

BIODIVERSITY AND HABITAT ASSESSMENT

**Proposed Solar Farm
Prickly Pear Drive
Village of Croton on Hudson
Westchester County New York**

Prepared for:

Matrix Development LLC

Prepared By: Steve Marino, PWS
Tim Miller Associates, Inc.
10 North Street
Cold Spring, New York 10516
(845) 265-4400

December 1, 2020

Introduction

Tim Miller Associates was retained to conduct an initial Phase I Biodiversity Assessment of the Hudson National Golf Club-owned parcel adjacent to Prickly Pear Road south of the existing Club parking lot and near the Club's maintenance and materials storage area. The purpose of this Phase I Biodiversity Assessment was to conduct an overall qualitative assessment and evaluation of the main habitat cover types present on the subject parcel, in order to determine habitat quality in relation to the ability of these habitats to support a diverse and healthy wildlife population. The survey was limited to two field days to assess and perform an analysis of existing habitats and their potential to support target focal wildlife populations.

A number of site walks were conducted during October and November of 2020 to evaluate site conditions and the existence of important or unique habitat. An analysis of the forested habitat was performed throughout the study area.

Study Area

The study area included the entire 13.5 acre parcel that is proposed for the solar farm and accessory structures. The parcel was field investigated to assess the existing biological conditions and evaluate ecological values. Please refer to the attached map (Figure 1) that outlines the parcel. Please note that this parcel was not identified as a parcel of conservation concern in the Croton to Highlands Biodiversity Plan prepared by the Metropolitan Conservation Alliance (MCA) in 2004.

Survey Methods

A qualitative analysis of the forested habitat was performed throughout the study area. Specific random search areas were used to determine representative plant community characteristics. All plants observed were recorded to species when conditions allowed. Changes in the soil conditions, topography, and vegetation disturbances were also recorded. Each habitat was evaluated according to the following community characteristics, including uniqueness and relative abundance, vegetative species diversity, plant type and food value, vertical and structural diversity, and plant utilization of existing vegetation.

Wildlife observations were recorded. Direct observations were noted, as well as observation of scat, tracks, song and calls, and other applicable sign. Random transects were followed through the site, with occasional stops for listening and observations, and random turning of stones and logs.

Existing Conditions

The study area was limited to the proposed 13.5 acre solar farm parcel. This area was field investigated to assess the existing biological condition and evaluate their respective ecological values.

The existing parcel is made up of second growth hardwood forest. As recently as the 1960's, portions of the site were cleared, likely for agricultural purposes. With the abandonment of the site, vegetation has regenerated and the site is now a uniform wooded parcel. A time series of aerial photos is provided with this report. No wetlands or watercourses were observed within or adjacent to the potential development area.

The project site is an undeveloped parcel with mature, mixed deciduous second-growth forest and a sparse understory. The terrain consists of sloping woody hillsides with occasional surface rock on shallow, well-drained soils. Upland areas were dominated by oaks (*Quercus spp.*), hickory (*Carya spp.*) and black birch (*Betula nigra*). Saplings included black birch, American beech, and sugar maple. It is noted that Japanese barberry (*Berberis thunbergii*) and Morrow honeysuckle (*Lonicera 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. Due to the late season when this inventory was conducted it is likely that some herbaceous species were not observed, but no unique or unusual habitat was identified that might support rare plants.

A tree survey and plan has been completed and submitted to the village under separate cover. A total of 948 trees were tagged and identified within or close to the area of the proposed disturbance for the installation of the solar panel arrays. Of these 948 trees, 581 trees that are in relatively good health will be removed; 177 of these are small (less than 8" dbh). A relatively small percentage of the overall tree count are greater than or equal to 18" in diameter (173 out of 948, or 18 percent). This is indicative of the young age of the forest group. Only seven trees greater than or equal to 36 inches in diameter were identified. 113 trees were identified as non-native or invasive species (Norway maple, black locust and tree of heaven).

Table 1. Plant species observed

Garlic mustard (<i>Alliaria petiolata</i>)	Japanese honeysuckle (<i>Lonicera japonica</i>)
Blackberry (<i>Rubus allegheniensis</i>)	Winged euonymus (<i>Euonymus alatus</i>)
Black locust (<i>Robinia pseudoacacia</i>)	Barberry (<i>Berberis thunbergii</i>)
Red oak (<i>Quercus rubra</i>)	Morrow honeysuckle (<i>Lonicera morrowii</i>)
Poison ivy (<i>Toxicodendron radicans</i>)	Choke cherry (<i>Prunus virginiana</i>)
Climbing bittersweet (<i>Celastrus orbiculatus</i>)	Black birch (<i>Betula lenta</i>)
White oak (<i>Quercus alba</i>)	Greenbriar (<i>Smilax rotundifolia</i>)
Japanese stiltgrass (<i>Microstegium vimineum</i>)	Virginia creeper (<i>Parthenocissus quinquefolia</i>)
Pignut hickory (<i>Carya ovata</i>)	Pennsylvania sedge (<i>Carex pensylvanica</i>)
Dewberry (<i>Rubus flagellaris</i>)	Chestnut oak (<i>Quercus montana</i>)
Red maple (<i>Acer rubrum</i>)	Black cherry (<i>Prunus serotina</i>)
Tree of Heaven (<i>Ailanthus altissima</i>)	Multifloral rose (<i>Rosa multiflora</i>)
Hop hornbeam (<i>Ostrya virginiana</i>)	Black oak (<i>Quercus velutina</i>)
Wineberry (<i>Rubus phoenicolasius</i>)	Deertongue (<i>Dichantelium clandestinum</i>)
Onion grass (<i>Allium canadense</i>)	Shagbark hickory (<i>Carya ovata</i>)
Norway maple (<i>Acer platanoides</i>)	Sassafras (<i>Sassafras albidum</i>)
Flowering dogwood (<i>Cornus florida</i>)	Wild raisin (<i>Viburnum cassinoides</i>)
Grapes (<i>Vitis spp.</i>)	Mugwort (<i>Artemisia vulgaris</i>)
Christmas fern (<i>Polystichum acrostichoides</i>)	Privet (<i>Ligustrum vulgaris</i>)
Sugar maple (<i>Acer saccharum</i>)	Tulip poplar (<i>Liriodendron tulipifera</i>)
American beech (<i>Fagus grandifolia</i>)	White pine (<i>Pinus strobus</i>)
Eastern red cedar (<i>Juniperus virginiana</i>)	White ash (<i>Fraxinus americana</i>)
Hackberry (<i>Celtis occidentalis</i>)	American elm (<i>Ulmus americana</i>)
Hornbeam (<i>Carpinus caroliniana</i>)	Prickly pear cactus (<i>Opuntia humifusa</i>)

Table 2. Animal species observed or likely

White-tailed deer (<i>Odocoileus virginiana</i>)	Opossum (<i>Didelphis virginiana</i>)
Gray squirrel (<i>Sciurus carolinensis</i>)	Wood thrush (<i>Hylocichla mustelina</i>)
Coyote (<i>Canis latrans</i>)	Cardinal (<i>Cardinalis cardinalis</i>)
Hairy woodpecker (<i>Picoides villosus</i>)	Mockingbird (<i>Mimus polyglottos</i>)
Robin (<i>Turdus migratorius</i>)	Tufted titmouse (<i>Baeolophus bicolor</i>)
Eastern phoebe (<i>Sayornis phoebe</i>)	Crow (<i>Corvus brachyrhynchus</i>)
Blue jay (<i>Cyanocitta cristata</i>)	Scarlet tanager (<i>Piranga olivacea</i>)
Mourning dove (<i>Zenaida macroura</i>)	Turkey vulture (<i>Cathartes aura</i>)
Chipping sparrow (<i>Spizella passerina</i>)	Chipmunk (<i>Tamias striatus</i>)
Canada Goose (<i>Branta canadensis</i>)	Black capped chickadee (<i>Poecile atricapillus</i>)
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	Broad-winged Hawk (<i>Buteo platypterus</i>)
Northern Flicker (<i>Colaptes auratus</i>)	Downy Woodpecker (<i>Picoides pubescens</i>)
Song Sparrow (<i>Melospiza melodia</i>)	Ovenbird (<i>Seiurus aurocapilla</i>)
	White-throated Sparrow (<i>Zonotrichia albicollis</i>)

Ecological Assessment and Setting

The site is the location of an undeveloped parcel that is currently vegetated (see attached photos). The vegetation in the upland areas is second growth forest. There is considerable evidence that the site was developed in the past; historic aerial photographs show the presence of roads and structures, and rock walls and debris are present throughout the site. A portion of the development site (for solar arrays #100 to #195), the “northeast” site, drains to the east toward Prickly Pear Road, while the southern arrays drain to the south, ultimately draining to the Hudson River. The presence of a significant number of individuals of non-native or invasive species is somewhat indicative of past site disturbance.

The site has moderate tree species diversity, with a moderate percentage of the trees in the 18-24” diameter range. Nut and mast producing trees are common, and standing dead trees with snags and cavities exist that may provide habitat for mammals and some of the larger bird species. The shrub layer was sparse, with the exception of those thorny nonnative species that often remain that are not palatable to deer.

The northeast solar array site is more open in the canopy and with fewer trees than the southern site. Sitting on a flat plateau between rock outcroppings, this site has more brambles and stiltgrass than the southern site, and fewer large trees. The southern array site is more typical of higher elevation, rocky woodlands in the Hudson Valley, dominated by red and chestnut oak over relatively shallow soils.. The trees are generally not large in diameter and close together, forming a dense canopy during the growing season. The shallow soils lead to shallow root systems, resulting in a number of windthrows that will occasionally open up the canopy. Any herbaceous vegetation that starts to grow in these open areas is quickly browsed by the deer population, although a few species (particularly the Pennsylvania sedge and garlic mustard) do not appear to be palatable to white tailed deer. Both areas are approximately 3-1/2 acres in size.

The existing stone walls and occasional cracks in the exposed bedrock may provide habitat for small mammals and reptiles. Occasional standing dead trees and fallen logs can provide cavities and habitat for a number of bird, small mammal and potentially some of the more terrestrial salamander species (redback salamander and slimy salamander). None were observed during site walks, likely due to the late season.

Perhaps the most interesting find during the site walks was a dense patch of prickly pear cactus (*Opuntia humifusa*) on a rocky outcrop just north of the existing maintenance shed. While not listed as a rare or threatened species, and considered to be secure throughout its habitat, this is still a relatively rare plant unusual as a cactus species that is tolerant of the cold winters in southeastern New York. This patch of plants is outside of the proposed limits of disturbance and will not be affected by the current proposal.

Based on the species observed, the quality of habitats, and the regional setting of the property in relation to adjacent large open space parcels, the property exhibits moderate ecological value (see Figure 2). The 13.5 acre parcel, of which 7.4 acres will be disturbed, represents a small portion of the overall forest and open space in this portion of the Hudson Valley. The areas are dominated by moderate to mature mixed deciduous forest with a sparse understory with occasional invasive, non-native plant species such as tree of heaven (*Ailanthus altissima*), Japanese barberry (*Berberis thunbergii*) and Japanese stiltgrass (*Microstegium vimineum*). In the northeast corner of the site, where there are fewer large trees and the canopy is therefore more open, a greater density of shrubs, brambles and mugwort (*Artemisia vulgaris*) in the understory was observed. The lack of native regeneration and establishment of non-native invasives are likely a result of heavy deer-browse and human alteration. Hollows and standing dead trees were occasionally observed, and could serve as habitat for cavity nesters or nocturnal animals.

The NRCS Westchester County Soil Survey shows the site as having Chatfield-Charlton and Charlton Chatfield soil complexes, which typically are upland soils with a stony substrate.

Threatened and Endangered Species

A review of the New York State DEC Environmental Resource Mapper, which includes the database for the Natural Heritage Program, turned up two Hudson River fish species as being known in the area. Due to the distance to the river, lack of direct hydrologic connection and no significant alteration to water quality, this project will not affect Atlantic or short-nosed sturgeon in the Hudson.

A review of the US Fish and Wildlife Service data returned only the Indiana bat (*Myotis sodalis*), although the response indicated that no known critical habitat is available on or near the site. The Indiana bat has been the victim of white nose syndrome, which is related to infections in the bat's winter hibernaculum, locally in the caves of Ulster County. If warranted, an appropriate and common mitigation measure is the cutting of potential summer roosting trees in the winter so that no bats are accidentally injured during tree clearing. The applicant will pursue discussions with the FWS to determine if such a measure is necessary.

Current Proposal as Reviewed

The owner of the property proposes to lease a portion of the property to Matrix Development LLC for the installation of a solar power generating facility. Approximately 400 trees that meet the Village permitting criteria will be removed for this project. Due to the nature of the project as a "solar farm", it is impossible to preserve additional trees within the area of the solar arrays. The site will only require relatively small amounts of earth movement as the solar arrays are flexible with regards to placement on piers. This will result in a change to the site from second growth forest to open meadow and maintained grassland over approximately seven acres of the parcel. Those wooded portions of the site will be lost as potential habitat for bird and mammal species

that are most dependent on closed canopy woodlands. The lack of available water in the immediate area does limit the potential as particularly good habitat for woodland species.

The proposed use (solar power generating facility) appears to be a low impact use with regards to human activity, unlike a residential subdivision or similar development, but will alter the site from wooded landscape to open grassland and solar panel array structures. Since no sensitive species were observed (and no specific habitat for such species identified) this would be consistent with the current condition on the much larger golf course parcel to the north, so is not expected to substantially alter the wildlife habitat availability for animals in the immediate vicinity. These animals are already adapted to an edge habitat of woodlands, as on the subject parcel and lands to the west, and the open space habitat of the golf course. The largest impact to wildlife is expected to occur during construction, when the site is cleared and the grounds regraded to reach the final landscape condition. Long term effects of solar arrays on local wildlife are still being determined as this is a new technology and detailed evaluations are ongoing.

Regarding interconnectedness to adjacent habitat areas, the site is adjacent to the open spaces of the Hudson National Golf Course to the north and east, and undeveloped woodlands to the west. These undeveloped lands are owned by the Village of Croton on Hudson and the Saw Mill River Audubon Society, and will not be developed in the future. Therefore the golf course and adjacent parcels represent a large contiguous tract of open space with a variety of habitat types and covers.

Developed communities exist to the south, west and east of the site and its immediate surroundings, including the Village of Croton and the lower density roads on southeastern Cortlandt.

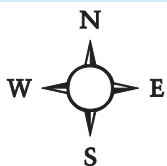
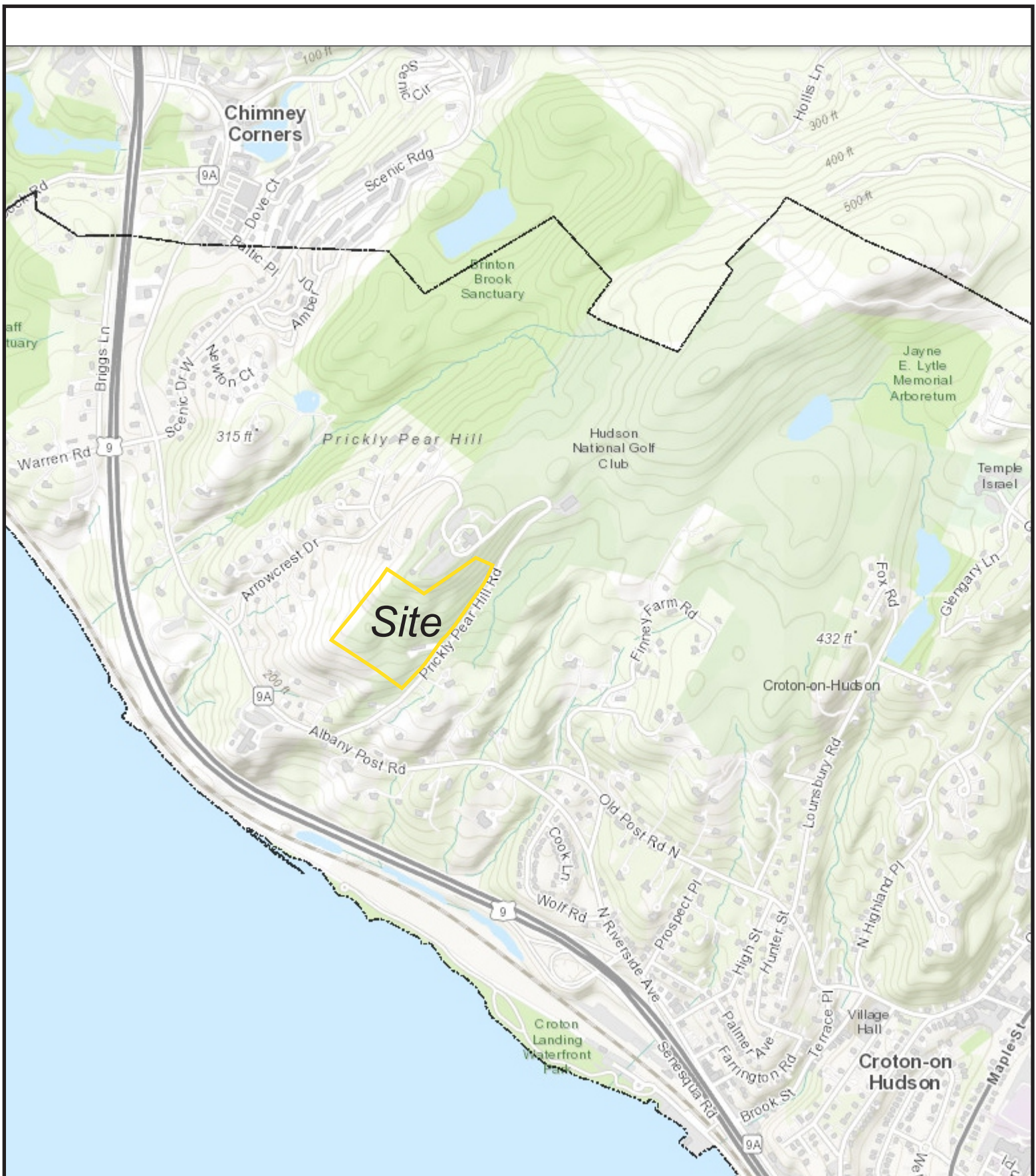


Figure 1: Location Map
Matrix Solar Farm
Croton on Hudson, NY
Source: Westchester County GIS



Figure 2: Regional Context with Adjacent Open Space Parcels - 2018 Aerial Photo
Matrix Solar Farm
Croton on Hudson, Westchester County, NY
Basemap: Westchester County GIS



Figure 3: Solar Farm Site Showing Areas to be Cleared - 2018 Aerial Photo
Matrix Solar Farm
Croton on Hudson, Westchester County, NY
Basemap: Westchester County GIS



Figure 4: Site on 2000 Aerial Photo
Matrix Solar Farm
Croton on Hudson, Westchester County, NY
Basemap: Westchester County GIS

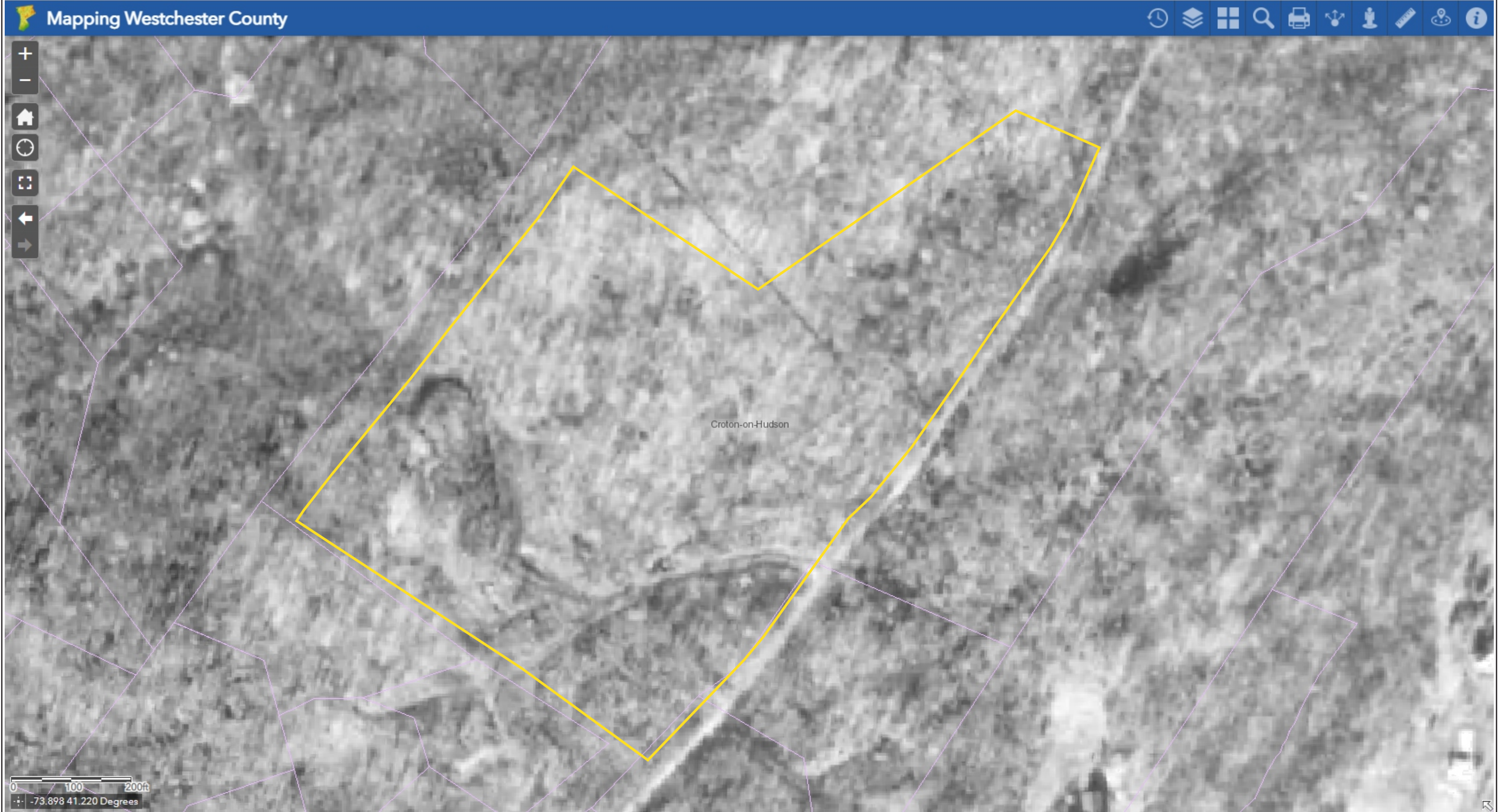


Figure 5: Site on 1960 Aerial Photo
Matrix Solar Farm
Croton on Hudson, Westchester County, NY
Basemap: Westchester County GIS



Site Photos
Matrix Solar Farm
Croton on Hudson, NY



Site Photos
Matrix Solar Farm
Croton on Hudson, NY



Site Photos
Matrix Solar Farm
Croton on Hudson, NY



Prickly pear cactus near existing maintenance building



Site Photos
Matrix Solar Farm
Croton on Hudson, NY