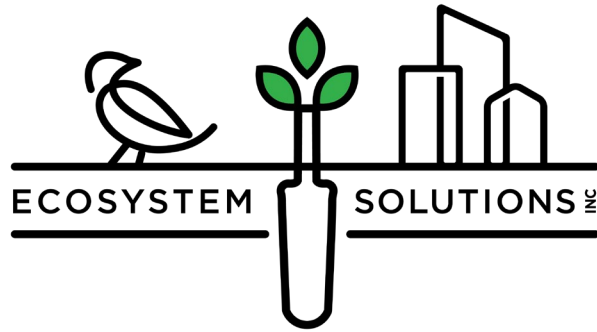


Est. 2003



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November 26, 2023

Project no. W23-1904

Edward Goodwin, Chair
Conservation Commission
301 Main Street
Sturbridge, MA 01566

RE: NOI Peer Review
200 Haynes Street / Parcel ID: 330-03748-200
Sturbridge, Massachusetts
DEP file no.: N/A- local Bylaw NOI only

Chair Goodwin:

Ecosystem Solutions, Inc. has finalized the NOI peer review for the above-referenced property ("Property"). The review is done in accordance with MGL c.131 §40 (Massachusetts Wetlands Protection Act)("WPA"), 310 CMR 10.00 (WPA Regulations), Chapter 286 (Sturbridge Wetlands Bylaw), and Chapter 365 (Sturbridge Wetlands Regulations).

The following documents were reviewed and actions performed since the time of my last report of 8/24/23:

- Notice of Intent ("NOI") Packet created by BSC Group w/ Coverletter dated August 28, 2023.
- Site plans by BSC Group entitled "Ground-Mounted Photovoltaic System" consisting of nine (9) sheets, stamped by Brian G. Yeratian, P.E. #46206 on 8/1/23 and Chistopher W. McNary, PLS #47396 on Sheet 2 on 8/3/23.
- Peer review report for stormwater compliance by CMG, dated November 1, 2023.
- Site visit on 11/24/23.

Comments

Site Description

The subject property ("Property") is an undeveloped, 13.92 acre parcel located on the east side of Haynes Street and immediately west of the Sturbridge Retirement Co-op ("Co-op"). It is more or less rectangular in shape, $\pm 1,500$ feet in length north-to-south and ± 400 feet in width east-to-west. It occurs at a high point in the local landscape, with a peak in the southern third of the site reaching about 730 feet. Topography drops off quickly to the east, south, and west from the peak, while it drops off more moderately to the

north. My observations show cut-banks where the hill was excavated to make land more level along both Haynes St. and the Co-op. Haynes St. is approximately 30' lower in elevation directly west of the peak, and the Co-op is 120' lower in elevation directly east of the peak. There is a slight swale on the east side of Haynes St. between the road and the cut-bank. It does not appear to carry water, at least not during "normal" storm events because I did not observe any defined channel or scouring within it that might suggest regular transport of water.

The site itself is completely forested, with dominant species in the upland including, but not necessarily limited to white pine (*Pinus strobus*), white oak (*Quercus alba*), black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea*), Eastern hemlock (*Tsuga canadensis*), mountain laurel (*Kalmia latifolia*), huckleberry (*Gaylussacia baccata*), bracken fern (*Pteridium aquilinum*), and other unidentified herbaceous species due to the time-of-year. Non-dominant species in upland areas include chestnut oak (*Quercus montana*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*) and black birch (*Betula lenta*), although chestnut oak was locally abundant near the peak. Wetland areas were dominated by red maple, Eastern hemlock, highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), sphagnum moss (*Sphagnum spp.*) and other unidentified herbaceous vegetation due to the time-of-year.



Picture 1. Typical upland forest within the interior of the site.

There is a headwall with double reinforced concrete pipes ("RCP") leading out of it at flag WF-33. Discharge leads downhill in a slight valley to the north and east. A weak channel can be seen in the BVW near the discharge point, but quickly dissipates.



Picture 2. Headwall and double RCP. Haynes St. immediately behind headwall. Blue flag numbered WF-33 can be seen near the center of the headwall.

Presumptions of Significance

The wetland resource area present on-site is Bordering Vegetated Wetland (“BVW”). Per Chapter 365, it is my opinion that the following public interests are present, with BVW being presumed to be significant to the following Interests under the WPA and the Sturbridge Wetlands Protection Bylaw:

- Protection of public and private water supply
- Protection of groundwater supply
- Storm damage prevention
- Prevention of pollution
- Protection of Fisheries
- Protection of Wildlife Habitat

It is my opinion that the following interests are present, with BVW being presumed significant to the following Interests under the Sturbridge Wetlands Protection Bylaw only:

- Erosion and sedimentation control
- Protection of water quality
- Protection of agriculture

Wetland Delineation Review

During my site visit on 11/24/23, I walked the delineated wetland boundary on the north side of the site and can confirm that the wetland type is Bordering Vegetated Wetland, and that the delineation is accurate. For the most part, the wetland occurs at the bottom-of-slope. It follows up a slight valley to the headwall with double RCP, but otherwise it occurs at bottom-of-slope. The only flags that are actually on-site, according to the site plan, are flags WF-26 through WF-29.

I walked the entire site looking for any potential missing wetland resource areas and did not find any. The NOI Packet, within the June 2, 2023 wetland border report by Goddard Consulting, LLC (“Goddard”) mentions wetland flags in the southern part of the Property. I walked the southern part of the site extensively and could not find the wetland flags or the wetlands that were mentioned in the report. If they exist, they occur far enough off-site that they were not accessible to me without significant trespass.

No other wetland resource areas besides BVW were observed on-site.

Wetland Jurisdiction

It is clear with the naked eye from walking on-site that a significant portion of the site consists of slopes of greater than eight percent (8%). This includes the slope to the south of the BVW depicted on the site plan. Therefore, a 500 foot Buffer Zone is present on-site. What is unclear to me, however, is whether the 500 Buffer Zone begins at the BVW boundary, or where the 8% slope adjacent to the BVW ends. If the latter is the case, then there is a good chance that the entire site is within the jurisdiction of the local Bylaw. As it is, the Applicant has depicted a 500’ Buffer Zone from the northern and southern BVWs with only the middle-third of the site outside of jurisdiction.

Critical Areas

I agree that there is no 100 year floodplain (Bordering Land Subject to Flooding), Areas of Critical Environmental Concern, Outstanding Resource Waters, Zone I, Zone II, or Interim Wellhead Protection Areas, Surface Water Protection Areas, Estimated or Priority Habitats of Rare & Endangered Species, or Potential or Certified Vernal Pools on-site. The Property does not fall within any NHESP BioMap areas.

There are a couple of Zone I wellhead protection areas just to the east comprised of “Rock Well 4” and “Rock Well 5” within the Co-op. The outer edge of the Zone 1 is approximately 750’-800’ away from the eastern Property boundary.

Breakneck Brook, approximately 1,900’ to the east, is a DCR Designated Coldwater Fishery.

According to MassGIS, the site falls within “Prime Forest Land,” specifically Prime 2 and Prime 3 forest land. A description of this data layer can be found at <https://www.mass.gov/info-details/massgis-data-prime-forest-land>. Using U.S. Natural Resources Conservation Service (“NRCS”) soils data, land was classified into nine (9) different categories based on potential timber productivity of white pine and red oak per acre per year at culmination of mean annual increment.

Site Design & Compliance w/ Bylaw & Regulations

General

According to the BSC site narrative, the site requires the clearing of 9.44 acres of forest, with the construction of the solar array and ancillary structures over ± 8.3 of those acres. It includes the construction of a 1,500-foot long, 20’ wide gravel access road, with access coming from Haynes St. The electrical tie-in will be along Kelly Rd. to the north, via overhead wires leading out to Haynes St. and not through the BVW on the north side of the Property.

The solar array will occur in the center of the site, in a north-to-south configuration in forty seven (47) rows. The gravel access road will be on the west side of the arrays, running parallel to Haynes St. An infiltration basin is proposed in the southeast quadrant of the site, on the Co-op side. Three sub-surface infiltration units are proposed as well, in the south western and northern parts of the array. Access will be from Haynes St., which will require grading to gain elevation from the street. Otherwise, grading is only proposed along the western part of the site near Haynes St., and in the southeast quadrant where the infiltration basin is proposed.

Applicant has presented an alternatives analysis, construction sequence, and has staked the erosion control line as well as other features on-site.

No Significant Impact Analysis

All work is proposed at least 100 feet away from wetland resource areas (i.e. BVW), with the northern limit of work coming very close to 100' boundary. §365-1.3(B) "No significant adverse impacts" of the Sturbridge Bylaw Regulations states:

When determining whether significant adverse impact could occur/has occurred, the Commission shall include in its review all potential cumulative impacts to resource areas and all work conducted within the 200-foot buffer from the time of adoption of the applicable regulations (See §365-4.19) through the proposed project time frame.

CMG has provided a review of the State and local Stormwater Regulations, among others, and I concur with their analysis. This project is subject to new construction standards and Department of Environmental Protection ("DEP") Program Policy 17-1: Photovoltaic System Solar Array Review. As stated in the Policy, "Large wooded parcels of land, historically, which have been difficult to develop in the past due to steep topography, shallow bedrock, or poor percolation rates, are often targeted for conversion to solar, development of such sites present unique challenges." This is indeed the case with the subject project. There is no doubt that expansive disturbance will be done in the area of proposed work, within 500 feet of BVW. This includes clearcutting forest on slopes of $\geq 8\%$ that lead down to BVW, not to mention a residential area to the west (the Co-op) and south (single-family residences). The potential for significant problems during the construction process is real, in my opinion, and in the end only the Commission's personal comfort with the project can allow it to move forward. In order to help the Commission decide, I offer the following comments for their consideration:

Supplemental comments to the CMG report:

1. I do not believe that siltsoxx compost filter socks are enough to control potential erosion and sedimentation on-site and recommend that silt fence be installed directly below filter socks with a high quality fabric and stake spacing of 4 feet, at a minimum. The siltsoxx should be 100% biodegradable with no vinyl mesh, regardless of whether or not it is photo-degradable.
2. Sedimentation controls should be placed a minimum of five (5') feet off of any proposed slope in order to allow sediment to settle before reaching it. If this is not possible, I recommend reducing the scale of the project.

-
3. The stone construction entrance should extend farther into the site, preferably into and around the construction staging area.
 4. The NPDES Construction General Permit (“CGP”) and SWPPP should be provided to the Commission when it becomes available, per Stormwater Standard 8. Due to the steep slopes present, the Commission should consider the Applicant to provide the weekly inspection logs / reports associated with the CGP in .pdf format. They may also consider having an outside professional monitor the site for erosion and sedimentation compliance under the CGP. The steepness of the slopes and potential for serious erosion and sedimentation of wetland resource areas is high at this site. I can guarantee that there will be significant precipitation events that will cause erosion on-site during construction.
 5. Include the long-term operation and maintenance plan as an in-perpetuity Special Condition.
 6. Not only does Infiltration Basin 1 not include a sediment forebay, it does not appear to have an emergency overflow spillway.
 7. In CMG’s comment 17, they state that the berm elevation for Infiltration Basin 1 should be a height that a minimum of 1ft. of freeboard be provided for the 100 year storm event. Given the very steep slopes leading down to the Co-op and residences associated with it, I recommend increasing this height if only to be overly cautious of a significant precipitation event.
 8. Are there any emergency overflow discharges for the subsurface infiltration systems?

I offer my own comments:

1. I recommend the Applicant provide as detailed a construction sequence as possible, including times-of-year when work will occur. For example, what time of year will trees be felled, stumped, and tree materials removed?
2. The site will have to be felled of trees and stumped. Will the trees and stumps be chipped on-site? Will any of this material be utilized for ESC’s? If so, I recommend removing chips from the trunk and stems from the site while keeping the root tailings for ESC’s on-site. Root tailings tend to be curved and ‘grab’ into the ground, while chips tend to float. Root tailings can be used as a cover, and also be created into erosion and sedimentation control berms. This can supplement the proposed ESC’s, and in my opinion even replace the need for siltsoxx, which tend to flatten over time and sheathing tear and rent.
3. If tree trunks are to be removed from the site, will they be removed using the existing gravel entrance near the southwestern Property corner, or will the new entrance near the northwestern Property corner be used? Is either entrance large enough to accommodate skid steers, cutting equipment, and logging trucks? Either way, a stone construction entrance will be required. The longer, the better.
4. I have no comments about the types and locations where seed will be spread per the seeding schedule on Sheet 4 of 9. However, having worked on many large-scale solar projects and peer reviewed even more, I find the inclusion of ‘pollinator mix’ seed mixes a bit of a joke, for lack of other terms. These kinds of seed mixes require a high level of care and upkeep to assure that they actually grow in as advertised. My personal experience has been that in most cases, the ground cover ends up being grasses and weeds unless the Commission requires close monitoring and re-seeding as needed. I recommend a Special Condition to this effect.

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5. My main concern for impact revolves around the BVW in the northern part of the Property, especially since the majority of it is located off-site. It is on land owned by Sturbridge Retirement. Please consider a Bond in case this off-site land is impacted in order to stave off complications in enforcement and potential civil actions among the parties involved. If sediment reaches areas off-site, the Applicant/Owner will have to obtain authorization from Sturbridge Retirement to perform the work. The Commission should try to anticipate this worst-case scenario and head-off problems associated with enforcement. The same applies to any wetlands to the south, and the residences in that area as well.
6. Other concerns, as they revolve around the Public Interests include:
- Public and private water supply- the Co-op has two community wells to the east. Clearing land and grading affects runoff and the direction in which water flows. Assurances need to be gained from the applicant in this regard, not to mention residences to the south, at a minimum.
 - Protection of groundwater supply- same comments as above, plus assurance that the BVW to the north, at a minimum, will be able to continue to be a groundwater source. This is mostly done through compliance with the Stormwater Standards.
 - Prevention of Pollution- the BVW has water quality functions in addition to its other functions. Sediment from this slope would significantly impair that ability.
 - Protection of fisheries- although I observed no streams on-site that would have fisheries, the BVW provides a water source for fisheries it eventually connects to.
 - Protection of wildlife habitat- this is a significant concern for me, not only for the BVW but for the Buffer Zone associated with it. The forest on-site is of good to high quality, with no invasive or exotic species observed anywhere that I could see. I observed a large wasp nest in a tree while walking a cut-trail toward the summit. The trees are mature and there is good spatial heterogeneity in herbaceous, shrub, and tree layers. The presence of mountain laurel in the forest, although not a rare forest ecosystem, is not common, either. The cumulative effect is that wildlife habitat value at this site is high.
 - Erosion and sedimentation control- this Interest under the local Bylaw is self-explanatory. The potential for significant erosion and sedimentation, as well as the distance it may reach from the source, is high. The BVW and Buffer Zone would be irreparably harmed if a significant sedimentation event occurred. What would be even more difficult is a cleanup.
 - Protection of water quality- Similar to prevention of pollution, the BVW provides water quality functions that would be significantly impacted by a sedimentation event.
 - Protection of agriculture- only in respect to tree harvesting, which is considered a form of agriculture. In this case, the forest would be harvested, which appears to be a positive toward this Interest, but if a solar array is constructed, this would be the last time it would be harvested for decades to come, if ever.

Conclusion

Before the Commission votes, I recommend that the Applicant answer the questions posed above, as well as address CMG's comments and produce revisions to the site plans as requested. This is a site that the Commission absolutely has to see with their own eyes.

Should you have any questions regarding this letter, or would like to conduct a site walk with me, please do not hesitate to call at (401) 741-3263 or by using the other contact information above.

Sincerely,

Ecosystem Solutions, Inc.

Brandon B. Faneuf, M.S., Principal

PWS, RPSS, CWB, CPESC

BF/bf

enclosures

