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MEMORANDUM

To: Bryan Healy, Village of Croton-on-Hudson Village Manager
CC: Dan O'Connor, Village Engineer; Linda Whitehead, Village Attorney
From: Nick Vamvas & Barbara B. Beall, PWS, LEED®AP
Date: December 17, 2021
Re: Hudson National Golf Club/Matrix Development, LLC – Solar Project - Engineering Review
Project #: 82050.00

The following are our comments on the applicant's latest submission. The following items were reviewed for conformance with the Village code, NYSDEC stormwater design requirements, and general engineering and natural resource protection best practices:

- Matrix Response to McCullough, Goldberger & Staudt, LLL, dated December 13, 2021,
- Matrix Response to Chazen, dated December 13, 2021,
- Prickly Pear Solar – Mastromonaco Response, dated December 13, 2021,
- Prickly Pear Solar – Tim Miller Association Response, dated December 10, 2021,
- Decomissioning Plan – Prickly Pear Solar, LLC, dated December 13, 2021,
- RM non-Disturbance Memo, dated October 19, 2021,
- Site Plan Proposed Subdivision/Solar Array System prepared for Hudson National Golf Club dated April 22, 2019 revised December 9, 2021 sheet 1 of 7 sheets,
- Overall Map, Proposed Subdivision/Solar Array System prepared for Hudson National Golf Club dated January 22, 2020 revised December 9, 2021 sheet 2 of 7 sheets,
- Tree Plan, Solar Array System prepared for Hudson National Golf Club dated March 25, 2020 revised December 9, 2021 sheet 3 of 7 sheets,
- Tree Replanting Landscape Plan, Solar Array System prepared for Hudson National Golf Club dated March 25, 2020 revised December 9, 2021 sheet 4 of 7 sheets,
- Erosion Control Plan, Solar Array System prepared for Hudson National Golf Club dated July 2, 2020 revised December 9, 2021 sheet 6 of 7 sheets, and
- Detail/Notes, Solar Array System prepared for Hudson National Golf Club dated July 2, 2020 revised December 9, 2021 sheet 7 of 7 sheets.

<u>COMMENTS ON RESPONSE TO MCCULLOUGH, GOLDBERGER & STAUDT</u>

1. The applicant proposes to plant 10 conifers six to eight feet tall at the discretion of the Village Engineer prior to issuance of the construction permit. It would be more appropriate to discuss the location of the trees prior to issuance of a completed works certifications (certificate of occupancy or similar instrument). That way, the trees can be planted where they will have the most impact on mitigation of array visibility.
2. The count of "poor" trees should be included in the live count as these are regulated as part of the Village ordinance.
3. The use of Fend Off Deer and Rabbit Repellent Clips appears to be appropriate on this site.
4. The applicant provided a detailed explanation of the reason for the location of the array, but can Matrix please identify if there are other potential points of interconnection (POI) around the HNGC property? And is it the role of the developer to dictate the POI location, or is that at the sole discretion of the utility company?

5. The explanation for siting the electrical equipment on the south side of Prickly Pear Hill Road seems reasonable, but this presents the issue of Tier 3 solar facilities being allowed only as the principle use on a parcel. Wouldn't the electrical equipment therefore have to be on a parcel separate from the primary HNGC parcel?
6. We acknowledge that the inclusion of energy storage will be a benefit to the local electrical grid, but the Special Use Permit application, Site Plan application, and Environmental Assessment Form must be updated accordingly. It appears that applicant has already considered the visual affect of the Megapack and has proposed screening. The applicant should address the potential for impacts on ambient noise levels associated with the operation of the Megapack.
7. The applicant is requested to address the comments provided by Chief Karpoff. The final plan should be updated accordingly. As none of the requested changes will affect environmental review, we anticipate these items will be addressed during Site Plan review.

<u>COMMENTS ON MATRIX RESPONSE TO CHAZEN</u>

1. We acknowledge that the inclusion of energy storage will be a benefit to the local electrical grid, but the Special Use Permit application, Site Plan application, and Environmental Assessment Form must be updated accordingly. It appears that applicant has already considered the visual affect of the Megapack and has proposed screening. The applicant should address the potential for impacts on ambient noise levels associated with the operation of the Megapack.
2. No further comments on the decommissioning plan.
3. The applicant is requested to address the comments provided by Chief Karpoff. The final plan should be updated accordingly. As none of the requested changes will affect environmental review, we anticipate these items will be addressed during Site Plan review.
4. The applicant provided a detailed explanation of the reason for the location of the array, but can Matrix please identify if there are other potential points of interconnection (POI) around the HNGC property? And is it the role of the developer to dictate the POI location, or is that at the sole discretion of the utility company?
5. We are comfortable pushing additional review of the drainage calculations to the Site Plan approval process, but we defer to the Village Board to make this determination.

<u>COMMENTS ON RALPH MASTROMONACO RESPONSE TO CHAZEN</u>

1. The count of "poor" trees should be included in the live count as these are regulated as part of the Village ordinance.
2. If the jute mats are only included as a means to help establish vegetation, what other measures are proposed to address the potential for channelization and erosion on the steep slopes in the array? It may be appropriate to add check dams or similar devices in the existing flow channels, particularly while vegetation is established on site. We view this as a technical issue that can be discussed during the Site Plan approval process.
3. A detail for a temporary swale has been added. We have no further comments on this matter.
4. The applicant intends to integrate the existing drainage structures on the driveway to Lands N/F of Reilly with the newly proposed drainage. We have no further comment on this matter.
5. The callout for the inverter pad still says 6'X22'X8' in the plan set reviewed by this office. The final plan should be corrected.
6. The rain garden detail has been modified as requested. The applicant notes that HNGC staff will be responsible for maintenance of the rain garden. This should be included as a note on the plans.

7. The applicant proposes to complete soil testing in the rain garden prior to installation. We believe the soil testing should occur prior to site plan approval in order to verify the rain garden is suitable for use in this location.
8. The wildflower/grass seed mix appears appropriate for this project.
9. The use of Fend Off Deer and Rabbit Repellent Clips appears to be appropriate on this site.

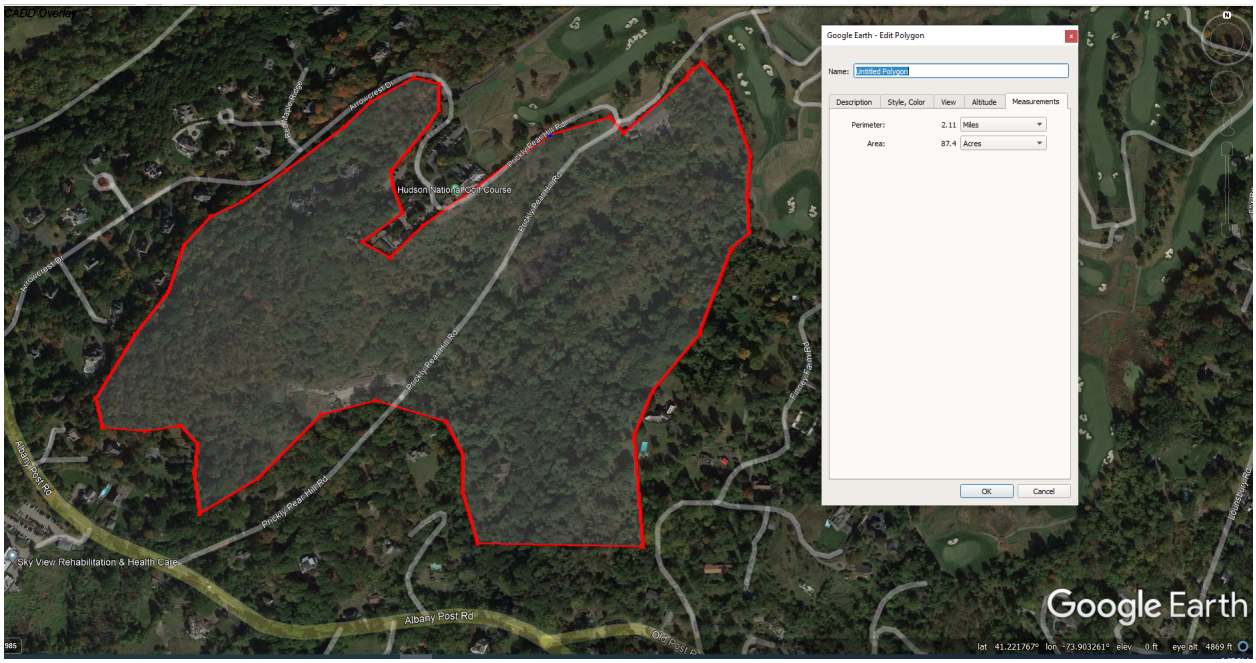
COMMENTS ON REVISED PLANS

All plan comments are incorporated into the comments above.

COMMENTS ON TIM MILLER ASSOCIATES, INC. RESPONSE TO CHAZEN MEMO

In response to Tim Miller Associates' Inc. (TMA) letter dated December 10, 2021, we would like to provide this additional documentation relative to forest patch size, use by interior birds, and fragmentation.

1. The TMA letter provided a figure titled "Regional Vegetation Associations on 2016 Aerial Photo" illustrating an area of "undisturbed" woodland (in dark green) that includes the 6.7 acres of solar array would be located. As shown in Figure 1 below, Chazen extrapolated the approximate limits of that "undisturbed" woodland into Google Earth as a polygon (excluding parking areas for the Hudson National Golf Club) and measured the polygon area. The red boundary is the approximate limit of the "undisturbed" woodland and is approximately 87 acres. See Figure 1 below.



2. Chazen notes that even this "undisturbed" woodland is bisected by Prickly Pear Hill Road. It is also encroached upon by the maintenance area in the vicinity of the proposed solar array, two large homes on the south side of Arrowcrest Drive and by what appears to be accessory parking for the clubhouse on the south side of the entrance drive.
3. Chazen then reviewed NYSDEC's Final Supplemental Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program, prepared in 2015[1], as this document had a significant d

[1] 2015. NYSDEC. Final Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program. Volume 1: Final SGEIS Regulatory Program for Horizontal Drilling

iscussion about forest patch size necessary to support significant interior birds. Volume 1, Section 7.4.1.2 discussed the reduction of indirect and cumulative impacts of habitat fragmentation, focused on grassland and forested habitats. Regarding Forest Focus Areas, the EIS discussed conditions necessary to maintain an intact forest capable of supporting sensitive interior bird species as studied by The Nature Conservancy (TNC). Specifically TNC's criteria for viable forest conditions were: "low road density with few or no bisecting roads; large regions of core interior habitat with no obvious fragmenting features; evidence of the presence of forest breeding species, regions of old growth forest,….composition not dominated by weeded or exotic species…TNC generally considered areas embedded in much larger areas of forest to be more viable than those embedded in a sea of residential development…[2]" The Nature Conservancy identified a 150-acre threshold for a forest to be included as a "forest focus area," and provided this explanation:

> *"Fragmentation of large forest blocks can negatively affect breeding birds that require interior forest habitat for successful reproduction. Fragmentation due to human development of forest openings and structures that are relatively permanent will fragment habitats, create more edge, and reduce breeding success. Human-induced openings can influence breeding bird productivity several hundred feet from the edge of the forest through increased predation and increased nest parasitism. There is a wide diversity of bird species that rely on forest interior habitats to breed. As such, patch size requirements can vary widely by species that rely on forest interior habitats to breed. As such, patch size requirements can vary widely by species, and can be influenced by surrounding land cover as well as the amount of forest cover on the landscape. Previous research on forest interior birds suggest that the minimum forest patch size needed to support breeding species ranges between 100 and 500 acres [Roberts and Norment 1999, Hoover et al. 1995, Robbins 1979].* ***A 100-acre patch size is the minimum that would probably support a relatively diverse assemblage of forest breeding birds [emphasis added].*** *Additional research indicates that the negative impacts along a forest edge extend between 200-500 feet into the forest [Rosenburg et. al 1999, Robinson et. al 1995]. If we assume a 100-acre forest patch with a 300-foot forested buffer, the minimum patch size for forest interior birds is approximately 150 acres of contiguous forest.* ***Patches less than 150 acres are not of optimum value to forest interior birds [emphasis added].[3]*** *"*

4. Chazen's summarizes this review as follows:
    a. Based on measurements using Google Earth, the size of the "undisturbed" woodland where the solar array is being placed is approximately 87 acres, which is less than the 150 acres identified by the NYSDEC in the referenced DEIS as being adequate habitat for interior birds.
    b. The 87-acre "undisturbed" woodland is further bisected by Prickly Pear Hill Road and encroached upon by two large homes.
    c. The proposed solar array would be located adjacent to another open encroachment, the maintenance area for the golf course.
    d. The December 1, 2020 Biodiversity and Habitat Assessment prepared by TMA states "[i]t is noted that Japanese barberry (*Berberis thunbergii*) and Morrow honeysuckle (Lonicera

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and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs (ny.gov). Accessed 12/14/2021

[2] Ibid. Page 7-84.

[3] Ibid. Page 7-96.

morrowii), both non-native invasive species, were the dominant plants in the shrub layer. Heavy deer browsing has significantly reduced the number of native shrubs and saplings in the lower canopy.[4] "

e. Absent other data (i.e., a spring Breeding Bird Survey), the data to date, including the size of the woodland area, the existing fragmentation of that woodland by roadways and other human-induced activities, the presence of the maintenance facility adjacent to the proposed solar site, the presence of significant understory deer browse and associated invasive species, along with the data on forest patch size contained in the NYSDEC GEIS the Oil, Gas and Solution Mining Regulatory Program would indicate that the proposed solar facility is unlikely to have a significant impact on endangered, threatened, rare or significant concern forest species, particularly interior bird species.

[4] 2021. Tim Miller Associates. Biodiversity and Habitat Assessment for the Proposed Solar Farm, Prickly Pear Drive, Village of Croton on Hudson.