June 23, 2022

Michele Gagnon, Planning Director
Bar Harbor, Maine
mgagnon@barharbormail.org

RE: PEER REVIEW OF BAR HARBOR COMMUNITY SOLAR DECOMMISSIONING & STORMWATER MANAGEMENT

Dear Ms. Gagnon:

Please accept this letter as a summary of our independent peer review findings regarding the Bar Harbor Community Solar project, specifically for decommissioning and stormwater management. Our comments are based on our review of the project materials forwarded by the Town of Bar Harbor and do not include any site inspections/field reviews.

DECOMMISSIONING

As requested, we have reviewed the Decommissioning Plan & Financial Assurance document (decommissioning plan) prepared by BRI Environmental (BRI) provided to us on May 19, 2022 with the filename "Midcoast_BarHarbor_DecommissioningPlan.pdf". Our review tasks included the following:

1. Confirm compliance with town ordinance 125-69 Z(6)
2. Confirm compliance with town ordinance 125-69 Z(8)(a)
3. Confirm the decommissioning cost meets industry standards related to each of the descriptions of work listed in the cost estimate table within the decommissioning plan

Note that the ordinance language is indented with *italicized* font and our responses are in **bold** font.

Task 1: Confirm compliance with Town ordinance 125-69 Z(6)

> *(6) Decommissioning plan. Within 365 days of the SPVS-PU ceasing operation, including if construction begins but is not completed, the owner shall begin site restoration according to the decommissioning plan approved by the Planning Board. Decommissioning shall be completed within 365 days. The owner shall submit a decommissioning plan to include, but not be limited to, the following:*
>
> *(a) Provision for the notification to the Code Enforcement Officer by certified mail of the proposed date of the discontinued operations of the SPVS-PU and of the removal schedule.*

The decommissioning plan has included information that, in our opinion, meets this requirement [page 1, last paragraph (above Table 1)].

> *(b) Provision for the removal of aboveground and underground equipment and of structures and foundations to at least three feet below grade. Underground equipment, structures and foundations that are at least three feet below grade and do not constitute a hazard or interfere with agricultural or other resource-based land use do not need to be removed.*

The decommissioning plan has included information that, in our opinion, meets this requirement [page 2, 1st paragraph].

> *(c) Provision for the removal of graveled areas, access roads, fences, gates, etc., unless leaving it in place benefits an agricultural or other resource-based land use.*

The decommissioning plan has included information that, in our opinion, meets this requirement [page 1, 1st bullet point].

> *(d) Provision for the restoration of the surface grade and soil after removal of aboveground structures and equipment.*

The decommissioning plan has included information that, in our opinion, meets this requirement [page 1, 3rd bullet point].

> *(e) Provision for the revegetation of restored soil area with, to the maximum extent possible, native pollinator-friendly seed mixtures and plant species suitable to the area.*

The decommissioning plan states that "Disturbed areas will be re-seeded with the same native conservation/wildlife seed mix used across the site during Project construction." It is our opinion this statement meets the above requirement [page 2, 2nd paragraph].

> *(f) Provisions for the protection of public health and safety, as well as for protection of the environment and natural resources during the site restoration.*

The decommissioning plan has included information that, in our opinion, meets the requirement for protection of the environment and natural resources during site restoration [page 2, 4th and 5th paragraphs]; the decommissioning plan does not specifically call out provisions for the protection of public health and safety. Considering the legal requirement for contractors to operate within the regulations outlined by OSHA, provisions for the protection of public health may be considered implicit.

> *(g) Provisions for the disposal of all solid and hazardous waste in accordance with state and federal waste disposal regulations.*

The decommissioning plan has included information that, in our opinion, meets this requirement [page 1, 2nd bullet point].

(h) A schedule for completion of site restoration work.

The decommissioning plan has included information that, in our opinion, meets this requirement [page 1, 1st paragraph and page 2, 3rd paragraph].

(i) An estimated cost to implement the decommissioning plan at the estimated date of decommissioning. The cost is to be determined by an independent registered professional engineer in the State of Maine, to be mutually acceptable by the Owner and the Town. The engineer will be paid by the Owner but hired by the Town. The cost to implement the decommissioning plan shall be acceptable to the Town's Finance Director.

The decommissioning plan has included information that, in our opinion, meets this requirement [page 1, last paragraph (above Table 1)].

(j) Provision of financial assurance of performance.

The decommissioning plan has included information that, in our opinion, meets this requirement [page 3, 1st paragraph (above Table 2) and bottom paragraph (below Table 2)].

Task 2: Confirm compliance with Town ordinance 125-69 Z(8)(a)

(8) Financial assurance of performance.

(a) At the time of approval, the owner of the SPVS-PU shall submit to the Town a bond or other financial surety per Article IX of this chapter, to be approved by the Town Council for 110% of the estimated decommissioning of the facility based on the average life span of the SPVS-PU.

The decommissioning plan has included information that, in our opinion, meets this requirement [page 3, 1st paragraph (above Table 2) and bottom paragraph (below Table 2)].

Task 3: Confirm the decommissioning cost meets industry standards related to each of the descriptions of work listed in the cost estimate table within the decommissioning plan

According to the BRI decommissioning plan, the task-by-task cost estimate is based on 2022 estimates from industry professionals and the New York State Energy Research and Development Authority (NYSERDA) [page 3,

1st paragraph]. The associated footnote is for the *New York Solar Guidebook for Local Governments*. A copy of the decommissioning estimate from the NYSERDA Guidebook, dated May 2022, is shown below as Exhibit A; the decommissioning estimate received from BRI for Bar Harbor is shown below as Exhibit B:

Exhibit A: NYSERDA decommissioning estimate

Table 1: Sample list of decommissioning tasks and estimated costs

Tasks	Estimated Cost ($)
Remove Rack Wiring	$2,459
Remove Panels	$2,450
Dismantle Racks	$12,350
Remove Electrical Equipment	$1,850
Breakup and Remove Concrete Pads or Ballasts	$1,500
Remove Racks	$7,800
Remove Cable	$6,500
Remove Ground Screws and Power Poles	$13,850
Remove Fence	$4,950
Grading	$4,000
Seed Disturbed Areas	$250
Truck to Recycling Center	$2,250
Current Total	**$60,200**
Total After 20 Years (2.5% inflation rate)	**$98,900**

Exhibit B: BRI decommissioning estimate

Table 2: Decommissioning Cost Estimate by Task

Task	Task Description	Estimated Cost
1	Mobilization to the site	$ 5,000
2	Install erosion and sedimentation control measures	$ 6,424
3	Remove rack wiring	$ 2,450
4	Remove solar panels	$ 2,450
5	Dismantle racks	$ 12,350
6	Remove electrical equipment	$1,850
7	Break up and remove concrete pads	$ 1,500
8	Remove racks	$ 7,800
9	Remove racking foundations and power poles	$ 25,438
10	Remove fence	$ 4,950
11	Grading	$ 4,000
12	Seed disturbed area	$ 250
13	Truck items to recycling center	$ 2,250
14	Demobilization from the site	$ 5,000
	Total Estimated Cost	$ 81,712
	20-Year Cost Projection (Assumes 2.5% Inflation)	$ 133,895
	110% of the Total Estimated Cost	$ 147,285

Note that the NYSERDA decommissioning estimate shown in Exhibit A, per the NYSERDA Guidebook, "provides an estimate of potential decommissioning costs for a ground-mounted 2-MW solar panel system. Figures are based on estimates from the Massachusetts solar market." As the Bar Harbor Solar Community Solar project is a ground-mounted 1.99-MW solar energy system (a statement we suggest be added to the decommissioning plan overview), the two tables are generally comparable for the purposes of this review.

Additionally, note that neither the NYSERDA plan nor the BRI plan provide any disassembly assumptions, back-up data, or other calculations/item descriptions to indicate the specific procedures for how the tasks or how the estimates were determined.

1. The tasks (descriptions of work) listed in Exhibit B, especially with the addition of mobilization, erosion and sedimentation control, and demobilization, meet industry standards in our opinion; the exception to this is the Exhibit B omission of the 'remove cable' item (as included in Exhibit A).
    a. Based on drawing sheet C-3.1 (from *Application Updates Compiled 4.26.22.pdf*), there appears to be upwards of 1,300 feet (or more, if counting each circuit) of overhead power lines included with this project. As overhead power lines are not mentioned in the BRI decommissioning plan, we suggest adding a line item for overhead power line removal.
    b. We are assuming that the underground power lines and/or other underground cables are not included in the decommissioning as they may be buried deeper than 3 feet. We recommend verification of burial depth and suggest including a line item for removal of underground wiring should burial depth be less than 3 feet.

2. Using the total estimated cost of $81,712 per Exhibit B, we double-checked the math for a 20-year cost projection using the same BRI-assumed 2.5% inflation rate; our calculations agree with the $133,895 value. It is our opinion that a 2.5% inflation factor is not unreasonable for long-term engineering estimates. However, the Town may want to consider an inflation rate that they deem appropriate.

3. We also double-checked the math for 110% of the $133,895 figure and agree with the $147,285 value.

4. Many of the costs for Exhibit B tasks are identical to costs for Exhibit A. As Exhibit A costs are based on the Massachusetts solar market, and the average RS Means Location Factor Index for Massachusetts is generally greater than the same factor for Maine (i.e. the cost of living is higher in Massachusetts), it could be assumed that the costs in Exhibit B are conservative, which is often appropriate.

5. The above being said (regarding item #4), it is our opinion that the total estimated cost of $81,712 (which is prior to the addition of the 20-year projection and the 110% markup) for the BRI decommissioning plan is low. For example:

    a. Transportation is generally based on weight. Per the specifications for the Hi-MO 5 solar panels (included in the *Application Updates Compiled 4.26.22.pdf*), each panel weighs 71.22 lbs (32.3 kg). Based on our experience with a similarly sized solar project, we are assuming there are approximately 6,200 solar panels. The weight of 6,200 solar panels is approximately 441,564 lbs. Assuming transportation is with a flatbed trailer truck that can handle 48,000 lbs per load, more than 9 trucks will be needed to haul these items. Note that the weight calculated does not include the weight of pallet or bin packaging. Additionally, if the panels are removed, packaged, and transported with care, the number of required trucks could increase.

        Adding the weight of the racks, electrical equipment, concrete pads, rack foundations, power poles, fence, and electrical wiring will increase the number of required trucks. Hauling distance is also a factor with these items.

        It is our opinion that $2,250 will not cover those costs.

    b. Based on decommissioning task descriptions, we are assuming the components of the solar project will be disassembled systematically and with some level of care (for example, the rack wiring will be removed first, then the solar panels, then the racks, then the rack foundations, etc.) rather than the having the solar components unceremoniously 'bulldozed' into a big pile for loading and transportation. Therefore, we are assuming the removal of the project components will take time.

        Based on the above-assumption that there are 6,200 solar panels that will be removed, the work could theoretically involve a multi-person crew that will remove and palletize the solar panels

in addition to equipment (with operator) needed to transport the pallets around the site concurrent with solar panel removal.

It is our opinion that $2,450 will not cover those costs.

c. The decommissioning plan states that "Minimal ground disturbance is anticipated from decommissioning activities, and the site will be restored to a natural state…" [page 2, 2nd paragraph]. Based on our assumptions of equipment activity needed to transport the modules around the site, as well as equipment activity needed to transport the racks, foundations, and fencing, it is our opinion that the ground disturbance will be greater than minimal. We would assume that the disturbed area will require some minor regrading (rutting repair) and will need to be seeded and mulched. Additionally, we assume the fenced-in portion of road (approximately 750 linear feet) will require 4" of loam, as well as seed and mulch.

   It is our opinion that $4,000 for grading and $250 for seeding will not cover those costs.

STORMWATER MANAGEMENT

As requested, we have reviewed the Stormwater Management Plan (stormwater plan) prepared by BRI Environmental (BRI), updated on 04/14/2022, and provided to us on May 8, 2022 as part of the document with the filename "Application Updates Compiled 4.26.22.pdf". Our review tasks included the following:

1. Confirm compliance with town ordinance 125-67B(8)(c)
2. Confirm compliance with town ordinance 125-67L
3. Confirm compliance with town ordinance 125-109 (Definition Lot Coverage)
4. Verify the accuracy of the calculations provided by the applicant.
5. Determine whether the panels/arrays, which are established as being exempt from lot coverage calculations per §125-67B(8)(c), count or do not count as impervious area for the purposes of the stormwater management calculations.

Task 1: Confirm compliance with town ordinance 125-67B(8)(c)

(8) Exceptions to lot coverage.

(c) The panels/arrays of the solar photovoltaic system, principal use (SPVS-PU), located over live ground cover with sufficient space between the panels/arrays and above the ground to allow sunlight for vegetation to grow shall be exempt from lot coverage calculations due to sharing of the space. All other SPVS-PU-related amenities such as, but not limited to, roads, etc., are not exempt from lot coverage

calculations. Live ground cover includes, but is not limited to, native perennial vegetation and foraging habitat beneficial to game birds, songbirds, and pollinators.
[Added 11-2-2021]

Based upon our experience with the design of other similar solar panel systems, it is our opinion that the panels will be sufficiently spaced to allow sunlight for vegetation to grow beneath the panels (we suggest the applicant confirm the mounting height). Therefore, it is our opinion that the solar panels would be exempt from the lot coverage calculation. Note that there was no dimension shown between the panels; we recommend dimensions be added. [sheet C-3.1]

Based on guidance provided by the Maine Department of Environmental Protection, only the panel posts would be counted as impervious area. The stormwater plan acknowledges that roads, concrete equipment pads, and racking posts, etc. are not exempt from lot coverage calculations by [page 3, section 1.4] and have listed these items as proposed impervious.

It is our opinion that the ground cover that the applicant is proposing throughout the panels meets the Town's live ground cover requirements and will be a low growth native pollinator friendly seed mix [see Integrated Vegetation Management Plan].

Task 2: Confirm compliance with town ordinance 125-67L

L. Stormwater management. All site plans shall demonstrate that the proposed development shall provide for adequate stormwater management in compliance with the following standards and must be maintained as necessary to ensure proper functioning:
[Amended 11-5-1991; 6-10-2008; 11-3-2009; 6-8-2010]

(1) All new construction and development, whether or not served by a stormwater collection and transportation system, shall be designed to reflect or resemble, as nearly as possible, natural runoff conditions in terms of volume, velocity and location of runoff. If runoff into receiving waters other than direct discharge to the ocean after development would exceed by 10% predevelopment runoff conditions, the off-site impact must be evaluated in terms of potential soil erosion and sedimentation, drainage capacity, land use and land cover characteristics. Appropriate methods of reducing off-site impact shall be employed. Stormwater management evaluations and designs shall be based on a twenty-four-hour, twenty-five-year recurrence interval storm except detention pond spillways, which shall be designed for the one-hundred-year, twenty-four-hour storm event.

During our review of the curve number calculations in the Hydrocad model as well as our review of the plan sheets [sheets C-3.0 and C-3.1] for the pre- and post-development areas, we noted the following issues:

- **It appears the soils group acreages do not match from pre to post development conditions for both watersheds 2 and 3.**

- **Pipe channel flow is not labeled within watershed 3 for the post development condition.**
- **The pipe slope within the Hydrocad model is 10% for the 36" culvert [sheet C-1.0, station 0+63]; it is our opinion that this slope may be a typo given the slope of the existing grades within the wetland at that area is closer to 2%.**
- **Assuming the 36" culvert sits on existing grade, it is our opinion that there is not enough cover over the 36" culvert, (i.e. there may not be adequate separation between the road surface elevation and the top of the 36" culvert elevation).**
- **It is our opinion that the 20-foot pipe length of the 36" culvert is too short as the road width is 20 feet (16ft plus 2-foot shoulders).**
- **Once the stormwater runoff goes through the 36" culvert it will be channelized. It is our opinion that the model should reflect channelized stormwater flow at this location unless there are means being proposed to revert the stormwater runoff back to sheet flow once it leaves the culvert. If this is the case, the means being proposed will need to be provided, as well as the appropriate calculations, and revisions to the Hydrocad model.**

Based on the above discrepancies, we are unable to provide an opinion as to whether or not the current stormwater plan meets the ordinance requirements.

> *(2) Stormwater runoff systems should be designed to facilitate aquifer recharge when it is advantageous to compensate for groundwater withdrawals or reductions in infiltration. Conversely, designs should avoid recharge where groundwater effects might be harmful. The development shall use the Maine Stormwater Best Management Practices Manual in the control of stormwater, published by the Maine Department of Environmental Protection. Design of permanent storage facilities should consider safety, appearance, recreational use, and cost and effectiveness of maintenance operations, in addition to the primary storage function. Natural overland flows and open drainage channel and swale locations should be the preferred alignments for major components of a residential drainage system. The use of enclosed components, such as underground piping, should be minimized where the existing natural systems are able to accommodate storm runoff. Energy dissipaters, to reduce high flow velocities, and other forms of outfall protection shall be employed where enclosed drains discharge onto erodible soils. Stormwater and surface water runoff, whether channelized or not, shall not be diverted onto adjacent properties without an easement, unless in a natural or previously existing channel.*

Based on the stormwater plan drawings [sheets C-3.0 and C-3.1], the runoff path for the post development condition is the same as the pre-development condition. No runoff has been *diverted* onto adjacent properties. It is our opinion that portions of this ordinance requirement are not applicable to this development and the remainder meets the intent of the requirements.

> *(3) The stormwater management system shall be designed to accommodate upstream drainage, taking into account existing conditions and approved or planned developments not yet built, and shall include a surplus design capacity factor of 25% for potential increases in the peak twenty-five-year, twenty-four-hour upstream runoff rate.*

The stormwater plan has not included any language in the application that shows the existing or future planned upstream development. While it appears the stormwater management system for this project includes ditching and culverts, design calculations pertaining to existing, proposed, and future development/capacity factors were not included with the stormwater plan. It is our opinion that the current application does not meet the requirements of this section.

> *(4) Downstream drainage requirements shall be studied to determine the effect of the proposed development, including the twenty-five-percent surplus design capacity factor as required above. The storm drainage shall not overload existing or future planned storm drainage systems downstream from the development. The applicant shall be responsible for financing any improvements to existing drainage systems required to handle the increased storm flows.*

The stormwater plan has not included any language in the application that shows the existing or future planned downstream storm drainage systems will not be overloaded by any potential increase in flows. It is our opinion that the current application does not meet the requirements of this section.

> *(5) The minimum pipe size for any storm drainage pipe shall be 12 inches. Maximum trench width at the pipe crown shall be the outside diameter of the pipe plus two feet. Pipe shall be bedded in crushed stone or widely graded gravel with a uniformity coefficient of greater than six and less than 10% passing the #200 sieve and containing no stones larger than three inches, lumps of clay, or organic matter, reaching a minimum of six inches below the bottom of the pipe and extending to six inches above the top of the pipe.*

The stormwater plan has several culverts proposed for this project. All are greater than 12". There is no cross-section detail that shows the trench width or bedding materials. It is our opinion that the current application partially meets the requirements of this section.

> *(6) Catch basins shall be installed where necessary and located at the curbline, but at no greater horizontal intervals than 300 feet.*

Not applicable.

> *(7) Drain inlet alignment shall be straight in both horizontal and vertical alignment unless specific approval of a curvilinear drain is obtained in writing from the Public Works Director.*

Not applicable.

> *(8) Manholes shall be provided at all changes in vertical or horizontal alignment and at all junctions. On straight runs, manholes shall be placed at a maximum of two-hundred-fifty-foot intervals.*

Not applicable.

(9) Outlets shall be stabilized against soil erosion by riprap or other suitable materials to reduce stormwater velocity.

The stormwater plan contains a detail for riprap outlet aprons [sheet C-2.1]. It is our opinion that a note should be added to the plans to call for outlet *and* inlet protection. A level spreader detail was provided but there are no level spreaders shown on the plans. It is our opinion that level spreaders should be located at the culvert outlets discharging away from the project, where appropriate, and where ditches daylight especially upstream of wetlands.

(10) Materials used in storm drainage construction shall comply with the following standards:

(a) Reinforced concrete pipe. Reinforced concrete pipe shall meet the requirements of ASTM Designation C-76 (AASHTO M 170). Pipe classes shall be required to meet the soil and traffic loads with a safety factor of 1.2 on the 0.01 inch crack strength with a Class B bedding. Joints shall be of the rubber gasket type meeting ASTM Designation C 443-70, or of an approved preformed plastic jointing material such as "Ramnek." Perforated concrete pipe shall conform to the requirements of AASHTO M 175 for the appropriate diameters.

The pipe material was not called out in the plans. Applicant should confirm pipe material.

(b) (Reserved)

(c) ABS pipe. ABS (Acrylonitrile-butadiene styrene) composite pipe and fittings shall conform to the requirements of AASHTO M 264 and AASHTO M 265. Perforated pipe shall conform to the requirements of AASHTO M 36, Type III.

The pipe material was not called out in the plans. Applicant should confirm pipe material.

(d) Corrugated plastic pipe. Corrugated plastic pipe shall conform to the requirements of AASHTO M 252.

The pipe material was not called out in the plans. Applicant should confirm pipe material.

(e) Manholes. Manholes shall be of precast eccentric concrete truncated cone section or eccentric flat top construction meeting the requirements of ASTM Designation C 478. Bases may be cast-in-place 3,000 psi twenty-eight-day strength concrete or may be of precast concrete, placed on a compacted foundation of uniform density. Metal frames and covers shall be set in a full mortar bed and with tops shall conform to the requirements of AASHTO M 103 for carbon steel castings, AASHTO M 105, Class 30, for gray iron castings or AASHTO M 183 (ASTM A 283, Grade B or better) for structural steel. Manholes shall be

provided with polypropylene-coated steps. Frames and covers shall be brought to grade with a minimum of two courses and a maximum of five courses of brick.

Not applicable.

(f) Catch basins. Catch basins shall be of precast concrete eccentric truncated cone section or eccentric flat top construction meeting the requirements of ASTM Designation C 478. Castings shall be square cast iron sized for the particular inlet condition with the gratings perpendicular to the curbline. Bases may be cast-in-place 3,000 psi twenty-eight-day strength concrete or may be of precast concrete, placed on a compacted foundation of uniform density. Metal frames and grates shall be set in a full mortar bed and with tops shall conform to the requirements of AASHTO M 103 for carbon steel castings, AASHTO M 105, Class 30, for gray iron castings or AASHTO M 183 (ASTM A 283, Grade B or better) for structural steel. Frames and grates shall be brought to grade with a minimum of two courses and a maximum of five courses of brick. Catch basins shall be provided with a two sump.

Not applicable.

(11) Stormwater drainage systems shall be designed so as to prevent the infiltration of stormwater into the public sewer system and shall be maintained as necessary to ensure proper functioning.

The stormwater plan does not address this information. Based on a google search, it appears there is no public sewer system in the area. The applicant should confirm this assumption.

(12) Wherever a stormwater drainage system, including a natural watercourse or drainageway, is not within a public right-of-way, perpetual easements shall be provided to the Town allowing maintenance and improvement of the system. Such easement shall be at least 30 feet in width. In no event shall the granting of such an easement be deemed to require maintenance or improvement of the stormwater drainage system by the Town.

Not applicable.

(13) All site plans shall demonstrate in the form of signed affidavits from the Public Works Department that the proposed development shall not place an unreasonable burden on the municipal stormwater drainage system, if such system is to be used, and that the Public Works Department has approved the design specifications of any stormwater drainage system that shall be connected to the municipal system.

The stormwater plan appears to show that the stormwater from the project will not be tied into the municipal stormdrain system. The applicant should confirm this assumption.

Task 3: Confirm compliance with town ordinance 125-109 (Definition Lot Coverage)

> ***LOT COVERAGE***
> *Except as otherwise provided in § **125-67B(8)**, the footprint area of all structures and improvements calculated as a percentage of the area of the lot shall be considered to be lot coverage, including but not limited to principal and accessory buildings; all improved vehicular and pedestrian surfaces, such as parking lots, roads, driveways, maneuvering spaces, and pedestrian walkways, regardless of the construction material employed; graveled areas and other nonvegetated surfaces. Unimproved natural surfaces of a site shall not constitute lot coverage, regardless of whether they are vegetated. Boats stored in cradles above an unimproved natural surface shall not constitute lot coverage. However, in the case of lumber yards, areas of stored lumber shall constitute lot coverage.*
> *[Amended 5-6-1996; 11-4-2003; 11-7-2006; 6-8-2010; 6-12-2018]*

Based on the information provided in the stormwater plan, the existing lot coverage is less than 1% and the proposed lot coverage is ~1.6%, which meets the 25% maximum lot coverage. Note this calculation is based on a proposed lot coverage calculation that does not include the solar panel area. See above.

Task 4: Verify the accuracy of the calculations provided by the applicant.

1. **Reiterating some items from Task 1, above: during our check of the curve number calculation within the Hydrocad model and reviewing the plan sheets [sheets C-3.0 and C-3.1] for the pre- and post-development areas, we noted several issues, including the following:**
    a. **It appears the soils group acreages do not match from pre to post development conditions for both watersheds 2 and 3.**
    b. **Pipe channel flow is not labeled on watershed 3 for post development condition.**
    c. **The pipe slope in the model is 10% for the 36" culvert; it is our opinion that this slope may be a typo given the slope of the existing grades within the wetland at that area is closer to 2%.**
    d. **Assuming the 36" culvert sits on existing grade, it is our opinion that there is not enough cover for the 36" culvert.**
    e. **It is our opinion that the 20-foot pipe length of the 36" culvert is too short as the road width is 20 feet (16ft plus 2-foot shoulders).**
    f. **Once the runoff goes through the culvert it will be channelized. It is our opinion that the model should reflect channelized flow unless there are means being proposed to return the runoff back to sheet flow once it leaves the culvert. If this is the case, the means being proposed will need to be provided, as well as the appropriate calculations, and revisions to the Hydrocad model.**
    g. **We are unable to check culvert sizing calculations, along with the contributing areas with Tc lines on a plan, as they are not included with the stormwater plan.**

2. **The Erosion and Sedimentation Control Inspection and Maintenance Plan identified as Appendix A has been provided, but it is shown with an aerial background that does not include several typical plan details. It does not show the resource limits that need to be protected nor does it show culverts, grading, and other details typically shown on this type of plan. For example, we recommend a double row of sediment barrier within 100 feet of wetlands.**

3. **Some of the line types on the plans do not match (or are not provided) in the legend [sheet C-1.0]; for example:**
    a. **Per the legend, the existing contours are shown as dashed lines, but on the plans, they are not dashed. Additionally, they are listed as 5-foot contours when they are actually 2-foot.**
    b. **The legend does not list proposed contours, but they appear to be dashed on the plans.**
    c. **The delineated stream symbol on the plan does not match the legend.**

4. **Our initial review of the proposed grading along the access road:**
    a. **There appears to be a ditch along the south side of the access road within the array. However, the proposed grading near the turnaround abruptly ends and does not tie into existing contours.**
    b. **The proposed ditch grading near the equipment pad appears to cut through the turnaround. No proposed grading is shown around either turnaround.**
    c. **The proposed grading from station 0+00 to 2+75 shows the road to be the low spot compared to its surroundings; this will essentially cause the road to become the ditch.**
    d. **There does not appear to be suitable cover over the culverts.**
    e. **We recommend continuing the ditch on both sides to the wetland crossing and use level spreaders, as needed, where ditches daylight and at the end of culverts.**

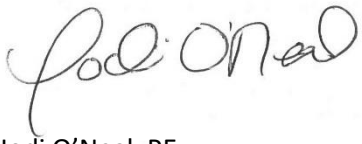
Task 5: Determine whether the panels/arrays, which are established as being exempt from lot coverage calculations per §125-67B(8)(c), count or do not count as impervious area for the purposes of the stormwater management calculations.

Based upon our experience with the design of other similar solar panel systems, it is our opinion that the panels will be sufficiently spaced to allow sunlight for vegetation to grow beneath the panels (we suggest the applicant confirm the mounting height). Therefore, it is our opinion that the solar panels would be exempt from the lot coverage calculation. Note that there was no dimension shown between the panels; we recommend dimensions be added. [sheet C-3.1]

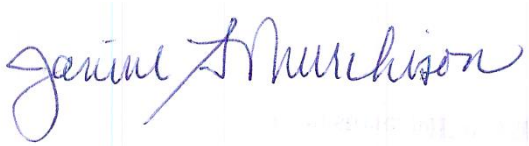
Based on guidance provided by the Maine Department of Environmental Protection, only the panel posts would be counted as impervious area. The stormwater plan acknowledges that roads, concrete equipment pads, and racking posts, etc. are not exempt from lot coverage calculations by [page 3, section 1.4] and have listed these items as proposed impervious.

If you have any questions, please do not hesitate to contact us.

Sincerely,
JAMES W. SEWALL COMPANY



Jodi O'Neal, PE
Project Manager



Janine S. Murchison, PE
Project Manager