Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

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January 6, 2017

Mr. Ed Thorne, Town Administrator
Town of Pembroke
100 Center Street
Pembroke, MA 02359

&

Sam Youneszadeh
SunE Sunset Holding3, LLC
7550 Wisconsin Ave.
Bethesda, MD 20814

RE: Final Approval
Application for: BWP SW 36 Post-Closure Use - Major Ground Mounted Solar Photovoltaic (PV) Array
Transmittal #: X272764

AT: Pembroke Landfill
Hobomock Street
Pembroke, MA 02359
Facility ID #: 39623 Regulated Object#: 172837

Dear Mr. Thorneand Mr.Youneszadeh:

The Massachusetts Department of Environmental Protection, Solid Waste Management Section (the "MassDEP"), has completed its Administrative and Technical review of the referenced Post-Closure Use permit application (the "Application") for the Pembroke Landfill (the "Landfill") located on HobomockStreet in Pembroke, Massachusetts.

MassDEP has determined the Application and supplemental submittal are administratively and technically complete and hereby **Approves** the Post-Closure Use of the Landfill for a 2.7 megawatt ("MW") alternating current ("AC") (3.6 MW direct current ("DC")) solar photovoltaic ("PV") array, subject to conditions as specified herein.

I. SUBMITTALS:

The Application consists of bound reportsubmitted on November 15, 2016, and supplemental information consisting of the following:

1) A completed BWP SW 36 Post Closure Use permit application form signed by Ed Thorne, Pembroke Town Administrator, Sam and Sam Youneszadeh, Authorized Representative, SunE Sunset Holding3, LLC, and signed and stamped by Christopher McDermott, (Massachusetts Registered Civil Engineer No. 48272),TRC Environmental, Inc. ("TRC");
2) A bound report containing a project narrative,and Landfill related historical documents;
3) Nine site plan and construction detail drawings (36" x 24") prepared by TRC. Final copy of those drawings with Massachusetts Registered Civil/Structural Engineer signature and stamp will be submitted to MassDEP before construction activity starts (Refer to Condition # 10);
4) One electrical details drawing (36" x 24") prepared by TRC.Final copy ofthat drawing with Massachusetts Registered Electrical Engineer signature and stamp will be submitted to MassDEP before construction activity starts (Refer to Condition # 10);
5) One PV array mounting system details drawing prepared by Sunlink Corporation, Final copy of that drawing with Massachusetts Registered Civil Engineer signature and stamp will be submitted to MassDEP before construction activity starts (Refer to Condition # 10);
6) A StormwaterDrainage Analysis including a Stormwater Management System Operations and Maintenance Plan prepared by TRC;
7) A draft Operations and Maintenance Plan for the PV array prepared by TRC;
8) Structural calculations prepared by SunLink Corporation;
9) Geotechnical Calculations prepared by TRC;
10) E-mail response to MassDEP comments e-mailed to TRC on December 7, 2016, received by MassDEP on December 15, 2016, consisting of a response letter, revised project narrative, revised site plans, revised electrical plans, and sliding stability analysis.
11) E-mail response to MassDEP comments e-mailed to TRC on January 5, 2017, received by MassDEP on January 5, 2017 consisting of a document sent by TRC responding to MassDEP's comments.

II. APPLICATION REVIEW AND DECISION PROCESS:

The Application was submitted and reviewed pursuant to the provisions of 310 CMR 19.029(2): Applicable Permit Procedures and 310 CMR 19.033: *Permit Procedure for an Application for a Permit Modification or Other Approval*. According to these review procedures, MassDEP's decision regarding the proposed activities shall be either: a "Provisional Decision" pursuant to 310 CMR 19.033(4)(a); or a non-provisional decision pursuant to 310 CMR 19.033(4)(b). MassDEP has determined that a non-Provisional Decision is appropriate for this Application.

MassDEP has reviewed the Application pursuant to 310 CMR 19.000: *Solid Waste Regulations*, 310 CMR 19.143: *Post-Closure Use of Landfills* and MassDEP's *Landfill Technical Guidance Manual*, *May 1997* (the "Manual.)

III. SITE DESCRIPTION:

The Landfill is located at 151 Hobomock Street, Pembroke, Massachusetts on a parcel of land containing approximately 209.7 acres, out of which 29 acres is capped Landfill. Landfillrecords indicate that the southern portion of the Landfill consists of an old “dump” that accepted waste starting in the 1920s and the northern area is an engineered, cell type sanitary landfill dating from 1976. Filling of the Landfill ceased in 1983.A Record Notice of Landfill Operation is going to be filed at the Registry of Deeds by the Town. (Refer to Condition 20)

Thefinal cover system of the Landfill on the southern area proposed for a PV array installation includes:

- 6-inches of daily cover soil;overlain by
- 6-inch sand gas venting layer(minimum permeability 1 x 10^{-3} cm/sec), overlain by
- 12 inches clay like material (maximum permeability 1x10^{-5} cm/sec); overlain by
- 9-inch sand drainage layer (minimum permeability 1 x 10^{-3} cm/sec), overlain by
- 9-inch topsoil cover.

A passive landfill gas collection system was installed consisting of 15 passive landfill gas vents.

IV. POST-CLOSURE USE SOLAR ARRAY PROPOSAL SUMMARY:

Town of Pembroke(“Town” and “Owner”) is the owner of the Landfill. Arrangements for the proposed solar project have been contractually agreed to between SunE Sunset Holding3, LLC and the Town in the “Executed Net Metering Credit Purchase and Sale Agreement”.

Hereinafter,SunE Sunset Holding3, LLCand the Townshall jointly be referred to as the “Applicants”. The Applicants and all construction and maintenance personnel associated with the solar photovoltaic installation on the Landfill shall be referred to as the "Applicants’ Contractors".

The Applicants have proposed to develop a 2.7 MW AC (3.6 MW DC) solar photovoltaic (“PV”) array installation on approximately 9 acres of the southern Landfill area.

PV Array Design: The proposed PV array will include the following:

- Approximately 9,866 PV modules
- 783 support racks;
- 3,132 cast-in-place concrete ballast pads;and
- 3 Pad-Mounted Transformers.

The proposed PV array will use approximately 9,866 fixed-tilt PV modules, mounted on 783 racks supported by 3,132 cast-in-place concrete ballast pads. The ballast pads will be placed on the Landfill surface generally in areas where the Landfill slope is less than 10 percent (approximately 5 degrees) with some areas sloped up to approximately 15 percent (9 degrees). Where the slope is greater than 10 percent, gravel will be added under the pad to create a more level pad placement area. The racks are connected with DC direct current wiring on the racks

and each string of racks is connected to a string inverter that inverts DC to AC. The AC cabling from the string inverters is carried above the Landfill surface via protective cable trays to one of three transformers. The medium voltage AC cable from the transformers to the point of interconnection on Hobomock Street will be placed on a cable tray on and off the Landfill. The modules and racks will be fully bonded for grounding.

The rack mounting hardware will be SunlinkGeoPro rack or equivalent. Each of the array racks will hold 12 PV modules in a two-module, portrait configuration at a fixed tilt of 15 degrees and support the wiring between the modules. The lower edge of the assembly will be at least three feet above the ground to shed snow and to allow sun to shine beneath the modules to maintain vegetation growth. The upper edge will beapproximately 6.5 feet above the ground. The edge-to-edge distance between each row of modules will be approximately 8.5 feet (north-south measurement).

Sunlink's structural design of the racking system is provided in Appendix D of the Application. The structural design was done in accordance with the Massachusetts Building Code and used ASCE 7-05 "Minimum Design Loads for Buildings and Other Structures" load combinations. Basic design wind speed for the design is 110 miles per hour and snow load is 30 pounds per square foot. Seismic design data was based on USGS Seismic Parameters.

The ballast pads were designed to be of adequate size and weight to prevent the rack assemblies from moving or tipping due to the designed wind speed and to limit the bearing or contact pressure to below a level that could potentially damage the underlying landfill cap or cause excessive settlement. The Applicants calculated that three different sized pre-cast concrete ballast pads will be needed to meet design specifications. All north post ballast pads will be 48 inches in diameter. The ballast pads for the south posts at the north row, east/west edge, north rows and interior rows will be 36 inches in diameter. The south row south post ballast pads will be 42 inches in diameter. All ballast pads will be 14 inches thick.

For ballast block design, the upper limit contact stress was set at 7pounds per square inch (psi) on the surface of the impervious clay layer. The Applicants stated that a ballast block contact stress at or below 7 psi is unlikely to damage the Landfill cap and calculated bearings stresses of3.1, 3.4, and 1.5 psi for the 48 inch diameter, 42 inch diameter and 36 inch diameter ballast pads respectively.

Forty-four string inverters will be surface mounted on 3 foot by 3 foot by 1 foot thick concrete pads and convert the DC output to AC. The inverter will be a SunGrow SG 60KU-M or equivalent. The AC cabling from the inverter will be above ground in cable trays to the pad mounted transformer where the voltage will be stepped up at three 1,000 kVA transformers located on a gravel pad and concrete slab. No conduits will be installed below grade except within open-ended, precast concrete trenches at road crossings.

As a precaution against potential gas migration below the transformer pads, a 20 mil HDPE geomembrane liner will be placed directly on the Landfill surface overlain by a 16 ounce geotextile fabric, overlain by 18 inches of crushed stone and 6 inches of gravel. The transformer pad will consist of a 12-inch reinforced concrete slab bearing directly on the crushed stone layer.

The PV modules and racks will be located at least 10 feet from existing passive landfill gas vents, and transformers will be located at least 40 feet from existing passive landfill gas vents.

Interconnection: The Applicants have applied to National Grid for the project interconnection and were granted a conditional interconnection service agreement in May 2016. The point of interconnection will be to Feeder 07-910W25 into National Grid's Water Street Substation via an existing service line feeding the project site. National Grid will provide service to this new meter at 238 kV from its existing area 13.8 kV circuit. A new visible physical disconnect switch will be installed to protect National Grid's distribution system (and the solar array) in the event of an emergency situation. No conduits will be installed below grade.

As a condition of this permit, final details of all electrical work must be submitted to MassDEP and must be designed in accordance with the most recent versions of the Massachusetts Electrical Code. All electrical permits must be secured from the local building official. (Refer to Condition #2)

Bearing Capacity and Settlement:The Applicants used the Tergahi method and determined that the allowable net bearing capacity for the ballast pads on the Landfill cap was 1,000 psf for all three pad sizes. A factor of safety of 3 was applied to the ultimate bearing capacity and a limiting immediate, or elastic, settlement of 0.25 inches was assumed. Based on the actual maximum contact stress beneath the ballast pads, the actual factor of safety against bearing failure is approximately 6 to 12 and the immediate settlement was determined to be less than the 0.25-inch criteria.

As a condition of this permit, MassDEP is requiring a pre-construction inspection of the Landfill for existing settlement and repair of settled areas. (Refer to Condition #6).

Stability:The solar arrays will be constructed generally in areas where the Landfill slope is less than 10 percent, with some areas up to 15 percent slope. Where the slope is greater than 10 percent, gravel will be added under the pad to create a more level pad placementarea. The Applicants state the stability "failure" mode for the ballast pads on the maximum proposed slope would be sliding on the Landfill soil surface. For the maximum uplift wind load, a factor of safety against sliding was calculated by the Applicantsto be 1.5, which the Applicantstate is appropriate.

Landfill Access:The existing 16 foot wide, permanent, paved road constructed as part of the Landfill closure and used by heavy equipment accessing the Town's recycling center willbe the primary access road used for the project. The Applicants stated there is no indication of pavement failure or subgrade distress to date and that if pavement distress is seen during array construction, measures will be taken as appropriate to stabilize and repair the road.

Permanent gravel access roads proposed to provide access to the transformer pads have been designed for "on-highway" type vehicles and will consist of a woven geotextile fabric placed on top of the landfill final cover soils overlain by 18 inches of gravel. Temporary construction roads have not been proposed by the Applicants.

During construction of the solar array, construction equipment will need to travel on portions of the Landfill. The Applicants will minimize the potential for impact to the Landfill final cover system cap by using only off-highway and low ground pressure equipment (10 psi or less) on the Landfill.

Storm Water:The existing Landfill has a storm water run-off control system designed and constructed during the Landfill closure. The Applicants used HydroCAD version 10.0, HydroCAD Software Solutions LLC, to model pre construction and post construction conditions. The Applicantsmodified the run-off curve numbers to take into account the increased impervious surface due to the concrete ballast blocks and determined that the volume of runoff at the site after the installation of the PV array will not be significantly increased (approximately 1%) when compared to existing conditions and the peak flow rate will decrease approximately 1 per cent. No substantialchanges to the Landfill storm water control system are proposed, with the exception of the new access roadsto the equipment pads that cross an existing stormwater swale. At each of these 3 locations, two 15 inch diameter culverts, adequate to convey the 25 year, 24 hour storm event, will be installed beneath the new access roads.

Solar array construction activities are expected to disturb more than 1 acre of land for the installation of solar panel array pads, inverters, and existing access roads. Disturbance of land areas greater than 1 acre of land is regulated under the National Pollutant Discharge Elimination System ("NPDES") and the Applicant will file a Notice of Intent ("NOI") for a NPDES construction general permit (CGP) for this project. A CGP requires operators to prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to the start of construction activities.

Wetlands: The Applicants stated there are no wetlands within the project development area and all project access, solar and electrical components are located outside of the 100 foot buffer of all nearby wetlands.

Site Security: A new 7 foot high chain link fence with 12 padlocked access gates will be installed around the perimeter of the PV array above the landfill final cover system mounted on 2 foot wide by 3 foot long by 1 foot thick concrete support blocks. The fence will jog 6 inches below the top of the blocks to maintain a clearance height not greater than 6 inches above the ground.

Post Closure and Post-Closure Use Operations and Maintenance:The existing Post-Closure Monitoring and Maintenance Operations Plan established during Landfill closure and approved by MassDEP will continue unchanged, with the exception of the increased Landfill cap monitoring within the PV array area.The Town will continue to maintain the Landfill areas outside the array area which will be delineated by the installation of a new chain link security fence.

As a condition of this permit, MassDEP is requiring that, during the first year of operation of the PV array, inspections of the Landfill final cover system be performed on a monthly basis and thereafter quarterly, at a minimum. MassDEP is also requiring that inspections include the condition of the security fencing. All settlement must be repaired. (Refer to Condition #21)

Landfill Gas Control: The existing landfill gas vents will not be modified by the installation of the PV array. The PV arrays will be set-back from the passive gas vents by at least ten feet to prevent physical damage to the vents, allow maintenance and minimize worker exposure to landfill gas. The transformer pads have specific gas intrusion prevention elements including a geomembrane gas barrier, crushed stone venting layer and under transformer openings. The meters, which contain motors and switches, will be off the Landfill final cover system well away from gas vents.

The landfill gas monitoring program will be unchanged by the installation of the PV array. All on-site maintenance personnel will be trained to comply with the rules and regulations for public health, safety, welfare or the environment relating to landfill gas hazards, operations of the solar arrays and associated electrical hazards. (Refer to conditions #4, 5, 11, 12, 13 and 17)

Landfill Gas Survey: The low permeability layer of the Landfill final cover system is comprised of soil with a minimum hydraulic conductivity of $1x10^{-5}$ cm/sec. Due to the potential for landfill gas migration through this soil, MassDEP required the Applicants to perform a landfill gas survey. TRC collected landfill gas measurements at 15 passive landfill gas vents, 37 locations around the landfill perimeter, and 63 location across the Landfill final cover at 30 meter intervals. The Applicants reported that Landfill surface concentrations of total hydrocarbons as methane ranged from below detection limit to 4.5 parts per million (ppm) with only 8 of the 100 readings taken being greater than 2.5 ppm and only 7 readings between 2.0 and 2.5 ppm. The majority of readings were, therefore 2.0 ppm or less.TRC in its response to comments on January 5, 2017 stated that, with few exceptions all landfill surface monitoring data indicated that methane values are at or below typical background concentrations. For those few methane values recorded that were slightly above the background, it doesn't appear as if those values were the result of methane discharged through the Landfill cap but rather due to downwash from the Landfill vents.

Glare Potential: The potential for glare from the array occurring along Hobomock Street, south of the landfill, was checked by the Applicants using the Solar Glare Hazard Analysis Tool software program (www.forgesolar.com). Several locations along Hobomock Street were selected and November 20, 2016 (winter solstice) and June 20 (summer solstice) sun angle conditions used. The Applicants stated that no glare problems were identified by the Solar Glare Hazard Analysis Tool.

Health and Safety:As a condition of this permit, MassDEP is requiring that a Solar Array Construction Period Health and Safety Plan and a Post Closure Operations and Maintenance Health and Safety Plan be submitted and that personnel training be provided for employees who access the solar array areas of the Landfill. (Refer to Condition #11)

Decommissioning Plan and Financial Assurance Mechanism: The Applicants intend for the PV Project to remain in operation for at least 25 years. When the Project has reached its useful life and needs to be removed, decommissioning and site restoration will include dismantling and removal of all panels and supporting equipment, transformers, overhead and surface cables, foundations, and ancillary equipment unless otherwise requested by the Town. The site will be restored to substantially the physical condition that existed immediately before construction.

Bonding and financial surety arrangements have been contractually agreed to by SunE Sunset Holding3, LLC and the Town in an Executed Net Metering Credit Purchase and Sale Agreement. As a Condtion of this permit, the Applicants are required to submit to MassDEP for review and approval a detailed decommissioning and site restoration plan to properly restore the Landfill/Site to its original condition. (Refer to Condition #23).

MassDEP is also requiring that, at any time the Applicants for this project do not include a municipal entity, the Applicants provide a financial assurance mechanism, in accordance with 310 CMR 19.051, for the costs of decommissioning and site restoration activities. (Refer to Condition #24)

Massachusetts Environmental Protection Act (MEPA): The Applicants reviewed the MEPA threshold applicability to the proposed post-closure use of the site as a solar generation facility. MEPA review is applicable where there is both: 1) a "state action" and 2) anticipated project impacts that exceed one or more of the review thresholds articulated at 301 CMR 11.03. The Applicants concluded that, while the Major Post Closure Permit being sought is clearly a "state action", the project does not meet or exceed any of the thresholds articulated at 301 CMR 11.03 and thus no MEPA review is considered to be appropriate for the project.

Massachusetts Endangered Species Act:The Applicants reviewed the Massachusetts Natural Heritage and Endangered Species Program (MNHESP) designated “Priority” and “Estimated” rare and endangered species habitat areas in the vicinity of the project site was performed utilizing the MassGIS’ OLIVER online mapping tool. The Applicants stated their review did not identify that the proposed project site is within or abutting any such identified area.

V. PERMIT DECISION WITH CONDITIONS:

MassDEP, having determined the information in the Application is satisfactory and in accordance with its authority granted pursuant to M.G.L. c.111, s. 150A, and 310 CMR 19.000, hereby **APPROVES** the Post-Closure Use of Pembroke HobomockLandfill for a Solar Photovoltaic Array subject to the conditions identified herein.

1. Permit Limitations: The issuance of this approval is limited to the proposed Solar Photovoltaic Array at the Landfill as detailed in the Application and does not relieve the Applicants from the responsibility to comply with all other regulatory or permitting requirements. Post-Closure Use construction shall proceed in complete compliance with the approved plans, MassDEP's regulations and requirements, the Manual or as required by this Approval. This approval does not relieve the Town of Pembroke , as the owner of the Landfill, from its responsibility to comply with all post closure monitoring and maintenance requirements for the entire Landfill. There shall be no deviation from this Approval without prior consent from MassDEP. MassDEP shall be consulted prior to any deviation from the approved design. MassDEP may require a permit modification application for significant design modifications.

2. Pre-Construction submittals: Prior to construction, the Applicants shall submit the following to MassDEP for its review and approval (unless otherwise noted), at least 60 days prior to commencing construction activities, unless otherwise approved by MassDEP:

   a) A final PV array layout plan with an accompanying statement that the engineering assumptions regarding stability, sliding, and the potential for glare impacts made in the Application, or as revised in the supplemental submittals, are consistent with the final PV array layout. All TRC plans must be signed and sealed by a Massachusetts Registered Professional Engineer of the appropriate discipline.

   b) Revised copies of the Neo Vitriouselectrical drawing E-2.0, if any revisions are made to this drawing prior to construction. All electrical drawings must be stamped by a Massachusetts Registered Electrical Engineer.

   c) A final (revised if/as necessary) copy of the Sunlink Corporation drawing SL 2.0, signed and sealed by a Massachusetts Registered Professional Engineer of the appropriate discipline.

   d) All electrical permits issued by the local building official.

   e) A Construction Phase Health and Safety Plan and an Operations and Maintenance Phase Health and safety Plan (for MassDEP records only). (refer to Condition # 11)

3. PV Array Installation: As submitted within the Application including supplemental information, the PV array racking system foundations have been designed to be installed on Landfill slopes up to 9 percent (15 degrees) from horizontal. Prior to the installation of any ballast pads at slopes greater than this design slope, supplemental design information must be submitted by a Massachusetts Registered Professional Engineer including a analysis of the maximum loading on the racking system at the proposed racking system orientation and an analysis of the ballast block design for overturning and sliding.

4. Enclosures and Combustible Gas Alarms:Any enclosures that that allow human entry shall have a landfill gas monitor that is fully operational at all times. The monitor shall be calibrated to a methane standard; have an audible and a lighted beacon. At a minimum, the alarm shall be set to sound when the concentration of explosive gases exceeds 10% of the Lower Explosive Limit (LEL).

5. Regulatory Compliance: The Applicants, Engineer and Applicants' Contractors shall fully comply with all applicable local, state and federal laws, regulations and policies, by-laws, ordinances and agreements. This includes but is not limited to, 310 CMR 19.142: *Post-Closure Requirements*, 310 CMR 19.143: *Post-Closure Use of Landfills*, and 310 CMR 19.043: *Standard Conditions*. Applicable federal regulations include, but are not limited to, 29 CFR Part 1910, OSHA standards governing employee health and safety in the workplace and all applicable local, state and federal electrical codes and permits, including National Electrical Code (NEC), 2011 Edition, Article 690-"Solar Photovoltaic (PV) Systems", as amended.

6. Inspection and Repair of Settlement Areas: Prior to construction of the PV array, any suspect settlement areas on the Landfill project area shall be surveyed to determine the lowest spot. The surrounding area should be then surveyed to find the "relief point" defined as the lowest surrounding area where ponded water would flow off the cap. The elevation difference is defined as the "pond value". Minor settlement shall be defined as less than a 12-inch pond value. Any Landfill project area that has undergone minor settlement shall be corrected by the placement of additional vegetative support soil to promote runoff and the area shall be reseeded prior to installation of the PV array. Any area repaired shall be surveyed and the location marked on a plan with the pond value. Any future settlement shall be repaired and recorded cumulatively. If/when the total settlement reaches 12 inches, the area will be considered to have suffered major settlement and appropriate repairs to eliminate ponding on the low permeability layer shall be performed.

   Major settlement is defined as a pond value of 12 inches or more. When this occurs, the final cover system must be repaired to prevent water from ponding above the low permeability layer. The Applicants may either:

   1. Strip off the final cover soils above the low permeability layer, inspect and repair the low permeability layer if/as necessary, place low permeability soil as necessary to promote runoff, replace final cover soils; or

   2. Expose the low permeability soil or geomembrane in a trench around the perimeter of the settled area. Fill the area with soil to form slopes promoting runoff. Cap the area with a new low permeability membrane, geosynthetic clay liner (GCL), or low permeability soil layer that ties into the existing low permeability layer at the identified perimeter. Place new drainage sand and vegetative support material over the new cap area.

   Any proposal to repair minor settlement may be done as routine maintenance, provided that the Applicant's report the settlement to MassDEP and state their intent to perform repairs and provides MassDEP with final survey results and a summary write up.

   Any proposal to do major settlement repair must be submitted within a Corrective Action Design (BWP SW 25) permit application, since disruption of the final cover system will take place and repair details must be submitted and approved.

7. Notification of Construction: The Applicantsshall notify MassDEP, Southeast Regional Office solid waste section chief, in writing (e-mail is acceptable) when the post-closure use construction commences and again when construction is completed.

8. Certification Report: Within ninety (90) days of completing the installation of the solar photovoltaic array, MassDEP shall be provided with a certification report for MassDEP's records. All construction work shall be completed under the supervision of a Massachusetts Registered Professional Engineer who shall have sufficient staff on-site to provide quality assurance/quality control (QA/QC) oversight for all construction work at the Landfill. The

report shall be signed and stamped by a Massachusetts-registered professional engineer and include, at a minimum, written certification from the supervising engineer that the project was performed in accordance with MassDEP regulations, requirements and the approved Post Closure Use permit application. The report shall include a project narrative, as-built drawings depicting all pertinent site features and photographs representative of the construction processes and completed work. A list of equipment used on the Landfill, the Landfill area accessed by the vehicle, and the pressure rating of each vehicle shall be indicated in the certification report. Should the Applicantsdesire a formal review and written approval of the certification report, the Applicantsmust submit a formal BWP SW 43, Landfill Closure Completion permit application.

9. Preconstruction Work: Prior to commencement of construction activities, all Landfill gas extraction wells, remote valves, Landfill soil-gas monitoring wells, groundwater monitoring wells and other existing above ground structures on the Landfill cap and appurtenances shall be flagged for visibility, and protective barriers shall be placed around such structures, as needed, to prevent damage by vehicles accessing the area.

10. Final design drawings: Before the start of construction activity the Applicant will submit MassDEP the copies of all the drawings (Nine construction drawings with site plan, one electrical drawing and one PV array mounting system drawing) signed and stamped by respective Massachusetts Registered Professional Engineers.

11. Health and Safety: The Applicant, Engineers and Applicant's Contractors are responsible to ensure all necessary precautions are taken to protect the health and safety of workers and the general public during both the construction phase and during the operation and maintenance phase of the post-closure use.

    A site specific Solar Array Construction Period Health and Safety Plan shall be developed and submitted to MassDEP (for its files) prior to the beginning of any construction work. The Solar Array Construction Period Health and Safety Plan shall include at a minimum;
    - protocols for monitoring of landfill gas as needed,
    - protocols for modifying work practices if landfill gas is detected at levels deemed unsuitable, and
    - training for all workers including the Applicants' workers conducting construction activities at the Landfill regarding hazards associated with the landfill gas and the PV array, including electrical hazards.

    A site specific Post Closure Operations and Maintenance Health and Safety Plan for the post-closure use period, shall be developed and submitted to MassDEP (for its files) prior to the beginning of any construction work. The Post Closure Operations and Maintenance Health and Safety Plan shall include at a minimum;
    - protocols for monitoring of landfill gas as needed,
    - protocols for modifying work practices if landfill gas is detected at levels deemed unsuitable, and

- training for all workers including the Applicants' workers conducting maintenance activities at the Landfill regarding hazards associated with the landfill gas and the PV array, including electrical hazards.

12. Personnel Training:The Applicants, Engineer and Applicants' Contractors shall instruct all construction and maintenance personnel regarding the potential hazards associated with landfill gas and shall give on-the-job training involving in any activity authorized by this permit. Such instruction and on-the-job training shall teach personnel how to comply with the conditions of the permit to carry out the authorized activity in a manner that is not hazardous to public health, safety, welfare or the environment.

13. Landfill Gas Notification Requirements:
As specified in solid waste management regulations at 310 CMR 19.132 (5) (g),

> *"When, at any time, the concentration of explosive gases exceeds 10% of the lower explosive limit (LEL) in any building, structure, or underground utility conduits, excluding gas control, gas recovery and leachate collection system components, the owner or operator shall:*
>
> *1. take immediate action to protect human health and safety;*
> *2. notify the Department's Regional Office that covers the municipality in which the facility is located within two hours of the findings; and*
> *3. undertake the actions specified under 310 CMR 19.150, Landfill Assessment Requirements and 310 CMR 19.151: Corrective Action, as required by the Department."*

If at any time monitoring detects the presence of any combustible gases at or in excess of 10% of the lower explosive limit at any location within a building or within any utility conduits on site or off-site, the Applicant shall notify MassDEP's Bureau of Waste Site Cleanup-Emergency Response Section (508) 946-2850 within two (2) hours of the exceedance as per 310 CMR 40.0321(1) (a) of the regulations.

14. Vehicles Operating on the Landfill Final Cover System: The Applicantshave not proposed to construct permanent or temporary access roads.

Vehicles operating on the Landfill final cover system shall be low-pressure construction equipment, with fully loaded ground pressures of **7 psi** or less. Site specific engineering calculation must be submitted prior to operation of any equipment with a bearing pressure of greater than 20 psi on the access roads above the Landfill final cover system.

Construction equipment shall limit turning on the vegetative support layer as much as possible. If MassDEP determines the use of any equipment is creating the potential for damage to the final cover system, the usage of such equipment shall immediately cease upon notification by MassDEP. All operators of the vehicles entering the final cover system area shall be clearly instructed by the on-site engineer and/or the contractor of the requirements of this permit prior to arrival, to avoid damage to the Landfill final cover system components.

A list of equipment used on the Landfill, the Landfill area accessed by the vehicle, and the pressure rating of each vehicle shall be indicated in the certification report.

15. Permanent and Temporary Roads: Equipment shall not access the final cover system from permanent and temporary roads where the transition will result in excessive pressure and wear on the Landfill vegetative service. The on-site engineer may allow the construction of temporary ramps as necessary.

16. Integrity of the Final Cover System: All disturbances of the Landfill shall be limited to the proposed excavations and installations as depicted and described within the Application and approved plans. Excavations shall be limited to the topsoil layer. No excavations shall penetrate the sand drainage layer without written approval by MassDEP. The Applicant, Engineer and Applicant's Contractors shall ensure that vehicles operating on the Landfill surface do not compromise the integrity of the Landfill final cover system. No grade stakes shall be used in the area of the Landfill final cover system for erosion control, construction layout, or any other purpose. No grounding rods for the PV array, electrical equipment, office trailers, etc. shall penetrate the Landfill final cover system low permeability layer. The Applicants shall verify the limits of the Landfill final cover system prior to installation of any security fence, utility poles, etc. that are designed to be installed outside the limits of the final cover system.

17. Construction Precautions: All excavations and construction shall be supervised by a Massachusetts Registered Professional Engineer. All necessary precautions shall be taken to protect the Landfill storm water control system, environmental monitoring network and the Landfill gas vents and other onsite structures. All operators of vehicles entering the construction area should be clearly instructed by the on-site engineer and/or the Applicant's Contractor of the permit requirements to avoid damage to the Landfill components. The on-site engineer shall observe the extent of each excavation performed on the Landfill capping system. If any damage occurs to any Landfill components, the Engineer shall notify MassDEP within 24 hours and provide a written plan with a schedule for repairs.

18. Array Setbacks: The Applicantsshall maintain a minimum 10 foot radius buffer between the closest edge of the PV array modules and all Landfill gas vents and a 40 foot radius buffer between the electrical equipment pads and all Landfill gas vents.

19. Solar Glare Analysis/Remediation: The Applicant shall monitor the solar glare from the panels as they are installed to confirm that no off-site glare issues develop. No portion of the array shall cause reflective glare to any motorist in any direction or impact the general public. The Applicant shall take remedial actions if a problem develops during or after installation of the panels.

20. Notice of Landfill Operation:The Applicant must file a Record Notice of Landfill Operation at the Registry of Deeds before the start of construction activity.

21. Post-closure Use Operation and Maintenance Plan: During the first year of operation of the PV array, inspections of the Landfill final cover system shall be performed on a monthly basis, unless otherwise approved in writing by MassDEP. Inspection reports shall be submitted to MassDEP within fourteen (14) days of the inspection. Following the first year of operation of the PV array, inspections of the Landfill shall be performed on a quarterly basis, or on an annual basis as determined by MassDEP at that time, and inspection reports shall be submitted to MassDEP, the Applicants, (and the Landfill owner if not an Applicant) within fourteen (14) days of the inspection. The Applicant, Engineer and Applicant's Contractors shall monitor the effectiveness of the site security system and the storm water management system which should include; swales, structures and any and all conveyance systems. MassDEP shall be consulted prior to any deviation from the approved storm water design. MassDEP may require a permit modification application for significant design modifications. Any erosion problems, settlement problems, security or other issues observed at the Landfill shall be reported to MassDEP and repaired immediately. When noted, all settlement shall be repaired. (refer to Condition 6)

    There are no proposed changes to the post closure operation and maintenance plan for the area to be maintained by the Owner and not used for the PV array. Landfill inspections shall be conducted pursuant to 310 CMR 19.018(6)(b) every two years that evaluate the entire Landfill, the environmental monitoring system and summarize the inspection and monitoring information pursuant to 310 CMR 19.018(6) and (8) and submitted pursuant to 310 CMR 19.018(8)(c).

22. Site Security: Pursuant to 310 CMR 19.130(23) the Landfill Owner is required to provide sufficient fences or other barriers to prevent unauthorized access to the Landfill. The Owner must continually monitor and evaluate the potential for unauthorized access and institute all appropriate measures to prevent unauthorized access during the closure and post-closure period.

23. Decommissioning Plan – If the proposed PV Array project is abandoned, during or after completion of construction, the Applicants shall submit to MassDEP for review and prior approval a detailed decommissioning and site restoration plan, which includes, at a minimum: dismantling and removal of all panels and supporting equipment, transformers, overhead and underground cables, foundations and buildings; and restoration of the roads to restore the Landfill to substantially the same physical condition that existed prior to post-closure use construction, unless otherwise approved by the Town and MassDEP.

24. Transfer and Financial Assurance: No transfer of this permit shall be permitted except in accordance with the requirements of 310 CMR 19.044. The form established by MassDEP for permit transfers is the BWP SW 49 application form. Any time the Applicants for this project do not include a municipal entity, the Applicants shall provide to MassDEP a financial assurance mechanism, in accordance with 310 CMR 19.051, for the costs of decommissioning and site restoration activities.

25. Entries and Inspections: In accordance with *310 CMR 19.043: Standard Conditions*, MassDEP and its agents and employees shall have the right to inspect the Landfill and any equipment, structure or land located thereon, take samples, recover materials or discharges, have access to

and photocopy records, to perform tests and to otherwise monitor compliance with this permit and all environmental laws and regulations.

26. Reservation of Rights: MassDEP reserves the right to require additional assessment or action, as deemed necessary to protect and maintain an environment free from objectionable nuisance conditions, dangers or threats to public health, safety and the environment. MassDEP reserves all rights to suspend, modify or rescind this permit if it determines the solar array compromises the integrity of the final cover system and/or results in a threat to public health, safety or the environment. MassDEP reserves the right to modify and re-issue this permit based on the site specific calculations to be performed for this Landfill.

    This approval pertains only to the Solid Waste Management aspects of the proposal does not negate the responsibility of the owners or operators to comply with any other local, state or federal laws, statutes and regulations or enforcement actions, including orders issued by another agency now or in the future. Nor does this approval limit the liability of the owners or otherwise legally responsible parties from any other applicable laws, statutes or regulations now or in the future.

VI. REVIEW OF DECISION

Pursuant to 310 CMR 19.033(4)(b), if the Applicants are aggrieved by MassDEP's decision to issue this decision, they may within twenty-one days of the date of issuance file a written request that the decision be deemed provisional, and a written statement of the basis on which the Applicants believe they are aggrieved, together with any supporting materials. Upon timely filing of such a request, the decision shall be deemed a provisional decision with an effective date twenty-one days after MassDEP's receipt of the request. Such a request shall reopen the administrative record, and MassDEP may rescind, supplement, modify, or reaffirm its decision. If MassDEP reaffirms its decision, the decision shall become final decision on the effective date. Failure by the Applicants to exercise the right provided in 310 CMR 19.033(4)(b) shall constitute waiver of the Applicants' right to appeal.

VII. RIGHT TO APPEAL

Right to Appeal: This approval has been issued pursuant to M.G.L. Chapter 111, Section 150A, and 310 CMR 19.033: Permit Procedure for an Application for a Permit Modification or Other Approval, of the "*Solid Waste Management Regulations*". Pursuant to 310 CMR 19.033(5), any person aggrieved by the final permit decision, except as provided for under 310 CMR 19.033(4)(b), may file an appeal for judicial review of said decision in accordance with the provisions of M.G.L. Chapter 111, Section 150A and M.G.L. Chapter 30A no later than thirty days of issuance of the final permit decision to the Applicant. The standing of a person to file an appeal and the procedures for filing such an appeal shall be governed by the provisions of M.G.L. c. 30A. Unless the person requesting an appeal requests and is granted a stay of the terms and conditions of the permit by a court of competent jurisdiction, the permit decision shall be effective in accordance with the terms of 310 CMR 19.033(3).

Notice of Appeal: Any aggrieved person intending to appeal a final permit decision to the Superior Court shall first provide notice of intention to commence such action. Said notices of

intention shall include MassDEP Transmittal No. X272764 and shall identify with particularity the issues and reason why it is believed the final permit decision was not proper. Such notice shall be provided to the Office of General Counsel of MassDEP and the Regional Director for the regional office which processed the permit application, if applicable at least five days prior to filing of an appeal. The appropriate addresses to send such notices are:

Office of General Counsel
Department of Environmental Protection
One Winter Street
Boston, MA 02108

Regional Director
Department of Environmental Protection
20 Riverside Drive
Lakeville, MA 02347

No allegation shall be made in any judicial appeal of a final permit decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in 310 CMR 19.000, provided that a matter may be raised upon showing that it is material and that it was not reasonably possible with due diligence to have been raised during such procedures or that matter sought to be raised is of critical importance to the environmental impact of the permitted activity.

Please direct any questions regarding this matter to me at (508) 946-2847 or HershThakor (508) 946-2715or write to the letterhead address.

Very truly yours,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Mark Dakers, Chief
Solid Waste Management Section
Bureau of Air and Waste

D/HT/
W:\Document Prep Folder\BAW\Solid Waste\Thakor\Pembroke solar PCU 12-28-2016 X271764.docx

fc: Pembroke Board of Health
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