BEALS + THOMAS
CIVIL ENGINEERS | LANDSCAPE ARCHITECTS |
LAND SURVEYORS | PLANNERS | ENVIRONMENTAL SPECIALISTS

September 28, 2020

Mr. George Barrett, Chair
Wareham Planning Board
c/o Mr. Kenneth Buckland, Town Planner
54 Marion Road
Wareham, Massachusetts 02571

Via: Hand Delivery and Email to sraposo@wareham.ma.us
and kbuckland@wareham.ma.us

Reference: Response to Supplemental Peer Review Comments
Application for Site Plan Review
27 Charge Pond Road PV+ES Project
Wareham, Massachusetts
B+T Project No. 1833.109

Dear Planning Board Members:

On behalf of the Applicant, Borrego Solar Systems, Inc. (BSSI), Beals and Thomas, Inc. (B+T) respectfully submits this response to supplemental peer review comments on the above-referenced solar project. For ease of review, comments are indicated in *italicized* font, with our responses in regular font.

We have enclosed nine hard copies of this letter and attachments. We understand that the Board will distribute one of these copies to the peer review consultant for supplemental review. A separate copy of the letter has been submitted directly to Wareham Fire.

Visual Impact from Charge Pond Road

1. *Sheet C-4.5 of the plan set shows the entrance at a scale of 1" = 30' which is acceptable for overall grading. It would be clearer, however if spot grades had been included along the gutter line of Charge Pond Road to indicate the actual grade transition into the site.*

   No response required.

2. *Depending on the point of observation from Charge Pond Road, the visual impact of the project will be clear and open for a width of 80 feet or more. This opening will allow the entire field of vision to be observed for a depth of more than 500 feet into the site and to a width of 500 feet or more from side to side. The reason for this is twofold.*

a. *The elevation of the site extends from 26.5 at Charge Pond Road to 45 at the highest elevation before the grade again descends toward the northwest.*

   No response required.

b. *All vegetation is to be removed between Charge Pond Road and the line of site at the entrance for more than 300 feet.*

   No response required.

3. *Based on the contours of the ground, general grading patterns and the nature of the underlying soil, it is quite possible that the visual impacts from Charge Pond Road can be reduced considerably by the following:*

   a. *Close up the entrance to only that necessary to provide the 20-foot wide access road, leaving all vegetation including large trees intact,*

      The original design intent of the access road was to provide a wider, unpaved construction entrance which would be subsequently tightened and paved upon completion of construction. Based on our understanding of a prior comment by Mr. Rowley, the access road was revised such that the modifications for construction access were made a permanent condition. Accordingly, the currently-proposed extent of clearing is consistent with prior comments.

   b. *Remove the drainage basin that is located next to Charge Pond Road and relocate it or regrade the entrance so that the basin is not required,*

      Respectfully, the Project team has a difference of engineering opinion with regard to this comment. The revised stormwater model submitted with the Response to Peer Review Comments on September 16, 2020 indicates that a basin to the southwest of the site entrance is necessary in order to minimize runoff to Charge Pond Road. Furthermore, this basin provides additional protection to the A-series Isolated Vegetated Wetland. Accordingly, removal of this basin from the proposed design is not feasible. The basin will be loamed and seeded upon completion of construction.

      Practically speaking, the scale of the basin is approximately 2,750 square feet in area with a depth of 3 feet. When constructed, the infiltration basin will serve as an important component to the Project's stormwater controls but will not be noticeable to passersby as it will be loamed and seeded. Thus, we request the Board accept this stormwater basin as proposed.

c. *Leave all trees and vegetation in place between the "Y" of the entrance road and the proposed infiltration basin located immediately south of the closest solar array.*

While it is infeasible to allow the existing trees to remain during construction, the Applicant hereby commits to provide post-construction landscape plantings in the "Y" of the entrance drive below the infiltration basin, in order to provide visual screening. The Applicant respectfully requests that the Board condition its approval to allow the Applicant to submit a landscaping plan for review and comment prior to construction.

d. *Substitute pad mounted metering equipment for the two overhead power lines that are shown on the plans with the exception of one pole to receive the connection from the utility poles on Charge Pond Road.*

It is the opinion of the Applicant that pad-mounted equipment is more impactful than the preferred pole-mounted alternative. Due to the distance between Charge Pond Road and the proposed equipment area, the poles can be spread out over the approximately three hundred feet between the project site and Charge Pond Road rather than clustered at the entrance.

Please be aware that the photographs provided by Mr. Rowley depict solar projects of the SREC or SREC II vintage which have substantially different metering requirements when compared to the current Massachusetts solar program called SMART. However, the Applicant recognizes the subjective nature of aesthetic issues like this and, if it is requested by the Board, the Applicant agrees to providing ground-mounted equipment.

4. *To illustrate the potential visual impacts along Charge Pond Road, photographs have been taken of two existing solar energy sites. The first one is intended to show how exposed panels are visible when viewed from a low elevation and the panel grade rises. The site is on Cranberry Highway near the West Wareham water tank. The second photo was taken of the entrance roadway for a solar site on County Road. While the grade is substantially different, it is readily apparent that using pad mounted equipment instead of overhead power lines reduces the visual impact significantly because clearing for overhead wires is not necessary.*

No response required.

Storm Water and Grading

1. *As evidenced by the underlying soil conditions and the calculations presented, storm water runoff will generally be low. As an example, for infiltration basin #6 which is in the southerly end of the site and is close to the "Y" of the access road, the depth of runoff is only 9" for the 100-year storm event. The height of runoff in the basin would not overtop the basin except in the most extreme conditions beyond the 100-year event.*

   No response required.

2. *A complete evaluation of the runoff to other basins is subject to a check on the identification of sub-catchment areas and pond areas. The Post-Construction Hydrology diagram numbering system in the calculations is not consistent with the Post-Construction hydrologic condition plan. For example, the plan shows PDA 13, 14, 15, 16 or 17 but they are not identified in the calculations.*

   A complete evaluation of all subcatchments and basins was provided in the Stormwater Report. Due to the number of nodes in HydroCAD, the project analysis had to be split into two different files, with file names referenced in the upper left corner of the printouts as 1833109HC002B and 1833109HC003B. The pages labeled 1833109HC003B contain all the subcatchments and associated stormwater basins referenced above. These calculations begin approximately 54 pages into Attachment 3: Post-Development Hydrologic Analysis, after the second routing diagram.

3. *The section through the proposed gravel access road shows it to consist of an 8-inch depth of 3 inch minus stone underlain by filter fabric. However, there is no indication of what is intended by "suitable material for subgrade". It should not be left to the contractor to make this decision.*

   The detail for the gravel access road included on Sheet C5.0 of the plans requires 95% compaction for the proposed subgrade. The Applicant agrees to make the following modification to Note 1 on the civil detail in the construction drawings: "Subcontractor shall remove all topsoil, subsoil, organic and deleterious material for roadway subgrade."

4. *The grading plan shows that the road surfaces would pitch slightly toward the lower side slope. This may be sufficient to provide for good drainage without cutting in swales on the up-hill side. Using the stone and filter fabric could reduce the impact of additional surface runoff, thereby reducing the need for infiltration areas. Since this type of cross section is not a typical gravel road, the runoff curve numbers for it could be much less than 96 as provided in the storm water calculations.*

   The Applicant acknowledges this comment, but notes that the calculations were prepared in compliance with the curve number for gravel as defined by TR-55 – Urban Hydrology for Small Watersheds. An updated gravel road detail clarifying the roadway surface material and specification has been provided with this letter and will be included on the construction drawings.

5. *I recommend that the entrance grading and use of pipe culverts to convey runoff be revisited. The cross over pipe FE-8 to FE-9 has little to no cover. The pipe FE-10 to FE-11 has similar cover concerns. The open infiltration basin located in the 50-foot buffer along Charge Pond Road must be relocated outside the buffer.*

   The Applicant acknowledges this response, and proposes to provide an appropriate depth of cover for pipes FE-8 to FE-9 and FE-10 to FE-11 in the construction drawings. Please refer to Visual Impact from Charge Pond Road Response 3 for additional discussion regarding relocation of the basin adjacent to Charge Pond Road.

6. *The cross section on Sheet C-6.0 for repaving shows 3 inches of binder with a 1-inch wearing surface. The wearing surface thickness should be increased to a minimum 1-1/2" to reduce the potential for unraveling. Sidewalk thickness and slope should meet ADA standards.*

   The Applicant agrees and acknowledge this comment, and will increase the wearing surface thickness to 1.5 inches in the construction drawings. The Applicant hereby confirms that the sidewalk and slope comply with applicable ADA standards as proposed.

Decommissioning Estimate

1. *The project response of September 16, 2020 continues to suggest that the Wareham Recycling Center could be the receiver for recyclable materials if the project is shut down. The center is not equipped to handle such a volume of materials. The center is a volunteer run facility only. The Town of Wareham should not be held responsible for the removal and/or disposal of project materials.*

   The recipient of recyclable materials has been revised in the amended decommissioning estimate, attached.

2. *The decommissioning document as provided should be filled in with all appropriate information and should be submitted for review by Town Counsel.*

   The Applicant agrees with this comment, and requests that the Board add a condition to its approval as they have for prior solar projects proposed by BSSI. As an example, from the 160 Tihonet Road PV+ES Project approval, "The form of security to be posted for decommissioning shall be approved by Town Counsel and shall be automatically renewable with the Town of Wareham cited as a beneficiary of security proceeds in the event of default by the owner or successor(s) in title to the facilities."

3. *It is recommended that the security include a provision that allows the security amount to be reviewed and adjusted accordingly for economic conditions every 5 years for the life of the facility.*

   The Applicant agrees with this comment, and requests that the Board add a condition to its approval as they have for prior solar projects proposed by BSSI. As an example, from the 160 Tihonet Road PV+ES Project approval, "The Decommissioning Proposal presented is approved subject to the condition that the costs for each item shown shall be reviewed every five years following final approval of the project and the submission of a copy of the recorded SPA that is recorded at the PCRD to the Planning Board for the file."

We trust that the information provided herein satisfies the comments on the Project, and look forward to meeting with the Planning Board at the continued hearing on September 28, 2020. Please do not hesitate to contact us should you have any questions in the interim.

Very truly yours,

BEALS AND THOMAS, INC.

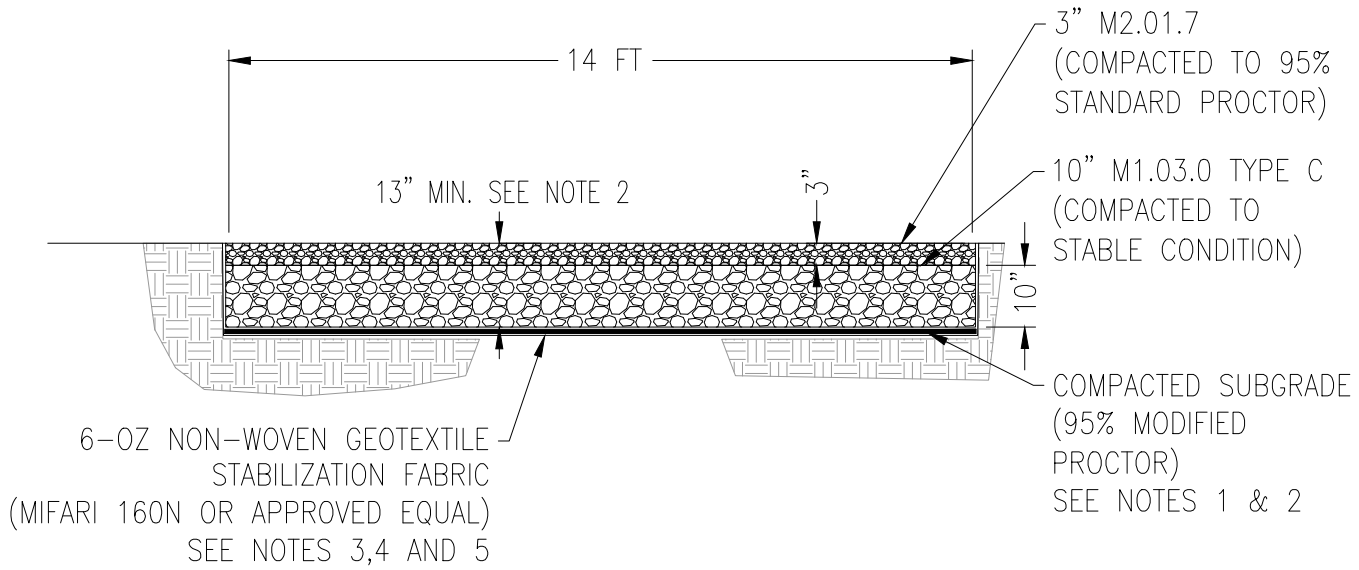
Stacy H. Minihane

Stacy H. Minihane, PWS
Senior Associate

Attachments: Revised Gravel Access Road Detail
Revised Decommissioning Estimate, dated September 28, 2020

cc: Wareham Fire Department (via Certified Mail)
Borrego Solar Systems, Inc. (via Box upload)
A.D. Makepeace Company, James Kane (1 copy via US Mail and email)
Charles L. Rowley PE, PLS (via email and hard copy via Planning Office)

MKS/jrm/shm/mac/1833109LT004



NOTES:

1. SUBCONTRACTOR SHALL EXCAVATE TO SUITABLE MATERIAL FOR SUBGRADE.
2. SUBCONTRACTOR SHALL COMPACT SUBGRADE TO PROVIDE SUITABLE SURFACE TO PLACE ROAD. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPERATION CRITERIA.
3. SUBCONTRACTOR SHALL FOLLOW MANUFACTURER INSTALLATION PROCEDURES.
4. WHERE OVERLAPPING OF GEOTEXTILE FABRIC IS REQUIRED, SUBCONTRACTOR SHALL OVERLAP A MINIMUM OF 24".
5. SUBCONTRACTOR SHALL REMOVE TEMPORARY CONSTRUCTION ACCESS ROADS, AND RESTORE TO PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE CEOR AND THE GOVERNING AGENCIES.
6. SUBCONTRACTOR SHALL INSTALL CONDUITS FOR ALL ELECTRICAL CONDUIT CROSSINGS PRIOR TO INSTALLATION OF THE GEOGRID MATERIAL. THE GEOGRID SHALL NOT BE HORIZONTALLY CUT ONCE INSTALLED.

GRAVEL ACCESS ROAD

SCALE: NTS

XD_CIVIL_GRAVEL_ROAD_MA 09-28-2020

Decommissioning Estimate

Date: 09/28/20

27 Charge Pond Road
Wareham, MA

This Decommissioning Estimate has been prepared by Borrego Solar in an attempt to predict the cost associated with the removal of the proposed solar facility. Key assumptions used include the fact that the fencing, electrical cabinetry, solar racks, solar panels, wiring and all other equipment are all one hundred percent recyclable, therefore, the primary cost of decommissioning is the labor to dismantle and load as well as the cost of trucking. No salvage values have been assumed in these calculations. The concrete pads will be broken up at the site and hauled to the nearest transfer station where it will be accepted without a charge.

The following values were used in this Decommissioning Estimate:

System Specifications	
Number of Modules	30,078
Number of Racks	1,253
Number of Inverters	2
Number of Transformers	2
Electrical Wiring Length (ft)	6,500
Number of Foundation Screws	5,013
Length of Perimeter Fence (ft)	8,342
Number of Power Poles	12
Access Rd Material Volume (YD)	6,400
Total Disturbed Area (SF)	175,693
Total Fence Weight (lbs)	5,923
Total Racking Weight (lbs)	1,065,263
Total Foundation Screw Weight (lbs)	200,520

Equipment & Material Removal Rates	
Module Removal Rate (min/module)	1
Rack Wiring Rem. Rate (min/mod)	0.5
Racking Dismantling Rate (min/rack)	30
Inverter Removal Rate (units/hr)	1
Transformer Removal Rate (units/hr)	0.5
Rack Loading Rate (min/Rack)	15
Elect. Wiring Removal Rate (min/LF)	0.5
Screw Rem. Rate (screws/day)	500
Fence Removal Rate (min/LF)	0.5
Days req. to break up concrete pads	3
Days req. with Rough Grader	3
Days req. with Fine Grader	5
Total Truckloads Required	79
Round-Trip Dist. to Trans. Sta.(miles)	56
Round-Trip Time to Trans. Sta. (hr)	1

Labor and Equipment Costs		
Labor Rate ($/hr)	$	25.00
Bobcat Cost ($/hr)	$	50.00
Front End Loader Cost ($/Day)	$	1,000.00
Excavator Cost ($/Day)	$	1,000.00
Trucking Cost ($/hr)	$	120.00
Backhoe Cost ($/hr)	$	245.00
Power Pole Removal Cost ($/pole)	$	1,500.00
Grader Cost ($/day)	$	1,800.00
Gravel Export Cost ($/YD)	$	10.00
Loam Import Cost ($/YD)	$	25.00
Seeding Cost ($/SF)	$	0.08
Fuel Cost ($/mile)	$	0.25

Energy Storage Decommissioning		
Number of Energy Storage Units		2
Battery Disposal Fee	$	2,000.00
Battery Loading Prep Time (hr)		32
Battery Loading Time (hr)		8

Labor, Material, and Equipment Costs

1. Remove Modules

The solar modules are fastened to racking with clamps. They slide in a track. A laborer needs only unclamp the module and reach over and slide the module out of the track.

Module Removal Rate • Total Number of Solar Modules • Labor Rate = Module Removal Cost

Total = $ 12,532.50

2. Remove Rack Wiring

The modules are plugged together in the same manner as an electrical cord from a light is plugged into a wall socket. The string wires are in a tray. A laborer needs only unplug the module, reach into the tray and remove the strands of wire.

Wire Removal Rate • Total Number of Solar Modules • Labor Rate = Rack Wiring Removal Cost

Total = $ 6,266.25

3. Dismantle Racks

The racking is supported by screw foundations. The racking will be disconnected from the foundation and removed seperately.

Number of Racks • Rack Dismantling Rate • Labor Rate = Rack Dismantling Cost

Total = $ 15,665.63

4. Remove and Load Electrical Equipment

Electrical equipment includes transformers and inverters.

(Number of Inverters • Inverter Removal Rate + Number of Transformers • Transformer Removal Rate) • (Labor Rate + Bobcat Cost) = Electrical Equipment Removal Cost

Total = $ 225.00

5. Break Up Concrete Pads

Concrede pads are broken up using an excavator and jackhammer.

Number of Demolition Days • (Excavator Cost + Labor Cost) = Total Concrete Pad Removal

Total = $ 3,600.00

6. Load Racks

Once the racks have been dismantled, they will be loaded onto trucks for removal from the site. The trucking cost associated with this line item represents the additional time a truck will be needed during loading. Please see item # 13 for additional trucking costs.

Number of Racks • Rack Loading Rate • (Labor Cost + Front End Loader Cost + Trucking Cost) = Total Rack Removal Cost

Total = $ 61,095.94

7. Remove Electrical Wiring

Electrical wiring will be removed from all underground conduits.

Cable Length • Cable Removal Rate • (Labor Cost + Backhoe Cost) = Total Cable Removal Cost

Total = $ 14,625.00

8. Remove Foundation Screws

Foundation screws will be backed out of the ground and loaded onto a truck to be removed from site.

(Total Number of Screws / Daily Screw Removal Rate) • (Labor Rate + Excavator Cost) = Total Screw Removal Cost

Total = $ 12,031.20

9. Remove Fencing

Fencing posts, mesh, and foundations will be loaded onto a truck and removed from site. Trucking costs included in this line item are for the removal process. Trucking to a recycling facility are included in item #13.

(Total Length of Fence • Fence Removal Rate) • (Labor Rate + Bobcat Cost + Trucking Cost) =

Total = $ 13,555.75

10. Remove Power Poles

Power poles will be removed and shipped off site.

Number of Power Poles • Pole Removal cost = Total Power Pole Removal Cost

Total = $ 18,000.00

11. Seed Disturbed Areas

Seeding cost includes labor and materials for reseeding all disturbed areas including the reclaimed gravel road area, former electrical areas, and areas disturbed by racking foundation removal.

Seeding Cost • Disturbed Area = Total Seeding Cost

Total = $ 14,055.46

12. Truck to Transfer Station

All material will be trucked to the nearest Transfer station that accepts construction material. The nearest transfer station is Raynham Transfer Station

(Total Truckloads • Roundtrip Distance • Fuel Cost) + (Total Truckloads • Round Trip Time • Trucking Cost) =
Total Trucking Cost to Transfer Station

Total = $ 10,586.00

13. Remove and Dispose of Energy Storage Equipment

The battery units will be prepared for shipment and loaded onto a truck. A disposal fee will also be required for the disposal company to accept the batteries.

Number of Battery Units • ((Loading Prep Time • Labor Cost) + Loading Time • (Labor Rate + Bobcat Cost + Trucking Cost) + Disposal Fee) =
Total Energy Storage Removal and Disposal Cost

Total = $ 8,720.00

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Summary of Decommissioning Costs

Line Item	Task	Cost
1	Module Removal	$ 12,532.50
2	Rack Wiring Removal	$ 6,266.25
3	Rack Dismantling	$ 15,665.63
4	Electrical Equipment Loading and Removal	$ 225.00
5	Break Up Concrete Pads	$ 3,600.00
6	Load Racks	$ 61,095.94
7	Electrical Wiring Removal	$ 14,625.00
8	Foundation Screw Removal	$ 12,031.20
9	Fence Removal	$ 13,555.75
10	Power Pole Removal	$ 18,000.00
11	Seed Disturbed Areas	$ 14,055.46
12	Trucking to Transfer Station	$ 10,586.00
13	Energy Storage System Removal	$ 8,720.00
	Subtotal =	$ 190,958.72

Present Value Total with 1.25% Adder = $ 238,698.40

Total after 20 years @ 1.5% Inflation

Present Value • (1+ Inflation Rate)^Number of Years = Future Value

Grand Total = $321,492.14