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DESIGN ENGINEERS, INC.

June 16, 2022

Kenneth Buckland
Director of Planning and Community Development
Town of Wareham Planning Board
54 Marion Road
Wareham, MA 02571

RE: Response to Charles Rowley's Peer Review Comments, July 20, 2021
91 and 101 Fearing Hill Road Solar Project – Wareham, MA
ADE Job #3055.02

Dear Mr. Buckland:

This response letter addresses the comments made in Charles Rowley's Peer Review letter dated July 20, 2021, for the above-referenced project. Please note the peer review comments are italicized, and our responses follow in bold text:

Plans:

Sheet 2 of 7

1. *Identify which parts of the site plan were prepared from field survey information and which parts were done using GIS data. No ties are shown to property monuments or the layout of Fearing Hill Road which is a Plymouth County layout.*

   Notes and callouts have been revised on Sheet 2 to clarify that the boundary and existing conditions is all based on field survey except abutter houses and property lines, which are compiled from GIS data. Existing monumentation found during the survey is now shown on Sheet 2.

2. *Confirm that portion of the old Fearing Hill Road that was discontinued.*

   The callout referencing Old Fearing Hill Road has been clarified on Sheet 2 to include record plan information.

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3. *The frontage for Lot 1000 appears to be based on the proposed cul-de-sac and short street layout that connects Fearing Hill Road to the site. Until a subdivision plan is approved by the Planning Board this frontage does not exist.*

   The Definitive Subdivision Plan has been approved.

4. *Who is the owner of the lot between the cul-de-sac and the old railbed along Fearing Hill Road? If an abutter, it should be noted. If part of the project, it should be so noted.*

   This lot is the 5.01 acre Lot 1 shown on the above-mentioned approved Definitive Subdivision Plan and it is owned by Ninety Six Reality LLC. This information is now shown on the plans.

Sheet 3 of 7

1. *The proposed limits of clearing are 50 feet from the property line except for along the northeasterly boundary where the limits are shown as 25 feet, more or less. This is not consistent with the requirement for vegetated buffers as required by the Wareham Zoning By-Law, Section 594.1.*

   The site layout/design has been revised to maintain the 50' buffer per the bylaw.

2. *Minimum buffers of 50 feet must be maintained around the perimeter at all points and may be increased as necessary by the Planning Board as noted in Section 594.1 (subsections 3, 4 and 5). The Planning Board does not have the authority to waive the minimum buffer, but which can only be done by the granting of a variance by the Board of Appeals.*

   The site layout/design has been revised to maintain the 50' buffer per the bylaw.

3. *The 20-foot wide perimeter access road on the northeasterly side of the project cannot easily be negotiated at the cul-de-sac and has extremely tight corners at the southeast side and appears to extend into the runoff area on the longest northeast side. At the extreme northwest corner of the site there is no radius for the inside and no turn around.*

   The perimeter access road has been revised to provide better maneuverability.

4. *There are four utility poles (narrative suggests as many as 6) that are proposed as a connection from the existing overhead electric line on the southerly side of Fearing Hill*

Road and which would be located on the northerly side of the road. It would require additional clearing of trees and vegetation along the road for these poles to be erected and have clearance to the wires.

The interconnection design has been revised to eliminate all but 1 pole on the north side of Fearing Hill Road, with minimal clearing requirements.

Sheet 4 of 7

1. *Clearing limits on the northeast side are shown as 14 feet and 15 feet from the property boundary. The same minimum buffer is required at this location and may be increased by action of the Planning Board. See Item 2 for Sheet 3 of 7 above.*

   The site layout/design has been revised to maintain the 50' buffer per the bylaw.

2. *It may not be necessary to clear the entire cul-de-sac of vegetation as shown on the plan. Much will depend on the timing of any approval that is granted for the solar project. It is assumed that if the project approval is received by the applicant prior to the expiration of an approved subdivision plan, that the solar project would take precedence.*

   The entrance has been revised to show just the gravel access drive, which curves to the northeast to minimize visual impacts.

3. *A reconfiguration of the clearing limits at the cul-de-sac may eliminate the need to have the four new utility poles along Fearing Hill Road. One County Road solar project only has one pole before going underground to pad mounted panels.*

   See response to #4 (Sheet 3 of 7) above.

Sheet 5 of 7

1. *The flow from the detention basin at the southwest corner of the project extends through pipe to a riprap basin and which then spills over ground toward the old railbed. As noted on the site plan a portion of this bed has been delineated with wetlands flags. This confirms the presence of water close to the ground surface in this area. In winter months portions of the railbed close to Fearing Hill Road have been observed as flooded due to standing water. This condition must not be made worse by the addition of concentrated flow emanating from the site.*

The revised drainage analysis incorporates this railroad bed into the modeling and peak rate and volume are calculated to be equal to or reduced in post development conditions.

2. *The emergency spillway elevation is wrong at 60.5.*

   This has been revised and corrected on the revised site plans.

3. *The land clearing on the southwest side of the site is extensive and does not need to go beyond the fence line. It extends into the adjacent lot by 60 feet. If this front lot is part of the project there is no need for the property line separation.*

   The limit of clearing has been adjusted to maintain the 50' buffer to the approved subdivision lot line of Lot 1.

4. *The stripping of topsoil from the site and the removal of stumps will result in finish grades being much closer to the underlying soils that have low permeability. There is a possibility of permanent standing water in the lower portions of the detention basins.*

   There will be NO stripping of topsoil from the site. Further, the basin outlet pipes are designed at the lower/bottom elevation of basin with the basin sloping towards these outlet pipes to alleviate standing water.

5. *A similar wet condition may result from cutting swales 18" into the grade. Most soils on the site have perched ground water from 12" to 37" below the surface. This is borne out by the descriptions of each of the soil types encountered in the project area.*

   Test pits indicate estimated seasonal high groundwater (ESHG) at 20" to 42" below grade. The swales are a maximum of 18" deep, which puts them above ESHG, and have a minimum gradient of 1%, which should reduce the possibility of standing water.

Sheet 6 of 7

1. *Clearing limits are within 17 feet of the lot line at the southeast side of the project. The minimum clearing limit is 50 feet which may be made greater if conditions support it.*

   The site layout/design has been revised to maintain the 50' buffer per the bylaw.

2. *The northerly corner of the array clearing is 140 feet from the nearest panel and is on a downward slope. There is no need to clear this area as panel exposure to sunlight is from the southeast to southwest. There is a 25-foot difference in elevation which would allow clearing to be reduced while retaining ample sunlight for the array. Also, panels could be pulled back to reduce the steep grading at the corner for the service road.*

   The revised site layout/design eliminates these panels in the northerly corner of the site, further reducing the size of the project.

3. *The 20-foot access road at the northwest corner of the site will be impossible to negotiate by emergency vehicles. The corner of the array needs to be pulled back to allow for a better swing.*

   Refer to response #3 (Sheet 3 of 7) above.

4. *As mentioned above, water may be trapped in the detention area below the elevation of the 6-inch pipe. Unless ample protection is provided for the pipe there could be sediment buildup that would eventually clog the pipe and reduce its capacity to drain.*

   The basin outlet pipes are designed at the lower/bottom elevation of basin with the basin sloping towards these outlet pipes to alleviate standing water. In addition, a small 4'x4' x 12" deep rip-rap sump/micropool has been incorporated at these outlets pipes to allow for sediment buildup.

5. *Two infiltration trench notations are shown to the east of the equipment pads. Only one trench is shown. The purpose is questionable given the indications of perched ground water at very shallow depths.*

   These infiltration trenches have been relocated adjacent to the equipment pads and are now elevated above existing grade and any potential shallow groundwater.

6. *What do the heavy short dashed lines represent? Regrading?*

   These are intermittent intermediate rows of erosion control measures to help contain erosion in the open solar field during construction. They are labelled on the site plan Sheets 4, 5, and 6.

Sheet 7 of 7

1. *Several of the details rely on swales and excavation that may intercept the perched water table. The potential for erosion, especially during the construction phase is high, especially on the steeper slopes of 8% or more.*

   Refer to responses for #5 (Sheet 5 of 7) and #6 (Sheet 6 of 7) above. Also, the swales on the steeper slopes will be rock lined, as shown on Sheet 6. Also note that no cutting or excavation is proposed on the Site to generate fill for the basin berms, access roads, and equipment pads. Any fill required will be imported from off-site.

2. *The access road cross section shows only 6-inches of gravel over a natural base. It is unlikely that this thin layer of gravel will be sufficient to maintain a dry driving surface that will not be muddy or that will not deteriorate over time.*

   The gravel depth has been increased to 12".

Site Impact Report

1. *There should be a discussion included in the report as to the natural conditions that are on the site. Reference is made to Section 1543.1 (3) of the Site Plan Review requirements with respect to reporting on the ecology of the site as well as significant off-site impacts. The current description of existing conditions does not go into depth as to the current site environment.*

   The Hydrogeologic and Hydrologic Study completed by Horsley Witten Group provided a very detailed description of existing conditions on the site.

2. *The Planning Board does not have the authority to waive the minimum requirements of the Zoning By-Law. Only the Board of Appeals can grant a variance for that purpose.*

   The waiver request has been withdrawn.

Solar Decommissioning Evaluation and Cost Estimates

1. *The description of restoration requirements suggests that areas of the site will be re-seeded if needed. There is no doubt but what re-seeding will be necessary as equipment will be*

required to remove fencing, support posts, remove underground wiring, remove concrete pads and the loading of materials to be removed. All disturbed areas need to be re-vegetated to the extent necessary for stabilization and growth.

The Decommissioning Plan (revised June 16, 2022) has been amended to address this comment.

2. *The cost estimate does not include any mention of the removal of utility poles, concrete pads, fencing or the re-vegetation of disturbed areas. Each item should be listed with the unit cost and total cost shown.*

   The Decommissioning Plan (revised June 16, 2022) has been amended to address this comment. Unit costs are shown in Exhibit A of the Decommissioning Plan.

3. *Whether there is salvage value or not, this should not be included to reduce the net amount of security to be submitted to the town.*

   The Decommissioning Plan (revised June 16, 2022) has been amended to address this comment. Salvage value has been excluded.

4. *The total amount to be secured by a cash bond, performance bond or other method to be approved by the Town of Wareham should be increased by 25% to cover the cost of inflation.*

   The Decommissioning Plan (revised June 16, 2022) has been amended to address this comment.

5. *The bond amount should be reviewed and adjusted accordingly every 5 years.*

   The Decommissioning Plan (revised June 16, 2022) has been amended to address this comment.

Stormwater Report

The stormwater report has provided data according to the Stormwater Regulations of DEP for the 2-year, 10-year and 100-year storm events. There is no issue with the delineation of the watersheds as noted on the two plans that accompany the report. However, the amount of soil cover that is identified as Group B throughout the site is significant and causes concern.

The Plymouth County Soils Survey has identified the project area as having moderately to poorly drained soils. A significant portion of the upper central part of the site is labeled as within hydrologic soil group B. However, this moderately well drained soil also has groundwater depths ranging from 18 inches to 37 inches according to the soil descriptions. This is an indication that even if rainfall permeates the ground surface and is absorbed quickly, it also meets a much denser soil barrier that causes the water to travel laterally across slopes.

The soil classification for the central portion of the site is 301B (Montauk). Due to its range of low transmissibility, it is recommended that this soil be tested on site to determine the potential for runoff.

Similarly, soil types 321B (Birchwood) and 69A (Mattapoisett) have very low transmissibility ranges from 0.0 inches/hr. to 0.20 inches/hr. and have very shallow depths to groundwater.

Opening up these soil types to direct rainfall will have a significant impact on total runoff. Currently the site is well vegetated with natural cover of pine and oak. These trees intercept runoff directly, along with decaying matter and leaf litter reducing the amount of rainfall that directly falls on the surface. In addition, there is a natural uptake of water as it is absorbed into the root systems for the vegetation. Removing this vegetation will allow a greater portion of rainfall to hit the ground directly and increase the runoff rate.

The project proposes to revegetate the disturbed ground with loam and seed but the hydrologic conditions of re-seeding will not protect the area from the increase in runoff. Along with the removal of topsoil is the disturbance caused by the removal of tree stumps and roots. This action will alter the overall condition of the ground surface soils.

It is assumed that the surface will be covered with a minimum of 75% good cover. Given that the surface will be open to the sun for the purpose of panel exposure, it is also conceivable that the surface will be easily dried out to the extent that good grass cover would not occur.

To address these concerns as well as others brought up by the Planning Board and neighbors during the Public Hearing process, the Town commissioned Horsley Witten Group to complete a Hydrogeologic and Hydrologic Study, including onsite soil evaluation/test pits, soil borings, monitoring wells, groundwater readings, etc. The revised drainage analysis and site design incorporates the results and addresses the recommendations of this hydrogeologic and hydrologic study.

Recommendations

1. *Absent the documentation of actual transmissibility for the soils found on the site, it is recommended that on-site testing be conducted to establish the depth to ground water and the capacity of the soil to absorb runoff.*

   Refer to Stormwater Report response above.

2. *The applicant should consider reducing the size and scope of the project which will automatically reduce the site impacts.*

   The size and scale of the project has been reduced by ±6.4 acres, a 24% reduction from the original project size.

3. *The natural buffers around the east and west portions of the site should be increased substantially to retain the natural capacity to absorb runoff, especially on the steeper slopes.*

   These natural buffers have been increased within the revised site layout/design.

4. *Move the detention areas to within the reduced site area and allow for the discharge of runoff to occur over larger portions of the natural cover contained within the buffers.*

   The detention basin locations have been pulled back to allow for a greater buffer of natural cover at the outlets.

5. *Reduce the opening to the site so as to minimize visual impacts from Fearing Hill Road and surrounding area.*

   The entrance has been revised to show the gravel access drive curving to the northeast to minimize visual impacts.

6. *Revise the curve number for 75% or better for good grass cover to a higher curve number for fair grass cover and compute runoff accordingly.*

   The revised site layout/design now incorporates a thicker layer of loam (6" minimum) as well as a special seed mix within the array field. In addition, the array field has greater than 50% openness area (not under the panels) to allow for better establishment of a healthy grass/meadow, providing justification for the "good" grass cover designation in this area. Fair grass cover is used in other grassed areas outside the array field.

Please call us at (508) 888-9282 if you should have any questions.

Sincerely,

ATLANTIC DESIGN ENGINEERS, INC.

Richard J. Tabaczynski, P.E.
Vice President

RJT/rp

CC: Charles Rowley
Wareham MA 3, LLC
Horsley Witten Group