Petition No. 1312
Development and Management Plan
Interrogatories to Candlewood Solar, LLC
Set Two

Question 5. Please respond directly to the comments in the February 26, 2019 Milone & MacBroom, Inc. affidavit that was submitted bv the Town of New Milford in Petition 1362. A copy of the affidavit is attached.

Response 5. Please see Attachment A.

Question 6. ***Page 8 of the Development & Management Plan (D&M Plan) dated January 28, 2019 notes that Candlewood Solar, LLC (Candlewood) is "working with DEEP NDDB on a potential modification to the tree-clearing window." What is the status of such potential modification? Is such modification expected to deviate from the originally proposed November 1 through March 30 window?***

Response 6. Candlewood will not clear trees outside of the November 1 through March 30 window.

Question 7. In response to Connecticut Siting Council (Council) D&M Plan interrogatory response number two, Candlewood notes that, "Should the schedule require it, additional work may be performed on Saturdays." However, page 4 of the D&M Plan notes that work hours could occur potentially outside of the standard hours due to working on the electric power system (interconnection), or for other operations due to the nature and scope. Accordingly, could there potentially be any Sunday or nighttime construction hours under such circumstances?

Response 7. Sunday and night work is not anticipated at this time. Should additional work time be required on Sundays or evenings, Candlewood will coordinate with the Town of New Milford for notification.

Question 8. Was the property owner consulted regarding the Decommissioning Plan? Would the Decommissioning Plan in any way conf1ict with the lease option agreement (or other agreement as applicable) with the property owner? Are there any provisions in the lease option agreement with the property owner related to site restoration at the end of the project's useful life? If so, please provide any such provisions.

Response 8. Candlewood Solar LLC is the property owner.

Question 9. Provide the approximate final length of the interconnection line (in linear miles) beginning at the solar facility and ending at the last pole to be owned or controlled by Candlewood.

Response 9. The approximate length of the revised interconnection line is 1.3 miles.

Question 10. ***Referencing Section 2.8 (Compliance with DEEP "Stormwater Management at Solar Farm Construction Projects), are there any guidelines in the document that Candlewood would not be able to comply with? Explain.***

Response 10. These guidelines have been complied with along with more stringent stormwater practices for solar PV construction (Minnesota guidelines). The solar PV array design is being revised in order to reduce the size. As a result, the stormwater design will be revised and will comply with these guidelines.

Question 11. ***Referencing Section 2.13 (Final Wildlife Protection Measures and Seasonal Restrictions), page 10, Candlewood notes that, "Updates on Candlewood Solar's consultation with DEEP NDDB regarding the preconstruction survey and tree clearing will be provided separately to the CSC." A re there any updates at this time? If yes, provide a copy of such updates.***

Response 11. Candlewood Solar will work with a qualified herpetologist to develop the preconstruction survey protocol and schedule. The preconstruction survey will be conducted following receipt of a Scientific Collector's Permit and approved protocol. For additional information on tree clearing, please see Response 6 above.

IN THE MATTER OF:

DEVELOPMENT AND MANAGEMENT PLAN
PROPOSED 20-MW SOLAR PHOTOVOLTAJC
PROJECT CANDLEWOOD MOUNTAIN ROAD
NEW MILFORD, CONNECTICUT
CANDLEWOOD SOLAR LLC-APPLICANT
MMI #1481-57-01

AFFIDAVIT

STATE OF CONNECTICUT)
) **ss: Cheshire**
COUNTY OF NEW HAVEN)

Ryan McEvoy, Edward *A.* Hart, and Vincent C. McDermott, being duly sworn, depose and say the following:

1. We are members of Milone & MacBroom, Inc., a professional engineering, landscape architecture, and environmental science firm with its principal office in Cheshire, Connecticut

2. Ryan McEvoy and Edward A. Hart are professional engineers licensed to practice in the State of Connecticut and by our experience are qualified to review the Development and Management (D&M) Plan for the above-referenced project as such plan relates to site development, stormwater management. erosion and sedimentation control, and similar construction activities. Vincent C. McDermott is a landscape architect licensed to practice in the State of Connecticut and by his e.l(perience is qualified to review the D&M Plan for the above-referenced proj@ct.

3. The Town of New Milford has engaged Milone & MacBroom, Inc. to review the O&M Plan submitted on behalf of Candlewood Solar, LLC (Candlewood) by Wood Environmental and Infrastructure Solutions, Inc. dat d January 14, 2019. This review focuses on the impacts on the environment from the proposed development by comparing the representations made by the petitioner during the proceedings leading to the December 21,2017, Decision and Order (D&O) by the Connecticut Siting Council (CSQ, and the conditions of approval in the D&O to the refined site plans and engineering presented in the D&M Plan. More specifically, this review addresses the following:

   3.1 Adequacy of the Final Site Plans (Appendix B) to provide a responsible contractor to interpret the plans and to construct the improvements and to allow esc to verify that the improvements have been constructed in accordance with the plans

3.2 Adequacy of the Erosion and Sedimentation Control Plan included in Appendix B and described further in the Stormwater Pollution Control Plan (Appendix D) for consistency with the Connecticut Department of Energy & Environmental Protection (CTDEEP) *2002 Connecticut Guidelines for Erosion and Sedimentation Control* including but not limited to seeding the site for stabilization purpos:;s prior tc installation of racking systems and panels

3.3 Consistency of the Stormwater Management Plan with the CTDEEP *2004 Connecticut Stormwater Quality Manual,* including an analysis on the potential impact of driveways on stormwater flows including but not limited to potential diversion of stormwater away from wetlands

3.4 Adequacy of the site clearing, grubbing, stabilization, and stormwater controls phasing plan

3.5 The consistency of the plans with the recommendations from CTDEEP outlined in "Stormwater Management at Solar Farm Construction Projects" dated September 8, 2017

4. The Candlewood Solar project will be constructed on a large site. The portion of the site where construction is proposed has steep slopes that average 10% to 15% with some slopes as steep as 25%. The underlying soils are compact upland soil formed over glacial till, typical of what is found on the hillsides elsewhere in New Milford. The soil infiltration rates for these soils are classified by the Natural Resources ConseiVation Service as being slow to very slow. They are also prone to erosion due to being fine grained. There are several special wetlands on the property including three vema! pools as well as state special concern and threatened amphibians that are sensitive to water quality impacts. There are no construction activities proposed directly in the wetlands, but there are activities in the upland review area that could impact/impair water quality. Except for a small area of hayfields, construction *will* occur in wooded areas of the property. Overall, approximately 83 acres will be disturbed, and approximately 54 acres of core forest land will be clear-cut to allow for the installation of the solar array and the transmission line connecting to the Rocky River substation east of the site.

S. The plans submitted to the CSC as part of the D&M Plan are represented as being "For Construction." The pJans are not suitable for construction, in our opinion, because they lack detail spedfic to the conditions on this subject site, are not adequate to allow a responsible contractor to implement the improvements In the field, and allow esc to verify that the improvements. have been constructed in accordance with the approved plans. Note the following:

5.1 Based on our experience with the design of similar facilities, it is customary engineering practice to provide site layout plans with appropriate dimensions showing the precise limits of clearing and the location of all improvements, grading plans having 2-foot contour intervals showing existing and proposed finished grades including what will be beneath the solar arrays, and detailed drainage plans showing the precise slope sizes and inverts of pipes and other structures. This information is

in addition to the required Erosion and Sedimentation Control Plans. Without having refined plans, the impacts of the proposed development cannot be adequately assessed.

5.2 The project calls for the clearing and grubbing of tl'!e ite in order tc install the solar arrays, access drives, and other related facilities. However, except for some drainage swales and other drainage improvements located on the perimeter of the disturbed site {83.4 acres), there are no grading plans that show how the topography will be regraded once the existing vegetation and stumps have been removed and prior to restoration and the implementation of site improvements.

5.3 The site construction details included in the plans are generic, accompanied by standard tables. The critical details related to drainage structures have not been customized to be applied to this site and rely on field interpretation during construction.

5.4 In reviewing other solar installations and based on our experience, the ratio between the panels and the space between arrays should be approximately 50/SO to facilitate adequate maintenance and provide for sunlight for the vegetation to grow beneath the panels. The plans show that the solar arrays are separated by aisles having a width as narrow as 5 feet, which is too narrow to allow maintenance and promote a healthy vegetative community. Moreover, it wilf cause the vegetation in the aisles and beneath the panels to be shaded, thus affecting the long-term sustainability and quality of the vegetation.

6. The stormwater analysis presented by the applicant is fundamentally flawed as noted below:

6.1 The plalis are bas on outdated rainfall data. Both CTDEEP and the Connecticut Department of Transportation (CTDOT) require the use of rainfail precipitation data from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, not TP-40. (See Appendix B in Chapter 6 of the *2000 DOT Drainage Manual,* as undated on the DOT webpage, now referencing NOAA Atlas 14Volume 10.) The NOAA Atlas 14 rainfall data is 15% to 20% higher than the old data in TP-40 and would have a significant impact on the outcome of the modeling and the actual design.

6.2 The *HydroCAD* model output provided in the Stormwater Pollution Control Plan indicates the use of infiltration in the design of the proposed sand filters. However, it does not appear that In-situ soil testing has been performed to determine if surface sand filters are an acceptable stormwater practice for the site.

6.3 The CTDEEP *Stormwater Quality Manual* provides guidelines for stormwater filtering practices that have not been followed in the proposed design. The manual states that filtering practices are designed as offline systems to treat the water quality volume and bypass larger flows. Also, the manual recommends the Water Quality Volume should be diverted into a pretreatment sediment forebay or settling chamber

to reduce the amount of sediment that reaches the filter. (See Filtering Practices In Chapter 11 of the *2004 DEEP Water Quality Manual,* page 11-P4-l) The proposed design directs all of the runoff to the surface sand filter with no pretreatment. The manual contains a list of the limitations of stormwater filters that pertain to the proposed design: 1) Pretreatment is required to prevent filter media from dogging; 2) Frequent maintenance is required; 3) Surface sand filters are not feasible in areas of high groundwater; 4) Surface sand filters should not be used in areas of heavy sediment loads; 5) Surface sand filters provide little or no stormwater quantity control; and 6) Surface and perimeter filters may be susceptible to freezing. The design of the proposed stormwater management needs to be designed with greater attention to site conditions.

6.4 It is appropriate to assume a meadow coverage condition for the proposed conditions *HydroCAD* model only if continuous vegetation is permanently established and maintained under the solar panels. However, it is expected that the new vegetation will struggle to grow under the panels due to the density, size, and short height of the panels in relation to the ground. The only possible portion of the site where the arrays are proposed that could have a continuous meadow coverage would be the open space in between the panel rows that are illustrated to be as narrow as 5 feet The hydrologic compu ations need to be revised to assume a poorer ground coverage under the proposed solar panels. This is likely to result in the need for stormwater detention that is not part of the plans as now presented.

6.5 The post development peak discharge rates for Points of Analysis 5 and 6 show an increase from the predevelopment conditions. A technical explanation as to why these increases will not cause negative impacts downstream has not been provided.

6.6 At present. much of the runoff from the western portion of the site that drains to abutting properties to the west does so in an even, shaliow, concentrated flow. The introduction of the spillway outlets will result in runoff being consolidated and concentrated in a few distinct locations. This will fundamentally change the nature of the discharge from the subject parcels and could result in long-term risk of erosion and damage to downgradient parcels. This condition also exists on the eastern side of the parcel where runoff is concentrated and not s read out in a manner_more_ consiste wr ex1 rng con rt1ons.

6.7 Design computations for the drainage swales and culverts have not been provided to demonstrate that they are adequately sized to convey the contributing stormwater runoff.

6.8 There are no supporting calculations demonstrating the velocity of runoff that is expected at the outlets of the basins.

6.9 The use of sheet flow in the time of concentration calculations where solar panels are proposed is not a reasonable expectation given the concentrated nature of the runoff

from the panels themselves. The runoff generated from the drip line of the panels will travel downgradient in a manner more consistent with shallow, concentrated flow.

6.10 The grading of the driveway from Candlewood Mountain includes rlprap swales along both sides of the road, with runoff directed to sand filter 7C. The uphill swale appears to simply discharge across the driveway to the sand filter. The uphill swale in particular is likely to convey significant flows that will cause erosion across the driveway in an unprotected manner. Also, there does not appear to be any supporting calculations on the design of the roadside or other swales on site.

6.11 The roadway swales ultimately discharge into two 18-inch culverts beneath the driveway that will channelize the flow and result in point discharges that currently do not occur on site. Also, the 18-inch culvert along the road is shown within the town right-of-way, requiring approval from the New Milford Public Works Department Calculations for the 18-inch culverts have not been provided.

6.12 The riprap spillway depth is not specified for the sand filter details. Assuming that the outflow from the spillway is calculated to begin at the crest and not the bottom of the riprap, the basins will begin to drain at the interface between the earth embankment and the bottom of the riprap, significantly reducing the effective storage within the basins.

6.13 The benns of the sand filters are shown at a 2:1 slope. Recommended slopes on constructed berms generally require an average slope of 2.5 between *the* inside and outside slopes of the berm.

6.14 Sand filter 7C does not include a berm as shown in the calculations and merely drains from elevation 726 to 724.

6.15 The plans call for a narrow sand filter strip within the bottom of some sand filter basins. The soil media should be placed within the entire bottom ofthe sand filters.

6.16 Water quality basins 2A, 28, 4A, and 48 are proposed on existing grades approaching 25%, resulting in significant grading along the property line. These basins need to be relocated upgradient to flatter existing slopes that are more suitable for construction of stonnwater control features.

6.17 Portions of the site grading, drainage, and site improvements are shown directly against property lines and the town right-of-way. The submitted documents indicate that the property lines are based on tax maps and not based on surveyed property lines. Assessor's mapping is appfC?ximate and should not be used as a basis for design of construction plans particularly when activity is proposed right up to a property line. An A-2 boundary survey should have been completed prior to submission of the Stormwater General Permit application.

6.18 ·The grading plan for basin 1A requires the installation of a constructed berm that will impound stormwater up to a couple feet in depth beneath portions of the solar panels. Based on the limited area of sand filter that is shown only in a small portion of the area impound@d by the basin nearest to the eastern berm, extended periods of standing water may exist beneath panels after a rainstorm.

7. The phasing plan described in the Stormwater Pollution Control Plan (Appendix D) is simplistic and does not adequately address the potential erosion and sedim ntation that should be anticipated from the disturbance of 83.4 acres (see Section 2.1 in the Stormwater Pollution Control Plan) on a steep hillside. Note the following:

7.1 The plans do not clearly show how no more than S acres at a time will be disturbed before stabilization and prior to the installation of the panels.

7.2 The plan states that the solar array will be installed after vegetative cover is "initiated," but there is no metric for determining when the soil has been stabilized.

7.3 The plans call for the clear-cutting of trees as one continuous operation, leaving the stumps in place. Such forest operations can cause soil erosion, but the applicant is not proposing to install erosion control measures until after the clearing operation is finished.

7.4 The second phase of the operation calls for the grubbing {removal of stumps) to be done in 5-acre increments, but the locations of those "plots" have not been clearly defined; this will be left to field survey at the time of construction. Furthermore, the method of grubbing has not been presented. If not performed with appropriate equipment, there is likely to be a loss of topsoil and an increase in the potential for erosion on the steep slopes. It appears from the pians that it is the applicant's intention to perform the operations in a continuum rather that in discrete and separate disturbance plots that will allow for separation of the disturbed areas and for vegetation to become established.

7.5 Temporary seeding is proposed in areas that will be disturbed by subsequent construction activity with permanent seeding occurring at a later time. It is not dear how, when, and where permanent seeding will occur.

7.6 It is not appropriate to assume that once germination occurs that the land is stabilized and the 5-acre phase is ready for the installation of foundations. It is our experience on sites where grass needs to be established prior to having activity on the site that it takes a substantial period of time before sod becomes adequately established. Permanent seed, which should include drought- and shade-tolerant species, takes 3 weeks or so to germinate and takes months, not weeks, to develop a root system that can withstand traffic. The actual time for turf establishment depends on the time of year that seed is placed, temperature, and moisture. The turf

needs to be mowed to promote density. In this instance, we would expect a full growing season for the grass to become fully established.

7.7 As described in the plan, the foundations for the solar arrays will be ground screws that, in our experience, are installed using a skid-steer vehicle (a Bobcat). The movement of such equipment will tear -apart the grass, likely resulting in erosion unless the grass is fully established.

7.8 The phasing plan attempts to break up the stabilization and construction ofthe site based on contributing watersheds. This does not seem to be a practical means to construct the improvements, particularly given the potential of subwatersheds being changed or modified as a result of ongoing construction activities. Sediment control measures including sediment traps and diversion swales should be installed and in place In phases immediately adjacent to phases that are under active construction to ensure that downgradient protections are in place should the topography not precisely match what is. shown on the plans or if construction activities divert runoff across the estimated watershed limits.

7.9 The temporary sediment traps (TST) are shown on the plans in the identical manner that sand filter/Water quality basins are shown. The supporting calculations shown on the details sheets include bottom elevations of the TSTs that are up to 3 feet below the *bottom* of the sand filter, well below the finished grade. The sediment and erosion control plans should reflect the grading of the TSTs shown in the supporting calculations.

7.10 long slopes several hundred feet in length {as much as 700 feet) with average slopes exceeding 10% of disturbed, exposed soil are proposed prior to any sediment c:ontroJ measures. Unprotected long and steep slopes represent a significantly high risk of erosion. long, steep slopes are required to be broken up by benching, terracing, or diversions to avoid erosion problems (pages 3 through 7 of the *2002 Connecticut Guidelines for Erosion and Sediment Control).* Detailed site grading plans should be provided to show these site modifications.

7.11 The sediment barrier shown on the perimeter of the site will channelize and direct runoff to the low points along the slope, concentrating runoff from sediment trap outlets. The sediment barrier/silt fence locations need to be pfaced in a manner that will not result in channelizing the discharge from the basins.

712 Soil stockpile locations are not shown.

7.13 Much of the clearing and installation of overhead wires occurs on a slope that exceeds 25% in grade. While the activities proposed in that area are intended to be minor in nature, disturbed soil on a slope this steep will require temporary diversions and at least temporary erosion control matting to allow for vegetation to become established.

7.14 There are no long-term stabilization measures shown along the drip line of the panels. Particularly in areas exceedfng 10% in grade, there exists the potential for erosion of the soil, which over time will result in increased sediment loads to downgradient areas.

8. The document prepared by CTDEEP entitled *Stormwater Management at Solar Farm Construction Projects* includes clarification on procedure, design goals, and construction monftoring requirements that reiterate the goals of design documents referenced in Comment 3 above. The submitted documents fail to adhere to the recommendations of crDEEP guidelines as noted below:

8.1 The CTDEEP document requires that the methods of *"an approvable SWPCP will include methods tor avoiding compaction of soils, disconnection of and reduction of runoff..,avoidance of concentration of stormwater, and other measures necessary to maintain or improve pre-construction hydrology conditions."* For the reasons stated in Comment 6, it is our opinion that the postconstruction hydrology will degrade and exacerbate preconstruction hydrology.

8.2 The CTDEEP document requires that the design professional be well versed in erosion and sedimentation guideiTnes, particularly Chapter 4 for large construction sites. For the reasons *we* stated in Comment 7, the D&M Plan does not meet these criteria.

8.3 The document states "an approvable SWPCP shall include, but not be limited to, the location of all erosion, sediment and stormwater control measures including detailed design cut sheets with supporting calculations, construction means and methods, project phasing (i.e. site planning pre-construction, construction, and post-construction stabilization, etc.), construction sequencing and a construction schedl!le." For the reasons stated in Comment 7, the phasing plan lacks sufficient detail, and the timing of construction activities will result in large tracts of disturbed land with a lack of mature vegetation needed to limit the potential for transport of sediment during construction.

9. In summary, the plans submitted to the esc as part of the D&M Plan are inadequate and lack the necessary information to assure that there will not be erosion and sedimentation caused by the construction activities that could impact the waters of the stated as noted below:

9.1 Contrary to representations made by the petitioner, the hydrology of the site will be permanently altered and will impact adjoining properties.

9.2 The Candlewood Solar project should be distinguished from other projects that come before the esc. Whereas transmission line projects, for example, disturb land in a linear manner where impacts from erosion and sedimentation are manageable and stabilization can occur quickly, the Candlewood Solar project will require the dearing,

grubbing, and regrading of a large block of land on steep slopes where it will be difficult to manage impacts.

9.3 The establishment of grass cover adequate to prevent long-term erosion will require regrading of the site prior to seeding. The time that it will take to achieve wail-established grass should be measured in months, not weeks. By developing the site in "rolling" 5-acre increments without establishing thick turf before installing the solar arrays is highly likely to cause both short-term and long-term erosion and sedimentation.

9.4 The density of the solar arrays will severely restrict sunlight to the grass beneath the panels and make it very difficult to maintain the grass that will allow for its long-term health.

9.5 If the esc requires the petitioner to modify and resubmit the plan and supporting documents in accordance with the foregoing comments, It is quite possible that the configuration of the solar arrays will need to be modified and further reduced in number.

MILONE & MAC8ROOM, INC.

Ryan McEvoy, PE
Lead Project Engineer, Civil
Cheshire, Connecticut

Date 2/27/2019

Edwarcl A. Hart PE, Vice President
Director of Civil Engineering
Cheshire, Connecticut

Date

Vincent C. McDermott, FASLA, AICP
Senior Vice President
Cheshire, Connecticut

Date Feb. 26. 2019

ATTACHMENT A: Response to Milone & MacBroom Inc. affidavit dated February 26, 2019

5. The plans submitted to the CSC as part of the D&M Plan are represented as being "For construction." The plans are not suitable for construction, in our opinion, because they lack detail specific to the conditions on this subject site, are not adequate to allow a responsible contractor to implement the improvements in the field, and allow CSC to verify that the improvements have been constructed in accordance with the approved plans. Note the following:

5.1 Based on our experience with the design of similar facilities, it is customary engineering practice to provide site layout plans with appropriate dimensions showing the precise limits of clearing and the location of all improvements, grading plans having 2-foot contour intervals showing existing and proposed finished grades including what will be beneath the solar arrays, and detailed drainage plans showing the precise slope sizes and inverts of pipes and other structures. This information is in addition to the required Erosion and Sedimentation Control Plans. Without having refined plans, the impacts of the proposed development cannot be adequately assessed.

Response: The Issued for Construction plans dated December 19, 2018 are in the process of being revised in order to provide additional information to construct the project.

- *The existing and proposed topography is presented in 2-ft intervals as shown on the Grading and Drainage Plans (Sheets 9-12). The proposed grading is only shown where it differs from the existing conditions, otherwise the existing topography will remain. Proposed grading is shown as solid lines that tie into existing dashed grade lines (for example, the 830 elevation contour is being slightly regraded as shown on the northwest portion of the array on Sheet 11). The Grading and Drainage Plans do not show the solar PV components in order to provide clarity on the grading and drainage design. Note that the stormwater design is in the process of being revised based on a reduced limit of work as a result of the solar PV array redesign. This reduced limit of work, including an increased natural buffer on the western side of the site, will reduce the tree clearing. Additional clarification on this response will be provided once the re-design is complete.*

- *Callouts for the proposed tree clearing limits are depicted on the site layout plans (Sheets 4-8). Dimensions have been added depicting the distance between tree clearing limits and proposed panels.*

- *Erosion and sedimentation controls including construction phasing, site plans, notes, and specific details for each control measure are provided in the Erosion and Sedimentation Control Plans (Sheets 13-22). The detailed phasing plan is described on Sheet 13. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete, which will include additional detail on the phasing plan as well as specific proposed dates that correspond to the construction schedule (see further comment response related to the construction schedule below (comment 7.5)).*

- *The design of stormwater and erosion control features was prepared based on the Connecticut Department of Energy & Environmental Protection (CTDEEP) regulations including the 2002 Connecticut Guidelines for Erosion and Sedimentation Control, the 2004 Connecticut Stormwater Quality Manual, and the 2017 Stormwater Management at Solar Farm Construction Projects. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.*

5.2 The project calls for the clearing and grubbing of the site in order to install the solar arrays, access drives, and other related facilities. However, except for some drainage swales and other drainage improvements located on the perimeter of the disturbed site (83.4 acres), there are no grading plans that show how the topography will be regraded once the existing vegetation and stumps have been removed and prior to restoration and the implementation of site improvements.

Response: The site topography will remain largely unchanged with minimal site grading proposed to construct the access roads, stormwater features, and minor land grading as shown on the Grading and Drainage Plans (Sheets 9-12) of the Issued for Construction plan set dated December 19, 2018. Once the trees are cleared and stumps are removed within the proposed fence line, the land will be graded to match existing conditions, unless otherwise shown on the Grading and Drainage Plans (see response above). Stumps will remain in place in the area between the fence line and the limit of work. Note that the proposed access road within the array is flush with the surrounding grade as explained in the testimony to the Siting Council. For this reason, proposed grades are not shown in the majority of the proposed access roads within the array, however, proposed grading for the access road from Candlewood Mountain Road to the limits of the array are shown Sheet 10. Details for the flush access drive and the raised access road are provided as details B3 and C1, respectively on Sheet 24. Also note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.

5.3 The site construction details included in the plans are generic, accompanied by standard tables. The critical details related to drainage structures have not been customized to be applied to this site and rely on field interpretation during construction.

Response: The site construction details presented in the Issued for Construction set are specific to the site development, including the surface sand filter (Detail C3 on Sheet 23) and sediment trap (Detail C1 on Sheet 22) design tables which specify the design elevations for each structure. These tables are included below for your convenience. The surface sand filter water quality volume calculations are also included in Appendix B-3.1 and are summarized in Table B3-2. These details reference the 2002 Connecticut Guidelines for Soil Erosion & Sediment Control, the 2004 Connecticut Stormwater Quality Manual and also the Minnesota Stormwater Manual's Stormwater Management for Solar Projects. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response, including physical dimensions of each BMP for construction, will be provided once the re-design is complete.

CTDEEP SEDIMENT TRAP TABLE

Sediment Trap No.	Drainage Area	Acreage	Initial Storage Capacity	Trap Bottom Elevation	Outlet Base Elevation (Wet Pool)	Max. Trap Depth Below Outlet, ft (D_w)	Outlet Top Elevation (Overflow)	Rise of Stone Outlet, ft (D_d)	Wet Pool Surface Area, sf (A_w)	High Pool Surface Area, sf (A_d)	Wet Storage Volume Provided*, cf (V_w)	*Wet Storage Volume Required, cf (V_w)*	Dry Storage Volume Provided*, cf (V_d)	*Dry Storage Volume Required, cf (V_d)*
1A	**1AS**	3.71	13,405	805.00	808.00	3.00	810.00	2.00	3,936	5,117	10,037	*6,702*	9,053	*6,702*
1B	**1BS**	2.34	8,455	805.00	808.00	3.00	809.54	1.54	5,702	7,413	14,540	*4,228*	10,098	*4,228*
2A**	**2AS**	2.46	8,915	791.00	794.00	3.00	795.50	1.50	1,046	3,151	4,457	*4,457*	4,457	*4,457*
					Perform additional grading to a minimum area of:				**1,748**	**4,195**				
2B**	**2BS**	4.54	16,437	772.00	775.00	3.00	776.76	1.76	2,353	5,599	8,218	*8,218*	8,218	*8,218*
					Perform additional grading to a minimum area of:				**3,223**	**6,116**				
2C**	**2CS**	3.58	12,967	766.00	769.00	3.00	770.81	1.81	1,408	3,027	6,483	*6,483*	6,483	*6,483*
					Perform additional grading to a minimum area of:				**2,543**	**4,622**				
3A**	**3AS**	4.31	15,575	722.00	725.00	3.00	727.00	2.00	2,841	6,027	7,788	*7,788*	8,868	*7,788*
					Perform additional grading to a minimum area of:				**3,054**					
3B**	**3BS**	3.88	14,049	729.50	732.50	3.00	734.25	1.75	2,566	5,694	7,024	*7,024*	7,228	*7,024*
					Perform additional grading to a minimum area of:				**2,755**					
4A**	**4AS**	4.00	14,472	719.00	722.00	3.00	723.71	1.71	1,647	5,420	7,236	*7,236*	7,060	*7,236*
					Perform additional grading to a minimum area of:				**2,838**					
4B**	**4BS**	4.02	14,548	727.00	730.00	3.00	730.99	0.99	1,410	4,332	7,274	*7,274*	7,274	*7,274*
					Perform additional grading to a minimum area of:				**2,853**	**11,842**				
5A**	**5AS**	2.76	9,971	792.00	795.00	3.00	796.06	1.06	1,540	4,126	4,986	*4,986*	3,003	*4,986*
					Perform additional grading to a minimum area of:				**1,955**					
5B	**5BS**	2.03	7,337	797.00	800.00	3.00	802.00	2.00	1,977	4,640	5,041	*3,669*	6,617	*3,669*
6A**	**6AS**	1.30	4,685	802.00	805.00	3.00	806.62	1.62	636	6,907	2,343	*2,343*	6,110	*2,343*
					Perform additional grading to a minimum area of:				**919**					
6B**	**6BS**	2.03	7,341	799.00	802.00	3.00	803.56	1.56	583	7,728	3,670	*3,670*	6,483	*3,670*
					Perform additional grading to a minimum area of:				**1,439**					
6C**	**6CS**	2.85	10,304	764.84	767.84	3.00	769.67	1.83	1,384	3,453	5,152	*5,152*	5,152	*5,152*
					Perform additional grading to a minimum area of:				**2,020**	**3,610**				
7A**	**7AS**	2.98	10,771	786.93	789.93	3.00	791.76	1.83	961	3,276	5,385	*5,385*	5,385	*5,385*
					Perform additional grading to a minimum area of:				**2,112**	**3,774**				
NO CTDEEP SEDIMENT TRAP FOR SUBCATCHMENT 7B														
7C	**7CS**	1.44	5,210	718.04	721.04	3.00	722.87	1.83	1,700	6,822	6,822	*2,605*	7,798	*2,605*
8A**	**8AS**	4.38	15,843	760.00	763.00	3.00	764.56	1.56	1,073	3,008	7,922	*7,922*	7,922	*7,922*
					Perform additional grading to a minimum area of:				**3,107**	**7,049**				
8B**	**8BS**	4.86	17,580	744.00	747.00	3.00	748.64	1.64	1,125	3,174	8,790	*8,790*	8,790	*8,790*
					Perform additional grading to a minimum area of:				**3,447**	**7,272**				
9A**	**9AS**	3.46	12,522	754.00	757.00	3.00	758.14	1.14	1,693	5,755	6,261	*6,261*	6,261	*6,261*
					Perform additional grading to a minimum area of:				**2,455**	**8,529**				
9B**	**9BS**	4.93	17,837	752.00	755.00	3.00	757.19	2.19	1,673	3,974	8,918	*8,918*	8,918	*8,918*
					Perform additional grading to a minimum area of:				**3,497**	**4,647**				
10	**10S**	3.53	12,753	751.50	754.50	3.00	757.19	2.69	2,724	8,698	6,946	*6,377*	15,363	*6,377*
12	**12S**	0.42	1,523	696.25	700.25	3.00	701.70	1.45	945	1,425	2,410	*762*	1,718	*762*

Notes:

* Storage volumes provided are shown on the drawings for most sediment traps as the grading contours for the permanent sand filters. Following construction, temporary sediment traps will be converted to permanent water quality sand filters.

** Sediment traps require additional grading beyond what is shown on the drawings to meet the required storage volume(s).

1. Wet storage volume: $V_w = 0.85 * A_w * D_w$
2. Dry Storage volume: $V_d = (A_w + A_d)/2 * D_d$

CTDEEP SURFACE SAND FILTER TABLE									
SURFACE SAND FILTER	TOP OF FILTER ELEVATION (FT)	FILTER INVERT ELEVATION (FT)	UNDERDRAIN INVERT ELEVATION (FT)	TOP OF BERM ELEVATION (FT)	WATER QUALITY HGL ELEVATION (FT)	10 YEAR HGL ELEVATION (FT)	25 YEAR HGL ELEVATION (FT)	100 YEAR HGL ELEVATION (FT)	100 YEAR FREEBOARD HEIGHT (FT)
1A	810.00	808.17	807.17	812.50	807.43	810.66	810.86	811.18	1.32
1B	809.54	807.71	806.71	811.37	806.75	809.85	810.05	810.36	1.01
2A	795.50	793.67	792.67	798.45	795.04	797.22	797.29	797.36	1.09
2B	776.76	774.93	773.93	780.58	774.83	779.16	779.35	779.57	1.01
2C	770.81	768.98	767.98	774.90	768.35	773.44	773.62	773.82	1.08
3A	727.00	725.17	724.17	730.49	724.31	728.91	729.11	729.39	1.10
3B	734.25	732.42	731.42	738.62	731.56	737.06	737.30	737.62	1.00
4A	723.71	721.88	720.88	728.20	721.23	726.70	726.99	727.20	1.00
4B	730.99	729.16	728.16	734.90	728.43	733.47	733.65	733.90	1.00
5A	796.06	794.23	793.23	799.35	793.49	798.12	798.22	798.34	1.01
5B	802.00	800.17	799.17	805.25	799.38	803.90	804.02	804.16	1.09
6A	806.62	804.79	803.79	809.12	803.98	807.92	808.01	808.12	1.00
6B	803.56	801.73	800.73	806.06	801.11	804.07	804.16	804.31	1.75
6C	769.67	767.84	766.84	772.67	767.27	771.27	771.38	771.54	1.13
7A	791.76	789.93	788.93	794.30	789.22	793.08	793.14	793.24	1.06
No CTDDEP Surface Sand Filter for Subcatchment 7B									
7C	722.87	721.04	720.04	726.25	720.89	724.64	725.03	725.24	1.01
8A	764.56	762.73	761.73	768.63	762.32	767.39	767.49	767.63	1.00
8B	748.64	746.81	745.81	752.30	746.22	751.03	751.12	751.26	1.04
9A	758.14	756.31	755.31	761.64	755.73	760.36	760.47	760.60	1.04
9B	757.19	755.36	754.36	759.44	754.79	758.23	758.30	758.43	1.01
10	796.30	794.47	793.47	798.96	793.74	797.65	797.76	797.91	1.05
Wet Swale 12B	NA	NA	NA	702.20	701.08	702.03	702.07	702.15	0.05

5.4 In reviewing other solar installations and based on our experience, the ratio between the panels and the space between arrays should be approximately 50/50 to facilitate adequate maintenance and provide for sunlight for the vegetation to grow beneath the panels. The plans show that the solar arrays are separated by aisles having a width as narrow as 5 feet, which is too narrow to allow maintenance and promote a healthy vegetative community. Moreover, it will cause the vegetation in the aisles and beneath the panels to be shaded, thus affecting the long-term sustainability and quality of the vegetation.

Response: Shade tolerant seed mixes have been specified for restoration of the array portion of the site to account for the potential increase in shade due to the row spacing. The stabilization seed mix installed after clearing and grubbing but before the array installation will be the Quick Erosion Control Cover Mix (ERNMX-104). Once the array is installed, the site will be restored by overseeding with either the Solar Farm Seed Mix (ERNMX-186) or the Conservation Shade Mix (ERNMX-129) both of which require as little as 2 hours of indirect sunlight per day to promote a healthy vegetated cover. Seeding will be performed by hydroseeding.

As a conservative approach and per CTDEEP direction, the stormwater design was revised to incorporate the Minnesota Stormwater Manual's Stormwater Management for Solar Projects and Determining Compliance with NPDES Construction Stormwater Permit to provide additional stormwater quality volume treatment.

In addition, the stormwater design is being revised for the reduced size limit of work area and revised to achieve a consistent interrow spacing.

6. The stormwater analysis presented by the applicant is fundamentally flawed as noted below:

6.1 The plans are based on outdated rainfall data. Both CTDEEP and the Connecticut Department of Transportation (CTDOT) require the use of rainfall precipitation data from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, not TP-40 (See Appendix B in Chapter 6 of the 2000 DOT Drainage Manual, as undated on the DOT webpage, now referencing NOAA Atlas 14 Volume 10). The NOAA Atlas 14 rainfall data is 15% to 20% higher than the old data in TP-40 and would have a significant impact on the outcome of the modeling and the actual design.

Response: The approach of the stormwater design was to follow Table 7-2 of the CTDEEP 2004 Stormwater Quality Manual. Based on these comments and comments from DEEP, the stormwater analysis has been revised to include the updated rainfall data provided by the National Oceanic

and Atmospheric Administration Atlas 14 (NOAA Atlas 14) Precipitation Frequency Estimates. The revised stormwater calculations will be included with the revised design plans. The table below shows a comparison of the Table 7-2 rainfall data (for Litchfield County) vs. the NOAA Atlas 14 rainfall data for the site (Candlewood Mountain) for the 24-hour storm event.

24 Hour Design Rainfall Event	CTDEEP Table 7-2 Rainfall Amount for Litchfield County	NOAA Atlas 14 Rainfall Amount for Station ID 06-6966
2-year	3.2	3.42
10-year	4.7	5.42
25-year	5.5	6.68
100-year	7.0	8.61

The NOAA Atlas 14 rainfall data was used to recalculate the peak discharge from the site under pre and post construction conditions. A summary table with the peak flow rate result from each surface sand filter is provided below which demonstrates that 5 of the surface sand filters will require additional capacity to accommodate the increase in flow for the 100-year storm event and the surface sand filters for Point of Analysis 6 would require additional capacity for the 10-, 25-, and 100-year storm events. The NOAA Atlas 14 rainfall data will be used in the stormwater analysis to be completed for the reduced limit of work area.

Watershed	24-hour Storm Event	Existing Condition Peak Outflow (cfs)	Proposed Condition Peak Outflow (cfs)	**Difference in Peak Flow (cfs)**
DA-1	10	14.73	0.00	**-14.73**
	25	20.88	0.05	**-20.83**
	100	30.69	3.22	**-27.47**
DA-2	10	32.83	28.50	**-4.33**
	25	45.78	43.81	**-1.97**
	100	66.21	64.02	**-2.19**
DA-3	10	11.06	6.68	**-4.38**
	25	15.92	15.10	**-0.82**
	100	23.79	26.36	**2.57**
DA-4	10	13.59	10.44	**-3.15**
	25	19.57	18.94	**-0.63**
	100	29.16	30.39	**1.23**
DA-5	10	7.43	4.79	**-2.64**
	25	10.68	10.42	**-0.26**
	100	15.95	17.25	**1.30**
DA-6	10	9.26	9.63	**0.37**
	25	13.23	14.57	**1.34**
	100	19.61	21.98	**2.37**
DA-7	10	16.83	13.20	**-3.63**
	25	23.50	21.24	**-2.26**
	100	34.06	32.63	**-1.43**
DA-8	10	22.60	15.44	**-7.16**
	25	31.56	22.61	**-8.95**
	100	45.72	33.82	**-11.90**
DA-9	10	13.52	11.98	**-1.54**
	25	19.16	18.58	**-0.58**
	100	28.17	27.89	**-0.28**
DA-10	10	7.33	4.91	**-2.42**
	25	10.31	7.89	**-2.42**
	100	15.05	12.05	**-3.00**
DA-11	10	2.12	2.12	**0.00**
	25	2.91	2.91	**0.00**
	100	4.13	4.13	**0.00**
DA-12	10	1.80	1.72	**-0.08**
	25	2.36	2.22	**-0.14**
	100	3.23	3.31	**0.08**

24-hour average rainfall data referenced from NOAA Atlas 14, Volume 10, Version 2 ROCKY RIVER DAM for Station ID: 06-6966 New Milford, Connecticut.

10-year = 5.43 inches

25-year = 6.69 inches

100-year = 8.62 inches

6.2 The HydroCAD model output provided in the Stormwater Pollution Control Plan indicates the use of infiltration in the design of the proposed sand filters. However, it does not appear that In-situ soil testing has been performed to determine if surface sand filters are an acceptable stormwater practice for the site.

Response: Soil test pitting is proposed to be completed in the Spring of 2019 to evaluate the soil characterization at each BMP location. The test pits will be completed at each surface sand filter location to evaluate soil type, depth to groundwater and presence of ledge. Following the test pit activities, the stormwater analysis will be updated to include the information collected at each test

pit, following Table II-P3-I from the 2004 Connecticut Stormwater Quality Manual (below). If unfavorable soil types for infiltration, high groundwater or ledge are present at the proposed BMP locations, the BMPs will be relocated to a more favorable location.

Group	Soil Texture	Minimum Infiltration Rate (in/hr)
A	sand, loamy sand, or sandy loam	0.3-0.45
B	silt loam or loam	0.15-0.3
C	sandy clay loam	0.05-0.15
D	lab loam, silty loam, sandy clay, silty clay, or clay	0-0.05

6.3 The *CTDEEP Stormwater Quality Manual* provides guidelines for stormwater filtering practices that have not been followed in the proposed design. The manual states that filtering practices are designed as offline systems to treat the water quality volume and bypass larger flows. Also, the manual recommends the Water Quality Volume should be diverted into a pretreatment sediment forebay or settling chamber to reduce the amount of sediment that reaches the filter. (See Filtering Practices in Chapter 11 of the 2004 DEEP Water Quality Manual, page 11-P4-l) The proposed design directs all of the runoff to the surface sand filter with no pretreatment. The manual contains a list of the limitations of stormwater filters that pertain to the proposed design: 1) Pretreatment is required to prevent filter media from dogging; 2) Frequent maintenance is required; 3) Surface sand filters are not feasible in areas of high groundwater; 4) Surface sand filters should not be used in areas of heavy sediment loads; 5) Surface sand filters provide little or no stormwater quantity control; and 6) Surface and perimeter filters may be susceptible to freezing. The design of the proposed stormwater management needs to be designed with greater attention to site conditions.

Response: The majority of the drainage areas are proposed to have water quality swales collect and pretreat the stormwater prior to discharge at the surface sand filters. For surface discharge of stormwater to the surface sand filter, there is an upgradient vegetated buffer to provide pretreatment and sediment filtration. As discussed in the Stormwater Management Plan, the Operation and Maintenance (O&M) Plan will provide more detail on the frequency and method of cleaning each filter as discussed in 6.3.2 below. Once the site is considered stabilized, it will not be considered an area of high pollutant load, therefore, the sedimentation rate is anticipated to be very low as discussed further in 6.3.4 below.

1. *The site is proposed to have water quality swales and vegetated buffers which collect and treat the stormwater flow to the surface sand filters. This is allowable per the 2004 Connecticut Stormwater Quality Manual page 3-5, however, the stormwater analysis will be revised to include pretreatment measures at each surface sand filter in accordance with the 2004 Connecticut Stormwater Quality Manual Chapter 11 Primary Treatment Practice 4 (Filtering Practice) which will include:*
    a. *Primary pretreatment within a sediment chamber or stilling basin (to be included in the revised stormwater analysis);*
    b. *Secondary pretreatment through water quality swales*
    c. *Tertiary pretreatment through vegetated filter strips.*

Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.

2. *The site will have a standing O&M Plan that will address the frequency and required maintenance for each design feature as discussed in Section 8 of the Stormwater Management Plan dated January 3, 2019 submitted as part of the Development and Management Plan dated January 14, 2019. This O&M Plan will address inspection, maintenance and access to each stormwater BMP along with the responsibilities of each person in charge. The O&M Plan will*

be updated to include BMP specific maintenance measures. The specific inspection and maintenance requirements for the surface sand filter are provided below:

a. *Each surface sand filter will be inspected in accordance with the Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The inspection will generally be conducted after every major storm (rainfall that generates a discharge from each surface sand filter and/or a storm event that generates 0.5 inches of rainfall or greater) during the first 6 months after construction. Based on the results of the inspections, the surface sand filters will be inspected every 6 months thereafter. The inspections will include:*
    i. *Checking the filter surface for standing water or other evidence of clogging such as discolored or accumulated sediments;*
    ii. *Checking the pretreatment stilling basin, water quality swales and vegetated filter strips contributing to the surface sand filter for sediment accumulation, trash, and debris;*
    iii. *Checking inlets, outlets, and overflow spillway for blockage, structural integrity and evidence of erosion.*
b. *Sedimentation should be removed from the sedimentation chamber or pretreatment collection systems when it accumulates to a depth of more than 12 inches or 10 percent of the pretreatment volume. All outlet devices should be cleaned when drawdown times exceed 36 hours.*
c. *Sediment should be removed from the filter bed when the accumulation exceeds 1 inch or when there is evidence that the infiltration capacity of the filter bed has been significantly reduced (i.e., observed water level above the filter exceeds the design level or drawdown time exceeds 36 to 48 hours).*
d. *The top layer (approximately 6 to 12 inches) of the filter bed should be removed and replaced annually or more frequently if necessary. The material should be removed with rakes rather than heavy equipment to avoid compaction of the filter bed. Heavy equipment may be used if the system is designed in a configuration where the heavy equipment can access the filter material from outside the BMP.*

3. *Per the 2004 Connecticut Stormwater Manual page 11-P4-4, 'At least 3 feet of separation is recommended between the bottom of the filter and the seasonally high groundwater table …". As discussed in Response 6.2, soil test pitting is proposed to be completed prior to construction to assess the seasonally high groundwater elevation, presence of ledge and soil type at each proposed surface sand filter location. The groundwater elevation relative to the bottom of the surface sand filter media will dictate if groundwater recharge, while not required at all locations, can be accounted for in the stormwater analysis. The groundwater recharge volume required is approximately 3,000 ft^3 for the site which is based on the increase in impervious area proposed (see documentation in Appendix B-3). This recharge volume is accounted for in 17 of the stormwater BMPs, therefore not all BMPs have to infiltrate stormwater to meet the groundwater recharge requirements. In addition, the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.*

4. *The surface sand filters are proposed to be installed after the solar array construction is complete and the vegetation is restored. The site is considered restored when 80% of the vegetated cover is established, therefore, all potential erosion and sedimentation sources will have been stabilized and the sedimentation rate from the site is expected to be minimal. Also, once stabilization is achieved, the roadway will be very infrequently traveled, and there is no fueling or storage of oils proposed at the site. The site will, therefore, not be considered an area of high pollutant load.*

5. *The surface sand filters were designed to meet the post-development water quality volume and water quantity rate for the site through the use of the constructed earthen berms of the surface sand filter proposed to retain and treat the stormwater runoff. The surface sand filters were designed to accommodate the 25 and 100 year storm events through controlling the discharge with the spillway design elevations. The berm and spillway design elevations work together to control the peak stormwater runoff to ensure the pre-construction stormwater rates of runoff are met once construction is complete. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.*

6. *Per the 2004 Connecticut Stormwater Manual Figure 11-P4-1, the surface sand filters have been designed with an underdrain collection system to allow the sand filters to drain completely and not pond water for durations exceeding 24 hours. During periods of thaw the surface sand filters will, therefore, drain appropriately so that there is no standing water which may freeze during periods of low temperature conditions. The surface sand filters will be inspected and maintained in accordance with the O&M Plan for the project as discussed in Response 6.3 above to address any underdrain maintenance or repairs that may be required due to clogging and/or damage. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.*

6.4 It is appropriate to assume a meadow coverage condition for the proposed conditions HydroCAD model only if continuous vegetation is permanently established and maintained under the solar panels. However, it is expected that the new vegetation will struggle to grow under the panels due to the density, size, and short height of the panels in relation to the ground. The only possible portion of the site where the arrays are proposed that could have a continuous meadow coverage would be the open space in between the panel rows that are illustrated to be as narrow as 5 feet. The hydrologic computations need to be revised to assume a poorer ground coverage under the proposed solar panels. This is likely to result in the need for stormwater detention that is not part of the plans as now presented.

Response: Shade tolerant seed mixes have been specified for restoration of the array portion of the site to account for the potential increase in shade due to the row spacing. The stabilization seed mix installed (by hydroseeding) after clearing and grubbing but before the array installation will be the Quick Erosion Control Cover Mix (ERNMX-104). Once the array is installed, the site will be restored by overseeding with either the Solar Farm Seed Mix (ERNMX-186) or the Conservation Shade Mix (ERNMX-129) both of which require as little as 2 hours of indirect sunlight per day to promote a healthy vegetated cover.

Soil test pits are proposed to be conducted in the Spring of 2019. The stormwater analysis will be revised based on the soil conditions including the presence of groundwater and/or ledge. Stormwater detention will be evaluated as part of the redesign.

6.5 The post development peak discharge rates for Points of Analysis 5 and 6 show an increase from the predevelopment conditions. A technical explanation as to why these increases will not cause negative impacts downstream has not been provided.

Response: The overall stormwater discharge from the site decreases (Table B4-1), however, one of the goals for post-construction stormwater design is to ensure the rate of runoff to each off-site property is equal to or less than the pre-construction flow rate. This analysis shows that the hydrology of the site is not drastically different from pre-construction conditions and one area of the site is not contributing a larger stormwater runoff rate when compared to others. Points of Analysis 5 and 6 met the pre-construction rate of runoff for all storm events except for the 100-year storm. The stormwater design will be revised based on the reduced limit of work area. This analysis will

demonstrate the rate of runoff for all Points of Analysis at the site are less than, or equal to, the pre-construction conditions.

6.6 At present, much of the runoff from the western portion of the site that drains to abutting properties to the west does so in an even, shallow, concentrated flow. The introduction of the spillway outlets will result in runoff being consolidated and concentrated in a few distinct locations. This will fundamentally change the nature of the discharge from the subject parcels and could result in long-term risk of erosion and damage to downgradient parcels. This condition also exists on the eastern side of the parcel where runoff is concentrated and not spread out in a manner more consistent with existing conditions.

Response: The basis of the stormwater design related to attenuation was to design so the post-construction rates of runoff are equal to, or less than existing conditions at each point of analysis (see Table in response to comment 6.1). The spillway from the surface sand filter is proposed to discharge over an energy dissipator (Detail A1, Sheet 23) which also includes a table (included below) specifying the design for each location. This design references Chapter 10 of the 2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control and redistributes the stormwater discharge from the surface sand filter over a larger area to mimic existing conditions. The energy dissipators vary in length from 10 to 20 feet based on the contributing flow rate. Also, the stormwater design, including the energy dissipators, will be revised based on the reduced limit of work area and further clarification will be provided related to this comment.

ENERGY DISSIPATOR TABLE			
SURFACE SAND FILTER	LENGTH (FT)	WIDTH (FT)	DEPTH (FT)
1A	20.00	6.00	0.60
1B	10.00	6.00	0.50
2A	20.00	6.00	0.60
2B	10.00	6.00	0.50
2C	20.00	6.00	0.60
3A	10.00	6.00	0.50
3B	10.00	6.00	0.50
4A	10.00	6.00	0.50
4B	10.00	6.00	0.50
5A	10.00	6.00	0.50
5B	10.00	6.00	0.50
6A	10.00	6.00	0.50
6B	10.00	6.00	0.50
6C	10.00	6.00	0.50
7A	10.00	6.00	0.50
7B	10.00	6.00	0.50
No Surface Sand Filter for Subcatchment 7B			
7C	10.00	6.00	0.50
8A	10.00	6.00	0.50
8B	10.00	6.00	0.50
8C	10.00	6.00	0.50
9A	10.00	6.00	0.50
9B	10.00	6.00	0.50
10	10.00	6.00	0.50
11	10.00	6.00	0.50
Dimensions per CTDEEP Guidelines for Soil Erosion and Sediment Control Manual Chapter 5-10 - Energy Dissipators - Figure LS-1 - Minimum Dimensions for Level Spreaders			

6.7 Design computations for the drainage swales and culverts have not been provided to demonstrate that they are adequately sized to convey the contributing stormwater runoff.

Response: Due to the size of the HydroCAD file, only the summary tables were included in the Stormwater Pollution Control Plan per DEEP's request. The full HydroCAD model output is attached that reflects the December 19, 2018 submittal. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.

6.8 There are no supporting calculations demonstrating the velocity of runoff that is expected at the outlets of the basins.

Response: The full HydroCAD model output is attached which includes supporting documentation for the velocity of stormwater runoff expected at the site. Discharge flows from the sand filters were compared to the length of proposed energy dissipators to estimate a discharge velocity for each Point of Analysis for the 25- and 100-year storm events (see table below). Velocities were compared to allowable discharge velocities by soil texture type outlined in Section 5 Table OP-1 of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. The erosion control matting on the downslope side of each basin was specified based on the expected discharge velocity. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. The current design shows exceedance of allowable discharge velocities at sand filters 2B, 8B and 9B. Additional clarification on this response will be provided, including revised energy dissipator sizing, once the re-design is complete.

Drainage Area	Existing Conditions				Proposed Conditions						
	Storm Event	Flow (cfs)	Area[1] (sq ft)	Velocity (fps)	Sand Filter ID	Storm Event	BMP Outflow (cfs)	Area[2] (sq ft)	Actual Discharge Velocity (fps)	Soil Type at Discharge Point[3]	Allowable Discharge Velocity[4] (fps)
DA-1	25-year	15.06	235	0.06	1A	25-year	0	6.7	0.0	HSG C Fine	3.5
	100-year	22.43		0.10		100-year	0	6.7	0.0	Sandy	
					1B	25-year	0	3.3	0.0	HSG C Fine	3.5
						100-year	0.45	3.3	0.1	Sandy	
DA-2	25-year	33.54	167.5	0.20	2A	25-year	8.95	6.7	1.3	HSG D Rock	6.0
	100-year	49.02		0.29		100-year	12.69	6.7	1.9	Outcrop	
					2B	25-year	12.3	3.3	**3.7**	HSG C Fine	3.5
						100-year	19.8	3.3	**5.9**	Sandy	
					2C	25-year	8.77	6.7	1.3	HSG C Fine	3.5
						100-year	14.75	6.7	2.2	Sandy	
DA-3	25-year	11.32	155	0.07	3A	25-year	9.41	3.3	2.8	HSG C Fine	3.5
	100-year	17.17		0.11		100-year	9.41	3.3	2.8	Sandy	
					3B	25-year	2.98	3.3	0.9	HSG C Fine	3.5
						100-year	7.79	3.3	2.3	Sandy	
DA-4	25-year	13.92	215	0.06	4A	25-year	5.13	3.3	1.5	HSG C Fine	3.5
	100-year	21.08		0.10		100-year	10.07	3.3	3.0	Sandy	
					4B	25-year	6.96	3.3	2.1	HSG C Fine	3.5
						100-year	11.4	3.3	3.4	Sandy	
DA-5	25-year	7.61	250	0.03	5A	25-year	4.34	3.3	1.3	HSG C Fine	3.5
	100-year	11.51		0.05		100-year	7.3	3.3	2.2	Sandy	
					5B	25-year	2.01	3.3	0.6	HSG C Fine	3.5
						100-year	4.81	3.3	1.4	Sandy	
DA-6	25-year	9.47	140	0.07	6A	25-year	2.45	3.3	0.7	HSG C Fine	3.5
	100-year	14.24		0.10		100-year	3.92	3.3	1.2	Sandy	
					6B	25-year	3.69	3.3	1.1	HSG C Fine	3.5
						100-year	5.98	3.3	1.8	Sandy	
					6C	25-year	5.12	3.3	1.5	HSG C Fine	3.5
						100-year	7.72	3.3	2.3	Sandy	
DA-7	25-year	17.19	52.5	0.33	7A	25-year	5.1	3.3	1.5	HSG C Fine	3.5
	100-year	25.18		0.48		100-year	7.68	3.3	2.3	Sandy	
					7C	25-year	0.15	3.3	0.0	HSG D Rock	6.0
						100-year	2.85	3.3	0.9	Outcrop	
DA-8	25-year	23.09	115	0.20	8A	25-year	7.42	3.3	2.2	HSG C Fine	3.5
	100-year	33.81		0.29		100-year	11.38	3.3	3.4	Sandy	
					8B	25-year	8.58	3.3	2.6	HSG C Fine	3.5
						100-year	13.14	3.3	**3.9**	Sandy	
DA-9	25-year	13.82	125	0.11	9A	25-year	4.69	3.3	1.4	HSG C Fine	3.5
	100-year	20.58		0.16		100-year	8.23	3.3	2.5	Sandy	
					9B	25-year	7.9	3.3	2.4	HSG C Fine	3.5
						100-year	11.86	3.3	**3.6**	Sandy	
DA-10	25-year	7.49	160	0.05	10	25-year	5.08	3.3	1.5	HSG C Fine	3.5
	100-year	2.50		0.02		100-year	8.57	3.3	2.6	Sandy	

Notes:

1. Area of discharge for existing condtions was assumed to be a half foot of the total downstream length of the drainage area.

2. Area of discharge for proposed conditions is the cross-sectional area of level spreader as shown in Detail S-1 on C-303 (sheet 23 of 26) Issued For Construction dated December 19, 2018.

3. Soil types based on NRCS Soil Maps.

4. Allowable velocities taken from Figure OP-1 Allowable Velocities for Various Soils Section 5-10 of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. **Red** velocities denote exceedance of allowable velocities for the existing soil type.

6.9 The use of sheet flow in the time of concentration calculations where solar panels are proposed is not a reasonable expectation given the concentrated nature of the runoff from the panels themselves. The runoff generated from the drip line of the panels will travel downgradient in a manner more consistent with shallow concentrated flow.

Response: In our experience, sheet flow has been the industry standard for modeling this runoff, however, the stormwater analysis will be revised to model shallow concentrated flow from the panels. A gravel strip will be incorporated into the solar design within areas where the existing topography is greater than or equal to 10% as demonstrated in Figure 1 attached. A more detailed O&M Plan will be developed that addresses potential erosion from the drip line which, in our experience, has not been an issue for sites with established vegetation. The O&M Plan will include a detailed discussion of inspections, turf mowing frequency, and additional required maintenance and contingencies so that erosion is easily identified and corrected in a timely manner.

6.10 The grading of the driveway from Candlewood Mountain includes riprap swales along both sides of the road, with runoff directed to sand filter 7C. The uphill swale appears to simply discharge across the driveway to the sand filter. The uphill swale in particular is likely to convey significant flows that will cause erosion across the driveway in an unprotected manner. Also, there does not appear to be any supporting calculations on the design of the roadside or other swales on site.

Response: The uphill swale along the access road is not designed to discharge across the roadway. Since this swale will collect stormwater from undeveloped portions of land from above, it is simply a collection swale which discharges to a culvert farther down the proposed access road. The flat section of the swale shown opposite the sand filter 7C is a result of the grading of the access road to accommodate the sand filter (see the Grading and Drainage Plan - 2, Sheet 10). A minimum slope of 0.8% is, however, maintained within the swale to promote positive drainage. The plans will be revised to clarify this approach. See Response 6.7 above for calculations.

6.11 The roadway swales ultimately discharge into two 18-inch culverts beneath the driveway that will channelize the flow and result in point discharges that currently do not occur on site. Also, the 18-inch culvert along the road is shown within the town right-of-way, requiring approval from the New Milford Public Works Department Calculations for the 18-inch culverts have not been provided.

Response: The location of the culverts will be revised to be installed within the project's property lines. Any impacts to Candlewood Mountain Road or the existing drainage system will be coordinated with the Town of New Milford and their Department of Public Works for approval. The culvert design information is included in the attached HydroCAD report.

6.12 The riprap spillway depth is not specified for the sand filter details. Assuming that the outflow from the spillway is calculated to begin at the crest and not the bottom of the riprap, the basins will begin to drain at the interface between the earth embankment and the bottom of the riprap, significantly reducing the effective storage within the basins.

Response: Details A2 and C3 on Sheet 23 of the Issued for Construction plan set dated December 19, 2018 will be revised to address this comment. The surface sand filter design was modeled with a soil berm retaining the stormwater. This stormwater would be retained within the surface sand filter by the berm, percolate through the filter media and eventually either be discharged through the underdrain or infiltrated back into the ground (soil test pits are proposed to confirm this design as discussed above). The berm was designed to retain the rainfall runoff from the 25 year storm event and the spillway was designed to discharge during the 100-year storm event. Details A2 and C3 will be revised to accurately depict the design of the stormwater model since, as the review notes, outflow will begin at that crest.

6.13 The berms of the sand filters are shown at a 2:1 slope. Recommended slopes on constructed berms generally require an average slope of 2.5 between the inside and outside slopes of the berm.

Response: The design is being re-evaluated and the berm slope will be modified in the re-design.

6.14 Sand filter 7C does not include a berm as shown in the calculations and merely drains from elevation 726 to 724.

Response: Surface sand filter 7C has a top of berm design height of 726.25 ft as shown on the design table on Sheet 23 of the Issued for Construction plan set dated December 19, 2018 and also included as Table B3-2 (below) of the Stormwater Pollution Control Plan. The sand filter 100 year hydraulic grade line is 725.24 ft providing 1.01 ft of freeboard with the proposed berm. The Grading and Drainage Plan - 2 (Sheet 10) will be revised for clarity. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.

Surface Sand Filter	Top of Filter Elevation (Ft)	Filter Invert Elevation (Ft)	Underdrain Invert Elevation (Ft)	Spillway Crest Elevation (Ft)	Top of Berm Elevation (Ft)	100 Year HGL Elevation (Ft)	100 Year Freeboard Height (Ft)
1A	810	808.17	807.17	811.50	812.5	811.18	1.32
1B	809.54	807.71	806.71	810.29	811.37	810.36	1.01
2A	795.50	793.67	792.67	796.80	798.45	797.36	1.09
2B	776.76	774.93	773.93	778.75	780.58	779.57	1.01
2C	770.81	768.98	767.98	773.15	774.90	773.82	1.08
3A	727.00	725.17	724.17	728.60	730.49	729.39	1.10
3B	734.25	732.42	731.42	736.92	738.62	737.62	1.00
4A	723.71	721.88	720.88	726.37	728.20	727.20	1.00
4B	730.99	729.16	728.16	733.00	734.90	733.90	1.00
5A	796.06	794.23	793.23	797.91	799.35	798.34	1.01
5B	802.00	800.17	799.17	803.83	805.25	804.16	1.09
6A	806.62	804.79	803.79	807.68	809.12	808.12	1.00
6B	803.56	801.73	800.73	803.64	806.06	804.31	1.75
6C	769.67	767.84	766.84	770.87	772.67	771.54	1.13
7A	791.76	789.93	788.93	792.80	794.30	793.24	1.06
7C	722.87	721.04	720.04	725.00	726.25	725.24	1.01
8A	764.56	762.73	761.73	767.07	768.63	767.63	1.00
8B	748.64	746.81	745.81	750.64	752.30	751.26	1.04
9A	758.14	756.31	755.31	760.14	761.64	760.60	1.04
9B	757.19	755.36	754.36	758.85	759.44	758.43	1.01
10	796.30	794.47	793.47	797.46	798.96	797.91	1.05

6.15 The plans call for a narrow sand filter strip within the bottom of some sand filter basins. The soil media should be placed within the entire bottom of the sand filters.

Response: The filter media is proposed to be installed to ensure the entire bottom of the sand filter is operational as shown on Details C2 and C3, Sheet 23 of the Issued for Construction plan set. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete.

6.16 Water quality basins 2A, 2B, 4A, and 4B are proposed on existing grades approaching 25%, resulting in significant grading along the property line. These basins need to be relocated upgradient to flatter existing slopes that are more suitable for construction of stormwater control features.

Response: The stormwater design is in the process of being revised based on a reduced limit of work area. The revisions will include relocation of these BMPs. Additional clarification on this response will be provided once the re-design is complete.

6.17 Portions of the site grading, drainage, and site improvements are shown directly against property lines and the town right-of-way. The submitted documents indicate that the property lines are based on tax maps and not based on surveyed property lines. Assessor's mapping is approximate and should not be used as a basis for design of construction plans particularly when activity is proposed right up to a property line. An A-2 boundary survey should have been completed prior to submission of the Stormwater General Permit application.

Response: A A-2 boundary survey has been completed by Robert Green Associates, LLC. The boundary lines are very similar to those shown on the design plans submitted with the permit applications. The stormwater design is in the process of being revised based on a reduced limit of work area, however, the design is not expected to change based on the recently conducted boundary survey.

6.18 The grading plan for basin 1A requires the installation of a constructed berm that will impound stormwater up to a couple feet in depth beneath portions of the solar panels. Based on the limited area of sand filter that is shown only in a small portion of the area impounded by the basin nearest to the eastern berm, extended periods of standing water may exist beneath panels after a rainstorm.

Response: Based on the results of the soil test pits (confirming soil type, depth to groundwater and presence of ledge) and the re-design of the solar array, the grading plan for surface sand filter 1A will be revised to be located outside the solar array footprint.

7. The phasing plan described in the Stormwater Pollution Control Plan (Appendix D) is simplistic and does not adequately address the potential erosion and sedimentation that should be anticipated from the disturbance of 83.4 acres (see Section 2.1in the Stormwater Pollution Control Plan) on a steep hillside. Note the following:

7.1 The plans do not clearly show how no more than 5 acres at a time will be disturbed before stabilization and prior to the installation of the panels.

Response: The phasing plan depicted on Sheet 13 of the Issued for Construction plan set shows the areas to be constructed as Phase IIA, IIB, etc. The text on Sheet 13 also describes how the phasing will occur to ensure no more than 5 acres will be disturbed at one time in accordance with the DEEP Stormwater Erosion Control Guidance. This phasing plan will be revised based on the revised solar PV array design. Note that temporary stabilization will be implemented as part of the phasing plan.

7.2 The plan states that the solar array will be installed after vegetative cover is "initiated," but there is no metric for determining when the soil has been stabilized.

Response: Phase III.1.9 on Sheet 13 of the Issued for Construction plan set states that a stabilized vegetative cover exists when 80% of the area is covered with growth mature enough to control soil erosion and survive severe weather conditions as dictated on page 5-3-3 of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. The phasing plan will be updated based on the revised design which will include temporary (e.g., hydroseed with tackifier) and permanent stabilization measures.

7.3 The plans call for the clear-cutting of trees as one continuous operation, leaving the stumps in place. Such forest operations can cause soil erosion, but the applicant is not proposing to install erosion control measures until after the clearing operation is finished.

Response: The phasing plan depicted on Sheet 13 of the Issued for Construction plan set describes Phase I – Install Perimeter Erosion Control and Site Clearing which includes establishing perimeter controls prior to tree clearing. This will also include survey staking of each angle point of the phase subareas.

Phase I – Install Perimeter Erosion Control and Site Clearing

This phase will consist of the installation of all perimeter erosion control measures and clearing above ground large growth trees from the site. The contractor shall be responsible for survey layout and flagging of the limit of clearing prior to the start of activities associated with this phase.

1. *Survey and stake limits of disturbance for Phase I activities, as shown on the drawings.*
2. *Hold a pre-construction meeting*
3. *Install perimeter sediment controls as shown on the drawings*
4. *Install the construction entrance along Candlewood Mountain Road and prepare the temporary staging area.*
5. *Cut above ground vegetation, within the limits of disturbance. Chip cleared vegetation and save for future use as mulch or wood chip mulch berms around the perimeter of the site. Avoid disturbing vegetation outside the limits of clearing.*

The phasing plan will be updated to reflect the revised design.

7.4 The second phase of the operation calls for the grubbing (removal of stumps) to be done in 5-acre increments, but the locations of those "plots" have not been clearly defined; this will be left to field survey at the time of construction. Furthermore, the method of grubbing has not been presented. If not performed with appropriate equipment, there is likely to be a loss of topsoil and an increase in the potential for erosion on the steep slopes. It appears from the plans that it is the applicant's intention to perform the operations in a continuum rather that in discrete and separate disturbance plots that will allow for separation of the disturbed areas and for vegetation to become established.

Response: This will be addressed in the redesigned submittal. Hydroseeding with tackifier will be performed as grubbing and grading are completed with a goal of no more than 5 acres of unstabilized soil at one time. The redesign will also address additional erosion control measured on longer, steep exposed side slopes.

7.5 Temporary seeding is proposed in areas that will be disturbed by subsequent construction activity with permanent seeding occurring at a later time. It is not clear how, when, and where permanent seeding will occur.

Response: Phase III.1.8 on Sheet 13 of the Issued for Construction plan set describes that the site shall be temporarily seeded within 72 hours of final grading in a given area and that permanent seeding may be initiated in lieu of temporary seeding in areas that are not anticipated to be disturbed during later phases.

Phase III.4.3 on Sheet 13 of the Issued for Construction plan set also describes that the site shall be cleaned, restored, and reseeded as required after the solar and electrical equipment is installed.

The seed mix installed after clearing and grubbing but before the array installation will be the Quick Erosion Control Cover Mix (ERNMX-104). This seed mix will be combined with a fertilizer and polymer (First Stop or similar) which will harden and hold the soil and seed in place. This seed/fertilizer/polymer mix will then be covered with a continuous application of hay mulch (approximately 4 tons/acre). The final step in stabilization will be to reapply a polymer to the hay mulch to act as a 'glue' to hold the seed, mulch and soil in place. This stabilization sequence has been completed successfully at other large solar PV installations in Connecticut.

Once the array is installed, the site will be restored by overseeding with either the Solar Farm Seed Mix (ERNMX-186) or the Conservation Shade Mix (ERNMX-129) both of which are shade tolerant seed mixes. This site restoration will be completed in the same stabilization sequence noted above on an as-needed basis following site inspections. Additional information on phasing and seed specifications will be provided with the redesign submittal.

Other temporary erosion and sedimentation controls such as erosion control blanket, flocculants, and/or soil stabilizers (Envirotac II, Posi-Shell, or similar) will be proposed on steep and/or long slopes to ensure the site remains stable at all times throughout construction.

The final construction schedule will depend on the final date of approval.

7.6 It is not appropriate to assume that once germination occurs that the land is stabilized and the 5-acre phase is ready for the installation of foundations. It is our experience on sites where grass needs to be established prior to having activity on the site that it takes a substantial period of time before sod becomes adequately established. Permanent seed, which should include drought- and shade-tolerant species, takes 3 weeks or so to germinate and takes months, not weeks, to develop a root system that can withstand traffic. The actual time for turf establishment depends on the time of year that seed is placed, temperature, and moisture. The turf needs to be mowed to promote density. In this instance, we would expect a full growing season for the grass to become fully established.

Response: The phasing plan on Sheet 13 of the Issued for Construction plan set provides response actions necessary for reseeding if re-disturbance of the vegetation takes place.

The temporary seed mix installed after clearing and grubbing but before the array installation will be the Quick Erosion Control Cover Mix (ERNMX-104). In sensitive areas, a clover mix may also be used in conjunction with the Quick Erosion Control Cover Mix such as a Crownvetch Seeding Mix (ERNMX-109) and also the Native Steep Slope Mix w/Annual Ryegrass (ERNMX-181) for areas with steep slopes and poor soils. The seed mix will be combined with a fertilizer and polymer (First Stop or similar) which will harden and hold the soil and seed in place. This seed/fertilizer/polymer mix will then be covered with a continuous application of hay mulch (approximately 4 tons/acre). The final step in stabilization will be to reapply a polymer to the hay mulch to act as a 'glue' to hold the seed, mulch and soil in place. This stabilization sequence has been completed successfully at other large solar PV installations in Connecticut.

Once the array is installed, the site will be restored by overseeding with either the Solar Farm Seed Mix (ERNMX-186) or the Conservation Shade Mix (ERNMX-129) both of which are shade tolerant seed mixes. This site restoration will be completed in the same stabilization sequence noted above on an as needed basis following site inspections.

Temporary erosion and sedimentation controls such as erosion control blanket, flocculants, and/or soil stabilizers (Envirotac II, Posi-Shell, or approved equal) will be proposed on steep and/or long slopes to ensure the site remains stable at all times throughout construction.

The phasing plan and construction schedule will be revised based on the revised solar PV layout.

7.7 As described in the plan, the foundations for the solar arrays will be ground screws that, in our experience, are installed using a skid-steer vehicle (a Bobcat). The movement of such equipment will tear-apart the grass, likely resulting in erosion unless the grass is fully established.

Response: The site will be monitored for erosion and precautionary measures will be taken to ensure the construction activities have minimal impact on the vegetation. Temporary equipment access roads and/or low-ground pressure (typically 7 psi or less) equipment will be used to minimize disturbance of the restored areas. The temporary roads may be built with gravel or an erosion control product such as TMax High-Performance Turf Reinforcement Mat or approved equal. Vehicles operating on the vegetated surface shall only operate on the existing or temporary gravel access roads, except for low ground pressure construction equipment. Low ground pressure construction equipment operating off the designated access drives shall limit turning on the stabilized vegetation as much as possible. If the full-time on-site inspector and/or engineer determines that the use of equipment is creating the potential for damage to the vegetation, the usage of such equipment shall immediately cease and a revised operation plan shall be

implemented. All operators of the equipment shall be clearly instructed by the on-site inspector and/or engineer regarding the requirements of this project prior to mobilization. Any ruts or rills identified during inspections will be filled and appropriately stabilized promptly.

7.8 The phasing plan attempts to break up the stabilization and construction of the site based on contributing watersheds. This does not seem to be a practical means to construct the improvements, particularly given the potential of subwatersheds being changed or modified as a result of ongoing construction activities. Sediment control measures including sediment traps and diversion swales should be installed and in place in phases immediately adjacent to phases that are under active construction to ensure that downgradient protections are in place should the topography not precisely match what is shown on the plans or if construction activities divert runoff across the estimated watershed limits.

Response: The sediment traps and diversion swales will be installed taking into account the cleared area of land to ensure the topography is accurately depicted and will contribute to the drainage area of each sediment trap without uncontrolled runoff. Per discussions with CT DEEP, on-site representation will monitor for potential changes to subwatersheds. Sheet 13 of the Issued for Construction plan set specifies each sub-area and how these areas are to be developed in series. All perimeter and sediment controls will be installed prior to earth disturbance. The phasing plan will be updated based on the reduced limit of work area.

7.9 The temporary sediment traps (TST) are shown on the plans in the identical manner that sand filter/Water quality basins are shown. The supporting calculations shown on the details sheets include bottom elevations of the TSTs that are up to 3 feet below the bottom of the sand filter, well below the finished grade. The sediment and erosion control plans should reflect the grading of the TSTs shown in the supporting calculations.

Response: Grading detail for each of the temporary sediment traps will be shown on the Erosion and Sedimentation Control Plans (Sheets 17 – 20). The revised design will incorporate the results of the soil test pits.

7.10 Long slopes several hundred feet in length (as much as 700 feet) with average slopes exceeding 10% of disturbed, exposed soil are proposed prior to any sediment control measures. Unprotected long and steep slopes represent a significantly high risk of erosion. Long, steep slopes are required to be broken up by benching, terracing, or diversions to avoid erosion problems (pages 3 through 7 of the 2002 Connecticut Guidelines for Erosion and Sediment Control). Detailed site grading plans should be provided to show these site modifications.

Response: The proposed topography mimics the existing topography unless shown otherwise. There will be on-site personnel monitoring erosion and sediment control to ensure there are adequate protections installed for the site (including perimeter controls and sediment traps). Temporary erosion and sedimentation controls such as erosion control blanket, hay mulch and/or soil stabilizers (Envirotac II, Posi-Shell, or approved equal) will be proposed on steep and/or long slopes to ensure the site remains stable at all times throughout construction. Note that the stormwater design is in the process of being revised based on a reduced limit of work area. Additional clarification on this response will be provided once the re-design is complete, which will include mid-slope E&S controls on longer disturbed slopes. Any ruts or rills identified during inspections will be filled and appropriately stabilized promptly.

7.11 The sediment barrier shown on the perimeter of the site will channelize and direct runoff to the low points along the slope, concentrating runoff from sediment trap outlets. The sediment barrier/silt fence locations need to be placed in a manner that will not result in channelizing the discharge from the basins.

Response: It is acknowledged that the sediment barrier will be installed along consistent contour intervals to avoid channeling or re-directing stormwater flow. For example, a continuous segment of sediment barrier will be installed along contour 280' and a new length of sediment barrier will be

installed along contour 282' when the 280' contour deviates from the surveyed limit of work. The erosion and sedimentation control plans and details of the Issued for Construction plan set will be revised to address this comment, which will include E-Fence or similar product at the outfall of the sediment traps.

7.12 Soil stockpile locations are not shown.

Response: The material staging and stockpiles areas will be shown on the revised plan set. The stockpiles will be surrounded with perimeter controls according the General Construction Details note 5 on Sheet 21 and Detail B4 on Sheet 22 of the Issued for Construction plan set. The stockpiles that are intended to be left dormant for 30 days or longer will also be seeded and stabilized within 15 days.

7.13 Much of the clearing and installation of overhead wires occurs on a slope that exceeds 25% in grade. While the activities proposed in that area are intended to be minor in nature, disturbed soil on a slope this steep will require temporary diversions and at least temporary erosion control matting to allow for vegetation to become established.

Response: Figure 1 attached has been prepared demonstrating the areas of the site where existing topography is equal to or exceeds a 10% and a 25% slope. This figure represents the areas where temporary erosion and sedimentation controls such as erosion control blanket, hydroseed with tackifier, flocculants, and/or soil stabilizers (Envirotac II, Posi-Shell, or approved equal) will be proposed on steep and/or long slopes to ensure the site remains stable at all times throughout construction. A polymer will also be used during the seeding process as discussed above, which will hold the soils, seed and erosion control in place. A detail for slope erosion control matting is provided as Detail A3 on Sheet 22 of the Issued for Construction plan set which states that the biodegradable erosion control matting shall be installed on slopes greater than or equal to 10%.

7.14 There are no long-term stabilization measures shown along the drip line of the panels. Particularly in areas exceeding 10% in grade, there exists the potential for erosion of the soil, which over time will result in increased sediment loads to downgradient areas.

Response: A gravel strip will be incorporated into the solar design within areas where the existing topography is greater than or equal to 10% as demonstrated in Figure 1 attached.

8. The document prepared by CTDEEP entitled Stormwater Management at Solar Farm Construction Projects includes clarification on procedure, design goals, and construction monitoring requirements that reiterate the goals of design documents referenced in Comment 3 above. The submitted documents fail to adhere to the recommendations of CTDEEP guidelines as noted below:

8.1 The CTDEEP document requires that the methods of "an approvable SWPCP will include methods for avoiding compaction of soils, disconnection of and reduction of runoff...avoidance of concentration of stormwater, and other measures necessary to maintain or improve pre-construction hydrology conditions." For the reasons stated in Comment 6, it is our opinion that the post construction hydrology will degrade and exacerbate preconstruction hydrology.

Response: The majority of the equipment proposed for construction at the site will be track equipment which is typically lower ground pressure than rubber tire equipment which will reduce the compaction of existing soils on-site. The contractor will be directed to use access roads for as much site traffic as possible. In addition, while the majority of the site was modeled with poorly infiltrating soils with a high runoff potential (hydrologic soil group (HSG) C and D), the stormwater model will be adjusted for the remainder of the site to be modeled with more conservative hydrologic soil types (such as HSG D) to accommodate potentially compacted soil within the solar PV array area. This will also address the post-construction stormwater design should soils be significantly

compacted (as commented on by DEEP). The response to comment 6.8, above, addresses discharge velocities.

8.2 The CTDEEP document requires that the design professional be well versed in erosion and sedimentation guidelines, particularly Chapter 4 for large construction sites. For the reasons we stated in Comment 7, the D&M Plan does not meet these criteria.

Response: Candlewood Solar will address the comments noted above and incorporate these updates into a revised Stormwater Pollution Control Plan. We will work with the Siting Council and DEEP to ensure all concerns are met which includes:

- *Completion of soil test pits at each stormwater BMP location;*
- *Revising the stormwater design to ensure the analysis represents the existing hydrologic conditions at the site;*
- *Updated temporary and permanent soil stabilization measures;*
- *Revised perimeter E&S control measures; and*
- *Revising the solar PV layout including consistent interrow spacing; revising the E&S control approach to include minimization of grading, use of compost filter socks to diffuse channelized flows, and promptly restoring ruts and rills; and adjusting the stormwater analysis accordingly.*

8.3 The document states an approvable SWPCP shall include, but not be limited to, the location of all erosion, sediment and stormwater control measures including detailed design cut sheets with supporting calculations, construction means and methods, project phasing (i.e. site planning pre-construction, construction, and post- construction stabilization, etc.), construction sequencing and a construction schedule." For the reasons stated in Comment 7, the phasing plan lacks sufficient detail, and the timing of construction activities will result in large tracts of disturbed land with a lack of mature vegetation needed to limit the potential for transport of sediment during construction.

Response: We have summarized the locations within the SWPCP where the requested information can be located. The HydroCAD model output for pre and post construction conditions is also attached, which contains these supporting calculations. We will revise the application to ensure the information is clear and complete:

- *The location of all erosion, sediment and stormwater control measures such as sediment barriers, silt fence, construction exits, outlet protection, and notes/references for temporary and permanent seed mixes are included on:*
  - *Sheets 14 – 20 for temporary erosion and sedimentation controls*
  - *Sheets 9 – 12 for permanent erosion and sedimentation controls*
- *Detailed design cut sheets with supporting calculations:*
  - *All construction details including specific design details are provided on Sheets 22 – 23*
  - *All detailed calculations are provided in Appendix B of the SWPCP*
- *Construction means and methods, project phasing and construction sequencing:*
  - *All project phasing is provided on the Erosion and Sedimentation Controls – Overview and Phasing Plan (Sheet 13)*
- *Construction Schedule: provided in response 7.5 above and will be included in the revised plan set.*

9. In summary, the plans submitted to the CSC as part of the D&M Plan are inadequate and lack the necessary information to assure that there will not be erosion and sedimentation caused by the construction activities that could impact the waters of the stated as noted below:

9.1 Contrary to representations made by the petitioner, the hydrology of the site will be permanently altered and will impact adjoining properties.

Response: While the conditions of the site will be altered for the construction of the solar PV array, the stormwater design was developed based on the Connecticut requirements. Existing drainage patterns will be maintained, and the intent of the design is to model the post construction stormwater hydrology to generate an equal or less rate of stormwater runoff from the site, compared to existing conditions, with better stormwater quality as demonstrated in Appendix B of the SWPCP. The discharge of each surface sand filter will flow over an energy dissipator designed to reduce the discharge velocity and redistribute the stormwater to promote sheet flow. This response will be further clarified upon submittal of the re-design.

9.2 The Candlewood Solar project should be distinguished from other projects that come before the CSC. Whereas transmission line projects, for example, disturb land in a linear manner where impacts from erosion and sedimentation are manageable and stabilization can occur quickly, the Candlewood Solar project will require the clearing, grubbing, and regrading of a large block of land on steep slopes where it will be difficult to manage impacts.

Response: The construction plan will be revised based on the re-design and the project schedule.

9.3 The establishment of grass cover adequate to prevent long-term erosion will require regrading of the site prior to seeding. The time that it will take to achieve well-established grass should be measured in months, not weeks. By developing the site in "rolling" 5-acre increments without establishing thick turf before installing the solar arrays is highly likely to cause both short-term and long-term erosion and sedimentation.

Response: The construction phasing plan will be revised as discussed above based on the redesign. The overall strategy is to provide as much time for seed germination as possible prior to installing the racking and panels. To augment this, additional stabilization measures will be provided as outlined in the response to comment 7.6

9.4 The density of the solar arrays will severely restrict sunlight to the grass beneath the panels and make it very difficult to maintain the grass that will allow for its long-term health.

Response: Shade tolerant seed mixes have been specified for restoration of the array portion of the site to account for the potential increase in shade due to the row spacing. The stabilization seed mix installed after clearing and grubbing but before the array installation will be the Quick Erosion Control Cover Mix (ERNMX-104). Once the array is installed, the site will be restored by overseeding with either the Solar Farm Seed Mix (ERNMX-186) or the Conservation Shade Mix (ERNMX-129) both of which require as little as 2 hours of indirect sunlight to promote a healthy vegetated cover. Also, the array design will be re-designed with a consistent interrow spacing. The revised inter-row spacing will be shown on the redesign submittal.

9.5 If the CSC requires the petitioner to modify and resubmit the plan and supporting documents in accordance with the foregoing comments, it is quite possible that the configuration of the solar arrays will need to be modified and further reduced in number.

Response: The solar PV array layout is being redesigned to address these comments. The design will be finalized to obtain DEEP approval.