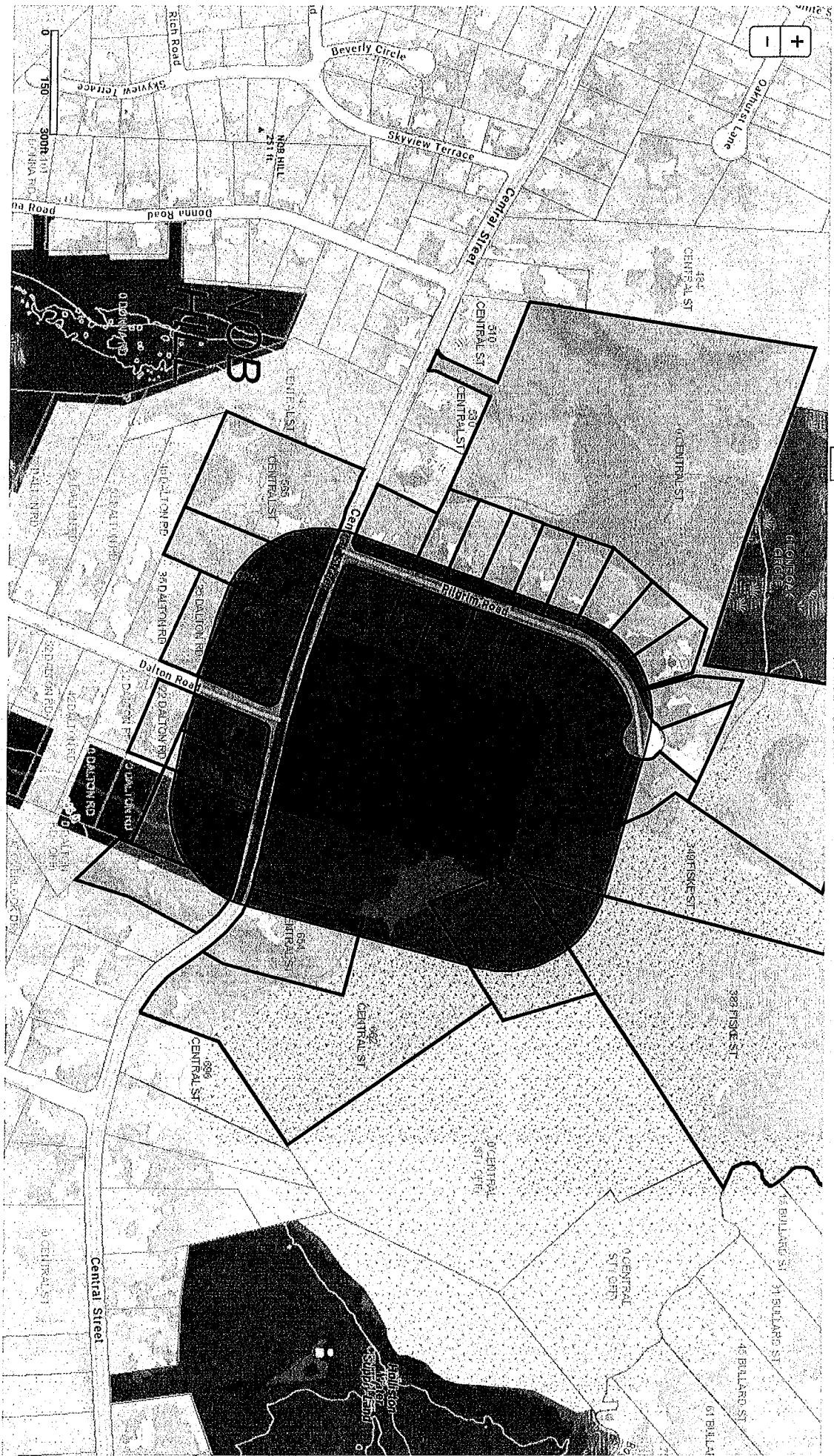
A handwritten signature in black ink, appearing to read "Tracy Sudhalter".

Applicant's Signature

¹ FEE: \$50.00 minimum for up to 25 names/addresses, then \$2 per each additional name/address up to a maximum fee of \$100.00.
(For example, 1-25 names/addresses = \$50.00; 40 = \$80; 50 and above = \$100)

paid
\$50.00
CK # 123954
Rec'd 6-29-22
CB

- enter a parcel id -



CERTIFIED ABUTTERS LIST
SUBJ PROP: 600 CENTRAL ST
RADIUS: 300 FT

PARCEL ID	OWNER 1	OWNER 2	ADDRESS	CITY/TOWN	STATE	ZIP CODE
136/009.0-0004-0063.0	BYERS, ANNE E		654 CENTRAL ST	HOLLISTON	MA	01746-
136/009.0-0005-0141.0	RONSTADT, JASON ALEXANDER	SPAMPINATO, MICHAELA GRACE	597 CENTRAL ST	HOLLISTON	MA	01746-
136/009.0-0005-0162.0	GEBSKI, KATHRYN BOUNDS TTEE	KATHRYN BOUNDS GEBSKI REV TRUST	25 DALTON RD	HOLLISTON	MA	01746-
136/009.0-0004-0028.0	OLDE OAKS HOMEOWNERS ASSOC INC		54 PILGRIM ROAD	HOLLISTON	MA	01746-
136/009.0-0004-0045.1	FISKE STREET SHP, LLC		2 WILLOW RD	WELLESLEY	MA	02482-
136/009.0-0004-0098.0	PIPE, RONALD W. & JULIE C		54 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0005-0136.0	GERRY, THOMAS B & BETHANY J		567 CENTRAL ST	HOLLISTON	MA	01746-
136/009.0-0005-0137.0	KIPP, DAVID & LAURA		565 CENTRAL ST	HOLLISTON	MA	01746-
136/009.0-0005-0143.0	BEESLEY, CHAD		22 DALTON RD	HOLLISTON	MA	01746-
136/009.0-0004-0084.0	MCDONALD, BENJAMIN E	MCDONALD, JENNIFER, LUTZY	19 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0004-0088.0	SLACK, WILLIAM D. & JAMIE E		57 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0004-0090.0	FLANAGAN, CHRISTOPHER & ANNA S		81 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0005-0138.0	MILLER, JESSICA ANN	TYRRELL, DEBRA ANN	631 CENTRAL ST	HOLLISTON	MA	01746-
136/009.0-0004-0046.0	COCKRILL, HUSTON G & CAROLINE A		349 FISKE ST	HOLLISTON	MA	01746-
136/009.0-0004-0089.0	CUMMINS, CHRISTOPHER S	CUMMINS, ELIZABETH O	71 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0004-0101.0	HATFIELD, MARK & ASHLEY		28 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0004-0102.0	KAMPERSAL, THOMAS A. & JULIE A		20 PILGRIM ROAD	HOLLISTON	MA	01746-
136/009.0-0004-0087.0	MCSHANE, BRIAN M & MEREDITH		47 PILGRIM RD	HOLLISTON	MA	01746-
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136/009.0-0004-0091.0	RANDALL, MARCIE SCHEIN		87 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0004-0092.0	DE FARIA, FABRICIO L & FARIA, CONSUELO D O TTEES	OLIVEIRA FARIA FAMILY TRUST	99 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0004-0099.0	SECAUR, KEVIN & SAMANTHA		453 UNDERWOOD ST	HOLLISTON	MA	01746-
136/009.0-0005-0139.0	ROWE, MARGARET M TRUSTEE	ROWE FAMILY TRUST	623 CENTRAL ST	HOLLISTON	MA	01746-
136/009.0-0004-0030.0	PUOPOLO, ANTHONY D. & DONNA		662 CENTRAL ST	HOLLISTON	MA	01746-
136/009.0-0004-0081.0	RAYMER, BRIAN		3 PILGRIM RD	HOLLISTON	MA	01746-
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136/009.0-0004-0094.0	STANWOOD, SCOTT A & CAROLYN R		82 PILGRIM RD	HOLLISTON	MA	01746-
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136/009.0-0004-0096.0	CHARTIER, GARY D & KATHI L TTEES	GARY D & KATHI L CHARTIER FAMILY TRUST	68 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0004-0100.0	O'NEILL, SEAN P & KRISTEN G		38 PILGRIM RD	HOLLISTON	MA	01746-
136/009.0-0005-0138.B	HOLLISTON, TOWN OF	CONSERVATION COMM	703 WASHINGTON ST	HOLLISTON	MA	01746-
136/009.0-0006-0002.0	LACONTE, NANCY J & ARTHUR M TTEES	NANCY LACONTE LIFE TRUST	655 CENTRAL ST	HOLLISTON	MA	01746-

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Attachment C: Permitting Plan Set

BWC BOGASTOW BROOK BESS PROJECT PROPOSED BATTERY ENERGY STORAGE SYSTEM

CENTRAL STREET, HOLLISTON, MIDDLESEX COUNTY, MASSACHUSETTS

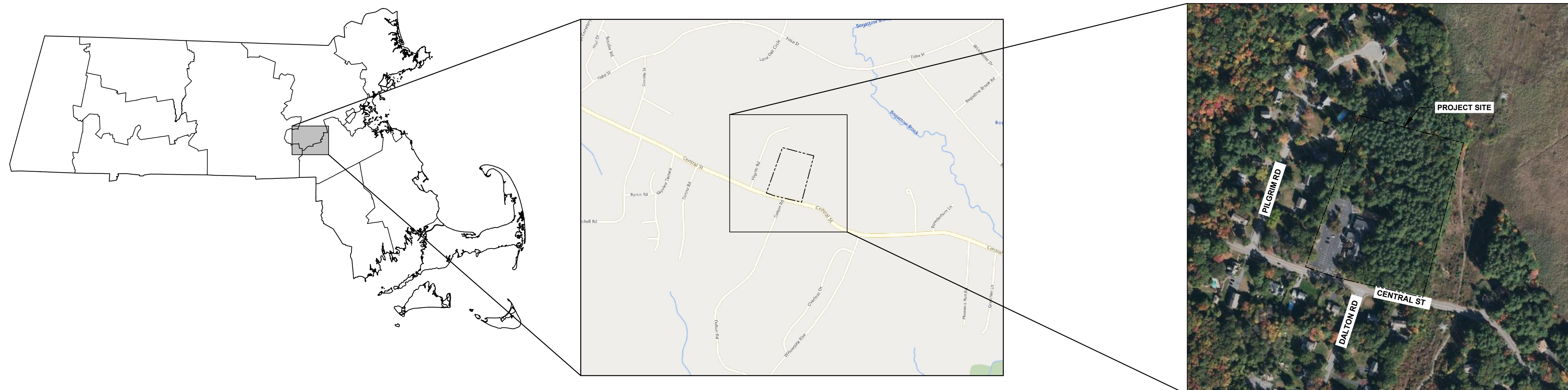
**DEVELOPER: BWC BOGASTOW BROOK, LLC
C/O BLUEWAVE SOLAR
501 BOYLSTON STREET, SUITE 10B134
BOSTON, MA 02116**

PREPARED BY: TRC
LOWELL, MA 01854

DATE: AUGUST 2022

[illegible]

SHEET INDEX	
SHEET NUMBER	SHEET TITLE
G1.00	CIVIL COVER SHEET
G1.01	GENERAL NOTES & LEGEND
G1.02	EROSION CONTROL NOTES & DETAILS
C1.00	EXISTING CONDITIONS PLAN
C1.01	SITE PREPARATION PLAN
C2.00	SITE GRADING & DRAINAGE PLAN
C4.00	CIVIL CONSTRUCTION DETAILS
C4.01	CIVIL CONSTRUCTION DETAILS
C5.00	PRELIMINARY ELECTRICAL DETAILS



MASSACHUSETTS

HOLLISTON

SITE LOCATOR



NOTE: THESE PLANS ARE ACCOMPANIED BY PERMIT APPLICATIONS OF THE SAME TITLE. THESE DOCUMENTS ARE INTERRELATED AND ARE INTENDED TO BE USED TOGETHER. THESE DOCUMENTS ARE INTENDED TO BE USED FOR REGULATORY PURPOSES ONLY.



650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

1. THE PROJECT HORIZONTAL COORDINATES SYSTEM IS BASED ON NAD83 MASSACHUSETTS STATE PLANE (US SURVEY FEET, MAINLAND ZONE, MA83F). ELEVATIONS ARE BASED ON NAVD88 (US SURVEY FEET).
2. PROJECT PROPERTY BOUNDARIES AND SITE TOPOGRAPHIC INFORMATION ARE BASED UPON ON-THE-GROUND FIELD SURVEY COMPLETED BY LAND PLANNING, INC. IN JANUARY 2022 AS PROVIDED IN A PLAN ENTITLED "EXISTING CONDITIONS PLAN, 600 CENTRAL STREET, IN HOLLISTON, MA" AND DATED JANUARY 19, 2022. SURVEY PLANS SEALED BY A LICENSED PROFESSIONAL LAND SURVEYOR ARE PROVIDED UNDER SEPARATE COVER.
3. UTILITY INFORMATION DEPICTED IS COMPILED USING PHYSICAL SURFACE EVIDENCE LOCATED IN THE FIELD IN CONJUNCTION WITH ANY RECORD INFORMATION AVAILABLE AT THE TIME OF THE FIELD SURVEY AND MAY NOT NECESSARILY REPRESENT ALL EXISTING UTILITIES. THEREFORE ALL UTILITY LOCATIONS SHOULD BE CONSIDERED APPROXIMATE AND BE VERIFIED BY THE CONTRACTOR. DIGSAFE SHALL BE NOTIFIED A MINIMUM OF 72-HOURS PRIOR TO COMMENCING ANY EXCAVATION. FULL UTILITY COORDINATION WITH NON-MEMBER UTILITIES AND USE OF GROUND-PENETRATING RADAR TO LOCATE UTILITIES SHOULD BE PERFORMED AS NECESSARY.
4. WETLAND DELINEATION WITHIN THE PROJECT AREA WAS PERFORMED BY TRC IN JANUARY 2021 AND LOCATED USING MAPPING GRADE GPS UNITS. ADDITIONAL NATURAL RESOURCE AND ZONING INFORMATION IS COMPILED FROM A COMBINATION OF SOURCES INCLUDING STATE OF MASSACHUSETTS GIS DATA.
5. THIS IS A PRELIMINARY DESIGN PLAN. FINAL DESIGN SHALL BE MODIFIED BY CONTRACTOR TO MATCH FINAL ELECTRICAL INTERCONNECTION STUDIES, EQUIPMENT PURCHASES, AND POSSIBLE PERMIT CONSTRAINTS REVEALED DURING PROJECTS REVIEW OF ELECTRICAL EQUIPMENT LAYOUT, INVERTED BATTERY UNITS, EQUIPMENT PADS, UTILITY POLES, ETC. WERE PROVIDED BY BLUEWAVE SOLAR IN A CAD FILE DATED MAY 13, 2022.
6. ALL WORK DETAILED ON THESE PLANS AND PERFORMED UNDER THIS CONTRACT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIAL SPECIFICATIONS AND ANY APPLICABLE TECHNICAL PERMIT, PERMIT CONDITIONS, AND ANY OTHER APPLICABLE TECHNICAL REQUIREMENTS. WHERE INDICATED, STATE AND/OR LOCAL STANDARD SPECIFICATIONS SHALL APPLY. ALL WORK SHALL COMPLY WITH THE ASSOCIATED STANDARDS SET FORTH IN THE TOWN OF HOLLISTON ZONING BYLAWS.
7. THE CONTRACTOR SHALL ABIDE BY ALL LOCAL, STATE, AND FEDERAL LAWS, RULES AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION OF THESE IMPROVEMENTS, INCLUDING STATE AND FEDERAL REQUIREMENTS WITH RESPECT TO STORMWATER DISCHARGE.
8. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITY LINES AND SITE INFRASTRUCTURE WITHIN OR ADJACENT TO THE CONSTRUCTION AREA. ANY DAMAGE TO EXISTING FACILITIES CAUSED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
9. CONSTRUCTION SHALL NOT OCCUR IN ANY PUBLIC RIGHTS OF WAY, PUBLIC OR PRIVATE EASEMENTS, BEYOND THE LIMITS OF DISTURBANCE, OR OUTSIDE THE PROPERTY LIMITS WITHOUT NECESSARY PERMITS. ANY PUBLIC OR PRIVATE PROPERTY OR IMPROVEMENTS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER AT THE COST OF THE CONTRACTOR.
10. OVERNIGHT PARKING OF CONSTRUCTION EQUIPMENT SHALL NOT OBSTRUCT DRIVEWAYS OR DESIGNATED TRAFFIC LANES. THE CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIAL WITHIN THE PUBLIC RIGHT OF WAY. OVERNIGHT PARKING OF CONSTRUCTION VEHICLES ON PRIVATE PROPERTY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
11. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE LANDOWNER FOR SITE ACCESS AND USE AND SHALL COMPLETE WORK IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE ACCESS AGREEMENT.
12. ALL PROPERTY CORNERS OR MONUMENTS DESTROYED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. ALL PROPERTY CORNERS MUST BE RESET BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF MASSACHUSETTS.
13. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS CONTROLLING THE POLLUTION OF THE ENVIRONMENT.
14. CONTRACTOR TO ENSURE ALL WORK PERFORMED IS IN ACCORDANCE WITH EXISTING PROJECT PERMITS, STUDIES, AND REPORTS PROVIDED IN THE CONTRACT DOCUMENTS INCLUDING STATE STORMWATER MANAGEMENT PERMIT AND LOCAL ORDINANCES.
15. IT IS THE INTENT OF THESE PLANS THAT THE CONTRACTOR SHALL NOT PERFORM ANY WORK OUTSIDE THE IDENTIFIED PROJECT BOUNDARIES AND APPROVED LIMITS OF DISTURBANCE.
16. IT IS THE INTENT OF THESE PLANS THAT THE CONTRACTOR AVOID "FILLING" WETLANDS AT ALL COSTS. CONTRACTOR TO AVOID THE DELINEATED WETLAND AREAS AND NATURAL RESOURCES ONSITE.
17. WHENEVER PRACTICABLE, NO DISTURBANCE ACTIVITIES SHOULD TAKE PLACE WITHIN 50 FEET OF ANY PROTECTED NATURAL RESOURCE. IF DISTURBANCE ACTIVITIES SHOULD TAKE PLACE UPGRADEMENT TO AND LESS THAN 50 FEET OF ANY PROTECTED NATURAL RESOURCE, PERMETER EROSION CONTROLS MUST BE DOUBLED. ALL AREAS WITHIN 75 FEET OF A PROTECTED NATURAL RESOURCE MUST BE PROTECTED WITH A DOUBLE ROW OF SEDIMENT BARRIERS NOVEMBER 1 THROUGH APRIL 15. EXPOSED AREAS UPGRADEMENT TO AND LESS THAN 50 FEET OF ANY PROTECTED NATURAL RESOURCE MUST BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 7 DAYS, OR PRIOR TO A STORM EVENT.
18. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING DRAINAGE THROUGHOUT THE CONSTRUCTION OF THE PROJECT.
19. EXISTING ACCESS ROADS TO BE MAINTAINED SHALL BE SMOOTHED AND RESURFACED AS NECESSARY TO PROVIDE AN ACCEPTABLE SURFACE.
20. THE CONTRACTOR SHALL SECURE PERMITS FROM THE STATE AND TOWN OF HOLLISTON AS NECESSARY BEFORE DRIVING CONSTRUCTION EQUIPMENT OVER AND ACROSS STATE AND TOWN MAINTAINED ROADS.
21. ALL WORK IN THE PUBLIC RIGHTS OF WAY SHALL CONFORM WITH THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES".
22. WHERE APPROVAL OR DIRECTION BY AN ENGINEER IS SPECIFIED, THIS INCLUDES A QUALIFIED ENGINEER OR PROFESSIONAL (MASSACHUSETTS REGISTERED PROFESSIONAL ENGINEER (PE), CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENTATION CONTROL (CPESC), OR SIMILAR SPECIALIST).

CONTRACTOR SHALL MAINTAIN THE PROJECT SITE IN ACCORDANCE WITH THE FOLLOWING PERFORMANCE STANDARDS

CONTRACTOR SHALL MAINTAIN THE PROJECT SITE IN ACCORDANCE WITH THE FOLLOWING PERFORMANCE STANDARDS

1. **SPILL PREVENTION:** CONTROL SHALL BE IN PLACE TO PREVENT POLLUTANTS FROM BEING DISCHARGED FROM MATERIALS USED AND STORED ONSITE. APPROPRIATE CONTROLS INCLUDE, BUT ARE NOT LIMITED TO, PROPER STORAGE PRACTICES THAT MINIMIZE EXPOSURE OF MATERIALS TO STORMWATER, AND APPROPRIATE SPILL PREVENTION, CONTAINMENT, AND RESPONSE PLANNING AND IMPLEMENTATION.
2. **GROUNDWATER PROTECTION:** DURING CONSTRUCTION, THE CONTRACTOR MAY NOT STORE OR HANDLE LIQUID PETROLEUM PRODUCTS OR OTHER HAZARDOUS MATERIALS WITH THE POTENTIAL TO CONTAMINATE GROUNDWATER IN AREAS OF THE PROJECT SITES DRAINING TO AN INFILTRATION AREA OR WITHIN 100 FEET OF A CRITICAL RESOURCE AREA OR STREAM, DIKES, BERMS, SUMPS, AND OTHER FORMS OF SECONDARY CONTAINMENT THAT PREVENT DISCHARGE TO GROUNDWATER MAY BE USED TO ISOLATE PORTIONS OF THE SITE FOR THE PURPOSES OF STORING AND HANDLING LIQUID HAZARDOUS MATERIALS.
3. **FUGITIVE SEDIMENT AND DUST:** CONTRACTOR SHALL TAKE ALL NECESSARY ACTIONS TO ENSURE THAT ACTIVITIES DO NOT RESULT IN NOTICEABLE EROSION OF SOILS OR FUGITIVE DUST EMISSIONS DURING OR AFTER CONSTRUCTION. OPERATIONS DURING DRY WEATHER CONDITIONS SHOULD BE SCHEDULED TO AVOID DRYING OF SOILS. EXCESSIVE DUSTS ARE NOT TO BE MORE FREQUENTLY AS NEEDED WITH WATER. CALCIUM CHLORIDE AND OIL MAY NOT BE USED FOR DUST CONTROL. CONTRACTOR SHALL MONITOR VEHICLES ENTERING AND EXITING THE PROJECT SITE FOR EVIDENCE OF TRACKING MUD ONTO PUBLIC OR PRIVATE PROPERTY. DUSTS ARE TO BE CONTROLLED THROUGHOUT THE PROJECT. TRACKING OF MUD ONTO PUBLIC OR PRIVATE PROPERTY AREAS EXPERIENCING TRACKING. PAVED SURFACES SHALL BE VACUUM SWEEPED WHEN IF OR OFF-SITE TRACKING OCCURS ON PUBLIC ROADS, THEY SHOULD BE SWEEP IMMEDIATELY AND NO LESS THAN ONE WEEK AND PRIOR TO SIGNIFICANT STORM EVENTS. DURING THE MUD SEASON IT MAY BE NECESSARY TO INCREASE THE SIZE OF STABILIZED CONSTRUCTION ENTRANCES OR PROVIDE A WHEEL WASHING STATION.
4. **DEBRIS AND OTHER MATERIALS:** CONTRACTOR SHALL MANAGE ALL LITTER, CONSTRUCTION DEBRIS, CONSTRUCTION CHEMICALS, AND OTHER MATERIALS AND LANDSCAPING MATERIALS EXPOSED TO STORMWATER TO PREVENT MATERIALS FROM BECOMING A SOURCE OF POLLUTION.
5. **TRENCH OR FOUNDATION DEWATERING:** TRENCH DEWATERING IS THE REMOVAL OF WATER FROM TRENCHES, FOUNDATIONS, Coffer Dams, PONDs, Sumps, BASINS, AND OTHER AREAS WITHIN THE CONSTRUCTION AREA THAT RETAIN WATER AFTER EXCAVATION. IN MOST CASES THE COLLECTED WATER IS HEAVILY SILTED AND HINDERS CORRECT AND SAFE CONSTRUCTION PRACTICES. THE CONTRACTOR SHALL REMOVE COLLECTED WATER FROM THE PONDED AREAS, EITHER THROUGH GRAVITY OR PUMPED. MATERIALS SHOULD BE STORED THROUGHOUT THE YEAR TO AVOID THE NEED FOR SPECIAL SPECIAL TRENCHES DESIGNED TO COLLECT THE MAXIMUM AMOUNT OF SEDIMENT POSSIBLE (E.G. COFFERDAM FLOWBEN BASIN). THE CONTRACTOR SHALL AVOID PRACTICES THAT ALLOW SEDIMENT LOADED WATER FROM DEWATERING TO FLOW OVER DISTURBED AREAS OF THE PROJECT SITES. OTHER MEASURES OR METHODS MAY BE UTILIZED AS REVIEWED AND APPROVED BY THE ENGINEER AND, IF NECESSARY, THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION.
6. **AUTHORIZED NON-STORMWATER DISCHARGES:** THE CONTRACTOR SHALL IDENTIFY AND PREVENT CONTAMINATION BY AUTHORIZED NON-STORMWATER DISCHARGES. AUTHORIZED NON-STORMWATER DISCHARGES EXIST. THEY MUST BE IDENTIFIED AND STEPS SHALL BE TAKEN TO ENSURE IMPLEMENTATION OF APPROPRIATE POLLUTION PREVENTION MEASURES FOR THE NON-STORMWATER COMPONENTS OF THE DISCHARGE. AUTHORIZED NON-STORMWATER DISCHARGES ARE: DISCHARGES FROM FIREFIGHTING ACTIVITY, FIRE HYDRANT FLUSHING, DUST CONTROL RUNOFF IN ACCORDANCE WITH PERMIT CONDITIONS, INTERNAL TREATMENT OF WASTEWATER (WASTEWATER TREATMENT PLANT EFFLUENT), AND WASHWATER USE. DISCHARGES OF UNCONTAMINATED GROUNDWATER OR SPRING WATER, FOUNDATION OR FOOTING DRAIN-WATERS WHERE FLOWS ARE NOT CONTAMINATED, UNCONTAMINATED EXCAVATION DEWATERING, POTABLE WATER SOURCES INCLUDING WATERLINE FLUSHING, AND LANDSCAPE IRRIGATION.
7. **UNAUTHORIZED NON-STORMWATER DISCHARGES:** THE CONTRACTOR SHALL IDENTIFY AND PREVENT CONTAMINATION BY UNAUTHORIZED NON-STORMWATER DISCHARGES. UNAUTHORIZED NON-STORMWATER DISCHARGES INCLUDE, BUT ARE NOT LIMITED TO WASTEWATER FROM CONCRETE WASHOUT, FUELS OR HAZARDOUS SUBSTANCES, AND DETERGENTS USED IN VEHICLE AND EQUIPMENT WASHING.
8. **ADDITIONAL REQUIREMENTS:** COMPLETION OF THE WORK WILL REQUIRE FREQUENT ACCESS TO VARIOUS PORTIONS OF THE PROJECT AREA FROM STATE AND LOCAL ROADWAYS. CONTRACTOR SHALL MONITOR PUBLIC ROADWAYS AND SHALL CLEAN PAVEMENT BY MEANS NECESSARY IN THE EVENT THAT SEDIMENT OR TRACKING IS OBSERVED. SIGNAGE SHALL BE POSTED AT INTERSECTIONS OF PROJECT ACCESS ROADS AND PUBLIC WAYS, STATING COMPANY NAME AND 24-HOUR CONTACT PHONE NUMBER.

	SURVEYED PROPERTY BOUNDARY
	APPROXIMATE ABUTTING PROPERTY BOUNDARY
	BOUNDARY MONUMENT, FOUND
	IRON PIPE, FOUND
	WATER HYDRANT
	BENCHMARK, FOUND
	LIGHT POST
	EXISTING EDGE OF PAVEMENT/CONCRETE
	EXISTING EDGE OF GRAVEL
	EXISTING FENCE
	EXISTING OVERHEAD ELECTRIC & POLES
	EXISTING RIP RAP
	EXISTING TREE
	EXISTING BUILDING
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING SPOT ELEVATION
	EXISTING TREES AND/OR BRUSH
	FIELD DELINEATED WETLAND
	DEP WETLAND
	WETLAND FLAG & I.D.
	CERTIFIED VERNAL POOL IDENTIFIED
	POTENTIAL VERNAL POOL IDENTIFIED
	FIELD DELINEATED STREAM OR WATERBODY
	DEP MAPPED STREAM
	25' NO-DISTURBANCE BUFFER
	100' WETLAND BUFFER
	200' RIVERFRONT AREA
	FEMA 100-YEAR FLOOD ZONE
	APPROXIMATE FLOOD ZONE LIMIT
	PROPOSED GRAVEL ACCESS
	PROPOSED CONCRETE EQUIPMENT PAD
	PROPOSED MINOR CONTOUR
	PROPOSED MAJOR CONTOUR
	PROPOSED TREE LINE/CLEARING LIMITS
	PROPOSED CHAIN LINK FENCE
	PROPOSED OVERHEAD ELECTRIC LINE AND POLE
	PROPOSED MV UNDERGROUND ELECTRIC LINE

ZONING DISTRICTS SUMMARY TABLE									
GENERAL ZONING DISTRICT					OVERLAY ZONING DISTRICTS				
AGRICULTURAL-RESIDENTIAL DISTRICT B (AR-2)					WELLHEAD PROTECTION AREA ZONE 1A, ZONE 3, MA DEP APPROVED ZONE II				

DIMENSIONAL STANDARDS									
DISTRICT	MIN. FRONT YARD SETBACK		MIN. SIDE YARD SETBACK		MIN. REAR YARD SETBACK		BUILDING MAX. HEIGHT		
	REQUIRED	PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED	
AGRICULTURAL-RESIDENTIAL DISTRICT B (AR-2)	40'	59A'	30'	17A'	40'	98'	35'	12'	

ID	NAME	SLOPE RANGE	TEXTURE	HYDROLOGIC SOIL GROUP
52A	FREETOWN MUCK	0 - 1%	MUCKY PEAT	B/D
253D	HINCKLEY	15 - 25%	LOAMY SAND	A
254C	MERRIMAC	8 - 15%	FINE SANDY LOAM	A
255B	WINDSOR	3 - 8%	LOAMY SAND	A
424C	CANTON	8 - 15%	FINE SANDY LOAM	A

SPECIFICS OF HOW WORK IS TO BE COMPLETED SHALL ALSO BE BASED ON ENVIRONMENTAL CONSIDERATIONS ASSOCIATED WITH SEASONAL CHANGES. THE FOLLOWING DATES ARE PROVIDED TO ESTABLISH A GENERAL GUIDELINE FOR THESE SEASONS:

SPECIFICS OF HOW WORK IS TO BE COMPLETED SHALL ALSO BE BASED ON ENVIRONMENTAL CONSIDERATIONS ASSOCIATED WITH SEASONAL CHANGES. THE FOLLOWING DATES ARE PROVIDED TO ESTABLISH A GENERAL GUIDELINE FOR THESE SEASONS:

- WINTER: NOVEMBER 1 TO MARCH 19
- MUD SEASON: MARCH 20 TO APRIL 30
- SPRING: MAY 1 TO JUNE 21
- SUMMER: JUNE 22 TO SEPTEMBER 21
- FALL: SEPTEMBER 22 TO OCTOBER 31

IN GENERAL, FERTILIZER AND LIME APPLICATION RATES WILL FOLLOW THE GUIDELINES IDENTIFIED BELOW UNLESS SITE SPECIFIC SOIL TESTS IDENTIFY THE NEED FOR ALTERNATIVE FERTILIZER/LIME APPLICATION RATES. FERTILIZER WILL BE APPLIED TO UPLAND AREAS PRIOR TO SEEDING AT A RATE OF 600 POUNDS PER ACRE USING 0-10-10 ANALYSIS OR EQUIVALENT. GROUND LIMESTONE (EQUIVALENT TO 40 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) WILL BE APPLIED AT A RATE OF 2.5 TONS PER ACRE. AN EQUIVALENT MIXTURE OF FERTILIZER AND LIME MAY BE APPLIED USING THE HYDROSEEDING METHOD. NO LIME OR FERTILIZER WILL BE APPLIED TO WETLANDS.

ON SLOPES GREATER THAN 3 PERCENT, STRAW MULCH WILL BE FIRMLY ANCHORED INTO THE SOIL UTILIZING ONE OF THE FOLLOWING METHODS:

ON SLOPES GREATER THAN 3 PERCENT, STRAW MULCH WILL BE FIRMLY ANCHORED INTO THE SOIL UTILIZING ONE OF THE FOLLOWING METHODS:

- CRIMPING WITH A STRAIGHT OR NOTCHED MULCH CRIMPING TOOL (FARM DISCS WILL NOT BE ALLOWED);
- TRACK WALKING WITH DEEP-CLEATED EQUIPMENT OPERATING UP AND DOWN THE SLOPE (MULCH CRIMPED PERPENDICULAR TO THE SLOPE) ON SLOPES <25 PERCENT;
- APPLICATION OF MULCH NETTING;
- APPLICATION OF 1000 LB./ACRE OF WOOD FIBER MULCH OVER STRAW/HAY MULCH; AND
- COMMERCIALLY AVAILABLE TACKIFIERS (EXCEPT WITHIN 100 FEET OF WATERBODIES OR WETLANDS).

PARCEL ID	PARCEL ADDRESS	PARCEL AREA (AC.)	OWNER NAME	OWNER ADDRESS	TOWN	STATE	ZIP CODE
009.0-0004-0062.0	600 CENTRAL ST	8.512	CHRIST THE KING LUTHERAN CHURCH	600 CENTRAL ST	HOLLISTON	MA	01746

PARCEL ID	PARCEL ADDRESS	OWNER NAME	OWNER ADDRESS	TOWN	STATE	ZIP CODE
009-0-0004-0028.0	0 CENTRAL ST	OLUE OAKS HOMEOWNERS ASSOC INC	54 PILGRIM ROAD	HOLLISTON	MA	01746
009-0-0004-0030.0	662 CENTRAL ST	POPOKO, ANTHONY D & DONNA	662 CENTRAL STREET	HOLLISTON	MA	01746
009-0-0004-0044.0	0 FISKE ST	CENTURY-TY WOOD MANUFACTURING INC	79 LOWLAND ST	HOLLISTON	MA	01746
009-0-0004-0045.0	383 FISKE ST	CENTURY-TYWOOD MANUFACTURING INC	79 LOWLAND ST	HOLLISTON	MA	017462030
009-0-0004-0046.0	349 FISKE ST	COCKRILL, HYSTON G & CAROLINE A	349 FISKE ST	HOLLISTON	MA	01746
009-0-0004-0062.0	600 CENTRAL ST	CHRIST THE KING LUTHERAN CHURCH	600 CENTRAL ST	HOLLISTON	MA	01746
009-0-0004-0063.0	654 CENTRAL ST	BERYES, ANNE E	654 CENTRAL ST	HOLLISTON	MA	01746
009-0-0004-0080.0	4 PILGRIM RD	JOHAL, GURDISH S & HARMINDER K	4 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0081.0	3 PILGRIM RD	RAYMER, BRIAN & KIMBERLEE	3 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0084.0	19 PILGRIM RD	MC DONALD, BENJAMIN E.	19 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0085.0	29 PILGRIM RD	BUREAU, DANA D & TANYA D	29 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0086.0	37 PILGRIM RD	QUINAN, JOSEPH & ALISON REED	37 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0087.0	47 PILGRIM RD	MCSHANE, BRIAN M & MEREDITH	47 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0088.0	57 PILGRIM RD	KELLY, BRIAN G & JUDY M	57 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0089.0	71 PILGRIM RD	CUMMINS, CHRISTOPHER S.	71 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0090.0	81 PILGRIM RD	FLANAGAN, CHRISTOPHER & ANNA S	81 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0091.0	87 PILGRIM RD	RANDALL, MARCIE SCHEIN	87 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0092.0	99 PILGRIM RD	DE FARIA, FABRICIO L	99 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0094.0	82 PILGRIM RD	STANWOOD, SCOTT A & CAROLYN R	82 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0095.0	74 PILGRIM RD	KELLY, DESMOND M & JOAN H	74 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0096.0	68 PILGRIM RD	PENNYPACKER, KATHI L	68 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0097.0	60 PILGRIM RD	ARMES, ROBERT C	60 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0098.0	54 PILGRIM RD	PIPE, RONALD W. & JULIE C.	54 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0099.0	46 PILGRIM RD	BARNARD, PAUL A & LINDA J	46 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0100.0	38 PILGRIM RD	O'NEILL, SEAN P & KRISTEN G	38 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0101.0	28 PILGRIM RD	DILLON, WILLIAM A & HEATHER J.	28 PILGRIM RD	HOLLISTON	MA	01746
009-0-0004-0102.0	20 PILGRIM RD	KAMPERSAL, THOMAS A & JULIE A.	20 PILGRIM ROAD	HOLLISTON	MA	01746
009-0-0005-0136.0	567 CENTRAL ST	GERRY, THOMAS B & BETHANY J	567 CENTRAL ST	HOLLISTON	MA	01746
009-0-0005-0137.0	565 CENTRAL ST	KIPP, DAVID & LAURA	565 CENTRAL ST	HOLLISTON	MA	01746
009-0-0005-0138.0	631 CENTRAL ST	MILLER, JESSICA ANN	631 CENTRAL STREET	HOLLISTON	MA	01746
009-0-0005-0138.0	0 CENTRAL ST	HOLLISTON, TOWN OF	TOWN HALL	HOLLISTON	MA	01746
009-0-0005-0139.0	623 CENTRAL ST	ROWE, MARGARET M TRUSTEE	623 CENTRAL STREET	HOLLISTON	MA	01746
009-0-0005-0140.0	607 CENTRAL ST	TRUITT, DAVID P & LINDA A TTEES	607 CENTRAL ST	HOLLISTON	MA	01746
009-0-0005-0141.0	597 CENTRAL ST	RONSTADT, JASON ALEXANDER	597 CENTRAL ST	HOLLISTON	MA	01746
009-0-0005-0143.0	22 DALTON RD	BESSELY, CHAD	22 DALTON RD	HOLLISTON	MA	01746
009-0-0005-0162.0	25 DALTON RD	GESBKY, KATHRYN BIANNE TTEE	25 DALTON RD	HOLLISTON	MA	01746
009-0-0006-0002.0	655 CENTRAL ST	LAGONTE, NANCY J & ARTHUR M TTEES	655 CENTRAL ST	HOLLISTON	MA	01746

SEED MIX SPECIFICATIONS		
SEED MIX NAME	SEED MIX COMPONENTS	LB./ACRE ¹
TEMPORARY SEED MIX	ANNUAL RYEGRASS	40
PERMANENT SEED MIX	PERMANENT SEED MIXTURE #1 PART III, E&SC PRACTICES (OR APPROVED EQUAL)	25
SUPPLEMENTAL WINTER SEED MIX ²	WINTER RYEGRASS	120

NOTES:
1. INCREASE SEEDING RATES 10% WHEN HYDROSEEDING
2. WINTER RYE WILL BE ADDED TO PERMANENT SEED MIX AT A RATE OF 120 LB./ACRE BETWEEN AUGUST 15 AND OCTOBER 15

CONDITION	TIMING	MULCH TYPE	APPLICATION RATES
TEMPORARY			
INACTIVE AREAS	IF NO ACTIVITY IN EXPOSED AREAS FOR 7 DAYS, OR PRIOR TO A STORM EVENT	STRAW MULCH OR WOOD FIBER MULCH OR EROSION CONTROL MIX	1000 LB./ACRE 1000 LB./ACRE 2" THICK OVER AREA
ALL DISTURBED AREAS OF THE CONSTRUCTION WORKSPACE	APPLY MULCH TO ALL EXPOSED AREAS IF NO ACTIVITY OCCURS WITHIN 30 DAYS. APPLY MULCH AND TEMPORARY SEEDING SOONER WHEN IT CAN BE ANTICIPATED THAT ACTIVITY IS NOT GOING TO OCCUR WITHIN 30 DAYS.	STRAW MULCH OR WOOD FIBER MULCH	1000 LB./ACRE
ALL WORK AREAS EXPOSED ARE TO BE MULCHED DAILY EACH TIME SOIL IS DISTURBED ³	NOVEMBER 1 - APRIL 15	STRAW MULCH OR WOOD FIBER MULCH	1000 LB./ACRE

SEEDING TO STABILIZE THE SOIL SURFACE	COVERED BY STRAW MULCH ON ALL AREAS THAT HAVE BEEN RESTORED TO FINAL GRADE. THIS DOES NOT APPLY TO AREAS STABILIZED BY OTHER MEANS SUCH AS LITE MATTING OR PERMANENT EROSION CONTROL MIX.	CRIMPED STRAW MULCH OR PAPER MULCH OR WOOD FIBER MULCH	1000 LB./ACRE
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- NOTES:
1. IN ALL CASES, SUFFICIENT MULCH SHALL BE APPLIED SUCH THAT NO SOIL IS VISIBLE THROUGH THE MULCH.
 2. DOUBLE RATE OF WOOD FIBER MULCH WHEN USED IN OR ADJACENT TO CRITICAL AREAS.
 3. PAPER MULCH IS ACCEPTABLE FOR USE DURING THE GROWING SEASON. ON SLOPES ≥ 30 PERCENT AND IN AREAS WHERE VEGETATION HAS NOT ESTABLISHED WELL, ADDITIONAL HAY MULCH WILL BE ADDED AS A WINTERIZING MEASURE.
 4. MULCH MAY NOT BE SPREAD ON TOP OF SNOW.

CONDITION	TIMING ²	SEED MIX
TEMPORARY SEEDING ³	TEMPORARY SEED BETWEEN APRIL 1 AND JUNE 30 OR SEPTEMBER 1 AND SEPTEMBER 30. DISTURBED AREAS OR SOIL STOCKPILES WILL BE SEEDDED IMMEDIATELY IF FURTHER DISTURBANCE IS NOT EXPECTED FOR 30 DAYS OR MORE.	TEMPORARY SEED MIX
PERMANENT SEEDING ^{3,4}	SEED BETWEEN APRIL 1 AND MAY 31 OR AUGUST 1 AND SEPTEMBER 10	PERMANENT SEED MIX
UPLAND PORTIONS OF THE CONSTRUCTION AREA	DISTURBED AREA WILL BE SEEDDED WITHIN 7 DAYS OF FINAL GRADING.	PERMANENT SEED MIX
SLOPES > 3:1	DISTURBED AREA WILL BE SEEDDED IMMEDIATELY AFTER SEEDBED PREPARATION.	PERMANENT SEED MIX
WINTER DORMANT SEEDING	DORMANT SEED BETWEEN NOVEMBER 1 AND DECEMBER 15 ONLY. NO SEEDING WILL OCCUR IF SNOW DEPTHS EXCEED 1 INCH.	PERMANENT SEED MIX PLUS SUPPLEMENTAL WINTER SEED MIX

- NOTES:
1. WEATHER CONDITIONS PERMITTING.
 2. AREAS THAT DO NOT SUCCESSFULLY REVEGETATE WITHIN APPROPRIATE PERIOD OF TIME WILL BE RESEED AS NECESSARY.
 3. LOOSEN COMPACTED SOIL TO A MINIMUM DEPTH OF 2 TO 4 INCHES.
 4. TOP DRESS WITH 4 TO 6 INCHES LOAM, AS NEEDED.

PERMITTING
NOT FOR CONSTRUCTION

SEAL: COMMONWEALTH OF MASSACHUSETTS THOMAS M. DANIELS, JR. CIVIL NO. 56089 REGISTERED PROFESSIONAL ENGINEER		PROFESSIONAL ENGINEER: THOMAS M. DANIELS, JR. 		
DATE: AUGUST 5, 2022				

NO.	BY	DATE	REVISION	APP'D.

PROJECT: **BLUEWAVE SOLAR**
BWC BOGASTOW BROOK, LLC
HOLLISTON BATTERY ENERGY STORAGE SYSTEM
CENTRAL STREET, HOLLISTON, MASSACHUSETTS

TITLE:	PERMITTING GENERAL NOTES & LEGEND
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DRAWN BY: TRC	PRJG. NO.: 412899-0001
CHECKED BY: TND	G1.01
APPROVED BY: TND	
DATE: AUGUST 2022	

650 Suffolk Street
 Suite 200
 Lowell, MA 01854
 Phone: 978.970.5800

FILE NO.:	412899-1 - G SHEETS.dwg
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EROSION CONTROL NOTES

PROJECT DESCRIPTION

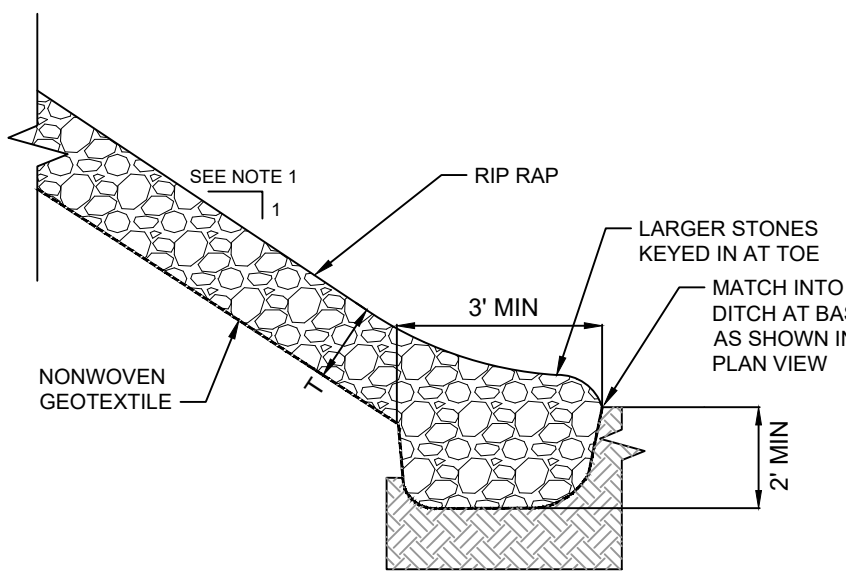
THE PROJECT INVOLVES THE CONSTRUCTION OF A BATTERY ENERGY STORAGE SYSTEM (BESS) AND ALL RELATED ACCESS ROADS, UTILITIES, SITE PREPARATION, CLEARING & GRUBBING, AND EROSION & SEDIMENTATION CONTROL MEASURES.

CONSTRUCTION SEQUENCE

1. ESTABLISH CONSTRUCTION WORKSPACE LIMITS; IDENTIFY AND MARK SENSITIVE RECEPTORS INCLUDING NATURAL RESOURCES AND DOWNGRADIENT DRAINAGE INFRASTRUCTURE.
2. INSTALLATION OF ALL EROSION AND SEDIMENT CONTROL MEASURES AND ASSOCIATED WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS".
3. PRIOR TO USAGE, CONSTRUCT AND STABILIZE THE CONSTRUCTION ENTRANCES IN THE LOCATIONS INDICATED ON THE EROSION CONTROL PLAN SHEET. AT A MINIMUM, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED AT EACH POINT SITE OF ACCESS/EGRESS FROM THE PROJECT AREA TO PAVED AREAS.
4. CLEAR TIMBER, BRUSH, AND COMPLETE TREE REMOVAL; GRUBBING SHALL NOT BE COMPLETED UNTIL JUST PRIOR TO PRELIMINARY GRADING AND ESTABLISHMENT AND STABILIZATION OF TEMPORARY OR PERMANENT DRAINAGE CONVEYANCES.
5. INSTALL AND MAINTAIN PERIMETER SEDIMENT BARRIERS SUCH AS SILT FENCING AND OTHER APPROVED EROSION CONTROL BARRIERS ALONG THE DOWNHILL LIMIT OF DISTURBANCE AS SHOWN ON THE DRAWINGS. SEDIMENT BARRIER LOCATIONS MAY BE ADJUSTED IN THE FIELD BASED ON ACTUAL SITE CONDITIONS AS DEEMED NECESSARY TO ENSURE PROPER FUNCTION. WHERE SILT FENCE CANNOT BE TOED-IN PROPERLY DUE TO TREE ROOTS, ROCKS, OR FROZEN GROUND, HAY BALES OR AN EROSION CONTROL MIX BERM MAY BE SUBSTITUTED. PERIMETER SEDIMENT BARRIERS SHALL BE INSTALLED AS SOON AS POSSIBLE BUT MAY FOLLOW INITIAL SITE PREPARATION. EROSION OR SEDIMENTATION ISSUES DEVELOPING DURING INITIAL SITE PREPARATION SHALL BE TEMPORARILY STABILIZED AS NECESSARY.
6. STABILIZE PERMANENT ACCESS ROAD SURFACES, PARKING AREAS, AND EQUIPMENT STORAGE AND LAYDOWN AREAS WITH MATTING, CRUSHED STONE, OR GRAVEL SUBBASE AS NECESSARY TO MINIMIZE RUTTING AND AVOID PONDING OF STORMWATER.
7. CONCURRENT WITH INITIATION OF SITE GRADING, CONSTRUCT CHECK DAMS AND HAYBALES TO MINIMIZE SEDIMENT IN SITE RUNOFF DURING CONSTRUCTION. DEWATERING SHALL BE IN ACCORDANCE WITH THE DEWATERING NOTES.
8. INSTALL PROPERLY SPACED STONE CHECK DAMS IN ANY SECTION OF DITCH WITHIN 24-HOURS OF FORMING, SHAPING, OR ROUGH GRADING THAT SECTION OF DITCH.
9. MINIMIZE THE AMOUNT OF DISTURBANCE AT ANY ONE TIME BY STAGING CONSTRUCTION AS MUCH AS PRACTICAL FOR EFFICIENT CONSTRUCTION OF THE FACILITY. NATURAL VEGETATIVE BUFFERS SHOULD BE LEFT IN PLACE WHERE FEASIBLE TO AID IN SEDIMENT RETENTION AND REDUCE THE POTENTIAL FOR EROSION. OPEN AREA SHALL BE LIMITED TO NO MORE THAN CAN BE MULCHED IN A SINGLE DAY.
10. STABILIZE ANY DISTURBED SLOPES GREATER THAN 3H:1V AND ANY SECTION OF NEWLY CONSTRUCTED VEGETATED DITCH USING ANCHORED EROSION CONTROL BLANKETS OR OTHER APPROVED MULCHING TECHNIQUES WITHIN 24-HOURS. ALL VEGETATED DITCHES THAT HAVE NOT BEEN STABILIZED BY NOVEMBER 1, OR WILL BE WORKED ON BETWEEN NOVEMBER 1 AND APRIL 15, MUST BE STABILIZED WITH STONE LINING BACKED BY GRAVEL BED OR GEOTEXTILE AS SPECIFIED BY THE ENGINEER.
11. DUST CONTROL METHODS SHALL BE EMPLOYED AFTER GRADING AND PRIOR TO FINAL STABILIZATION TO PREVENT THE BLOWING AND MOVEMENT OF NUISANCE DUST THROUGH THE APPLICATION OF WATER AND/OR CALCIUM CHLORIDE.
12. APPLY TEMPORARY SEED AND MULCH TO EXPOSED AREAS WHERE ACTIVITY IS NOT ANTICIPATED FOR 30-DAYS. TEMPORARILY MULCH ANY EXPOSED AREAS AS FOLLOWS: (1) WITHIN 100-FEET OF A WETLAND OR NATURAL RESOURCE WHERE WORK IS NOT ANTICIPATED OR HAS NOT OCCURRED IN 7 DAYS, OR PRIOR TO A STORM EVENT; AND (2) ALL OTHER AREAS THAT WILL NOT BE ACTIVELY WORKED FOR MORE THAN 14 DAYS.
13. REMOVE EXCESS SPOILS FROM THE SITE THAT WILL NOT BE USED FOR THE FINAL DESIGN AND STABILIZATION. STOCKPILED SOILS THAT REMAIN IN PLACE FOR 48-HOURS OR MORE SHALL BE CONTAINED WITH SEDIMENT BARRIERS. THE SEDIMENT BARRIERS SHALL BE REINFORCED TO HANDLE A SIGNIFICANT RAIN EVENT AND THE POTENTIAL SLUMPING OF THE PILE. BETWEEN APRIL 15 AND OCTOBER 1, APPLY TEMPORARY SEED AND MULCH TO A STOCKPILE THAT IS NOT ANTICIPATED TO BE DISTURBED WITHIN 30-DAYS. APPLY ANCHORED MULCH DAILY AND/OR AS NEEDED DURING WINTER CONSTRUCTION.
14. INSPECT AND REPAIR EROSION CONTROL MEASURES DAILY IN AREAS OF ACTIVE CONSTRUCTION; OTHERWISE WEEKLY AND AFTER A RAINFALL EVENT OF 0.5-INCHES OR GREATER WITHIN A 24-HOUR PERIOD. REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES 1/2 OF THE HEIGHT OF THE BARRIER.
15. MONITOR PUBLIC ROADS FOR SIGNS OF TRACKING OR SPILLING OF SPOIL MATERIAL AND CLEAN-UP AS NECESSARY.
16. COMPLETE FINAL GRADING AND STABILIZATION OF EARTHEN STRUCTURES SUCH AS DIVERSION BERMS, LEVEL SPREADERS, AND SWALES THAT WILL CONTROL POST-CONSTRUCTION RUNOFF.
17. FINISH GRADE AND REPLACE TOPSOIL OR LOAM IN DISTURBED AREAS. SEED AND MULCH DISTURBED AREAS WITHIN 7 DAYS OF FINAL GRADING. BETWEEN NOVEMBER 1 AND APRIL 15, STABILIZE AREAS THAT ARE FINAL GRADED AT THE END OF EACH DAY.
18. MAINTAIN ALL TEMPORARY EROSION CONTROLS AND SEDIMENT BARRIERS UNTIL VEGETATION HAS BEEN ESTABLISHED OVER 90% OF THE AREA TO BE REVEGETATED. RESEED SPARSELY VEGETATED AREAS AS NECESSARY.
19. REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES ONCE THE SITE IS PERMANENTLY STABILIZED.

DEWATERING NOTES

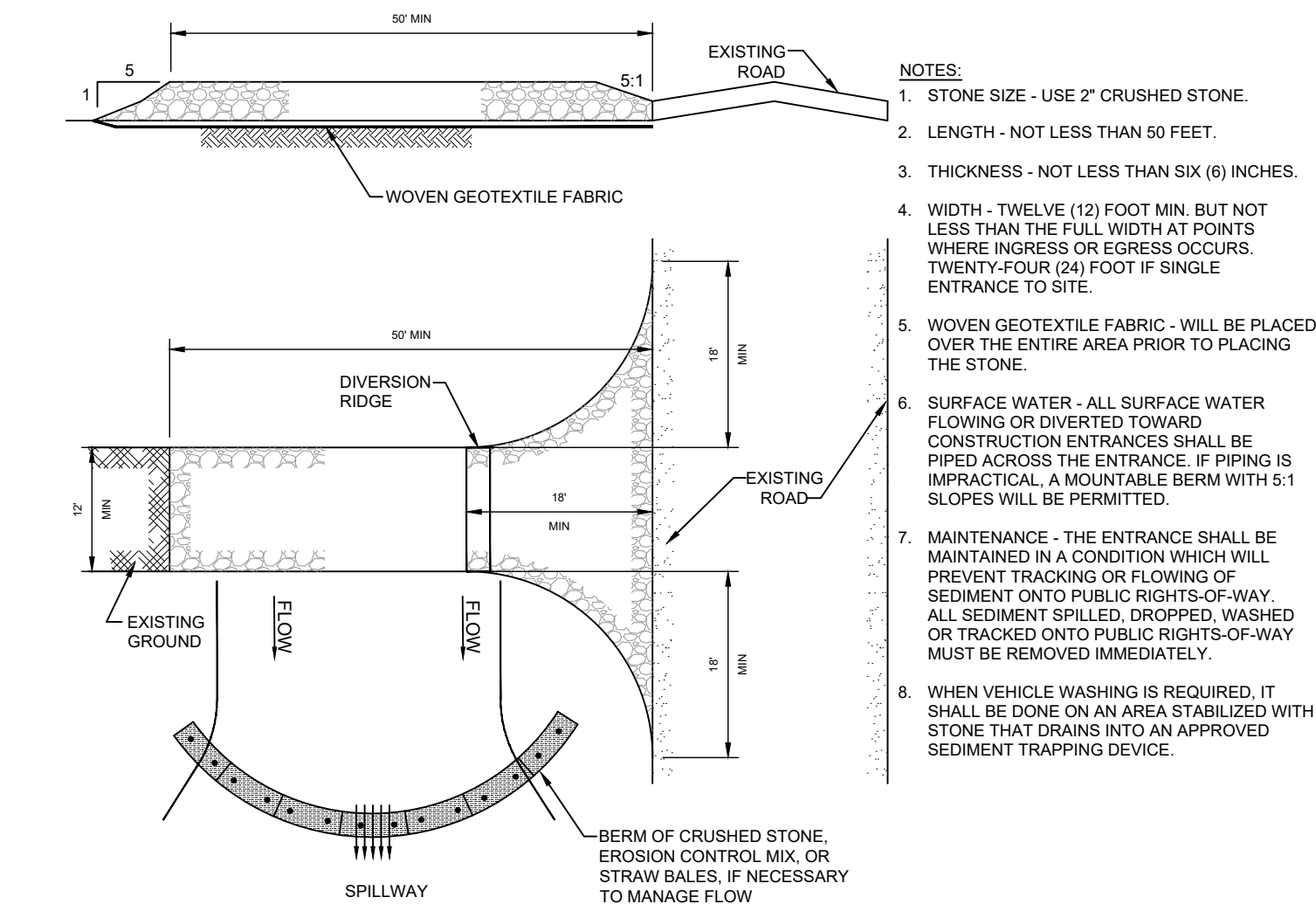
1. THE CONTRACTOR SHALL INSTALL, MAINTAIN, AND OPERATE ALL CHANNELS, SUMPS, AND OTHER TEMPORARY DIVERSION AND PROTECTIVE WORKS NEEDED TO DIVERT STREAM FLOW AND OTHER SURFACE WATER THROUGH OR AROUND THE CONSTRUCTION SITE. CONTROL OF SURFACE WATER SHALL BE CONTINUOUS DURING THE PERIOD THAT DAMAGE TO CONSTRUCTION WORK COULD OCCUR.
2. OPEN EXCAVATIONS SHALL BE DEWATERED AND KEPT FREE OF STANDING WATER AND MUDDY CONDITIONS AS NECESSARY FOR THE PROPER EXECUTION OF THE WORK. THE CONTRACTOR SHALL FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL DRAINS, SUMPS AND ALL OTHER EQUIPMENT REQUIRED TO PROPERLY DEWATER THE SITE. DEWATERING SYSTEMS THAT CAUSE A LOSS OF SOIL FINES FROM THE FOUNDATION AREAS WILL NOT BE PERMITTED.
3. INSTALL DIVERSION DITCHES OR BERMS IF NECESSARY TO MINIMIZE THE AMOUNT OF CLEAN STORMWATER RUNOFF ALLOWED INTO THE EXCAVATION AREA.
4. REMOVAL OF WATER FROM THE CONSTRUCTION SITE SHALL BE ACCOMPLISHED SO THAT EROSION AND TRANSPORTATION OF SEDIMENT AND OTHER POLLUTANTS ARE MINIMIZED.
5. DISCHARGE DEWATERING EFFLUENT TO AREAS AS INDICATED ON THE SITE GRADING PLAN. DISCHARGE SHALL BE MANAGED TO ENSURE SHEET FLOW.
6. DEWATERING IN PERIODS OF INTENSE HEAVY RAIN OR WHEN THE INFILTRATIVE CAPACITY OF THE SOIL IS EXCEEDED, SHALL BE AVOIDED TO THE MAXIMUM EXTENT PRACTICABLE.
7. FLOW TO THE SEDIMENT REMOVAL STRUCTURE MAY NOT EXCEED THE STRUCTURE'S CAPACITY TO SETTLE AND FILTER FLOW OR THE STRUCTURE'S VOLUME CAPACITY.
8. WHEN TEMPORARY WORKS ARE NO LONGER NEEDED, THE CONTRACTOR SHALL REMOVE AND RETURN THE AREA TO A CONDITION SIMILAR TO THAT WHICH EXISTED BEFORE CONSTRUCTION. AREAS WHERE TEMPORARY WORKS WERE LOCATED SHALL BE GRADED FOR SLIGHTLY APPEARANCE WITH NO OBSTRUCTION TO NATURAL SURFACE WATER FLOWS OR THE PROPER FUNCTIONING AND ACCESS TO THE WORKS OF IMPROVEMENTS INSTALLED. THE CONTRACTOR SHALL EXERCISE EXTREME CARE DURING THE REMOVAL STAGES TO MINIMIZE THE LOSS OF SOIL, SEDIMENT AND DEBRIS THAT WAS COLLECTED DURING CONSTRUCTION.



- CONSTRUCTION NOTES:
1. SLOPE GRADED AS DEPICTED BY PROPOSED GRADES IN PLAN VIEW.
 2. SUBGRADE SHALL BE COMPACTED TO 95% OF ASTM D1557 TO A DEPTH OF 12-INCHES.
 3. GEOTEXTILE SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL AND SHALL BE KEYED IN AT THE UPPER LIMITS OF THE RIP RAPPED SLOPE.
 4. RIPRAP SIZING SHALL CONFORM TO MDOT 703.26.
 5. MINIMUM RIPRAP THICKNESS (T) OF RIPRAP COVER SHALL BE 15".
 6. ENTRENCH THE TOE OF THE RIP RAPPED SLOPE USING LARGER ROCKS.

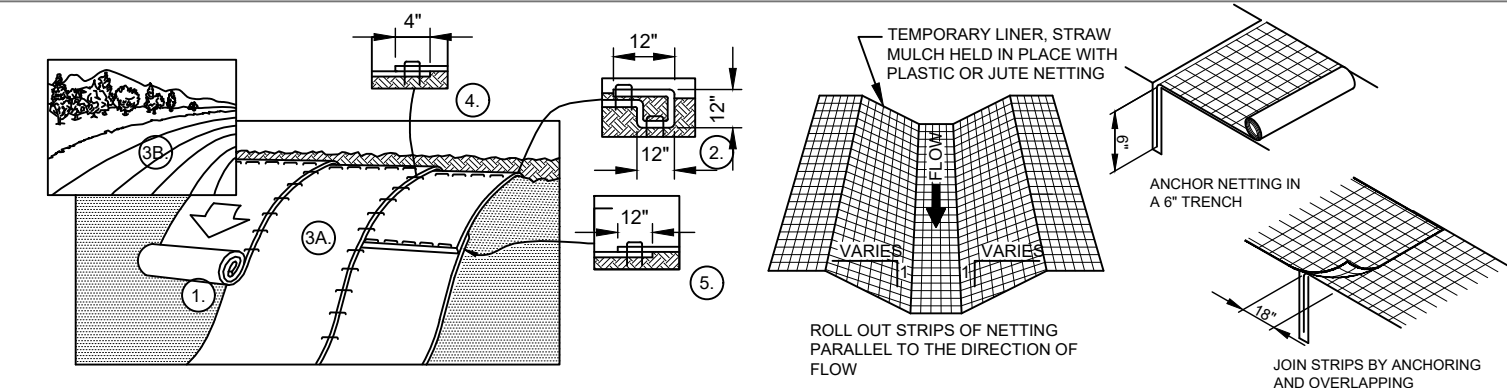
RIP RAP STABILIZATION DETAIL

NOT TO SCALE



STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



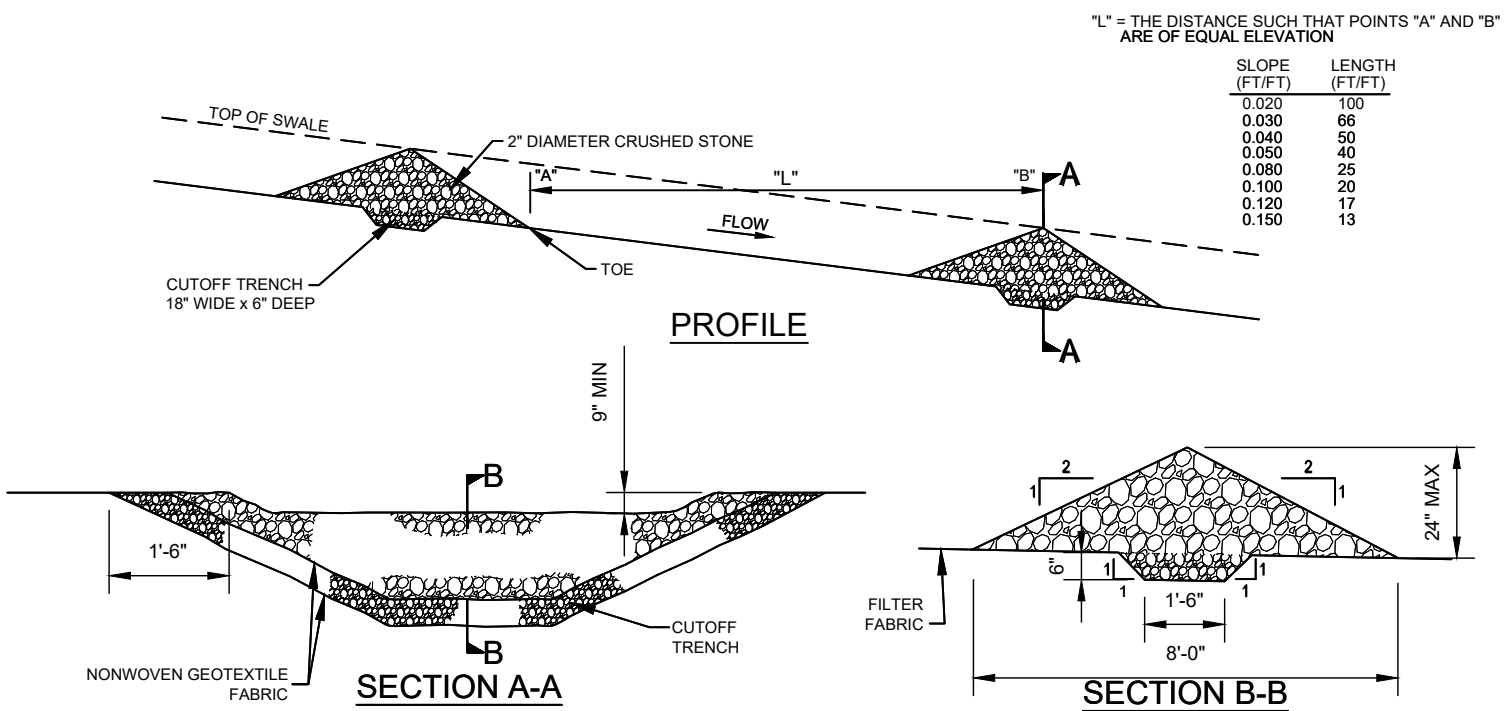
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELLO-SEED DO NOT SEED PREPARED AREA. CELLO-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
 2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 12" DEEP X 12" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
 3. ROLL THE BLANKETS (A) DOWN THE SLOPE. HORIZONTAL (B) INSTALLATION MAY BE APPROPRIATE IN SOME INSTANCES AS APPROVED BY THE ENGINEER. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
 4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH A MINIMUM OF 4" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
 5. CONSECUTIVE BLANKETS SPICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 12" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.
- NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

EROSION CONTROL BLANKET

NOT TO SCALE

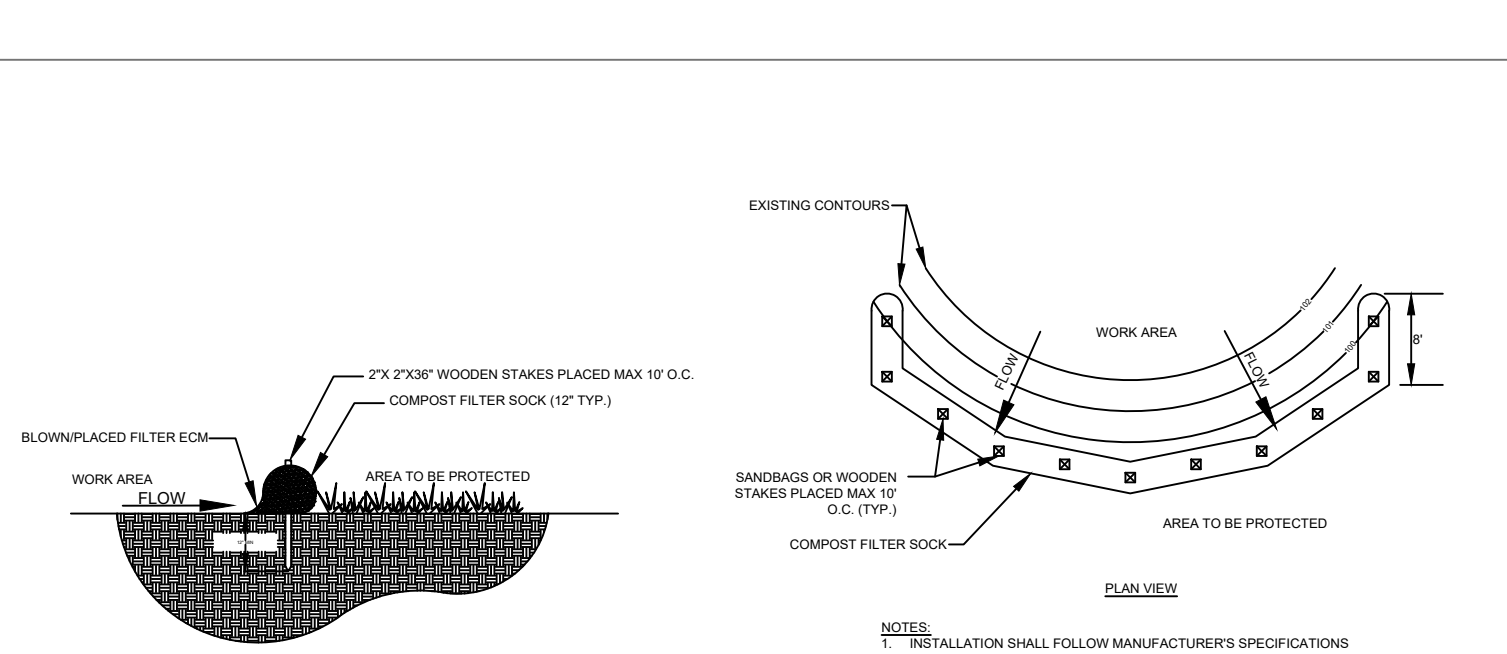
GRASS LINED DITCH

NOT TO SCALE



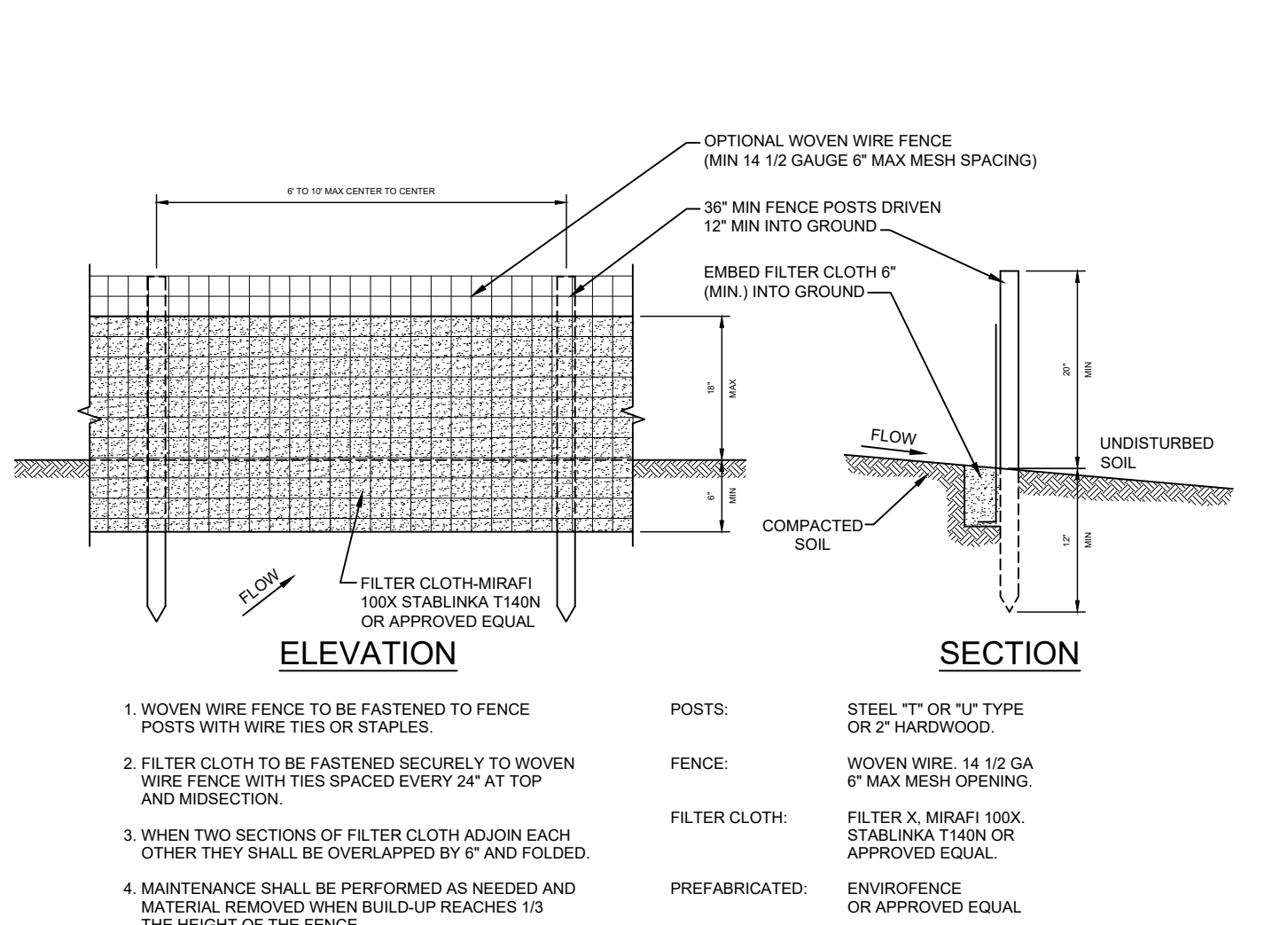
CHECK DAM DETAILS

NOT TO SCALE



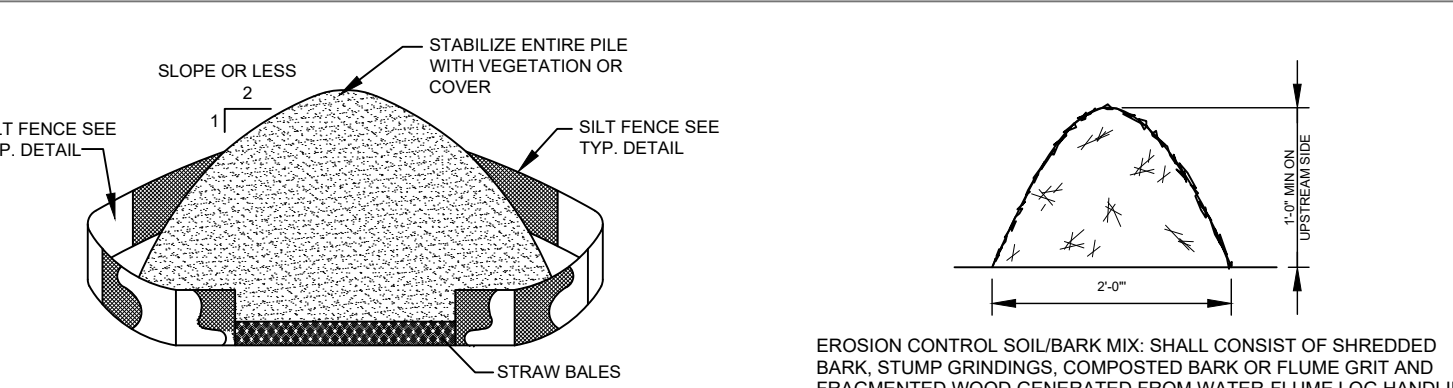
COMPOST FILTER SOCK

NOT TO SCALE



SILT FENCE DETAILS

NOT TO SCALE



INSTALLATION NOTES:

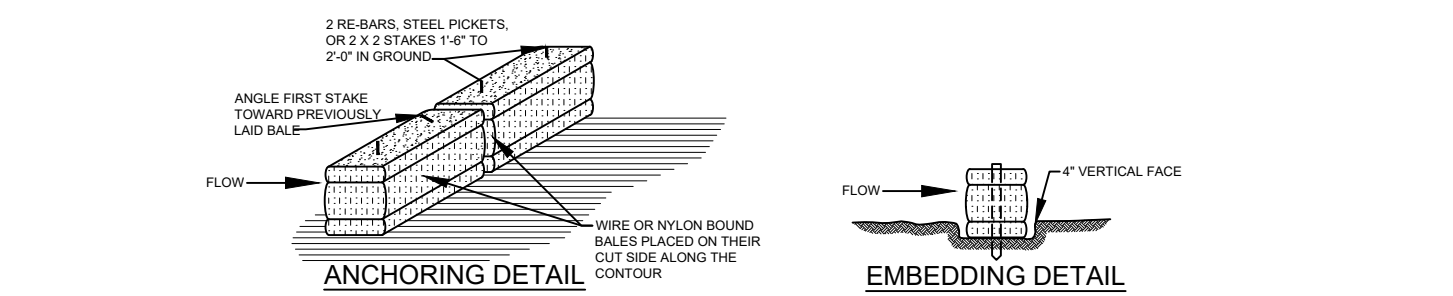
1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 2H:1V.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH EITHER SILT FENCING OR STRAW BALES, THEN STABILIZED WITH VEGETATION OR COVERED.

TYPICAL SOIL STOCKPILE

NOT TO SCALE

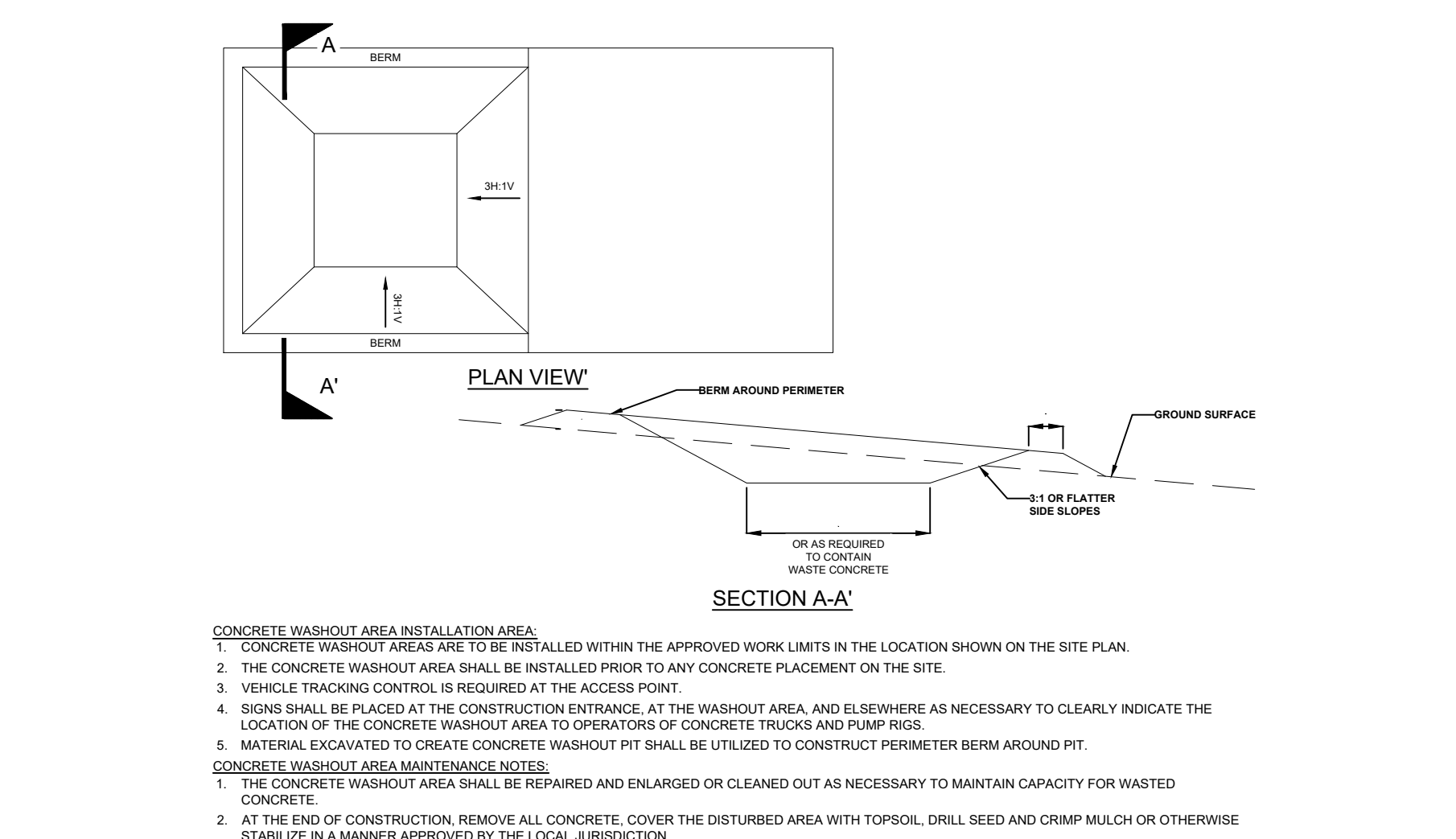
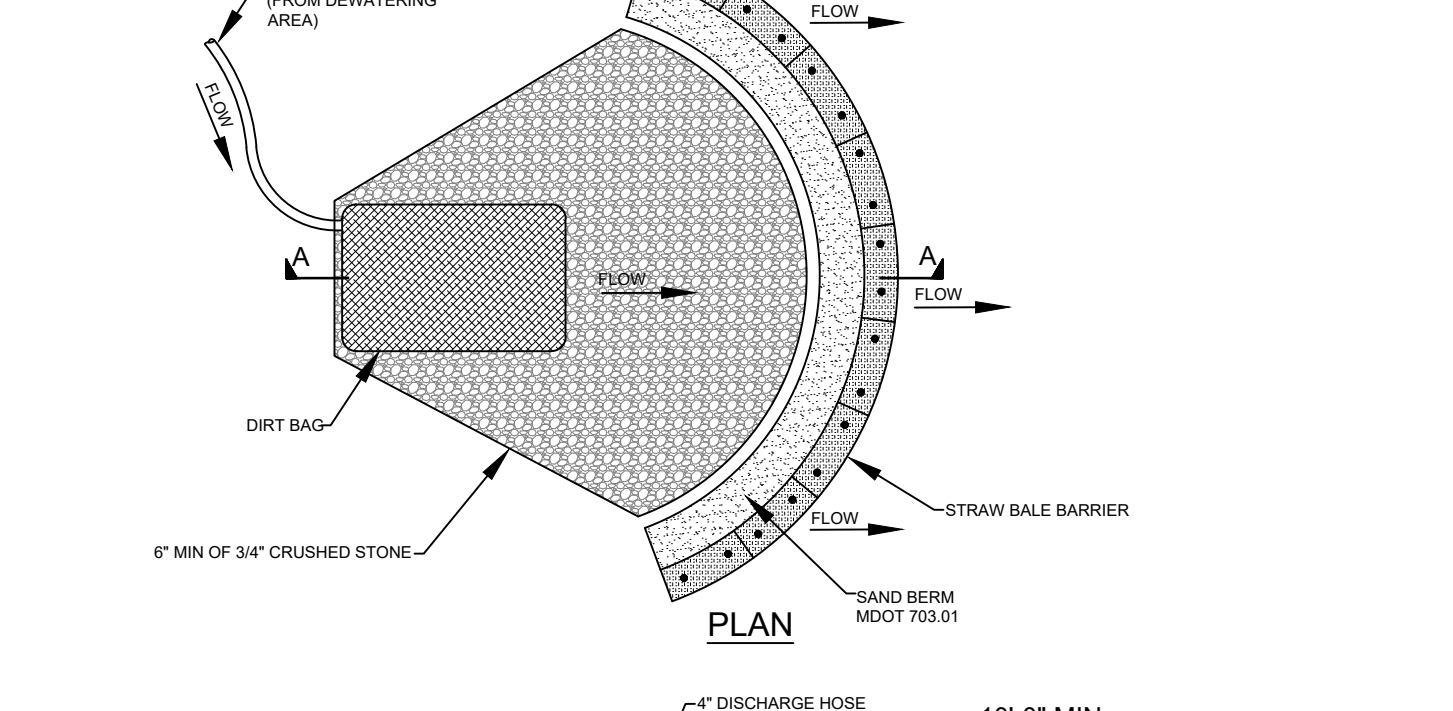
EROSION CONTROL BERM

NOT TO SCALE



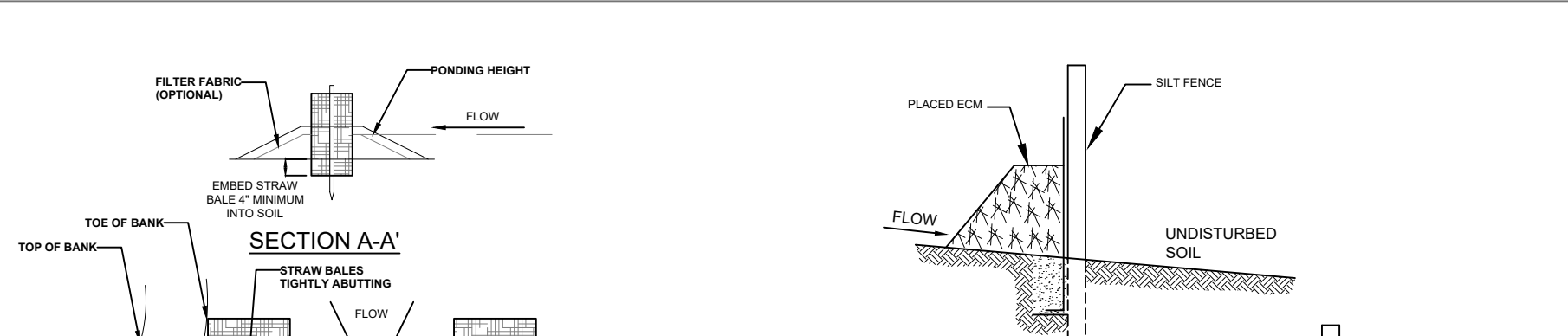
STRAW BALE BARRIER

NOT TO SCALE



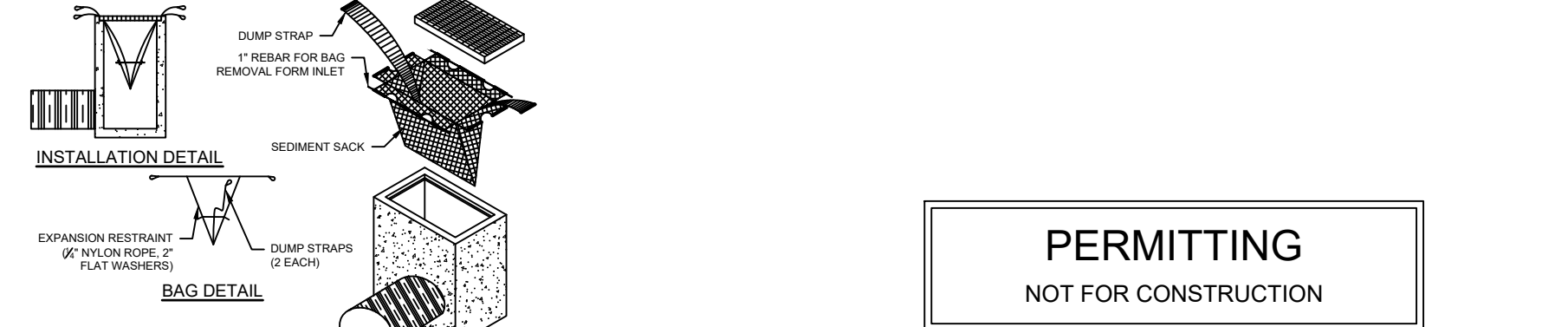
CONCRETE WASHOUT AREA

NOT TO SCALE



PAIRED PERIMETER CONTROLS FOR CRITICAL AREAS

NOT TO SCALE



PERMITTING

NOT FOR CONSTRUCTION

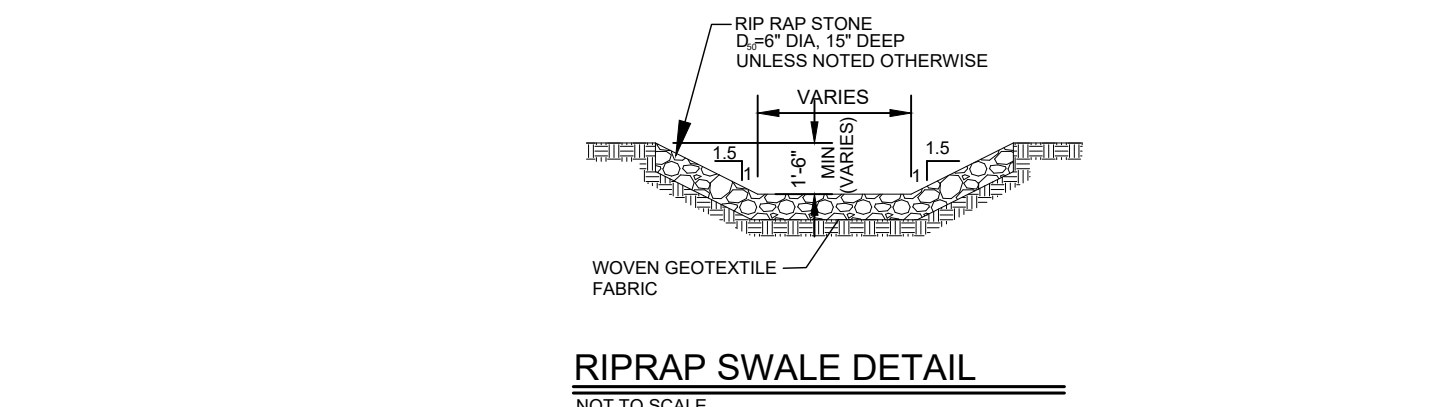
CATCH BASIN INLET PROTECTION

NOT TO SCALE

- DEWATERING DETAIL NOTES:
1. DIRT BAG MATERIAL, BASED ON PARTICLE SIZE IN DIRTY WATER, I.E. FOR COARSE PARTICLES A WOVEN MATERIAL IS PREFERRED. FOR SILT/CLAYS A NON-WOVEN MATERIAL SHOULD BE IMPLEMENTED.
 2. DO NOT OVER PRESSURIZE DIRT BAG OR USE BEYOND CAPACITY.
 3. LOCATE DISCHARGE SITE AS INDICATED ON THE SITE GRADING PLAN.
 4. DOWNGRADIENT RECEIVING AREA MUST BE WELL VEGETATED OR OTHERWISE STABLE FROM EROSION, E.G., PERMANENT VEGETATION OR COARSE GRAVEL/STONE.
 5. DISCHARGE OF DEWATERING ACTIVITIES PROHIBITED WITHIN 25' OF A NATURAL RESOURCE.

EXCAVATION DEWATERING DETAIL

NOT TO SCALE



RIP RAP SWALE DETAIL

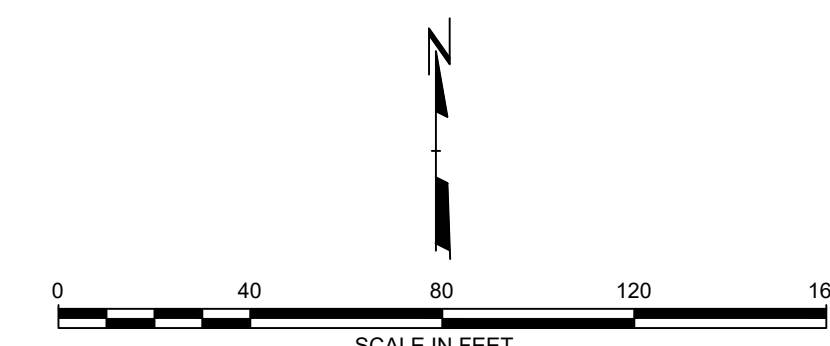
NOT TO SCALE

SEAL:		PROFESSIONAL ENGINEER:	
		THOMAS N. DANIELS, JR.	
DATE:		AUGUST 5, 2022	
PROJECT:		BLUEWAVE SOLAR BWC BOGASTOW BROOK, LLC HOLLISTON BATTERY ENERGY STORAGE SYSTEM CENTRAL STREET, HOLLISTON, MASSACHUSETTS	
TITLE:		EROSION CONTROL NOTES & DETAILS	
DRAWN BY:	TRC	PROJ. NO.:	412899.0001
CHECKED BY:	TND	G1.02	
APPROVED BY:	TND		
DATE:	AUGUST 2022		
FILE NO.:		412899 - 1 - G SHEETS.dwg	

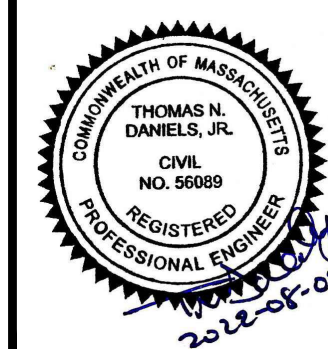


NOTES

1. APPROXIMATE FLOOD ZONE LIMIT IS ESTIMATED BASED ON BASE FLOOD ELEVATION OF 151 FEET. ACTUAL FLOOD ZONE LIMIT SHOULD BE CONFIRMED BY A SURVEYOR.



PERMITTING
NOT FOR CONSTRUCTION



PROFESSIONAL ENGINEER:
THOMAS N. DANIELS, JR.

DATE:
AUGUST 5, 2022

[illegible]

NO.	BY	DATE	REVISION
PROJECT: BLUEWAVE SOLAR			
BWC BOGASTOW BROOK, LLC			
HOLLISTON BATTERY ENERGY STORAGE SYSTEM			
CENTRAL STREET, HOLLISTON, MASSACHUSETTS			

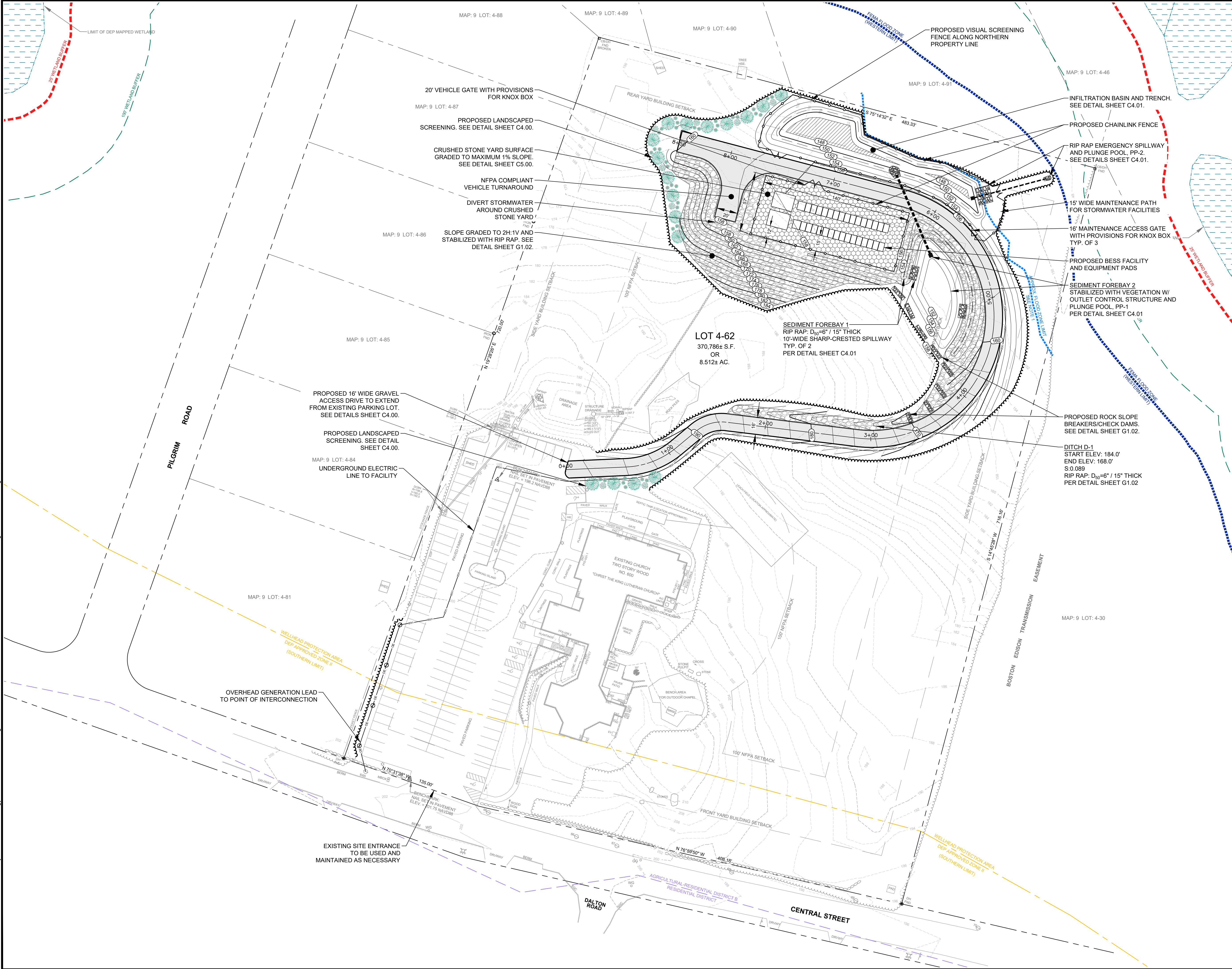
TITLE: **EXISTING CONDITIONS PLAN**

DRAWN BY:	TRC	PROJ. NO.:	412899.0001
CHECKED BY:	TND	C1.00	
APPROVED BY:	TND		
DATE:	AUGUST 2022		



650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

FILE NO.: 412899.1 - EXISTING.dwg



NOTES

1. APPROXIMATE FLOOD ZONE LIMIT IS ESTIMATED BASED ON BASE FLOOD ELEVATION OF 151 FEET. ACTUAL FLOOD ZONE LIMIT SHOULD BE CONFIRMED BY A SURVEYOR.

PERMITTING

NOT FOR CONSTRUCTION

SEAL

PROFESSIONAL ENGINEER:

THOMAS N. DANIELS, JR.

DATE:

AUGUST 5, 2022

NO.	BY	DATE	REVISION	APPD.

PROJECT:

BLUEWAVE SOLAR
BWC BOGASTOW BROOK, LLC
HOLLISTON BATTERY ENERGY STORAGE SYSTEM
CENTRAL STREET, HOLLISTON, MASSACHUSETTS

TITLE:

SITE GRADING & DRAINAGE PLAN

DRAWN BY:

TRC

CHECKED BY:

TND

APPROVED BY:

TND

DATE:

AUGUST 2022

PROJ. NO.:

412899.0001

C2.00

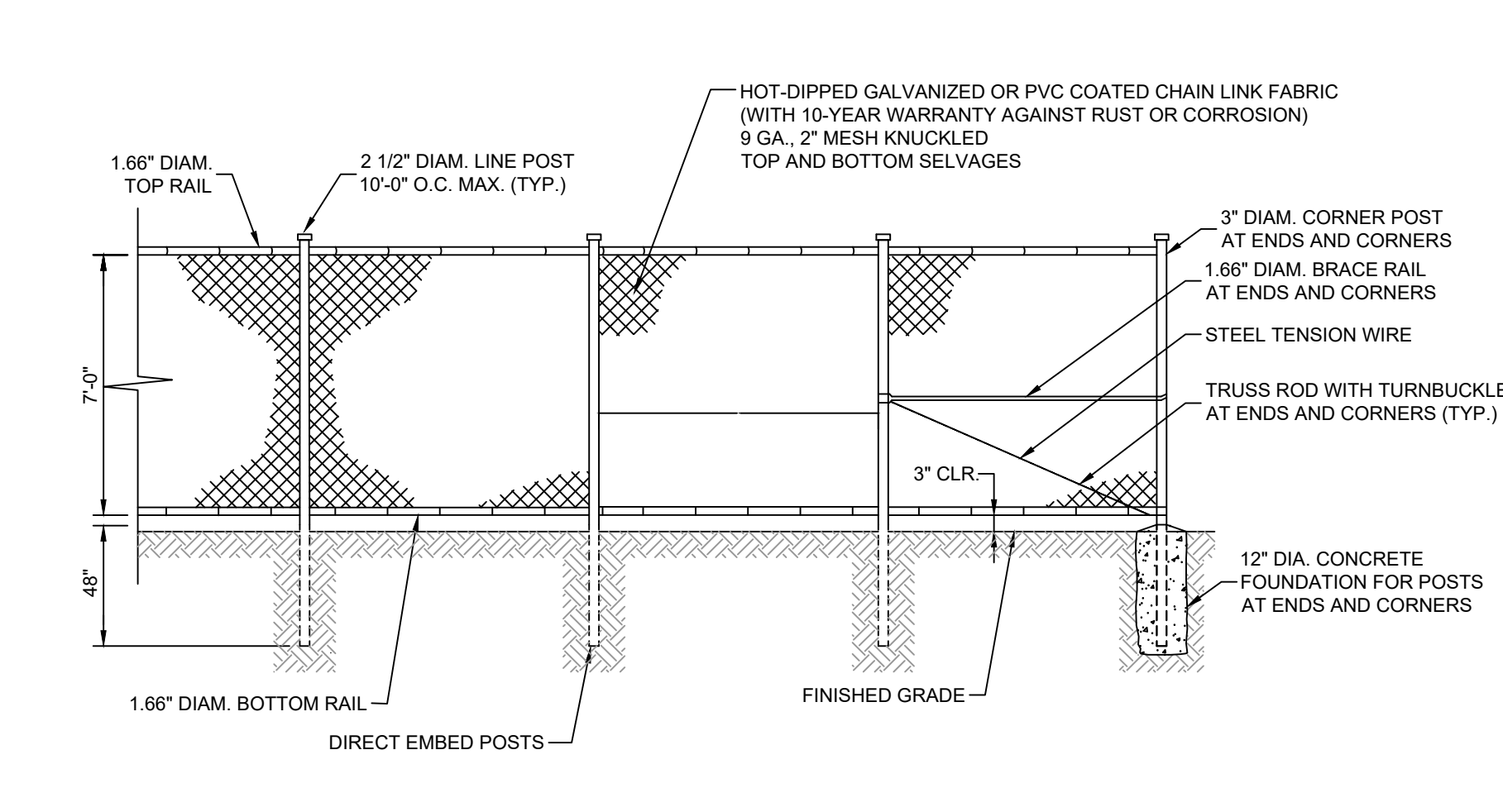
650 Suffolk Street
Suite 200
Lowell, MA 01854
Phone: 978.970.5600

FILE NO.:

412899.1 - BASE.dwg

2426 --USER: Administrator -- ATTACHED FILES: 412899.1 - EXISTING -- ATTACHED FILES: HMA3022805 - HMA3022805
DRAWING NAME: E:\RMD\ENV RMD Projects\BlueWave Energy\412899 - BWC BESS Program - Massachusetts\412899.1 - BASE.dwg --- PLOT DATE: August 05, 2022 - 7:59AM --- LAYOUT: C2.00
Version: 2017.10.21

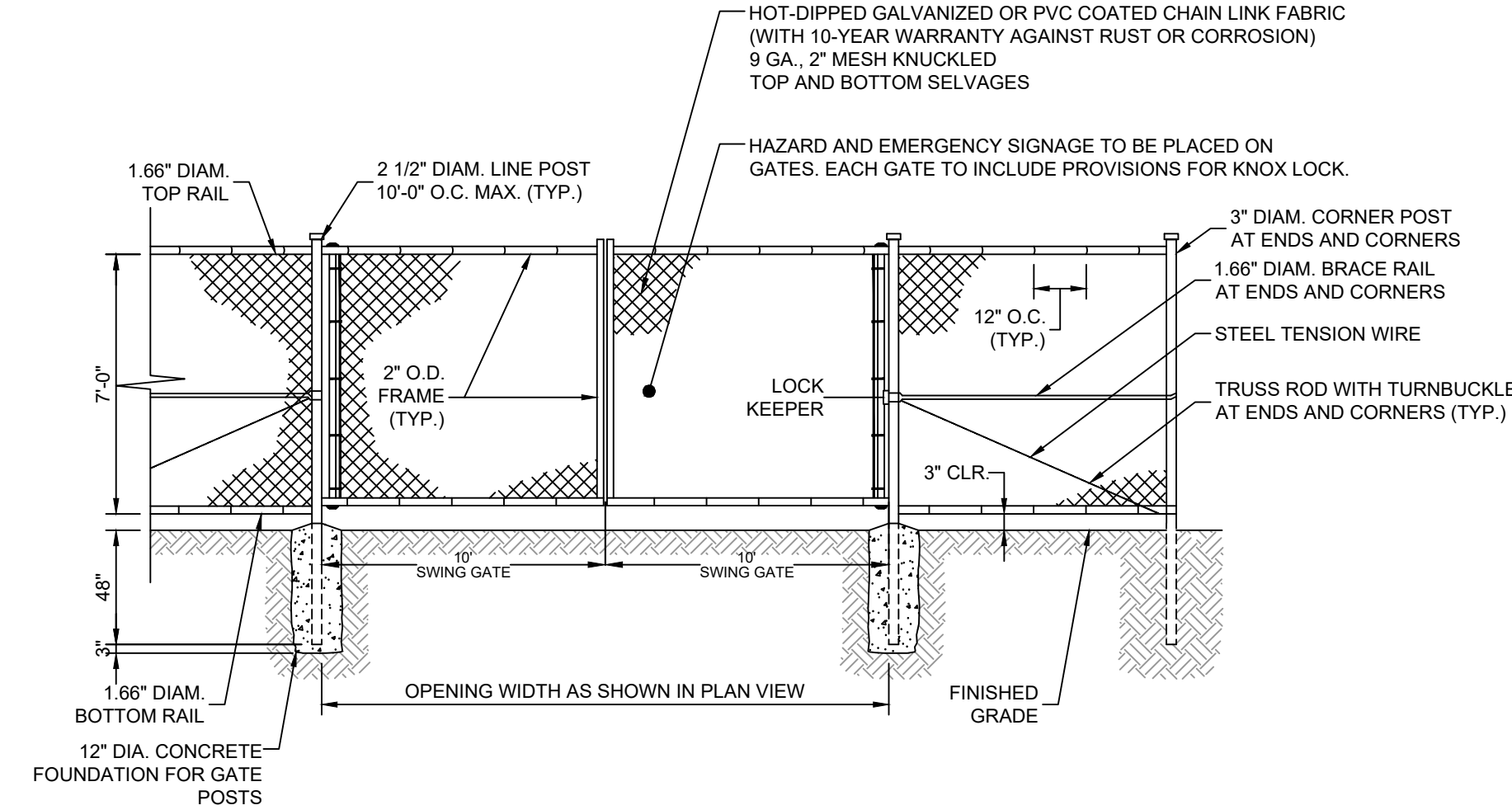
24-06 -- USER: daniel -- ATTACHED IMAGES: -- ATTACHED IMAGES: holliston10-DWG: 412899.1 - DT.dwg -- PLOT DATE: August 05, 2022 - 7:59AM -- LAYOUT: C4.00
DRAWING NAME: E:\RMD\ENV RMD Projects\BlueWave Energy\412899 - BWC BESS Program - Massachusetts\412899.1 - Holliston10-DWG: 412899.1 - DT.dwg



NOTES:
1. DETAIL IS FOR ILLUSTRATIVE PURPOSES ONLY. FINAL GATE DESIGN AND LAYOUT SUBJECT TO DETAILED ENGINEER AND APPROVAL AND CONTRACTOR SUBMITTAL.

CHAINLINK FENCE

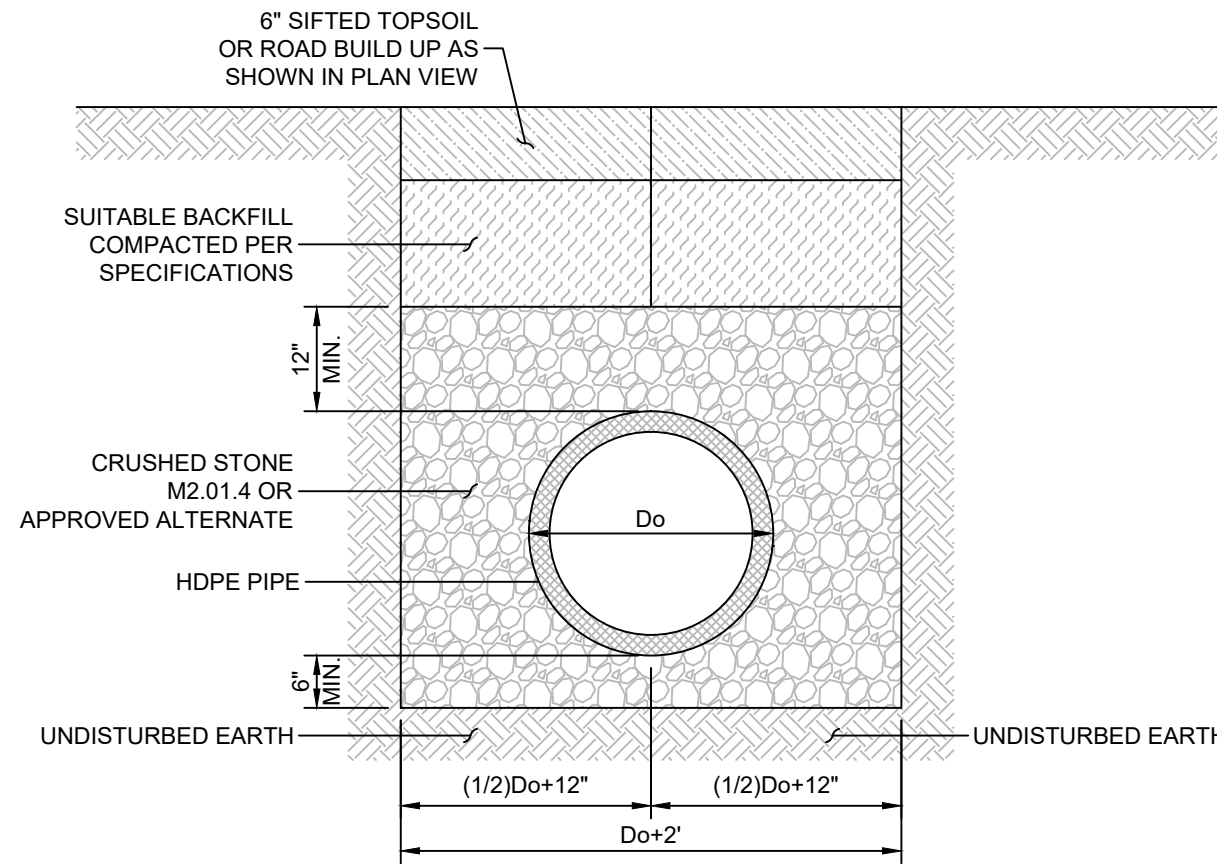
NOT TO SCALE



NOTES:
1. DETAIL IS FOR ILLUSTRATIVE PURPOSES ONLY. FINAL GATE DESIGN AND LAYOUT SUBJECT TO DETAILED ENGINEER AND APPROVAL AND CONTRACTOR SUBMITTAL. ALTERNATIVE DESIGN FOR GATE IS 20FT CANTILEVERED SLIDING GATE.

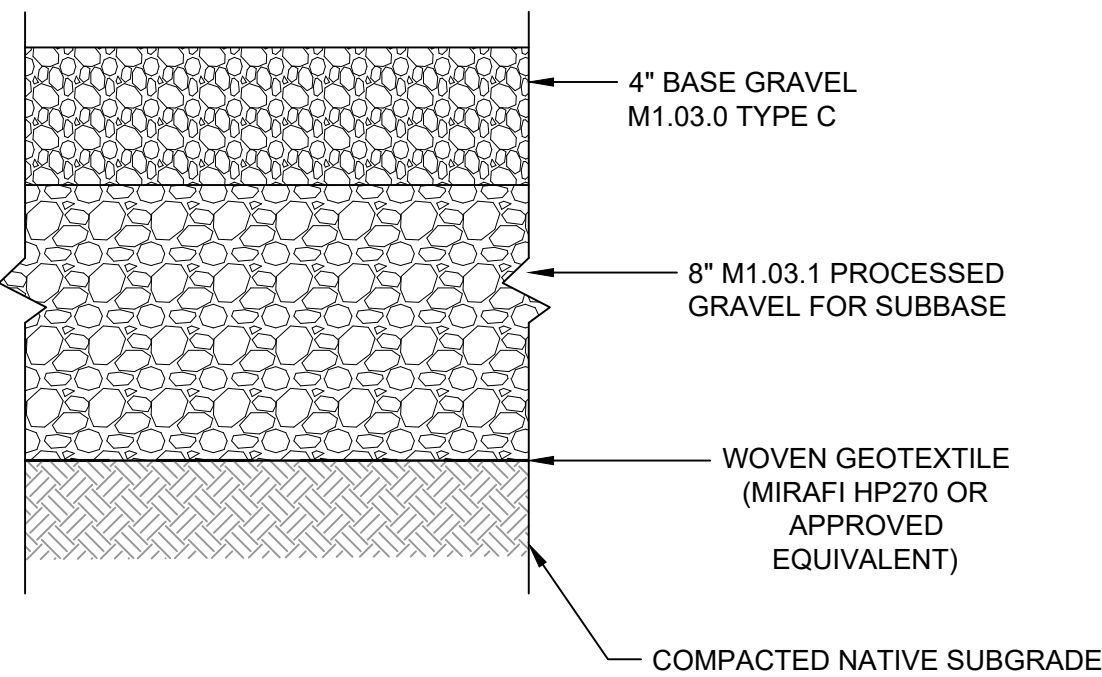
VEHICULAR GATE DETAIL

NOT TO SCALE



STORM PIPE TRENCH DETAIL

NOT TO SCALE

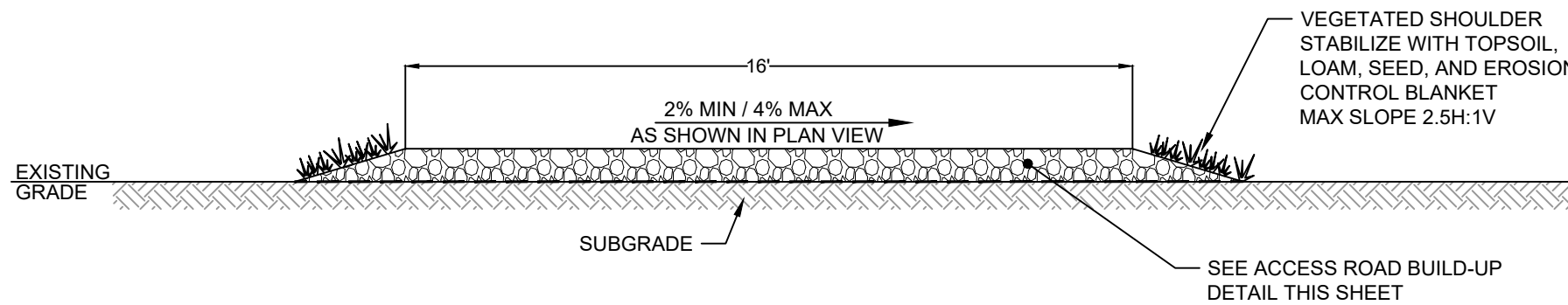


CONSTRUCTION NOTES:

1. BASE GRAVEL AND GRAVEL SUBBASE SHALL BE M1.03.1 AGGREGATE BACKFILL. AGGREGATE SHALL BE DURABLE CRUSHED ROCK CONSISTING OF THE ANGULAR FRAGMENTS OBTAINED BY BREAKING AND CRUSHING SOLID OR SHATTERED NATURAL ROCK, AND FREE FROM A DETRIMENTAL QUANTITY OF THIN, FLAT, ELONGATED, OR OTHER OBJECTIONABLE PIECES.
2. BASE GRAVEL AND SUBBASE GRAVEL, SHALL BE COMPACTED TO 95% OF ASTM D1557 AND PLACED IN MAXIMUM COMPACTED LIFTS OF 9-INCHES.
3. VEGETATION AND TOPSOIL WITHIN LIMIT OF ROAD FILL SHALL BE STRIPPED PRIOR TO PLACEMENT OF GEOTEXTILE.
4. SUBGRADE SHALL BE COMPACTED TO 95% OF ASTM D1557 TO A DEPTH OF 12-INCHES.
5. SUBGRADE FILL REQUIRED TO ACHIEVE DESIGN GRADES, BEYOND DEPTH OF BASE GRAVEL AND GRAVEL SUBBASE, SHALL CONFORM TO THE REQUIREMENTS OF M1.02.0; SPECIAL BORROW MATERIAL EXCEPT THAT IT SHALL CONTAIN NO STONE LARGER THAN 6-INCHES AND SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8-INCHES IN DEPTH, COMPACTED MEASURE.

ACCESS DRIVE BUILD-UP

NOT TO SCALE

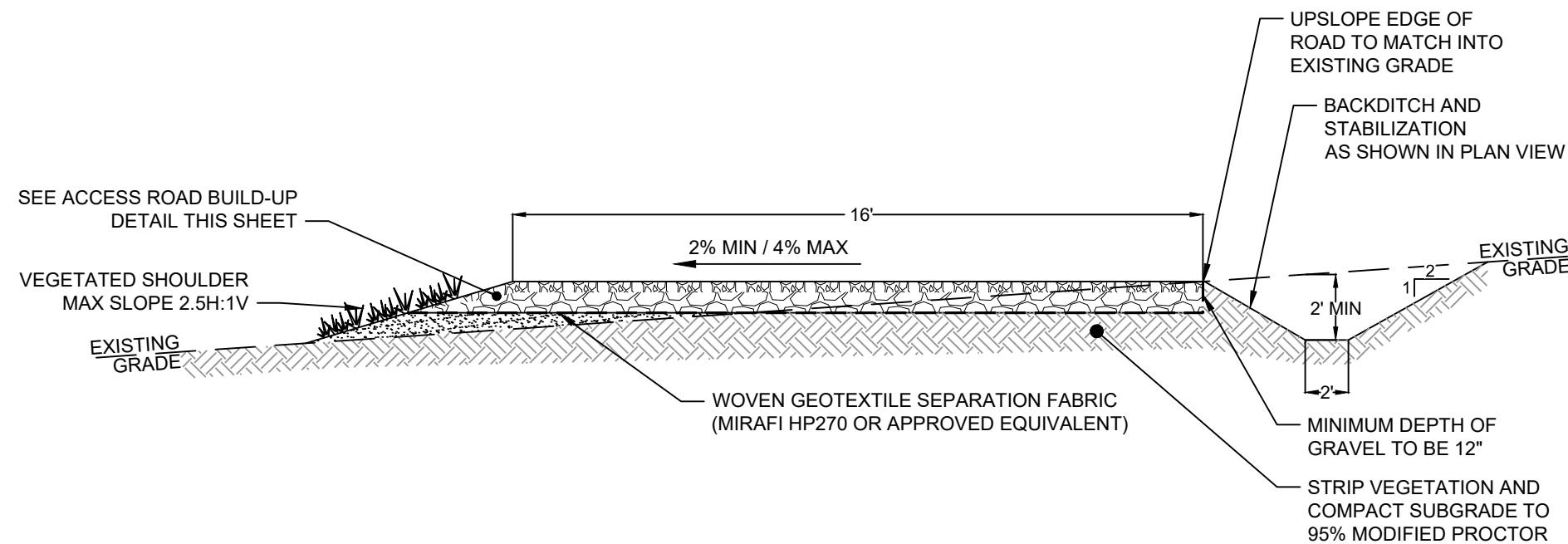


CONSTRUCTION NOTES:

1. BUILD-UP OF ACCESS ROAD SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE ACCESS ROAD BUILD-UP DETAIL.
2. GRAVEL SURFACE SHALL BE SUPERELEVATED AND SLOPED A MINIMUM OF 2% AS INDICATED IN PLAN VIEW. CROSS SLOPE SHALL NOT EXCEED 4%.
3. VEGETATION AND TOPSOIL WITHIN LIMIT OF ROAD FILL SHALL BE REMOVED PRIOR TO PLACEMENT OF ROAD BUILD-UP MATERIALS AND USED IN SUPPORT OF STABILIZING ROADWAY SHOULDERS.
4. ROADWAY SHOULDER SHALL BE VEGETATED AND PREPARED TO DIRECT RUNOFF AS SHEETFLOW TO UNDISTURBED AREAS.

TYPICAL ACCESS ROAD SECTION

NOT TO SCALE



CONSTRUCTION NOTES:

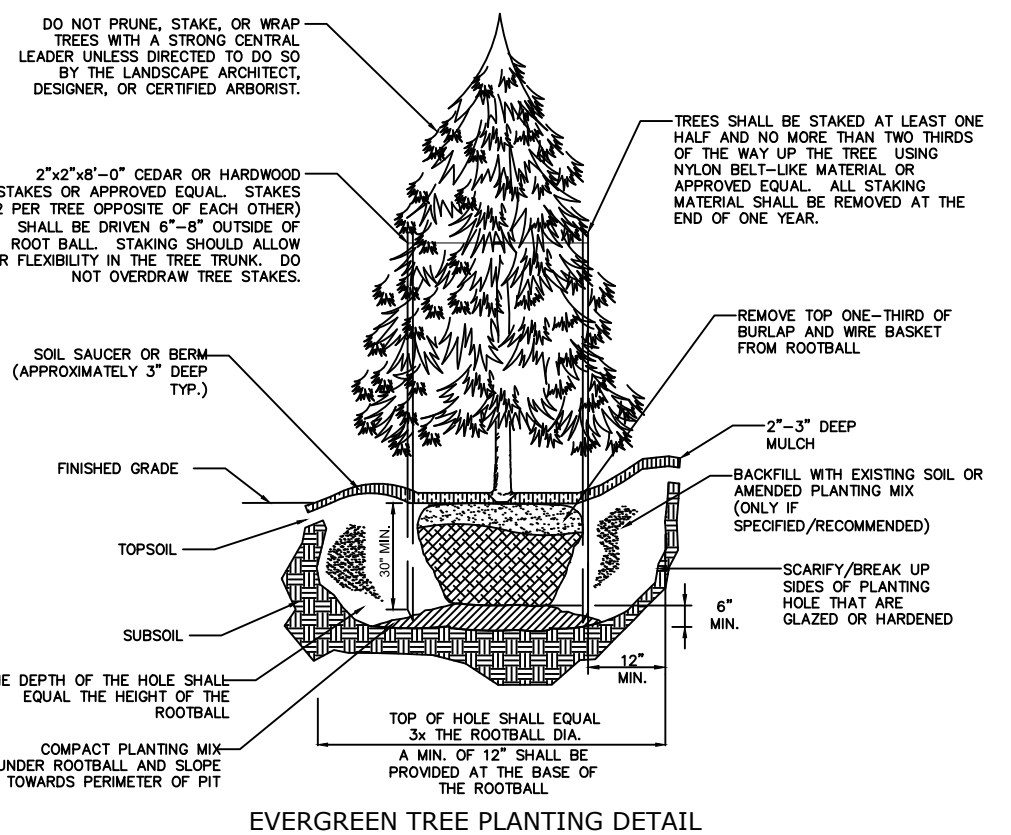
1. GRAVEL SURFACE SHALL BE SUPERELEVATED AND SLOPED A MINIMUM OF 2% AS INDICATED IN PLAN VIEW. CROSS SLOPE SHALL NOT EXCEED 4%.
2. ROADWAY SHOULDER SHALL BE VEGETATED AND PREPARED TO DIRECT RUNOFF AS SHEETFLOW TO IDENTIFIED BUFFER AREAS.
3. DITCH SHALL BE TRAPEZOIDAL WITH MINIMUM 2-FOOT FLAT BOTTOM AND A MINIMUM DEPTH OF 2 FEET. DITCH SHALL BE STABILIZED IN ACCORDANCE WITH CONDITIONS SHOWN ON THE SITE GRADING & DRAINAGE PLAN, SHEET C2.00.

PROPOSED ACCESS DRIVE : STA. 1+75 TO 3+50

NOT TO SCALE

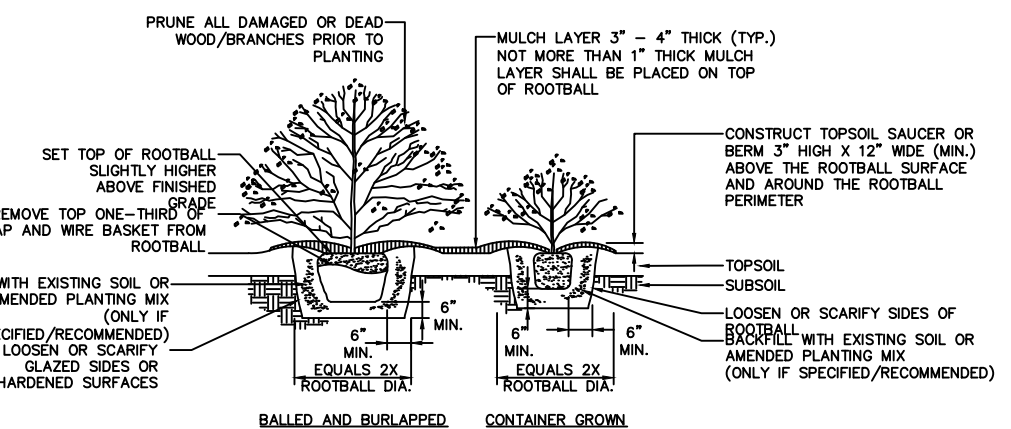
GENERAL LANDSCAPING NOTES AND VEGETATION MANAGEMENT RECOMMENDATIONS

1. THE CONTRACTOR SHALL MONITOR AND GUARANTEE THAT ALL PLANTS, TREES, AND SHRUBS SHALL BE HEALTHY AND FREE OF DISEASE FOR A PERIOD OF (2) TWO YEARS AFTER SUBSTANTIAL COMPLETION AND ACCEPTANCE BY THE OWNER. CONTRACTOR SHALL REPLACE ANY DEAD OR UNHEALTHY PLANTS AT CONTRACTOR'S EXPENSE. FINAL ACCEPTANCE SHALL BE MADE IF ALL PLANTS MEET THE GUARANTEE REQUIREMENTS INCLUDING MAINTENANCE, MAINTENANCE RESPONSIBILITIES INCLUDE INVASIVE SPECIES MONITORING, REMOVAL, AND SUPPLEMENTATION. ADDITIONAL MAINTENANCE RESPONSIBILITIES INCLUDE: APPROVED CULTIVATING, SPRAYING, WEEDING, WATERING, TIGHTENING OF TREE STRAP GUYS, PRUNING, FERTILIZING, MULCHING, AND ANY OTHER OPERATIONS NECESSARY TO MAINTAIN PLANT VIABILITY. MAINTENANCE SHALL BEGIN IMMEDIATELY AFTER PLANTING AND CONTINUE UNTIL 90 DAYS AFTER FINAL ACCEPTANCE.
2. PLANTS SHALL BE INSPECTED ANNUALLY FOR (5) FIVE YEARS POST-CONSTRUCTION AND REPLACED AS NEEDED TO ENSURE A CONTINUOUS SCREEN BECOMES ESTABLISHED.
3. WITHIN 24-HOURS OF PLANTING, AND CONTINUING THROUGHOUT ESTABLISHMENT (TWO MONTHS OR LONGER IN DROUGHT CONDITIONS), PLANTS SHALL BE WATERED WEEKLY UNLESS 0.5-INCHES OF RAIN OR GREATER FALLS WITHIN A GIVEN WEEK.
4. THE CONTRACTOR SHALL SUPPLY ALL LABOR, PLANTS, APPROVED SEEDING MIX, AND MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE WORK SHOWN ON THE DRAWING(S) AND LISTED IN THE PLANT SCHEDULE(S) AND/OR SEEDING TABLE(S). IN THE EVENT OF A DISCREPANCY BETWEEN QUANTITIES SHOWN IN THE PLANT SCHEDULE AND/OR SEEDING TABLE AND THOSE REQUIRED BY THE DRAWINGS, THE LARGER SHALL APPLY. ALL PLANTS SHALL BE ACCLIMATED BY THE SUPPLY NURSERY TO THE LOCAL HARDINESS ZONE AND BE CERTIFIED THAT THE PLANTING MATERIAL HAS BEEN GROWN FOR A MINIMUM OF (2) TWO YEARS AT THE SOURCE AND OBTAINED WITHIN 100 MILES OF PROJECT SITE UNLESS OTHERWISE APPROVED BY OWNER, CERTIFIED LANDSCAPE INSPECTOR, OR LANDSCAPE ARCHITECT.
5. THE LOCATIONS FOR PLANT MATERIAL ARE APPROXIMATE AND ARE SUBJECT TO FIELD ADJUSTMENT DUE TO SLOPE, VEGETATION, AND SITE FACTORS SUCH AS THE LOCATION OF ROCK OUTCROPS. PRIOR TO PLANTING THE CONTRACTOR SHALL ACCURATELY STAKE OUT THE LOCATIONS FOR ALL PLANTS. THE OWNER, CERTIFIED LANDSCAPE INSPECTOR, OR LANDSCAPE ARCHITECT SHALL APPROVE THE FIELD LOCATIONS OR ADJUSTMENTS OF THE PLANT MATERIAL.
6. ALL SHRUB MASSING SHALL BE MULCHED TO A DEPTH OF 2" AND SHREDDED HARDWOOD BARK MULCH SHALL BE USED FOR SHRUB MASSING AREAS.
7. LANDSCAPE PLANTING PITS MUST BE FREE DRAINING, PAVEMENT, COMPACTED SUBGRADE, AND BLASTED ROCK SHALL BE REMOVED TO A DEPTH OF 2" OR TO A GREATER DEPTH IF REQUIRED BY PLANTING DETAILS OR SPECIFICATIONS. REPLACE SOIL WITH MODERATELY COMPACTED, LOAM OR SANDY LOAM FREE FROM STONES AND RUBBISH 1" OR GREATER IN DIAMETER AND ANY OTHER MATERIAL. HARMFUL TO PLANT GROWTH AND DEVELOPMENT. PLANTING INSTALLATION SHALL BE AS DETAILED AND CONTAIN PLANTING MIX AS SPECIFIED UNLESS RECOMMENDED OTHERWISE BY SOIL ANALYSIS.
8. PLANTING SOIL MIXTURE:
 - 2 PARTS PEAT MOSS
 - 5 PARTS TOPSOIL
 - MYCORRHIZA INOCULANT - "TRANSPLANT 1-STEP" AS MANUFACTURED BY ROOTS, INC. OR APPROVED EQUAL. USE PER MANUFACTURER'S RECOMMENDATIONS FOR TREES AND SHRUBS. FERTILIZER/LIME APPLY AS RECOMMENDED BY SOIL ANALYSIS.
9. TREES AND SHRUBS: TREES AND SHRUBS SHALL BE NURSERY GROWN UNLESS OTHERWISE NOTED AND HARDY UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCATION OF THE PROJECT. THEY SHALL BE TYPICAL OF THEIR SPECIES OR VARIETY WITH NORMAL HABIT OF GROWTH. THEY SHALL BE SOUND, HEALTHY, VIGOROUS, WELL-BRANCHED AND DENSELY FOLIATED WHEN IN LEAF. THEY SHALL BE FREE OF DISEASE, INSECT PESTS, EGGS OR TRIST SYSTEMS. THEY SHALL HAVE HEALTHY AND WELL-DEVELOPED ROOT SYSTEMS. ALL TREES SHALL HAVE STRAIGHT SINGLE TRUNKS WITH THEIR MAIN LEADER INTACT UNLESS OTHERWISE STATED. THE OWNER, CERTIFIED LANDSCAPE INSPECTOR, OR LANDSCAPE ARCHITECT SHALL ONLY PERMIT SUBSTITUTIONS UPON WRITTEN APPROVAL. THEIR SIZES SHALL CONFORM TO THE MEASUREMENT SPECIFIED ON THE DRAWINGS. PLANTS LARGER THAN SPECIFIED ON THE DRAWINGS MAY BE USED IF APPROVED. THE USE OF SUCH PLANTS SHALL NOT INCREASE THE CONTRACT PRICE. ALL TREES AND SHRUBS SHALL BE MULCHED IN ACCORDANCE WITH THE RESPECTIVE PLANTING DETAIL(S) PROVIDED IN THE LANDSCAPING PLAN.
10. TOPSOIL SURROUNDING LANDSCAPING FEATURES SHALL BE INSTALLED AT A MINIMUM DEPTH OF 4 INCHES. CONTRACTOR SHALL SUBMIT TOPSOIL TO A CERTIFIED TESTING LABORATORY TO DETERMINE PH, FERTILITY, ORGANIC CONTENT AND MECHANICAL COMPOSITION. THE CONTRACTOR SHALL SUBMIT THE TEST RESULTS FROM REGIONAL EXTENSION OFFICE OF US DA TO THE OWNER, CERTIFIED LANDSCAPE INSPECTOR, OR LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL. CONTRACTOR SHALL INCORPORATE AMENDMENTS FOR GOOD PLANT GROWTH AND PROPER SOIL ACIDITY RECOMMENDED FROM THE TOPSOIL TEST.
11. NO PHOSPHOROUS SHALL BE USED AT PLANTING TIME UNLESS SOIL TESTING HAS BEEN COMPLETED AND TESTED BY A HORTICULTURAL TESTING LAB AND SOIL TESTS SPECIFICALLY INDICATE A PHOSPHOROUS DEFICIENCY THAT IS HARMFUL, OR WILL PREVENT NEW LAWNS/GRASSES AND PLANTINGS FROM ESTABLISHING PROPERLY.
12. IF SOIL TESTS INDICATE A PHOSPHOROUS DEFICIENCY THAT WILL IMPACT PLANT AND LAWN ESTABLISHMENT, PHOSPHOROUS SHALL BE APPLIED AT THE MINIMUM RECOMMENDED LEVEL PRESCRIBED IN THE SOIL TEST FOLLOWING ALL APPLICABLE STANDARDS, REQUIREMENTS, AND/OR REGULATIONS.
13. ALL WILDFLOWERS AND GRASSES SOWNED SHALL BE ALLOWED TO GROW TO THEIR NATURALLY OCCURRING HEIGHTS WHENEVER POSSIBLE. NATIVE WILDFLOWERS AND/OR GRASSES CAN BE MOWED/MAINTAINED (WITHIN ACCEPTABLE AREAS IDENTIFIED AND/OR APPROVED BY APPROPRIATE REGULATORY AGENCIES) AS OFTEN AS NEEDED TO KEEP THE VEGETATION AT A DESIRED AND/OR MANAGEABLE MAINTAINED HEIGHT.
14. INVASIVE SPECIES SHALL NOT BE PERMITTED.
15. ALL PLANT MATERIAL SHALL CONFORM TO THE PLAN SIZE SPECIFICATIONS AS ESTABLISHED BY THE AMERICAN STANDARD FOR NURSERY STOCK LATEST EDITION.



EVERGREEN TREE PLANTING DETAIL

N.T.S.



SHRUB PLANTING DETAIL

N.T.S.

DETAIL NOTES

1. IN AREAS WITH MASS PLANTINGS, CONTINUOUS EXCAVATION AND MULCHING PRACTICES SHALL BE IMPLEMENTED WHENEVER POSSIBLE.
2. IT IS NOT RECOMMENDED TO AMEND THE EXISTING SOIL BEFORE BACKFILLING THE HOLE UNLESS SOIL CONDITIONS ARE POOR FOR PLANTING.
3. WATER THOROUGHLY TO HELP ENSURE THE REMOVAL OF AIR POCKETS.

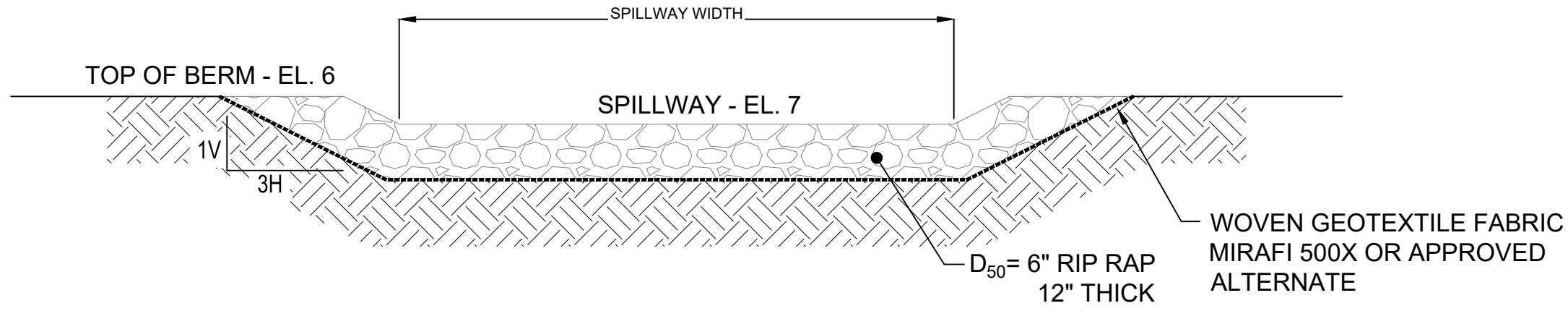
PERMITTING

NOT FOR CONSTRUCTION

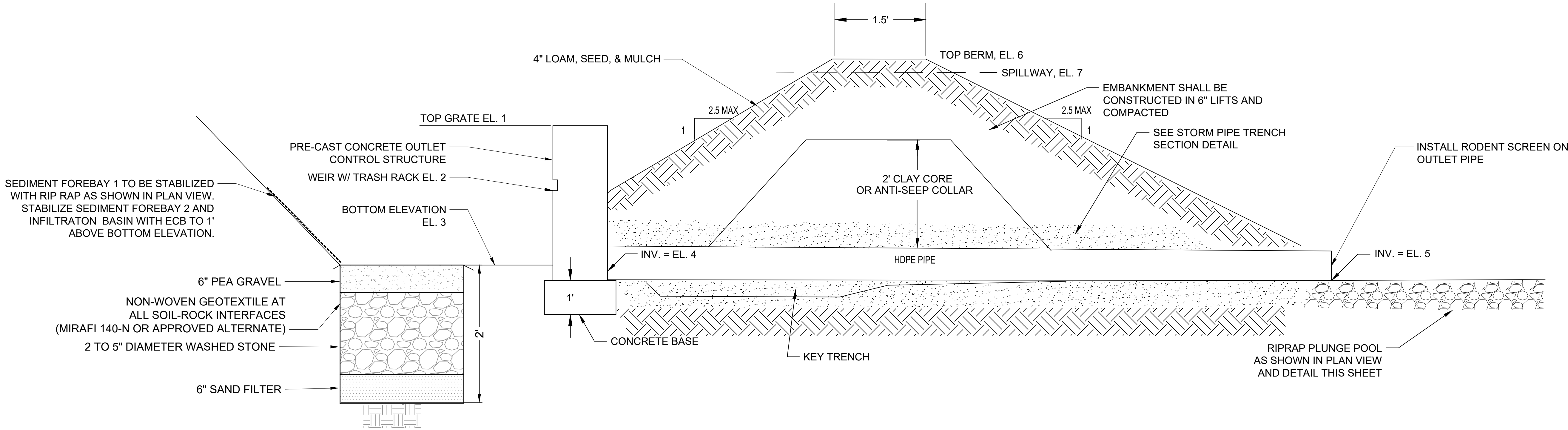
SEAL:		PROFESSIONAL ENGINEER:	
		THOMAS N. DANIELS, JR.	
DATE:		AUGUST 5, 2022	
PROJECT:		BLUEWAVE SOLAR BWC BOGASTOW BROOK, LLC HOLLISTON BATTERY ENERGY STORAGE SYSTEM CENTRAL STREET, HOLLISTON, MASSACHUSETTS	
TITLE:		CIVIL CONSTRUCTION DETAILS	
DRAWN BY:		TRC	PROJ. NO.: 412899.0001
CHECKED BY:		TND	
APPROVED BY:		TND	C4.00
DATE:		AUGUST 2022	
		650 Suffolk Street Suite 200 Lowell, MA 01854 Phone: 978.970.5800	
FILE NO.:		412899.1 - DT.dwg	

STORMWATER BMP	ELEV. 1 (FT)	ELEV. 2* (FT)	ELEV. 3 (FT)	ELEV. 4 (FT)	ELEV. 5 (FT)	ELEV. 6 (FT)	ELEV. 7 (FT)	OUTLET STRUCTURE	OUTLET PIPE
SEDIMENT FOREBAY 1	N/A	N/A	153.00	N/A	N/A	156.00	155.20 (1)** 155.25 (2)	N/A	N/A
SEDIMENT FOREBAY 2	155.00	153.70 30"X12"	152.00	153.00	152.00	156.00	N/A	3.5'X3.5' ST. 2.5'X2.5' GR.	L=80' DIA.=24"
INFILTRATION BMP	150.50	149.08 24"X6"	148.00	149.00	148.25	152.25	151.00	3.0'X3.0' ST. 2.0'X2.0' GR.	L=70' DIA.=12"

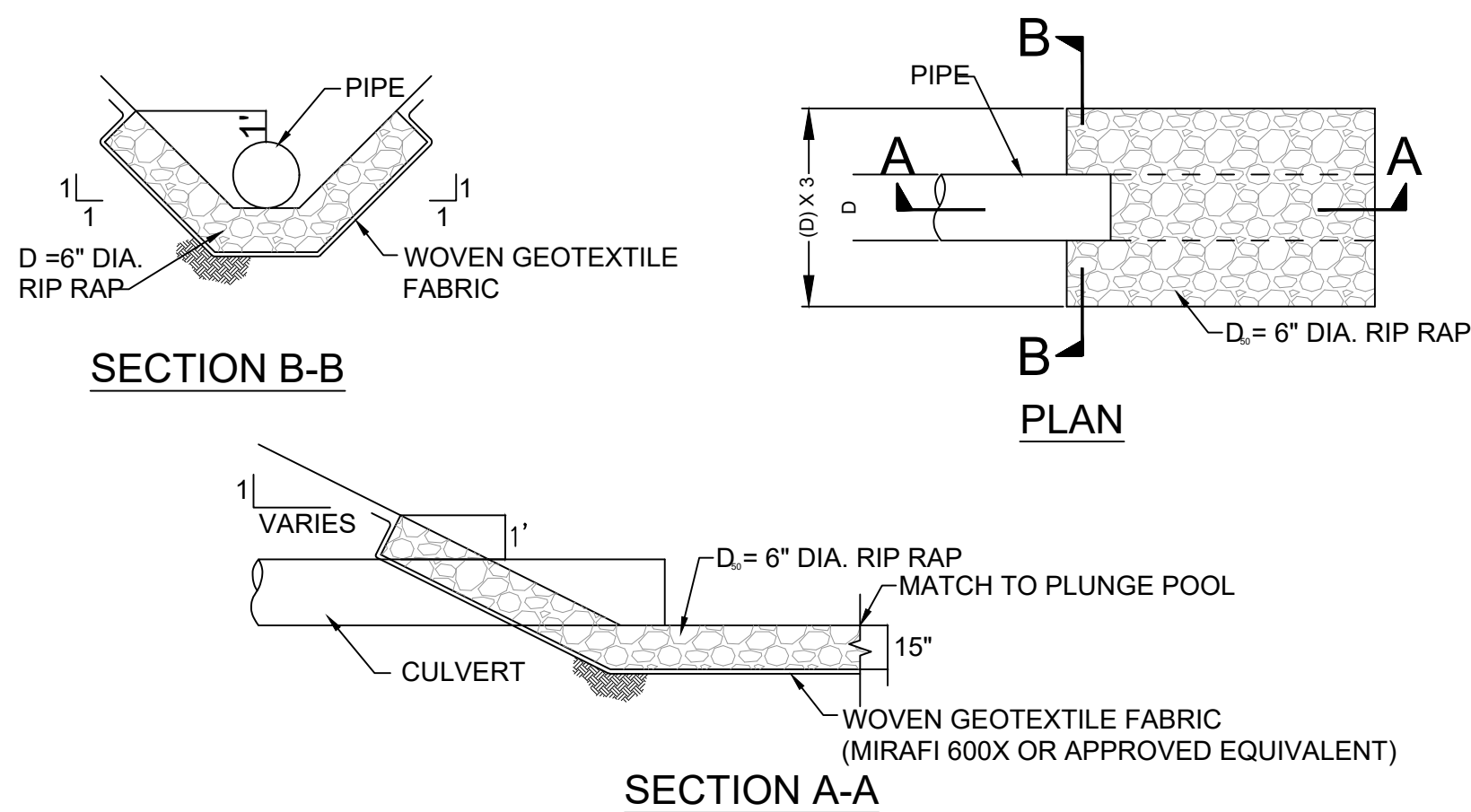
*SECOND VALUE SPECIFIES WEIR VERTICAL ORIFICE DIMENSIONS.
**THE TWO SPILLWAY ELEVATIONS ARE FOR THE EAST AND WEST SPILLWAYS RESPECTIVELY.



EMERGENCY SPILLWAY DETAIL
NOT TO SCALE

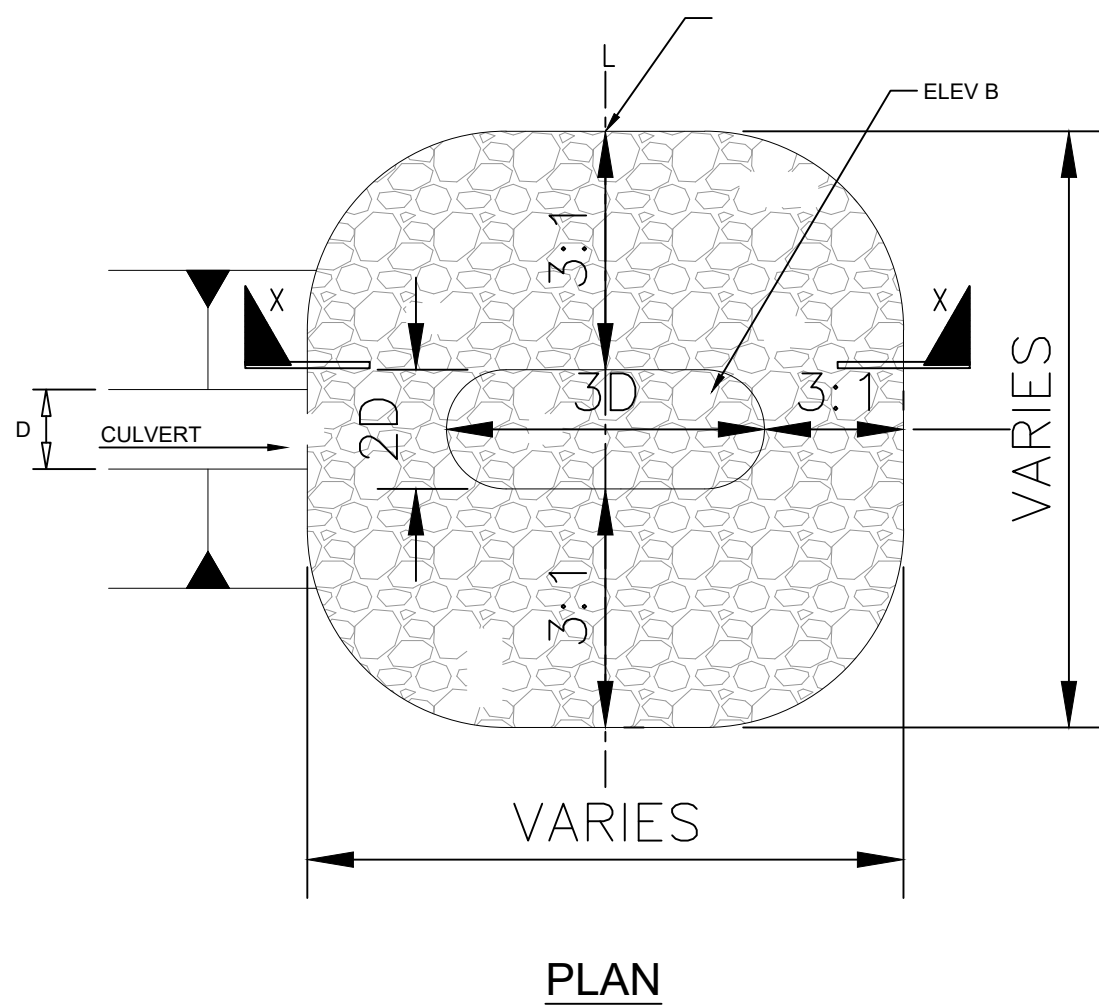


SEDIMENT FOREBAY AND INFILTRATION BMP DETAIL
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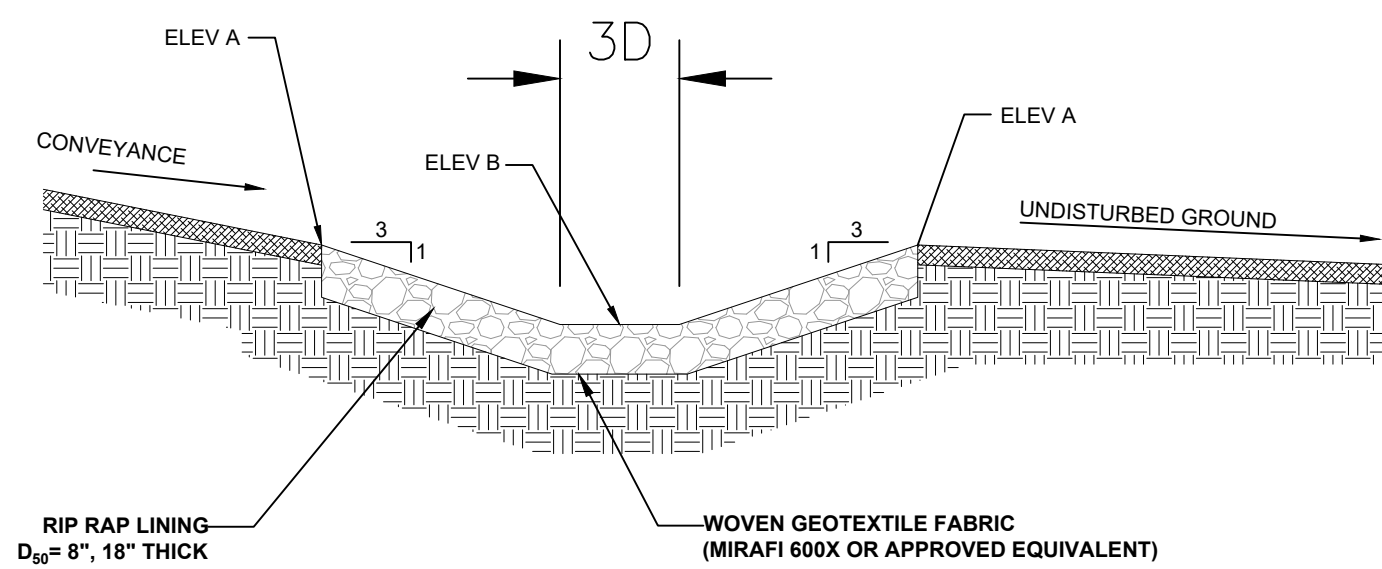


- NOTES:
- CULVERT SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) PIPE.
 - CONTRACTOR SHALL FIELD FIT CULVERT TO ENSURE THERE IS POSITIVE DRAINAGE.
 - THERE SHALL BE A MINIMUM 1' OF SOIL COVER OVER CULVERT.

OUTLET PROTECTION DETAIL
NOT TO SCALE



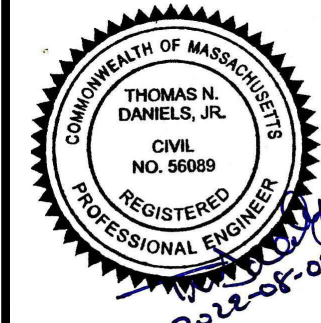
PLUNGE POOL DETAIL
NOT TO SCALE



SECTION X-X

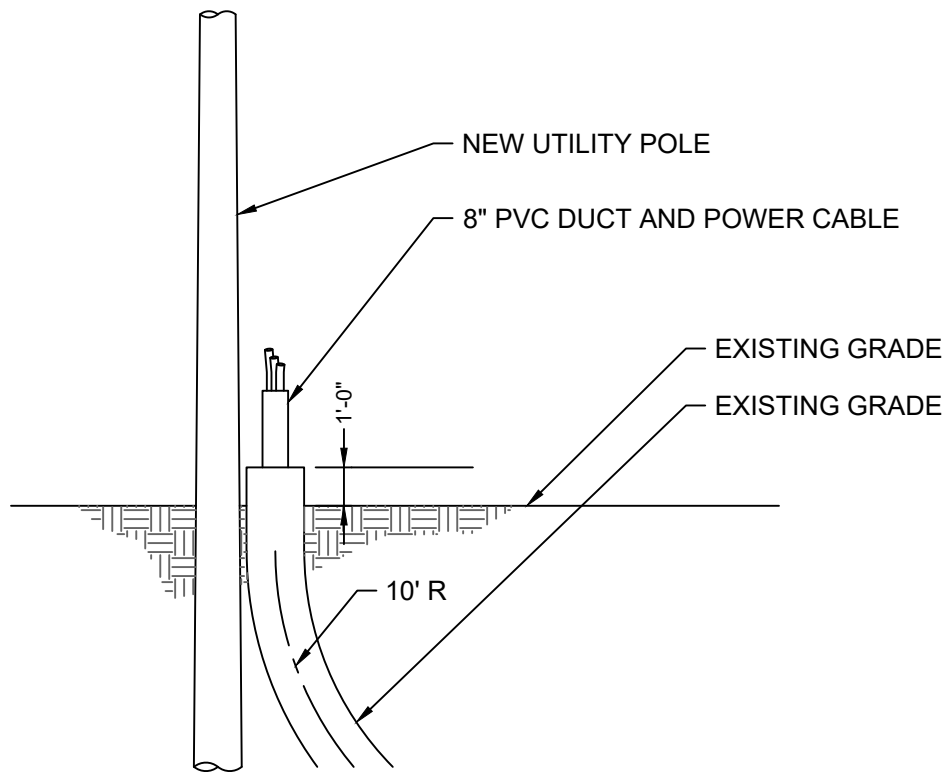
PLUNGE POOL SCHEDULE			
ID	INLET DIA.	ELEV. (A)	ELEV. (B)
PP-1	24"	152.0'	151.0'
PP-2	12"	148.25'	147.25'

PERMITTING
NOT FOR CONSTRUCTION



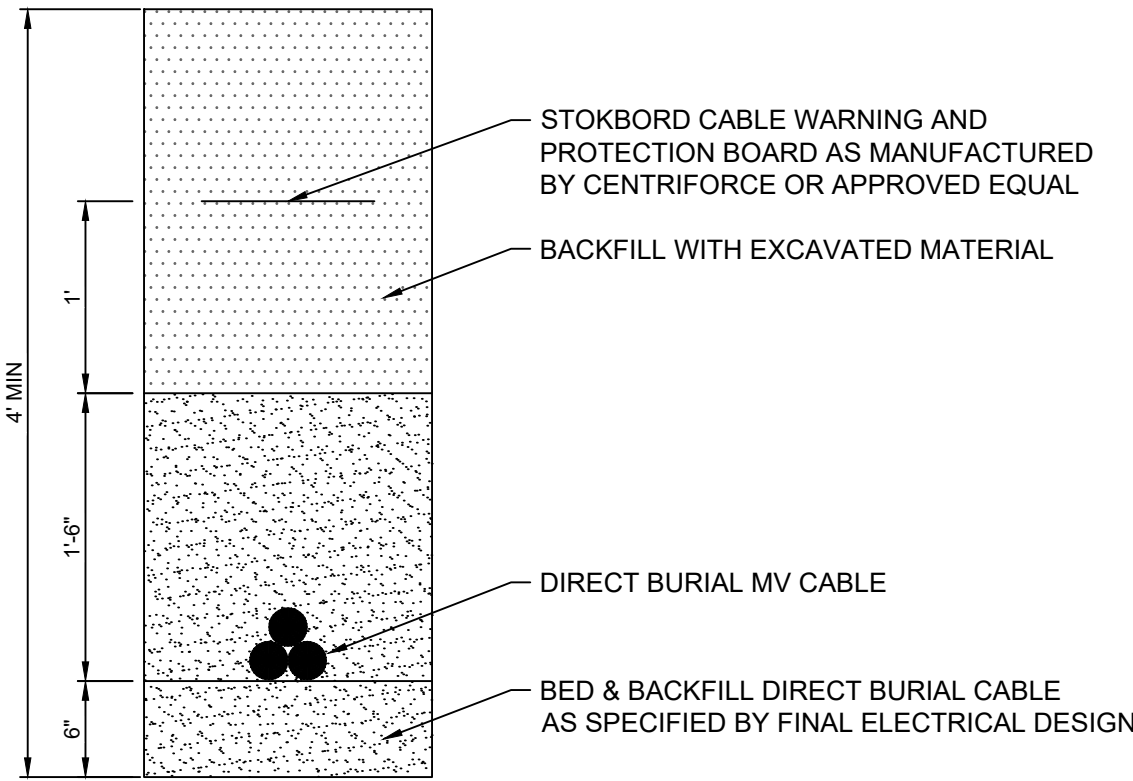
PROFESSIONAL ENGINEER:
THOMAS N. DANIELS, JR.
DATE:
AUGUST 5, 2022

PROJECT: BLUEWAVE SOLAR BWC BOGASTOW BROOK, LLC HOLLISTON BATTERY ENERGY STORAGE SYSTEM CENTRAL STREET, HOLLISTON, MASSACHUSETTS			
TITLE: CIVIL CONSTRUCTION DETAILS			
DRAWN BY: TRC	PROJ. NO.: 412899.0001		
CHECKED BY: TND			
APPROVED BY: TND	C4.01		
DATE: AUGUST 2022			
TRC		650 Suffolk Street Suite 200 Lowell, MA 01854 Phone: 978.970.5600	
FILE NO:	412899.1 - DT.dwg		

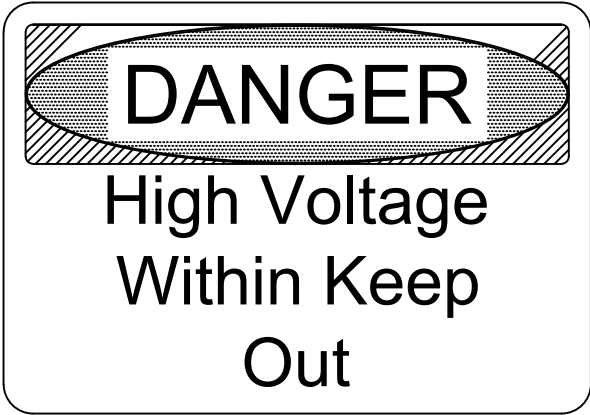
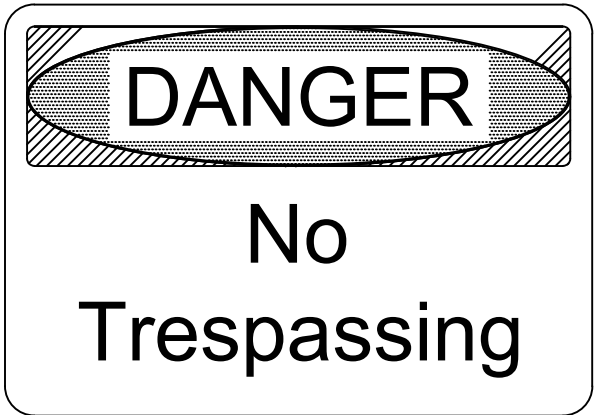


- NOTES:
1. EXTEND CONCRETE ENCASED DUCTBANK TO APPROXIMATELY 1'-0" ABOVE GRADE. CONTINUE PVC DUCT BANK TO TERMINATION / TRIFURCATION.
 2. TOP OF DUCT SHALL BE SEALED WITH APPROVED FIRE RETARDANT SEALER TERMINATION FITTING SUCH AS CONDULATOR BY ROBERT'S ELECTRIC PRODUCTS.

UNDERGROUND TO OVERHEAD TRANSITION DETAIL
NOT TO SCALE

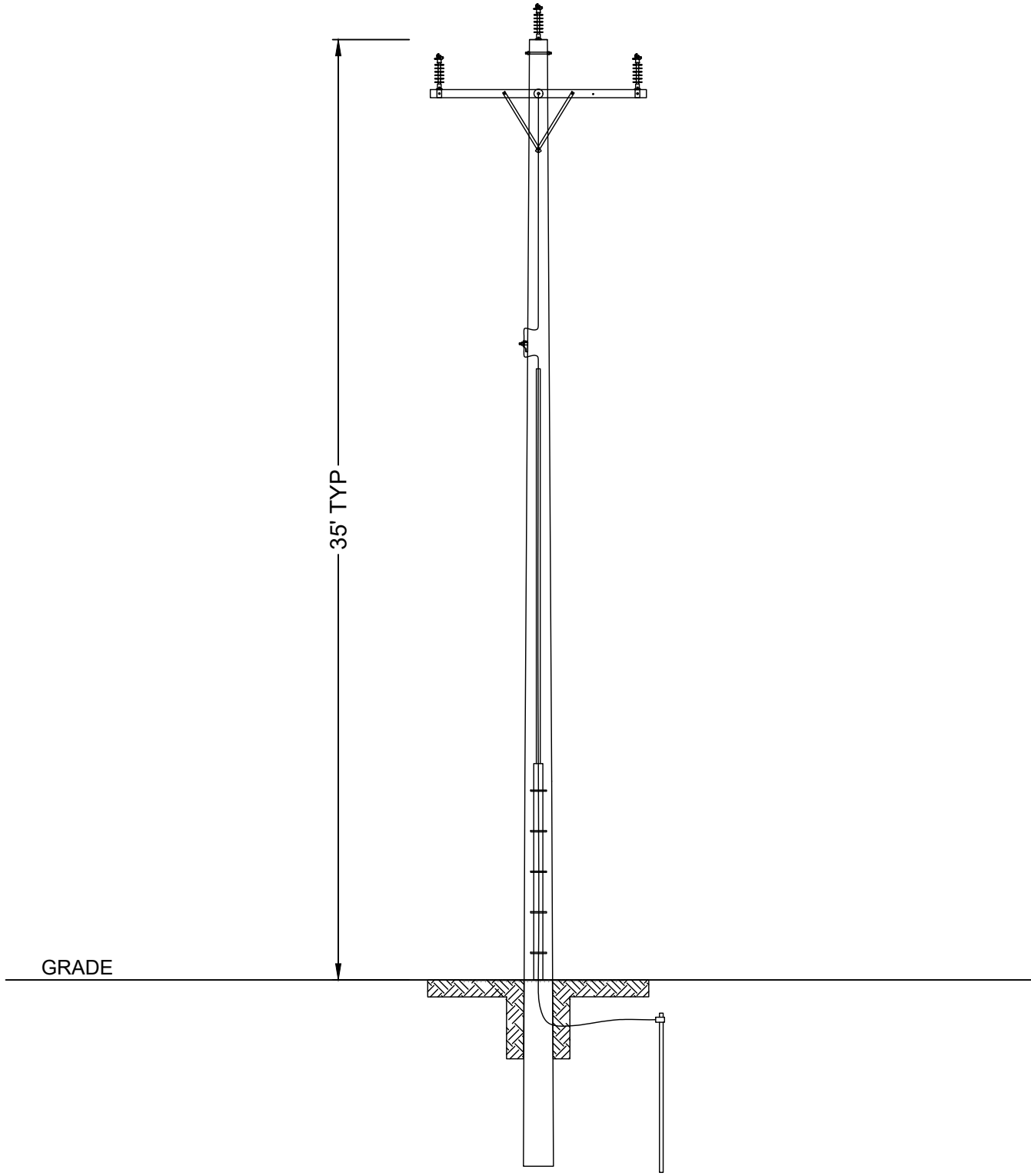


MV UNDERGROUND COLLECTION LINE DETAIL
NOT TO SCALE

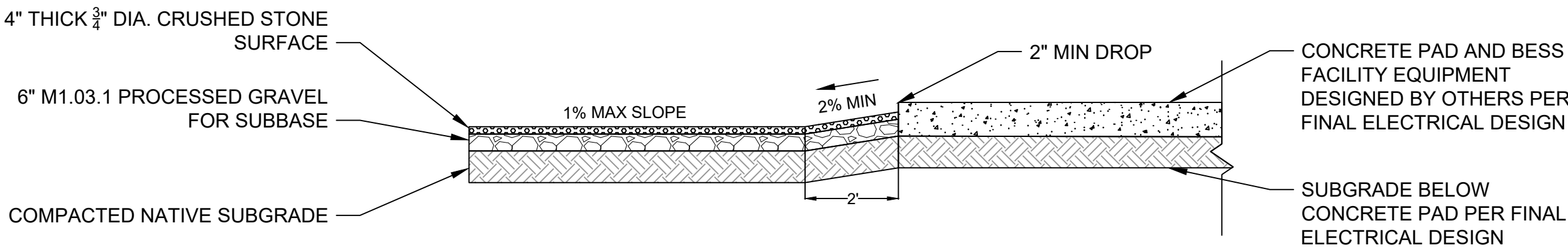


- NOTES
1. NO PARKING SIGN SHALL BE POSTED AT FACILITY ENTRANCE GATE. OTHER SIGNS SHALL BE PLACED ON GATES AND ALONG PERIMETER FENCING.
 2. SIGNS SHALL CONFORM TO THE 2013 OSHA AND ANSI REQUIREMENTS.
 3. SIGNS SHALL BE 20" WIDE BY 14" HIGH.
 4. SIGNS SHALL HAVE A MOUNTING HEIGHT OF BETWEEN 45 TO 66 INCHES.
 5. SIGN PANELS SHALL BE 10 GAUGE ALUMINUM WITH HIGH VISIBILITY REFLECTIVE SHEETING.
 6. SIGNAGE SHALL INCLUDE 24-HR EMERGENCY CONTACT INFORMATION FOR FACILITY OPERATOR.

HAZARD & EMERGENCY SIGNAGE
NOT TO SCALE



TYPICAL UTILITY POLE
NOT TO SCALE



- CONSTRUCTION NOTES:
1. GRAVEL SUBBASE SHALL BE M1.03.1 AGGREGATE BACKFILL. AGGREGATE SHALL BE DURABLE CRUSHED ROCK CONSISTING OF THE ANGULAR FRAGMENTS OBTAINED BY BREAKING AND CRUSHING SOLID OR SHATTERED NATURAL ROCK, AND FREE FROM A DETRIMENTAL QUANTITY OF THIN, FLAT, ELONGATED, OR OTHER OBJECTIONABLE PIECES.
 2. CRUSHED STONE SURFACE AND SUBBASE GRAVEL SHALL BE COMPACTED TO 95% OF ASTM D1557.
 3. VEGETATION AND TOPSOIL WITHIN LIMIT OF CRUSHED STONE YARD SHALL BE STRIPPED PRIOR TO PLACEMENT OF SUBBASE GRAVEL.
 4. SUBGRADE SHALL BE COMPACTED TO 95% OF ASTM D1557 TO A DEPTH OF 12-INCHES.
 5. SUBGRADE FILL REQUIRED TO ACHIEVE DESIGN GRADES, BEYOND DEPTH OF CRUSHED STONE SURFACE AND GRAVEL SUBBASE, SHALL CONFORM TO THE REQUIREMENTS OF M1.02.0: SPECIAL BORROW MATERIAL EXCEPT THAT IT SHALL CONTAIN NO STONE LARGER THAN 6-INCHES AND SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8-INCHES IN DEPTH, COMPACTED MEASURE.

TYPICAL CRUSHED STONE YARD SECTION
NOT TO SCALE

PERMITTING
NOT FOR CONSTRUCTION

SEAL:		PROFESSIONAL ENGINEER: THOMAS N. DANIELS, JR. DATE: AUGUST 5, 2022		
NO.	BY	DATE	REVISION	APPD.
PROJECT: BLUEWAVE SOLAR BWC BOGASTOW BROOK, LLC HOLLISTON BATTERY ENERGY STORAGE SYSTEM CENTRAL STREET, HOLLISTON, MASSACHUSETTS				
TITLE: PRELIMINARY ELECTRICAL DETAILS				
DRAWN BY: TRC		PROJ. NO.: 412899.0001		
CHECKED BY: TND				
APPROVED BY: TND		C5.00		
DATE: AUGUST 2022				
		650 Suffolk Street Suite 200 Lowell, MA 01854 Phone: 978.970.5600		
FILE NO:		412899.1 - DT.dwg		

Attachment D: Battery Specification Sheets



PRODUCT: **Stack750E** PLATFORM: **Centipede**

Centipede is Powin's modular battery energy storage platform, purpose-built for the most grueling environments and use cases. Designed to dramatically increase site energy density, decrease installation times and simplify capacity augmentation, Centipede is ready to perform a diverse set of market applications including Frequency Response/Regulation, T&D Deferral, Flexible Peaking Capacity, Renewable Integration and more.



Modular, Scalable and Configurable

Centipede's modular design allows you to easily scale up your project size from a single standalone unit to gigawatt-hours per project site. Centipede utilizes Powin's field-proven Stack hardware and StackOS software platform to ensure continuity and familiarity between Powin's product lines to perform a variety of simple and advanced market applications.



Enhanced Safety and Quality

Centipede combines Powin's safest-in-class LFP Stack hardware and integrated enclosures into one standardized, factory-built, outdoor product to ensure maximum quality control. Each Centipede unit includes a comprehensive package of explosion prevention and fire safety features, such as hydrogen detection and active ventilation, fire detection, fireproof insulation, and optional clean agent fire suppression.



End to End Cost Savings

Centipede's factory-built and tested design allows for units to be installed on site in a fraction of the time it takes for traditional enclosure-based systems to be installed. The increased energy density also reduces the amount of land that is required to install a system per MWh. The highly serviceable design includes field-swappable, redundant components that minimizes downtime and service costs. These advantages, paired with Powin's diverse supply chain and Tier 1 cell procurement strategy give Powin's customers continual cost advantages upfront and over the lifespan of a system.

		STACK750E		
Electrical	DC Voltage	1,210 - 1,491 V		
	Duration	2+ hrs		
	Maximum Energy Capacity ¹	750 kWh DC per segment & 250 MWh AC per acre		
	Rated Duration of Discharge	2 hrs	3 hrs	4 hrs
	DC Power @ Rated Duration	369.5 kW	247.5 kW	186.5 kW
	DC Energy Capacity @ Rated Duration ²	739 kWh	742.5 kWh	746 kWh
	Aux Load per Stack (Standby/Peak) ³	0.25 kW / 5.6 kW	0.24 kW / 5.5 kW	0.23 kW / 5.4 kW
	Daily Aux Energy per Stack ³	29 - 31 kWh	21 - 23 kWh	17 - 19 kWh
	Auxiliary Power Input	3-phase 480V AC / 60 Hz (50 Hz option available)		
Performance & Safety	DC Round Trip Efficiency	93%	94%	95%
	Cycle Life ^{4,5}	7,300 cycles		
	Calendar Life ⁵	20 years		
	Cell Manufacturers	CATL & EVE		
	Cell Chemistry	Lithium Iron Phosphate (LFP)		
	Depth of Discharge	100%		
	Explosion Prevention & Mitigation	Off-gas detection with dedicated, fail-safe active & passive ventilation systems		
	Fire Suppression	Addressable fire panel, smoke & heat detectors, heat activated sprinkler system with remote FDC dry standpipe connection, fire rated insulation, strobes, and horn; optional clean agent fire suppression		
	Heating & Cooling ⁶	Redundant, field-swappable, high efficiency HVAC with humidity control		
	Codes & Compliance	UL 9540A, UL 1642, UL 1973, UL 9540, NFPA 1, NFPA 69, NFPA 855, IFC, IEC 62619, IEC 6100-6-2, IEC 62477, UN3480, UN38.3		
Mechanical	Weight (Approximate)	20,000 lbs (9,074 kg)		
	Battery Segment Dimensions	8'1" D x 5'2" L x 10'8" H (2,443mm x 1,572mm x 3,282mm)		
	Enclosure Type / Rating ⁷	NEMA 4/IP 56 standard; NEMA 4X available		
	Ambient Operating Temperature Range ⁸	-30° C to +50° C		
Software	BMS + EMS + Solar + Environmental Controls	StackOS™		
	Analytics + Optimization + Data Warehouse	StackOS+™		
	First Responder HMI	Powin for First Responders™		
	Communications Interface	Modbus TCP (MESA/Sunspec) & REST API		

Note: Specifications in the above table are design estimates only and are not guaranteed. Contact Powin for a project-specific estimate as final values depend on system design, location, and use case.

1 Per acre energy capacity represents fully installed AC BESS, including inverters, transformers, and auxiliaries; excludes augmentation

2 Energy capacity is recorded at the DC bus

3 Assumes 1 full cycle per day at rated power in a temperate climate; active cell balancing contribution de minimous

4 Assumes 1 full cycle per day and includes calendar aging for the day; 2-hr systems may provide fewer cycles depending on the cell used

5 End of life depends both on BESS age and usage; actual lifetime may be less than 20 years

6 Degree of HVAC redundancy (partial or full) depends on location and use case

7 IP rating applicable only for the compartments containing batteries and electronics

8 StackOS may automatically derate power at high/low ambient temperatures or after extended operation to maintain proper cell temperatures

Three-phase pad-mounted compartmental type transformer



General

At Eaton, we are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality, most reliable transformers. Eaton's Cooper Power series Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. In order to drive this innovation, we have invested both time and money in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin. Such revolutionary products as distribution-class UltraSIL™ Polymer-Housed Evolution™ surge arresters and Envirotemp™ FR3™ fluid have been developed at our Franksville lab.

With transformer sizes ranging from 45 kVA to 12 MVA and high voltages ranging from 2400 V to 46 kV, Eaton has you covered. From fabrication of the tanks and cabinets to winding of the cores and coils, to production of arresters, switches, tap changers, expulsion fuses, current limit fuses, bushings (live and dead) and molded rubber goods, Eaton does it all. Eaton's Cooper Power series transformers are available with electrical grade mineral oil or Envirotemp™ FR3™ fluid, a less-flammable and bio-degradable fluid. Electrical codes recognize the advantages of using Envirotemp™ FR3™ fluid both indoors and outdoors for fire sensitive applications. The bio-based fluid meets Occupational Safety and Health Administration (OSHA) and Section 450.23 NEC Requirements.



Powering Business Worldwide

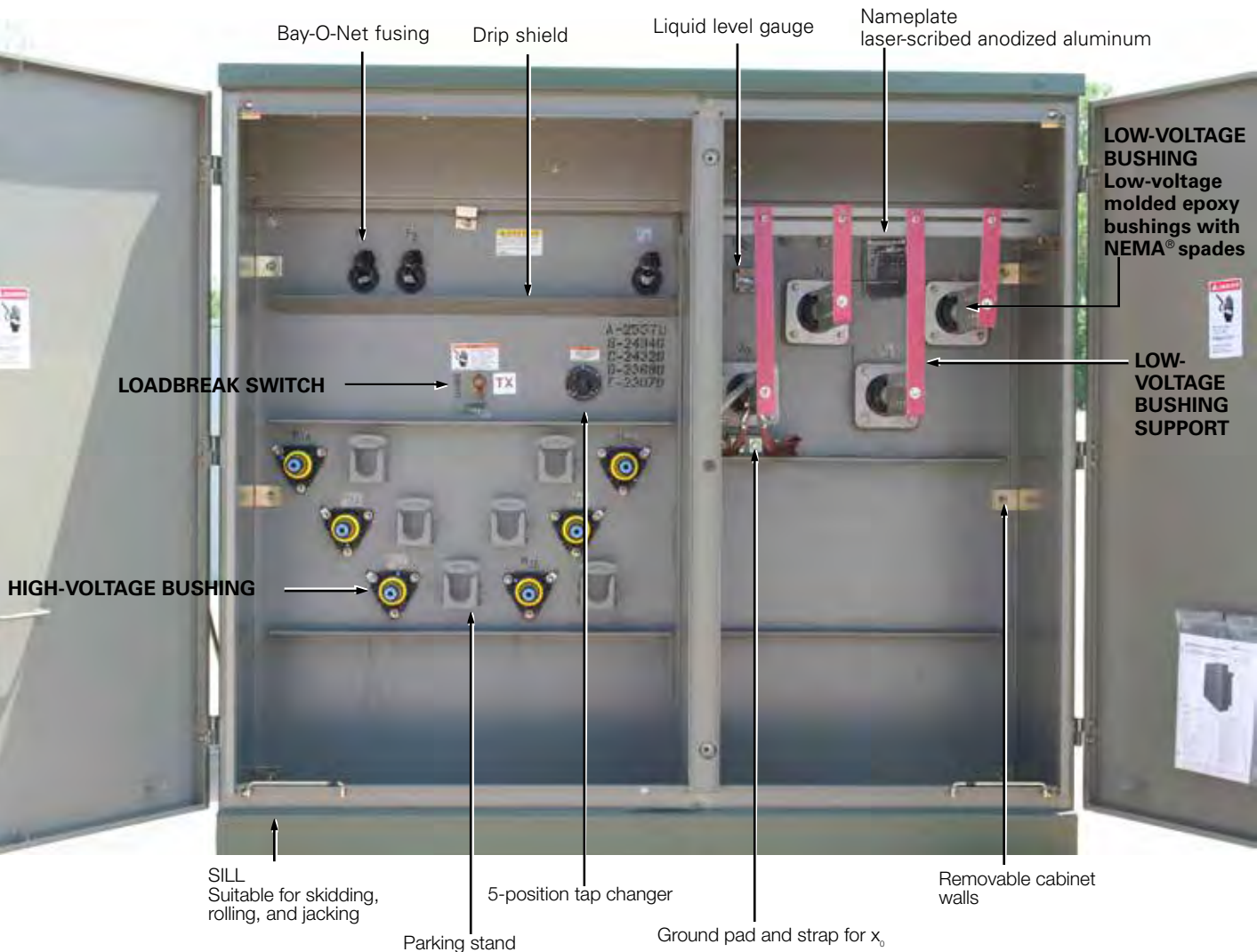


Figure 1. Three-phase pad-mounted compartmental type transformer.

Table 1. Product Scope

Type	Three Phase, 50 or 60 Hz, 65 °C Rise (55 °C, 55/65 °C), 65/75 °C, 75 °C
Fluid Type	Mineral oil or Envirotemp™ FR3™ fluid
Coil Configuration	2-winding or 4-winding or 3-winding (Low-High-Low), 3-winding (Low-Low-High)
Size	45 – 10,000 kVA
Primary Voltage	2,400 – 46,000 V
Secondary Voltage	208Y/120 V to 14,400 V
Specialty Designs	Inverter/Rectifier Bridge
	K-Factor (up to K-19)
	Vacuum Fault Interrupter (VFI)
	UL® Listed & Labeled and Classified
	Factory Mutual (FM) Approved®
	Solar/Wind Designs
	Differential Protection
	Seismic Applications (including OSHPD)
	Hardened Data Center

Table 2. Three-Phase Ratings**Three-Phase 50 or 60 Hz**kVA Available¹:

45, 75, 112.5, 150, 225, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 3750, 5000, 7500, 10000

¹Transformers are available in the standard ratings and configurations shown or can be customized to meet specific needs.**Table 3. Impedance Voltage**

Rating (kVA)	Low-voltage rating		
	≤ 600 V	2400 Δ through 4800 Δ	6900 Δ through 13800GY/7970 or 13800 Δ
45-75	2.70-5.75	2.70-5.75	2.70-5.75
112.5-300	3.10-5.75	3.10-5.75	3.10-5.75
500	4.35-5.75	4.35-5.75	4.35-5.75
750-2500	5.75	5.75	5.75
3750	5.75	5.75	6.00
5000		6.00	6.50

Note: The standard tolerance is ± 7.5%**Table 4. Audible Sound Levels**

Self-Cooled, Two Winding kVA Rating	NEMA® TR-1 Average
	Decibels (dB)
45-500	56
501-700	57
701-1000	58
1001-1500	60
1501-2000	61
2001-2500	62
2501-3000	63
3001-4000	64
4001-5000	65
5001-6000	66
6001-7500	67
7501-10000	68

Table 5. Insulation Test Levels

KV Class	Induced Test 180 or 400 Hz 7200 Cycle	kV BIL Distribution	Applied Test 60 Hz (kV)
1.2	Twice Rated Voltage	30	10
2.5		45	15
5		60	19
8.7		75	26
15		95	34
25		125	40
34.5		150	50

Table 6. Temperature Rise Ratings 0-3300 Feet (0-1000 meters)

	Standard	Optional
Unit Rating (Temperature Rise Winding)	65 °C	55 °C, 55/65 °C, 75 °C
Ambient Temperature Max	40 °C	50 °C
Ambient Temperature 24 Hour Average	30 °C	40 °C
Temperature Rise Hotspot	80 °C	65 °C

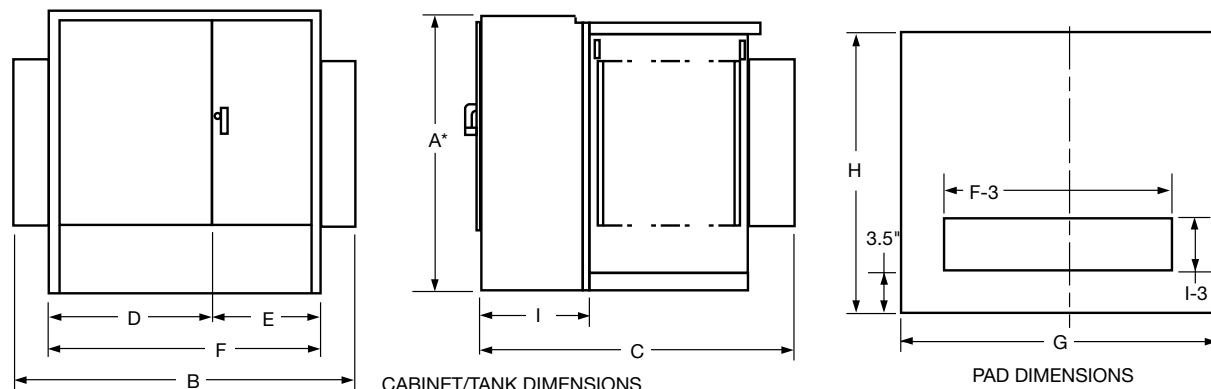


Figure 2. Transformer and pad dimensions.

* Add 9" for Bay-O-Net fusing.

Table 7. Fluid-filled—aluminum windings 55/65 °C Rise¹

65° Rise	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—ALUMINUM WINDINGS									Gallons of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)										
kVA Rating	A*	B	C	D	E	F	G	H	I		
45	50	68	39	42	26	68	72	43	20	110	2,100
75	50	68	39	42	26	68	72	43	20	115	2,250
112.5	50	68	49	42	26	68	72	53	20	120	2,350
150	50	68	49	42	26	68	72	53	20	125	2,700
225	50	72	51	42	30	72	76	55	20	140	3,150
300	50	72	51	42	30	72	76	55	20	160	3,650
500	50	89	53	42	30	72	93	57	20	190	4,650
750	64	89	57	42	30	72	93	61	20	270	6,500
1000	64	89	59	42	30	72	93	63	20	350	8,200
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	490	12,500
2500	73	72	99	42	30	72	76	103	24	530	14,500
3000	73	84	99	46	37	84	88	103	24	620	16,700
3750	84	85	108	47	38	85	88	112	24	660	19,300
5000	84	96	108	48	48	96	100	112	24	930	25,000
7500	94	102	122	54	48	102	100	126	24	1,580	41,900

¹ Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Table 8. Fluid-Filled—Copper Windings 55/65 °C Rise¹

65° Rise	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—COPPER WINDINGS									Gallons of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)										
kVA Rating	A*	B	C	D	E	F	G	H	I		
45	50	64	39	34	30	64	69	43	20	110	2,100
75	50	64	39	34	30	64	69	43	20	115	2,350
112.5	50	64	49	34	30	64	69	53	20	115	2,500
150	50	64	49	34	30	64	69	53	20	120	2,700
225	50	64	51	34	30	64	73	55	20	140	3,250
300	50	64	51	34	30	64	75	55	20	160	3,800
500	50	81	53	34	30	64	85	57	20	200	4,800
750	64	89	57	42	30	72	93	61	20	255	6,500
1000	64	89	59	42	30	72	93	63	20	300	7,800
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	420	11,600
2500	73	72	99	42	30	72	76	103	24	500	14,000
3000	73	84	99	46	37	84	88	103	24	720	18,700
3750	84	85	108	47	38	85	88	112	24	800	20,500
5000	84	96	108	48	48	96	100	112	24	850	25,000
7500	94	102	122	54	48	102	100	126	24	1,620	46,900

¹ Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Standard features

Connections and neutral configurations

- Delta - Wye: Low voltage neutral shall be a fully insulated X0 bushing with removable ground strap.
- Grounded Wye-Wye: High voltage neutral shall be internally tied to the low voltage neutral and brought out as the H0X0 bushing in the secondary compartment with a removable ground strap.
- Delta-Delta: Transformer shall be provided without a neutral bushing.
- Wye-Wye: High voltage neutral shall be brought out as the H0 bushing in the primary compartment and the low voltage neutral shall be brought as the X0- bushing in the secondary compartment.
- Wye-Delta: High voltage neutral shall be brought out as the H0 bushing in the primary compartment. No ground strap shall be provided (line to line rated fusing is required).

High and low voltage bushings

- 200 A bushing wells (15, 25, and 35 kV)
- 200 A, 35 kV Large Interface
- 600 A (15, 25, and 35 kV) Integral bushings (dead-front)
- Electrical-grade wet-process porcelain bushings (live-front)

Tank/cabinet features

- Bolted cover for tank access (45-2500 kVA)
- Welded cover with hand hole (>2500 kVA)
- Three-point latching door for security
- Removable sill for easy installation
- Lifting lugs (4)
- Stainless steel cabinet hinges and mounting studs
- Steel divider between HV and LV compartment
- 20" Deep cabinet (45-1000 kVA)
- 24" Deep cabinet (1500-7500 kVA)
- 30" Deep cabinet (34.5/19.92 kV)
- Pentahead captive bolt
- Stainless steel 1-hole ground pads (45-500 kVA)
- Stainless steel 2-hole ground pads (750-10,000 kVA)
- Parking Stands (dead-front)

Valves/plugs

- One-inch upper filling plug
- One-inch drain plug (45-500 kVA)
- One-inch combination drain valve with sampling device in low voltage compartment (750-10,000 kVA)
- Automatic pressure relief valve

Nameplate

- Laser-scribed anodized aluminum nameplate



Figure 3. Drain valve with sampler.



Figure 4. Automatic Pressure relief valve.



Figure 5. Liquid level gauge.



Figure 6. External Gauges.



Figure 7. External visible break with gauges.

Optional features

High and low voltage bushings

- 200 A (15, 25 kV) bushing inserts
- 200 A (15, 25 kV) feed thru inserts
- 200 A (15, 25 kV) (HTN) bushing wells with removable studs
- High-voltage 600 A (15, 25, 35 kV) deadbreak one-piece bushings
- Low voltage 6-, 8-holes spade
- Low voltage 12-, 16-, 20-holes spade (750-2500 kVA)
- Low voltage bushing supports

Tank/cabinet features

- Stainless steel tank base and cabinet
- Stainless steel tank base, cabinet sides and sill
- 100% stainless steel unit
- Service entrance (2 inch) in sill or cabinet side
- Touch-up paint (domestic)
- Copper ground bus bar
- Kirk-Key provisions
- Nitrogen blanket
- Bus duct cutout

Special designs

- Factory Mutual (FM)
- UL® Classified
- Triplex
- High altitude
- K-Factors
- Step-up
- Critical application
- Modulation transformers
- Seismic applications (including OSHPD)

Switches

- One, two, or three On/Off loadbreak switches
- 4-position loadbreak V-blade switch or T-blade switch
- Delta-wye switch
- 3-position V-Blade selector switch
- 100 A, 150 A, 300 A tap changers
- Dual voltage switch
- Visible break with VFI interrupter interlock
- External visible break (15, 25, and 35 kV, up to 3 MVA)
- External visible break with gauges (15, 25, and 35 kV, up to 3 MVA)

Gauges and devices

- Liquid level gauge (optional contacts)
- Pressure vacuum gauge (optional contacts and bleeder)
- Dial-type thermometer (optional alarm contacts)
- Cover mounted pressure relief device (optional alarm contacts)
- Ground connectors
- Hexhead captive bolt
- Molded case circuit breaker mounting provisions
- External gauges in padlockable box

Overcurrent protection

- Bay-O-Net fusing (Current sensing, dual sensing, dual element, high amperage overload)
- Bay-O-Net expulsion fuse in series with a partial range under-oil ELSP current limiting fuse (below 23 kV)
- Cartridge fusing in series with a partial range under-oil ELSP current limiting fuse (above 23 kV)
- MagneX™ interrupter with ELSP current-limiting fuse
- Vacuum Fault Interrupter (VFI)
- Visible break window
- Fuse/switch interlock

Valves/plugs

- Drain/sampling valve in high-voltage compartment
- Globe type upper fill valve

Overvoltage protection

- Distribution-, intermediate-, or station-class surge arresters
- Elbow arresters (for dead-front connections)

Metering/fan/control

- Full metering package
- Current Transformers (CTs)
- Metering Socket
- NEMA® 4 control box (optional stainless steel)
- NEMA® 7 control box (explosion proof)
- Fan Packages

Testing

- Customer test witness
- Customer final inspection
- Zero Sequence Impedance Test
- Heat Run Test
- ANSI® Impulse Test
- Audible Sound Level Test
- RIV (Corona) Test
- Dissolved Gas Analysis (DGA) Test
- 8- or 24-Hour Leak Test

Coatings (paint)

- ANSI® Bell Green
- ANSI® #61 Light Gray
- ANSI® #70 Sky Gray
- Special paint available per request

Nameplate

- Stainless steel nameplate

Decals and labels

- High voltage warning signs
- Mr. Ouch
- Bi-lingual warning
- DOE compliant
- Customer stock code
- Customer stenciling
- Shock and arc flash warning decal
- Non-PCB decal

Construction

Core

The three-legged, step-lap mitered core construction is manufactured using a high-quality cutting machine. For maximum efficiency, cores are precisely stacked, virtually eliminating gaps in the corner joints.

Five-legged wound core or shell-type triplex designs are used for wye-wye connected transformers, and other special transformer designs.

Cores are manufactured with precision cut, burr-free, grain-oriented silicon steel. Many grades of core steel are available for optimizing core loss efficiency.

Coils

Pad-mounted transformers feature a rectangular coil configuration with wire-wound, high-voltage primaries and sheet-wound secondaries. The design minimizes axial stress developed by short circuits and provides for magnetic balancing of tap connections.

Coils are wound using the highest quality winding machines providing exacting tension control and conductor placement for superior short-circuit strength and maximum efficiency.

Extra mechanical strength is provided by diamond pattern, epoxy-coated paper insulation, used throughout the coil, with additional epoxy at heavy stress points. The diamond pattern distribution of the epoxy and carefully arranged ducts, provide a network of passages through which cooling fluid can freely circulate.

Coil assemblies are heat-cured under calculated hydraulic pressure to ensure performance against short-circuit forces.

Core and coil assemblies

Pad-mounted transformer core and coil assemblies are braced with heavy steel ends to prevent the rectangular coil from distorting under short-circuit conditions. Plates are clamped in place using presses, and welded or bolted to form a solid core and coil assembly. Core and coil assemblies exceed ANSI® and IEEE® requirements for short-circuit performance. Due to the rigidity of the design, impedance shift after short-circuit is comparable to that of circular wound assemblies.

Tanks

Transformer tanks are designed for high strength and ease of handling, installation, and maintenance. Tanks are welded using precision-cut, hot rolled, pickled and oiled steel. They are sealed to protect the insulating fluid and other internal components.

Transformer tanks are pressure-tested to withstand 7 psig without permanent distortion and 15 psig without rupture.

Tank finish

An advanced multi-stage finishing process exceeds IEEE Std C57.12.28™-2014 standards. The eight-stage pre-treatment process assures coating adhesion and retards corrosion. It converts tank surfaces to a nonmetallic, water insoluble iron phosphate coating.

The paint method consists of two distinct layers of paint. The first is an epoxy primer (E-coat) layer which provides a barrier against moisture, salt and corrosives. The two-component urethane final coat seals and adds ultraviolet protection.

Vacuum processing

Transformers are dried and filled with filtered insulating fluid under vacuum, while secondary windings are energized. Coils are heated to drive out moisture, ensuring maximum penetration of fluid into the coil insulation system.

Insulating fluid

Eaton's Cooper Power series transformers are available with electrical-grade mineral insulating oil or Envirotemp™ FR3™ fluid. The highly refined fluids are tested and degassed to assure a

chemically inert product with minimal acid ions. Special additives minimize oxygen absorption and inhibit oxidation. To ensure high dielectric strength, the fluid is re-tested for dryness and dielectric strength, refiltered, heated, dried, and stored under vacuum before being added to the completed transformer.

Eaton's Cooper Power series transformers filled with Envirotemp™ FR3™ fluid enjoy unique fire safety, environmental, electrical, and chemical advantages, including insulation life extending properties.

A bio-based, sustainable, natural ester dielectric coolant, Envirotemp™ FR3™ fluid quickly and thoroughly biodegrades in the environment and is non-toxic per acute aquatic and oral toxicity tests.

Building for Environmental and Economic Sustainability (BEES) total life cycle assessment software, utilized by the US Dept. of Commerce, reports its overall environmental performance impact score at 1/4th that reported for mineral oil. Envirotemp™ FR3™ fluid has also earned the EPA Environmental Technology Verification of transformer materials.

With a fire point of 360 °C, Envirotemp™ FR3™ fluid is FM Approved® and Underwriters Laboratories (UL®) Classified "Less-Flammable" per NEC® Article 450-23, fitting the definition of a Listed Product per NEC®.



Figure 8. VFI transformer with visible break.

Pad-mounted VFI transformer

Eaton's Cooper Power series VFI transformer combines a conventional distribution transformer with the proven Vacuum Fault Interrupter (VFI). This combination provides both voltage transformation and transformer over current protection in one space saving and money saving package. The pad-mounted VFI transformer protects the transformer and provides proper coordination with upstream protective devices. When a transformer fault or overload condition occurs, the VFI breaker trips and isolates the transformer.

The three-phase VFI breaker has independent single-phase initiation, but is three-phase mechanically gang-tripped. A trip signal on any phase will open all three phases. This feature eliminates single-phasing of three phase loads. It also enables the VFI breaker to be used as a three-phase load break switch.

Due to the resettable characteristics of the VFI breaker, restoring three-phase service is faster and easier.

The sealed visible break window and switch is an option that can be installed to provide visible break contact. This feature provides enhanced safety and allows an operator to see if the loadbreak switch contacts are in an open or closed position before performing maintenance.

Envirotran™ FM Approved special protection transformer

Eaton's Cooper Power series Envirotran™ transformer is FM Approved and suitable for indoor locations. Factory Mutual Research Corporation's (FMRC) approval of the Envirotran transformer line makes it easy to comply with and verify compliance with Section 450.23, 2008 NEC, Less-Flammable Liquid-Filled Transformer Requirements for both indoor and outdoor locations.

Envirotran FM Approved transformers offer the user the benefit of a transformer that can be easily specified to comply with NEC, and makes FM Safety Data Sheet compliance simpler, while also providing maximum safety and flexibility for both indoor and outdoor installations.

Because the "FM Approved" logo is readily visible on the transformer and its nameplate, NEC compliance is now easily verifiable by the inspector.

Envirotran FM Approved transformers are manufactured under strict compliance with FMRC Standard 3990 and are filled with FM Approved Envirotemp™ FR3™ fluid, a fire-resistant dielectric coolant.

**Special application transformers****Data Center transformer**

With focus rapidly shifting from simply maximizing uptime and supporting demand to improving energy utilization, the data center industry is continually looking for methods to increase its energy efficiency and reliability. Utilizing cutting edge technology, Eaton's Cooper Power series Hardened Data Center (HDC) transformers are the solution. Designed with special attention given to surge protection, HDC liquid-filled transformers provide superior performance under the harshest electrical environments. Contrary to traditional dry-type units, HDC transformers provide unsurpassed reliability, overloadability, operational life, efficiency, thermal loading and installed footprint. These units have reliably served more than 100 MW of critical data center capacity for a total of more than 6,000,000 hours without any reported downtime caused by a thermal or short-circuit coil failure.

The top priority in data center operations is uninterrupted service. Envirotran HDC transformers from Eaton, having substantially higher levels of insulation, are less susceptible to voltage surges. Eaton has experienced zero failures due to switching transients. The ANSI® and IEEE® standard impulse withstand ratings are higher for liquid-filled transformers, making them less susceptible to insulation failure. The Envirotran HDC transformer provides ultimate protection by increasing the BIL rating one level higher than standard liquid-filled transformer ratings. The cooling system of liquid-filled transformers provides better protection from severe overloads—overloads that can lead to significant loss of life or failure.

Data center design typically includes multiple layers of redundancy, ensuring maximum uptime for the critical IT load. When best in class transformer manufacturing lead times are typically weeks, not days, an unexpected transformer failure will adversely affect the facility's reliability and profitability. Therefore, the ability to determine the electrical and mechanical health of a transformer can reduce the probability of costly, unplanned downtime. Routine diagnostic tests, including key fluid properties and dissolved gas analysis (DGA), can help determine the health of a liquid-filled transformer. Although sampling is not required for safe operation, it will provide the user with valuable information, leading to scheduled repair or replacement, and minimizing the duration and expense of an outage. With a dry-type transformer, there is no reliable way to measure the health or likelihood of an impending failure.

Solar transformer

As a result of the increasing number of states that are adopting aggressive Renewable & Alternative Energy Portfolio Standards, the solar energy market is growing—nearly doubling year over year. Eaton, a key innovator and supplier in this expanding market, is proud to offer its Cooper Power series Envirotran transformers specifically designed for Solar Photovoltaic medium-voltage applications. Eaton is working with top solar photovoltaic developers, integrators and inverter manufacturers to evolve the industry and change the way we distribute power.

In accordance with this progressive stance, every Envirotran Solar transformer is filled with non-toxic, biodegradable Envirotemp™ FR3™ dielectric fluid, made from renewable seed oils. On top of its biodegradability, Envirotemp™ FR3™ fluid substantially extends the life of the transformer insulation, saving valuable resources. What better way to distribute green power than to use a green transformer. In fact, delaying conversion to Envirotran transformers places the burden of today's environmental issues onto tomorrow's generations. Eaton can help you create a customized transformer, based on site specific characteristics including: temperature profile, site altitude, solar profile and required system life. Some of the benefits gained from this custom rating include:

- Reduction in core losses
- Improved payback on investment
- Reduction in footprint
- Improved fire safety
- Reduced environmental impact

For the solar photovoltaic industry, Eaton is offering standard step up transformers and dual secondary designs, including 4-winding, 3-winding (Low-High-Low) and 3-winding (Low-Low-High) designs.

Wind transformer

Eaton is offering custom designs for renewable energy power generation. Eaton manufactures its Cooper Power series Generator Step-Up (GSU) transformers for installation at the base of every wind turbine. Additionally, grounding transformers are available for wind power generation.

DOE efficiency

The United States Department of Energy (DOE) has mandated efficiency values for most liquid type, medium voltage transformers. As a result, all applicable Eaton's Cooper Power series transformers 2500 kVA and below conform to efficiency levels as specified in the DOE ruling "10 CFR Part 431 Energy Conservation Program."

Underwriters Laboratories® (UL®) Listed and Labeled/Classified

The Envirotran transformer from Eaton can be specified as UL® Listed & Labeled, and/or UL® Classified. Underwriters Laboratories (UL®) listing is a verification of the design and construction of the transformer to the ANSI® and IEEE® standards. UL® listing generally is the most efficient, cost-effective solution for complying with relevant state and local electrical codes. UL® Combination Classification/Listing is another way in which to comply with Section 450.23, 2008 NEC® requirements. This combines the UL® listed transformer with a UL® Classified Less-Flammable Liquid and complies with the use restrictions found within the liquid Classification.



K-Factor transformer

With a drastic increase in the use of ferromagnetic devices, arcing devices, and electric power converters, higher frequency loads have increased significantly. This harmonic loading has the potential to generate higher heat levels within a transformer's windings and leads by as much as 300%. Harmonic loading has the potential to induce premature failure in standard-design distribution transformers.

In addition to standard UL® "K-Factor" ratings, transformers can be designed to customer-provided specifications detailing precise loading scenarios. Onsite measurements of magnitude and frequency, alongside harmonic analysis of the connected load can be performed by Eaton engineers or a third party consultant. These field measurements are used to determine exact customer needs and outline the transformer specifications.

Eaton will design harmonic-resistant transformers that will be subjected to the unique harmonic loads. These units are designed to maintain normal temperature rise under harmonic, full-load conditions. Standard UL® "K-Factor" designs can result in unnecessary costs when the "next-highest" K-Factor must be selected for a calculated design factor. To save the customer these unnecessary costs, Eaton can design the transformer to the specific harmonic spectrum used in the application. Eaton's Cooper Power series K-factor transformers are filled with mineral oil or Envirotemp™ FR3™ fluid and enjoy the added benefits of dielectric cooling such as higher efficiencies than dry-type transformers.

Modulation transformer

Bundled with an Outboard Modulation Unit (OMU) and a Control and Receiving Unit (CRU), a Modulation Transformer Unit (MTU) is designed to remotely achieve two way communication.

The use of an MTU reduces travel time and expense versus traditional meter reading performed by high voltage electricians. Additionally, with MTU it is possible to manage and evaluate energy consumption data, providing reduced metering costs and fewer tenant complaints.

An MTU utilizes existing utility infrastructure, therefore eliminating the need to engineer and construct a dedicated communication network.



Figure 9. Modular transformer.

Inverter/rectifier bridge

Eaton complements its range of applications for transformers by offering dual winding designs. These designs are intended for connection to 12-pulse rectifier bridges.

Product attributes

To set us apart from other transformer manufactures, Eaton includes the following guarantees with every three-phase pad-mounted transformer.

Engineered to order (ETO)

Providing the customer with a well developed, cost-effective solution is the number one priority at Eaton. Using customer specifications, Eaton will work with the customer from the beginning to the end to develop a solution to fit their needs. Whether it is application specific, site specific, or a uniquely specified unit, Eaton will provide transformers with the best in class value and performance, saving the customer time and money.

Made in the U.S.A.

Eaton's three-phase pad-mounted transformers are produced right here in the United States of America. Our manufacturing facilities are positioned strategically for rapid shipment of products. Furthermore, should the need arise, Eaton has a broad network of authorized service repair shops throughout the United States.

Superior paint performance

Protecting transformers from nature's elements worldwide, Eaton's E-coat system provides unrivaled transformer paint life, and exceeds IEEE Std C57.12.28™-2014 and IEEE Std C57.12.29™-2005 standards. In addition to the outside of the unit, each transformer receives a gray E-coat covering in the interior of the tank and cabinet, providing superior rust resistance and greater visibility during service.

If the wide range of standard paint selections does not suit the customer's needs, Eaton will customize the paint color to meet their requirements.

Rectangular coil design

Eaton utilizes a rectangular coil design. This winding technique results in a smaller overall unit footprint as well as reducing the transformer weight. The smaller unit size does not hinder the transformer performance in the least. Units have proven short circuit withstand capabilities up to 10 MVA.

Testing

Eaton performs routing testing on each transformer manufactured including the following tests:

- **Insulation Power Factor:** This test verifies that vacuum processing has thoroughly dried the insulation system to required limits.
- **Ratio, Polarity, and Phase Relation:** Assures correct winding ratios and tap voltages; checks insulation of HV and LV circuits. Checks entire insulation system to verify all live-to-ground clearances.
- **Resistance:** This test verifies the integrity of internal high-voltage and low-voltage connections; provides data for loss upgrade calculations.
- **Routine Impulse Tests:** The most severe test, simulating a lightning surge. Applies one reduced wave and one full wave to verify the BIL rating.
- **Applied Potential:** Applied to both high-voltage and low-voltage windings, this test stresses the entire insulation system to verify all live-to-ground clearances.
- **Induced Potential:** 3.46 times normal plus 1000 volts for reduced neutral designs.
- **Loss Test:** These design verification tests are conducted to assure that guaranteed loss values are met and that test values are

within design tolerances. Tests include no-load loss and excitation current along with impedance voltage and load loss.

- Leak Test: Pressurizing the tank to 7 psig assures a complete seal, with no weld or gasket leaks, to eliminate the possibility of moisture infiltration or fluid oxidation.

Design performance tests

The design performance tests include the following:

- Temperature Rise: Our automated heat run facility ensures that any design changes meet ANSI® and IEEE® temperature rise criteria.
- Audible Sound Level: Ensures compliance with NEMA® requirements.
- Lightning Impulse: To assure superior dielectric performance, this test consists of one reduced wave, two chopped waves and one full wave in sequence, precisely simulating the harshest conditions.

Thomas A Edison Research and Test Facility

We are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality transformer for the lowest cost. Eaton's Cooper Power series Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. We have invested millions of dollars in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin affirming our dedication to introducing new innovations and technologies to the transformer industry. This research facility is fully available for use by our customers to utilize our advanced electrical and chemical testing labs.

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For Eaton's Cooper Power series three-phase transformer product information call 1-877-277-4636 or visit: www.eaton.com/cooperpowerseries.



Powering Business Worldwide

SUNNY CENTRAL

2000-EV-US / 2500-EV-US / 2750-EV-US



SC-2000-EV-US-10 / SC-2500-EV-US-10 / SC-2750-EV-US-10



**FULL POWER
UP TO 35 °C**

Unmatched Power Density

- Small footprint simplifies site preparation and logistics
- Industry leading over-dimensioning capabilities
- Integrated voltage supply for internal consumption and external loads

Robust Performance

- Precision air-cooling enables greater reliability and simpler service compared to liquid cooled inverters
- Best-in-class performance in any environment
- DC/AC Ratio up to 250%

Grid Management

- Conforms to all known grid requirements worldwide
- Provides Q on demand

Superior Integration

- Improved DC connection area
- Easily accessible bay for connecting site specific equipment
- Available as a stand-alone inverter or solution with medium-voltage block and tracker auxiliary rack

SUNNY CENTRAL

2000-EV-US / 2500-EV-US / 2750-EV-US

Maximum power density and simple integration for 1,500 V PV projects

The Sunny Central family features an output of up to 2,750 kVA with 1,500 V DC systems. Fewer system components are needed due to the integrated DC fuse servicing switches and convenience power. The inverter also includes integrated control power and a network switch. OptiCool™ precision air cooling keeps this central inverter running smoothly, even in extreme ambient temperatures. It also protects against sand and dust intrusion. The Sunny Central inverter is the central component of the SMA Utility Power System and offers industry leading DC:AC ratios. In conjunction with the medium-voltage block 2.0, DC technology, power plant controlling system and SMA Service, it offers maximum ROI for utility-scale PV projects.

SUNNY CENTRAL 2000-EV-US

Technical Data	SC 2000-EV-US
Input (DC)	
MPP voltage range V_{DC} (at 25°C / at 35°C / at 50°C)	1425 V / 1200 V / 1200 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	778 V / 928 V
Max. input voltage $V_{DC, max}$	1500 V
Max. input current $I_{DC, max}$ (up to 50°C)	2610 A
Max. short-circuit current rating	6400 A
Number of DC inputs (20 / 24)	● / ○
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm ²
Integrated zone monitoring (±0.5% shunt resistors)	○
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A
Output (AC)	
Nominal AC power (up to 50°C)	2200 kVA / 2000 kW
Nominal AC power at $\cos \phi = 0.8$ (at 35°C / at 50°C)	1760 kW
Max. output current $I_{AC, max}$	2310 A
Nominal AC current $I_{AC, nom}$	2100 A
Max. total harmonic distortion	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range ¹⁾⁸⁾	550 V / 440 V to 660 V
AC power frequency	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz
Power factor at rated power / displacement power factor adjustable ⁸⁾	1 / 0.8 overexcited to 0.8 underexcited
Efficiency	
CEC efficiency* ³⁾	98.0%
Protective Devices	
Input-side disconnection point	DC load-break switch
Output-side disconnection point	AC circuit breaker
DC overvoltage protection	Surge arrester, type I
AC overvoltage protection (optional)	Surge arrester, class I
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III
Overcurrent protection device (according to NEC, ANSI/NFPA 70)	3600 A
Ground-fault monitoring / remote ground-fault monitoring / insulation monitoring	○ / ○ / ○
Degree of protection: electronics / air duct / connection area (as per IEC 60529)	IP65 / IP34 / IP34
Degree of protection (as per UL 50)	Type 3R
General Data	
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)
Weight	< 3400 kg / < 7496 lb
Self-consumption: max. ⁴⁾ / partial load ⁵⁾ / average ⁶⁾	< 8100 W / < 1800 W / < 2000 W
Self-consumption (standby)	< 370 W
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer
Operating temperature range	-25 to 60°C / -13 to 140°F
Temperature range (standby)	-40 to 60°C / -40 to 140°F
Temperature range (storage)	-40 to 70°C / -40 to 158°F
Noise emission ⁷⁾	66,3 dB(A)
Max. permissible value for relative humidity: condensing / non-condensing	95% to 100% (2 month/year) / 0 to 95%
Maximum operating altitude above MSL ⁸⁾ 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)
Fresh air consumption	6500 m ³ /h
Features	
DC connection	Terminal lug on each input (without fuse)
AC connection	With busbar system (three busbars, one per line conductor)
Communication	Ethernet, Ethernet/IP, Modbus TCP/IP
Enclosure / roof color	RAL 9016 / RAL 7004
Supply transformer for external loads	○ (2.5 kVA)
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 61), UL 1741-SA, NEC 2011/2014, UL 1998, IEEE 1547, IEEE 693, MIL-STD-810G, BDEW, CE, CAN/CSA C22.2 107.1-1
EMC standards (pending)	CISPR 22:2008 modified class A, FCC Part 15 Class A
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001
● Standard features ○ Optional * preliminary	
Type designation	SC-2000-EV-US-10

- 1) At nominal AC voltage < 550V, nominal AC power decreases in the same proportion
2) Preliminary values
3) Efficiency measured with internal power supply
4) Self-consumption at rated operation
5) Self-consumption at < 75% P_n at 25°C

- 6) Self-consumption averaged out to 5% to 100% P_n at 25°C
7) Sound pressure level at a distance of 32.8 ft (10 m)
8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.

SUNNY CENTRAL 2500-EV-US / 2750-EV-US

Technical Data	Sunny Central 2500-EV-US	Sunny Central 2750-EV-US
Input (DC)		
MPP voltage range V _{DC} (at 25 °C / at 35 °C / at 50 °C)	850 V to 1425 V / 1200 V / 1200 V	875 V to 1425 V / 1200 V / 1200 V
Min. input voltage V _{DC, min} / Start voltage V _{DC, Start}	778 V / 928 V	849 V / 999 V
Max. input voltage V _{DC, max}	1500 V	1500 V
Max. input current I _{DC, max} (at 25 °C / at 50 °C)	3200 A / 2956 A	3200 A / 2956 A
Max. short-circuit current rating	6400 A	6400 A
Number of DC inputs (20/24)	● / ○	● / ○
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	2 x 800 kcmil, 2 x 400 mm²
Integrated zone monitoring	○	○
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Output (AC)		
Nominal AC power at cos φ =1 (at 35 °C / at 50 °C)	2500 kVA / 2250 kVA	2750 kVA / 2500 kVA
Nominal AC power at cos φ =0.9 (at 35 °C / at 50 °C)	2250 kW / 2025 kW	2475 kW / 2250 kW
Nominal AC current I _{AC, nom} = Max. output current I _{AC, max}	2624 A	2646 A
Nominal AC current I _{AC, nom}	2624 A	2646 A
Max. total harmonic distortion	< 3% at nominal power	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range ¹⁾	550 V / 440 V to 660 V	600 V / 480 V to 690 V
AC power frequency	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz
Min. short-circuit ratio at the AC terminals	> 2	> 2 ⁸⁾
Power factor at rated power / displacement power factor adjustable ⁹⁾	● 1 / 0.8 overexcited to 0.8 underexcited ○ 1 / 0.0 overexcited to 0.0 underexcited	
Efficiency		
Max. efficiency ²⁾ / European efficiency ²⁾ / CEC efficiency ³⁾	98.6% / 98.3% / 98.0%	98.7% / 98.5% / 98.5%
Protective Devices		
Input-side disconnection point	DC load-break switch	DC load-break switch
Output-side disconnection point	AC circuit breaker	AC circuit breaker
DC overvoltage protection	Surge arrester, type I	Surge arrester, type I
AC overvoltage protection (optional)	Surge arrester, class I	Surge arrester, class I
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	Lightning Protection Level III
Overcurrent protection device (according to NEC, ANSI/NFPA 70)	3600 A	3600 A
Ground-fault monitoring / remote ground-fault monitoring / insulation monitoring	○ / ○ / ○	
Degree of protection: electronics / air duct / connection area (as per IEC 60529)	IP65 / IP34 / IP34	IP65 / IP34 / IP34
Degree of protection (as per UL 50)	Type 3R	Type 3R
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	
Weight	< 3400 kg / < 7496 lb	
Self-consumption (max. ⁴⁾ / partial load ⁵⁾ / average ⁶⁾)	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	Integrated 8.4 kVA transformer	
Operating temperature range	-25 to 60 °C / -13 to 140 °F	
Temperature range (standby)	-40 to 60 °C / -40 to 140 °F	
Temperature range (storage)	-40 to 70 °C / -40 to 158 °F	
Noise emission ⁷⁾	66.3 dB(A)	64.3 dB(A)
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month / year) / 0 % to 95%	
Maximum operating altitude above MSL 2000 m	●	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lug on each input	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Ethernet/IP, Modbus TCP/IP	
Enclosure / roof color	RAL 9016 / RAL 7004	
Display	HMI touchscreen (10.1")	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 6I), UL 1741-SA, NEC 2011/2014, UL 1998, IEEE 1547, IEEE 693, MIL-STD-810G, BDEW, CE, CAN/CSA C22.2 107.1-1	
EMC standards (pending)	CISPR 22:2008 modified class A, FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features ○ Optionalw		
Type designation	SC-2500-EV-US-10	SC-2750-EV-US-10

1) At nominal AC voltage, nominal AC power decreases in the same proportion

2) Efficiency measured without internal power supply

3) Efficiency measured with internal power supply

4) Self-consumption at rated operation

5) Self-consumption at < 75% P_n at 25 °C

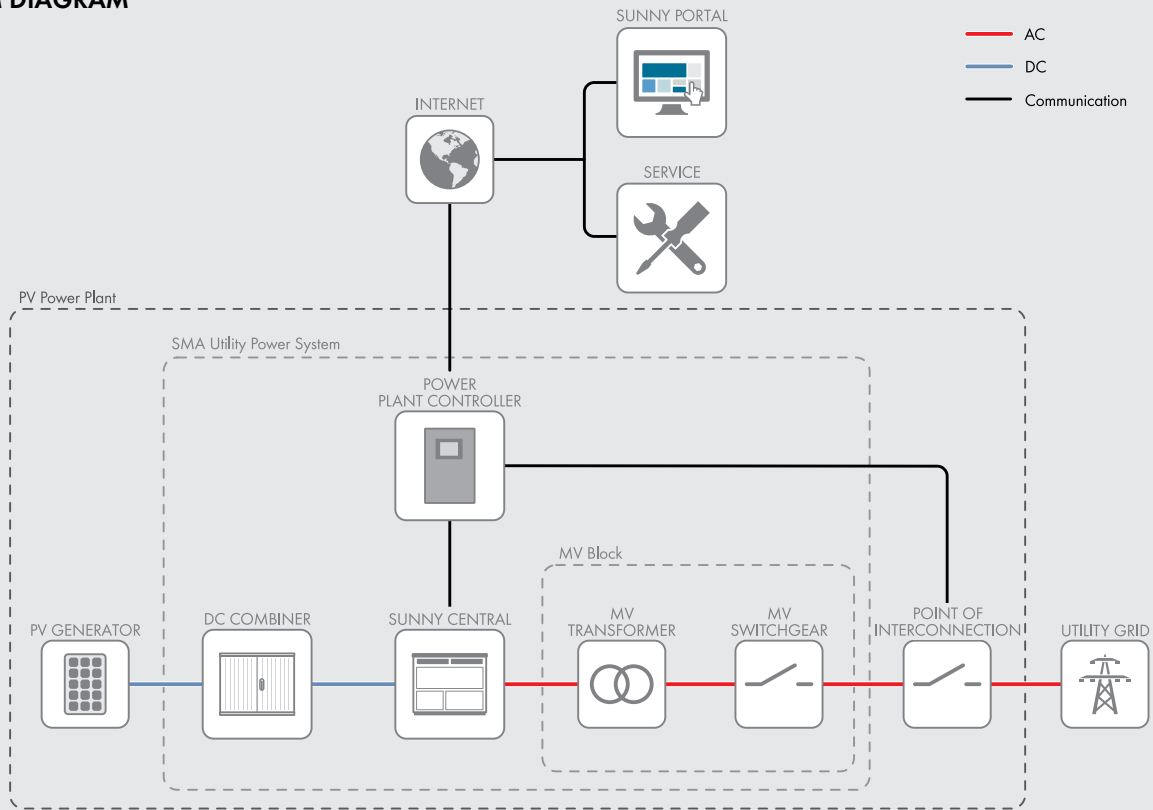
6) Self-consumption averaged out from 5% to 100% P_n at 35 °C

7) Sound pressure level at a distance of 10 m

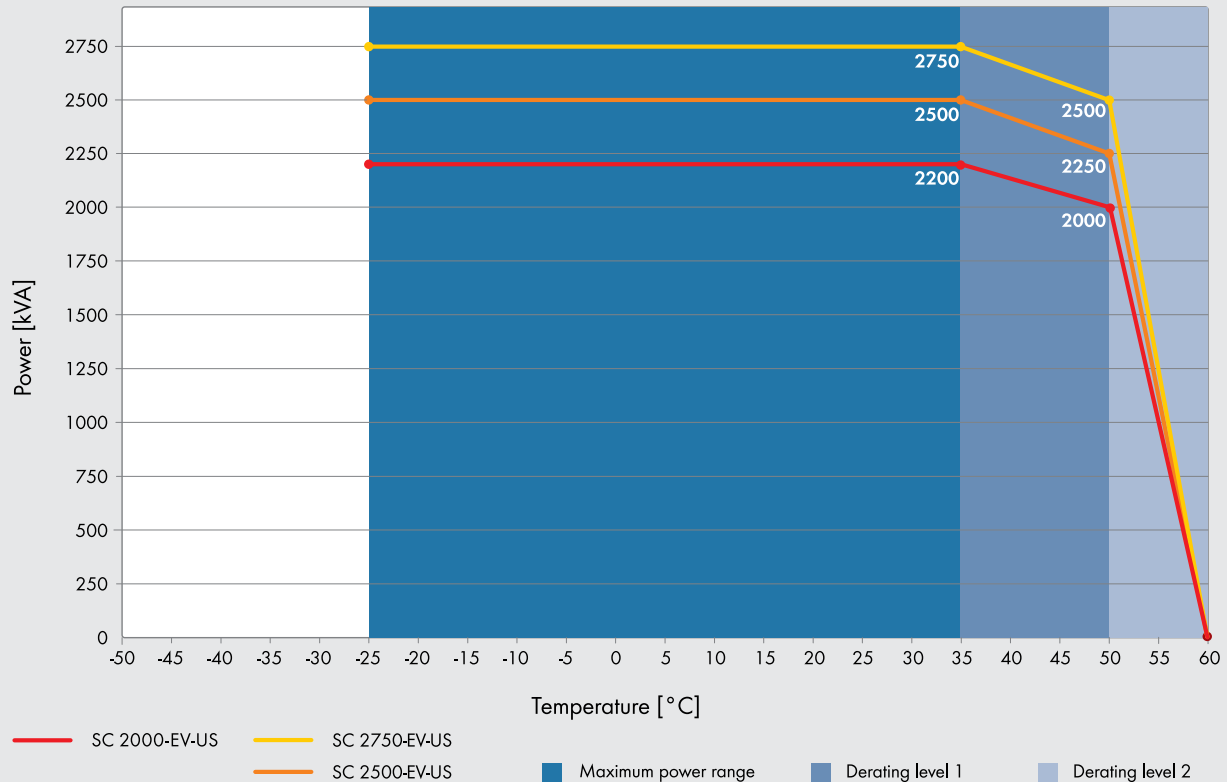
8) A short-circuit ratio of < 2 requires a special approval from SMA

9) Depending on the DC voltage

SYSTEM DIAGRAM



TEMPERATURE



SC2000-EV-US-2750-EV-US-DUS 183711 All products and services described and all technical data are subject to change, even for reasons of country-specific deviations, at any time without notice. SMA assumes no liability for typographical or other errors. For current information, please see www.SMA-Solar.com.

Material Safety Data Sheet

Section 1 – IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Name: Lithium-ion Rechargeable Battery

Battery type: Lithium-ion Battery

Model	Voltage	Capacity (mAh)			Energy (Wh)
		Typical	Min	MAX	
LF280L	3.2V	280000	/	/	896

Product Use: Energy Storage System

MSDS Date of Preparation: Jan 1, 2021

Company Identification:

Name: EVE Power Co., Ltd

Address: No.68,Jingnan Avenue Hi-Tech Zone,Jingmen,Hubei, China

Post Code: 448000

Tel: +86-724-6079630

Fax: +86-724-6079688

Section 2 - Hazards Identification

- **Health Hazards (Acute and Chronic)**

These chemicals are contained in a sealed Aluminum-plastic film. Risk of exposure occurs only if the battery is mechanically or electrically abused. Contact of electrolyte with skin and eyes should be avoided.

- **Sign/Symptoms of Exposure**

A shorted battery can cause thermal and chemical burns upon contact with the skin. Maybe a reproductive hazard.

These products are classified as Articles under REACH and are not subject to the requirements for Information in the Supply Chain (Safety Data Sheets and Labels). While batteries may release hazardous substances if damaged, this is not an intended release as defined under REACH. Batteries are not classified as hazardous under the CLP.

The following information is provided to assist in the safe use of our products.

CAUTION: Battery can explode or leak if heated, disassembled, shorted, recharged, exposed to fire or high temperature or inserted incorrectly. Keep in original package until ready to use. Do not carry batteries loose in your pocket or purse. Keep batteries away from children. If swallowed, consult a physician at once. Under certain misuse conditions and by abusively opening the battery, exposed lithium can react with water or moisture in the air causing potential thermal burns or fire.

Section 3 – Composition/Information on Ingredient

Material or ingredient	Chemical Formula	CAS No.	Wt %
Lithium iron phosphate	LiFePO ₄	/	37.0
Phosphate(1-),hexafluoro,lithium	LiPF ₆	(CAS-No.)21324-40-3 (EC-No.)244-334-7	3.2
Graphite	C	(CAS-No.)7782-42-5 (EC-No.)231-955-3	19.1
Aluminum	Al	(CAS-No.)7429-90-5 (EC-No.)231-072-3 (EC Index-No.)013-002-00-1	4.6
Copper	Cu	(CAS-No.)7440-50-8 (EC-No.)231-159-6	7.5
Polypropylene	PP	(CAS-No.) 9003-07-0 (EC-No.)618-352-4	4.8

Section 4 - First Aid Measures

- **General Advice**

The chemicals in this product are contained in a sealed package. Exposure to the contents will not occur unless the battery leaks, is exposed to high temperatures or is mechanically, physically, or electrically abused.

- **Eye**

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

- **Skin**

Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.

- **Inhalation**

Remove from exposure and move to fresh air immediately. Use oxygen if available.

- **Ingestion**

Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Call a physician.

- **Note to Physician**

Published reports recommend removal from the esophagus be done endoscopically (under direct visualization). Batteries beyond the esophagus need not be retrieved unless there are signs of injury to the GI tract or a large diameter battery fails to pass the pylorus. If asymptomatic, follow up x rays are necessary only to confirm the passage of larger batteries. Confirmation by stool inspection is preferable under most circumstances.

Section 5 - Fire Fighting Measures

- **Fire and Explosion Hazards:** Batteries may burst and release hazardous decomposition products when exposed to a fire situation.

- **Extinguishing Media**

CO₂.

- **Special Fire-Fighting Procedures**
Self-contained breathing apparatus.
- **Unusual Fire and Explosion Hazards**
Cell may vent when subjected to excessive heat-exposing battery contents.
- **Hazardous Combustion Products**
Carbon monoxide, carbon dioxide, lithium oxide fumes.

Section 6 - Accidental Release Measures

- **Steps to be Taken in case Material is Released or Spilled**
If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapors to dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.
- **Waste Disposal Method**
It is recommended to discharge the battery to the end, handing in the abandoned batteries to related department unified, dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental protection agency and/or federal EPA.

Section 7 - Handling and Storage

The battery should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container.

Do not short circuit terminals, or over charge the battery, forced over-discharge, throw to fire. Do not crush or puncture the battery, or immerse in liquids.

- **Precautions to be taken in Handling and Storing**
Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided.
Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.
- **Other Precautions**
The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures.
Do not short or install with incorrect polarity.
- **Storage**
Store batteries in a dry place at normal room temperature.

Section 8 - Exposure Controls, Personal Protection

- **Exposure Limits:** No exposure to the battery components should occur during normal use.
- **Ventilation:** Not necessary under conditions of normal use.
- **Respiratory Protection**
In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores. Respiratory Protection is not necessary under conditions of normal use.
- **Skin Protection:** None required for normal use. Use butyl rubber gloves when handling leaking

batteries.

- **Eye Protection:** None required for normal use. Wear safety goggles when handling leaking batteries.
- **Protective Gloves**
In the event of leakage wear gloves, Others not need.
- **Other Protective Clothing or Equipment**
Not necessary under conditions of normal use.
Personal Protection is recommended for venting battery: Respiratory protection, Protective gloves, protective clothing and safety glass with side shields.

Section 9 - Physical and Chemical Properties

Appearance and Odor: prismatic cell , no odor.

Water Solubility: Insoluble

Flash Point: 52°F (25°C) ((DMC)

Section 10 - Stability and Reactivity

- **Stability**
Stable
- **Conditions to Avoid**
Heating, mechanical abuse and electrical abuse.
- **Hazardous Decomposition Products**
N/A.
- **Hazardous Polymerization**
N/A.

Section 11 - Toxicological Information

- **Potential Health Effects:** The chemicals in this product are contained in a sealed package. Exposure to the contents will not occur unless the battery leaks, is exposed to high temperatures or is mechanically, physically, or electrically abused.
- **Eye Contact:** Contact with battery contents may cause irritation.
- **Skin Contact:** Contact with battery contents may cause irritation.
- **Inhalation:** Inhalation of vapors or fumes released due to heat or a large number of leaking batteries may cause respiratory and eye irritation.
- **Ingestion:** Seek immediate medical advice. Batteries lodged in the esophagus should be removed immediately since leakage, caustic burns and perforation package occur as soon as two hours after ingestion. Irritation to the internal/external mouth areas, may occur following exposure to a leaking battery.

Section 12 - Ecological Information

When promptly used or disposed the battery does not present environmental hazard. When disposed, keep away from water, rain and snow.

Section 13 - Disposal Considerations

● APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

If batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amount of not reaction or unconsumed lithium remaining in the spent battery. The battery must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste. Recycling of battery can be done in authorized facility, through licensed waste carrier.

lithium ion cell batteries are labeled in compliance with the EU Battery Directive 2006/66/EC.

Section 14 - Transport Information

Emergency Phone Number:

CHEMTREC 24 Hour Emergency Response Hotline (+86-752-2606966)

Persons who prepare or offer lithium batteries for transport are required by regulation to be trained and certified.

The information provided below is for informational purposes only.

Lithium Ion Batteries		
UN3480 Lithium ion batteries – PI 965		
UN3481 Lithium ion batteries with or in equipment PI 966 & 967		
UN 38.3: EVE certifies that all of its lithium batteries meet the requirements of the UN Manual of Tests and Criteria, Part III subsection 38.3. If you assemble these batteries into larger battery packs, it is recommended that you perform the UN Tests to ensure the requirements are met prior to shipment.		
US DOT: Special Provision 188,		
Air Transport (IATA/ICAO): Packing Instruction 965 --967		
Marine/Water Transport (IMDG): Special Provision 188,		
ADR: Special Provisions: 188,		

The products meet all the requirements of the IATA DGR 62th edition, under special provisions including UN 38.3 test. If the package exceeds the table 965 - the - standard, so it belongs to the ninth category of dangerous goods. Only cargo transport. According to the packing instructions 965 Part IB IATA 62th version of the DGR requirements.

Lithium ion cells and batteries must be offered for transport at a state of charge (SoC) not exceeding 30% of their rated design capacity from 1 April 2016.

Shipping packages containing rechargeable lithium batteries must be labeled, regardless of size or number of batteries, with a lithium battery handling label.

More information concerning shipping, testing, marking and packaging can be obtained from Label master at <http://www.labelmaster.com>.

Separate battery when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles and wet by rain.

Section 15 - Regulatory Information

● Law Information

- 《Dangerous Goods Regulation》
- 《Recommendations on the Transport of Dangerous Goods Model Regulations》
- 《International Maritime Dangerous Goods》
- 《Technical Instructions for the Safe Transport of Dangerous Goods》
- 《Classification and code of dangerous goods》
- 《Occupational Safety and Health Act》 (OSHA)
- 《Toxic Substances Control Act》 (TSCA)
- 《Consumer Product Safety Act》 (CPSA)
- 《Federal Environmental Pollution Control Act》 (FEPCA)
- 《The Oil Pollution Act》 (OPA)
- 《Superfund Amendments and Reauthorization Act Title III (302/311/312/313)》 (SARA)
- 《Resource Conservation and Recovery Act》 (RCRA)
- 《Safety Drinking Water Act》 (CWA)
- 《California Proposition 65》
- 《Code of Federal Regulations》 (CFR)

EU BATTERY DIRECTIVE: These batteries comply with the Directive substance limits and labeling requirements.

EU REACH REGISTRATION: These products are manufactured articles and not subject to REACH registration requirements.

EU REACH SVHC: These products don't contains the Substances of Very High Concern.

EU Labeling: lithium ion cell batteries are labeled in compliance with the EU Battery Directive 2006/66/EC.

Section 16 – Other Information

EVE Hazard Rating: Health: 0 Fire: 0 Reactivity: 0

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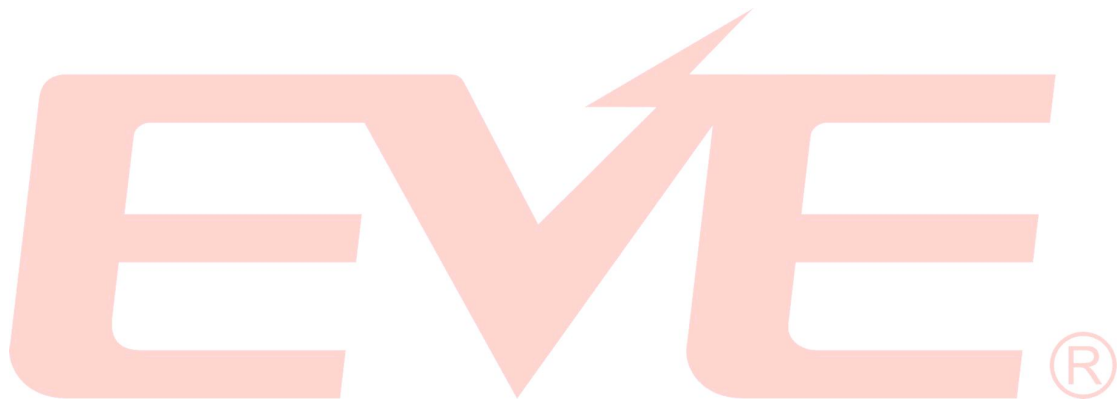
Data supplied is for use only in connection with occupational safety and health.

DISCLAIMER: This MSDS is intended to provide a brief summary of our knowledge and guidance regarding the use of this material. The information contained here has been compiled from sources



Report No.: 2020052001

considered by EVE to be dependable and is accurate to the best of the Company's knowledge. It is not meant to be an all inclusive document on worldwide hazard communication regulations.



Attachment E: Fire Suppression System Specifications



Powin Energy



Safety Guide:
Fire Alarm Standard Operating
Procedure (SOP)

powinenergy.com



REVISION HISTORY

Name	Date	Reason for Changes	Version
D. Vance	2020.02.26	Initial Draft	0.01
K. Plank	2020.02.27	Authorized for Release	1.0



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PURPOSE

This Standard Operating Procedure (SOP) defines the steps that should be taken in response to any fire alarm event in a Powin containerized solution. It should be used in conjunction with an [Emergency Response Plan](#), which is developed and distributed to the personnel listed below before completion of the commissioning process.

- Emergency Response Coordinator
 - Name: _____
 - Phone: _____
- Powin Support Team
 - Phone: 855-888-3659
- Site Operator(s)
 - Name: _____
 - Phone: _____
- First Responders
 - Phone: 911

REFERENCES

1. [ESA Emergency Response Plan Template](#)
2. [NFPA 855](#)
3. [IFC 2012 Section 608](#)

INFORMATION FOR EMERGENCY RESPONDERS

This facility contains:

- **Lithium-Ion Batteries.** Battery components are ALWAYS LIVE and present an electrical hazard even when disconnected & powered off. Never touch any electrical components in this facility.
- **DC Voltages.** Up to 1kV that cannot be de-energized
- **AC Voltages.** Up to 28kV that can be de-energized

Environmental Safety Considerations

- Explosion is the primary safety concern once a clean agent fire suppression system has activated, thus ventilation of explosive gases must complete before opening the container.
- Gasses released from lithium-ion batteries may include Hydrogen, Carbon Monoxide, Carbon Dioxide, Methane, Ethene, Ethane, Propene, Propane, C4, Pentane.
 - Wear a Self-Contained Breathing Apparatus (SCBA) when entering the container for the first time to protect against breathing in lingering gases.
- Damaged lithium-ion batteries are capable of ignition or re-ignition at any time after a fire or other damage and must be monitored.
- Battery components are ALWAYS LIVE and present an electrical hazard even when disconnected. Never touch any electrical *components* in this facility.



- Critical systems must be left powered on – Fire Systems, Ventilation Systems, Gas Systems, and Notification Systems.
- If there are victims inside the facility, be aware that their bodies could be electrically energized – if they may be touching electrically energized parts, do not touch them except with non-conductive materials.
- See the Emergency Response Plan for follow up information about other environmental considerations such as water runoff and clean up.

DEFINITIONS

- **Supervisory Signal:** This is an indication that the fire detection or suppression system is experiencing a control issue. A special supervisory alarm will go off and a signal sent to the monitoring organization. The fire department need not be notified, and fire suppression should not be engaged.
- **Fire Alarm:** This is an indication that at least one detector (smoke, heat, manual) has been triggered. A single detector may not be enough to trigger fire suppression, but should always trigger local indicators (horns, flashing lights) and Powin monitoring indicators.
- **Fire Suppression Response:** This is the actual physical response to fire, triggered by one or more fire alarms.

SYSTEM CONFIGURATION

Inside each container, there will be a manual trigger, smoke detectors, heat detectors, and, in some container models, gas detectors. By design, the following is expected to occur in response to a signal from each device, provided that such a response is not prevented by on-site conditions:

- **Supervisory Signal.** If there is a supervisory signal, a supervisory indicator signal will be sent to Powin's remote monitoring systems.
- **Manual Trigger.** If the manual trigger is tripped, an audible alarm and flashing light will activate locally, Powin's remote monitoring system will indicate an alarm, and, after a delay of 60 seconds, the fire suppression response will begin.
- **Single Detector.** If a smoke, heat, or gas detector is tripped, an audible alarm and flashing light will activate locally and Powin's remote monitoring system will indicate an alarm. Fire suppression is not automatically triggered in response to a signal from a single detector.
- **Multiple Detectors.** If both smoke and heat detectors are tripped, fire suppression response will begin immediately, an audible alarm and flashing light will activate locally, and Powin's remote monitoring system will indicate a fire suppression response.



CASE 1: SUPERVISORY SIGNAL

This is most likely a non-emergency malfunction, but proper care must still be taken to ensure safety of personnel and assets during the investigation.

1. Powin will immediately call the Emergency Response Coordinator listed in the [Emergency Response Plan](#) and at the top of this document.
2. The Powin support team will create a fire detection/suppression ticket to track relevant details.
3. The Emergency Response Coordinator will arrange and conduct a visual inspection of the container on each side, **before opening any doors**. Look for any evidence of heat, fire, explosion, or out gassing.
4. Take one of the following actions, depending on site conditions:
 - a. If evidence of heat, fire, explosion, or out gassing is found, immediately proceed to 'Case 4: Fire'
 - b. If evidence of fire suppression is seen, immediately go to 'Case 3: Alarm with Fire Suppression Response'
 - c. If no evidence of heat, fire, explosion, out gassing, or fire suppression is found, carefully open the container door.
5. Follow up actions:
 - a. The Powin support team will provide support on finding the root cause of the Supervisory Signal.
 - b. Within one week of the incident, Powin will provide a root-cause analysis and mitigation document, if appropriate, for this alarm.



CASE 2: ALARM WITHOUT FIRE SUPPRESSION RESPONSE

If a visual inspection of the enclosure shows evidence of a fire, immediately go to 'Case 4: Fire'.

1. Keep the container closed and under observation for at least 60 minutes.
2. Disconnect all DC power to the container and establish a safety perimeter of 30.5 meters / 100 feet around all sides.
3. Call the Emergency Response Coordinator listed in the [Emergency Response Plan](#) and at the top of this document.
4. Call and notify Powin via the support line at 855-888-3659.
5. Powin will create a fire detection/suppression ticket to track relevant details.
6. If no evidence of heat, fire, explosion, or out gassing is seen after 60 minutes and no fire suppression response is reported by the Powin remote monitoring tools or local monitoring, conduct a visual inspection of the container on each side, **before opening any doors**. Look for any evidence of heat, fire, explosion, or out gassing.
 - a. If evidence of heat, fire, explosion, or out gassing is found, immediately go to 'Case 4: Fire'
 - b. If no evidence of heat, fire, explosion, or out gassing is found, open the container door but **do not enter**.
7. Re-establish the safety perimeter of 30.5 meters / 100 feet around the container and observe the container another 60 minutes.
8. If no further indications of heat, fire explosion, or out gassing is found then the container may be entered at this point.
 - a. *A Self Container Breathing Apparatus (SCBA) must be worn upon initial entry in case any gases are lingering.*
9. Follow up actions:
 - a. Powin will provide further support on resetting the alarm signal.
 - b. Within one week of the incident, Powin will provide a root-cause analysis and mitigation document, if appropriate, for this alarm.



CASE 3: ALARM WITH FIRE SUPPRESSION RESPONSE

If a visual inspection of the enclosure shows evidence of a fire, immediately go to 'Case 4: Fire'

1. Keep the container closed and under observation for at least 60 minutes.
2. Disconnect all DC power to the container and establish a safety perimeter of 30.5 meters / 100 feet around all sides.
3. Call the Emergency Response Coordinator listed in the [Emergency Response Plan](#) and at the top of this document.
4. Call and notify the Powin via the support line at 855-888-3659.
5. Powin will create a fire detection/suppression ticket to track relevant details.
6. If no evidence of fire is seen from the safety perimeter after 60 minutes and no fire suppression response is reported by the Powin monitoring tools or local monitoring, conduct a visual inspection of the container on each side, **before opening any doors**. Look for any evidence of heat, fire, explosion, or out gassing.
 - a. If evidence of heat, fire, explosion, or out gassing is found, immediately go to 'Case 4: Fire'.
 - b. If no evidence of heat, fire, explosion, or out gassing is found, open the container door, but **do not enter**.
7. Re-establish the safety perimeter of 30.5 meters / 100 feet around the container and observe the container another 60 minutes.
8. If no further indications of heat, fire explosion, or out gassing is found then the container may be entered at this point.
 - a. *A Self Container Breathing Apparatus must be worn upon initial entry in case any gases are lingering.*
9. Follow up actions:
 - a. Powin will provide further support on resetting the alarm signal.
 - b. Within one day of the incident, the Powin will provide an initial analysis and response for this alarm.
 - c. Within one week of the incident, the Powin will provide a root-cause analysis and mitigation document, if appropriate, for this response.
 - d. Within one week of the incident, Powin will provide a cleanup and response plan for compromised components.



CASE 4: FIRE

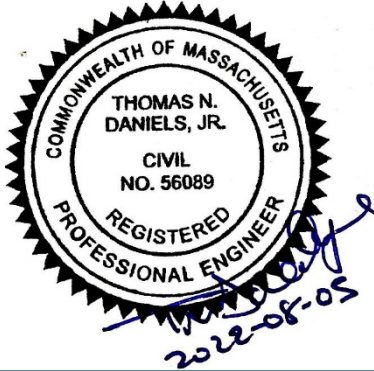
1. Disconnect all AC and DC power to the container and establish a safety perimeter of 30.5 meters / 100 feet around all sides. No personnel other than firefighters should go inside the safety perimeter.
2. If the alarm system does not already signal the local fire department, immediately call the local fire department. Provide copies of the **Information for First Responders** from the top of this document.
3. Call the Emergency Response Coordinator listed in the [Emergency Response Plan](#) and at the top of this document.
4. Call and notify Powin via the support line at 855-888-3659.
5. Many Powin containers have a standpipe connection for fire hoses on the outside of the container. The Emergency Response Coordinator and the Emergency Response Plan will indicate if this site has standpipes, and where the hookup is for them. **If the containers have a standpipe, the recommended course of action is to use this port to flood the container.** CO₂ is also an accepted means of fighting lithium battery fires. If a standpipe connection is not available and there is no danger to surrounding structures or people, it is recommended to let the fire burn out on its own in the container.
6. **DO NOT ENTER THE CONTAINER WITHOUT TESTING FOR EXPLOSIVE GAS.** The standpipe can be used for this purpose if there is not a port specifically for gas detection.
7. Powin will provide safe decommissioning, disposal, and cleanup documentation.

Attachment F: Stormwater Management Plan



Stormwater Management Report

August 2022



Prepared by: Ariel R. Davidson, P.E.
Reviewed and Approved by: Thomas N. Daniels Jr., P.E.

Holliston Battery Energy Storage System Project | Central Street, Holliston, Massachusetts

Prepared For:

BLUEWAVE

BWC Bogastow Brook, LLC
c/o BlueWave Solar
501 Boylston Street, Suite 10B134
Boston, MA 02116

Prepared By:

TRC
650 Suffolk Street, Suite 200
Lowell, MA 01854



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ATTACHMENTS

Attachment A – Massachusetts Checklist for Stormwater Report
Attachment B – Figures, Maps, and Pre- and Post-Development Drainage Plans
Attachment C – Stormwater Calculations & Supporting Documents
Attachment D – Construction & Post Construction Stormwater Inspection Maintenance Forms
Attachment E – Stormwater Management System Long-Term Operation and Maintenance Plan

1.0 Introduction

This Stormwater Management Report has been prepared for the proposed BWC Bogastow Brook, LLC Holliston Battery Energy Storage System (BESS) Project (the Project). The Project is to be located at 600 Central Street in Holliston, Middlesex County, Massachusetts. This report has been prepared in accordance with the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook.

The goals of the Stormwater Management Report are to analyze the peak rate of runoff under pre- and post-development conditions, demonstrate that post-development rate of runoff will be similar to pre-development rate of runoff, and propose stormwater management strategies to address water quantity and quality standards. This report identifies and details stormwater management pollution prevention and erosion and sediment control measures that will be used during and following completion of construction.

Overall, the proposed development is low impact and meets the requirements of the MassDEP Stormwater Management Standards. The Massachusetts Checklist for Stormwater Report is provided in **Attachment A**.

2.0 Project Information

2.1 Project Location

The Project is located on a single 8.5-acre parcel, at 600 Central Street in Holliston, Middlesex County, Massachusetts (Project Site). The parcel is described by the Town's tax assessor as Tax Map 9, Lot 4-62. The Project Site is currently occupied by a church and associated parking lot in the southwestern portion of the site. The remainder of the Project Site is primarily wooded lands. The Project Site is located within the Agricultural-Residential District B, Wellhead Protection Area Zones 1a and 3, and MassDEP Approved Zone II.

2.2 Proposed Battery Energy Storage System (BESS)

The proposed BESS is to be located in the northern portion of the Project Site. This area is currently forested and located to the north of the church. The Project Area will be accessed via a proposed gravel access drive that will extend from the existing church parking lot. The proposed gravel access drive will terminate at the location of the BESS where an emergency vehicle turnaround will be provided. The BESS is comprised of a fenced-in facility with 30 battery units housed in 5'x8' containers and four equipment pads with inverters and auxiliary equipment. The total Project Area that is expected to be disturbed by construction activities is 1.7 acres which consists of the fenced-in facility, the gravel access drive, underground electrical conduit runs, and overhead electric line corridor. All work will take place within property limits.

2.3 Surface Water On or Abutting the Project Site

TRC conducted a reconnaissance of the Project Site in January 2021 to determine the presence or absence of wetland resources located within and surrounding the proposed Project Area. No

wetlands were delineated within the Project Site but there are MassDEP mapped wetlands on abutting properties as depicted in the civil design drawings. There are no impacts to wetlands resources or buffer zones proposed.

2.4 Downstream Waterbodies

Runoff from the Project Area drains predominantly to Bogastere Swamp which lies to the east. Bogastere Swamp discharges to Bogastow Brook followed by the Charles River which eventually drains into the Atlantic Ocean. The entire Project Site is located within the Charles River Basin watershed. The associated segment of Charles River is classified as Class B waters per 314 CMR 4.00 Division of Water Pollution Control and the Bogastow Brook is identified as Segment MA72-16, Category 4a waters per the Massachusetts Year 2016 Integrated List of Waters with the following identified for total maximum daily loads (TMDLs): E. Coli and Fecal Coliform. Impacts to wetlands and watercourses by the proposed development will be avoided.

2.5 General Topography

A map of the Project Site boundaries overlaid on a USGS 7.5-minute topographic quadrangle map is included as **Figure 1** in **Attachment B**. A topographic survey at 2-foot contours was performed by Land Planning, Inc. in January of 2022 and is the basis of the civil design drawings.

Existing topography generally slopes east and north within the area of the proposed development. The majority of the Project Site drains north and east to the Bogastere Swamp.

Under post-development conditions, existing topography will not be significantly altered, and drainage will generally remain the same. Changes to grades will take place within the Project Area as follows:

- A gravel access drive and turnaround will be constructed to allow site maintenance and emergency vehicles to access the BESS facility.
- Localized grading will be performed to provide a generally level surface and positive drainage within the BESS facility. An existing slope to the south of the facility will be regraded to 2H:1V and stabilized with rip rap.
- A stormwater basin will be constructed to manage stormwater runoff, attenuate peak discharges, exfiltrate the required recharge volume, and treat the required water quality volume.

Earthwork will be balanced to the maximum extent practical. However, an estimated 1,840 cubic yards of earth material will be exported from the Project Site in order to provide the necessary stormwater BMPs.

2.6 Flood Plain

The Federal Emergency Management Agency (FEMA) maintains materials developed to support flood hazard mapping for the National Flood Insurance Program. The 100-year flood zone intersects the far northeastern corner of the Project Site but the entire Project Area is located outside the 100-year flood zone according to the Flood Insurance Rate Map (FIRM) for the Town of Holliston, Massachusetts, panel number 25017C0634E, effective June 4, 2010 (see

Attachment B). The actual flood zone limit shall be confirmed by a surveyor prior to construction of the Project. The proposed development will not impact flood storage or habitat function of any on-site or off-site receptors.

2.7 Alterations to Natural Drainage Ways

Construction of the proposed Project will not alter natural drainage ways. Overall, the proposed development design gives preference to existing and natural drainage patterns.

2.8 Alterations to Land Cover Within Watershed

The location of the proposed development consists primarily of wooded lands with a portion of the Project Site developed in the southwestern corner where there is an existing church and associated parking lot. The Project Site is surrounded by residential development to the north, west, and south.

During construction, ground disturbance will be minimized as much as possible and will only occur for the installation of the BESS facility, electrical conduit runs, gravel access drive with turnaround, and security fence. Disturbed areas will be revegetated, unless otherwise stabilized. Some tree clearing is required for the proposed development. The church's existing paved parking lot will be used for contractor parking, material laydown, and storage throughout the duration of construction.

Based on initial consultation with the Town of Holliston the following project items will be considered as impervious surfaces for the purposes of stormwater management treatment system sizing and design: gravel access drive with turnaround, crushed stone aggregate surface within the BESS facility overlain by the 30 battery unit containers, and four concrete equipment pads. Impervious surfaces within the watershed are increased by approximately 0.53 acres and about 1.76 acres of clearing is proposed. The table below provides a summary of land cover changes as represented by the composite runoff curve numbers (CNs) within the assessed watershed:

Table 2.1. Pre- and Post-Development Land Cover Changes

LAND COVER CHANGES				
Subcatchment ID	Pre-Development Conditions		Post-Development Conditions	
	CN	Area (Ac.)	CN	Area (Ac.)
1S	44.9	6.317	51.2	6.328

As shown in the table, changes to the land cover between pre- and post-development conditions within the delineated watershed are minimal with a small increase in the composite CN. A summary of the land cover types and CNs for the pre- and post-development subcatchments are provided in **Attachment C**.

3.0 MassDEP Stormwater Management Standards

The required documentation and computations have been provided for the MassDEP Stormwater Management Standards as follows:

3.1 Standard 1: No Untreated Discharges or Erosion to Wetlands

In accordance with Standard 1 of the Massachusetts Stormwater Handbook, there will be no new untreated discharges or erosion to wetlands or waters of the Commonwealth. The proposed development does not include any new outlets, outfalls, or structures that discharge runoff from the Project Site directly to wetlands or natural resource areas. Stormwater runoff from impervious areas will be treated on-site and will not be directly discharged to wetlands or natural resource areas. Prior to any earth-disturbing activities, perimeter sediment controls will be installed around the limits of disturbance. During Site preparation and construction activities, sediment will be intercepted by sediment controls before reaching the adjacent receptors. New impervious surfaces proposed for the Project will consist of the gravel access drive with turnaround, and aggregate surface within the BESS facility overlain by the battery unit containers and equipment pads. Upon completion of construction activities, any disturbed areas of the Project Site will be revegetated, unless otherwise stabilized, such that runoff will not result in channelized flow from the developed areas and will not cause erosion in wetlands or waters of the Commonwealth. The vegetation will also serve as a vegetated filter strip, attenuating stormwater runoff further and providing a measure of Total Suspended Solids (TSS) treatment.

3.2 Standard 2: Peak Rate Attenuation

In accordance with Standard 2, post-development peak discharge rates are generally the same as pre-development peak discharge rates. In support of this standard, a runoff analysis was completed as detailed in Section 4 of this report. The results of the analysis and assessment of any stormwater runoff quantity control measures are provided in Section 5.

3.3 Standard 3: Stormwater Recharge

In accordance with Standard 3, loss of annual recharge of groundwater was eliminated or minimized through the use of infiltration measures. The necessary computations associated with this requirement are provided in Section 6 of this report.

3.4 Standard 4: Water Quality

In accordance with Standard 4, stormwater management systems were designed to remove 80% of the average annual post-construction load of TSS with at least 44% of TSS removed in pretreatment. The necessary computations associated with this standard are provided in Section 6 of this report.

3.5 Standard 5: Land Uses with Higher Potential Pollutant Loads

The proposed development will not result in higher potential pollutant loads. Source control and pollution prevention will be implemented in accordance with the proposed Stormwater Management System Long-Term Operations and Maintenance Plan, to eliminate untreated off-

site discharge of stormwater and associated TSS impacts. A Stormwater Pollution Prevention Plan (SWPPP) will be developed as part of the required National Pollutant Discharge Elimination System (NPDES) permitting process.

3.6 Standard 6: Critical Areas

The Project Site is located in MassDEP Approved Zone II and in an area of rapid infiltration (greater than 2.4 inches/hour) and therefore is considered a Critical Area. The proposed stormwater best management practices (BMPs) will generally maintain the existing flow conditions at the Project Site and serve to treat stormwater discharges from new impervious areas associated with the Project. The appropriate setbacks from the wetlands and other resource areas have been incorporated into the design drawings. Long-term source control and pollution prevention measures are discussed in Section 9 and will be further detailed in the SWPPP.

3.7 Standard 7: Redevelopment

In accordance with Standard 7, the Project will comply with the other requirements of the Stormwater Management Standards and improve existing conditions.

3.8 Standard 8: Construction Period Controls

In accordance with Standard 8, a plan to control construction-related impacts will be developed by the BESS installation contractor in coordination with TRC to identify potential construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities. Land disturbance and construction activities will be implemented in a manner that limits off-site TSS transport through the installation of silt fencing and other necessary erosion control measures downgradient of the limit of disturbance. A Notice of Intent seeking permit coverage under a NPDES construction stormwater permit will be submitted to the Environmental Protection Agency prior to Project Site preparation and land disturbance. As a requirement of the NPDES permit, a SWPPP will be prepared to comply with the requirements of Standard 8. The SWPPP will address stormwater management activities necessary during land disturbance and construction, including source control and pollution prevention measures, BMPs to address erosion and sedimentation, stabilization measures, and procedures for operating and maintaining the BMPs. The SWPPP will also include a schedule for sequencing construction and stormwater management activities that minimize land disturbance and expedite restoration activities. The construction sequence will begin with the installation of sedimentation barriers, the construction entrance and any additional erosion and sediment BMPs. Once the temporary BMPs are in place, the installation of the BESS will commence. A temporary stabilized construction entrance will be installed at the Project Site entrance. Disturbed areas (if any) will be stabilized with straw mulch and seeded. After final stabilization has been achieved, temporary erosion and sediment control BMPs will be removed. Construction sequence and erosion and sediment control measures are discussed in Sections 7 and 8 and will be further detailed in the SWPPP.

3.9 Standard 9: Operation and Maintenance Plan

In accordance with Standard 9, a preliminary Stormwater Management System Long-Term Operation and Maintenance Plan to ensure that stormwater management systems function as designed has been prepared and can be found in **Attachment E**. The stormwater management system BMPs will be maintained by BWC Bogastow Brook, LLC. The proposed stormwater

features are located entirely on lands that are or will be under control of and will be maintained by BWC Bogastow Brook, LLC for the entire lifecycle of the Project. The plan will be finalized prior to operations.

3.10 Standard 10: Illicit Discharges to Drainage Systems

Stormwater management system operation and maintenance will be performed according to the Long-Term Operation and Maintenance Plan and all specified pollution prevention measures will be implemented as needed to prevent illicit discharges. In the post-development condition, stormwater will generally maintain the existing on-site flow conditions generated during 2, 10, and 100-year, 24-hour design storms, for all drainage areas. The BESS facility will be surrounded by fencing and access to the facility will be further limited by locked gates to limit the probability of illicit discharges to the Site stormwater BMPs. The Illicit Discharge Compliance Statement is provided in the Stormwater Management System Long-Term Operation and Maintenance Plan included as **Attachment E**.

4.0 Runoff Analysis

Stormwater runoff was estimated using HydroCAD, Version 10.0. HydroCAD software is based on methodologies developed by the United States Department of Agriculture Soil Conservation Service (USDA-SCS¹), namely *Urban Hydrology for Small Watersheds*, Technical Release 55 and Technical Release 20 (TR-55 and TR-20), in combination with other hydraulic and hydrologic calculations. Based on Site-specific information including subcatchment area and slopes, hydrologic soil groups (HSGs), land cover types, and rainfall data, the program estimates inflow and outflow hydrographs for each subcatchment and performs reach and pond routing calculations. The pre- and post-development runoff analysis calculations are provided in **Attachment C**.

The hydrologic analysis for this Project consists of delineating one subcatchment for both pre- and post-development conditions which contributes runoff to one analysis point. The subcatchment boundaries were determined from the existing and proposed contours. Runoff from the subcatchment was analyzed at the point of intersection of the respective longest hydrologic flow paths and either a subcatchment boundary, stormwater conveyance or Project Area boundary. The intent of the hydrologic analysis is to demonstrate that the changes in ground cover and grading resulting from the Project will not adversely affect downgradient properties or natural resources.

The Pre- and the Post-Development Drainage Plans for the proposed Project, SW1.00 and SW2.00 respectively, are included in **Attachment B**. Both plans include two-foot contours, land cover types, HSGs, subcatchment boundaries and analysis point, hydrologic flow lines, existing features, and drainage ways where applicable. The Post-Development Drainage Plans include the locations of the proposed gravel access drive, structures, and stormwater management features.

¹ Now known as the Natural Resource Conservation Service (NRCS)

4.1 Precipitation

Design storms modeled for the pre- and post-development runoff analyses are based on rainfall data information provided by the Northeast Regional Climate Center (NRCC) and the rainfall distribution type depicted in Figure B-2 of the NRCS TR-55 manual (June 1986). The precipitation events used in the runoff analyses are 24-hour duration having a Type III distribution with return periods of 2, 10, and 100 years. Rainfall depths for these events are 3.21, 4.81, and 8.61 inches respectively. Supporting documentation is provided in **Attachment C**.

4.2 Runoff Curve Numbers

A summary of the land cover types, HSGs, and runoff curve numbers (CNs) for the pre- and post-development subcatchments are provided in the stormwater calculation package in **Attachment C**. Cover types for the impacted areas were determined from the natural resource survey and publicly available aerial imagery.

Published NRCS soils data and mapping were used to support the hydrologic assessment. The HSGs within the runoff analysis area are shown on the Pre- and Post-Development Drainage Plans included in **Attachment B**.

The CNs were selected from HydroCAD software which incorporates a complete CN lookup table based on the data developed by the NRCS and published in TR-55, based on the observed cover types and HSGs.

4.3 Time of Concentration Calculations

Times of concentration were calculated using NRCS TR-55 methodologies considering the hydrologic flow lengths, slope, land cover type, and surface roughness. The type and length of each flow line segment determining travel times in the area to be developed are indicated on the Pre- and Post-Development Drainage Plans. A maximum sheet flow length of 50 feet was used for this analysis. Shallow concentrated flow was used for portions of the flow path beyond 50 feet extending until a channel, culvert, or subcatchment boundary was encountered. For each subcatchment, the travel times were summed to determine the time of concentration, which was then input directly into HydroCAD. The calculation spreadsheets are included in **Attachment C**.

5.0 Stormwater Runoff Quantity Control

5.1 Peak Discharge Calculations

Peak discharge calculations are included in the HydroCAD output. One analysis point was assessed under both pre- and post-development conditions. Results of the pre- and post-development runoff analyses are shown and compared in the table below.

Table 5.1. Pre- and Post-Development Stormwater Runoff Analysis

ANALYSIS POINT: DP-1				
DESIGN STORM	PRE-DEVELOPMENT		POST-DEVELOPMENT	
	RUNOFF VOL. (AF)	RUNOFF RATE (cfs)	RUNOFF VOL. (AF)	RUNOFF RATE (cfs)
2-Year, 24-hour	0.024	0.04	0.000	0.00
10-Year, 24-hour	0.202	0.90	0.077	0.28
100-Year, 24-hour	1.088	9.59	1.104	9.04

The analyses demonstrate that peak volumes and rates of runoff under post-development conditions are generally the same as those of pre-development conditions. The post-development analysis reflects a 0.016 AF increase in the 100-year storm event runoff volume. This increase is within the margin of error for stormwater modelling and is de minimis considering the overall size of the watershed. The pre- and post-development stormwater analyses are conservative as they do not account for the existing development stormwater detention features.

5.2 Stormwater Runoff Quantity Control Measures

As demonstrated above, post-development peak discharge rates are generally the same as pre-development peak discharge rates. One infiltration BMP is proposed to provide storage, attenuate peak discharges, exfiltrate the required recharge volume, and treat the required water quality volume. The plan showing these stormwater features is provided in **Attachment C**. Sizing of proposed ditching, culvert, and basin are also provided in **Attachment C**.

6.0 Stormwater Recharge and Runoff Quality Control

The proposed stormwater management system will be used to provide treatment for the water quality volume (WQV) and to maintain annual recharge to groundwater (recharge volume, RV). The treatment volumes were calculated for the BMP using the MassDEP design criteria and standards for stormwater management (Standards 3 and 4).

The annual recharge requirements and stormwater treatment will be met in post-development conditions by sizing the proposed stormwater management BMPs for the larger of the two volumes. Calculations for both standards are dependent on the impervious surfaces in post-development conditions.

Impervious surfaces associated with the proposed development, which are subject to the recharge to groundwater and stormwater treatment standards, consist of the gravel access drive with turnaround and aggregate surface within the BESS facility overlain by the 30 battery unit containers and four equipment pads. The total impervious area is 23,166 square feet.

6.1 Stormwater Recharge Volume Calculation

The intent of Standard 3 of the MassDEP Stormwater Handbook is to ensure that the infiltration volume of precipitation into the ground under post-development conditions is at least as much as

the infiltration volume under pre-development conditions. Published NRCS soils data and mapping were used to support the following calculations. NRCS soils data indicates that the soils within the area of the proposed impervious surfaces and infiltration BMP are characterized by Hinckley loamy sand (HSG A), Windsor loamy sand (HSG A), and Canton fine sandy loam (HSG A).

The Simple Dynamic Method, as outlined within the Massachusetts Stormwater Handbook, was used for the recharge volume calculation. Because the Simple Dynamic Method was employed, a field-derived saturated hydraulic conductivity was not established and the Rawls infiltration rate for HSG A soils was utilized.

Under post-development conditions, the total impervious area for the purposes of this assessment is 23,166 ft².

$$\text{Recharge Volume (RV)} = A_{\text{impervious}} * F_{\text{HSG A}}$$

$$A_{\text{impervious}} = 23,166 \text{ ft}^2$$

F = Target Depth Factor = 0.60 inches for HSG A soils per Table 2.3.2 of Stormwater handbook

$$RV = 23,166 \text{ ft}^2 * \frac{0.60 \text{ in}}{12 \frac{\text{in}}{\text{ft}}} = 1,158 \text{ ft}^3$$

6.2 Water Quality Volume Calculation

The below calculation is based on the requirements of Standard 4 of the MassDEP Stormwater Handbook. The required Water Quality Volume equals 1.0 inch of runoff times the total impervious area:

$$\text{Water Quality Volume (WQV)} = \left(\frac{WQD}{12 \frac{\text{in}}{\text{ft}}} \right) * A_{\text{impervious}}$$

$$A_{\text{impervious}} = 23,166 \text{ ft}^2$$

WQD = Water Quality Depth = 1 inch for discharges within a Zone II and exfiltration to soils with infiltration rate greater than 2.4 inches/hour per Equation (3) of the Stormwater handbook.

$$WQV = \left(\frac{1.0 \text{ in}}{12 \frac{\text{in}}{\text{ft}}} \right) * 23,166 \text{ ft}^2 = 1,931 \text{ ft}^3$$

WQV > RV, therefore WQV will be used in BMP sizing calculations.

6.3 BMP Sizing Calculation

Groundwater recharge and TSS removal will be provided by an infiltration BMP constructed downgradient of the proposed impervious surfaces. The Rawls rate for loamy sand (2.41 in/hr) was selected as a conservative infiltration rate for soils at the Project Site.

$$\text{Minimum Infiltration BMP Surface Area (A)} = \frac{WQV}{D_1 + D_2 * \text{Voids} + K * T}$$

WQV = Water Quality Volume = 1,931 ft³

D₁ = Proposed Basin Facility Depth = 1ft

D₂ = Proposed Infiltration Facility Depth = 2ft

K = Rawls Rate = 2.41 in/hr for HSG A, loamy sand per Table 2.3.3 of Stormwater handbook

T = Allowable drawdown during the peak of the storm = 2 hours per Stormwater handbook

$$A = \frac{1,931 \text{ ft}^3}{1\text{ft} + 2\text{ft} * 0.40 + \left(2.41 \frac{\text{in}}{\text{hr}}\right) \left(\frac{1\text{ft}}{12\text{in}}\right) * 2 \text{ hours}} = 877 \text{ ft}^2$$

The proposed infiltration BMP, as shown on the drawings, will have an area of approximately 1,460 ft² with a basin depth of 1'1" and infiltration trench depth of 2' for holding the WQV. Therefore, the BMP sizing is acceptable for design purposes.

An emergency spillway has been provided to manage flows from larger storm events. The estimated maximum flow velocities through the emergency spillway and into the existing vegetated downgradient area were calculated for post-development conditions for the full range of design flows up to a 100-year storm event. The calculated maximum velocities remain below the maximum permissible velocities for channels lined with vegetation, as provided in the U.S. Soil Conservation Service (SCS) 1966 *Handbook of Channel Design for Soil and Water Conservation*. The emergency spillway sizing calculations are included in the HydroCAD output in **Attachment C**.

6.4 BMP Drawdown Analysis

This analysis is performed to determine whether an infiltration BMP will drain within 72 hours. In accordance with the Simple Dynamic Method, the Rawls rate for loamy sand of 2.41 inches per hour was used to calculate the drawdown time of the proposed infiltration basin. For the purpose of the analysis, the infiltration rate was assumed to be constant and was only considered for the bottom surface. No credit is claimed for sidewall exfiltration.

$$\text{Time}_{\text{drawdown}} = \frac{WQV}{K * \text{Trench Bottom Area}} = \frac{1,931 \text{ ft}^3}{\left(2.41 \frac{\text{in}}{\text{hr}}\right) \left(\frac{1\text{ft}}{12\text{in}}\right) (1,460 \text{ ft}^2)} = 6.6 \text{ hrs}$$

6.6hrs < 72hrs; therefore, the result is satisfactory for design purposes.

6.5 Total Suspended Solids (TSS) Calculations

The intent of Standard 4 is to provide stormwater management systems designed to remove 80% of the average annual post-construction load of TSS. As described above, the proposed infiltration BMP was sized to provide treatment of the water quality volume and meet recharge requirements for the new development impervious areas. All of the stormwater runoff generated from the impervious areas will be directed to a stormwater pretreatment facility, followed by the infiltration

BMP which will provide 80% TSS removal. This removal efficiency is provided in Table TSS of Volume 1 of the Stormwater Handbook for an infiltration BMP combined with adequate pretreatment. With proper maintenance, as specified in the prepared Operation & Maintenance Plan, the proposed BMP will effectively remove 80% of the average annual TSS load for the life of the proposed BESS facility.

As the proposed infiltration BMP is located within an area of rapid infiltration (greater than 2.4 inches per hour) and within a Zone II, at least 44% of TSS is required to be removed in pretreatment prior to discharging to the infiltration BMP. As described above, all stormwater runoff from the new development impervious areas is directed to a pretreatment facility. The pretreatment facility consists of 2 sediment forebays which provides 44% of TSS removal, as provided in the TSS Removal Calculation Worksheet provided in **Attachment C**.

The required Treatment Volume for each sediment forebay equals 0.1 inch of runoff times the total impervious area:

$$\text{Treatment Volume} = \left(\frac{WQD}{12 \frac{\text{in}}{\text{ft}}} \right) * A_{\text{impervious}} = \left(\frac{0.1 \text{ in}}{12 \frac{\text{in}}{\text{ft}}} \right) * 23,166 \text{ ft}^2 = 193.1 \text{ ft}^3$$

Each sediment forebay, as shown on the drawings, will have a minimum treatment volume of greater than 193 ft³; therefore, the pretreatment facility sizing is acceptable for design purposes.

6.6 Soil Evaluation

NRCS soils mapping indicates that the entire project area is underlain by soils with a depth to seasonal high groundwater exceeding 80 inches below ground surface; therefore, sufficient separation is provided by the design.

Prior to construction and installation of the infiltration BMPs, a competent soils professional will complete confirmatory test pits to determine soil conditions and depth to groundwater at the location of the proposed impervious surfaces and adjacent infiltration BMP and to verify that the assumptions used for the above calculations were appropriate.

7.0 Construction Sequence

7.1 Project Schedule

The Project's construction will be approximately 4 months in duration. Initial work will involve tree clearing and installation of associated erosion control measures. Installation of additional erosion control and species protection measures will follow. Formal construction notice to proceed is tentatively scheduled to commence in spring 2023. As each discrete area of installation is completed, the ground surface will be stabilized, although temporary BMPs will remain in place until final stabilization occurs. Land preparation and site work is anticipated to continue through summer 2023, with the final installation of the BESS in summer 2023. Final site stabilization, testing, and commissioning is expected to be completed in fall 2023. Construction activities are expected to occur Monday through Saturday between the hours of 7:00 a.m. and 9:00 p.m. The

Contractor shall sequence construction in a manner to minimize the area of disturbance contributing to a discharge point. Temporary or permanent stabilization shall be implemented as soon as possible.

Additionally, specifics of how work is completed will be based on environmental considerations associated with seasonal changes. The following dates are provided to establish a general guideline for these seasons:

- Winter: November 1 to March 19
- Mud Season: March 20 to April 30
- Spring: May 1 to June 21
- Summer: June 22 to September 21
- Fall: September 22 to October 31

7.2 Project Construction Activities Sequence

1. Schedule a pre-construction meeting that shall be attended by the qualified inspector and any involved subcontractors to discuss responsibilities as they relate to the implementation of the measures detailed in this report to avoid and minimize impacts during construction. In particular, it shall be ensured that construction activities will be phased to limit the area of disturbance at one time and that erosion and sediment controls are maintained as needed until the Project Site is stabilized.
2. Install erosion and sediment controls for clearing activities.
3. Perform clearing and grubbing during allowable timeframes and only within the footprints of the proposed fenced-in facility, access drive, and for proper placement of temporary erosion and sediment control measures.
4. Install additional erosion and sediment controls around Project Area as detailed in the drawing set and additional measures as needed.
5. Delineate soil stockpile area and establish silt fence barrier around the perimeter.
6. Construct the permanent and temporary access drives and stormwater management system (i.e., roadside ditching and stormwater treatment BMPs).
7. Perform site grading for the BESS aggregate surface and to promote positive drainage.
8. Install BESS components.
9. Carry out grading work around equipment pad, and other structures as needed, to promote positive drainage.
10. Seed and mulch disturbed areas. Install additional stabilization measures as needed.
11. Remove temporary sediment controls only after disturbed surfaces are stabilized.

8.0 Erosion and Sediment Control Plan

The following measures were developed, and will be implemented into the SWPPP, based on good engineering practices, generally accepted industry standards, applicable MassDEP stormwater management requirements and guidelines, and established practices associated with the Project Site. These temporary and permanent erosion and sediment control measures will be implemented during and after construction to minimize soil erosion and control sediment transport off-site and to control the quality and quantity of stormwater runoff from the Project Area.

This plan and the drawing set specifies the construction schedule for implementing the erosion and sediment control measures, criteria for when the measures shall be implemented, specifications for placement and installation of the measures, and a maintenance schedule.

The contractor shall use the following general measures and practices throughout construction and development of the Project:

- Erosion and sedimentation control BMPs shall be implemented prior to commencing earth disturbing activities;
- Phase construction activities as practicable to minimize the area and duration bare soils are exposed;
- Route all construction traffic through approved points of access and egress and over stabilized construction entrances;
- Only areas of active construction shall remain unstabilized or unvegetated;
- Preserve existing vegetation as much as possible;
- Protect and maintain identified buffer areas throughout construction; and
- Continuously maintain and inspect installed BMPs.

Where construction activities have permanently ceased, stabilization and protection practices shall be implemented within 7 days. Areas that will remain disturbed but inactive for at least 30 days shall receive temporary seeding or soil protection within 7 days in accordance with this plan. Areas that will remain disturbed beyond the seeding season, which is normally April 1st through June 15th and August 15th through October 1st, shall receive long-term, non-vegetative stabilization and protection sufficient to protect the Project Site through the winter. Areas that will remain unvegetated for habitat enhancement will also utilize non-vegetative stabilization measures. In all cases, stabilization and protection measures shall be implemented as soon as possible.

8.1 Temporary Measures

The following temporary erosion control BMPs are proposed and/or are likely anticipated to be needed during construction and development of the Project.

8.1.1 Construction Entrance

As indicated on the civil design drawings, construction entrances will be required at each point of ingress/egress. These features will be of significant importance at intersections with paved roads with the purpose of trapping dust and mud that would otherwise be carried off-site by construction traffic. Construction entrances shall have a minimum length of 50 feet and an appropriate width

(minimum of 12 feet) to fully contain anticipated construction vehicles. Construction entrances shall be constructed of a 6-inch-thick layer of angular crushed stone sized according to the standards set by ASTM C-33, size No. 2 or 3, underlain by a geotextile fabric. Under extremely wet conditions or during the mud season, a standard construction entrance may not be sufficient to fully remove sediment from vehicle tires and prevent tracking. In these instances, a construction entrance may either be lengthened as necessary or a wheel washing procedure shall be employed. Stabilized construction entrances shall be inspected weekly and prior to and immediately following a major storm. Tracked mud or sediment shall be removed prior to the next rain event. Roads adjacent to a construction site shall be left clean at the end of each day. Periodic replacement of the stone material may be required as sediment accumulates and fills the voids.

8.1.2 Dust Control

Measures to control creation and migration of nuisance dust shall be implemented throughout construction. Off-site vehicle tracking of sediments and the generation of dust shall be minimized. Primary travel ways and laydown areas shall be surfaced with base gravel or coarse gravel as soon as possible to minimize the creation of dust. Traffic control shall be implemented to reduce speeds and restrict traffic. Frequently traveled surfaces shall be periodically watered to reduce dust. Wet dust suppression shall be used for any construction activity that causes airborne particulates. Water trucks may be used as needed during construction to reduce dust generated on the Project Area. Paved surfaces shall be vacuum swept when dry. The volume of water sprayed for controlling dust shall be minimized so as to prevent the runoff of water. No discharge of dust control water shall contain or cause a visible oil sheen, floating solids, visible discoloration, or foaming in the receiving stream.

8.1.3 Temporary Soil Stockpile

Stockpile management for topsoil and other types of erodible soils is necessary to prevent unnecessary damage resulting from erosion of stockpile material. Stockpiles shall be located in an area that is dry and stable and away from storm drainage, wetlands, water bodies and/or courses, and steep slopes. Attempt to maximize the distance of stockpiles from wetlands, watercourses, drainage ways, and steep slopes. When the stockpile is downgradient from a long slope, divert runoff water away from or around the stockpile utilizing a temporary diversion berm or swale. Stockpiles shall have a maximum slope of 2H:1V and be completely surrounded by perimeter sediment barriers (i.e., silt fence, filter socks, etc.). Stockpiles that are not to be used within 30 days must be seeded and mulched immediately after formation of the stockpile. The seed mix used depends upon the stockpiled material and the length of time it is to remain stockpiled. After the stockpile has been removed, the area shall be graded and permanently stabilized.

8.1.4 Hay Bale Barrier

Hay bales can be used to create a temporary sediment barrier consisting of a row of entrenched and anchored bales of hay or straw. Hay bales are suitable for use below small disturbed areas where the drainage area (disturbed and undisturbed) is less than 1 acre in size or above disturbed slopes to direct surface water away from erodible areas where the drainage area (disturbed and undisturbed) is less than 1 acre in size. Hay bales are also appropriate for use where protection and effectiveness are required for less than 3 months, and where sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas, watercourses and other

sensitive areas. Hay bales must not be used in drainageways, except in special cases where they are applied with other measures, such as geotextile silt fences and stone check dams. Hay bales are not intended for use in streams. When installed, hay bales should be entrenched a minimum of 4 inches and anchored with 2 stakes per bale. Gaps between adjacent bales should be chinked with straw to prevent flow between the bales. Over time, hay bales will degrade and deteriorate and will require frequent inspection and periodic replacement. Due to their versatility and ability for rapid deployment during an emergency situation, it is recommended that a supply of hay bales be maintained on the Project Site at all times.

8.1.5 Silt Fence

Silt fence is a temporary sediment barrier consisting of a geotextile fabric pulled taut and attached to supporting posts and entrenched. The purpose of a geotextile silt fence is to intercept and retain sediment from disturbed areas and to decrease the velocity of sheet flows and low volume concentrated flows. Prior to the initiation of and during construction activities, a geotextile silt fence will be established along the perimeter of areas to be disturbed as a result of the construction that lies upgradient of water courses or adjacent properties. These barriers may extend into non-impact areas to ensure adequate protection of adjacent lands. Clearing and grubbing shall be performed only as necessary for the installation of the sediment control barrier. Silt fence shall be installed in an alignment that follows the contour as much as practicable. To ensure effectiveness of the sediment control barrier, daily inspections and inspections immediately after significant storm events will be performed by Project Site personnel. Inspect the silt fence at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Remove the sediment deposits or, if room allows, install a secondary silt fence up slope of the existing fence when sediment deposits reach approximately one half the height of the existing fence. Replace or repair the fence within 24 hours of observed failure. Maintain the fence until the contributing area is stabilized. After the contributing area is stabilized, determine if sediment contained by the fence requires removal or regrading and stabilization. If the depth is greater than or equal to 6 inches, regrading or removal of the accumulated sediment is required. No removal or regrading is required if sediment depth is less than 6 inches.

8.1.6 Erosion Control Mix

Erosion control mix (ECM) mulch may be utilized to stabilize slopes, frozen ground, forested areas, or to provide immediate stabilization without waiting for vegetation to establish. ECM shall be placed at a minimum thickness of 2 inches on slopes of 3H:1V or flatter. Slopes steeper than 3H:1V require a minimum of 4 inches. ECM shall be evenly distributed by hand, excavator bucket, or pneumatic blower. ECM alone is not suitable in areas of groundwater seepage, converging flows, or low-lying areas where ponding is expected. ECM may be produced from stumpage and rootballs generated during clearing and grubbing activities.

8.1.7 Erosion Control Mix Berms

Erosion control mix berms shall be lightly compacted or bucket-tamped to minimize large voids within the filter media. Berms shall be a minimum of 12-inches tall and 2 feet wide. The condition of ECM berms shall be continuously monitored throughout construction and replaced or repaired as necessary.

8.1.8 Compost Filter Sock

Compost filter sock (also referred to as “Silt Sock”) can be purchased from a commercial manufacturer or field-built from nonwoven geotextile fabric and processed ECM or other finely shredded material (i.e., coconut fiber, etc.). Compost filter sock can be a useful sediment barrier for small drainage areas or where trenching for silt fence is not possible (i.e., pavement). Compost filter socks shall be installed so that complete contact with the ground is achieved across the entire length. Staking will be necessary on steeper slopes. Once stabilization is achieved compost filter socks can be cut open and the filter material can be spread in place.

8.1.9 Temporary Mulching

Temporary mulching shall be applied to areas not yet prepared for permanent stabilization but that have been or shall be inactive for a maximum of 7 days. Temporary mulching shall consist of spreading straw mulch or erosion control mix across bare soil. Erosion control blankets or other methods may be substituted for areas where temporary mulching has proven to be ineffective. Areas of temporary mulching shall be inspected weekly and before and after significant storm events (greater than 0.5 inches in 24 hours). Temporary mulch application rates shall be doubled from November 1 through April 15.

8.1.10 Temporary Seeding

In areas where soil disturbance activity has temporarily or permanently ceased, a temporary stand of grass and/or legumes by seeding and mulching soils shall be established on those areas that will be exposed for a period greater than 1 month but less than 12 months. Seeding shall commence within the first 7 days of suspending work on a grading operation that exposes erodible soils where such suspension is expected to last for 1 to 12 months. Permanent seeding shall be used in areas to be left dormant for more than 1 year.

8.1.11 Temporary Erosion Control Blankets

Erosion control blankets shall be installed on all slopes exceeding 3H:1V. Erosion control blankets provide temporary erosion protection, rapid vegetative establishment, and long-term erosion resistance to shear stresses produced by high runoff flow velocities associated with steep slopes. Care must be taken to choose the type of blanket that is appropriate for the specific application. The success of temporary erosion control blankets is dependent upon strict adherence to the manufacturer’s installation recommendations.

8.1.12 Temporary Diversions

Temporary diversions (swales) shall be used to divert off-site runoff around the construction site, divert runoff from stabilized areas around disturbed areas, and direct runoff from disturbed areas into sediment traps. Temporary diversions shall be used where the drainage area at the point of discharge is 5 acres or less.

8.1.13 Stone Check Dams

Stone check dams may be necessary in existing or proposed upland swales and ditches to reduce flow velocity and promote sedimentation prior to final discharge of runoff. Reduction in flow

velocity will serve to reduce rilling in flow paths and promote establishment of vegetation. Check dams shall be spaced so that the top of the downgradient check dam is at the same elevation as the toe of the preceding check dam. Stone check dams shall be inspected at least once a week and within 24-hours of a storm event with a rainfall amount of 0.5 inches or greater. Damage shall be repaired upon discovery. If significant erosion has occurred between structures, a liner of stone or other suitable material shall be installed in that portion of the channel. Sediment accumulated behind the stone check dam shall be removed when sediment deposits reach approximately half the height of the check dam. Stones shall be replaced as needed to maintain the design cross section of the structures. The maximum height at the center of the check dam shall be 3 feet.

8.1.14 Dewatering

Dewatering shall be used, as necessary, to intercept sediment-laden stormwater or pumped groundwater and allow it to settle out of the pumped discharge prior to being discharged from the Project Site. Water from dewatering operations shall be treated to eliminate the discharge of sediment and other pollutants. Water resulting from dewatering operations shall be directed to temporary sediment traps, or dewatering devices, such as a Dewatering Bag or an approved equivalent. Temporary sediment traps and dewatering bags shall be provided, installed, and maintained on upland locations. No discharge of dewatering wastewater(s) shall contain or cause a visible oil sheen, floating solids, or foaming in the receiving water.

8.2 Permanent Measures

The following permanent erosion control BMPs are proposed to be used during construction and shall remain in-place after Project completion and be maintained throughout operation of the facility.

8.2.1 Permanent Seeding

Disturbed areas that will be vegetated must be seeded in accordance with the civil design drawing set. The type of seed, mulch, and maintenance measures are described in the drawings. Do not use permanent seeding on slopes steeper than 2H:1V. All areas at final grade must be seeded and mulched within 7 days after completion of construction activities. All seeded areas should be protected with mulch. Inspect seeded area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater during the first growing season. In the event seed does not grow, re-seed and re-mulch. If the cause was the result of wind, re-apply seed and mulch, and apply mulch anchoring. If the cause was concentrated water, install additional measures to control water and sediment movement, repair erosion damage, re-seed and re-apply mulch with anchoring or use Temporary Erosion Control Blanket measure and/or Permanent Turf Reinforcement Mat measure. If there is no erosion, but seed survival is less than 100 plants per square foot after 4 weeks of growth, re-seed as planting season allows. Continue inspections until at least 100 plants per square foot have grown at least 6 inches tall or until the first mowing.

8.2.2 Permanent Turf Reinforcement

Permanent turf reinforcement mats (TRMs) provide long-term erosion protection and vegetation establishment assistance while permanently reinforcing vegetation. TRMs shall be installed on all slopes exceeding 3H:1V and in channels where design flows exceed the stability of the soils

and/or proposed vegetation. Care must be taken to choose the type of turf reinforcement that is appropriate for the specific application. Success is dependent upon strict adherence to the manufacturer's installation recommendations.

Care must be taken to choose the type of blanket that is appropriate for the specific application. The success of temporary erosion control blankets is dependent upon strict adherence to the manufacturer's installation recommendations.

8.2.3 Gravel Drives

Drives shall be constructed with a crown or super-elevated as indicated on the design drawings to ensure runoff is delivered immediately to adjacent stabilized areas. Roadways shall be aligned in general conformance with those shown on the design drawings and constructed of specified aggregate base and subbase materials. At a minimum, permeable road base (rock sandwich) shall be constructed in sections of the drive indicated in the civil design drawing set; however, additional sections may be added dependent on encountered site conditions. Roadways shall be inspected for rutting, washboarding, and other signs of erosion. Installation of water bars, french drains, or other features may be necessary depending on conditions observed in the field and as directed by the Engineer during construction.

8.2.4 Rip Rap Swales

Rip rap swales shall be constructed to manage runoff along the proposed access drive where indicated on the civil design plans. Swales shall be trapezoidal in shape with a minimum bottom width of 2 feet and maximum side slopes of 2H:1V. Rip rap stabilization shall be installed as soon as swale has been shaped. Swales shall be inspected for failures following heavy rainfall and repaired as necessary to mitigate newly formed channels or gullies. Bare spots or displaced rip rap should be corrected where identified. Trash, leaves, and/or accumulated sediments should be removed and woody or other undesirable growth should be controlled. Temporary or permanent checkdams may be necessary depending on conditions observed in the field and as directed by the Engineer during construction.

8.2.5 Stormwater Pretreatment Facility and Infiltration BMP

Two sediment forebays and infiltration BMP (infiltration basin with infiltration trench) shall be constructed in accordance with the design drawings to provide adequate stormwater recharge and water quality treatment. During construction, the location for these BMPs shall be isolated to prevent heavy equipment from compacting the soil and adversely affecting the performance of the BMPs. Diversion berms or staked and lined hay bales around the perimeter of the basin shall be implemented during their construction. Light earth-moving equipment shall be used to excavate the basin and excavated materials should be placed downstream of the BMPs. Drainage shall be diverted away from these BMPs until the contributing drainage area is fully stabilized.

8.3 Erosion Control Measure Removal

The removal and disposal of erosion and sedimentation control measures shall be the responsibility of the Contractor. BMPs shall remain in-place until a minimum of 90% cover of vegetation has been achieved or other permanent measures of stabilization are installed (i.e., rip rap, ECM, etc.). Sediment trapped in front of perimeter sediment barriers shall be spread within

an area undergoing final grading and distributed in a uniform manner conforming to local topography, and then seeded and mulched. Erosion control berms and compost filter socks may be demolished, and the erosion control mix filter media may be evenly distributed across the adjacent areas.

8.4 Overwinter Construction

The following general practices and procedures should be utilized during any construction occurring over the winter season and through April 15:

- Exposed areas should be limited to those where work will occur within the next 14 calendar days;
- Exposed areas should not exceed the limit of what can be mulched in one day (prior to predicted precipitation);
- At the end of each construction day, areas that have been brought to final grade must be stabilized; Where frozen ground prevents installation of silt fence or ground penetrating sediment barriers, the Contractor shall request an appropriate detail modification from the Engineer;
- Permanent seeding shall not be attempted, unless a dormant seeding application method is approved by the Engineer;
- All areas within 75 feet of a protected natural resource must be protected with a double row of sediment barriers; and
- All vegetated ditch lines that have not been stabilized by November 1, or will be worked on between November 1 and April 15, must be stabilized with stone lining backed by gravel bed or geotextile as specified by the Engineer.

8.5 Housekeeping

As an authorized agent of the Applicant, the Contractor shall maintain the Project Site in accordance with the following performance standards and housekeeping practices:

Spill Prevention: Controls shall be in place to prevent pollutants from being discharged from materials used and stored on-site. Appropriate controls include, but are not limited to, proper storage practices that minimize exposure of materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.

Groundwater Protection: During construction, the Contractor may not store or handle liquid petroleum products and other hazardous materials with the potential to contaminate groundwater in areas of the Project Site draining to an infiltration area or within 100 feet of a critical resource area or stream. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the Project Site for the purposes of storing and handling liquid hazardous materials.

Fugitive Sediment and Dust: During construction, the Contractor shall take the necessary actions to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive. Oil may not be used for dust control. The Contractor shall monitor vehicles entering and exiting the Project Site for evidence of tracking mud onto public or private roadways outside the

work area. If necessary, the Contractor shall provide a means for sweeping and cleaning road areas experiencing tracking. If off-site tracking occurs on public roads, they should be swept immediately and no less than once a week and prior to significant storm events. During the mud season, it may be necessary to increase the size of stabilized construction entrances or provide a wheel washing station.

Debris and Other Materials: The Contractor shall manage litter, construction debris, and construction chemicals exposed to stormwater to prevent materials from becoming a source of pollution.

Non-Stormwater Discharges: The Contractor shall identify and prevent contamination by unauthorized non-stormwater discharges. Unauthorized stormwater discharges include, but are not limited to, wastewater from concrete washout, fuels or hazardous substances, and detergents used in vehicle and equipment washing.

8.6 Inspection and Maintenance

The Contractor shall bear the responsibility of installation, maintenance, and day-to-day monitoring, repair, and replacement of erosion and sedimentation control measures throughout the entire duration of the Project. It is the responsibility of the Contractor to ensure installed measures are effective and functioning as designed. Inspections may indicate additional or more substantive measures are required.

At a minimum, inspections shall be conducted weekly and within 24 hours of a significant rain event (greater than 0.5 inches in 24 hours). Inspections shall be documented in site inspection reports that are kept on the Project Site at all times. An example inspection report template is provided as **Attachment D**. A copy of the site inspection reports shall be retained by BWC Bogastow Brook, LLC for a period of at least three years from the completion of permanent stabilization.

Presence of a third-party inspector does not relieve the Contractor of inspection and reporting responsibilities.

8.7 Erosion and Sedimentation Control Conclusion

In the event that a situation arises that is not specified above or depicted on the civil design drawings, the Contractor shall follow the guidance of “Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas” (Rev. May 2003) and the Volume 2 Chapter 2 of the Stormwater Handbook. If the Project is phased and constructed in accordance with the specifications and requirements of the civil design drawings and basic standards listed above, the Project will not result in significant erosion or sedimentation.

9.0 Post-Construction Stormwater Maintenance Plan

The Project will be owned, operated, and maintained solely by BWC Bogastow Brook, LLC. During construction, the Project Site will be periodically inspected by a qualified engineer or professional (PE, CPESC, or similar specialist) to ensure the work is being conducted in

accordance with the civil design drawings and the erosion and sedimentation control plan, and that applicable features are functioning as designed. Once permanent stabilization is achieved, the Project will be operated by a qualified maintenance representative who will be responsible for inspection and maintenance of the entire grounds and stormwater management features. The following maintenance requirements are provided in the Stormwater Management System Long-Term Operation and Maintenance Plan included as **Attachment E**.

9.1 Facilities to be Maintained

The stormwater management features to be maintained at the Project include:

- Access Drive;
- Stormwater Pretreatment Facility and Infiltration BMP;
- Rip rap Swales; and
- Revegetated Areas and Embankments.

9.2 General Inspection and Maintenance Requirements

Generally, the proposed facility will be operated and maintained in a manner consistent with good utility practices, including a minimum of bi-annual on-site inspections and maintenance of stormwater management system components, as needed. A post-construction maintenance and inspection log will be completed as part of the quarterly on-site inspections, refer to **Attachment D** for a template of this inspection log. A copy of the log shall be retained by BWC Bogastow Brook, LLC for a period of at least five years from the completion of permanent stabilization.

Potential maintenance activities associated with specific areas and stormwater management features at the facility are discussed in the following paragraphs.

9.3 Access Drive

The access drive will typically require little ongoing maintenance, owing to their primary and limited use by light-duty vehicles. These areas will be inspected for signs of existing or developing erosion, rutting, trash or unwanted vegetation which will be removed/repared as needed. Additionally, shoulders shall be inspected for low spots or evidence of channelized flow and false ditching. Repair/maintenance shall be completed as necessary to ensure runoff from the roadways is conveyed as sheet flow to the downgradient stabilized areas.

9.4 Stormwater Pretreatment Facility and Infiltration BMP

The two sediment forebays and infiltration BMP (including associated emergency spillways, outlet structures, culverts, outlet protection and plunge pools) shall be inspected periodically, at least twice a year and after major rain events. They will be inspected for evidence of erosion, sediment accumulation, outlet structure obstructions, debris, or other conditions that may present operational difficulties. Overall condition of the culvert barrel sections shall be assessed for signs of damage, heaving, settlement, deflection, or other structural damage. BMPs shall be cleaned, as needed, by removing accumulated sediment, trash, debris, leaves, grass clippings from mowing, and tree seedlings before they become firmly established. The sediment forebays shall have sediment markers to determine the height of sediment accumulation. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding.

When mowing grasses in the sediment forebays, keep the grass height no greater than 6 inches and set mower blades no lower than 3 to 4 inches. Mowing of the infiltration basin will be limited to twice per year to ensure a healthy grass cover is present. Weeding, pruning, and removal of woody growth on basin embankments shall be completed as necessary.

If there is water ponding on the surface of the infiltration trench, even after removal of visible sediment and debris, the sand filter material shall be replaced. If there is water ponding inside the basin as observed in the observation well (even after a 72-hour drawdown period following a storm), it may be an indication that the bottom of the basin has failed. To rehabilitate the basin, all accumulated sediment must be stripped from the bottom, the bottom of the basin must be scarified and tilled to induce infiltration, and all stone aggregate and filter fabric must be removed and replaced.

9.5 Rip Rap Swales

Swale shall be inspected in the spring and fall of each year and following major storm events (25-year 24-hour storms). Swales shall be inspected for signs of failure including but not limited to evidence of erosion, newly formed channels or gullies, bare spots, and sediment accumulation. Bare spots should be re-stabilized as soon as practicable. Woody vegetation within the banks or flow path of the ditch shall be controlled. Sediment, leaf litter, sand from winter operations, etc. shall be removed from ditches when it reduces the capacity of the channel. Addition of stone checkdams to reduce velocity may be necessary following maintenance or repair activities.

9.6 Revegetated Areas and Embankments

Revegetated areas and embankments will be inspected quarterly. Any signs of erosion or inadequate revegetation of these areas will be corrected as needed.

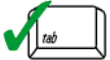
Attachment A: Massachusetts Checklist for Stormwater Report



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

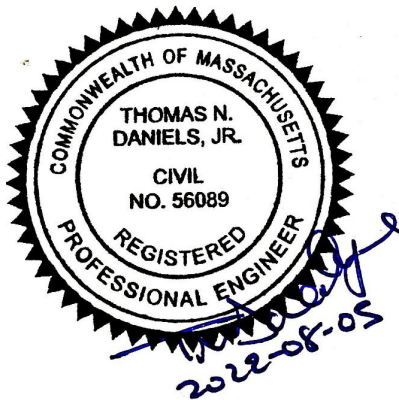
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

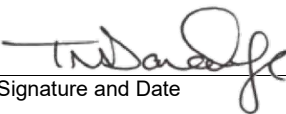
A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature




Signature and Date

August 4, 2022

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☒ New development
- ☐ Redevelopment
- ☐ Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
 - ☐ Credit 1
 - ☐ Credit 2
 - ☐ Credit 3
- ☐ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☒ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - ☐ Static
 - ☒ Simple Dynamic
 - ☐ Dynamic Field¹
- ☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- ☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☒ is within the Zone II or Interim Wellhead Protection Area
 - ☐ is near or to other critical areas
 - ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the proprietary BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☒ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☒ Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - ☐ Limited Project
 - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
 - ☐ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☐ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☒ Description and delineation of public safety features;
 - ☐ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☒ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☒ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☒ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☐ An Illicit Discharge Compliance Statement is attached;
- ☒ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.