

MATRIX DEVELOPMENT, LLC

153 Mercer Street, #4
New York, New York 10012



January 3rd, 2022

Attn: Mayor Pugh, Village Manager Healy and Trustees
Croton-On-Hudson Planning Board
1 Van Wyck Street
Croton-on-Hudson, NY 10520

RE: Response to Public Comments

Dear Mayor Pugh,

In response to the public comments made during the 12-20-21 Croton-On-Hudson Village Board of Trustees meeting, the following information has been provided.

1. **Ambient Temperature Impact** – A member of the audience asserted that the ambient temperature surrounding the solar array will rise by twenty degrees, presumably in the summer months and measured in Fahrenheit. This is not true. Several studies have determined that increased ambient temperatures were likely to range from 0.5 to 3.0 Celsius (less than 6 Fahrenheit). New York Solar Energy Research & Development Authority (NYSERDA) has cited the Columbia University study, “Analysis of the Potential for a Heat Island Effect in Large Solar Farms”. This study recorded 18 months of data and saw a maximum temperature rise of 2.5 Celsius at the center of the array during the day and completely cooled off at night to sync with ambient temperatures. It’s important to note that Prickly Pear Solar energy system will operate in a mild climate with limited solar irradiance (less sunlight) and a vegetative understory. The vegetative understory will lower solar panel temperatures and corresponding effects on ambient temperatures. All studies indicate the heat quickly dissipates vertically and horizontally within the footprint of the array and would not increase ambient temperatures of the surrounding area or impact adjacent residents.

From the NYSERDA – New York Solar Guidebook:

2.3.6 Do solar panels create high ambient temperatures in their surroundings? The theory that a functioning solar PV array increases the ambient temperature of its surroundings is known as the “heat island” effect. The “heat island” effect proposes that solar panels create a darker landscape that reflects less light, and therefore creates a localized area of increased heat. Few studies have been conducted on the subject, but it has been generally concluded that the area surrounding a large-scale solar array is unlikely to experience a net heating change from the panels. It is, however, possible to see some heating occur under the panels themselves. This can be mitigated with proper implementation of vegetative cover instead of gravel.¹³ With any PV array, the significance of the heating depends on the location of the array, time of the year, and surrounding environment.^{14, 15}

¹³ “Beneath Solar Panels, the Seeds of Opportunity Sprout.” NREL, www.nrel.gov/news/features/2019/beneath-solar-panels-the-seeds-of-opportunity-sprout.html.

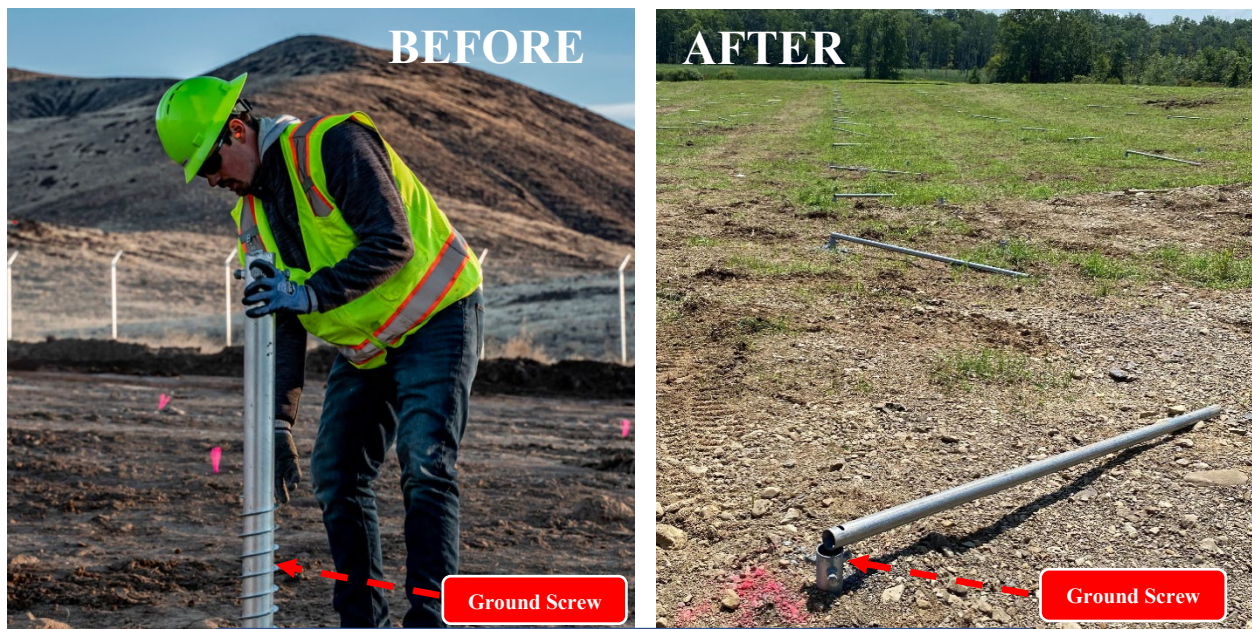
¹⁴ “Clean Energy Results, Questions and Answers, Ground Mounted Solar Photovoltaic Systems.” Energy Center, June 2015. <http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf>

¹⁵ “Analysis of the Potential for a Heat Island Effect in Large Solar Farms.” Columbia University, http://www.clca.columbia.edu/13_39th%20IEEE%20PVSC_%20VMF_YY_Heat%20Island%20Effect.pdf

2. **National Audubon Society** – Audubon showed the **alarming risks to birds** due to climate change in their birds and climate change report (Audubon 2019). Audubon utilized data from more than 70 sources and more than 140 million observations to assess the impacts of climate change on North American Birds and a climate threats analysis (Audubon 2019; Bateman et al. 2020a, b). Audubon scientists modeled 604 North American bird species along with climate models to map where bird ranges in summer and winter could be under scenarios with warming of 1.5, 2.0, and 3.0 degrees Celsius(°C). Audubon indicated that holding warming at an increase of no more than 1.5°C is needed to avoid increasingly dire consequences (Audubon 2019). Should nothing be done to reduce the warming trend from climate change, then a 1.5°C increase is imminent, while a 2.0°C increase could happen as soon as 2050, and a 3.0°C increase could occur by 2080 (Audubon 2019). Audubon’s work shows that two thirds of North American bird species are at risk of extinction from climate change at 3.0°C, but also, that if action is taken now to combat climate change then the chances would improve for nearly 75% of the species at risk (Audubon2019).

Accessed online at: <https://www.audubon.org/climate/survivalbydegrees>

3. **Steep Slope Construction** – In the context of the SEQRA process, steep slopes can be an issue of special consideration due to impacts from excavation or modification of the landscape. However, unlike building foundations or the sub-base of a paved road, the understory of a solar array is vegetative and absorbs rainwater directly or indirectly from the solar panels. Solar construction is distinctly very different from residential or commercial construction, as it does not require excavation or grading that displaces stormwater due to increased impervious surfaces. In fact, the solar array is installed over the existing landscape. Additionally, the galvanized steel solar racking that supports the solar panels will be drilled and screwed into the bedrock of the slope which only improves stabilization in and around the array. Pictures shown below show the ground screw before and after it is installed.



NO Excavation Required!

MATRIX DEVELOPMENT, LLC

153 Mercer Street, #4
New York, New York 10012



4. Steep Slope Experience – There are three key aspects of developing solar on steep slopes:

- 1- Comprehensive stormwater management plan (SWPPP)
- 2- Qualifications of solar racking contractor
- 3- Solar racking specifications

Matrix Development has been doing business for 20+ years as a Real Estate and Solar Developer. Matrix has developed several projects on steep slopes (greater than 15%) (see photos below). Matrix's role as the developer is to hire qualified contractors to perform the proposed work. For the Prickly Pear Solar Project, the following contractors have extensive steep slope experience and have been selected.

Civil - Ralph Mastromonoco has been contracted to complete the civil design, including the SWPPP. Mr. Mastromonoco has been working on projects in the Village of Croton-On-Hudson since 1991 and has been in business for 35+ years.

Terrasmart - For 10 years, Terrasmart has been a front-runner in the solar industry by continuously evolving its turnkey business model to build over 3 GW of ground mounted, utility-scale solar projects across the United States. Widely known for its innovative ground screw-based racking system, Terrasmart has helped change the solar industry with its capability of transforming rocky and hilly terrain into buildable sites to provide clean energy production.

Solar Racking – Terrasmart ground screw and racking technology is designed for conditions found on the Prickly Pear Solar site – rocky terrain. Terrasmart's technology is designed to handle steep slopes up to 36%. See attached datasheet.

MATRIX DEVELOPMENT, LLC

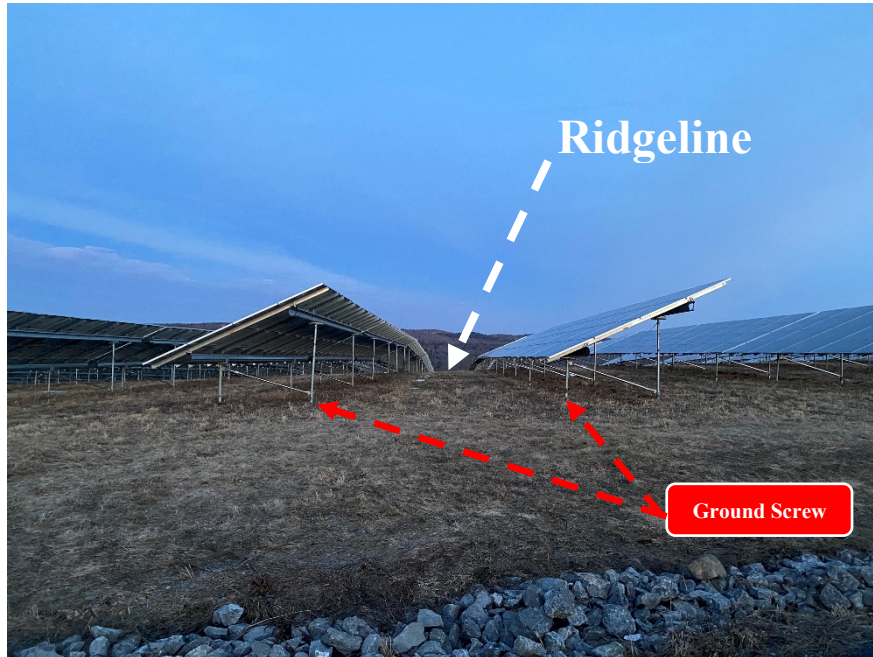
153 Mercer Street, #4

New York, New York 10012



5. Steep Slope Examples:

Westerlo, NY – 15 to 20% slope (Owned by Nexamp)



MATRIX DEVELOPMENT, LLC

153 Mercer Street, #4
New York, New York 10012



Other examples (35% + Slope)



The public has raised many questions during the December 20th meeting, which are hopefully answered in further detail by this letter. Please let us know if you need additional information.

Regards,

A handwritten signature in black ink, appearing to read "Michael Doud".

Michael Doud
Matrix Development, LLC.
Director of Development
(518) 727-6219
mdoud@matrixdevllc.com

Attachments:

- 1) Analysis of the Potential for a Heat Island Effect in Large Solar Farm
- 2) Terrasmart Racking Datasheet/Specifications