



ENGINEERING,
INC.

ENGINEERS
SURVEYORS

August 18, 2021

Attn: Mr. Kenneth Buckland, Director of Planning and Economic Development
Town of Wareham Planning Board
54 Marion Road
Wareham, MA 02571

Re: Site Plan Review – Ground Mounted Solar Energy Facility
LSE Hydra, LLC
Map 104 Lots 1046, V/B 36, 44, 48
North Carver Road, Wareham, MA
G.A.F. Job No.: 20-9568

Dear Planning Board Members,

G.A.F. Engineering, Inc., on behalf of our client LSE Hydra, LLC, hereby submits the following materials which comprise our application for Site Plan Review.

- Site Development Plans dated August 16, 2021 (14 sets).
- Stormwater Report dated August 16, 2021 (2 copies).
- Site Plan Review Application (14 copies).
 - Project Narrative and Impact Assessment Report.
 - 300' Certified Abutters list.
 - Tax Verification Form.
 - Site Plan Review Checklist.
 - Solar Facility documents, including:
 - Modules, ESS, Racking and Inverter Specifications
 - Utility Notification (Interconnection Service Agreement)
 - Single Line Diagram
 - Operations and Maintenance Plan
 - Decommissioning Plan
- Filing fee of seven hundred fifty dollars (\$750.00)
- Advertising fee of one hundred dollars (\$100.00)
- Abutter notification fee of sixty-five dollars and eighty-eight cents (\$65.88)

This project consists of the construction of a ground mounted solar energy generation facility on a 9.7 Acre portion of the above referenced properties. The project has been designed in compliance with the applicable sections of the Wareham Zoning By-Laws.

Please contact me directly if you have any questions.

Sincerely,

Robert J. Rogers
Project Manager

cc: LSE Hydra, LLC
Town Clerk

266 MAIN ST.
WAREHAM, MA 02571

TEL 508.295.6600
FAX 508.295.6634

APPLICATION FOR SITE PLAN REVIEW

Applicant: Name: LSE Hydra LLC

Mailing Address: 40 Tower Lane, Suite 201, Avon, CT 06001

Telephone: 307-231-1509

Project: Street & Number: 36, 44, 48 North Carver Road

Assessor's Map: 104 Lot(s): 1046, V/B, V/C

Dwelling Units #: N/A

Parking Spaces #: 2 at equipment pad

Acres: 9.7± Square feet commercial space: N/A

Briefly describe project: The project consists of the construction of a 990 kW/AC ground mounted solar photovoltaic electric generating facility.

Date: August 17th, 2021

Signature of Applicant: 

***Signature of approval needed from Treasurer-Collector prior to processing application**

Treasurer-Collector: _____ Date: _____

Town of Wareham

APPLICANT/CONTRACTOR/REPRESENTATIVE INFORMATION SHEET

Check One: Variance Special Permit Site Plan Appeal

Date stamped in: _____ Date decision is due: _____

Applicant's Name: LSE Hydra, LLC

Applicant's Address: 40 Tower Lane, Suite 201, Avon, CT 06001

Telephone Number: Eric Crisler: 307-231-1509

Cell Phone Number: 307-231-1509

Email Address: eric@enteroenergy.com

Address of Property/Project: 36, 44, 48 North Carver Road

Landowner's Name: Linda Rinta

Owner's Address: 34 North Carver Road, W. Wareham, MA 02576

Telephone Number: c/o GAF Engineering, Inc. 508-295-6600

Contact Person: Bob Rogers-GAF Engineering, Inc. Telephone Number: 508-295-6600

Map 104 Lots 1046, V/B, V/C Zone Residence 60 (R-60)

Date Approved _____ Date Denied _____

Comments: _____



ENGINEERING,
INC.



ENGINEERS
SURVEYORS

Project Narrative & Impact Assessment Report

For

“Ground Mounted Solar Energy Generation Facility”

36, 44, 48 North Carver Road
W. Wareham, MA

Prepared for

LSE Hydra, LLC
40 Tower Lane, Suite 201
Avon, CT 06001

Prepared by

G.A.F. Engineering, Inc.
266 Main Street
Wareham, MA 02571

266 MAIN ST.
WAREHAM, MA 02571

TEL 508.295.6600
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August 16, 2021
G.A.F. Job No.: 20-9568

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Project History

LSE Hydra entered into an option agreement with Linda and Andrew Rinta on April 18, 2018 to lease a portion of the site needed for solar, with the remainder to remain as part of the existing farming operations. The Project will comprise 3 separate array areas which will be electrically interconnected and tie-in to a single interconnection point to the Eversource circuit adjacent to the property. The areas to be used for the solar facility were selected with careful consideration of the past and current uses of the land, surrounding environmental features, and integration with the existing and future operation of the farm. The first, northernmost array area is approximately 2.5± acres of previously wooded land containing mature white pine and oak trees, many of which were suffering from gypsy moth damage. The second site is a 2.7± acre upland cranberry bog that has been historically unproductive. The third, southernmost is a 4.5± acre decommissioned U-pick blueberry patch. The blueberry patch was closed due to the introduction of an insect pest, the spotted wing drosophilae, which required pesticides that could not be used with the patch open to the public.

Along with generating clean electricity for the community and lease income for the landowners, the solar facility will provide the development necessary to rejuvenate the property from an agricultural standpoint as the array areas will incorporate farming operation within the ground mounted solar arrays. The landowner will be able to expand their current operation of growing beachgrass to sell for shoreline restoration by planting between the rows of solar panels. Additionally, the landowner will use the land beneath the panel for an apiary and pollinator habits by maintaining shade resistant early successional growth and bee forage mixes within the solar arrays. This will bring much needed pollination to the landowner's and neighboring cranberry bogs. Both beachgrass and pollinator habitats will require little to no pesticides, herbicides, or other harmful chemicals.

Project Site

The project site is located at 36, 44, 48 North Carver Road in West Wareham and is further shown as Lots 1046, V/B, & V/C on Assessors Map 104. The total land area is approximately 47.7 acres. North Carver Road is on the westerly side of the property and the Weweantic River is the easterly boundary.

The property has been utilized for agriculture for many years primarily for the cultivation of cranberries. Portions of the property have also been used to grow blueberries and beachgrass.

There is a metal building on Lot V/B used for equipment maintenance and storage. There are several pump houses for use in flooding and fertigating the bogs.

Currently the land contains a combination of active cranberry bogs, abandoned cranberry bogs, and an abandoned blueberry field. The solar arrays are proposed to

be constructed within the abandoned areas allowing continued harvesting of the productive bogs and providing financial support to the overall operation.

Project Description

This project consists of the construction of a 990 kW/AC ground mounted solar photovoltaic installation consisting of rows of solar panels mounted on a racking system within a perimeter security fence.

All disturbed areas will be seeded with a pollinator seed mix to stabilize soils. The planned vegetation in the array is a meadow which is typically seeded with a pollinator friendly wildflower and low-height grass mix. Local species will be used, and no invasive species will be included. No pesticides or chemicals of any kind will be used to manage the meadow. The project maintains a 50 ft non-disturbance buffer from any wetlands and a 100 ft vegetated buffer from the river high water mark.

The proposed activities associated with the proposed Project do not involve the withdrawal of water, nor the storage or use of oil or hazardous materials (other than what is present in the construction equipment). Thus, the proposed Project is not anticipated to have an impact on any surrounding drinking water supplies.

The Project's location is ideally situated for construction access, as there are existing access roads onto the site that are already trafficked by farm vehicles. Expected construction timeframe is 4-5 months, during which time construction vehicles will enter and exit the property on most weekdays. Approximately 15-20 tractor-trailer trips will be needed for equipment delivery. Post-construction, traffic will only consist of light-duty pick-up trucks for electric and vegetative maintenance 3-4 times per year. The Project will be permanently accessed via an improved driveway off North Carver Road.

The electricity generated at the Site will be transferred via a combination of underground conduits and poles with overhead wires to connect to the existing distribution lines to the N Carver Rd. The Project's delivery of electricity will support renewable energy development that is context-sensitive and increasing resiliency of energy generation and delivery. Solar naturally produces power at the times of higher system demand during warm summer months. The battery system can handle large output adjustments, allowing it to stabilize the frequency of the local distribution network in the event of a spike or sudden dip in demand. The project will participate in the Community Solar program, which allows households and small commercial businesses in the same utility territory to benefit from the project through electricity-bill savings. This will allow the Project to benefit town residents who do not have access to roof-top solar.

Project equipment is expected to consist of 8 SunGrow SG125HV inverters, approximately 4,700 solar panels, and a fixed-tilt racking system from RBI Solar. The Project will also include an energy storage facility to ensure greater grid reliability. The solar panels will be mounted on racks supported by galvanized steel piles that are driven into the ground. Other work associated with the construction of the solar arrays will include creation of an interior gravel access road, installation of utility pads, associated electrical equipment, electrical conduit, conduit supports, electrical poles, overhead wire, and security fencing.

Proposed grading is limited to the installation of the gravel access roads and for the establishment of two drainage areas in the northernmost array. A detailed description of the basins and the project's compliance with the applicable regulations is provided in the Stormwater Report.

Environmental Impact Statement - Impacts and Mitigation

Town Services

There is no anticipated increase in demand for municipal services associated with the solar energy facility. The project will create construction phase jobs and increase tax revenue to the Town of Wareham.

Mitigation: None required.

Water System

This project does not require municipal water for its operation and maintenance.

Mitigation: None required.

Sanitary Sewer System

Similar to the above water usage, the facility will not require on-site personnel other than for routine maintenance therefore no sanitary sewage system is needed.

Mitigation: None required.

Parks and Recreation

The proposed use does not create new residential dwelling units. There is no need for additional parks or recreation areas at this location.

Mitigation: None required.

Police Protection

This project will be constructed with a seven-foot tall security fence around the perimeter of each solar array. The landowner will continue to manage the productive cranberry bogs and utilize the solar arrays to grow beach grass between the rows. These activities will supplement the monitoring of the facility performed by the maintenance contractor. Police involvement will be limited to construction phase details, if necessary, during the installation of access drives in North Carver Road.

Mitigation: None required.

Fire Protection

This project includes battery storage and is therefore required to comply with 527 CMR 1.00 the Massachusetts Comprehensive Fire Safety Code. Chapter 52 is

specific to battery storage units. Twenty-foot wide gravel roads are proposed to provide access within and around the arrays for emergency services. Turning movement templates indicate that the roads allow a large fire truck to maneuver around the facility without damaging the panels or security fence. Gates with lock boxes are being provided at locations requested by the Fire Department. There will be signage provided to direct emergency personnel on the means to turn off the power if necessary. The Fire Dept. will receive training from the facility owner once the facility is completed and prior to full operation.

Mitigation: None required.

Schools

The proposed use will not generate additional demands on the school department as no new school age children will be introduced as a result of this project.

Mitigation: None required.

Traffic

Traffic impacts from this project will be limited to the construction phase which will last approximately 3-4 months. Construction vehicles will access the site from North Carver Road utilizing the two northernmost entrances. The third southernmost entrance to the blueberry field will be gated to prevent use during construction. Once construction is completed traffic will be limited to inspections and maintenance which will occur only once or twice a month.

Mitigation: None required.

Ecology of the Site

Land

This property has been in agricultural use for many years. The land contains a mixture of active cranberry bogs, abandoned cranberry bogs, an abandoned blueberry field, and areas where beach grass is cultivated. The owner is proposing to construct a ground mounted solar energy generation facility within unproductive areas which will provide clean energy, create construction phase jobs, and generate long term revenue for the owner and Town. The arrays will occupy only 20% of the total acreage.

Mitigation: None required.

Surface Water

This property is located adjacent to the west side of the Weweantic River and the wetlands that border the river. Currently there are several pump houses which are used to flood the bogs for picking in the fall and sanding in the winter. There is an irrigation system for watering and fertigating the productive bogs. Surface water is controlled by a series of bog ditches, culverts, and flumes. This project will not change surface water flow patterns nor will it create impervious surfaces which would require water quality volume mitigation. Stormwater runoff characteristics within the abandoned cranberry bog and blueberry field will not be altered. At the northernmost array two basin areas will be constructed to capture and infiltrate runoff in order to mitigate the potential increase in runoff due to the addition of the gravel roads.

Mitigation: No additional mitigation required.

Groundwater

The depth to seasonal high groundwater at this site varies from 0 to 2 feet due to the location proximate to the Weweantic River and the necessity to pump and hold surface water on the active cranberry bogs during picking season and winter sanding operations. The solar arrays are located on portions of the property where agricultural activities have been abandoned. The proximity to groundwater creates an opportunity to plant a wildflower meadow and grow beach grass between the rows of panels. Both beach grass and pollinator habitats will require little to no pesticides, herbicides, or other harmful chemicals. The project occupies only 20% of the total acreage with only 900 square feet of impervious surface. This project does not negatively impact groundwater recharge and does not include any components which require pre-treatment prior to discharge to groundwater.

Mitigation: No additional mitigation required.

Air Quality

Minimal impact due to construction phase vehicle emissions and dust from site clearing and grading activities and vehicles driving on the gravel access road, which are temporary in nature. Watering for dust control will be a requirement of the projects EPA construction phase Stormwater Pollution Prevention Plan. No long-term air quality impacts will result from this project.

Mitigation: None required.

Noise

Once constructed, noise from the facility is limited to the transformer which is centrally located approximately 300 feet east of North Carver Road. There are very few homes in this section of West Wareham. The closest home to the proposed

transformer is that of the owner at 34 North Carver Road. The transformer noise is comparable to an outdoor residential air conditioning unit. This will not be heard over the traffic noise from Route 495 and North Carver Road. Construction noise will be temporary and limited to the days and hours as stipulated by the permitting authority.

Mitigation: No additional mitigation required.

Wetlands

This property contains bordering vegetated wetlands associated with the Weweantic River to the east and an intermittent stream at the south end of the blueberry field. The wetlands and mean annual highwater line of the river were delineated by Caron Environmental Consulting in March 2020 and December 2020. The flags were located by GAF in October and December 2020. This project is avoiding wetland impacts by constructing the arrays within previously disturbed unproductive agricultural fields and upland areas. A Notice of Intent will be filed with the Wareham Conservation Commission and MassDEP. This project will be reviewed for compliance with DEP's Wetlands Program Policy 17-1, Photovoltaic System Solar Array Review.

Mitigation: No additional mitigation required.

Wildlife

The layout of the three solar arrays is such that there is ample room for wildlife such as fox, coyote, deer, raccoons, etc. to traverse around the security fence. There will be a minimum 6" gap between the bottom rail of the fence and the ground for small animals to travel under the fence and continue through and out of the arrays. The ground cover within the arrays will be planted with a pollinator seed mix to establish wildflowers and low height grass. This will provide a new food source for bees, other insects, and birds.

Mitigation: No additional mitigation required.

Rare Species

The site is not located within a mapped Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife. There will be no impact to rare species.

Mitigation: None required.

Project Narrative

LSE Hydra LLC

44 N Carver Road Solar Project

August 16, 2021

Dear Planning Board Members:

Lodestar Energy, an experienced solar developer who has developed, owns and operates over 30 energy facilities throughout New England, by and with its partner, Entero Energy LLC, submits this letter on behalf of their joint venture, LSE Hydra LLC, to provide a project summary to the Town of Wareham Planning Board in advance of its review of the subject project site (the "Project"). The Project is classified as a "Large Ground Mounted Solar Energy" under the Wareham Protective Zoning Bylaw, and will require a Site Plan Review from the Planning Board. The project has simultaneously been submitted to the Wareham Conservation Commission as a Notice of Intent.

Project Overview

We are proposing the construction of a 990 kW/AC ground mounted solar photovoltaic electric generating facility at property located at 44 North Carver Road in Wareham, Massachusetts, consisting of one parcels known as assessor's parcel # (the "Site"). The Site comprises approximately 47.7± acres and is currently owned by Linda Rinta and her son, Andrew. As shown on the plans submitted, approximately 33 acres of the site are already disturbed.

LSE Hydra entered into an option agreement with Linda and Andrew Rinta on April 18, 2018 to lease a portion of Site needed for solar, with the remainder to remain as part of the existing farming operations. The Project will comprise 3 separate array areas which will be electrically interconnected and tie-in to a single interconnection point to the Eversource circuit adjacent to the property. The areas to be used for the solar facility were selected with careful consideration of the past and current uses of the land, surrounding environmental features, and integration with the existing and future operation of the farm. The first, northernmost array area is approximately 2.5± acres of previously wooded land containing mature white pine and oak trees, many of which were suffering from gypsy moth damage. The second site is a 2.7± acre upland cranberry bog that has been historically unproductive. The third, southernmost is a 4.5± acre decommissioned U-pick blueberry patch. The blueberry patch was closed due to the introduction of an insect pest, the spotted wing drosophilae, which required pesticides that could not be used with the patch open to the public.

Along with generating clean electricity for the community and lease income for the landowners, the solar facility will provide the development necessary to rejuvenate the property from an agricultural standpoint as the array areas will incorporate farming operation within the ground mounted solar arrays. The landowner will be able to expand their current operation of growing beachgrass to sell for shoreline restoration by planting between the rows of solar panels. Additionally, the landowner will use the land beneath the panel for an apiary and pollinator habits by maintaining shade resistant early successional growth and bee forage mixes within the solar arrays. This will bring much needed pollination to the landowner's and neighboring cranberry bogs. Both beachgrass and pollinator habitats will require little to no pesticides, herbicides, or other harmful chemicals.

All disturbed areas will be seeded with a pollinator seed mix to stabilize soils. The planned vegetation in the array is a meadow which is typically seeded with a pollinator friendly wildflower and low-height grass mix. Local species will be used, and no invasive species will be included. No pesticides or chemicals of any kind will be used to manage the meadow. The project maintains a 50 ft non-disturbance buffer from any wetlands and a 100 ft vegetated buffer from the river high water mark.

The proposed activities associated with the proposed Project do not involve the withdrawal of water, nor the storage or use of oil or hazardous materials (other than what is present in the construction equipment). Thus, the proposed Project is not anticipated to have an impact on any surrounding drinking water supplies.

The Project's location is ideally situated for construction access, as there are existing access roads onto the site that are already trafficked by farm vehicles. Expected construction timeframe is 4-5 months, during which time construction vehicles will enter and exit the property on most weekdays. Approximately 15-20 tractor-trailer trips will be needed for equipment delivery. Post-construction, traffic will only consist of light-duty pick-up trucks for electric and vegetative maintenance 3-4 times per year. The Project will be permanently accessed via an improved driveway off of N Carver Rd.

The electricity generated at the Site will be transferred via a combination of underground conduits and poles with overhead wires to connect to the existing distribution lines to the N Carver Rd. The Project's delivery of electricity will support renewable energy development that is context-sensitive and increasing resiliency of energy generation and delivery. Solar naturally produces power at the times of higher system demand during warm summer months. The battery system can handle large output adjustments, allowing it to stabilize the frequency of the local distribution network in the event of a spike or sudden dip in demand. The project will participate in the Community Solar program, which allows households and small commercial businesses in the same utility territory to benefit from the project through electricity-bill savings. This will allow the Project to benefit town residents who do not have access to roof-top solar.

Project equipment is expected to consist of 8 SunGrow SG125HV inverters, approximately 4,700 solar panels, and a fixed-tilt racking system from RBI Solar. The Project will also include an energy storage facility to ensure greater grid reliability. The solar panels will be mounted on racks supported by galvanized steel piles that are driven into the ground. Other work associated with the construction of the solar arrays will include creation of an interior gravel access road, installation of utility pads, associated electrical equipment, electrical conduit, conduit supports, electrical poles, overhead wire, and security fencing. Based on the existing topography, re-grading of the Site will not be required except for the connection of existing to new access roads. The foundation systems can be installed with minimal disturbance. As a result, the existing drainage patterns, which consist of sheet flow to the surrounding depression, will be preserved.

Compliance with site plan review bylaw:

1510.1 Protection of adjacent areas against detrimental or offensive uses on the site by provisions of adequate surface water drainage, buffers against lighting, sight, sound, dust, vibration, and the allowance of sun, light, and air;

The Project will have minimal impact to surrounding neighbors, as solar and any associated equipment produce little to no noise, light, sound, dust or other potential disturbance. The panels and any electrical equipment will be no higher than 12', causing no sun or light concerns for surrounding property.

1510.2 Convenience and safety of vehicular and pedestrian movement within the site and in relation to adjacent areas;

All access roads between and within array and equipment areas will be gravel and meet the Fire Department's width and radius requirements. Space between the rows of solar panels will be 15 feet to provide further access for emergency vehicles and personnel. The equipment areas will be fenced in with access gates for emergency, maintenance and landowner vehicles and foot traffic. These gates, however, will remain locked to the public when not in use for safety purposes.

1510.3 Adequacy of facilities of handling and disposal of refuse and other production by-products;

All waste created during the construction process will be collected and properly disposed of by selected installers. Once the system is installed and operational, there will be little refuse or by-product created by the facility. All defective or replaced equipment will be disposed of or recycled by certified maintenance personnel.

1510.4 Protection of environmental features on the site and in adjacent area;

The facility will maintain a 50 ft no-activity buffer from all bordering vegetated wetlands and a 100 ft setback from the adjacent Weweantic River.

1510.5 Promotion of appropriate arrangement of structures within the site and in relation to existing structures within the district and neighborhood;

The surrounding district is largely agricultural, and as described above, the solar property will not only support the landowners through lease payments, but the solar facility will provide the development necessary to rejuvenate the property from an agricultural standpoint as the array areas will incorporate farming operation within the ground mounted solar arrays. The landowner will be able to expand their current operation of growing beachgrass to sell for shoreline restoration by planting between the rows of solar panels. Additionally, the landowner will use the

land beneath the panel for an apiary and pollinator habits by maintaining shade resistant early successional growth and bee forage mixes within the solar arrays. This will bring much needed pollination to the landowner's and neighboring cranberry bogs.

1510.6 Coordination with and improvement of systems of vehicular and pedestrian access, drainage, water supply, sewage disposal, lighting, landscaping, wetlands, water courses, buildings and other features that support the neighborhood;

Solar facilities naturally cause no drain on local utilities, with no usage of sewage, public water, gas lines, and very minimal traffic on public roads once a site is operational. As described above, this project will support not only the on-site farming operations, but neighboring farms as well. The site maintains setbacks from water features, and is seeking approval from the Conservation Commission.

We appreciate your timely attention to this matter, and look forward to working together with you. A checklist of all of the required documentation under the Town Bylaw has been provided in addition to this narrative. If you have any questions, please feel free to contact the Project Coordinator, Dan Watson, who can be reached at 405-973-8767 or dwatson@lodestarenergy.com.

Sincerely,

Jeffrey J. Macel
Manager, Lodestar Energy LLC

[Eric Crisler](#)

Manager, Entero Energy LLC

Operations and Maintenance Plan

LSE Hydra LLC will contract with an O&M Servicer (Servicer) that will maintain the proposed solar project for its lifetime. This memo is provided to the Town of Wareham to demonstrate the ongoing operational maintenance of the project. Stormwater and erosion controls are detailed in the Stormwater Report provided with the Special Permit application materials.

A. SCOPE OF SERVICES FOR O&M

The maintenance services for the solar photovoltaic (PV) system (System) will consist of the following:

I. Site Management

- Site management activities will be performed quarterly and as needed to maintain project specifications.
- Site management activities include, but are not limited to, perimeter fencing inspections, road maintenance, signage inspections, snow removal (as required for emergency and maintenance access), and vegetation management including mowing. It is expected that mowing will be undertaken at least once per year within the fenced solar array area and along the outside perimeter of the fence line.

II. Completion of an annual preventative maintenance system check (Basic Preventative Maintenance (PM) Services)

- Servicer shall perform annual preventative maintenance site visits, during which Servicer shall conduct a thorough inspection and perform basic onsite preventive and corrective maintenance of PV system equipment, including wiring, mounting systems, PV panels, inverters combiner boxes and other equipment in accordance with best industry practices, and the equipment manufacturers' recommended O&M guidelines. (This does not include washing or cleaning of PV modules).
- Servicer shall test the System, including string level open circuit voltage and DC operating amperage tests.
- Servicer shall recalibrate or replace the DAS sensors and meters in compliance with all manufacturer instructions, at least once every two years. (NOTE: The recalibration of the DAS sensors would be included as part of the PM duties; but replacement of sensors and meters would be conducted on a time & materials basis, as required).
- Servicer shall conduct inverter preventative maintenance in compliance with all manufacturer's operation guidelines; clean inverter cabinet air vents; and clean and change the inverter air filters in compliance with all manufacturer's guidelines, as necessary.
- Servicer shall check the torque and re-tighten screws/bolts on the modules, racking, grounds, and inverters in compliance with all manufacturer's guidelines.
- Servicer shall remove any materials (e.g., trash, bird nests, etc.) that may be found under the PV array modules obstructing air flow. This excludes any bee, hornet, or wasp nests, which may require a professional exterminator.
- Servicer shall supply, or cause to be supplied, all goods and materials, including spare parts and other basic consumables, required to operate and maintain the System.
- Servicer will generate and deliver a complete PM Report for each site inspection, which will detail the conditions of various system components and any deficiencies found, list the basic maintenance items resolved, and include a time and materials estimate for any further (non-basic) corrective repair items that will require further attention. The reports will also contain

photographs depicting site conditions, problem areas, and preventative/corrective measures taken.

III. Non-Basic Repairs and Coordination of Warranty Service for any Covered Equipment Failure (T&M Services)

Should the need arise, Servicer shall additionally provide technical assistance in the administration and/or execution of any repairs/replacement of PV system components covered under manufacturers' warranties (e.g. inverter, solar modules); or repair or replace any PV system components that are otherwise damaged or defective and not covered under any manufacturers' warranties. The labor, materials, and equipment provided to complete any such (non-basic) major repairs or to provide warranty administration will be supplied on a T&M basis.

IV. Completion of service and repair calls placed by others (T&M Services)

- Servicer will respond to both emergency and non-emergency service calls, and carry out the necessary repairs to the System and replacement of any defective/damaged parts, components and other accessories. The labor, materials, and equipment provided to complete any such (non-basic) repair calls will be supplied by Servicer on a T&M basis.
- Servicer shall also monitor project performance on a daily basis and will receive System-specific notifications from the performance monitoring software. Upon receipt of a notification of an error from the performance monitoring software, Servicer shall recommend to LSE Hydra a recommended course of action and carry out any work on a T&M basis.

B. OTHER CONDITIONS

Servicer will provide maintenance services utilizing only qualified, experienced, and competent technicians. Maintenance services will be provided on all working days from 0800 to 1630, Monday to Friday. Provision of availability of service technicians on Saturdays, Sundays or other holidays will be made in case of exigency.

Emergency Response Plan

Emergency access: Emergency access will be available via N Carver Rd and will be designed in accordance with local requirements to accommodate emergency vehicles and fire trucks. The Project includes a proposed seven and one half (7.5) foot high safety fence and locked gate (which is mandated by National Electric Code), which will limit access to authorized or emergency personnel only. The fire department is provided 24/7 access by installing their own lock on the access gate to the site. Prior to construction, LSE Hydra will arrange for a meeting of its selected installer and town officials and emergency personnel.

Emergency shut-down procedures: Copies of the final construction drawings, electric diagrams and a detailed explanation of emergency shut-off procedures will also be provided prior to the issuance of a building permit. The following procedures are meant as a guideline for disconnecting a solar facility from the electric grid in response to an emergency. These procedures should be updated during construction and before commercial operation to properly reflect the as-built conditions and equipment locations and descriptions for the solar plant.

In an emergency situation:

- If the inverters have Emergency Stop buttons, push them in on each inverter.
- If the inverter has an on/off switch, turn it to the off position. Each inverter should be manually turned to the off position. This will immediately open the internal ac and dc contactors (if present) inside the inverter.
- If the site contains multiple inverters, open inverter output circuit breakers at the AC panel combiner panels.
- Call local utility (Eversource) to open project-specific utility recloser to cut AC power to the site.

Note that some inverters do not have an on/off switch or an Emergency Stop button. For these inverters, it will be necessary to turn the systems off using the disconnect switches attached to or located near the inverters. Do not open switches that are specifically labeled “Do not disconnect under load” until a load-break switch has been opened and current flow is stopped. Generally, the first available upstream load-break ac switch or circuit breaker is safer to operate first (before the dc switch), because the inverter instantly shuts down the transistor bridge when ac voltage is removed. Once the system is off, the remaining switches can be opened and the system can be locked out until the fault condition is repaired or it is safe to turn it back on.

Isolation Procedure—Inverter Pad Equipment

To isolate the inverter pad safely:

- Shut the inverters off through a controlled shutdown.
- Turn off all dc and ac disconnects that feed the pad. Follow the procedure in the LOTO section for opening electrical disconnects.
- Use LOTO procedures to ensure the system remains off.
- Always wear appropriate PPE and test for voltages with a properly rated meter to confirm the system is completely isolated.

Isolation Procedure—Field Combiner Box

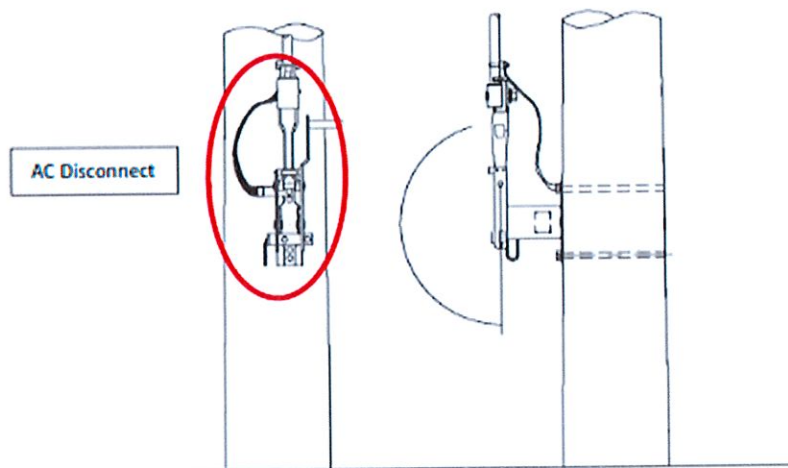
To isolate field combiner boxes:

- Turn off the inverters as described above.
- Operate the switch of the combiner (if applicable) by turning the handle to the off position.
- Use a dc clamp on the meter to confirm there is no current passing through the ungrounded conductors in the combiner box, and then open all of the fuses.
- If further isolation of the box is needed, use the string diagrams to locate the homeruns (end connectors of the PV strings).
- Use a clamp-on dc current meter to confirm that the homerun does not have any current passing through it, and then disconnect the string by opening the homerun positive and negative connectors and putting caps on the source circuit connectors.
- Go back to the combiner box and use a voltmeter to confirm that each string has been successfully disconnected.

Medium Voltage Switch Operation (Qualified Medium Voltage Personnel)

Emergency Shutdown Procedure

1. Proceed to the disconnect located on pole UP-1 just outside facility gate.
2. De-energize the AC Disconnect by pulling handle to the “Off Position”



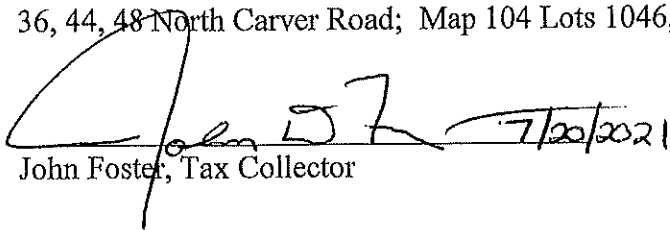
TOWN OF WAREHAM ABUTTERS
 MAP 104 LOT 1046 300'
 OWNER PAUL E & LINDA A RINTA

MAP & LOT	OWNER	CO-OWNER	STREET ADDRESS	TOWN	STATE	ZIP CODE
103-1034/B	RINTA ANDREW B	RINTA JENIFER	45 N CARVER RD	W WAREHAM	MA	02576
104-1048/B	BOOTH ANN MARIE		32 NORTH CARVER RD	W WAREHAM	MA	02576
104-1048/A	MCCULLEY ROBERT M		349 MAPLE ST	W BARNSTABLE	MA	02668
104-1050/A	MEREDITH BRETT W		PO BOX 359	CARVER	MA	02330
104-1050/B	SELLON LORING W		15 N CARVER RD	W WAREHAM	MA	02576
104/J	SLOCUM-GIBBS CRANBERRY CO		PO BOX 6	SO CARVER	MA	02366
104-1046	RINTA PAUL E	RINTA LINDA A	34 NO CARVER RD	W WAREHAM	MA	02576
CERTIFIED ABUTTERS AS THEY APPEAR ON OUR TAX ROLLS						
AS OF 7/21/2021						
<i>By Paul & Linda Rinta</i>						
ASSESSORS OFFICE						
REQUESTED BY						
BOB ROGERS GAF ENGINEERING, INC						
508 295-6600						
BOB@GAFENGINE.COM						

PLANNING BOARD
TAX VERIFICATION FORM

This verifies that LSE Hydra, LLC (applicant) is up to date on the taxes for the property(ies) he/she owns in Wareham. If the applicant is not the current owner of the property that the application addresses, the current owner, Paul E. & Linda A. Rinta, is up to date on taxes on all properties he/she owns in the Town of Wareham.

36, 44, 48 North Carver Road; Map 104 Lots 1046, V/B, V/C

 7/20/2021
John Foster, Tax Collector

Town of Wareham Site Plan Review
Application Checklist

Applicability: All new commercial and/or industrial structures or developments, multiple Family dwellings, apartment houses, changes in use, reconstruction, alteration, or extension of Existing uses, structures and/or developments. All developments of any type (i.e. subdivision) on 30 acres or greater.

Name of Site: Large Ground Mounted Solar Energy **Date:** August 16, 2021

Owner(s): Paul E. & Linda A. Rinta

Address: 34 North Carver Road, W. Wareham, MA 02576

Telephone Number: 508-295-6600 (c/o GAF Engineering, Inc.)

Developer(s): LSE Hydra, LLC

Address: 40 Tower Lane, Suite 201, Avon, CT 06001

Telephone Number: 307-231-1509

Relationship between Developer & Property Owner: Developer will lease the property from the owner.

Surveyor: G.A.F. Engineering, Inc., 266 Main Street, Wareham, MA 02571

Engineer: G.A.F. Engineering, Inc., 266 Main Street, Wareham, MA 02571

Architect: N/A

Landscape Architect: N/A

ITEM	COMPLETED
Application filed with Planning Board and Zoning Board (in case of Special Permit)	X
Copy filed with Town Clerk	
Preliminary plan and supplementary materials (14 copies)	
Filing fee	X
GENERAL INFORMATION	
Developer Name, address, telephone number	X
Property Owner Name, address, telephone number	X
Date of Application	X
Statement briefly describing project	X
Locus Map (1" = 2000')	X
Location of property to surrounding area (scale should be no less than 1" = 100') and general characteristics of all lands within 200' of the proposed site including	X

Structures, parking areas, driveways, pedestrian ways, and natural characteristics	X
Zoning district (sq. feet within each district if more than one)	X
Total area of project to include wetland and 100 year floodplain (both in sq. feet)	
All contiguous land owned by the applicant or by owner of property	X
Photographs of site (8" by 10") – at discretion of Permitting Authority	
EXISTING FEATURES	
(Scale 1"=20', 1"=40', or 1"=100' where practical and appropriate to the size of the proposal) Must include at minimum the following:	
1. Existing Natural Features	
a. Tree line of natural area;	X
b. Individual trees 18" dbh or over;	
c. Bogs or agricultural areas;	X
d. All wetlands protected under 310 CMR 10.02 (1) (a-d); floodplain (100 year) with base flood elevation data;	X
e. Contour lines (2' intervals);	X
f. General soil types.	X
2. Existing Man-Made Features	
a. Vehicle accommodation areas; streets, roads, private ways, walkways;	X
b. Curbs, gutters, curb cuts, drainage grates;	X
c. Storm drainage facilities including manholes;	N/A
d. Utility lines including water, sewer, electric, telephone, gas, cable TV;	X
d. Fire hydrants and location of dumpsters;	N/A
f. Buildings, structures, and signs (free standing) including dimensions of each;	X
g. Exterior lighting features.	N/A
3. Existing Legal Features	
a. Zoning of property (district lines);	X
b. Property lines (with dimensions identified);	X
c. Street right-of-way lines;	X
d. Utility or other easement lines;	X
e. Monuments.	X
DEVELOPMENT PLAN	
Proposed changes to existing natural features, existing man-made features, and existing legal features including the following:	
• Area of each new lot in square feet;	N/A
• Lot dimensions;	X
• Location and dimensions of all buildings and freestanding signs as well as the distances from all buildings to lot lines, streets, or street;	N/A
• Location, dimension, and designated use for all recreation areas;	N/A
• Location and dimension of all open space (indicate whether such open space is to be dedicated to public use or to remain private);	N/A
• Streets (including street names) which conform to the design standards of the Planning Board's Rules and Regulations Governing the Subdivision of Land;	X
• Curbs and gutters, curb cuts, drainage grates;	X
• Drainage facilities including manholes, pipes, drainage ditches, and retention	X

ponds;	
• Sidewalks and walkways showing widths and materials;	X
• Outdoor illumination with lighting fixture size and type identified;	X
• Utilities- water, sewer, electric, telephone, gas, cable TV;	X
• Fire hydrant locations;	X
• Dumpster (trash collection facilities);	X
• New contour lines resulting from earth movement (2' intervals) and indication of types of ground cover and other precautions to stabilize slopes;	X
• Vehicle parking, loading, and circulation areas showing dimensions and layout of parking spaces, travel lanes, aisles, and driveways;	X
• Proposed new plantings by size and location or construction of other devices to comply with screening and shading requirements.	
IMPACT STATEMENT	
Part One: Description of impact of proposed development on all applicable town services including but not limited to schools, sewer service, water system, parks, fire, and police protection; roads in the immediate vicinity of proposed development (include estimate of both peak and average daily traffic count); and the ecology of the area within the site and any significant off-site impacts.	X
Part Two: Description of actions that have been taken to mitigate the impacts described in part one.	X

powered by

Q.ANTUM DUO

Q.PEAK DUO L-G5.2 380-405

ENDURING HIGH
PERFORMANCE



Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 20.3%.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (2400 Pa).



A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance warranty².



STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

¹ APT test conditions according to IEC/TS 62804-1:2015, method B (-1500V, 168h)

² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:



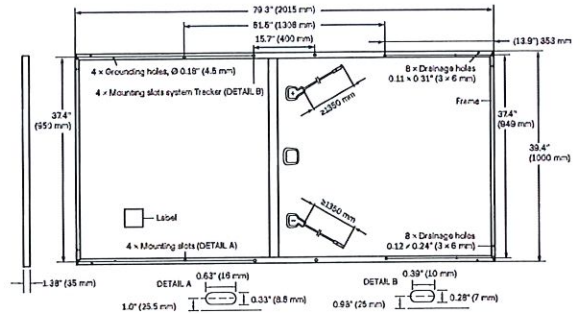
Rooftop arrays on commercial / industrial buildings



Ground-mounted solar power plants

MECHANICAL SPECIFICATION

Format	79.3in × 39.4in × 1.38in (including frame) (2015mm × 1000mm × 35mm)
Weight	51.8lbs (23.5kg)
Front Cover	0.13in (3.2mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Anodized aluminum
Cell	6 × 24 monocrystalline Q.ANTUM solar half cells
Junction Box	2.76-3.35in × 1.97-2.76in × 0.51-0.83in (70-85mm × 50-70mm × 13-21mm), IP67, with bypass diodes
Cable	4mm ² Solar cable; (+) ≥53.1in (1350mm), (-) ≥53.1in (1350mm)
Connector	Stäubli MC4, Stäubli MC4-Evo2, Amphenol UTX, Renhe O5-8, Tonglin TL-Cable01S-F; IP68 or Friends PV2e; IP67

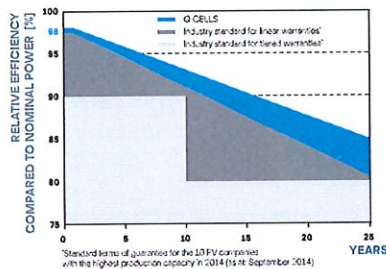


ELECTRICAL CHARACTERISTICS

POWER CLASS			380	385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC¹ (POWER TOLERANCE +5W / -0W)								
Minimum	Power at MPP ¹	P_{MPP} [W]	380	385	390	395	400	405
	Short Circuit Current ¹	I_{SC} [A]	10.05	10.10	10.14	10.19	10.24	10.28
	Open Circuit Voltage ¹	V_{OC} [V]	47.95	48.21	48.48	48.74	49.00	49.26
	Current at MPP	I_{VMP} [A]	9.57	9.61	9.66	9.70	9.75	9.79
	Voltage at MPP	V_{VMP} [V]	39.71	40.05	40.38	40.71	41.04	41.36
	Efficiency ¹	η [%]	≥18.9	≥19.1	≥19.4	≥19.6	≥19.9	≥20.1
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT²								
Minimum	Power at MPP	P_{MPP} [W]	284.4	288.2	291.9	295.6	299.4	303.1
	Short Circuit Current	I_{SC} [A]	8.10	8.14	8.17	8.21	8.25	8.28
	Open Circuit Voltage	V_{OC} [V]	45.21	45.46	45.71	45.96	46.21	46.45
	Current at MPP	I_{VMP} [A]	7.53	7.57	7.60	7.64	7.67	7.71
	Voltage at MPP	V_{MPP} [V]	37.77	38.08	38.40	38.71	39.02	39.33

¹Measurement tolerances $P_{MPP} \pm 3\%$; I_{SC} ; $V_{OC} \pm 5\%$ at STC: 1000W/m², 25±2°C, AM 1.5G according to IEC 60904-3 • *800W/m², NMOT, spectrum AM 1.5G

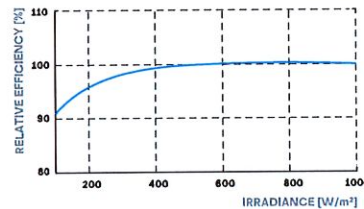
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α [%/K]	+0.04	Temperature Coefficient of V_{OC}	β [%/K]	-0.27
Temperature Coefficient of P_{MPP}	γ [%/K]	-0.36	Normal Module Operating Temperature	NMOT [°F]	109±5.4 (43±3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1500 (IEC)/1500 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating	C/TYP 1
Max. Design Load, Push/Pull ³	[lbs/ft ²]	75 (3600Pa)/33 (1600Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Test Load, Push/Pull ³	[lbs/ft ²]	113 (5400Pa)/50 (2400Pa)		

³ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 1703, CE-compliant,
IEC 61215:2016, IEC 61730:2016, Application Class II



PACKAGING INFORMATION

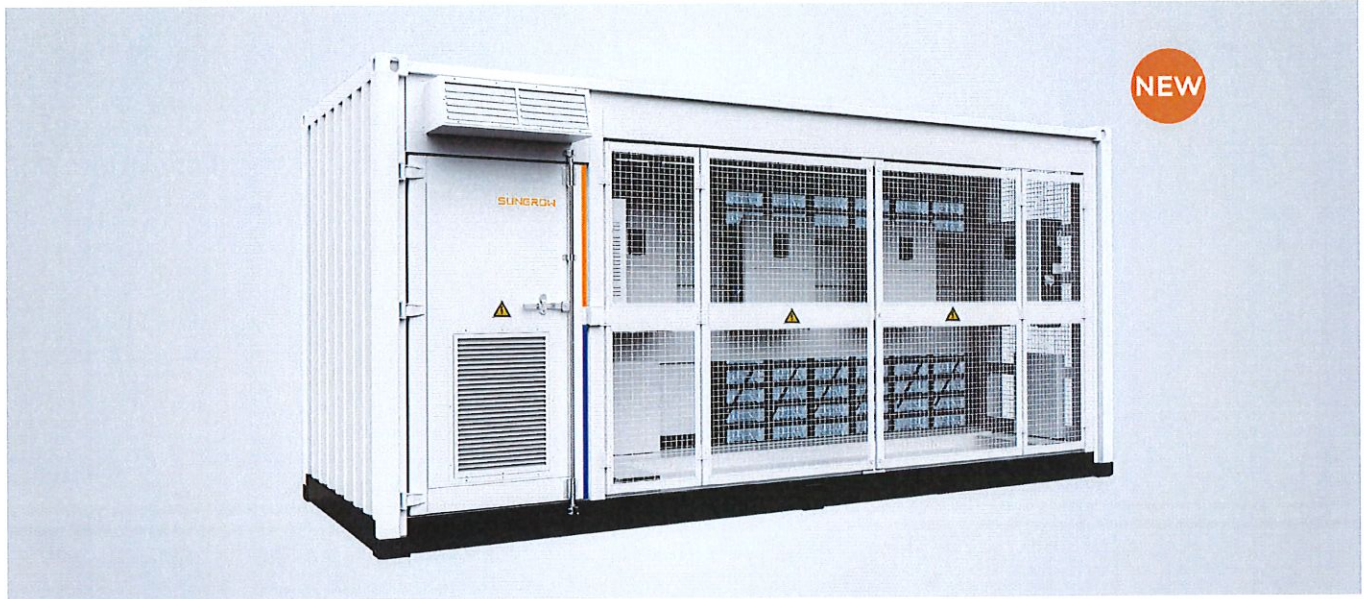
Number of Modules per Pallet	29
Number of Pallets per 53' Trailer	27
Number of Pallets per 40' HC-Container	22
Pallet Dimensions (L×W×H)	81.9 × 45.3 × 46.9in (2080 × 1150 × 1190mm)
Pallet Weight	1635lbs (742kg)

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748-5996 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.com/na

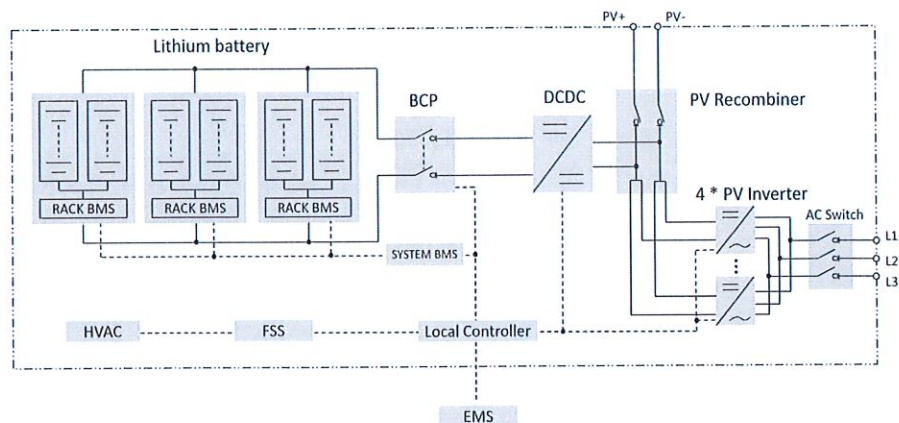
ST556KWH-D250HV +4xSG125HV Storage System



SYSTEM FEATURES

- Fully integrated 1500V DC coupled PV+ESS system with “one stop shop”
- Intelligent MPPT-Charging control algorithm enable the high-efficient operation

CIRCUIT DIAGRAM



ST556KWH-D250HV+4xSG125HV

System Type	ST556KWH-D250HV+4xSG125HV
PV Data	
Max PV input voltage	1,500 V
MPPT voltage range at nominal power	860 ~ 1,250 V
Number of DC inputs	5
Max. PV input current	1,250 A
DCDC Data	
Working voltage range	500 ~ 1,500 V
Nominal power	250 kW
Max. current	344 A
Battery Data	
Cell type	Samsung SDI Mega E3, 3.68 V / 100 Ah
Configuration of system	2P252S*3
Battery capacity (BOL)	556 kWh
Battery voltage range	806.4 ~ 1,045.8 V
AC Data	
AC output power	500kVA @ 50 °C
Max. AC output current	480 A
Nominal AC voltage	3 / PE, 600 V
AC voltage range	480 ~ 690 V
Nominal grid frequency / Grid frequency range	60 Hz / 55 ~ 65 Hz
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading ~ 0.8 lagging
Feed-in phases / connection phases	3/3
General Data	
Dimensions (W * H * D)	6,058 * 2,896 * 2,438 mm / 238.5" * 114.0" * 96.0"
Weight (with / without battery)	11.0 T / 7.0 T 24,250 lbs / 15,432 lbs
Degree of protection	IP 54 / NEMA 3R
Operating temperature range	-30 to 50 °C / -22 to 122 °F
Relative humidity	0 ~ 95 % (non-condensing)
Max. working altitude	2,000 m / 6,562 ft
Cooling concept of battery chamber	Heating, Ventilation and Air Conditioning
Fire suppression system of battery unit	FM-200 extinguishment system
Communication interfaces	RS485, Ethernet
Communication protocols	Modbus RTU, Modbus TCP
Compliance	UL 9540, UL 9540A

SG125HV

String Inverter for 1500 Vdc System



High Yield

- Patent five-level topology, max. efficiency 98.9 %, European efficiency 98.7 %, CEC efficiency 98.5 %
- Full power operation without derating at 50 °C



Easy O&M

- Virtual central solution, easy for O&M
- Compact design and light weight for easy installation



Saved Investment

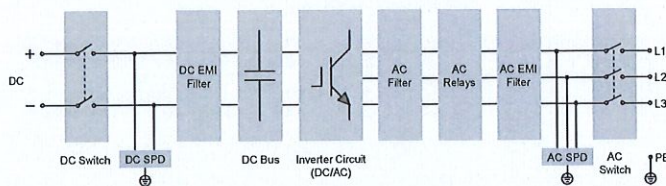
- DC 1500 V, AC 600 V, low system initial investment
- 1 to 5 MW power block design for lower MV transformer and labor cost
- Max. DC/AC ratio up to 1.5



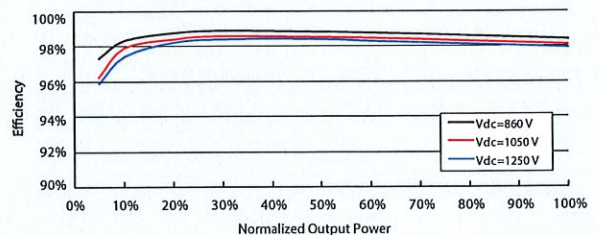
Grid Support

- Compliance with both IEC and UL safety, EMC and grid support regulations
- Low/High voltage ride through (L/HVRT)
- Active & reactive power control and power ramp rate control

Circuit Diagram



Efficiency Curve



Input (DC)
SG125HV

Max. PV input voltage	1500 V
Min. PV input voltage / Startup input voltage	860 V / 920 V
Nominal input voltage	1050 V
MPP voltage range	860 – 1450 V
MPP voltage range for nominal power	860 – 1250 V
No. of independent MPP inputs	1
No. of DC inputs	1
Max. PV input current	148 A
Max. DC short-circuit current	240 A

Output (AC)

AC output power	125000 VA @ 50 °C
Max. AC output current	120 A
Nominal AC voltage	3 / PE, 600 V
AC voltage range	480 – 690 V
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz
THD	< 3 % (at nominal power)
DC current injection	< 0.5 % I _n
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading – 0.8 lagging
Feed-in phases / Connection phases	3 / 3

Efficiency

Max. efficiency / Euro. efficiency / CEC efficiency	98.9 % / 98.7 % / 98.5 %
---	--------------------------

Protection

DC reverse connection protection	Yes
AC short-circuit protection	Yes
Leakage current protection	Yes
Grid monitoring	Yes
DC switch / AC switch	Yes / Yes
Overvoltage protection	DC Type II / AC Type II

General Data

Dimensions (W*H*D)	670*902*296 mm 26.4"*35.5"*11.7"
Weight	76 kg 167.5 lb
Isolation method	Transformerless
Degree of protection	IP 65 NEMA 4X
Night power consumption	< 4 W
Operating ambient temperature range	-25 to 60 °C (> 50 °C derating) -13 to 140 °F (> 122 °F derating)
Allowable relative humidity range (non-condensing)	0 – 100 %
Cooling method	Smart forced air cooling
Max. operating altitude	4000 m (> 3000 m derating) 13123 ft (> 9843 ft derating)
Display / Communication	LED, Bluetooth+APP / RS485
DC connection type	OT or DT terminal (Max. 185 mm ² 350 Kcmil)
AC connection type	OT or DT terminal (Max. 185 mm ² 350 Kcmil)
Compliance	CE, IEC 62109-1/-2, IEC 61000-6-2/-4, IEC 61727, IEC 62116, IEC 61000-3-11/-12, UL 1741, UL 1741 SA, IEEE 1547, IEEE 1547.1, CSA C22.2 107.1-01 and California Rule 21
Grid support	LVRT, HVRT, active & reactive power control and power ramp rate control
Type designation	SG125HV-10





Fixed-Tilt Ground Mount Solution | GM-2

When EPCs and project developers across the USA need dependable, low-maintenance ground mount racking, they turn to RBI Solar. As a single-source provider, we take responsibility for the Design, Engineering, Manufacturing, and Installation of PV mounting solutions. When you choose RBI Solar for your next ground mount, you're choosing peace of mind that your project is in the hands of the most trusted solar racking team in the industry.

Why choose RBI Solar?

- Professional Engineers licensed in all 50 states
- Quick response & efficient communication
- National installation capabilities
- Our in-house team members are an extension of your staff
- 85+ years manufacturing experience
- Complete turn-key process, reduction in your vendor coordination
- Company owned post driving equipment
- National project management capabilities with roaming site service personnel
- More time to focus on your business





GM-2 Solution Features

Foundation and racking design	Site wind speeds 170+ mph and ground snow loads 90+ psf
Signed and sealed drawings	Available in all 50 states
Proprietary on-site testing	Pull testing & corrosion testing - no geotechnical report required
Pre-assembled parts	Reduction in installation time
Variable slope	Accommodates slopes up to 30% (with topographic site map)
20-yr standard warranty	Proven rack reliability and bankability
G115 minimum galvanized coating	Exceeds ASTM and UL standards for 30% extended life
Driven posts	Cost-effective cee channel or I-beam post options available
Up to 24' long post driving	Ability to address challenging soils or elevate array structure
Module configurations	Portrait, landscape (all module types)
Raised purlins	Integrated bonding and grounding to UL 2703
Corrosion class	System available for all corrosion classes
Wire management and electrical	Integrated wire management solution and inverter mounting

Contact us at info@rbisolar.com or (513) 242-2051

DESIGN • ENGINEERING • MANUFACTURING • INSTALLATION

6715 Steger Drive, Cincinnati, OH 45237 | 513-242-2051 | info@rbisolar.com | www.rbisolar.com



Operations and Maintenance Plan

LSE Hydra LLC will contract with an O&M Servicer (Servicer) that will maintain the proposed solar project for its lifetime. This memo is provided to the Town of Wareham to demonstrate the ongoing operational maintenance of the project. Stormwater and erosion controls are detailed in the Stormwater Report provided with the Special Permit application materials.

A. SCOPE OF SERVICES FOR O&M

The maintenance services for the solar photovoltaic (PV) system (System) will consist of the following:

I. Site Management

- Site management activities will be performed quarterly and as needed to maintain project specifications.
- Site management activities include, but are not limited to, perimeter fencing inspections, road maintenance, signage inspections, snow removal (as required for emergency and maintenance access), and vegetation management including mowing. It is expected that mowing will be undertaken at least once per year within the fenced solar array area and along the outside perimeter of the fence line.

II. Completion of an annual preventative maintenance system check (Basic Preventative Maintenance (PM) Services)

- Servicer shall perform annual preventative maintenance site visits, during which Servicer shall conduct a thorough inspection and perform basic onsite preventive and corrective maintenance of PV system equipment, including wiring, mounting systems, PV panels, inverters combiner boxes and other equipment in accordance with best industry practices, and the equipment manufacturers' recommended O&M guidelines. (This does not include washing or cleaning of PV modules).
- Servicer shall test the System, including string level open circuit voltage and DC operating amperage tests.
- Servicer shall recalibrate or replace the DAS sensors and meters in compliance with all manufacturer instructions, at least once every two years. (NOTE: The recalibration of the DAS sensors would be included as part of the PM duties; but replacement of sensors and meters would be conducted on a time & materials basis, as required).
- Servicer shall conduct inverter preventative maintenance in compliance with all manufacturer's operation guidelines; clean inverter cabinet air vents; and clean and change the inverter air filters in compliance with all manufacturer's guidelines, as necessary.
- Servicer shall check the torque and re-tighten screws/bolts on the modules, racking, grounds, and inverters in compliance with all manufacturer's guidelines.
- Servicer shall remove any materials (e.g., trash, bird nests, etc.) that may be found under the PV array modules obstructing air flow. This excludes any bee, hornet, or wasp nests, which may require a professional exterminator.
- Servicer shall supply, or cause to be supplied, all goods and materials, including spare parts and other basic consumables, required to operate and maintain the System.
- Servicer will generate and deliver a complete PM Report for each site inspection, which will detail the conditions of various system components and any deficiencies found, list the basic maintenance items resolved, and include a time and materials estimate for any further (non-basic) corrective repair items that will require further attention. The reports will also contain

photographs depicting site conditions, problem areas, and preventative/corrective measures taken.

III. Non-Basic Repairs and Coordination of Warranty Service for any Covered Equipment Failure (T&M Services)

Should the need arise, Servicer shall additionally provide technical assistance in the administration and/or execution of any repairs/replacement of PV system components covered under manufacturers' warranties (e.g. inverter, solar modules); or repair or replace any PV system components that are otherwise damaged or defective and not covered under any manufacturers' warranties. The labor, materials, and equipment provided to complete any such (non-basic) major repairs or to provide warranty administration will be supplied on a T&M basis.

IV. Completion of service and repair calls placed by others (T&M Services)

- Servicer will respond to both emergency and non-emergency service calls, and carry out the necessary repairs to the System and replacement of any defective/damaged parts, components and other accessories. The labor, materials, and equipment provided to complete any such (non-basic) repair calls will be supplied by Servicer on a T&M basis.
- Servicer shall also monitor project performance on a daily basis and will receive System-specific notifications from the performance monitoring software. Upon receipt of a notification of an error from the performance monitoring software, Servicer shall recommend to LSE Hydra a recommended course of action and carry out any work on a T&M basis.

B. OTHER CONDITIONS

Servicer will provide maintenance services utilizing only qualified, experienced, and competent technicians. Maintenance services will be provided on all working days from 0800 to 1630, Monday to Friday. Provision of availability of service technicians on Saturdays, Sundays or other holidays will be made in case of exigency.

Emergency Response Plan

Emergency access: Emergency access will be available via N Carver Rd and will be designed in accordance with local requirements to accommodate emergency vehicles and fire trucks. The Project includes a proposed seven and one half (7.5) foot high safety fence and locked gate (which is mandated by National Electric Code), which will limit access to authorized or emergency personnel only. The fire department is provided 24/7 access by installing their own lock on the access gate to the site. Prior to construction, LSE Hydra will arrange for a meeting of its selected installer and town officials and emergency personnel.

Emergency shut-down procedures: Copies of the final construction drawings, electric diagrams and a detailed explanation of emergency shut-off procedures will also be provided prior to the issuance of a building permit. The following procedures are meant as a guideline for disconnecting a solar facility from the electric grid in response to an emergency. These procedures should be updated during construction and before commercial operation to properly reflect the as-built conditions and equipment locations and descriptions for the solar plant.

In an emergency situation:

- If the inverters have Emergency Stop buttons, push them in on each inverter.
- If the inverter has an on/off switch, turn it to the off position. Each inverter should be manually turned to the off position. This will immediately open the internal ac and dc contactors (if present) inside the inverter.
- If the site contains multiple inverters, open inverter output circuit breakers at the AC panel combiner panels.
- Call local utility (Eversource) to open project-specific utility recloser to cut AC power to the site.

Note that some inverters do not have an on/off switch or an Emergency Stop button. For these inverters, it will be necessary to turn the systems off using the disconnect switches attached to or located near the inverters. Do not open switches that are specifically labeled “Do not disconnect under load” until a load-break switch has been opened and current flow is stopped. Generally, the first available upstream load-break ac switch or circuit breaker is safer to operate first (before the dc switch), because the inverter instantly shuts down the transistor bridge when ac voltage is removed. Once the system is off, the remaining switches can be opened and the system can be locked out until the fault condition is repaired or it is safe to turn it back on.

Isolation Procedure—Inverter Pad Equipment

To isolate the inverter pad safely:

- Shut the inverters off through a controlled shutdown.
- Turn off all dc and ac disconnects that feed the pad. Follow the procedure in the LOTO section for opening electrical disconnects.
- Use LOTO procedures to ensure the system remains off.
- Always wear appropriate PPE and test for voltages with a properly rated meter to confirm the system is completely isolated.

Isolation Procedure—Field Combiner Box

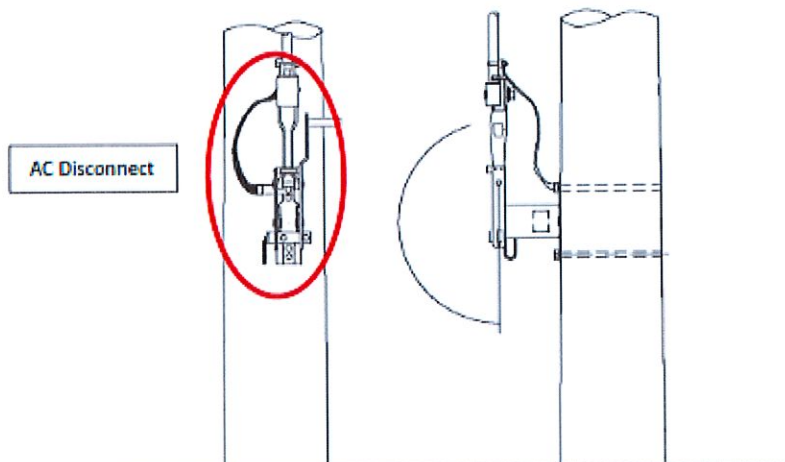
To isolate field combiner boxes:

- Turn off the inverters as described above.
- Operate the switch of the combiner (if applicable) by turning the handle to the off position.
- Use a dc clamp on the meter to confirm there is no current passing through the ungrounded conductors in the combiner box, and then open all of the fuses.
- If further isolation of the box is needed, use the string diagrams to locate the homeruns (end connectors of the PV strings).
- Use a clamp-on dc current meter to confirm that the homerun does not have any current passing through it, and then disconnect the string by opening the homerun positive and negative connectors and putting caps on the source circuit connectors.
- Go back to the combiner box and use a voltmeter to confirm that each string has been successfully disconnected.

Medium Voltage Switch Operation (Qualified Medium Voltage Personnel)

Emergency Shutdown Procedure

1. Proceed to the disconnect located on pole UP-1 just outside facility gate.
2. De-energize the AC Disconnect by pulling handle to the “Off Position”



STANDARDS FOR INTERCONNECTION OF DISTRIBUTED GENERATION

Exhibit G - Interconnection Service Agreement

1. Parties. This Interconnection Service Agreement (“Agreement”), dated as of 10/1/2020 is entered into, by and between NSTAR Electric d/b/a Eversource Energy, a Massachusetts corporation with a principal place of business at 247 Station Drive, Westwood, MA 02090 (hereinafter referred to as the “Company”), and LSE Hydra, LLC a corporation with a principal place of business at 40 Tower Lane Suite 201, Avon, CT, 06001 (“Interconnecting Customer”). (The Company and Interconnecting Customer are collectively referred to as the “Parties”). Terms used herein without definition shall have the meanings set forth in Section 1.2 of the Interconnection Tariff which is hereby incorporated by reference. WO# 2286968 (999 kW AC).
2. Basic Understandings. This Agreement provides for parallel operation of an Interconnecting Customer’s Facility with the Company EPS to be installed and operated by the Interconnecting Customer at 44 N. Carver Rd, Wareham, MA 02576 Acct# TBD. A description of the Facility is located in Attachment 1.

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STANDARDS FOR INTERCONNECTION OF DISTRIBUTED GENERATION

17. Notices.

17.1. Any written notice, demand, or request required or authorized in connection with this Agreement ("Notice") shall be deemed properly given on the date actually delivered in person or five (5) Business Days after being sent by certified mail, e-mail or fax with confirmation of receipt to the person specified below:

If to Company:

Name **Eversource**
Attention: **DG Group, SW340**
Email: melanie.khederian@eversource.com

If to Interconnecting Customer:

Name: **LSE Hydra, LLC**
Attention: **Jeffrey Macel**
Address: **40 Tower Lane, Suite 201**
City: **Avon, CT, 06001**
Phone: **(405) 973-8767**
Email: dwatson@lodestartenergy.com

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STANDARDS FOR INTERCONNECTION OF DISTRIBUTED GENERATION

Interconnecting Customer

Company

By: 

By: Melanie Khederian

Name: Jeffrey J. Macel

Name: Melanie Khederian

Title: Managing Member

Title: Account Executive

Date: 10/1/2020

Date: 10/1/2020

STANDARDS FOR INTERCONNECTION OF DISTRIBUTED GENERATION

The following attachments will be included as appropriate for each specific Interconnection Service Agreement:

Attachment 1: Description of Facilities, including demarcation of Point of Common Coupling

Attachment 2: Description of System Modifications

Attachment 3: Costs of System Modifications and Payment Terms

Attachment 4: Special Operating Requirements, if any

Attachment 1

Description of facility and Point of Common Coupling (One Line)

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Attachment 4

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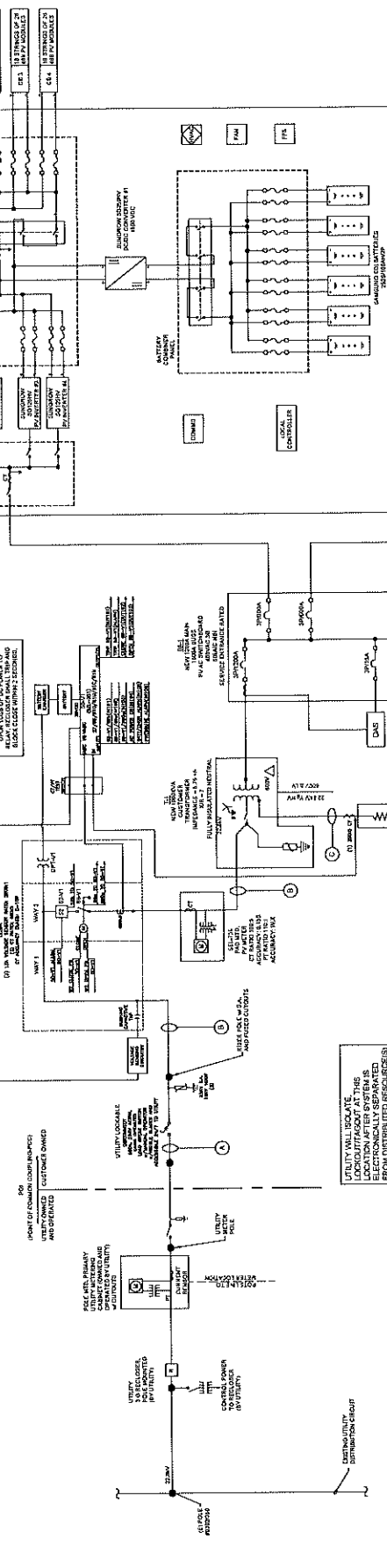
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SYSTEM SIZE = 1,497.6 kW DC
999.0 kW AC NOM.
999.0 kW AC MAX.
500kW / 1,12kWh
DC-COUPLED STORAGE



MINIMUM WIRE GAUGE SCHEDULE (CONDUIT AND CABLE SCHEDULE)

TABLE	CABLE COUNT & SIZE	TOTAL LENGTH +/- FT
(A)	15 TO WAVE CHIMNEY RATED	187
(B)	100% INSULATION	829
(C)	100% INSULATION	15

SEL 1511 Breakerless Relay Sizing

CONTROL PROTECTIVE	VOLTAGE	SYSTEM	CLASSIC	TRIP	TRIP	TRIP
PROTECTIVE	480	3000	3000	3000	3000	3000
PROTECTIVE	480	3000	3000	3000	3000	3000
PROTECTIVE	480	3000	3000	3000	3000	3000
PROTECTIVE	480	3000	3000	3000	3000	3000

INVERTER CONTAINER #1 + #2
 PV Modules = 400 Warts STC
 468 Modules per Container = 187,200 warts DC STC
 28 Strings of 26 PV Modules per Inverter

(3,744) TRINA TSM-400 DE14(H) MODULES
 (2) SUNGROW ST580MH-250HV CONTAINERS
 W/ (8) SUNGROW SG125HV INVERTERS
 & (2) SUNGROW SD250HV DC/DC CONVERTERS

INVERTER PROTECTIVE SETTINGS

INVERTER PROTECTIVE	FUNCTION	VOLTAGE	TRIP	TRIP	TRIP	TOTAL
PROTECTIVE	OVERVOLTAGE	X	1.05	300V	10	10
PROTECTIVE	UNDERVOLTAGE	X	0.95	300V	10	10
PROTECTIVE	OVERCURRENT	X	1.10	400V	10	10
PROTECTIVE	UNDERCURRENT	X	0.90	400V	10	10
PROTECTIVE	OVERTEMPERATURE	X	1.10	400V	10	10
PROTECTIVE	UNDERTEMPERATURE	X	0.90	400V	10	10
PROTECTIVE	OVERVOLTAGE	X	1.05	400V	10	10
PROTECTIVE	UNDERVOLTAGE	X	0.95	400V	10	10

ARC DESIGN
 409 NORTH MAIN STREET
 ELMER, NEW JERSEY 08318
 (856) 712-2166 FAX: (856) 358-1511

PROPOSED PHOTOVOLTAIC ARRAY
 LODSTAR ENERGY LLC
 44 NORTH CAREER ROAD
 WEST WAREHAM, MA 02576

JAMES A. CLANCY
 MA PE LICENSE # 40775

DATE	COMMENT
01-20-18	REWORK PLOT POLE
01-20-18	INVERTER / AC SIZE
01-20-18	UTILITY POLE #
01-20-18	MODE / IN / UPDATE
01-20-18	OPTION #2
01-20-18	REDUCE SYSTEM
01-20-18	DATE
01-20-18	DATE
01-20-18	DATE

E-1

Operations and Maintenance Plan

LSE Hydra LLC will contract with an O&M Servicer (Servicer) that will maintain the proposed solar project for its lifetime. This memo is provided to the Town of Wareham to demonstrate the ongoing operational maintenance of the project. Stormwater and erosion controls are detailed in the Stormwater Report provided with the Special Permit application materials.

A. SCOPE OF SERVICES FOR O&M

The maintenance services for the solar photovoltaic (PV) system (System) will consist of the following:

I. Site Management

- Site management activities will be performed quarterly and as needed to maintain project specifications.
- Site management activities include, but are not limited to, perimeter fencing inspections, road maintenance, signage inspections, snow removal (as required for emergency and maintenance access), and vegetation management including mowing. It is expected that mowing will be undertaken at least once per year within the fenced solar array area and along the outside perimeter of the fence line.

II. Completion of an annual preventative maintenance system check (Basic Preventative Maintenance (PM) Services)

- Servicer shall perform annual preventative maintenance site visits, during which Servicer shall conduct a thorough inspection and perform basic onsite preventive and corrective maintenance of PV system equipment, including wiring, mounting systems, PV panels, inverters combiner boxes and other equipment in accordance with best industry practices, and the equipment manufacturers' recommended O&M guidelines. (This does not include washing or cleaning of PV modules).
- Servicer shall test the System, including string level open circuit voltage and DC operating amperage tests.
- Servicer shall recalibrate or replace the DAS sensors and meters in compliance with all manufacturer instructions, at least once every two years. (NOTE: The recalibration of the DAS sensors would be included as part of the PM duties; but replacement of sensors and meters would be conducted on a time & materials basis, as required).
- Servicer shall conduct inverter preventative maintenance in compliance with all manufacturer's operation guidelines; clean inverter cabinet air vents; and clean and change the inverter air filters in compliance with all manufacturer's guidelines, as necessary.
- Servicer shall check the torque and re-tighten screws/bolts on the modules, racking, grounds, and inverters in compliance with all manufacturer's guidelines.
- Servicer shall remove any materials (e.g., trash, bird nests, etc.) that may be found under the PV array modules obstructing air flow. This excludes any bee, hornet, or wasp nests, which may require a professional exterminator.
- Servicer shall supply, or cause to be supplied, all goods and materials, including spare parts and other basic consumables, required to operate and maintain the System.
- Servicer will generate and deliver a complete PM Report for each site inspection, which will detail the conditions of various system components and any deficiencies found, list the basic maintenance items resolved, and include a time and materials estimate for any further (non-basic) corrective repair items that will require further attention. The reports will also contain

photographs depicting site conditions, problem areas, and preventative/corrective measures taken.

III. Non-Basic Repairs and Coordination of Warranty Service for any Covered Equipment Failure (T&M Services)

Should the need arise, Servicer shall additionally provide technical assistance in the administration and/or execution of any repairs/replacement of PV system components covered under manufacturers' warranties (e.g. inverter, solar modules); or repair or replace any PV system components that are otherwise damaged or defective and not covered under any manufacturers' warranties. The labor, materials, and equipment provided to complete any such (non-basic) major repairs or to provide warranty administration will be supplied on a T&M basis.

IV. Completion of service and repair calls placed by others (T&M Services)

- Servicer will respond to both emergency and non-emergency service calls, and carry out the necessary repairs to the System and replacement of any defective/damaged parts, components and other accessories. The labor, materials, and equipment provided to complete any such (non-basic) repair calls will be supplied by Servicer on a T&M basis.
- Servicer shall also monitor project performance on a daily basis and will receive System-specific notifications from the performance monitoring software. Upon receipt of a notification of an error from the performance monitoring software, Servicer shall recommend to LSE Hydra a recommended course of action and carry out any work on a T&M basis.

B. OTHER CONDITIONS

Servicer will provide maintenance services utilizing only qualified, experienced, and competent technicians. Maintenance services will be provided on all working days from 0800 to 1630, Monday to Friday. Provision of availability of service technicians on Saturdays, Sundays or other holidays will be made in case of exigency.

Emergency Response Plan

Emergency access: Emergency access will be available via N Carver Rd and will be designed in accordance with local requirements to accommodate emergency vehicles and fire trucks. The Project includes a proposed seven and one half (7.5) foot high safety fence and locked gate (which is mandated by National Electric Code), which will limit access to authorized or emergency personnel only. The fire department is provided 24/7 access by installing their own lock on the access gate to the site. Prior to construction, LSE Hydra will arrange for a meeting of its selected installer and town officials and emergency personnel.

Emergency shut-down procedures: Copies of the final construction drawings, electric diagrams and a detailed explanation of emergency shut-off procedures will also be provided prior to the issuance of a building permit. The following procedures are meant as a guideline for disconnecting a solar facility from the electric grid in response to an emergency. These procedures should be updated during construction and before commercial operation to properly reflect the as-built conditions and equipment locations and descriptions for the solar plant.

In an emergency situation:

- If the inverters have Emergency Stop buttons, push them in on each inverter.
- If the inverter has an on/off switch, turn it to the off position. Each inverter should be manually turned to the off position. This will immediately open the internal ac and dc contactors (if present) inside the inverter.
- If the site contains multiple inverters, open inverter output circuit breakers at the AC panel combiner panels.
- Call local utility (Eversource) to open project-specific utility recloser to cut AC power to the site.

Note that some inverters do not have an on/off switch or an Emergency Stop button. For these inverters, it will be necessary to turn the systems off using the disconnect switches attached to or located near the inverters. Do not open switches that are specifically labeled "Do not disconnect under load" until a load-break switch has been opened and current flow is stopped. Generally, the first available upstream load-break ac switch or circuit breaker is safer to operate first (before the dc switch), because the inverter instantly shuts down the transistor bridge when ac voltage is removed. Once the system is off, the remaining switches can be opened and the system can be locked out until the fault condition is repaired or it is safe to turn it back on.

Isolation Procedure—Inverter Pad Equipment

To isolate the inverter pad safely:

- Shut the inverters off through a controlled shutdown.
- Turn off all dc and ac disconnects that feed the pad. Follow the procedure in the LOTO section for opening electrical disconnects.
- Use LOTO procedures to ensure the system remains off.
- Always wear appropriate PPE and test for voltages with a properly rated meter to confirm the system is completely isolated.

Isolation Procedure—Field Combiner Box

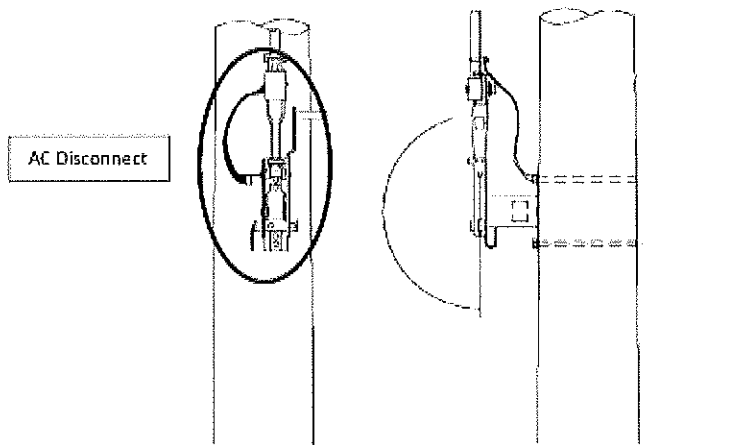
To isolate field combiner boxes:

- Turn off the inverters as described above.
- Operate the switch of the combiner (if applicable) by turning the handle to the off position.
- Use a dc clamp on the meter to confirm there is no current passing through the ungrounded conductors in the combiner box, and then open all of the fuses.
- If further isolation of the box is needed, use the string diagrams to locate the homeruns (end connectors of the PV strings).
- Use a clamp-on dc current meter to confirm that the homerun does not have any current passing through it, and then disconnect the string by opening the homerun positive and negative connectors and putting caps on the source circuit connectors.
- Go back to the combiner box and use a voltmeter to confirm that each string has been successfully disconnected.

Medium Voltage Switch Operation (Qualified Medium Voltage Personnel)

Emergency Shutdown Procedure

1. Proceed to the disconnect located on pole UP-1 just outside facility gate.
2. De-energize the AC Disconnect by pulling handle to the “Off Position”



Decommissioning Plan LSE Hydra LLC – Solar Project

44 North Carver Road

Wareham, Massachusetts

August 10, 2021



LODESTAR ENERGY

This document entitled Decommissioning Plan – LSE Hydra LLC Solar Project, was prepared by internal engineers at Lodestar Energy (“Lodestar”) for use by applicable regulatory agencies. Any reliance on this document by any other third party is strictly prohibited. The material in this document reflects Lodestar’s professional judgement as experienced solar developers in reference to the decommissioning and remediation of project sites previously used to generate electricity derived from large-scale photovoltaic power. The plans stated in this document are based on the conditions and information existing at the time this document was published and do not consider any subsequent changes.

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1.0 INTRODUCTION

Lodestar Energy, by and with its partner Entero Energy LLC, is proposing to construct a 990 kW/AC ground mounted solar photovoltaic electric generating facility at property located at 44 N Carver Rd in Wareham, Massachusetts through their joint venture LSE Hydra LLC. The “Site” consists of three parcels in Wareham known as assessor’s parcel #104-1046, 104-V/B, and 104-V/C.

The Site comprises approximately 45.7± acres, of which approximately 33 acres are already disturbed. The first, northernmost array area is approximately 2.5± acres of previously wooded land containing mature white pine and oak trees, many of which were suffering from gypsy moth damage. The second site is a 2.7± acre upland cranberry bog that has been historically unproductive. The third, southernmost is a 4.5± acre decommissioned U-pick blueberry patch. The project maintains a 50 ft non-disturbance buffer from any wetlands and a 100 ft vegetated buffer from the river high water mark. The electricity generated at the Site, which is the purpose of operations at the subject project site (the “Project”), will be transferred via a combination of underground conduits and poles with overhead wires to connect to the existing distribution lines at N Carver Rd.

The Decommissioning Plan (the “Plan”) provides a description of the decommissioning and restoration phase of the Project. The Plan is applicable given the realization of a set of conditions described here within, including premature termination of the Project or when the Project reaches full maturity. The Plan seeks to remove solar system components, restore and revegetate the Site’s land and environment to current conditions, and implement best practices that ensure adequate and responsible use of equipment and resources recovered from the system. As such, the Plan is an integral component of the Project.



Aerial Photograph of Site Location: The proposed Project Site is located at 44 N Carver Rd, North of State Route 495 (Blue Star Memorial Highway), adjacent to the Weweantic River, and several lots east of an unnamed pond.

1.1 SOLAR SYSTEM COMPONENTS

The Project's major equipment is expected to consist of:

- (8) SunGrow SG125HV inverters
- Approximately 4,700 solar panels
- Fixed-tilt racking system from RBI Solar
- Interior gravel access road
- Utility pads
- Electrical conduit and conduit supports
- Electrical poles and overhead wire
- Security fencing

2.0 EVENTS TRIGGERING DECOMMISSIONING

Throughout the life of the Project, it is paramount to the integrity of Project undertakings that its managers maintain active and quality engagement with stakeholders, especially those processes including premature and mature decommissioning.

2.1 PREMATURE DECOMMISSIONING

If the Project does not generate electricity in excess of (6) months, the Site will be decommissioned, as stated in local zoning law. Within the bounds of safety and efficiency, it is the full intention of LSE Hydra LLC and its parent organizations to avoid and mitigate risks that would contribute to the realization of the Project's premature decommissioning. In the event premature decommissioning is realized, the subsequent decommissioning sequence and corresponding processes will remain unaltered from those planned and scoped for the mature decommissioning date, unless factors unknown to Project stakeholders at the time of this document's publishing are introduced – which may warrant modification of the Plan in a reasonable way.

2.2 MATURE DECOMMISSIONING

Mature decommissioning is defined as the decommissioning of a Project's Site under normal circumstances, which is set to occur on a predetermined date, at which the Project will terminate operations due to full use of originally allocated resources. This Project's mature decommissioning date is 25 years following completed construction of solar system and electricity generation at the Site. At this time, the Project will either be refurbished, in which a partial decommissioning may occur, or the Project will no longer continue actively generating electricity beyond this date, and the decommissioning process will begin. Factors impacting this decision include the available equipment at the time and the expected revenue profile. For the purposes of local regulatory review and the establishment of a decommissioning bond, refurbishment would occur at the full expense of the of the project owner. It is the full intention of LSE Hydra LLC and its parent

organizations to begin decommissioning no sooner than this date. To remove all associated components of the solar facility, approximately 8 weeks is required to perform the work.

3.0 DECOMMISSIONING SEQUENCE

The decommission process will include the de-energization of the solar facility, revegetation of the Site, and the removal of photovoltaic modules, photovoltaic module steel racking system driven steel foundations, concrete pads, all buried conduit and conductors, inverters, transformer, vista, security fencing, and access roads. All aspects of the decommissioning process will be in accordance with local permitting requirements as well as all applicable federal, state and local laws. An onsite manager will be designated to the decommissioning process. The onsite manager will be responsible for the successful completion of the decommissioning process as well as the safety of the workers, public health, and environment of the project site for the duration of the work.

3.1 OVERVIEW OF DECOMMISSIONING PROCESSES

Mobilization

The decommissioning process will require the mobilization of construction equipment, tools, trash containers and material transportation trucks.

Module and Rack Disassembly

The first component to address in the decommissioning process is the photovoltaic array and its associated racking structure. Certified electricians will de-energize the circuits and confirm the array is safe for disassembly. Modules will then be removed individually and temporarily stored onsite. The modules will be assessed for value at the time of decommissioning and either recycled or transported to an appropriate disposal facility.

The steel racking structure will be unbolted and disassembled. Steel posts embedded in the ground that support the module racking system will be removed using construction equipment. Since the posts have no concrete foundation, associated holes will be small during the removal process. Any resulting holes will be backfilled with local soil to match existing soil conditions. All steel associated with the module racking structure will be transported to a steel recycling facility.

Electrical Component Removal

Inverters, transformer and vista are located on concrete foundations. Certified electricians will de-energize circuits and confirm the components are safe for removal. The transformer contains an environmentally safe mineral oil which will be contained and recycled separately from the equipment. The equipment will be removed, aggregated onsite and transported to an appropriate electrical recycling facility. The concrete will be demolished using jackhammers and hauled to an appropriate concrete disposal facility.

The electrical conductors/wiring will be removed from above ground and underground locations. Underground conduit is assumed to be excavated to a depth of 3' below grade. All excavated areas will be filled, compacted and regraded. All electrical conductors and associated conduit will be removed and recycled. The overhead interconnection circuit which connects the solar facility to the utility distribution circuit on 44 N Carver Rd is owned and operated by Eversource Energy. At

the time of decommissioning, the circuit consisting of (3) overhead utility poles may remain in place if the landowner prefers this circuit for future use on the site. If the circuit is not to be used, the associated poles and conductors will be removed.

Perimeter Fence

The 7' steel perimeter security fence will remain in place during the decommissioning process for security and public safety. Once power generation materials have been properly disposed, the security fence will be dismantled. Components will be transported to an appropriate recycling facility.

4.0 RESTORATION OF LAND AND ENVIRONMENT

LSE Hydra LLC and its parent organizations are committed to the restoration of the land and greater natural environment that the Project is sited on and near. The following subsections contain detailed descriptions regarding planned soil rejuvenation, ecosystem repopulation, and surface water control.

4.1 SOILS

During the decommissioning process the gravel access road will remain in place to provide as an access point for equipment and the transportation of system materials. Once associated components and materials have been properly disposed, the gravel access road will be removed. The aggregate base material will be removed and replaced with locally imported soil to match existing soil conditions. The area will be regraded to match pre-existing topography or to conform with any future permitted and allowed uses, such as agriculture. The civil site restoration will target the restoration of the property to pre-project conditions. This includes the replacement of topsoil and modification of topography as needed. Any excavated areas will be backfilled and compacted with local soils to match surrounding topography.

4.2 REVEGETATION AND REPOPULATION OF NATIVE ECOSYSTEM

In LSE Hydra LLC and its parent organizations' ongoing effort to maintain and improve stewardship of the land, associated ecosystems, and the greater biosphere, the Project will not use any nonnative species to revegetate the Site during decommissioning. Instead, beachgrass (a native plant) and other native plants will be used to cover any disturbed soil. These plants will encourage the growth of rich habitats, which in themselves offer high-value ecosystem services through the attraction of populations of pollinators and the retainment of soils to reduce erosion and increase nutrient retention. Aeration, de-compaction, disking and hydroseeding processes will be utilized as needed to encourage full vegetative coverage.

5.0 DECOMMISSIONING COST ESTIMATE SUMMARY

This section contains a mainly quantitative summary of the Project's estimated decommissioning expenses and revenues, used to estimate net total cost. Approximately 95% of materials are recyclable and will be transported to the appropriate recycling facilities. Any non-recyclable material will be transported to a nearby landfill and properly disposed of in accordance with state and federal law.

5.1 DECOMMISSIONING EXPENSES

Activity	Unit	Quantity	Cost per Unit	Total
Overhead, management and permitting	Lump Sum	1	\$10,000	\$10,000
Module disassembly and removal	Per module	4,700	\$4	\$18,800
Racking disassembly and removal	Per perlin	1,600	\$5	\$8,000
Steel pile removal	Per pile	450	\$10	\$4,500
Remove underground conduits	Linear feet	1,500	\$0.50	\$750
Remove inverters and transformers	Per inverter	8	\$1,200	\$9,600
Remove equipment pads	Lump Sum	1	\$15,000	\$15,000
Remove energy storage system	Lump Sum	1	\$15,000	\$15,000
Topsoil re-coating and regrading	Lump Sum	1	\$10,000	\$10,000
Fence removal	Linear feet	4,000	\$3	\$12,000
Total (Present Value)				\$103,650

5.2 DECOMMISSIONING REVENUES

Item	Unit of Measurement	Quantity	Salvage Price per Unit	Total Salvage Price per Item	Number of Items	Total
Panels – Silicon	Pounds per panel	2.2	\$0.40	\$0.88	3,625	\$4,136
Panels – Aluminum	Pounds per panel	3.5	\$0.30	\$1.40	3,625	\$6,580
Panels – Glass	Pounds per panel	32.6	\$0.05	\$1.63	3,625	\$7,661
Cable Copper	Pounds per 1000 feet	800	\$0.90	\$720	1.5	\$1,080
Racking System and Posts	Metric tons per MW (AC)	50	\$230	\$11,500	1	\$11,500
Total						\$30,957

5.3 NET DECOMMISSIONING SUMMARY

Based on the calculations herein, LSE Hydra expects decommissioning costs of \$103,650, or \$22.05 per solar module. This figure is significantly more conservative than several other previous estimates for solar project submitted to the Planning Board, including the \$62,850.00 (~\$8.93 per solar module) from the Fearing Hill Road Solar Project or 150 Tihonet Road (~\$5.14 per solar module).

After adjusting for a salvage value of \$30,957, the net cost will be \$72,693. Assuming a 2% yearly inflation rate for the 20-year proposed project lifespan and considering salvage value, the estimated future cost of decommissioning the project is \$108,018. The facility owner will be responsible for all decommissioning costs and will obtain all permits or approvals required by the Town prior to commencing decommissioning work.

The project company will provide a decommissioning guarantee as a condition to receive the certificate of occupancy.

Please feel free to Dan Watson of Lodestar Energy at (405) 973-8767 if you have any questions.