



October 20, 2021

Wales Conservation Commission  
Attn: Norma Thompson, Chair  
Town Office Building  
3 Hollow Road, P.O. Box 834  
Wales, MA 01081

Re: Notice of Intent Review Letter #2  
Proposed Solar Project  
40 Sizer Drive  
Wales, Massachusetts  
MassDEP File No. WE 314-0160

Dear Conservation Commission Members:

As requested, Lucas Environmental, LLC (LE) and Civil Design Group, LLC (CDG) have reviewed the responses to our initial Review Letter submitted by Wood Massachusetts, Inc. (Wood), dated September 24, 2021, as well as revised Notice of Intent (NOI) documents for the property located at 40 Sizer Drive in Wales, Massachusetts. The format of the original review letter has been retained, with Wood's responses directly below in italics, followed by LE's and CDG's responses (underlined).

## 1.0 DOCUMENTS REVIEWED

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The following revised documents and plans were reviewed in addition to the documents previously reviewed:

- Responses to Peer Review Comments by Lucas Environmental, LLC and Civil Design Group, LLC, Sunpin Energy Services Proposed Solar Project, 40 Sizer Drive, Wales MA. Map and Parcel 100 2830 0040. MassDEP File No. WE 314-0160. Prepared by Wood, dated September 24, 2021.
- MassDEP WPA Form 3, revised September 22, 2021.
- Report entitled "Stormwater Management Report, Ground-Mount Solar PV Development, 40 Sizer Drive, Wales, MA 01081," by Wood, dated January 2021 and last revised September 2021, 117 pages.
- Report entitled "Stormwater Pollution Prevention Plan (SWPPP) For Construction Activities At: Ground-Mount Solar PV Development, 40 Sizer Drive, Wales, MA 01081," by Wood, dated January 2021 and last revised September 2021, 225 pages.
- Report entitled "Operation and Maintenance Plan and Long-Term Pollution Prevention Plan", Ground-Mount Solar PV Development, 40 Sizer Drive, Wales, MA 01081," by Wood, dated January 2021 and last revised March 2021, 7 pages.

- Site Plans entitled “Sunpin Energy Services, LLC 4.493 MW DC Ground-Mount Solar PV Development, 40 Sizer Drive, Wales, Massachusetts”, prepared by Wood and dated April 29, 2021, last revised September 24, 2021.

## **2.0 COMMENTS AND REQUESTS FOR ADDITIONAL INFORMATION**

This review pertains to requirements under the Massachusetts Wetlands Protection Act and its implementing regulations, and does not pertain to Zoning or Planning Board requirements. After reviewing the wetland delineation and the documents listed above, LE offers the following comments.

### *Wetland Delineation Review*

The entire wetland delineation, consisting of wetland flags AA-1 to AA-117, AB-1 to AB-72, and AC-1 to AC-22 was reviewed by LE.

1. LE is in general agreement with the delineation of resource areas on the property, however, there are a few areas where LE recommends modifications, as follows:
  - A. LE added flags delineating the Bank in the area of the proposed road crossing. These are labeled SB-A-1 through 4 (north side of the stream) and SB-B-1 through 5 (south side of the stream). These flags were located by Mr. Herzog using a hand held Trimble GPS and should be added to the plan. For the flags in the area of the proposed crossing, it is recommended that at a minimum sub-meter accuracy be obtained, and preferably one-foot or better accuracy. If this accuracy was not obtained by GPS, it is recommended that these flags be located by instrument survey.

*Wood Response 1A. Wood added flags SB-A-1 through 4 and SB-B-1 through 5 to the project plan set. Flags were located with handheld GPS that does not yield sub-meter accuracy. After review of the GPS data, Wood tape-measured the flag locations in the area of the proposed crossing in relation to nearby flags previously located by survey, and estimates the accuracy of this method to be less than six inches.*

LE Response 1A. Comment addressed regarding the accuracy of the flag locations. However, flag SB-B-5 is not shown on the revised site plans and should be added.

- B. LE added flag AA-62A between flags AA-62 and AA-63.

*Wood Response 1B. Wood added flag AA-62A to the project plans.*

LE Response 1B. Flag AA-62A is not shown on the revised site plans and should be added.

- C. LE added revised flag AA-64R several feet upgradient of flag AA-64. Flag AA-64 should be eliminated.

*Wood Response 1C. Wood added flag AA-64R and removed flag AA-64 from the project plans.*

LE Response 1C. Flag AA-64R is not shown on the revised site plans and should be added.

- D. LE added revised flag AA-68R several feet upgradient of flag AA-68. Flag AA-68 should be eliminated.

*Wood Response 1D. Wood added flag AA-68R and removed flag AA-68 from the project plans.*

LE Response 1D. Comment addressed, no further response necessary.

- E. LE added revised flag AA-84R several feet upgradient of flag AA-84. Flag AA-84R should connect to flag AA-87, and flags AA-84, AA-85 and AA-86 should be eliminated.

*Wood Response 1E. Wood added revised flag AA-84R to the project plans, removed Flags AA-84, AA-85, and AA-86 from the project plans, and revised the plans to show flag AA-84R connecting to flag AA-87.*

LE Response 1E. Comment addressed, no further response necessary.

- F. There were two flags labeled AB-33 on the site plans, the further downgradient of these should be removed from the plan.

*Wood Response 1F. Wood removed the downgradient duplicate flag AB-33 from the project plans.*

LE Response 1F. Comment addressed, no further response necessary.

- G. LE added flag AB-17A between flags AB-17 and AB-18.

*Wood Response 1G. Wood added flag AB-17A to the project plans.*

LE Response 1G. Comment addressed, no further response necessary.

- H. There were two flags labeled AC-7 in the field. The more downgradient of these should be eliminated from the plan.

*Wood Response 1H. Wood removed the downgradient duplicate flag AC-7 from the project plans.*

LE Response 1H. Comment addressed, no further response necessary.

2. A potential vernal pool is present in the general area of wetland flag AC-3. It is LE's understanding that Mr. Herzog and Mr. Bower have observed evidence of use by vernal pool species at this area but that observed evidence was insufficient to meet certification criteria. LE recommends that details of the observations made at this area be submitted for the record. Although evidence was apparently not sufficient for certification, the area apparently provides vernal pool habitat to some extent and the Commission may want to consider additional monitoring of this area. If sufficient evidence for certification is observed and the pool is certified, it becomes an Outstanding Resource Water (ORW) and may require modification of stormwater management design.

*Wood Response 2. The undersigned, Stephen Herzog, recorded observations of three potential vernal pools on April 6, 2021 in an email to the Commission dated April 7, 2021. Those observations are reiterated below. "PVP-1 No water visible, but water-stained leaves indicate some standing water remained for a time after snowmelt. No evidence of amphibians.*

*PVP-2 I observed a complex of shallow pools, water to 10 inches deep, area approx. 15 feet by 40 feet. I observed one wood frog egg mass and two spotted salamander egg masses, which indicate the area is functioning as vernal pool wildlife habitat. However, designation as a MA "Certified Vernal Pool (CVP)" requires a minimum of five egg masses, so PVP-2 does not qualify as a CVP. PVP-2 is located greater than 100 feet from the proposed array perimeter fence. Less than 25% of the 750-foot critical terrestrial habitat buffer of the pool would be affected by the project, meaning that regulatory guidance to protect vernal pool habitat will be met by the project.*

*PVP-3 Wet leaves and soil were visible in depressions in this large wetland, but no standing water. I observed no evidence of vernal pool amphibians."*

*Also, no potential vernal pools were found near the proposed stormwater bioretention basin outfalls.*

LE Response 2. LE agrees that the observations by Mr. Herzog are not sufficient to meet NHESP vernal pool certification criteria. However, during the previous Conservation Commission hearing, Mr. Bower of the Commission stated that he had heard a full chorus of wood frogs at PVP-2. If the chorus was "constant, continuous & overlapping" that would be considered sufficient biological criteria for certification under the NHESP guidelines.

Although PVP-2 is located greater than 100 feet from the perimeter fence, tree clearing is proposed within approximately 60 feet of the PVP, which could potentially impact upland habitat within the 100-Foot Buffer Zone utilized by vernal pool species.

3. LE walked the upland portions of the site in the vicinity of the proposed project and did not encounter additional wetland resources other than what is indicated on the project site plans or has been noted above.

*Wood Response 3. No response warranted.*

LE Response 3. No further response necessary.

*NOI Document Review*

The documents noted above were reviewed for completeness and compliance with the Massachusetts Wetlands Protection Act (MGL Chapter 131, Section 40), and its implementing regulations (310 CMR 10.00 et seq.). LE has the following comments relative to the documents reviewed.

4. Notice of Intent Application and accompanying materials prepared by ASE. Several issues were noted in the NOI application prepared by ASE. However, some of these were addressed in the revised documents prepared by Wood. LE believes the following items remain to be addressed.
  - A. The NOI project narrative (ASE) states that wetland replication is proposed as part of the project to mitigate for impacted wetlands at the proposed crossing. No details regarding the construction of the replication area were observed in the documents reviewed. A detailed narrative and plan of the proposed wetland replication area construction should be provided.

*Wood Response 4A. The project design was modified in the June 29, 2021 plan revision to include a wetland crossing that will cause no permanent resource area impacts. As a result, no wetland replication is proposed. The project plan set revision shows a 16-foot by 24-foot precast concrete 3-sided box culvert that will completely span the stream and bordering vegetated wetlands. Sheet C-107 depicts the crossing and box culvert, and states how the stream crossing performance standards will be met. Erosion and sediment controls will be placed prior to work. In addition, any de minimus temporary disturbance to wetlands potentially caused by placement of the concrete footings for the culvert will be restored in place by seeding with a native wetland restoration seed mix and placement of straw mulch.*

LE Response 4A. LE recognizes that no direct resource area impacts are now proposed for the project and therefore no wetland replication is required.

LE recommends that the Applicant verify/clarify the dimensions of the proposed box culvert, as it is indicated on Sheet C-107 as 18 feet in width (and described above as 16 by 24 feet), and that the dimensions be included in a note on the Site Plan. The size of the culvert used to calculate the openness ratio should also be noted, and the ratio calculation revised if necessary.

Although the proposed box culvert as described meets the openness ratio for the stream crossings general standard, the height of the culvert, particularly at the upstream end (1.6 feet) is minimal and well less than the “optimal” standard height of six feet. LE recommends that the Commission discuss with the Applicant the possibility of a higher crossing to allow better wildlife passage.

- B. The NOI Form 3 does not indicate any Bank impacts. This was corrected in the revised WPA Form 3 submitted for the project.

*Wood Response 4B. The project proposes no Bank impacts; see Wood Response 4A above. WPA Form 3 has been revised to show no resource area impacts are proposed.*

LE Response 4B. Comment addressed, no further response necessary.

- C. The Natural Heritage map referenced in the NOI has recently been updated. The current NHESP map is dated August 1, 2021. However, the current map continues to indicate no Estimated or Priority Habitats mapped at the project site.

*Wood Response 4C. Wood agrees there is no mapped state-listed habitat on the site according to the most recent NHESP map.*

LE Response 4C. No further response necessary.

- D. The Wetland Resource Evaluation prepared by EcoTec, Inc., references the 1982 USGS Southbridge Quadrangle as the current USGS Map of the site regarding review of the perennial or intermittent nature of the stream (Lamphier Brook) that flows through the site. There are several more current maps, including the current 2021 Wales, MA, CT Quadrangle. However, the current map still indicates the brook as intermittent at the project site. LE is in agreement that the StreamStats analysis for this stream shows it to be intermittent at the site, as well as to a point at least 200 feet north (downstream) of the northern property line.

*Wood Response 4D. Wood agrees that the stream is intermittent at the site based on all available data.*

LE Response 4D. No further response necessary.

- E. The NOI Wetland Fee Transmittal Form referenced fee categories 2(d), 2(g) and 4(a). Category 2(d) is for coastal Limited Projects. The project is not presented as a Limited Project and is clearly not covered under the coastal wetland regulations. Category 4(a) is for Limited Project stream crossings. Again, the project is not presented as a Limited Project; however, MassDEP – WERO does require the Limited Project fees be submitted if the project involves a crossing, even if not requesting Limited Project status. LE recommends that the filing fees be reviewed and adjusted if necessary.

*Wood Response 4E. The Fee Transmittal Form submitted with the initial application in 2019 indicated incorrect fee categories, but the total fee paid is not less than the fee that would have applied for the proper categories. The project as presently designed is not a coastal project, and also does not propose any point source discharges to resource areas or their buffers. The project qualifies for Limited Project status, but the project was not previously presented as such. The revised project design does not involve any resource area impacts and therefore does not invoke Limited Project status. The correct fee category, as indicated by LE's comment, is 4(a) Construction of each crossing for a*

*limited project access roadway or driveway reviewable under 310 CMR 10.53(3)(e) associated with a commercial development..., and the corresponding fee (\$1,450) has been paid.*

LE Response 4E. Comment addressed, no further response necessary.

5. Addendum to Notice of Intent prepared by Wood. LE has the following comments regarding this document.
- A. MassDEP Comment 4 requested justification, through a shade analysis, for clearing portion of the Buffer Zone beyond the proposed fence line, which was provided by Wood. However, MassDEP also stated that further analysis of possible adverse impacts to the hydrology of adjoining BVW and slope analysis regarding possible erosion and sedimentation is required, as well as a potential analysis of thermal impacts to adjoining forested BVW. Wood states that the area between the fence and limit of work will be cut but not stumped, and the ground surface left intact and allowed to regrow to woody shrub vegetation. LE agrees that this should minimize soil disturbance and maintain shading within this portion of the Buffer Zone. However, LE recommends that this area be monitored to insure it is revegetating as proposed and that there is no soil erosion occurring.

***Wood Response 5A.** Wood agrees that the proposed work will minimize soil disturbance and maintain shading, and is amenable to performing periodic monitoring of the affected area.*

LE Response 5A. LE recommends the Applicant prepare a proposed monitoring program for the Commission's review. The monitoring program should include a protocol for management of invasive vegetation if/as needed since cutting the canopy may initially facilitate growth of invasive plants.

- B. MassDEP Comment 5 requested additional information on bankfull width at the crossing. Wood responded that the bankfull width at this location is approximately four to six feet and that approximately 110 linear feet of Bank will be impacted. Rough measurements of bankfull width in this area made by LE during the site inspection were generally six to eight feet. As noted above under 1.a., the Bank in this area was delineated in the field and should be added to the project Site Plans (with appropriate accuracy to accurately determine bankfull width on the Site Plans).

***Wood Response 5B.** Flagged locations of Bank were determined in the field, located with handheld GPS, and tape-measured. Flag locations have been added to the project plans. Bankfull width at the location of the proposed crossing is six to eight feet. As stated in response 4B, the revised project design proposes no impacts to Bank.*

LE Response 5B. Comment addressed, no further response necessary. However, note that bank flag SB-B-5 is not shown on the revised site plans and should be added (see LE Response 1A).

- C. Under Response 6, Wood indicates that unavoidable wetland impacts will be compensated by construction of a wetland replication area, as shown on plan sheets C-106 and C-107. It is not clear on these plan sheets exactly what is being considered as wetland replication area. LE recommends that the location of the replication area be better identified on the plans and that a detailed narrative be provided for the proposed construction and monitoring of this area.

*Wood Response 5C. Wood presumes LE's comment 5C referring to "Under Response 6" pertains to the January 21, 2021 Addendum to Notice of Intent letter responses to comments by MassDEP. As stated in Response 4A, the project design was modified to include a wetland crossing that will cause no permanent resource area impacts, and as a result, no wetland replication is proposed.*

LE Response 5C. Comment addressed, no further response necessary.

- D. Under "Additional Information", it is stated that the project will alter 110 linear feet of Bank and 684 square feet of BVW. The Revised WPA Form 3 states alterations will be the same for Bank but 555 square feet for BVW. The amount of BVW alteration should be clarified.

*Wood Response 5D. The project proposes no resource area alterations.*

LE Response 5D. Comment addressed, no further response necessary.

6. Revised WPA Form 3. LE has the following comments regarding this document.

- A. As noted above, the Revised WPA Form 3 states 555 square feet of BVW alteration is proposed; however, the NOI Addendum states 684 square feet. This should be clarified.

*Wood Response 6A. The project proposes no resource area alterations.*

LE Response 6A. Comment addressed, no further response necessary.

- B. The revised Form 3 should be signed.

*Wood Response 6B. The revised WPA Form 3 has been signed and is attached.*

LE Response 6B. Comment addressed, no further response necessary.

7. Stormwater Pollution Prevention Plan (SWPPP). This report is also being reviewed by CDG and additional comments are noted below.

- A. Page 5 of the SWPPP indicates that the project is not on a property of religious or cultural significance to an Indian Tribe. The source of this information is not provided.

*Wood Response 7A. The source of this information has been added to page 5 of the SWPPP.*



LE Response 7A. Comment addressed, no further response necessary.

- B. Page 6 of the SWPPP indicates that there is no receiving water designated as a Tier 2, 2.5, or 3 Water. In Massachusetts, all wetlands, other than ORW wetlands, are considered Tier 2 (as noted in CGP Appendix F). Discharge to a Tier 2 Water requires the more intensive inspection schedule.

*Wood Response 7B. Page 6 of the SWPPP has been revised to note discharge to Tier 2 waters (wetlands) to be consistent with Appendix F of the CGP.*

LE Response 7B. Comment addressed, no further response necessary.

- C. Page 17 of the SWPPP indicates that fueling of vehicles and equipment on-site should be avoided but may be performed. LE recommends that the Commission consider not allowing fueling of vehicles within the Buffer Zone.

*Wood Response 7C. While the SWPPP indicates that on-site fueling may be performed, it also outlines specific requirements for the fueling process, if it needs to occur, to ensure it is completed in a manner protective of the environment. Refueling will not be allowed within the 100-foot wetland Buffer Zone; the SWPPP has been revised to clarify this restriction.*

LE Response 7C. Comment addressed, no further response necessary.

- D. On page 25 of the SWPPP, the Certification and Notification form is not signed. LE recommends that a completed copy of the SWPPP, with signed Certification and Notification Form, the EPA Notification and Authorization email and any signed subcontractors agreement forms, be submitted to the Conservation Commission for their records.

*Wood Response 7D. A signed Certification and Notification form, EPA Notification and Authorization email, and any signed subcontractor agreement forms will be included in the final copy of the SWPPP, which will be provided to the Commission prior to commencement of construction.*

LE Response 7D. Comment addressed, no further response necessary.

8. Site Plans.

- A. As noted previously, the Site Plans should be updated to show the revised wetland delineation flags.

*Wood Response 8A. The plans have been updated to show the revised wetland delineation flags.*

LE Response 8A. As noted previously, several revised flag locations are missing from the plans (see LE Responses 1.A, 1.B, and 1.C).

- B. As noted previously, the Site Plans should be updated to more clearly indicate the proposed wetland replication area.

*Wood Response 8B. As stated in response 4A, the project proposes no permanent alteration to wetland resource areas, and therefore no wetland replication is proposed.*

LE Response 8B. Comment addressed, no further response necessary.

- C. The final plans submitted for the project should be stamped by a professional engineer.

*Wood Response 8C. The plans have been stamped by a MA registered professional engineer.*

LE Response 8C. Comment addressed, no further response necessary.

### **3.0 STORMWATER REVIEW**

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CDG is pleased to provide the following review of the project design plans, stormwater calculation/report, SWPPP, stream crossing design, and BMP selection for the subject project. CDG offers the following comments.

9. CDG recommends that the Applicant submit stamped/signed versions of the plan sheets (the review set is stamped “draft”).

*Wood Response 9. The plans have been stamped by a MA registered professional engineer.*

CDG Response 9. Comment addressed, no further response necessary.

10. CDG recommends that the Applicant submit a copy of the existing conditions survey that was used as the basis for the Site Plans.

*Wood Response 10. The Existing Conditions plan, Sheet V-101, shows the existing conditions, and was used as the basis for the site plans.*

CDG Response 10. CDG understands that the existing conditions used as the basis for the NOI documents, including the property lines, topography, and wetland lines, were inherited electronically from Andrews Survey & Engineering, Inc. (ASE), which is the engineering/surveying firm originally associated with the project. CDG recommends that as a condition of approval, the Conservation Commission require the applicant to provide a stamped survey plan documenting the source and accuracy of the existing conditions for the Commission’s files. The condition should also require the survey to be included as part of the construction plans.

11. CDG is in agreement that the SWPPP generally meets the intent of the NPDES Construction General Permit. The project description (section 2.3 of the SWPPP) states that the construction will be phased to three- to four-acre increments to limit extents of disturbance areas. CDG would recommend that the Conservation Commission request further details of the phasing and perhaps a phasing plan to better understand how the construction will be sequenced to minimize potential impacts to wetland areas.

**Wood Response 11.** *A phasing plan can be found on sheet C-101, which has been revised to include the work area of each phase.*

CDG Response 11. CDG notes that due to site constraints, it is not practicable to provide a sediment trap for the Phase 3 area. CDG recommends that as a condition of approval, the Conservation Commission require the applicant include on the construction plans temporary erosion and sedimentation control measures on the Phase 3 slopes and/or enhance the perimeter erosion control barrier associated with the Phase 3 area.

12. Sheet C-102: Note 4 states that it is assumed the Town of Wales will permit the alterations to the public road as shown on the Site Plans. CDG recommends that the Applicant provide a status update to the Conservation Commission on the road alteration and any other required local approvals.

**Wood Response 12.** *The NOI seeks approval by the Wales Conservation Commission of the project design as it affects wetlands. The Wales Conservation Commission does not have jurisdiction over the public road. After completion of the NOI process and receipt of an Order of Conditions, the applicant will resume review of the project by the Wales Planning Board.*

CDG Response 12. CDG's original comment was intended to gauge the likelihood for any revisions to the roadway design within jurisdictional areas after issuance of an Order of Conditions. General Conditions #13 and #14 of the Order of Conditions will require that the work conform to the approved plans and special conditions and provides a process to address subsequent plan revisions. CDG feels as though General Conditions #13 and #14 will sufficiently address this matter and as such, no further response is necessary.

13. Sheet C-102: CDG recommends adding a callout to clearly state that the existing pavement in Sizer Drive is to be removed prior to placement of the crushed stone access way (and a similar note should be added to Detail #2 on Sheet C-501).

**Wood Response 13.** *A callout has been added to Sheet C-102 and to Detail #2 on Sheet C-501.*

CDG Response 13. Comment addressed, no further response necessary.

14. Sheet C-104: CDG recommends providing proposed grades along the crushed stone access way. While we acknowledge that the proposed grades will generally conform to the existing grades for most sections of the road, it appears that more substantial re-grading will be necessary to accommodate roadway construction alongside Bioretention Basin 2 and in the vicinity of the stream crossing culvert.

*Wood Response 14. Proposed grades have been added for the length of the proposed access drive.*

CDG Response 14. Comment addressed, no further response necessary.

15. Sheet C-104: For Bioretention Basin 1, the spillway is called out as elevation 893.0. However, Detail #5 on Sheet C-501 lists the overflow weir elevation as 893.5 which is consistent with the HydroCad modeling. Please update Sheet C-104 accordingly.

*Wood Response 15. The callout on Sheet C-104 has been updated to elevation 893.5 to be consistent with the HydroCAD modeling.*

CDG Response 15. Comment addressed, no further response necessary.

16. Sheet C-105: This sheet shows stationing on the access way. CDG suggests that the stationing also be shown on the site plan sheets C-102, C-103, and C-104.

*Wood Response 16. Sheets C-102, C-103, and C-104 have been updated to show the stationing.*

CDG Response 16. Comment addressed, no further response necessary.

17. Sheet C-107: Detail #2, Note 4 states that the final design of the box culvert will be performed by others. Please clarify the note to indicate that it pertains to the structural design plans (assuming that is the case) and to clarify that the cross-sectional geometry of the culvert will not be varied from what is ultimately approved by the Conservation Commission.

*Wood Response 17. Sheet C-107, Detail #2, Note 4 has been revised to state that structural design is to be performed by others and the cross-sectional geometry shown on the plans will be maintained.*

CDG Response 17. Comment addressed, no further response necessary.

18. Sheet C-107: Table 1 indicates that the bankfull width is six feet but the detail calls it out as eight feet. On August 20, 2021, LE field confirmed the bankfull width as approximately eight feet within the span of the box culvert and as such, CDG recommends that the bankfull width in Table 1 be listed as eight feet for consistency with the detail and the field measurement, once the actual bankfull width is confirmed from the Bank delineation. This clarification should not require any modifications to the design of the box culvert as the proposed 16-foot span well-

exceeds the minimum span requirement of 9.6-feet (1.2x the bankfull width) assuming an eight-foot bankfull width.

***Wood Response 18.** Sheet C-107, Table 1 has been revised to specify a bankfull width of eight feet.*

CDG Response 18. Comment addressed, no further response necessary.

19. Sheet C-107: The box culvert detail appears to indicate that the structure will be set level, which is typical practice in this application, and would therefore have a larger open height at its downstream end than at its upstream end. However, the openness ratio calculations in row 4 of Table 1 indicate the open height as being the same at the upstream and downstream ends of the culvert. CDG requests clarification on the openness ratio calculations, which should utilize the open height at the upstream end representing the smaller of the two openings.

***Wood Response 19.** Sheet C-107, Table 1 has been revised to indicate openness calculations with different upstream and downstream open areas given a level top of culvert, and uses the upstream opening in the openness ratio calculation.*

CDG Response 19. Comment addressed, no further response necessary.

20. Sheet C-107: CDG suggests that the box culvert detail be updated to show the open height dimensions as well as critical elevations including the stream inverts and ceiling elevation at the upstream and downstream ends of the culvert.

***Wood Response 20.** The culvert detail on Sheet C-107 has been updated to include inside height dimensions, stream channel inverts, and top of culvert elevation.*

CDG Response 20. Comment addressed, no further response necessary.

21. Sheet C-107: CDG suggests that the box culvert detail clarify the thickness of the crushed stone layer over top of the culvert and the size of the riprap edge stones to show that they will adequately retain the crushed stone.

***Wood Response 21.** The culvert detail on Sheet C-107 has been updated to include a top of stone elevation. Additionally, cast-on spandrels are proposed in-lieu of riprap edge stones.*

CDG Response 21. Comment addressed, no further response necessary.

22. CDG is in agreement that the proposed sediment traps are a good practice to include as a construction period best management practice. Sheet C-502: Detail #14, note 2 states that the minimum storage volume for the sediment traps is based on one inch over the contributing area whereas the sizing calculations appear to utilize ½ inch over the contributing area. Section 2.2.12 of the NPDES Construction General Permit specifies a calculated storage volume based on either the 2-year, 24-hour storm or 3,600 cubic feet per acre drained. CDG requests clarification on the sizing calculations for the sediment traps.

**Wood Response 22.** *The sediment traps were sized utilizing the Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas. The Sediment Trap section (pg. 152) notes that traps should have a minimum volume of ½ inch per acre of contributing area. The note on Detail #14 was revised to specify ½ inch.*

CDG Response 22. Noted, the sizing of the sediment traps conforms to guidelines of the Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas. As this project will also be subject to the NPDES Construction General Permit, any temporary erosion controls will also need to conform to applicable requirements contained therein. No further response necessary.

23. CDG recommends that the designer revisit the constructability of Sediment Trap 2. It appears that it may be difficult to construct without significant re-grading given the existing elevation differential across its footprint area.

**Wood Response 23.** *Sediment Trap 2 has been shifted/resized to have less of an elevation differential over its footprint area.*

CDG Response 23. Comment addressed, no further response necessary.

24. CDG is in agreement that bioretention basins are an appropriate best management practice for the proposed application. CDG requests confirmation that the bioretention basins are not proposed to be exfiltrating bioretention basins, as the test pit logs included in the stormwater report suggest that the bottom of the bioretention basin cells will extend into the groundwater table and ledge in some areas.

**Wood Response 24.** *The intended function of the current bioretention basin design is to allow stormwater to filter through the bioretention soil while mitigating the potential for groundwater to swell into the filter area. The bottom of the filter is not lined, which allows the first flush of untreated stormwater entering the basin to filter through the bioretention media before capture through the underdrain and discharge from the basin. Additionally, any upward movement of groundwater will be captured through the underdrain before it enters the filter media. Groundwater was not encountered in the test pits taken for Bioretention Basin 2, however, an upgradient underdrain is proposed to alleviate any potential seepage of groundwater from the upgradient side slope into the basin. If any ledge is encountered during installation of either basin, it will be chipped away to a depth to accommodate the specified underdrain inverts.*

CDG Response 24. CDG finds this approach to be acceptable since no credit has been taken for exfiltration into the underlying soils. No further response necessary.

25. Sheet C-501: Detail #5, CDG requests clarification on whether the impermeable membrane liner is intended to run along the sides *and* underneath the filter or just along the sides as the callout suggests. CDG believes the bioretention basins are designed to be lined and that the intent is for

the liner to wrap beneath the filter but this should be clarified in the detail to eliminate any confusion at the time of construction.

***Wood Response 25.** See response to comment 24 above. The proposed liner is intended to wrap the sides of the basin only to enable the underdrain to handle both the filtering stormwater from above and any potential groundwater from below.*

CDG Response 25. Comment addressed, no further response necessary.

26. Sheet C-501: Detail #5, CDG suggests that the bioretention basin impermeable membrane liner not be extended as far up the side slopes of the bioretention area (upslope from the filter) as shown in the detail. Our concern is that when precipitation percolates into the topsoil, it will collect on the membrane potentially causing the topsoil to wash down into the bioretention basin.

***Wood Response 26.** Detail #5 on Sheet C-501 has been revised to show the liner only along the sides of the filter media and not the sides of the open basin area.*

CDG Response 26. Comment addressed, no further response necessary.

27. Sheet C-501: Detail #5, CDG recommends that two to three inches of hardwood mulch be applied to the top of the bioretention soil mix consistent with the Massachusetts Stormwater Handbook (MSH) Volume 2 Chapter 2.

***Wood Response 27.** Detail #5 on Sheet C-105 has been revised to specify two inches of mulch at the bottom of the basin.*

CDG Response 27. Comment addressed, no further response necessary.

28. CDG is not in full agreement with the manner in which the bioretention basins have been modeled in HydroCad as follows:

- A. Pond Storage: In cases where the filter media restricts the flow of water, which CDG feels is the case in this design, the pond storage definition should only include the open water volume above this point. The submitted HydroCad model accounts for the open water volume *and* the volume of voids within the filter media. CDG recommends updating the model to remove the volume of voids within the filter media.

***Wood Response 28A.** The HydroCAD model for Bioretention Basin 2 has been revised to show the underdrain pipe routed to the outlet control structure.*

CDG Response 28A. Comment addressed, no further response necessary.

- B. Outlets: In cases where outflow is also potentially restricted by an underdrain pipe, which CDG feels is the case in this design, the outflow should be routed first through the filter media as exfiltration, and the exfiltration then routed through the underdrain pipe to its outlet

point. For Bioretention Basin #2, the underdrain pipe should be routed through the downstream outlet control structure.

***Wood Response 28B.** The HydroCAD model for Bioretention Basin 2 has been revised to show the underdrain pipe routed to the OCS.*

CDG Response 28B. Comment addressed, no further response necessary.

- C. Infiltration Rate: CDG requests justification as to the use of an infiltration rate of 8.21 inches per hour for the bioretention filter media, which will consist of a mixture of sand, topsoil, and compost. This rate is very close to the “Rawls” infiltration rate of 8.27 inches per hour for pure sand and may be too high for this application. For context, the “Rawls” infiltration rate for loamy sand is 2.41 inches per hour and for sandy loam is 1.02 inches per hour.

***Wood Response 28C.** The HydroCAD model has been updated to specify an infiltration rate of 2.41 inches per hour, consistent with a loamy sand bioretention soil.*

CDG Response 28C. Comment addressed, no further response necessary.

29. CDG is in general agreement with the watershed delineations shown on the watershed maps with the exception of PR-S2.1, which flows to Bioretention Basin 2. Based on the grades, it appears possible that the western half of this watershed could potentially bypass around the northern end of the basin and contribute directly to DP-2. A berm or a swale may be necessary to ensure that the water from all of PR-S2.1 gets into Bioretention Basin 2.

***Wood Response 29.** An earthen berm has been added to the plan to ensure all modeled runoff for the subcatchment area will enter Bioretention Basin 2*

CDG Response 29. Comment addressed, no further response necessary.

30. For proposed watersheds PR-S1.1 and PR-S2.1, CDG recommends modeling the surface area of the bioretention basins as impervious area in lieu of brush or meadow to more accurately reflect what will happen with any precipitation that falls directly into these basins.

***Wood Response 30.** The HydroCAD model has been revised to assume the surface area of the basins as impervious.*

CDG Response 30. Comment addressed, no further response necessary.

31. The stormwater report references an operation & maintenance (O&M) plan under separate cover. The O&M plan was not included in the documents that CDG received for review. CDG recommends that the Conservation Commission confirm that the O&M requirements for the proposed bioretention basins are consistent with those listed in the MSH.





# CIVIL DESIGN GROUP, LLC

## Notice of Intent Review Letter #2

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*Wood Response 31. An Operation and Maintenance Plan and Long-Term Pollution Prevention Plan, last revised in March 2021, is included under separate cover with this response to comments submittal.*

CDG Response 31. CDG has reviewed the referenced document and has no comments.

LE and CDG have based this assessment on review of the submitted documents, thorough field reconnaissance, and discussions with the Applicant's consultant during the site inspection.

If you have any questions, please do not hesitate to contact Joe Orzel at 617.405.4118 or [jho@lucasenvironmetnal.net](mailto:jho@lucasenvironmetnal.net), or Matthew Leidner at 978.794.5400 or [matt.leidner@cdgengineering.com](mailto:matt.leidner@cdgengineering.com). Thank you for your consideration in this matter.

Sincerely,

**LUCAS ENVIRONMENTAL, LLC**

A handwritten signature in blue ink that reads 'Joseph H. Orzel'.

Joseph H. Orzel, PWS, CWS  
Project Manager/Wetland Scientist

**CIVIL DESIGN GROUP, LLC**

A handwritten signature in blue ink that reads 'Matthew A. Leidner'.

Matthew A. Leidner, P.E.  
Principal

A handwritten signature in blue ink that reads 'Christopher M. Lucas'.

Christopher M. Lucas, PWS, CWS, RPSS  
Principal/Wetland & Soil Scientist