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January 24, 2022

Mr. Robert Herbert, Chair
Town of Wales Conservation Commission
3 Hollow Road, P.O. Box 834
Wales, MA 01081

RE: Response to Comments
Proposed Solar Development
40 Sizer Drive, Wales, MA

Dear Mr. Herbert:

On behalf of Sunpin Solar Development, LLC., Wood respectfully submits the following responses to your review comment letter dated January 4, 2022.

Comment 1: *Bioretention Basin No. 1 has nearby testing with Ledge at 29" and Groundwater at 16". The proposed contours indicate up to a 2' cut in one area for bottom of the basin and an underdrain that is a 5' cut. This would mean that the soil media under the basin bottom and the underdrain system will have to be cut into ledge and will always be in groundwater. The basin cannot function as designed if the soil media directly underneath is saturated. In addition, any removal of underlying bedrock would have to be "daylighted" so as not to create a "bowl" in the underlying bedrock that would prevent water from free draining from the soil under the bioretention basin. There is not enough geotechnical information, nor enough information in the design, to ensure that this will not occur. Specifically, the drainage analysis assumes an exfiltration rate of 2.41 in/hr through the soil media starting at the basin bottom interface. This will be impossible if the media is always saturated due to groundwater intrusion. As a result, the stormwater would be forced to discharge out the overflow weir at a rate greater than being represented in the calculations. Lastly, the discharge pipe from the basin to the southeast would have a constant discharge due to picking up groundwater. This means you would have a greater discharge than being reported, that cannot be quantified, directed toward the wetland system to the east.*

Response 1: As noted in the prior technical review, the basins were designed such that any upward movement of groundwater from below is intercepted by an underdrain before it enters the basin's filter media. The underdrain will also accept filtered surface runoff that infiltrates through the filter media from above. This design approach was noted to be acceptable by the Town's peer reviewer.

Wood acknowledges that removal of ledge may be necessary to construct the basins/install the underdrains. However, a "bowl" condition will not be created as a result of the basin's installation. Any ledge encountered will be chipped away to a depth to accommodate the underdrain inverts, which will facilitate drainage. Therefore, groundwater will always be able to free drain from the soil under the basins and into the underdrains.

By their definition, wetlands are areas where water is at or just below the surface of the ground. Although the design proposes daylighting of any encountered groundwater via a pipe, the managed groundwater is the same flow that daylights in the wetlands from the ground under current conditions. The proposed underdrains follow common engineering practice, similar to a building foundation drain, and do not cause an increase in flowage to wetland resources.

Comment 2*: Overland flow is directed toward the western side of Bio Basin 1 that will pool at the basin edge according to proposed contours. A swale should be defined in this area to protect the basin's integrity.*

'Wood' is a trading name for John Wood Group PLC and its subsidiaries.

Response 2: Contours and spot grades have been revised to prevent runoff from pooling in this location.

Comment 3: *The 3-inch difference proposed between the overflow weir and the top of the berm creating the Basin 1 perimeter is not realistic to construct given construction tolerances. The weir is proposed to be rip rap which has varying gradation and cannot be uniformly installed. The elevations proposed are important given the results of the drainage analysis. The weir is designed to convey the 10-year storm event and greater. Any discrepancy on the installed elevation and dimensions vs. what is assumed in the analysis could result in a higher rate and volume of runoff being directed toward the wetlands.*

Response 3: Bioretention Basin 1 has been revised to accommodate 1 foot of freeboard for the 100-year event. Additionally, in an effort to maintain stormwater flowing over the weir at a uniform elevation, concrete curb will be utilized within the weir. This practice is also proposed for the weir at Basin 2. The plans and weir detail have been revised accordingly.

Comment 4: *The underdrain discharge pipe from Basin 1 indicates a plunge pool will be installed. However, the proposed grading and limits of rip rap do not match the detail. This should be updated.*

Response 4: The proposed grading and limits of riprap have been added to the plans to match the detail.

Comment 5: *The underdrain discharge pipe has a change in direction; change in slope; and change from perforated to solid pipe with no manhole. Standard practice is to have a manhole for each one of these.*

Response 5: The underdrain pipes are 6-inches in diameter. The transitions mentioned are commonly accomplished through the use of fittings and elbows for a pipe of this size. A second cleanout has been added where the pipe changes direction.

Comment 6: *Similar to Basin 1, Bioretention Basin No. 2, has contours proposed that would have the basin bottom in ledge and groundwater. Test holes in the basin indicate ledge as shallow as 19". The basin is proposed to have a 3' cut in one area. The underdrain is proposed to have a 6' cut. The 12" outfall from OSC-2 is proposed with a 9' cut. As stated above, the basin will not perform as assumed and will discharge groundwater directly to the surface and a rate and volume that cannot be measured.*

Response 6: See response to Comment 1.

Comment 7*: The proposed headwall and plunge pool for the discharge pipe from Basin 2 does not match the details provided. Subcatchment PR-S1.1 indicates a slope of 1% for 50' and 1.87% for 201' for the Tc calculation. However, the existing grades in this area do not reflect those conditions. Also, the material type for the Sheet Flow calculation uses Grass:Dense which is not representative of the meadow being proposed. That classification is typically used for maintained landscape. The Tc time should be shorter than what was used in the calculations.*

Response 7: The headwall and plunge pool for Basin 2 on the plan and detail have been revised to match. For subcatchment PR-S1.1, the first 50-ft of the Tc flows from approximately elevation 898.0 to 897.5 (1% slope) and the remaining 201-ft flows from approximately elevation 897.5 to 893.75 (1.87%) at Basin 1.

TR-55 and HydroCAD, industry standards for runoff calculations and stormwater modelling, provide three types of surface descriptions for grass: short grass prairie, dense grass, and bermudagrass. Dense grass is the most accurate way to model sheet flow through meadow in HydroCAD software. The proposed vegetation will only be mowed twice per year, deeming short grass inaccurate. Additionally, as noted in the Seeding and Revegetation Plan, at least 70% of the area will be vegetated with vigorous growth to be considered satisfactory following construction.

Comment 8: *The CN for the proposed subcatchment PR-S4 went down (69) from the existing conditions (70) for the same exact subcatchment boundary even though there is a material change from Woods to Meadow. That is not likely. Additionally, the volume is shown to have decreased. This does not reflect accurately how stormwater will be increased in this area.*

Response 8: CN values were taken directly from HydroCAD stormwater modelling software. The software utilizes the industry standard TR-55 specifications for runoff curve numbers. Meadow, defined in TR-55 as continuous grass protected from grazing and generally mowed, represents the most accurate groundcover model for the areas within the fence. Areas outside of the fence but within the limits of clearing, will have stumps remaining in addition to being seeded. This area will not be mowed, and it is anticipated that low growth brushy vegetation will establish. Therefore, brush groundcover was utilized on the model as the most accurate representation of proposed conditions. In general, dense, low-growth vegetation will have less runoff than higher growth trees/woods, as indicated by TR-55 CN designations for groundcover.

Comment 9: *The 100-year storm event for Bioretention Basin No. 1 indicates the flood elevation will reach 893.73'. The top of the basin is proposed at 893.75'. This is not an acceptable freeboard for the 100-year event. It does not leave any room for error or construction tolerances. A breach of the top of the berm will cause a potential failure of the basin and discharge more toward the wetlands than indicated.*

Response 9: Bioretention Basin 1 has been revised to accommodate 1 foot of freeboard for the 100-year event.

Comment 10: *Similarly, the flood elevation for Basin No. 2 for the 100-year event is 844.25 with the overflow weir proposed at 844.25. This means that there is no allowance for construction tolerances.*

Response 10: Bioretention Basin 2 has been revised to accommodate 1 foot of freeboard for the 100-year event.

Comment 11: *Detail 2 on Sheet C-107 indicates the limit of wetlands are 15' and the inside of the culvert spans 18'. The designers should indicate how the footing and erosion controls can be installed with only 1.5' of available room on both sides.*

Response 11: Erosion and sediment controls will be placed prior to work. Wood proposes no permanent wetland disturbance in the wetland crossing area. Any de minimus temporary disturbance to wetlands potentially caused by placement of the concrete footings for the culvert will be restored in place using a native wetland restoration seed mix. The completed culvert will span the entire width of the wetland.

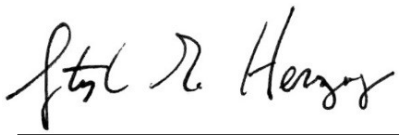
Please find the following included with this letter:

- Revised site plans, dated January 21, 2022
- Revised Stormwater Management Report, dated January 2022

If you have any questions, please contact the undersigned at andrew.vardakis@woodplc.com; 978-392-5341 or stephen.herzog@woodplc.com; 508-517-6470. Thank you.

Respectfully submitted,
Wood Environment & Infrastructure Solutions, Inc.

Andrew Vardakis, PE
Senior Engineer



Stephen G. Herzog, PWS
Senior Ecologist

Attachments