ENVIRONMENTAL REVIEW DOCUMENT

Great Bay Solar Project
Somerset County, Maryland

Prepared for:

Great Bay Solar I, LLC
1802 Lavaca St., Suite 200
Austin, TX 78701
P: 512.348.0606

Prepared by:

Environmental Design & Research,
Landscape Architecture, Engineering
& Environmental Services, D.P.C.
217 Montgomery Street, Suite 1000
Syracuse, New York 13202
P. 315.471.0688

May 2015

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EXHIBITS

COMMONLY USED ACRONYMS and ABBREVIATIONS

AC	Alternating Current
amsl	Above Mean Sea Level
ASTM	American Society for Testing and Materials
BBA	Maryland Breeding Bird Atlas
BBS	North American Breeding Bird Survey
COMAR	Code of Maryland Regulations
Corps	U.S. Army Corps of Engineers
CPCN	Certificate of Public Convenience and Necessity
CSP	Concentrated Solar Power
dBA	Decibels, A-weighted
DC	Direct Current
DNR	Maryland Department of Natural Resources
DOE	Determination of Eligibility
EDR	Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C.
ERD	Environmental Review Document
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Administration
GIS	Geographic Information System
GPS	Global Positioning System
IPAC	Information, Planning, and Conservation System
ISA	Interconnection Services Agreement
JEDI	Jobs and Economic Development Impact
kV	Kilovolt
kW	Kilowatt
MARA	Maryland Amphibian and Reptile Atlas
MDBED	Maryland Department of Business & Economic Development
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
MGS	Maryland Geological Survey
MHT	Maryland Historical Trust
MIHP	Maryland Inventory of Historic Places
MVA	Megavolt Ampere
MVT	Medium Voltage Transformer
MW	Megawatts
MWh	Megawatt hours
NAAQS	National Ambient Air Quality Standards
NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places

NSPS	New Source Performance Standards
NSR	New Source Review
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NWI	National Wetlands Inventory
PCS	Plant Control System
PJM	PJM Interconnection, LLC
POI	Point of Interconnection
PSC	Maryland Public Service Commission
PV	Photovoltaic
ROW	Right-of-Way
RPS	Renewable Portfolio Standards
SCADA	Supervisory Control and Data Acquisition
SMS	Solar Meteorological Station
SPCC	Spill Prevention Control and Countermeasure Plan
SWPPP	Stormwater Pollution Prevention Plan
USDA	U.S. Department of Agriculture
USDOE	U.S. Department of Energy
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
WHS	Maryland Wildlife and Heritage Service
WMA	Wildlife Management Area

20.79.03.01 PROJECT DESCRIPTION

Great Bay Solar I, LLC ("GBS" or the "Applicant"), a wholly owned subsidiary of Pioneer Green Solar, LLC (Pioneer), is proposing to develop a photovoltaic (PV) solar energy facility with a nominally rated capacity of up to 150 megawatts (MW) alternating current (the "Project"). The Project will be constructed on up to approximately 1,000 acres of private land currently under lease or purchase option (the "Project site") south of Princess Anne in Somerset County, Maryland (see Figure 1). The Project site also includes easements that will be utilized for buried and overhead electrical collection lines (see Figure 2). The collection line easements are located on privately owned property and are mostly adjacent to existing public roads and/or railroad rights-of-way (ROWs).

The Project will connect to the PJM Interconnection, LLC (PJM) grid at the existing Kings Creek substation, which is owned by Delmarva Power & Light. GBS has a purchase option on the parcel immediately south of the Kings Creek Substation. GBS plans to build its substation on the southern portion of the parcel and connect to the Kings Creek Substation via a short (<500 feet) 138 kilovolt (kV) generation tie line.

The generating sites will be served by a network of unpaved access roads. The main access driveway for each generating site will be approximately 20 feet wide, while the lateral driveways providing access to the solar fields for maintenance will be narrower (between 8 and 12 feet wide). Parking areas for maintenance vehicles within the solar facility will be constructed with compacted gravel. During Project construction, temporary lay down areas will be used for storage of construction equipment and supplies.

The Project will contain one or more on-site solar meteorological stations (SMSs), which would consist of irradiance (solar energy) meters as well as air temperature and wind meters.

The proposed facility would be enclosed with security fencing 7 to 10 feet high. The Project's access points will be gated. Security lighting may be installed to operate with motion detectors. Additional security measures may be utilized as necessary, such as monitoring by cameras and/or electronic security systems.

Several of the Project parcels are under purchase options that include commercial forest land that is not part of the Project. The Project Sponsor will either sell those portions of land to commercial forest land owners or keep the land as a source of revenue from timber harvests. However, no clearing of forest land is proposed as part of the Project.

Name and Address of Applicant

Great Bay Solar I, LLC
1802 Lavaca St., Suite 200
Austin, TX 78701

Persons Authorized to Receive Notices and Communications

Mr. Cyrus Tashakkori
Great Bay Solar I, LLC
c/o Pioneer Green Energy, LLC
1802 Lavaca St., Suite 200
Austin, TX 78701
Phone: (512) 348-0606
Fax: (512) 852-4452
cyrus.tashakkori@pioneergreen.com

Todd R. Chason
Victor A. Kwansa
Gordon Feinblatt LLC
233 East Redwood Street
Baltimore, Maryland 21202
tchason@gfrlaw.com
vkwansa@gfrlaw.com

Location at which a Copy of the Application May Be Inspected by the Public

Somerset County Planning Commission
Somerset County Office Complex
11916 Somerset Ave., Room #211
Princess Anne, MD 21853

20.79.03.01.A LOCATION

Somerset County is the southern-most county in Maryland. It is bound by the Chesapeake Bay to the south and west, Wicomico County to the north, Worchester County to the east, and the State of Virginia to the southeast. Princess Anne, the county seat, is located immediately northwest of the Project site. Pocomoke City is approximately 5 miles to the southeast. Salisbury is approximately 10 miles north and Crisfield is approximately 12 miles south.

Land use within the Project site and throughout the surrounding area is dominated by active farmland and commercial loblolly pine plantations. Row crops are dominated by corn and soybeans. Large chicken farms are also common.

Although many residences are farmsteads, a number of non-agricultural residential properties are found in the area as well, most of which have been developed as frontage lots along public roadways. The majority of residential structures in the vicinity of the Project site appear to be single-family units.

Parcels under lease or purchase option to host the generating facility are located along Old Princess Anne Road, Market Lane, Dublin Road, Arden Station Road, Charles Layfield Road, and Sign Post Road. The collection easements are anticipated to include a combination of the following: (1) an easement along portions of the Norfolk Southern railroad ROW that spans the Project site from Princess Anne to Pocomoke City; (2) easements that would allow buried collection lines adjacent to existing public road ROWs, including Dublin, Arden Station, and Old Princess Anne Roads; and (3) private easements to allow for buried or overhead collection lines that would cross privately owned property.

20.79.03.01.B DESIGN FEATURES

The proposed Project includes the construction and operation of a solar PV generation facility of up to 150 MW AC in generating capacity, with a maximum estimated site footprint of approximately 1,000 acres. The Project will consist of the following components:

- A solar field of PV panels mounted on fixed or tracking structures;
- An electrical collection system that will aggregate the output from the PV panels and converts the electricity from direct current (DC) to alternating current (AC) via inverters;
- A substation where the facility's electrical output voltage will be combined and its voltage increased to the transmission line voltage of 138 kilovolt via step-up transformers;
- A generation tie line (gen-tie) facility approximately 500' in length that will connect Project facilities to the designated point of interconnection (POI) at the Kings Creek substation;
- Internal infrastructure including roads, fencing, and communications infrastructure; and
- Temporary laydown areas for equipment storage during construction.

Solar energy will be captured by PV panels mounted on steel support structures. The support structures will be either fixed or on a single-axis tracking system, depending on the specific PV technology selected. Single-axis tracker designs vary by manufacturer, but generally consist of a series of mechanically linked horizontal steel support beams known as torque tubes, with a drive train system usually located in the center of the rows, dividing the array into two sides. The number of rows within a tracker block is typically limited by the drive system's ability to move multiple torque tube assemblies. This row design is also determined by the amount of the desired solar output to the inverters. The preliminary design specifies that the distance between rows of solar panels would be between 7 feet and 10 feet, and

a row length of approximately 105 feet on each side of the drive arm assembly. In the case of fixed supports, the rows would be aligned east to west, with each individual panel tilted to the south for maximum exposure. In the case of pivoting supports, rows would be aligned north to south and the PV panels would pivot, tracking the sun's motion from east to west. Both types of support systems would be almost identical in appearance and environmental effect. The PV panels would have a typical height of up to 10 feet above the ground.

Panels will be grouped into a series of circuits (strings). These strings will be wired in parallel through electrical harnesses that travel through the cable trays to combiner boxes. The number of combiner boxes is dependent on final tracker design and will be sized to accommodate the electrical design. The PV system will most likely be constructed in blocks made up of 1 to 2 MW each, approximately 5 to 10 acres in size. The blocks will each have power conversion stations that will contain DC to AC power inverters, medium-voltage transformers (MVTs), and control and distribution cabinets. These components are often mounted on a concrete slab, with or without an enclosure. A DC collection system will collect electrical power from the panels and transmit it to DC to AC inverters located in the power conversion stations for each block. These cables will typically be buried 36 to 48 inches below grade. The size of each block will depend upon the capacity of the inverters, which in turn will depend upon the types and size of inverters available for purchase and other electrical design considerations.

The electrical collector system will aggregate the output from the PV blocks. The electricity will then be consolidated and delivered to the Project switchyard. Each block's power conversion station will contain one or more inverters with an associated transformer to step up the electricity voltage from the inverter output level (e.g., 480 volts to 34.5 kV). From each transformer, electricity will typically be conveyed via an underground circuit to a 34.5 kV switchgear and bus that gathers the output of the PV panels. From each collection bus, electricity will be conveyed via an underground or overhead 34.5 kV collector circuit to a common 34.5 kV bus within the Project substation.

The PV panels will be secured on a racking system supported by metal piers driven or screwed into the ground by a pile-driving machine to a depth of approximately 5 to 8 feet. Since the site is relatively flat, very little grading is anticipated for the Project. Where required, grading will be limited. Although the permanent Project footprint is anticipated to be 1,000 acres or less, the maximum site footprint could be slightly larger during construction, if extra temporary staging areas and access roads are needed. Earthwork could include site grading, as necessary, to create finished grade slopes suitable for racking installation and storm water management improvements.

The Project will contain one or more on-site SMSs, which would consist of irradiance (solar energy) meters as well as air temperature and wind meters. The SMS equipment will be installed either on stand-alone driven poles or directly on the PV module mounting structures (up to 10 feet in height). SMS equipment will consist of 1 to 2 irradiance meters

and related equipment. Power to operate each SMS will be provided by the plant auxiliary power system or a dedicated PV module with a small battery. Data will be communicated directly to the plant control system (PCS). The SMS would be located within the solar array field or adjacent to the switchgear building as required to qualify the solar resource for electrical generation predictions.

The Project will be connected to a substation with transformers that increase the voltage to interconnection voltage. The substation will include transformers, breakers, switches, meters, a control room, and other related equipment. The substation will be a central hub for the 34.5 kV collector circuits and will step-up the electricity voltage from 34.5 kV to 138 kV. The Project substation footprint will cover approximately seven acres. The substation will include, but not be limited to, the following major components: (1) 34.5 kV bus and associated switching devices; (2) 138 kV bus and associated switching devices; (3) 125 megavolt ampere (MVA) 34.5/138 kV transformers; (4) 34.5 kV capacitors; (5) tubular steel support structures up to 40 feet in height; (6) a grounding grid; (7) communications infrastructure; and (8) a perimeter security fence. Necessary inspections will be performed by the local utility.

Only very minimal on-site impervious surface improvements outside of the substation will be required in the design of the proposed solar facility. Installation of the solar modules will not include paving of large surface areas. Instead, the PV will be installed by driving a series of posts into the ground. However, the Project will include on-site access roads and temporary lay down areas for construction activities. Parking areas for maintenance vehicles within the solar facility will be constructed with compacted gravel.

The proposed facility would be enclosed with security fencing 7 to 10 feet high (6 to 8 feet of chain link with three strands of barbed wire). Additional security may also include monitoring by cameras and electronic security systems. The Project's access points will be gated and have swinging or rolling chain link gates. The only lighting proposed for the facility is security lighting, which will be operated by motion detectors. This lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives and will be downward facing and shielded to focus illumination on the desired areas only.

The main access driveway for each generating site will be approximately 20 feet wide and consist of unpaved, engineered construction (gravel or aggregate base). Lateral driveways within each site that will provide access to the solar field for maintenance are expected to be between 8 and 12 feet wide.

A conceptual Site Plan is attached as Exhibit E. These plans are preliminary in nature and will continue to be refined as Project design evolves.

20.79.03.01.C OPERATIONAL FEATURES

Once in operation, the Project will generate electricity during daylight hours. No new permanent on-site operations and maintenance facilities will be required to support the proposed Project. It is anticipated that monitoring will be conducted from an existing off-site facility and that Project related supplies will be stored at an existing off-site storage facility. Operation and maintenance activities will consist of an anticipated staff of approximately four to twelve workers who will monitor operations from an off-site location and conduct periodic cleaning and on-site maintenance procedures as needed.

The Project's capacity factor depends on the final design features. For a fixed-tilt design, the capacity factor is expected to be approximately 23% (AC). Single-axis trackers could increase the capacity factor to approximately 27% (AC). Anticipated production results are presented below in Table 1.

Table 1. Preliminary Production Estimate

Parameter	Fixed-tilt Design	Single-axis Tracker Design
Annual Generation	295,692 MWh/year	322,312 MWh/year
DC Capacity Factor	16.11%	17.56%
AC Capacity Factor	22.50%	24.53%
Annual Yield (kWh/kWp)	3.87	4.22
Performance Ratio	78.4%	84.2%

Note: Estimated values are for the first full of energy production.

The Project will have a Supervisory Control and Data Acquisition (SCADA) system that will allow for remote monitoring and control of inverters and other project components. The SCADA system will include fiber optic, copper, or radio connections collecting data from the power stations and transmitting it to the on-site server. The SCADA system will be used to remotely operate breakers within the Project and is integral to the safe operation of the substation. The SCADA system will be able to monitor Project output and availability as well as run diagnostics on the equipment. The Project will also have a local overall plant control system (PCS) that will monitor the solar field as well as the balance of facility systems. The microprocessor-based PCS will provide control, monitoring, alarm, and data storage functions for plant systems as well as communication with the solar field SCADA systems. Redundant capability will be provided for critical PCS components so that no single component failure would cause a plant outage. All field instruments and controls will be hard-wired to local electrical panels. Local panels will be hard-wired to the plant PCS. Wireless technology will be considered as a potential alternative during final Project design.

Special activities at the Project site include periodic panel washing and maintenance. The Project will be a private facility and, for safety reasons, will not be open to the public. Only authorized personnel will be permitted on site (e.g.,

employees monitoring and maintaining the facility). Facility maintenance includes periodic maintenance of buildings, solar panels, and solar components as well as the internal access network. The level of vehicle activity entering and leaving the site during operation will be limited to scheduled and emergency maintenance visits. Scheduled solar park maintenance would occur in the early evening or early morning hours to avoid interference with the Project's peak hours of generation. Manual solar panel washing will likely take place one or two times per year depending on seasonal rainfall at the site.

20.79.03.01.D PROJECT SCHEDULE

The Applicant has already started the preliminary engineering and design, and final design and equipment procurement contracts will be completed by February 2016. Construction of the Project will start as early as March of 2016 and will take 6-9 months from initial grading to project energization. The Project is scheduled to begin operation by the end of 2016 and will likely operate for a minimum of 25 years. Land control agreements allow for operation for up to 40 years.

Please see the Project schedule below:

- Engineering and Permitting: Ongoing with completion by February 2016
- Construction: Beginning March 2016 and ending by December 2016
- Operation: Late Fall 2016

20.79.03.01.E SELECTION CRITERIA FOR PROJECT SITE AND DESIGN

As an experienced developer of renewable energy projects, the Applicant has established criteria key to the successful development of utility scale solar projects. These include criteria specific to project technology, site selection, and Project design, each of which is discussed below.

Project Technology Selection

The Applicant has selected a solar PV design over other renewable energy technologies such as concentrated solar power (CSP) or wind turbines for a variety of reasons. Unlike concentrated solar which requires constant, direct sunlight to produce intense heat which is then used to generate steam, solar PV can efficiently make use of the combination of direct and diffuse solar resource that is available in the eastern U.S. Solar PV is also much more modular than CSP, allowing for several smaller project areas to be aggregated into a larger utility scale project. In contrast, CSP requires very large contiguous areas of land that are not common in Maryland. Finally, CSP involves a much more intensive project footprint, the use of many tons of concrete, and large volumes of oils and chemicals, all of which increase the potential environmental impact when compared to the relatively benign nature of PV technology and project design. Similarly, solar PV is better suited to the area than is wind energy. Due to the height of wind

turbines, a wind farm in the vicinity of the Project site faces steep challenges, including potential impact to avian species, potential interference with military radar and airspace, and viewshed concerns from some members of local communities.

Project Site Selection

The Applicant evaluated potential project sites based on various criteria, including:

- Transmission Criteria – The Applicant has studied locations throughout Maryland and identified the Project POI as an ideal location for injection of power. The site offers an appropriately sized 138 kV transmission infrastructure with sufficient available capacity to inject power into the Maryland grid. The transmission capacity at this location is so ideal that injection of 150 MW of energy at the site triggers no significant network upgrades, a rare occurrence throughout the State's transmission system.

- Power Price Criteria – The Project's location in the Maryland transmission system is characterized by higher than average power prices compared with the rest of the State, a fact that reflects the imbalance between high demand for power in the Eastern Shore combined with limited supply of existing electricity generation. This makes the Project location an ideal place for generation of electricity.

- Environmental Criteria – In order to avoid environmental impacts, the Applicant seeks out previously disturbed properties without the existence of threatened or endangered species. The Project site parcels secured by the Applicant consist of previously disturbed farmland that is being closely studied to identify any jurisdictional wetlands, streams, aquifers, and sensitive species (which will be avoided in the Project's final design).

- Constructability Criteria – Ideal solar sites consist of large, relatively flat parcels that allow for easy construction of contiguous unobstructed acres of solar modules. Each of the parcels of land in the proposed Project consist of 50 or more acres of contiguous flat land, making it possible to efficiently construct a large-scale solar farm.

- Financial Criteria – Any solar project must make financial sense in order for it to be viable. Financial analysis includes an assessment of project costs (land, interconnection, construction, permitting, etc.) and project revenues (solar resource, electricity sales, renewable energy certificate and/or solar renewable energy certificate sales, grid capacity payments, etc.). While the Eastern Shore experiences modest solar resources, the combination of high power price, state solar renewable energy certificate prices, and low interconnection costs makes the Project financially viable.

- Public Benefit Criteria – The Applicant actively looks for opportunities to develop projects that benefit the public. The Project presents an opportunity to contribute millions of dollars each year to the tax base of one and local economy of the poorest counties in Maryland, while advancing the State's goal of promoting renewable energy generation.

    - The State of Maryland has enacted aggressive legal and policy standards in pursuit of more renewable energy generation within its borders. The State's goal and commitment is clear and widely considered to be among the most aggressive in the United States. Maryland's Renewable Portfolio Standard (RPS) mandates that twenty percent (20%) of Maryland's electricity be generated from renewable energy sources by 2022, which must include at least two percent (2%) solar energy. The RPS solar energy requirement increases each year from now until 2020 and the solar set-aside alone is projected to result in the need for at least 1,200 MW of solar capacity by 2020. Yet the State currently has approximately one hundred and fifty-eight megawatts (158 MW) of solar generation on the grid.

    - The Applicant proposes to construct, own, and operate this 150 MW solar generation facility, which will increase the State's current solar electricity output. The State is not being asked to purchase or subsidize any of the power produced at the facility. There will be significant economic benefits resulting from the facility to include a capital cost of approximately $225,000,000 and hundreds of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel.

    - The Project's construction schedule is estimated to be 6-9 months. It is also important to note that significant local resources are being employed as part of the design, entitlement, construction, and startup process. The tax revenue yield for a project of this size and type will also be significant. The Project will contribute to the local economy as well as the State's commitment for more instate renewable energy generation. Also, it has been reported that Maryland imports approximately forty-two percent (42%) of its required energy generation. The Project will help to reduce this reliance upon power generated out of state. Given the nature of solar power generation, it will also lead to reduced and more certain costs of electricity produced. Furthermore, the Project will contribute to the stated goals and objectives of section 7-702 of the Public Utilities Article of the Annotated Code of Maryland (the "Code").

- The public benefit for the type of renewable energy we are proposing has been clearly established by law. It is also clear that the State's requirements and commitments in this area are some of the most progressive in the United States. The Applicant, through this proposal, seeks to assist the State in its effort to meet these objectives and to create more renewable energy generation in Maryland. The Project will deliver all of its output to the wholesale electricity market through the Delmarva Power & Light distribution system and associated interconnection. A contract has been signed with the U.S. General Services Administration for the purchase of 75 MW of energy to be produced by the Project.

Project Design

See Section 20.79.03.01.B above for a description of the Project design features. This section describes the criteria by which these features were selected for the Project.

PVSyst is an industry standard software program that aids users in the design and data analysis of solar arrays. The models created are based on meteorological data per geographical location of the array, user selected system equipment based on a large database of PV array components (inverters, solar panels), and user input such as stringing, system DC size, orientation, tilt, etc. PVSyst V6.34 was used to model the predicted energy of approximately 298,678 MWh in the first full year of solar array operation. Table 2 is an example of a system design and components for a 150 MW sized system.

Table 2. System Design and Components

Location	Project Site
Time Zone	UT-5
Nominal DC Rating (STC)	209.5 MW DC
Nominal AC Rating	150 MW AC
Array Tilt	25 degrees
Array Azimuth	180 degrees (directly south)
Inverters	(100) Power-One Ultra 1500-TL-OUTD Inverters, or equivalent combination of 1,500 kW and 750 kW inverters
Modules	Trina TSM-315 PEG14 Glass on Glass modules
Stringing	19 modules in series

There are a number of resources to evaluate regional solar resource data. Table 3 shows a sample of the most relevant datasets, which are produced by the National Renewable Energy Laboratory (NREL). The most recent and location-specific of the data comes from the SUNY model developed by Dr. Richard Perez and collaborators at NREL and other

universities for the U.S. Department of Energy. This satellite model uses the inverse relationship between reflected irradiance (that reflected by clouds and atmosphere back to space and the satellite sensor) and ground irradiance (that transmitted through the atmosphere to the Earth's surface). In model-evaluation work conducted as part of the NSRDB project, this satellite model proved comparable with meteorological-based models. The data comes in discrete 10-km grid squares.

There are also NREL TMY3 sources that use a blend of ground-based measurements (the METSTAT model) and the SUNY model from 1991 to 2005. According to NREL, the METSTAT model relies on scattered and sometimes sparse point-source ground meteorological observations, whereas the SUNY model runs on the virtually seamless GOES satellite images. While the SUNY model has a lower uncertainty, data does not exist prior to 1998 so METSTAT was used for those years. The two nearest TMY3 sources are approximately 15 and 42 miles away and are Class II stations. Class II stations have a complete period of record but significant periods of interpolated, filled, or otherwise lower quality input data for the solar models. Due to the inconsistent quality and distance from the project site of the ground-based measurements, the SUNY model data is preferred, and the Typical GHI year is closer to the average, as shown in the chart below, so this was selected for the energy model.

Table 3. Solar Resource Data

Location	Dataset	Distance to Project	Annual Average GHI (kWh/m2)	% Difference from Average
Project Site (Satellite Based)	Perez '98-'09 Typical TMY Year	< 5 miles	1586	2.6%
Project Site (Satellite Based)	Perez '98-'09 Typical GHI Year	< 5 miles	1573	1.7%
Salisbury, MD	TMY3 Class II ('91-'05)	15 miles	1503	-2.8%
Patuxent, MD	TMY3 Class II ('91-'05)	42 miles	1522	-1.6%
Composite Average GHI			**1546**	

Parameters evaluated during the modeling and design of the solar field are discussed below, including soiling, albedo, shading, wiring losses, module mismatch losses, and parasitic losses and availability.

Soiling

Dust, snow, and other particles that can settle on the array are referred to as soiling. Because it blocks sunlight reaching the solar cells in the PV modules, soiling reduces the net incident solar energy and thereby reduces the PV energy production from the array. Rainfall of greater than 0.5 inches per month is generally accepted as adequate to

remove dust from the array and to prevent significant losses due to soiling. In locations where there is not adequate rainfall for extended periods it is necessary to plan for cleaning of the PV array in order to limit losses due to soiling. In locations where particular sources of soiling are present, e.g., agricultural activity, heavy road traffic, etc., regular cleaning may be necessary to limit losses due to soiling. Losses due to snow cover can occur in locations where low temperatures and snow cover combine to keep snow cover on the array for multiple days. System design parameters (e.g., array tilt and ground clearance) can have an impact on the array susceptibility to snow cover losses. In contrast to soiling, cleaning is generally not used as a method to limit losses due to snow cover. Therefore, for PV arrays in locations where significant and persistent snow is anticipated, it will be necessary to account for snow cover losses in models of PV array performance. These losses are modeled as soiling losses even though the source and mitigations are quite different from true soiling.

The energy model for the subject Project accounts for typical levels of soiling due to dust and anticipates no need for regular cleaning to limit losses due to soiling. An annual average effect of array soiling of two percent (2%) loss has been used as the soiling loss model parameter, due to frequent rainfall in all months of the year. Heavy and persistent snow cover is not anticipated for the Project location and so no allowance is made to account for snow cover losses in the soiling loss model parameter.

Albedo

The albedo is the fraction of sunlight that is reflected from the ground surrounding the PV array. Albedo contributes slightly to the diffuse irradiance incident on the PV array and is even less significant on array performance where the tilt of the array is low. For most fixed tilt array designs, the energy model output will not be sensitive to the model albedo parameter. The energy model for the subject Project uses twenty percent (20%) as the albedo model parameter, which is a typical value suitable for most situations.

Shading

Because direct, or line of sight, sunlight energy is the primary source of energy for any PV array, shading of the PV array (which refers to blocking of available sunlight from reaching the PV array can have a disproportionate impact on PV energy production. Important sources of shading include the following: mutual shading, which is shading of the PV array on itself due to the array structure; near shading due to nearby objects (e.g., tall trees, buildings and towers); and horizon shading due to more distant features such as mountains.

Careful design will limit the impact of mutual shading and care in choosing the array location will mitigate or eliminate the possibility of near and horizon shading. For locations in which near and horizon shading are unavoidable, the impact of this shading should be accounted for using a sophisticated energy modeling tool such as PVsyst. The energy

model for the subject Project uses a sophisticated model for mutual array shading. The Project is designed for zero mutual array shading during the prime "solar window" of 9:30 AM to 2:30 PM year round including the lowest sun angle design case on the winter solstice. In addition, due to the presence of trees around portions of the perimeter of the arrays, a horizon line has been entered into PVsyst at a 5 degree height. This height is selected to represent the average impact of tree shade on the systems as a whole, though it is a short-cut compared to detailed 3D shade models. In addition, array layouts are configured to avoid placing modules within the 10am-2pm (December 21st) shade zone created by the assumed tree heights.

Wiring Losses

A PV system will experience energy losses due to resistance in the wires that run from the modules to the inverters, transformers, and ultimately to the electric grid. PVsyst uses a sophisticated modeling algorithm to calculate these losses. These losses can vary slightly depending on the type of wires used, but generally the variance depending on wire choice is relatively minimal. Wiring losses can be calculated for the specific layout of the project. In addition to the losses within the DC part of the system, there are also losses running from the inverters to the point of interconnection. We have modeled a 2.4% annual loss for this factor (combined AC and DC ohmic loss inputs at STC of 4% due to Gen-Tie lines). Additionally, we have included a 1.1% annual loss for transformers.

Mismatch Losses

The array also experiences what are called current and voltage mismatch losses. These are losses that result from current and voltage differences in different areas of the array. This can occur when part of the array is shaded due to clouds, trees, soiling, or other factors as well as minor differences from module to module. A one percent (1.0%) mismatch loss factor has been used for this system.

Parasitic Losses and Availability

There will be some small amount of on-site electricity usage for area lighting and certain system components. This can be accounted for in overall system performance. Additionally, there may be some system downtime due to periodic maintenance on the panels and inverters. Inverters have an expected lifetime of 10 or more years before needing replacement. Availability for the system is expected to be over 99%.

20.79.03.01.F IMPACT ON THE ECONOMICS OF THE STATE

Based on 2012 reports, Maryland continues to import approximately forty-two percent (42%) of its generation power. The Project will not only provide some measureable offset to these generation import numbers but will contribute towards compliance with COMAR 20.61.01, which mandates that all suppliers that sell electricity at retail in Maryland accumulate renewable energy credits in an incrementally increasing percentage.

The proposed Project represents a significant capital investment in the State and local economy. At the full 150 MW size, the Project is expected to cost more than $225,000,000 to install, representing a significant increase in the Somerset County property tax base. In the 2014-2015 tax year, Somerset County raised less than $14,000,000 in combined property and real estate taxes from an assessable property tax base of just under $65,000,000 and a real estate tax base of approximately $1,351,000,000. At its full size, the Project would pay approximately $2,500,000 in direct property taxes in the first year.

Construction of the Project will also require hundreds of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel who will reside in the local community over a period of 6 to 9 months. The spending by this large workforce will result in a significant positive economic impact on the region. In addition to the significant annual increase to the County's tax base, operation of the Project will also create dozens of permanent local jobs and positive economic impact. See Section 20.79.03.02.B(1)(b)(vi) for additional information about the economic impacts of the Project.

The Project will also contribute to the overall compliance with the State's RPS law which mandates that as of December 31, 2011, a renewable energy source such as solar is eligible for meeting the RPS provided that it is connected with an electric distribution grid such as the PJM Electricity Grid. Through its interconnection with the Delmarva Power and Light system, the Project will become connected to and part of the PJM system.

The Project should not detract from the value or diminish the characteristics of adjacent properties.

20.79.03.01.G IMPACT ON STABILITY AND RELIABILITY OF THE ELECTRIC SYSTEM

The Applicant initiated a process to be interconnected with the PJM Electricity Grid and Delmarva Power & Light by filing an Interconnection Request and completing project feasibility, system impact and facilities study assessments. PJM studied the impact of injection of 150 MW of energy at the 138 kV Kings Creek substation. The initial feasibility and system impact studies of 150 MW of energy and 19.5 MW of capacity concluded that no network upgrades would be required to maintain grid stability and reliability. The Applicant later requested a study for an additional 37.5 MW of capacity and has since received the results of a feasibility study that did not identify any system upgrades that would be required for the addition of 37.5 MW of capacity. The project feasibility, system impact, and facilities study assessments were completed in February 2015, April 2015, and April 2015, respectively. The Project interconnection service agreement has been circulated by PJM and is expected to be executed in May 2015.

20.79.03.01.H LOCATION AND DESIGN OF REQUIRED ELECTRIC SYSTEM UPGRADES

Pioneer has an executed Interconnection Services Agreement (ISA) at the POI and has fully securitized the substation facility construction that is required to interconnect the Project to the Kings Creek substation. No network upgrades are required for interconnection of the Project to the electric grid. Pursuant to the ISA, the Transmission Owner is currently working on designing the interconnection facilities at the Kings Creek substation, which will include an attachment facility consisting of a new 138 kV bus position and a self-supporting 138 kV steel structure located within the Kings Creek substation footprint.

Additionally, the Applicant plans to construct a <500 foot long 138 kV gen-tie line to connect the Project substation to the POI at the Kings Creek substation. While the Applicant has site control of the parcel of land immediately south of the Kings Creek substation, which is currently used as an agricultural field, the northern portion of that parcel is classified as a Critical Area as designated by the Critical Area Act of 1984. In order to minimize negative impacts to this Critical Area, the Applicant plans to build the Project substation on the southern portion of the switchyard parcel, necessitating a short gen-tie line to span the majority of the Critical Area. Approximately 0.25 acres of the Project substation will extend into the Critical Area, and the gen-tie line will require that 1-2 utility posts be placed inside within the Critical Area.

20.79.03.02 ENVIRONMENTAL INFORMATION

This section addresses potential environmental impacts of the proposed Project. Resources evaluated herein include geology, topography, and soils; ecological resources; cultural resources; aesthetic resources; land use; socioeconomics; and noise.

20.79.03.02.A PURPOSE

The contents of this section demonstrate that the Project complies with applicable environmental restrictions.

20.79.03.02.B ENVIRONMENTAL INFORMATION

This section describes the existing conditions at the Project site, the environmental and socioeconomic impacts of Project construction and operation, and recommended mitigation measures, where applicable.

20.79.03.02.B(1) GENERAL INFORMATION

20.79.03.02.B(1)(a) Existing Conditions

This section provides a general description of the existing physical, biological, aesthetic, and cultural features and conditions of the site and adjacent areas.

20.79.03.02.B(1)(a)(i) Geology, Topography, and Soils

Information regarding topography, geology, and soils within a half-mile buffer of the Project site was obtained from existing published sources including geographic and topological maps and reports published by the Maryland Geological Survey (MGS, 1968, 2007, 2008a, 2008b). Information on soils was gathered from the Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS, 2013).

Geology

The Project site is located in the Atlantic Coastal Plain physiographic region, within the Princess Anne Lowland District of Maryland (USGS, 1946, MGS, 2008a). The bedrock underlying the study area generally consists of flat-lying sedimentary beds composed of sand, silt, gravel, clay, and peat of the Quaternary age (MGS, 2007). Within a half-mile of the Project site, surficial deposits occur as a combination of intercalated fluvial sands, marsh muds, and shell-baring estuarine clays and silts (MGS, 1968).

Topography

This area is characterized as a lowland plain of very low relief (0 to 5 feet), and is little altered by erosion (MGS, 2008b). Elevation within a half-mile of the Project site ranges between 18 and 21 feet above mean sea level (amsl).

Soils

Soils in the Princess Anne Lowland District are generally characterized by brown to yellowish interbedded sand, silt, and boulder gravel (MGS, 2008b). According to the Web Soil Survey (NRCS, 2013), there are 34 individual map units that occur within a half-mile of the Project site (see Figure 3). These soils are generally gently sloping to almost level silty and sandy loams, with low shrink-swell potential. Quindocqua silt loam (QuA) and Fallsington silt loam (FgA) are the most extensive mapping unit in the area, comprising 33% and 27% of the Project site, respectively, and 40% and 11% of the surrounding study area, respectively. This dark grayish brown silt loam is typically found in lowlands along interfluves, broad interstream divides, flats, and swales. Characteristics of the most prevalent soil series in the area are summarized below in Table 4.

Table 4. Soil Series Within a Half-Mile of the Project Site

Soil Series	Drainage Class	Depth to Water Table	Depth to Restrictive Feature	% Slope	Parent material	Hydric
Quindocqua silt loam	Poorly drained	approx. 10 inches	> 80 inches	0-2 %	Loamy fluvial and eolian deposits over sandy fluviomarine sediments	Partially Hydric (66-99%)
Othello and Kentuck soils	Poorly to very poorly drained	0-10 inches	> 80 inches	0-2 %	Silty eolian deposits over fluviomarine sediments	Partially Hydric (66-99%)
Fallsington loam	Poorly drained	10-20 inches	> 80 inches	0-2%	loamy fluviomarine sediments, fluviomarine deposits	Partially Hydric (66-99%)
Queponco silt loam	Well drained	40-72 inches	> 72 inches	0-5%	Loamy fluvial and eolian deposits over sandy and loamy fluviomarine sediments	Not Hydric
Manokin silt loam	Moderately well drained	20-40 inches	> 80 inches	0-2%	loamy eolian deposits over fluviomarine deposits	Partially Hydric (1-32%)
Longmarsh/ Indiantown soils	Very Poorly Drained	0-10 inches	> 80 inches	0-1 %	loamy alluvium	Partially Hydric (66-99%)

Source: NRCS, 2013.

Quindocqua silt loam and Fallston loam are classified as farmland of statewide importance, while Manokin and Queponco silt loams are considered prime farmland. Othello/Kentuck soils and Longmarsh/Indiantown soils are not classified as prime farmland or farmland of statewide significance.

20.79.03.02.B(1)(a)(ii) Ecological Resources

This section describes existing ecological resources within a study area consisting of a half-mile buffer around the potential Project site parcels and easements.

Critical Areas

The passage of the Critical Area Act in 1984 marked the first time that the State and local governments jointly addressed the impacts of land development on habitat and aquatic resources. The law identified the "Critical Area" as all land within 1,000 feet of the Mean High Water Line of tidal waters or the landward edge of tidal wetlands, and all waters of and lands under the Chesapeake Bay and its tributaries. The law created a statewide Critical Area Commission (CAC) to oversee the development and implementation of local land use programs directed towards the Critical Area that met the following goals:

- Minimize adverse impacts on water quality that result from pollutants that are discharged from structures or conveyances or that have run off from surrounding lands;

- Conserve fish, wildlife, and plant habitat in the Critical Area; and
- Establish land use policies for development in the Critical Area which accommodate growth and also address the fact that, even if pollution is controlled, the number, movement, and activities of persons in the Critical Area can create adverse environmental impacts.

Land within the Critical Area was assigned one of three land classifications based on the predominant land use and the intensity of development at the time it was mapped: Intensely Developed Areas (IDAs), Limited Development Areas (LDAs), and Resource Conservation Areas (RCAs). The classification system allows jurisdictions to use local zoning to implement Critical Area programs through land use and development regulations. The use of land classifications promotes the location of new growth and development near or within existing developed areas; provides for infill development of similar uses and intensity; and facilitates the designation of areas for natural resource conservation and related resource utilization activities, such as agriculture, forestry, and aquaculture. Each of the three land classifications includes use and intensity restrictions as well as development performance standards for proposed development and redevelopment. These provisions are used to ensure that land within the Critical Area is managed, used, and developed in a manner that will achieve the goals of the Critical Area Program (CAC, 2015).

Portions of the Critical Area associated with Manokin Rover, Taylor Branch, and Kings Creek occur within the half-mile study area (see Figure 4). All three land classifications are found within the study area.

Vegetative Communities

Vegetative communities within the study area were evaluated based on interpretation of aerial photography and field verification. Agricultural land and forestland are the dominant community types in the study area, with scattered developed/disturbed lands clustered along public roads. Successional communities (e.g., old fields and shrubland) do not occur to any significant extent. Brief descriptions are provided below for each of the ecological communities in the study area. All of the major plant communities found within the area are common to Maryland. Surface waters and wetlands, including associated habitats such as riparian corridors and vernal pools, are described separately in Sections 20.79.03.02.B(3) and 20.79.03.02.B(4).

Agricultural Land

Much of the drier ground within the study area is in agricultural production. The dominant crops produced on agricultural lands in the study area include soy beans and corn. During the winter months, fields may be planted in a cover crop such as fescue to control erosion. Large-scale chicken farming is also common. All Project site parcels consist of agricultural fields that are currently active or recently fallowed.

Forestland

Typical commercial forestry cultivation and harvesting practices create a monoculture of loblolly pine (*Pinus taeda*) for processing by lumber product industries. These plantations are common within the study area, often abutting Project site parcels. Understories are variable, ranging from sparse to dense, based on the age of the stand and the frequency/intensity of management activities. Where present, sub-canopy species include deciduous saplings such as red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), black cherry (*Prunus serotina*), and sassafras (*Sassafras albidum*). Shrubs include wax myrtle (*Morella cerifera*) and huckleberry (*Gaylussacia baccata*), while vines include poison ivy (*Toxicodendron radicans*), roundleaf greenbrier (*Smilax rotundifolia*), and Virginia creeper (*Parthenocissus quinquefolia*). Herbaceous species include slender wood oats (*Chasmanthium laxum*), Virginia chainfern (*Woodwardia virginica*), and hay-scented fern (*Dennstaedtia punctilobula*).

Disturbed/Developed

Disturbed/developed lands are most concentrated in the northern portion of the study area, toward Princess Anne, but are also found in low densities throughout the study area. These areas are characterized by the presence of buildings, parking lots, paved and unpaved roads, and lawns/landscaped areas. Vegetation in these areas is generally either lacking or highly managed (i.e., mowed lawns or plants seeded along roadsides for erosion control). Volunteer vegetation in these areas is generally sparse and comprised of early successional, often non-native, herbaceous species such as dandelion (*Taraxacum officinale*), thistle (*Cirsium vulgare*), ragweed (*Ambrosia artemesiifolia*), threeseed mercury (*Acalypha rhomboidea*), common purslane (*Portulaca oleracea*), and various upland grasses.

Fish & Wildlife Resources

Fish and wildlife resources within the half-mile study area for the Project were determined based on review of the Maryland Breeding Bird Atlas (BBA), the Maryland Amphibian and Reptile Atlas (MARA), and other publications. This information was supplemented through correspondence with the Maryland Wildlife and Heritage Service (WHS), and online consultation with the U.S. Fish and Wildlife Service (USFWS) website (see Exhibit A). In addition, actual wildlife occurrence and potential wildlife habitat were documented during on-site field surveys during March 2015.

Wildlife Species

The BBA is a statewide survey (2002-2006) coordinated by the Maryland Department of Natural Resources (DNR) and the Maryland Ornithological Society that indicates the distribution of breeding birds in Maryland and the District of Columbia. Point counts were conducted by volunteers within survey blocks across the State of Maryland. The half-mile study area for the Project overlaps eight BBA blocks (2213, 2214, 2215, 2216, 2223, 2225, 2311, and 2312). The number of species observed in these survey blocks in the Second Atlas project (covering 2002-2006) ranged from 64 to 72, for a cumulative total of 92 different species breeding in the study area. The majority of these species are typical

of the forestland and agricultural habitats that dominate the Project site and surrounding areas, and are considered regular breeders in the region. No State- or federally-listed endangered or threatened species were observed in the vicinity of the Project site during the BBA surveys (BBA Explorer, 2015).

The MARA is a five-year survey (2010-2014) coordinated by the DNR and the Natural History Society of Maryland to systematically document amphibian and reptile distributions throughout the State. The MARA was conducted on a grid-based geographic scale using USGS 7.5-minute quadrangle maps equally divided into six blocks of approximately 10 square miles each. Within each quad, blocks are referenced by their directional orientation (Northwest = NW, Northeast = NE, Center-west = CW, Center-east = CE, Southwest = SW, Southeast = SE). The half-mile study area for the Project overlaps eight quad blocks: Princess Anne (CW, CE, SW, SE); Dividing Creek (CW, SW); and Kingston (NW, NE). The number of species observed in these ten quad blocks ranged from 11 to 19, for a cumulative total of 34 different species in the study area. No State- or federally-listed endangered or threatened species were observed in the vicinity of the Project site during the MARA surveys (MARA Database, 2015).

Although the DNR (2015a) provides a list of mammals found within the State, data about mammalian distribution/occurrence is not available at the quad or County level. Therefore, the potential occurrence of mammalian species in the study area was assessed through field survey of available habitat. This effort suggests that 35-40 species of mammal could occur in the area, including red fox (*Vulpes vulpes*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), gray squirrel (*Sciurus carolinensis*), southern flying squirrel (*Glaucomys volans*), woodchuck (*Marmota monax*), muskrat (*Ondatra zibethicus*), cottontail rabbit (*Sylvilagus floridanus*), and various small mammals such as bats, mice, moles, voles, and shrews. These species are generally common and widely distributed throughout Maryland.

A number of streams occur within the study area, including Taylor Branch, Jones Creek, Kings Creek, and Back Creek. Data from DNR (2006) and Somerset County Chesapeake Watch (2015) were reviewed to determine the potential occurrence of fish in these streams. Species documented in Kings Creek and/or Taylor Branch include American eel (*Anguilla rostrata*), redfin pickerel (*Esox americanus*), eastern mudminnow (*Umbra pygmaea*), golden shiner (*Notemigonus crysoleucas*), creek chubsucker (*Erimyzon oblongus*), brown bullhead (*Ameiurus nebulosus*), pirate perch (*Aphredoderus sayanus*), and pumpkinseed (*Lepomis gibbosus*). These species are generally common throughout the region and State.

Wildlife Habitat

Wellington Wildlife Management Area (WMA) is located on Dublin Road, immediately adjacent to a Project site parcel. Most of the 400-acre property lies within the half-mile study area. Predominantly forested, the WMA attracts forest

wildlife, while small fields are planted with crops to provide habitat and winter food for upland wildlife species. In addition, several small ponds have been created and are managed to provide habitat for waterfowl, aquatic mammals, and amphibians (DNR, 2015b). There are no other State WMAs within the study area or in close proximity to the Project site; Pocomoke River WMA, located approximately 4.1 miles to the east, is the next closest.

The Chesapeake Forest Lands are another local public resource managed, in part, for wildlife habitat. Collectively totaling 67,722 acres in five Eastern Shore counties, with over 17,000 acres in Somerset County, several Chesapeake Forest Lands tracts are located adjacent to Project site parcels. A state-of-the-art sustainable forest management plan was originally developed by The Conservation Fund and has been implemented by the State and later updated to include additional tracts. The Chesapeake Forest lands provide important habitat for interior forest dwelling birds and threatened and endangered species (DNR, 2015c).

A basic principle of wildlife ecology is that the distribution and abundance of wildlife species is directly dependent upon the type, quantity, and quality of available habitat. As described above, the study area includes a mix of agricultural land, forestland, and disturbed/developed vegetative communities, along with various stream and wetland communities. Consequently, the study area supports a variety of wildlife species that utilize these habitat types. The value of these communities to various wildlife species is summarized below:

- Agricultural Land – In general, agricultural land provides habitat for a limited number of wildlife species. These areas are subject to frequent human activity and disturbances, including plowing, planting, harvesting, etc. Vegetation is often monotypic, thereby restricting foraging and cover opportunities. Although hayfields and pastures can provide nesting habitat for grassland birds, all Project site parcels consist of cropland, which is of lesser value for breeding birds. During the spring and fall migration seasons, harvested corn and soybean fields like those found at the Project site can be used as a stopover food source for waterfowl such as Canada goose (*Branta canadensis*), snow goose (*Chen caerulescens*), and mallard (*Anas platyrhynchos*). Resident wildlife will also forage in agricultural fields, including opossum, woodchuck, short-tailed shrew (*Blarina brevicauda*), cottontail rabbit, and white-tailed deer.

- Disturbed/Developed Land – Disturbed and developed areas provide some wildlife habitat, especially around their edges or where they include patches of trees and/or shrubs. Landscaping and other vegetation can be used for foraging, while man-made debris and other material can provide cover for birds, small mammals, and snakes. In addition, some species have adapted to the ever increasing human disturbances and are able to forage in the non-vegetated portions of developed areas (i.e., trash). These include pigeon (*Columba livia*), crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*), house sparrow (*Passer domesticus*), European

starling (*Sturnus vulgaris*), raccoon, opossum, and skunk. However, the overall habitat value of these areas is generally limited due to a lack of adequate cover and increased human activity. Consequently, such areas typically lack diversity and provide habitat to only a limited number of wildlife species.

- Forestland – Forest interior habitat refers to the area in the center of a forest, greater than 300 feet from the edge (e.g., cropland, pasture, lawn, road, etc.). A variety of avian species, including migrating songbirds as well as residents and short-distance migrants, require large forest areas to breed successfully and maintain viable populations (Jones et al., 2001). The DNR (2012) maintains a geographical dataset of habitat for forest interior dwelling species that includes much of the forestland in the study area, with the agricultural land of the Project site parcels often comprising the adjacent edges. The BBA data (BBA Explorer, 2015) suggest that these commercial pine plantations provide habitat for avian species that require forest interior conditions, including wood thrush (*Hylocichla mustelina*), red-eyed vireo (*Vireo olivaceus*), black-and-white warbler (*Mniotilta varia*), worm-eating warbler (*Helmitheros vermivorus*), ovenbird (*Seiurus aurocapilla*), hairy woodpecker (*Picoides villosus*), and pileated woodpecker (*Dryocopus pileatus*). Other animals that utilize forested habitat include mammals such as gray squirrel, southern flying squirrel, white-footed deer mouse (*Peromyscus leucopus*), white-tailed deer, and gray fox (*Urocyon cinereoargentius*); amphibians such as eastern red-backed salamander (*Plethodon cinereus*) and Cope's gray treefrog (*Hyla chrysocelis*); and reptiles such as common five-lined skink (*Plestiodon fasciatus*) and eastern box turtle (*Terrapene carolina*).

Threatened and Endangered Species

Information regarding documented threatened and endangered species in the area was obtained through written consultation with the WHS, and review of the USFWS Information, Planning, and Conservation System (IPAC) database. Copies of this correspondence are included in Exhibit A. A variety of publications and online resources were also consulted to obtain specific life history and habitat information about documented threatened and endangered species as well as measures that can be employed to help protect these species.

Federally-Listed Species

Review of the USFWS's IPAC System database (see Exhibit A) indicated potential occurrence in the study area of two species protected under the Endangered Species Act of 1973 (ESA): sensitive joint-vetch (threatened) and Delmarva Peninsula fox squirrel (endangered). A discussion of each of these species is presented below:

- Sensitive joint vetch (*Aeschynomene virginica*) – Sensitive joint-vetch is an annual legume native to the eastern United States. Although the historical range for this rare species once extended into Delaware and Pennsylvania, current populations are restricted to six watersheds in Maryland, New Jersey, North Carolina,

and Virginia. The two sub-populations of sensitive joint-vetch in the Manokin River drainage in Somerset County represent the only viable populations within the State (USFWS, 2012a). Sensitive joint-vetch occurs along the outer fringes of fresh to slightly brackish tidal river systems, within the intertidal zones that are flooded twice daily. Bare to sparsely vegetated substrates appear to be a critical habitat feature for establishment and growth in some places (USFWS, 1995), although both Somerset County populations occur in areas of "tall, dense, species-rich vegetation" (USFWS, 2012a). Sensitive joint-vetch usually attains a height of three to six feet, but may grow as tall as eight feet. The flowers are yellow streaked with red, and the fruit is a pod, turning dark brown when ripe. Surveys for this species should be conducted in July, August, or September when the plant is flowering (USFWS, 1995). The western edge of the study area contains potential habitat for sensitive joint-vetch. However, the Project site parcels do not contain any tidal marsh habitats.

- Delmarva Peninsula fox squirrel (*Sciurus niger cinereus*) – This large, heavy-bodied squirrel inhabits mature forests of mixed hardwoods and pines in the agricultural landscapes of the Delmarva Peninsula. Both upland and bottomland forests are utilized. Preferred sites are generally dominated by a variety of mast-bearing trees, contain over-age trees with cavities for dens, have open understories, and are located in proximity to corn and soybean fields. Historically, this species was distributed throughout most of the Delmarva Peninsula and into southern Pennsylvania, and possibly New Jersey and Virginia as well. By the time of listing as endangered in 1967, remnant populations occurred in just four Maryland Counties (USFWS, 1993). Through successful translocations, discovery of previously unknown natural populations, and natural population expansions, the known range now covers 28% of the Delmarva Peninsula, with populations in ten counties: eight in Maryland, and one each in Delaware and Virginia (USFWS, 2012b). The most recent *5-Year Review* concluded that this species is now sufficiently abundant and well distributed to withstand future threats. It is not in danger of extinction throughout all or a significant portion of its range, is not likely to become endangered within the foreseeable future, and no longer meets the definition of an endangered or threatened species under the ESA (USFWS, 2012b). In September 2014, the USFWS published a proposed rule to remove this species from the list of endangered and threatened wildlife, along with a draft post-delisting monitoring plan (79 FR 56686). The study area contains potential habitat for Delmarva Peninsula fox squirrel. However, the Project site parcels do not contain any forested habitats.

State-Listed Species

The WHS response letter dated April 3, 2015 identified the potential occurrence of several rare, threatened, or endangered (RTE) species within the half-mile study area. The identified RTE species consist of six plant species and

three fish species, as listed below in Tables 5 and 6. All of these species are associated with wetlands, tidal areas, streams, or other aquatic features.

Table 5. Rare Plant Species, as Identified by Maryland Wildlife and Heritage Service

Common Name	*Scientific Name*	State Status	Habitat	Survey Period
sensitive joint-vetch[1]	*Aeschynomene virginica*	Endangered	Freshwater to slightly brackish tidal river systems, within the intertidal zone	July, August, September
small-fruited beggar-ticks	*Bidens mitis*	Endangered	Brackish and freshwater marshes	September, October
tickseed sunflower	*Bidens trichosperma*	Rare/Watchlist	Marshes, bogs, wet meadows	August, September, October
Long's bittercress	*Cardamine longii*	Endangered	Tidal wetlands, within the intertidal zone	July, August, September
cylindric-fruited seedbox[2]	*Ludwigia glandulosa*	Endangered	Seasonally inundated roadside ditches	July, August, September
leafy pondweed	*Potamogeton foliosus*	Endangered	Tidal wetlands, streams, lakes (aquatic species)	August, September

[1] Also federally-listed as endangered.
[2] This species was documented in the area in 2013 during rare plant surveys associated with the Great Bay Wind Energy Center (EDR, 2013a).

Table 6. Rare Fish Species, as Identified by Maryland Wildlife and Heritage Service

Common Name	*Scientific Name*	State Status	Habitat
banded sunfish	*Enneacanthus obesus*	Rare	Sluggish streams, vegetated lakes and ponds
swamp darter	*Etheostoma fusiforme*	In Need of Conservation	Murky, slow-moving waters with abundant vegetation
mud sunfish	*Acantharcus pomotis*	In Need of Conservation	Acidic swamps, slow-moving streams

The Project site boundaries (i.e., participating parcels) changed somewhat after the original environmental review request was submitted in February. Consequently, the Applicant submitted an updated map and environmental review request to WHS April 6, 2015. The Applicant is awaiting a response from WHS regarding the second environmental review request and will provide this information as soon as it becomes available.

20.79.03.02.B(1)(a)(iii) Cultural Resources

This section describes cultural resources within a study area consisting of a half-mile buffer around the potential Project site parcels and easements. Cultural resources include archaeological as well as historic-architectural resources. Historic-architectural resources include structures listed on the National Register of Historic Places (NRHP) as well as resources included in the Maryland Inventory of Historic Places (MIHP), a statewide inventory of properties that are potentially of historic significance but have not necessarily been formally evaluated for NRHP-eligibility. The Maryland Historical Trust (MHT) is the state agency that maintains the MIHP, and reviews potential impacts to cultural resources.

Previously Identified Cultural Resources

A Phase 1 Archaeological Survey Report (EDR, 2014a) and a Historic Resources Assessment Compliance Report (EDR, 2014b) were recently completed for the Great Bay Wind Energy Center (GBWEC), located in Somerset County, Maryland, in close proximity to the Project site. The northeastern portion of the GBWEC study area overlaps part of the Project site and the associated 0.5-mile-radius study area for the Great Bay Solar Project.

Archaeological Resources

Relative to archaeological sites, the Phase 1 Archaeological Survey for the GBWEC noted a total of 23 previously identified archaeological sites located within the vicinity of the wind project, which included 11 prehistoric sites, nine historic-period sites, and three sites that contain both prehistoric and historic-period materials. None of these sites is located within the Project site for the Great Bay Solar Project. One property, the NRHP-listed Somerset Academy Archaeological Site, is located within the half-mile study area of the Great Bay Solar Project. The Phase 1 also noted that in general those portions of the GBWEC Project site located on well-drained landforms in close proximity to water features are most likely to contain prehistoric Native American archaeological materials (EDR, 2014a). The same is expected to be true in the study area for the Great Bay Solar Project. Conversely, those portions of the current Project site located in poorly drained areas and away from water features should be considered as having low potential for prehistoric Native American archaeological materials to be present.

Historic-Architectural Resources

Relative to historic architectural resources, the GBWEC Historic Resources Assessment noted the presence of 73 properties identified in the MIHP located within two miles of the GBWEC project. Of these properties, 18 are listed on the NRHP and six have previously been determined to not meet NRHP eligibility criteria. For the remaining 49 MIHP properties, EDR completed MHT Determination of Eligibility (DOE) forms or MHT MIHP Addendum forms (for those properties found to be no longer standing), and recommended three properties to be NRHP-eligible and 43 not NRHP-eligible. In addition, 15 properties were found to be no longer standing, and three were not evaluated due to lack of visibility from public rights-of-way (EDR, 2014b). Of the properties surveyed by EDR as part of the GBWEC Historic Resources Assessment, eighteen are located within the Great Bay Solar Project study area. One of these properties was determined by EDR to be NRHP-eligible, twelve properties were determined by EDR to be not NRHP-eligible, and five were found to be no longer standing. MHT noted in a June 2014 Review of Effect on Historic Properties letter (MHT, 2014) that it concurred with EDR's recommendations for these properties.

Several NRHP-listed and MIHP-listed properties, including the southern portion of the NRHP-listed Princess Anne Historic District, are located within a half-mile radius of the Project site. Three of the MIHP properties are located within

or immediately adjacent to a participating parcel within the Project site – of these, two are no longer standing (i.e., they have been demolished subsequent to their inclusion in the MIHP). MIHP-listed properties within or immediately adjacent to the Project site are listed in Table 7. Cultural resources within the study area are mapped in Figure 5.[1]

Table 7. MIHP Properties within the Study Area

MIHP Site Identifier	Property Name, Address, and/or Description	NRHP/MIHP Status	Distance to Project Site
S-202	Charlie Long Farm (Fred Senkbell Farm)	Demolished	Within Participating Parcel
S-343	Webley (Sidney Miller Farm)	Demolished	Within Participating Parcel
S-212	Ross Farm	Undetermined	Adjacent to Participating Parcel

Additional MIHP properties located in close proximity to participating parcels with the Project study area include the Old Barnes Farmhouse (S-112), Samuel Barnes Farm (S-201), the NRHP-Listed Cedar Hill (S-211), and the King's Creek Canning Company (S-341).

Maryland Historical Trust Consultation

In April 2015, EDR submitted a Project Review Form to the MHT to solicit comments on the potential impacts to cultural resources posed by the Great Bay Solar Project. Based on previously obtained data included as part of the GBWEC Phase 1A and Historic Resources Assessment completed by EDR, a map of historic resources included within the study area of the Great Bay Solar Project was included as part of the Project Review Form.

Potential impacts to cultural resources, based on the results of the MHT consultation, are discussed below in Section 20.79.03.02.B(1)(b)(iii). A copy of the Project Review Form is attached as Exhibit B. The Applicant is awaiting a response from MHT and will provide this information as soon as it becomes available.

20.79.03.02.B(1)(a)(iv) Aesthetic Resources

This section describes aesthetic resources within a study area consisting of a half-mile buffer around the potential Project site parcels and easements. Aesthetic resources typically include designated historic properties, National and State Parks, Scenic Byways, recreational resources, areas of intensive settlement, and local resources are considered scenic or that otherwise receive high-public use, including schools and municipal parks. EDR previously conducted a Visual Assessment Report (EDR, 2013b) for the Great Bay Wind Energy Center (GBWEC), located in Somerset

[1] Although a portion of the Westover Survey District is depicted within the Project Site on the Historic Resources Map, no MIHP-listed properties included in the district are located within or immediately adjacent to participating parcels. In addition, several MIHP properties that are depicted on the Historic Resources Map were found to be no longer standing during the Historic Resources Assessment conducted by EDR for the Great Bay Wind Energy Center (EDR, 2014b).

County, Maryland. The northeastern portion of the GBWEC study area overlaps part of the Project site and the associated 0.5-mile-radius aesthetic resources study area for the Great Bay Solar Project.

Vegetation in the study area is roughly a 50:50 mix of open fields and deciduous forest (primarily in the form of small woodlots). Open fields include active cropland and pasture. Forest vegetation is primarily deciduous with some planted conifers (pine and spruce). Mature trees typically occur in hedgerows, woodlots, and within wooded wetlands that are found in some low-lying coastal and interior areas. Water features within the study area include Back Creek, Jones Creek, Kings Creek, and various tributary streams.

Land use and landscape characteristics are fairly consistent throughout the half-mile-radius visual study. The majority of the land areas in the study area are agricultural and rural residential areas. These landscapes are primarily large expanses of flat active and inactive agricultural fields and pasture with agricultural storage buildings, large animal sheds, and rural residences on large lots. Many open views are available from these areas across grain fields, interrupted by the occasional residential or agricultural structure and screened only by tall vegetation in hedgerows and small woodlots. The agricultural landscape is broken up by commercial tree farm operations and private woodlots. These areas are enclosed with very tall trees along roads, effectively screening nearly all exterior views except from the edges and possibly from road sections where the cleared right-of-way extends to the edge. Higher-density development is concentrated at the northern end of the study area in the Town of Princess Anne. The portion of Princess Anne included within the study area is generally characterized by a main street business district, surrounded by traditional residential neighborhoods, with some commercial frontage development along the outskirts.

Several aesthetic resources are located within the half-mile Project study area. There are no National or State parks in the study area. However, the study area does include several resources that have been designated, or would typically be considered, visually sensitive or aesthetically significant. These include sites identified as scenic, historic, and/or aesthetic as well as recreational and institutional sites that receive a high level of public use or visitation. These resources are mapped in Figure 6.

The study area includes five individual properties and one historic district listed on the NRHP. In addition, the study area also includes 44 buildings, structures, or survey districts listed on the MIHP (i.e., the statewide inventory of historic sites). The MHT also manages Historic Preservation Easements throughout the State, including one within the study area (Beverly). One State Wildlife Management Area (WMA) occurs within the visual study area (but not within the Project site). Wellington WMA is 400 acres in size and is predominantly forested. Recreational opportunities include hunting, hiking or all-terrain bicycling on unmarked trails and nature photography (DNR, 2015b). The study area also includes several hundred acres of Chesapeake Forest Lands. Other visually sensitive areas within the study area

include: recreational sites/resources such as the Great Hope Golf Course and Long Centralized Athletic Facility (both located in Westover); schools and educational facilities including Westover Elementary School, Washington High School, and Greenwood Middle School; and Le Champ airstrip.

The study area is located within the Lower Eastern Shore Heritage Area. The purpose of this heritage area is to celebrate the landscape of wetlands, agriculture, forestland, small towns and urban centers and the regional way of life that was built on the area's rich resources of land and water, including the Chesapeake Bay, Atlantic Ocean, marshes and rivers, which have supported an economy based on seafood and agriculture (LESHC, 2015a). Designated aesthetic resources within the visual study area include the Blue Crab Scenic Byway, which includes 210 miles of roadways that link the towns and cities of the Lower Eastern Shore Heritage Area and extends to the Chesapeake Bay and Atlantic Ocean (LESHC, 2015b).

Potential impacts to aesthetic resources are discussed below in Section 20.79.03.02.B(1)(b)(iv).

20.79.03.02.B(1)(a)(v) Land Use

Land use within a half-mile of the Project site is dominated by active agricultural fields and commercial loblolly pine plantations. Corn and soybean are the two main row crops in the area; large chicken farms are also common. The area also includes some stands of naturally occurring evergreen forest, an abandoned railroad right-of-way, public roads, and a utility right-of-way. Although many residences are farmsteads, a number of non-agricultural residential properties are found within the area as well, most of which have been developed as frontage lots along public roadways. The northern portion of the half-mile buffer extends into Princess Anne, which as the County seat has a much higher concentration of residential and commercial development. This includes multiple residences, small businesses, and a public school.

As depicted in Figure 7, all of the proposed generation parcels are classified as agriculture land use/land cover by the Maryland Department of Planning (MDP, 2010). Field review confirmed that all Project site parcels are currently active or recently fallowed agricultural fields. There are no unique land uses or land covers that would create any type of conflict or impairment for the proposed development.

20.79.03.02.B(1)(a)(vi) Socioeconomics

Somerset County is the southernmost county in Maryland, and with a 2013 county-wide population estimate of 26,273, is the second least populous county in the State (U.S. Census Bureau, 2015a). The homeownership rate in Somerset County is 68.1 percent with an average of 2.29 persons per household, compared to 67.6 percent homeownership and

2.65 persons per household for the State. Median household income in 2013 for Somerset County was $38,447 as compared to $73,538 for the State of Maryland (U.S. Census Bureau, 2015b). The Maryland Department of Business and Economic Development (MDBED) lists 2014 civilian employment in the County at 6,615, of which 3,597 were employed in the private sector. Of those, 1,025 were employed within the trade, transportation, and utilities sector, while 243 were employed in the construction sector (MDBED, 2014).

The percentage of people in Somerset County living below the poverty level in 2013 was 23.4 percent, as compared to 9.8 percent for the State of Maryland. The unemployment rate in Somerset County in 2014 was 8.4 percent, as compared to 5.5 percent in the State of Maryland and 5.6 percent in the nation (U.S. Census Bureau, 2015b). The personal income tax rate in 2015 for Somerset County was 3.15 percent, as compared to the 2.0 – 5.75 percent range in the State (MDBED, 2014). The per capita total tax revenue in 2013 was $2,240 in Somerset County and $3,238 in the State of Maryland (MDLS, 2015).

By many metrics, Somerset is one of the most economically depressed counties in the State of Maryland. Somerset has the second highest poverty rate, the lowest median household income, and the lowest per capita local wealth in the State. As a result, tax revenues in Somerset County are low, despite having one of the highest income tax rates in the State. The County has the lowest assessable base, the lowest income base, and the lowest per capita net taxable income in the State of Maryland (MDLS, 2015).

20.79.03.02.B(1)(a)(vii) Noise

The Applicant had previously retained Epsilon Associates, Inc. (Epsilon) to evaluate the existing ambient sound levels immediately south of the Project site. Continuous broadband sound level measurements were taken from October 18, 2012 to November 7, 2012 at six locations south of Route 13, which range from approximately 1.2 to 5.3 miles south of the proposed Project site. This area is very similar in character to the Project site. Land use is dominated by agricultural fields, chicken farms, and commercial pine plantations, with farmsteads and scattered residences along rural roads. In other words, the sound measurements conducted by Epsilon can be considered representative of the existing sound levels in the vicinity of the Project site. Existing ambient sound levels in the vicinity of the Project site are summarized below in Table 8.

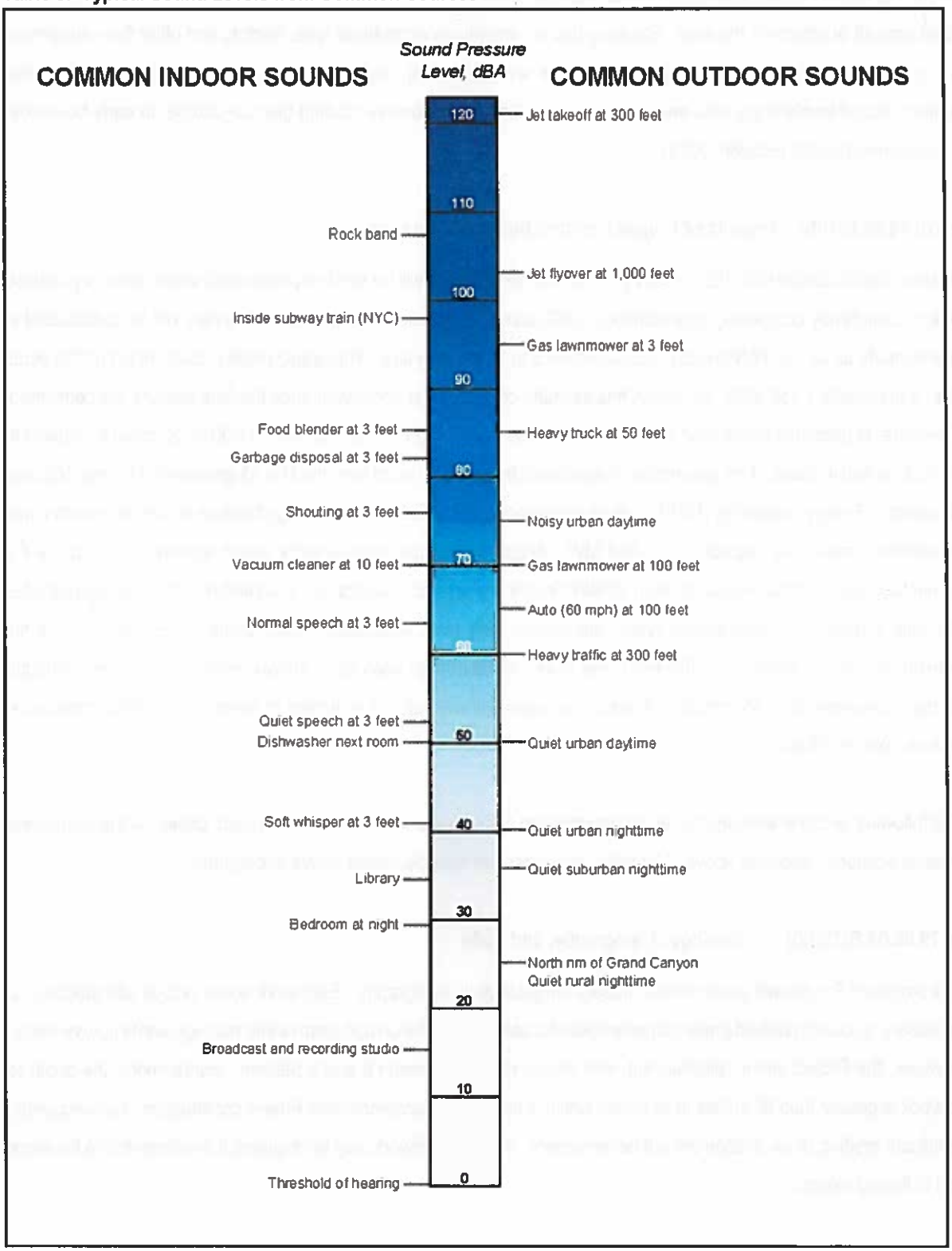
Table 8. Existing Sound Levels in the Vicinity of the Project Site

ID	Location	Approximate Distance to Project Site	L90 Sound Levels	Leq Sound Levels	Sound Sources								
					Occasional traffic	Steady traffic	Distant traffic	Wind in the trees	Insects and birds	Dogs barking	Planes overhead	Fan noise from barns	Occasional gunshots
1	Old Westover Marion Road	3.9 miles	22-56 dBA	28-71 dBA	✓			✓	✓	✓	✓	✓	
2	Intersection Lovers Lane & Charles Cannon Road	3.3 miles	19-53 dBA	20-64 dBA	✓		✓	✓	✓		✓		✓
3	Kingston Lane	2.8 miles	19-66 dBA	21-78 dBA	✓		✓	✓	✓		✓		
4	Ruark Lane	1.7 miles	19-56 dBA	21-77 dBA	✓			✓	✓		✓	✓	
5	Turkey Branch Road	1.9 miles	16-72 dBA	20-86 dBA	✓		✓	✓	✓		✓	✓	
6	Route 413	0.2 miles	25-62 dBA	33-75 dBA		✓	✓		✓	✓			

Source: Epsilon, 2013.

Sound levels are presented in two widely used metrics: exceedance levels and equivalent levels, both of which are derived from a large number of moment-to-moment A-weighted sound level measurements. Exceedance levels, designated Ln, where n can have a value of 0 to 100 percent, are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. L90 is the sound level exceeded 90 percent of the time during the measurement period, and, therefore, is close to the lowest sound level observed. In other words, occasional loud noises are filtered out and the L90 captures the sound levels during the quietest lulls. Leq, the equivalent level, is the level of a hypothetical steady sound that would have the same energy as the actual fluctuating sound observed. The equivalent level represents the average of the fluctuating sound pressure. However, because sound is represented on a logarithmic scale, the averaging results in a Leq value that is mostly determined by occasional loud noises. Table 9 provides context for the sound levels observed by presenting the typical sound levels generated by common indoor and outdoor activities.

Table 9. Typical Sound Levels from Common Sources



Source: Epsilon, 2013.

In order to obtain conservative sound levels, the sound monitoring was conducted at a time of year that represents the least amount of activity in the area. Because this is primarily an agricultural area, tractors and other farm equipment are active in the fields on a routine basis during the spring, summer, and early fall months. Therefore, it is likely that ambient sound levels in the area are regularly higher than those observed during the mid-October to early November measurement period (Epsilon, 2013).

20.79.03.02.B(1)(b) Impacts of Project Construction and Operation

As described in Section 20.79.03.01.B(1)(b), the proposed Project will be sited on private land under lease or purchase option, collectively comprising approximately 1,000 acres. It is anticipated that the PV system will be constructed in blocks made up of 1 to 2 MWs each, approximately 5 to 10 acres in size. This would result in total impact of 750 acres (i.e., 5 acres/MW x 150 MW). However, this estimate could change somewhat once the final designs are completed. Therefore, to present a worst-case impacts scenario, we have assumed that the entire 1,000 acres could be subject to Project-related impacts. This assumption is supported by a recent report from the U.S. Department of Energy National Renewable Energy Laboratory (NREL), which examined land use at 217 solar energy facilities across the country with a combined nameplate capacity of 12,800 MW. Although land use requirements varied somewhat by type of PV technology used, PV facilities larger than 20 MW directly impacted an average of 7.2 acres/MW. This average includes the solar arrays, along with access roads, substations, any other associated infrastructure (NREL, 2013). For the construction of the facility (i.e., 150 MW), this would result in total impacts of approximately 1,080 acres, although annual improvements in PV module efficiency are expected to result in a reduction in average acres/MW impacted in new vs. existing facilities.

The following sections evaluate the environmental and socioeconomic effects of the Project, based on the worst-case impacts scenario described above. Mitigation measures are also discussed where appropriate.

20.79.03.02.B(1)(b)(i) Geology, Topography, and Soils

The proposed Project will have minimal impact on geology or topography. Earthwork could include site grading, as necessary, to create finished grade slopes suitable for racking installation and storm water management improvements. However, the Project site is relatively flat, with slopes ranging between 0 and 5 percent. Furthermore, the depth to bedrock is greater than 80 inches in all areas, which is sufficient to accommodate Project construction. Consequently, significant grading or excavation will not be necessary. Where earthwork may be required, it is anticipated to be minor and of limited extent.

The primary impact to the physical features of the site will be the disturbance of soils during Project construction. As described in Section 20.79.03.01.B, the PV panels will be secured on a racking system supported by metal piers driven or screwed into the ground by a pile-driving machine to a depth of 5 to 8 feet. Each generating field will include at least one access road, which will be constructed of gravel or aggregate material. The extent of soil disturbance resulting from the construction of the 500-foot generation tie line will be a function of the number of support poles required, which has not yet been determined but is expected to be either one or two support poles. The Project substation will cover approximately two acres, and will require the construction of an impervious base layer to support the switchyard components. Soil impacts related to these components can be considered permanent, since the access roads, substation, gen-tie line, and PV panels will be represent conversion to impervious surface that will remain in place throughout the life of the Project. Other components will result in temporary soil impacts, subject to restoration following construction, including the construction laydown areas electrical collection lines. Installation of buried electrical collection lines will involve relatively minor soil disturbance, restricted to the path of the rock saw or cable plow.

In order to present worst-case impacts, we have assumed that the entire 1,000-acre Project site could be subject to soil disturbance during construction. However, actual direct impacts will likely be less. For example, since low growing herbaceous vegetation will be allowed to grow beneath the panels (i.e., not gravel or other impervious surfaces), permanent impacts as a result of the installation of the PV panels will be restricted to the support poles.

Soil disturbance associated with Project construction will increase the potential for wind/water erosion and sedimentation into the surface waters. Impacts to soil resources will be minimized by adherence to best management practices that are designed to avoid or control erosion and sedimentation, stabilize disturbed areas, and prevent the potential for spills of fuels or lubricants. In addition, erosion and sedimentation impacts during construction will be minimized by the implementation of a Stormwater Pollution Prevention Plan (SWPPP) and associated erosion and sedimentation control plan developed as part of the National Pollutant Discharge Elimination System (NPDES) general permit for construction activities.

20.79.03.02.B(1)(b)(ii) Ecological Resources

This section describes potential impacts to ecological resources within a study area consisting of a half-mile buffer around the potential Project site parcels and easements.

Critical Areas

The Project has been sited so as to avoid impacts to Critical Areas to the maximum extent practicable. However, there will be some minor and/or temporary impacts to Critical Areas as a result of installation of the gen-tie facility that will

connect the Project substation with the POI substation, the collection lines that will deliver electricity to the Project substation, and solar PV panels at one generating site. Each of these impacts is discussed below.

The existing Kings Creek substation is located within the Critical Area associated with Kings Creek, which is designated as a Resource Conservation Area (RCA) despite the presence of the substation and nearby residential structures. GBS has a purchase option on the parcel immediately south of the Kings Creek substation, which consists of active agricultural land. Instead of constructing the Project substation immediately adjacent to the POI, GBS plans to build its substation on the southern portion of the parcel, outside the Critical Area, and connect via a short (<500 feet) 138 kV generation tie line. This will avoid significant impacts to the Critical Area. No clearing will be necessary because the gen-tie will be located in an open agricultural field. The only permanent impact would be the bases of the support structures (i.e., poles) along the gen-tie route.

Temporary impacts as a result of installation of the collection lines will occur within Critical Areas associated with both Taylor Branch and Kings Creek. The collection easements in the Taylor Branch Critical Area are restricted to Lightly Developed Areas (LDAs), while those in the Kings Creek Critical Area are located in an RCA. It is anticipated that the collection lines in the railroad ROW will be overhead lines, while those on private lands in agricultural land or adjacent to public roads may be buried and/or overhead. Construction activity associated with the overhead collection line installation will occur within the already disturbed railroad ROW, which is lined with gravel in most locations. The pole bases will be the only permanent impacts to Critical Areas associated with overhead collection line installation. Underground collection lines will be installed via direct burial methods. Bundled cable (electrical and fiber optic bundles) will be laid directly into a "rip" in the ground created by the plow, saw blade, or rock wheel. The rip typically disturbs an area approximately 24 inches wide, with bundled cable installed to a minimum depth of 36 inches in most areas and 48 inches in active agricultural lands. All areas will be returned to pre-construction grades through the use of a small excavator or small bulldozer to replace sidecast materials. Disturbed soils will be stabilized, as necessary, and plants allowed to regenerate naturally. There will be no permanent impacts to Critical Areas as a result of buried collection line installation.

One of the generating site parcels includes portions of the designated Critical Areas associated with both Jones Creek and Kings Creek. Miller Farm is located on Market Lane, west of State Route 13. Approximately 9 acres in the northwest portion of the parcel are designated as an RCA, while in the southeast corner, approximately 0.8 acres are designated as an RCA and approximately 1.6 acres as Intensely Developed Areas (IDAs). Development of solar PV panels is allowed within designated IDAs. No PV panels, access roads, or other Project components will be located in RCA portions of the Critical Area on the Miller property.

In summary, total permanent impacts to Critical Areas are anticipated to consist of the conversion of 1.6 acres of agricultural land in an IDA to solar PV panels, along with the installation of the pole bases in the RCA along the gen-tie route. Temporary impacts will also occur along collection easements adjacent to public roads.

Vegetative Communities

Project construction will result in impacts to vegetation at the Project site. However, impacts to natural ecological communities have been minimized by siting Project components in previously disturbed habitats. There will be no impacts to forestland. The substation and all of the PV panels will be located within agricultural land, which generally does not support native plant species. The collection line easements are primarily located in ditches, lawns, agricultural fields, and other previously disturbed areas immediately adjacent to public roads and/or railroad ROWs. In the few spots where easements cut cross-country through leased private land, the collection lines are located entirely within active agricultural land or will involve underground bores in order to completely avoid wetland areas.

As described above in Section 20.79.03.02.B(1), we have assumed that the entire 1,000-acre Project site could be subject to disturbance during construction. During Project operation, it is anticipated that the Project site will be maintained in low-growing herbaceous vegetation (i.e., mowed grass under the PV panels). Therefore, the worst-case impacts to vegetative communities will consist of the conversion of 1,000 acres of agricultural land to disturbed/developed land throughout the life of the Project.

Fish & Wildlife Resources

Typical construction-related impacts to wildlife include incidental injury and mortality of juvenile and/or slow moving animals (e.g., salamanders, turtles, etc.) due to construction activity and vehicular movement; construction-related silt and sedimentation impacts on aquatic organisms; habitat disturbance/loss associated with clearing and earth-moving activities; and displacement of wildlife due to increased noise and human activities. However, the Project has been sited to avoid and/or minimize such impacts. The substation and all of the PV panels will be located within active agricultural land, which only provides habitat for a limited number of wildlife species. The few birds and mammals that may forage within these fields should be able to vacate areas that are being disturbed by construction. On a landscape scale, there is abundant availability of similar agricultural fields within the study area and beyond.

Earth-moving activities such as grading and construction of new access roads may result in sediment and siltation impacts to aquatic habitat. Siltation and sedimentation of water bodies can adversely affect water quality and aquatic habitat. It can also interfere with the respiration of aquatic organisms and the survival of fish and amphibian eggs and larvae. To avoid impacts to aquatic resources resulting from construction-related siltation and sedimentation, an approved sediment and erosion control plan and SWPPP will be implemented. Proper implementation of these plans

will assure compliance with NPDES regulations. In addition, a Spill Prevention, Containment and Counter Measures (SPCC) Plan will be developed and implemented to minimize the potential for unintended releases of petroleum and other hazardous chemicals during Project construction and operation.

Threatened and Endangered Species

As described above in Section 20.79.03.02.B(1)(a)(ii), correspondence with the WHS and review of the USFWS's IPAC System database indicated potential occurrence of two federally-listed and nine State-listed threatened or endangered species within the study area. Potential impacts to these species and their habitats are described below.

Federally-Listed Species

There are no designated critical habitats for federally threatened or endangered species within the study area. Potential habitat for threatened sensitive joint-vetch occurs in tidal marshes at the western edge of the study area, while potential habitat for endangered Delmarva Peninsula fox squirrel is found in forestland throughout the study area. However, all of the Project site parcels on which the substation and PV panels will be located consist of agricultural land, which does not provide suitable habitat for either species. Therefore, construction and operation of the proposed Project will have no impact on federally-listed plant or animal species or their habitats.

State-Listed Species

All of the State-listed species identified by WHS are associated with wetlands, tidal areas, streams, or other aquatic features (see Tables 5 and 6). There will be no impacts to the aquatic features that provide habitat for the rare fish species identified by WHS. Furthermore, the Project has been sited to avoid and/or minimize impacts to wetlands, streams, and tidal areas. The active agricultural fields in which the PV panels have been sited generally do not provide suitable habitat for any rare plants or animals. However, while many of the drainage ditches were determined to be non-jurisdictional by the Corps and MDE (see Exhibit D), these features may still provide habitat for rare plants.

The Applicant is committed to protecting sensitive resources at the Project site, including potential occurrences of State-listed plant species. To facilitate this goal, the Applicant will conduct rare plant surveys in any wetland or drainage ditch habitats to be impacted by Project construction. Appropriate survey periods for each State-listed species identified by WHS are included in Table 5. The phenology of these rare plant species are similar enough so that a single targeted survey conducted in the month of September will allow for the accurate identification of potential occurrences of all six identified species. Should populations of any State-listed species be located within the Project's footprint of disturbance, the Applicant will take appropriate measures to avoid and/or minimize potential impacts.

As described above in Section 20.79.03.02.B(1)(a)(ii), the Applicant submitted an updated map and environmental review request to WHS April 6, 2015. The Applicant is awaiting a response from WHS regarding the second environmental review request and will provide this information as a follow-up submission as soon as it becomes available. If the updated response letter identifies additional State-listed species not previously addressed herein, the Applicant will provide an assessment on how to protect those resources, as appropriate.

20.79.03.02.B(1)(b)(iii) Cultural Resources

As indicated above in Section 20.79.03.02.B(1)(a)(iii), EDR submitted a Project Review Form to the MHT in April 2015, which is included in Exhibit B. The Applicant is awaiting a response from MHT and will provide this information as a follow-up submission as soon as it becomes available. The Applicant will provide a copy of MHT's response to the Project Review Form as a follow-up submission.

Archaeological Resources

As indicated above in Section 20.79.03.02.B(1)(a)(iii), there are no previously recorded archaeological sites located within the Project site. The archaeological sensitivity (i.e., the potential for archaeological resources to be present) within the Project site and surrounding study area is highly variable. In general, those portions of the study area located on well-drained landforms in close proximity to water features are most likely to contain prehistoric Native American archaeological materials. Conversely, those portions of the study area located in poorly drained areas and away from water features should be considered as having low potential for prehistoric Native American archaeological materials to be present (EDR, 2014a). The Project site is located in agricultural fields that are prior converted wetlands. As described in Section 20.79.03.02.B(1)(a)(i), soils within the Project site are for the most part poorly drained to very poorly drained (see Table 4 and Figure 3 for additional information on soil properties). In general, it is unlikely that Native American archaeological resources are located in the Project site. However, the final evaluation of potential effects on archaeological resources will be determined by MHT.

Historic-Architectural Resources

As described above in Section 20.79.03.02.B(1)(a)(iii), there were two properties listed in the MIHP located within the Project site (see Table 7 and Figure 5): the Charlie Long Farm (or Fred Senkbell Farm, MIHP Site S-202) and Webley (or the Sidney Miller Farm, MISP Site S-343). In addition, the Ross Farm (MIHP Site S-212) is located immediately adjacent to the Project site. EDR conducted site visits to each of these properties to determine their existing condition in March, 2015. The current condition of these properties is described as follows[2]:

[2] Site descriptions are based on MIHP survey forms in the MHT Library in Crownsville, MD and/or *Somerset: An Architectural History* (Touart, 1990), EDR site visits conducted in 2013 as part of cultural resource investigations for the proposed Great Bay Wind Energy Center, and EDR site visits conducted in 2015 for support studies as part of the Great Bay Solar project.

- The Charlie Long Farm (MIHP Site S-202) was a two-and-a-half story hall/parlor-style house with associated hay barn located on the west side of Old Princess Anne Road near Westover. The house and barn are no longer standing. A small, unidentified outbuilding visible in a photograph from a previous survey (1984) remains on site, but shows signs of deterioration. The remaining buildings on site are two, corrugated steel-sided storage garages, and a shed with cinder block walls. None of the buildings on site appear to be of any historic significance.
- Webley/Sidney Miller Farm (MIHP Site S-343) is part of a tract of land owned by the King and Miller families since the eighteenth century. The Webley tract originally included an early Somerset County Courthouse as well as the Second Washington Academy (MIHP Site S-412, no longer standing), located east and across US 13 (i.e., outside the Project site). The Sidney Miller Farm was formerly located on the west side of US Route 13 (i.e., within the Project site) and included a farmhouse and several outbuildings, but no structures are currently standing on the property.
- Ross Farm (MIHP Site S-212) is a mid-nineteenth-century two-story, three-bay vernacular farmhouse clad in wood with a hipped roof and twin corbelled brick chimneys, and associated collection of outbuildings, located east of McCormick Swamp Road. The house is currently vacant and shows considerable deterioration. The rear service wing of the house has collapsed, and the remaining outbuildings exhibit considerable deterioration. Only one outbuilding is located within the Project site parcel. The house and remainder of the outbuildings are located immediately adjacent to the participating parcel.

The houses and agricultural buildings that contributed to the historic character of the Charlie Long Farm (MIHP Site S-202) and Webley/Sidney Miller Farm (MIHP Site S-343) have been demolished. Therefore, neither of these properties retains historic integrity, and they are therefore not eligible for the NRHP (i.e., they are not historically significant). In addition, due to the deteriorated condition of the structures, it is the opinion of EDR that the Ross Farm (MIHP Site S-212) lacks integrity and does not satisfy NRHP-eligibility criteria. Therefore, construction of the Project will not result in any direct effects on potentially significant historic properties.

The Project also has the potential to result in indirect (visual) effects on the setting associated with historic properties. In general, due to the low profile of the proposed PV panels and the screening provided by buildings and vegetation, the visual effect of the Project on historic properties is anticipated to be minimal (the potential visual effect of the Project is more fully considered in Section 20.79.03.02.B(1)(b)(iv), below). Neither construction nor operation of the proposed Project is anticipated to result in any significant adverse effects on historic-architectural resources. However, the final evaluation of potential effects on historic properties will be determined by MHT.

20.79.03.02.B(1)(b)(iv) Aesthetic Resources

As described above in 20.79.03.02.B(1)(a)(iv), the study area includes several resources that have been designated, or would typically be considered, visually sensitive or aesthetically significant. These include sites identified as scenic, historic, and/or aesthetic as well as recreational and institutional sites that receive a high level of public use or visitation. These resources are mapped in Figure 6.

Field Review

A field review of the Study Area was conducted from March 10, 2015 to March 12, 2015 to identify and document the availability of views toward the proposed Project from aesthetic resources and public vantage points. The purpose of this field investigation was to evaluate the potential visibility of the Project. Views toward the Project site were documented with field notes and photographs from 56 representative viewpoints within the half-mile radius study area (see Figure 6 and Exhibit C). A digital SLR camera with a minimum resolution of 10 mega pixels and the equivalent of a 50 mm lens setting was used for all photos. This focal length is the standard used in visual impact studies because it most closely approximates normal human perception of spatial relationships and scale in the landscape. The time and location of each photograph were noted on field maps and data sheets. Global positioning system (GPS) readings were also taken at each viewpoint to document photo and reference point locations.

Viewpoint locations were selected to provide the most open, unobstructed views toward the Project site (where possible) and/or were selected to document views from areas and sites identified as visually sensitive or that received a high level of public use or visitation. Viewpoint locations in relation to visually sensitive aesthetic resources within the study area are mapped in Exhibit C. A summary of the potential visibility of the Project from aesthetic resources within the study area based on field verification is included in Table 10. In many locations, the photographs from aesthetic resources and visually sensitive areas document the lack of visibility towards the Project site (because of the presence of intervening vegetation and/or buildings).

Table 10. Aesthetic Resources within the Study Area

Visually Sensitive Resource	Distance to Nearest Participating Parcel (Miles)[1]	Viewpoint Number[2]	Potential Visibility
1. National Register of Historic Places Listed Sites/Districts			
Beverly	0.00	17, 16	Project substation may be visible adjacent to existing substation. Views of proposed PV facilities screened or partially screened by vegetation.
Cedar Hill	0.09	50	Potential views of portion of PV facilities.
William T. Tull House	0.13	54	Views of proposed PV facilities screened or partially screened by vegetation.

Visually Sensitive Resource	Distance to Nearest Participating Parcel (Miles)[1]	Viewpoint Number[2]	Potential Visibility
Adams Farm	0.18	3, 4	Open or partial views of proposed PV facilities available from some vantage points. Views screened by buildings and vegetation from some vantage points.
Somerset Academy Archaeological Site	0.18	52	Views of proposed PV facilities screened by vegetation.
Arlington	0.20	-	Views of proposed PV facilities screened or partially screened by vegetation.
St. Paul's Methodist Episcopal Church	0.22	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Catalpa Farm	0.33	9	Views of proposed PV facilities screened by vegetation.
Princess Anne Historic District	0.40	-	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Glebe House	0.55	7	Views of proposed PV facilities screened by buildings and vegetation.
1a. Maryland Inventory of Historic Properties			
Ross Farm	0.00	39	Proximate, open views of proposed PV facilities.
Westover Survey District	0.00	21, 53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
King's Creek Canning Company	0.01	16, 17	Project substation may be visible adjacent to existing substation. Views of proposed PV facilities screened or partially screened by vegetation.
Old Barnes Farmhouse	0.03	14	Open view of PV facilities. Project substation may be visible adjacent to existing substation.
Webley (Sidney Miller Farm)	0.05	12, 13	Historic structure no longer present (demolished). Open, proximate views of PV facilities.
Charlie Long Farm (Fred Senkbeil Farm)	0.05	22, 23	Historic structure no longer present (demolished). Open, proximate views of PV facilities.
Cedar Hill (Long Farm)	0.11	50	Open, proximate view of proposed PV facilities.
William T. Tull House (E.D. Long House and Store)	0.15	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
John Lewis Porter Farm (Porter's Purchase)	0.16	40	Views of proposed PV facilities screened or partially screened by vegetation.
Chamberlin House	0.20	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Washington Academy Site (Second Washington Academy)	0.22	11	Open view of proposed PV facilities. Views partially screened by buildings from some vantage points.
St. James United Methodist Church	0.22	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Lloyd Chamberlin House	0.22	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
St. Paul's Methodist Episcopal Church	0.23	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
William Henry Ruark House	0.24	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.

Visually Sensitive Resource	Distance to Nearest Participating Parcel (Miles)[1]	Viewpoint Number[2]	Potential Visibility
Adams Farm (Old Adams Farm)	0.27	3, 4	Views of proposed PV facilities screened or partially screened by buildings and vegetation. Limited or partial views may be available from some vantage points.
St. Elizabeth Catholic Church	0.27	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Holly Grove Plantation	0.29	-	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Rolley House	0.29	55	Views of proposed PV facilities screened by vegetation.
Mary Ritzel House	0.29	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Ritzel House	0.30	53, 54	Views of proposed PV facilities screened or partially screened by buildings and vegetation.
Jennings Richards House	0.31	-	Views of proposed PV facilities screened by buildings and vegetation.
Cedar Lane Farm	0.31	-	Views of proposed PV facilities screened by vegetation.
Richards Store	0.32	55	Demolished (site no longer present). Views of proposed PV facilities screened by vegetation.
Beverly	0.34	17, 16	Project substation may be visible adjacent to existing substation. Views of proposed PV facilities screened or partially screened by vegetation.
Ritzel Mill (Ruark Mill, Westover Mill)	0.34	-	Views of proposed PV facilities screened by buildings and vegetation.
Catalpa Farm	0.35	-	Views of proposed PV facilities screened by vegetation.
Westover Ticket Office	0.35	-	Views of proposed PV facilities screened by buildings and vegetation.
Westover (Westover Farm)	0.35	-	Views of proposed PV facilities screened by vegetation.
Princess Anne Historic District	0.40	-	Views of proposed PV facilities screened by buildings and vegetation.
Daniel Collins House (Street House)	0.40	-	Views of proposed PV facilities screened by buildings and vegetation.
Campoe Farm	0.40	-	Views of proposed PV facilities screened by vegetation.
James Long House	0.40	31	Views of proposed PV facilities screened by vegetation.
Albert Krause House (Groutt House, Grout House)	0.42	-	Views of proposed PV facilities screened by buildings and vegetation.
Amanda Lankford House	0.43	-	Views of proposed PV facilities screened by buildings and vegetation.
John Wesley Methodist Episcopal Church	0.43	-	Views of proposed PV facilities screened by vegetation.
Edmund D. Young (Page Wickes House)	0.45	-	Views of proposed PV facilities screened by buildings and vegetation.
Thomas H. Bock House (Levin Wilson House)	0.46	-	Views of proposed PV facilities screened by buildings and vegetation.
Sandusky Farm	0.46	32	Views of proposed PV facilities screened by vegetation.
Green Hill Store	0.46	27	Demolished (site no longer present). Views of proposed PV facilities screened by vegetation.

Visually Sensitive Resource	Distance to Nearest Participating Parcel (Miles)[1]	Viewpoint Number[2]	Potential Visibility
Arlington (Wilson's Lott)	0.47	-	Views of proposed PV facilities screened by vegetation.
Samuel Barnes Farm	0.49	20	Views of proposed PV facilities screened by vegetation. Potential views of collection line infrastructure.
Barnes Layfield House (S. Barnes Layfield House)	0.50	-	Views of proposed PV facilities screened by buildings and vegetation.
Glebe House (Samuel Chase House)	0.55	7	Views of proposed PV facilities screened by buildings and vegetation.
Cherry Grove	0.66	5	Views of proposed PV facilities screened by vegetation.
1b. Maryland Historical Trust Historic Preservation Easements			
Beverly	0.14	17, 16	Project substation may be visible adjacent to existing substation. Views of proposed PV facilities screened or partially screened by vegetation.
2. National or State Parks			
None in Study Area	-	-	Not applicable.
3. Scenic Byways			
Blue Crab Scenic Byway	0.00	21, 26, 27, 28, 8, 12, 13, 15, 16, 17, 51, 55, 56, 53, 54	Proximate, open views of proposed PV facilities and collection infrastructure from some locations. Project substation will be visible adjacent to existing substation. Project screened or partially screened by vegetation from most locations.
4. National or State Wild and Scenic Rivers			
None in Study Area	-	-	Not applicable.
5. Recreational Resources			
None in Study Area	-	-	Not applicable.
6. Trails			
None in Study Area	-	-	Not applicable.
7. Major Surface Waters			
None in Study Area	-	-	Not applicable.
9. National or State Forests			
None in Study Area	-	-	Not applicable.
11. Local Parks			
Long Centralized Athletic Facility	0.02	21, 51	Proximate, open views of proposed PV facilities and collection infrastructure.
12. Private Conservation Properties			
Princess Anne Marshes	0.42	5	Views of proposed PV facilities screened by vegetation.
13. State Nature and Historic Preserve Areas			
Chesapeake Forest Lands	0.00	35	Views of proposed PV facilities screened by vegetation from most locations. Open, proximate views of PV facilities from forest edges in some locations.
14. Environmental Trust Easements			
None in Study Area	-	-	Not applicable.
16. Wildlife Management Areas			
None in Study Area	-	-	Not applicable.
17. Schools			
Greenwood Middle School	0.52	2	Views of proposed PV facilities screened by buildings and vegetation.

Visually Sensitive Resource	Distance to Nearest Participating Parcel (Miles)[1]	Viewpoint Number[2]	Potential Visibility
Washington High School	0.56	8, 9, 10	Views of proposed PV facilities screened or partially screened by buildings and vegetation. Potential for open views of collection infrastructure.
18. Hospitals			
None in study area	-	-	Not applicable.
19. Libraries			
None in study area	-	-	Not applicable.
20. Airports			
Le Champ	0.72	32	Views of proposed PV facilities screened by buildings and vegetation.
22. Areas of Intensive Land Use (City, Town, Village, Hamlet)			
Princess Anne	0.00	3, 4	Views of proposed PV facilities screened by buildings and vegetation.

[1] For large areas and linear sites, approximate distance to the participating parcel was measured from the respective area's closest point. Note that some sites are located further than 0.5-mile from a participating parcel but are within the study area because they are within 0.5-mile of a proposed collection line.

[2] If no viewpoint (VP) number is indicated, no photo was obtained during fieldwork. Viewpoint locations are shown on Figure 6 and the corresponding photograph included in Exhibit C.

Field review confirmed that actual Project visibility is likely to be limited due to the low profile of the proposed Project components (the PV panels are anticipated to be up to approximately 10 feet high) as well as screening provided by buildings and trees within the study area. The greatest Project visibility will occur along roadsides and in open agricultural areas immediately adjacent to the Project site, including portions of US Route 13, which is designated as the Blue Crab Scenic Byway within the study area. However, field review indicated that agricultural buildings, residences, hedgerows and trees screen views toward the proposed Project from public vantage points and aesthetic resources in a significant portion of the study area.

Several existing PV solar projects are located in the vicinity of the Project. These projects provide a basis for illustrating the potential visibility and visual effect of the proposed Great Bay Solar Project. One of these projects is located in the vicinity of the intersection of Costen and Wallace Taylor Roads (see Figure 6 and Insets 1-4). The visibility and visual prominence of these existing PV panels are variable based on viewer proximity and the extent of existing screening in the view.

As shown in Inset 1, where open views of PV panels are available in the immediate foreground, the panels attract viewer attention and provide a focal point in the view. However, the regular rows of panels appear orderly and do not create a sense of clutter in the view. Due to their low profile, the PV panels do not interrupt the horizon and allow for views of more distant landscape features above and between the PV panel arrays.

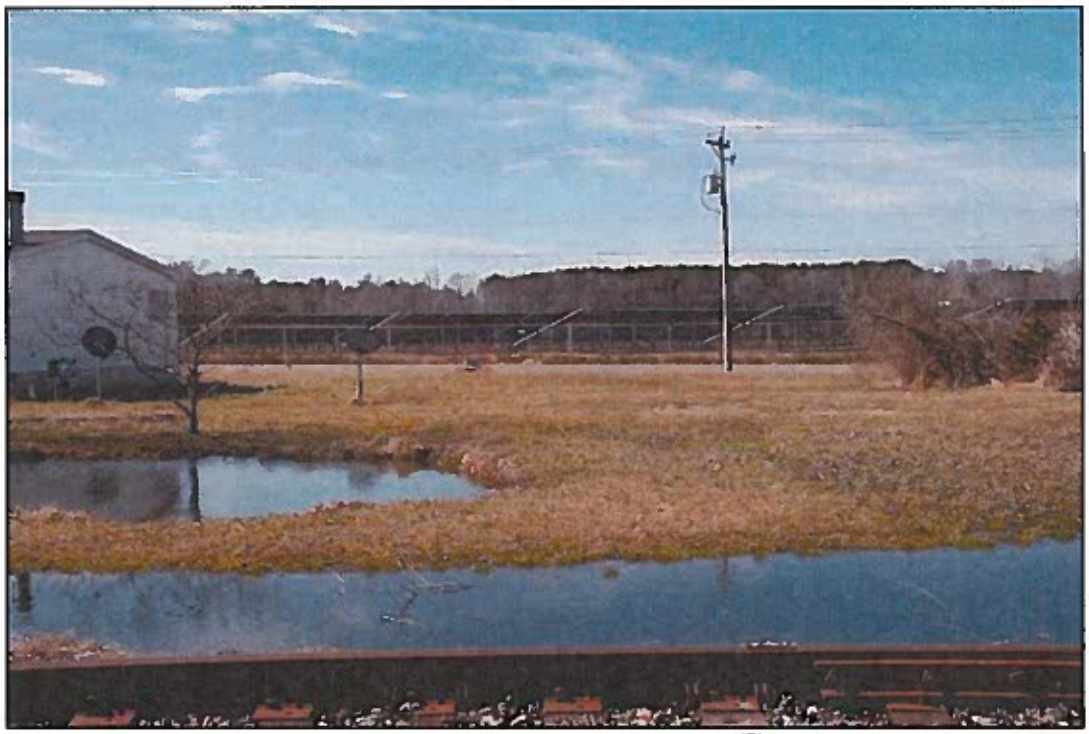
The visibility and visual effect of the PV panels are significantly reduced when viewed from greater distances, even where open views without intervening screening are available (see Inset 2). Due to their low profile, the panels do not obscure views of the forest vegetation that provide the backdrop for the view. (This is relatively typical for most agricultural fields within the study area). Insets 1 and 2 illustrate conditions during the dormant season when deciduous vegetation is in the "leaf-off" condition and crop fields have been harvested. During the growing season, the crops (corn), hedgerows, and other vegetation shown in this view would partially or completely screen views of the PV panels.

Inset 1. Foreground view of existing PV panels. *(Photograph by EDR, March 2015).*

Inset 2. Illustration of distant, open view of existing solar panels across agricultural fields. *(Photograph by EDR, March 2015).*

As shown in Insets 3-5, vegetation and buildings provide significant screening of the existing PV panels, even when located in close proximity to the viewer. Most of the open agricultural fields near the Project site are bordered on at least one side by loblolly pine (*Pinus taeda*) plantations (with an estimated typical height of 60 feet). These forested areas interrupt longer distance views within the study area. As shown in Inset 3, hedgerows with considerably shorter vegetation (estimated 12-15 feet) provide partial screening of the existing PV panels during the dormant season when deciduous vegetation is in the "leaf-off" condition. During the growing season, these hedgerows would significantly screen views of the existing PV panels. As shown in Insets 4 and 5, when buildings or other built features (such as a cemetery) are located in the immediate foreground of the view (i.e., between the viewer and the PV panels), these structures significantly screen views of the built PV panels.

Inset 3. Illustration of partial screening of existing PV panels provided by hedgerow vegetation. *(Photograph by EDR, March 2015).*



Inset 4. Illustration of partial screening of existing PV panels provided by built features. *(Photograph by EDR, March 2015).*

Inset 5. Illustration of screening of PV panels provided by built features. *(Photograph by EDR, March 2015).*

Visual Effect

The overall visual effect of the proposed Project is anticipated to be minimal. The PV panels will be very visible from public vantage points when viewed from roadside locations in agricultural areas with open views. However, Project visibility is expected to be limited throughout most portions of the study area due to the low profile of the proposed Project components (the PV panels are anticipated to be up to approximately 10 feet high) as well as screening provided by buildings and trees within the study area. In addition, the Project is dispersed over multiple dis-contiguous parcels. Therefore, all of the proposed PV facilities will not be visible at one time from any singular vantage point and the Project may be perceived as a series of smaller scale PV developments. The dispersal of the Project over multiple dis-contiguous parcels reduces the overall visual effect of the Project.

The panels may be perceived as a significant change in land use relative to the current agricultural character of the Project site. However, due to their orderly and clean appearance, the PV panels will not necessarily contribute to a sense of clutter. The collection lines and other electrical infrastructure that may be required for the Project will generally be consistent with existing transmission/distribution lines and substation features that are located within the study area (see Exhibit C: Viewpoints 17 and 19). In addition, due to associations with clean energy, the PV panels may be perceived as positive additions to the landscape by some viewers.

The potential for reflectivity or glare has been identified as a possible concern for solar PV installations. In order to maximize electricity production, fixed mount PV panels are generally oriented toward the south, and angled toward the sun, resulting in angles of reflection that are usually well above the height/gaze of viewers in the surrounding environment. The reflectivity of solar panels is generally highest during the early morning and the evening, when the sun is at its lowest angles. However, PV panels are designed to absorb as much of the solar spectrum as possible to maximize efficiency. There is an inverse correlation between light absorption and reflection. Consequently, virtually all PV panels installed in recent years have at least one anti-reflective coating to minimize reflection and maximize absorption. The reflectivity of a surface is often measured as albedo, which is the fraction of solar energy reflected by that surface. For comparison, the albedo of PV panels (0.1 -0.3) (Lasnier and Ang, 1990) is generally similar to, or lower than many natural surfaces such as coniferous forests (0.2), grasslands (0.25), dry sand (0.45), and snow cover (0.50) (Budikova, 2010). Furthermore, the glare and reflectivity of PV panels have been found to be decisively lower than the glare and reflectivity generated by standard glass (SunPower, 2009).

20.79.03.02.B(1)(b)(v) Land Use

As described above in 20.79.03.02.B(1)(a)(v), land use within a half-mile of the Project site is dominated by active agricultural fields and commercial loblolly pine plantations. Residential development within and around the Project site consists of single-family homesteads scattered along public roads. The proposed Project will involve the leasing of private land, collectively comprising approximately 1,000 acres. All of these parcels are classified as agricultural land use/land cover by the Maryland Department of Planning (MDP, 2010), and field review confirmed that all Project site parcels are currently active or recently fallowed agricultural fields. As such, direct impacts to land use are restricted to agricultural land. There will no impacts to forest, residential, commercial, or industrial land uses. The 1,000 acres can be considered a permanent land use impact, since the Project site parcels will be removed from agricultural production and converted to an electrical generation site for the life of the Project.

20.79.03.02.B(1)(b)(vi) Socioeconomics

The proposed Project represents a significant capital investment in the State and local economy. At the full 150 MW size, the Project could cost more than $225,000,000 to install, representing a significant increase in the Somerset County tax base, although the State of Maryland allows for a 50% tax abatement for electric generating assets. For example, applying the 2014-2015 business property tax rate of 2.2875% to a $225,000,000 solar project with a 50% abatement would produce over $2.5 million of property taxes in the first year alone, in a county that collected a total of $13.7 million in total property taxes in the 2014-2015 fiscal year. Construction of the Project will require hundreds of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel who will reside in the local community over a period of 6 to 9 months. The spending by this large workforce will result in a

significant positive economic impact on the region. In addition to the significant annual increase to the County's tax base, operation of the Project will also create dozens of permanent local jobs and positive economic impact.

The analysis of economic impacts incorporates the National Renewable Energy Laboratory's Job and Economic Development Impact (JEDI) model to calculate potential employment, earnings, and economic output that could be generated by the Project, assuming that the full 150 MW could be constructed during a 9-month period starting in 2016. The results of this analysis are based upon the maximum nameplate capacity (150 MW) of a fixed-tilt crystalline silicone PV generation facility. Alternative design considerations relative to axis type (e.g., single-axis tracking), materials (e.g., thin film), and capacity may alter the potential economic impacts of the Project.

Construction

Construction of the proposed facility would likely increase local employment demand. Based on the JEDI model outputs, during construction, the full 150 MW Project could employ an estimated 2,036 workers on-site. At this stage, it is unknown what portion of these workers will come from the existing labor force within the State. Those that come from outside of the State labor force may precipitate a marginal, short-term increase in housing demand. It is anticipated that the local housing market can accommodate this increased demand.

The JEDI model also measures potential increased employment demand that could occur throughout the industrial supply chain. In addition to the 2,036 on-site construction jobs, the off-site industries within Maryland that supply goods and services for the construction of the Project could experience increased employment demand of a projected 1,362 workers. Furthermore, the increased household income associated with both on- and off-site employment could induce demand for more than 926 jobs, as construction and supply chain workers spend their earnings on everyday household goods and services. In sum, it is estimated that the on-site, supply chain and induced jobs could generate $282.5 million in earnings over the course of facility construction.

In addition to jobs and earnings, the construction of the proposed Project could result in an increase in economic output for the businesses employing these workers. For the purposes of this analysis, output is measured by the value of industry production in the State economy. For the manufacturing sector, output is calculated by total sales plus or minus changes in inventory. For the retail sector, output is equal to gross profit margin. For the service sector, it is equal to sales volume. It is estimated that Project construction could result in an economic output of approximately $545.7 million, between on-site construction, supply chain impacts, and increased household spending. Table 11 outlines the labor and economic impacts of the Project construction, as calculated by the JEDI model.

Table 11. Predicted Economic Impacts during Project Construction

Construction Impacts	Jobs	Earnings (1,000)	Output (1,000)
Project Development and Onsite Labor Impacts			
Construction and Installation Labor	1,027.5	$66,546.0	
Construction and Installation Related Services	1,008.5	$75,966.2	
Subtotal	2,036.0	$142,512.2	$202,858.9
Module and Supply Chain Impacts			
Trade (Wholesale and Retail)	193.5	$15,137.8	$37,653.5
Professional Services	126.2	$8,271.8	$20,338.1
Other Services	403.5	$53,893.9	$128,469.3
Other Sectors	638.7	$10,028.6	$24,306.1
Subtotal	1,361.8	$87,332.2	$210,767.0
Induced Impacts	926.4	$52,705.2	$132,066.3
Total Construction Impacts	***4,324.2***	***$282,549.6***	***$545,692.2***

Source: USDOE, 2014
Notes: Earnings and output values are in thousands of dollars in year 2015 dollars. Construction jobs are full-time equivalent for one year (1 FTE = 2,080 hours). Figures may not add up due to independent rounding. Results are based on model default parameters.

Operation

The operation and maintenance of the proposed facility could increase local employment demand by an estimated 27-28 workers on-site, as calculated using the JEDI model. It is anticipated that these workers will either come from within the local labor force or move into the local labor force on a permanent (or semi-permanent) basis. The annual earnings of operations and maintenance personnel are estimated at approximately $1.7 million. These jobs will most likely be comprised of a Project Manager, technicians, and administrative personnel. The full-time local jobs generated by the facility comprise the Project's direct long-term employment impact.

In addition to the on-site workforce described above, the operation and maintenance of the proposed facility will also generate employment through the industrial supply chain and the spending of workers' earnings. It is estimated that Project operations and maintenance could support 6-7 jobs throughout the facility supply chain. The combined household spending of those employees, along with that of the on-site operations and maintenance workforce, could support approximately 5 additional (induced) jobs. In sum, it is estimated that the direct, indirect, and induced employment generated by facility operation and maintenance could result in $2.5 million in total annual earnings. In addition, Project operation and maintenance could result in an economic output of approximately $3.8 million, between on-site labor, supply chain impacts, and increased household spending. Table 12 outlines the labor and economic impacts of the Project operation, as calculated by the JEDI model.

Table 12. Predicted Annual Economic Impacts during Project Operation

Annual Operational Impacts	Jobs	Earnings (1,000)	Output (1,000)
PV Project Labor	27.7	$1,666.0	$1,666.0
Local Revenue and Supply Chain Impacts	6.7	$520.7	$1,355.3
Induced Impacts	5.1	$292.8	$733.8
Total Annual Operational Impacts	***39.5***	***$2,479.5***	***$3,755.0***

Source: USDOE, 2014
Notes: Earnings and Output values are in thousands of dollars in year 2015 dollars. Economic impacts during operating years represent impacts that occur from system/plant operations/expenditures. Figures may not add up due to independent rounding. Results are based on model default parameters.

20.79.03.02.B(1)(b)(vii) Noise

This section addresses both construction and operational noise impacts of the proposed Project. The Code of Maryland Regulations (COMAR) §26.02.03.02 establishes environmental noise standards for residential receptors. Except for certain specific exemptions (e.g., construction activities), maximum sound levels cannot exceed 65 dBA during daytime hours and 55 dBA during nighttime hours. These standards will apply during Project operation. The construction exemption only applies during the daytime, when noise levels of up to 90 dBA are permitted from construction activities.

Construction Noise

Noise will be generated during Project construction, primarily from vehicles and equipment operating along access routes and at work areas. The construction equipment to be used is similar to that used during typical public works projects and tree service operations. Typical sound levels for equipment used during construction are shown below in Table 13. Various construction activities may occur simultaneously with multiple construction crews potentially operating within the Project site. Thus, multiple sources of noise may be present any one time.

Table 13. Typical Sound Levels for Various Construction Equipment

Construction Equipment	Noise Level at 50 feet
Bulldozer	86 dBA
Chain Saw	84 dBA
Grader	82 dBA
Roller-Compactor	83 dBA
Loader	78 dBA
Water Truck	80 dBA
Dump Truck	76 dBA
Backhoe-Loader	78 dBA

Construction Equipment	Noise Level at 50 feet
Fork Lift	80 dBA
Mobile Crane	81 dBA
Auger Rig	84 dBA
Drill Rig	79 dBA
Compressor	78 dBA
Pump	81 dBA
Jackhammer	89 dBA
Specialty Truck	80 dBA
Flatbed Truck	74 dBA
Tracked Dozer	86 dBA
Mixed Trucks	80 dBA
Specialty Truck	75 dBA

Source: Federal Highway Administration, 2006.

Noise from construction-related activities may cause some temporary annoyance at residences within and adjacent to the Project site. Construction sound will be attenuated with increased distance from the source. However, in some places construction activities will occur relatively close to existing residences. Such levels would generally be unacceptable if they were occurring on a permanent basis or outside of normal daytime working hours. However, as a temporary, daytime occurrence, construction sound of this magnitude is not anticipated to be a significant adverse impact and may not be perceived as louder than routine noise sources such as farm equipment and vehicles passing on the road.

Construction noise impacts will be minimized and mitigated by requiring that all equipment be maintained in good operating condition and that all motors and engines be muffled in compliance with the Annotated Code of Maryland Transportation Article, § 22-402 and according to manufacturer's specifications. Any faulty noise suppressor will be repaired or replaced, equipment will not be left running unnecessarily, and existing tall growing vegetation that serves as a noise barrier will be maintained to the maximum extent practical. Noise impacts will also be mitigated by limiting construction activities to the hours between 7:00 a.m. and 10:00 p.m. As such, it is not anticipated that construction noise levels will exceed the 90 dBA noise limit for construction activities.

Operation Noise

The primary source of noise during Project operation will be inverter hum during the day when the solar arrays are generating electricity. A recent study of three utility-scale solar projects with capacities ranging from 1,000 to 3,500 kilowatts (kW) operating under full load conditions found that average Leq sound levels at a distance of 10 feet from the inverter face varied from 48 dBA to 72 dBA. As indicated above, sound attenuates with increased distance from

the source, consistent with the hemispherical wave spreading law (i.e., sound levels are reduced by 6 dB for each doubling of distance). As a result, sound levels approached background levels at a distance of 150 feet from the inverter pad, and any sound from the photovoltaic array and associated equipment was inaudible at distances of 50 to 150 feet from the fenced boundary of the arrays (Tech Environmental, 2012).

The nearest non-participating residential receptors are generally more than 50 feet away from the boundaries of the parcels proposed to host PV arrays. Furthermore, although the specific locations of the inverters have not yet been determined, it is anticipated that the power conversion stations would be centrally located within each block of PV panels rather than at the parcel edges (i.e., further away from nearby residences). As such, noise levels will not exceed the regulatory limits. In fact, based on the Tech Environmental study described above, it is unlikely that operational nose from the proposed Project would be audible at many nearby residences.

The Project substation will also represent a new sound source in the study area. The step-up transformer will be the primary source of sound within the substation. In contrast to the solar arrays, which will occupy multiple private parcels totaling approximately 1,000 acres, the substation will be located on one small parcel. As a result, there are fewer adjacent landowners who could potentially hear the humming sounds. Furthermore, each of the closest residences is approximately 1,000 feet or more from the nearest boundary of the proposed substation site. Consequently, no significant noise impacts are anticipated from the Project substation.

The only other operational activity that could generate noise is maintenance. Routine Project inspections and maintenance will occur after Project construction but will generally be of short duration, are not expected to result in adverse noise impacts, and will not require specific mitigation measures. Vegetation maintenance may require the use of chain saws. However, any Project-related chainsaw use would be a short term event limited to daytime periods only. Therefore, no mitigation for operational noise is proposed.

20.79.03.02.B(1)(c) Support Studies

The following studies of the environmental impact of the proposed Project are attached as Exhibits to this Environmental Review Document:

- Correspondence with WHS and USFWS – Exhibit A
- MHT Consultation – Exhibit B
- Visual Assessment Photographs – Exhibit C
- Wetland Delineation Report – Exhibit D
- Conceptual Site Plan – Exhibit E

20.79.03.02.B(1)(d) Ability to Conform with Applicable Environmental Standards

As summarized in Table 14, the Project's design and construction will require review by State and local authorities. Through these processes, including the Certificate of Public Convenience and Necessity (CPCN) application, the Project will comply with all applicable federal, State, and local environmental standards.

The submission of this report constitutes the application for a CPCN.

A National Pollutant Discharge Elimination System (NPDES) General Permit is required for planned construction activities with a planned total disturbance of one (1) acre or greater. Coverage under the General Permit is obtained by filing a completed NOI form with the Maryland Department of the Environment, Water Management Administration. The completed NOI form is considered a formal application for coverage and intent to comply with the terms of the General Permit. An NOI will be submitted to MDE concurrently with a submittal of the sediment and erosion control plans to the Somerset County Soil Conservation District.

In accordance with Natural Resources Article § 5-1602(b)(5), the provisions of the Maryland Forest Conservation Act (FCA) do not apply to the cutting or clearing of public utility rights-of-way or land for electric generating stations licensed pursuant to § 7-204, § 7-205, § 7-207 or § 7-208 of the Public Utilities Article, provided that any required CPCNs have been issued in accordance with § 5-1603(f) of this subtitle and the cutting or clearing of the forest is conducted so as to minimize the loss of forest. Notwithstanding the above, there will be no forest removal for this Project.

Table 14. Summary of Permits and Approvals

Agency	Permit/Approval	Regulatory Citation	Required For		Status			Waiver, Variance, or Exemption		Comments
			Construction	Operation	Application Contained Herein	Application to be Filed	Permit/Approval Obtained	Yes	No	
State of Maryland Public Service Commission (PSC)	Certificate of Public Convenience and Necessity (CPCN)	COMAR 20.79	✓		✓				✓	Currently being applied for applied for with this report. Estimated completion date October 2015.
PJM Interconnection, LLC	Interconnection	Condition for Issuance of CPCN	✓	✓			✓		✓	Facilities Study completed February 2015. Interconnection Service Agreement and Construction Service Agreement are expected to be executed in May 2015.
Maryland Department of the Environment (MDE)	National Pollution Discharge Elimination System (NPDES)	COMAR 26.08, Clean Water Act (CWA), Section 401, 40 CFR 122	✓			✓			✓	Application currently in progress.
Maryland Department of Natural Resources	Forest Conservation Act	Natural Resources Article 5-1602(b)(5)						✓		According to NR Article 5-1602(b)(5), FCA is not applicable to the Project. There will be no clearing of forest cover on this Project.
Critical Areas Commission	Critical Area Act	COMAR 27				✓			✓	Application currently in progress.
Somerset County Planning & Zoning	- Site Plan - Building Permit	Applicability varies according to Local and State Requirements				✓			✓	Application currently in progress.
Somerset County Soil Conservation District	- Environmental Site Design - Erosion Sediment Control - Construction Drawing Plan	Applicability varies according to Local and State Requirements	✓			✓			✓	Application currently in progress.

20.79.03.02.B(2) AIR QUALITY

During the site preparation and construction phases of the Project, minor, temporary adverse impacts to air quality could result from the operation of construction equipment and vehicles. Such impacts could occur as a result of emissions from engine exhaust and from the generation of fugitive dust during earth moving activities and travel on unpaved roads. To minimize the amount of dust generated by construction activities, the extent of exposed/disturbed areas on the site at any one time will be minimized and restored/stabilized as soon as possible. In addition, water will be used to wet down dusty roads (public roads as well as Project access roads) as needed throughout the duration of construction activities. The increased dust and emissions will not be of a magnitude or duration that would significantly impact local air quality. Any impacts from fugitive dust emissions from travel on unpaved roads are anticipated to be short-term and localized and will be avoided or quickly corrected using appropriate dust control procedures, as needed.

Operation of the proposed Project will have a beneficial impact on air quality in the region, because solar PV panels generate electricity without releasing pollutants into the atmosphere. Power delivered to the grid from this Project will directly offset the generation of energy at existing conventional power plants. Switching from fossil fuel energy generation to solar energy generation contributes to cleaner and healthier air, since solar power generation has zero emissions and is not a source of pollutants such as nitrogen oxides, sulfur dioxide, and mercury. Specifically, the proposed Project will produce approximately 295,692 to 322,312 MWh of emission-free electricity annually (assuming a nameplate capacity of the full 150 MW, operating at 22.50% to 24.53% capacity). Table 15 summarizes anticipated emission displacements for the Project, based on emissions rates for electricity used in Maryland.

Table 15. Estimated Annual Emission Displacements from the Project

Pollutant	Estimated Annual Displacement in Tons (295,692 MWh)	Estimated Annual Displacement in Tons (322,312 MWh)
CO_2 (carbon dioxide)	200,479	218,527
NO_x (nitrogen oxides)	532	580
SO_2 (sulfur dioxide)	1,242	1,354
Mercury Compounds	2,341	2,552
Lead Compounds	4,943	5,388

Source: Abraxas Energy, 2015.

20.79.03.02.B(2)(a) Ability to Comply with Air Quality Standards

This section evaluates the Project's ability to comply with various air quality standards.

20.79.03.02.B(2)(a)(i) Federal or State Ambient Air Quality Standards

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) in order to protect public health and welfare. These health-based standards were established for six pollutants of concern: nitrogen oxides; carbon monoxide; ozone; sulfur dioxide; lead; and inhalable particulate matter. The Maryland Department of the Environment (MDE) Ambient Air Monitoring Program measures and analyzes ground-level concentrations of criteria pollutants and air toxics at air monitoring stations located throughout Maryland. Areas that meet the NAAQS are classified as attainment areas, while areas that exceed the NAAQS are classified as non-attainment areas. There are no air monitoring stations in Somerset County. The closest active monitoring site to the proposed Project is located in Cambridge, which is classified as an attainment area for all monitored pollutants (EPA, 2014). Because solar PV facilities generate electricity without releasing pollutants into the atmosphere, the proposed Project will not affect NAAQS compliance.

20.79.03.02.B(2)(a)(ii) Federal or State Emission Standards

The vehicles to be used during Project construction and operation will comply with any applicable federal and State emission standards.

20.79.03.02.B(2)(a)(iii) Federal New Source Performance Standards

In accordance with Section 111 of the Clean Air Act of 1970, the EPA established New Source Performance Standards (NSPS) to regulate emissions of air pollutants from new stationary sources. These standards apply to a variety of facilities including landfills, boilers, cement plants, and electric generating units fired by fossil fuels. Because solar PV facilities generate electricity without releasing pollutants into the atmosphere, NSPS do not apply to the proposed Project.

20.79.03.02.B(2)(a)(iv) Federal Emission Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants (NESHAP) are authorized by Section 112 of the 1970 Clean Air Act, as amended in 1990. The 187 chemicals regulated by the EPA include volatile organic chemicals, chemicals used as pesticides and herbicides, inorganic chemicals, and radionuclides. Many of these chemicals are used for a variety of purposes in the United States today. Other chemicals, although not in use today, were used extensively in the past and may still be found in the environment. These hazardous air pollutants are known or suspected to cause an increase in fatalities or in serious, irreversible, or incapacitating health effects such as cancer, birth defects, and reproductive effects (EPA, 2013). Because solar PV facilities generate electricity without releasing pollutants into the atmosphere, NESHAP do not apply to the proposed Project.

20.79.03.02.B(2)(a)(v) Prevention of Significant Deterioration and New Source Review Provisions

Major new or modified sources of air pollutants are subject to Prevention of Significant Deterioration (PSD) if the source is to be located in an area that is in attainment or unclassifiable with the NAAQS. PSD is designed to protect public health and welfare; preserve, protect, and enhance the air quality in areas of special national or regional natural, recreational, scenic, or historic value; insure that economic growth will occur in a manner consistent with the preservation of existing clean air resources; and assure that any decision to permit increased air pollution in any area to which PSD applies is made only after careful evaluation of all the consequences of such a decision and after adequate procedural opportunities for informed public participation in the decision making process.

The New Source Review (NSR) is a permitting process created by the U.S. Congress as part of the 1977 amendment to the Clean Air Act. The NSR process requires industry to undergo an EPA pre-construction review for environmental controls if they propose either building new facilities or any modifications to existing facilities that would create a significant increase of a regulated pollutant.

Because solar PV facilities generate electricity without releasing pollutants into the atmosphere, PSD and NSR do not apply to the proposed Project.

20.79.03.02.B(2)(a)(vi) Requirement to Obtain Emission Offsets, Allowances, or Reduction Credits

Solar PV facilities like the proposed Great Bay Solar Project generate electricity without releasing pollutants into the atmosphere. Therefore, requirements to obtain emission offsets, allowances, or reduction credits do not apply to the proposed Project.

20.79.03.02.B(2)(b) Impact on Prevention of Significant Deterioration Areas and Existing Nonattainment Areas

As indicated above in Section 20.79.03.02.B(2)(a)(i),there are no existing non-attainment areas in the vicinity of the Project site. Furthermore, solar PV facilities generate electricity without releasing pollutants into the atmosphere. Therefore, the proposed Project will have no impact on PSD areas or existing non-attainment areas.

20.79.03.02.B(2)(c) Information and Forms

Under COMAR 26.11, MDE may include a condition in a permit to construct or operate that limits emissions from a source and is federally enforceable so that the source is not subject to a Part 70 permit or an applicable requirement of the Clean Air Act. Solar PV facilities generate electricity without releasing pollutants into the atmosphere. Therefore,

the proposed Project will not require MDE permits to construct or operate, and the associated information and forms are not applicable.

20.79.03.02.B(3) WATER QUALITY AND APPROPRIATION

This section addresses streams and groundwater resources within a half-mile study area, and potential appropriation of such waters. Wetlands are discussed below in Section 20.79.03.02.B(4).

20.79.03.02.B(3)(a) Availability of Surface Water and Groundwater

There are no onsite operations and/or maintenance facilities planned as part of this Project and no water and/or sewer requirements. The Project will not require surface or groundwater for construction or operation. The only Project-related water consumption will be for the cleaning of the panels on an as needed basis. The frequency of required cleanings depends on the climate that the panels are subjected to. Normal rain events will serve as a natural cleaning system, and manual cleanings are anticipated on an infrequent basis. It is anticipated that any water required for these cleanings will be purchased from the Princess Anne municipal water supply. Certified water service vehicles could also be utilized to supply water, as needed (e.g., to wet down dusty roads during Project construction).

20.79.03.02.B(3)(b) Affected Streams and Aquifers

This section identifies streams and aquifers within a half-mile study area.

Streams

The Project site is located approximately 5 miles east of the Chesapeake Bay and is roughly bounded by the Manokin River to the north, Dividing Creek to the east, and Annemessex Creek to the south. According to the USGS hydrologic mapping system, the entire study area lies within the Pocomoke Watershed (USGS Hydrologic Unit 02060009), which is part of the larger Chesapeake Bay Watershed (USGS, 2015). The DNR and MDE utilize a statewide watershed mapping system that is similar to the USGS method but that splits the drainages into smaller areas. According to the State classification system (MDE, 2014), the study area contains portions of five watersheds: Manokin River (MDE code 02130208); Big Annemessex River (MDE code 02130207); Pocomoke Sound (MDE code 02130201); Dividing Creek (MDE code 02130204); and Lower Pocomoke River (MDE code 02130202).

Kings Creek, Taylor Branch, Jones Creek, and Back Creek are the dominant hydrologic features within the study area (Figure 8). Various smaller tributaries pass through the study area and drain to these streams. Kings Creek flows west through the Project site, draining into the Manokin River approximately 1.2 miles west of the study area. Jones Creek drains into Taylor Branch near the northwestern edge of the study area; Taylor Branch subsequently drains into

Kings Creek shortly before it merges with Manokin River. Back Creek flows west, draining into the Manokin River approximately 3.5 miles west of the study area. The Manokin River flows southwest, draining into Tangier Sound, and, ultimately, the Chesapeake Bay.

The majority of surface hydrology in the Project site is generated by precipitation and surface water run-off from adjacent land. In Princess Anne, at the northern edge of the study area, total annual precipitation averaged 43.52 inches between 1961 and 2000 (USDA NRCS, 2015). Streams in the study area, both named and unnamed, are primarily low-gradient drainage features that meander through wetlands, forestland, and agricultural fields. Most of these streams are less than 10 feet wide with variable substrates and vegetative cover characteristics. Some have well-defined and abrupt banks, while the banks of others transition into adjacent wetland vegetation.

Due to the relatively flat, low topography of the Delmarva Peninsula, effective drainage of the land is vital to the economic well-being of the region. There are approximately 821 miles of drainage ditches maintained by 101 public drainage associations (PDAs) and four public watershed associations (PWAs) in Caroline, Queen Anne's, Somerset, Wicomico, and Worcester Counties. PDAs are regulated under Article 25 (County Commissioners) sections 52-95 of the Annotated Code of Maryland. PDAs and PWAs are independent entities of government and possess rights-of-way and easements for construction and maintenance purposes. The current role of PDAs and PWAs has expanded to provide support for storm drainage from urban town centers, state highways and county roads, and new commercial and residential development. PDA/PWAs administer drainage ditches on lands acquired by easement from the original landowners. These ditches function as water conveyance outlets for the farm ditches constructed by landowners on their private holdings. Multiple PDAs occur in the vicinity of the Project site.

Aquifers

The study area is located within the national Northern Atlantic Coastal Plain Aquifer that underlies the Delmarva Peninsula. The aquifer consists of multiple regional aquifers in sedimentary deposits that range in age from Early Cretaceous to Holocene permeable sand beds of Late Cretaceous age. The northern part of the Atlantic Coastal Plain is underlain by a wedge-shaped mass of semi-consolidated to unconsolidated sediments that thickens toward the ocean and rests on a surface of crystalline rock. These sediments attain thicknesses of as much as 8,000 feet along the coast of Maryland. The sediments consist of lenses and layers of clay, silt, and sand, with minor amounts of lignite, gravel, and limestone. The sand, gravel, and limestone compose aquifers of varying extent, which are separated by confining units of clay, silt, and silty or clayey sand. Although water moves more readily through the aquifers than through the confining units, water can leak through the confining units, especially where they are thin or where they contain sand. Therefore, the aquifers are hydraulically interconnected to some degree (Trapp & Horn, 1997).

On the Delmarva Peninsula, the Coastal Plain aquifers include the surficial aquifer, the Chesapeake aquifer, the Severn-Magothy aquifer, and the Potomac aquifer. The surficial aquifer consists of sand of Pleistocene age. Most of the flow is local, with water moving from recharge areas along short flow paths to discharge to the nearest stream or other surface-water body. However, some water percolates downward to recharge the underlying aquifers. The Chesapeake aquifer consists of permeable beds of Oligocene to Pliocene age, comprised of layers of medium to coarse, silty sand, with local deposits of gravel or shell fragments. The sands are separated by confining units of silty sand and clay. Where the surficial and Chesapeake aquifers are in direct contact, they form a composite aquifer that contains water under unconfined conditions. The Pocomoke and Manokin aquifers, both part of the Chesapeake Group, are important water sources in Somerset County (Andreasen et al., 2013). The Severn-Magothy aquifer consists of permeable sand beds of Late Cretaceous age. The regional Potomac aquifer is the lowermost and most widespread aquifer of the Northern Atlantic Coastal Plain aquifer system. It consists mostly of permeable sands in the Potomac Formation and their stratigraphic equivalents but also includes younger, hydraulically connected, permeable sediments (Trapp & Horn, 1997).

There will be no impacts to the local aquifers as the proposed Project will not require a well nor will it discharge any pollutants into the aquifer.

20.79.03.02.B(3)(c) Impact on Other Water Users

There are no impacts to other water users anticipated as a result of Project construction or operation.

Construction

Minimal water will be required during Project construction (e.g., for the concrete to be used at the substation and power conversion stations). In addition, if dry conditions during earth moving activities and travel on unpaved roads result in the generation of excessive fugitive dust, water could be used to wet down dusty roads. Should this occur, water would be trucked to the Project site by an off-site certified water service provider. To prevent adverse effects from construction-related stormwater runoff, the Applicant will obtain an NPDES general permit for construction activities over one acre and implement an Erosion and Sediment Control Plan that contains appropriate stormwater quality and quantity control measures.

Operation

There are no planned operations and/or maintenance facilities as part of this Project and no water and/or sewer requirements. As a result, the Project will not necessitate any water withdrawals or waste water discharges. The only Project-related water consumption will be for the cleaning of the PV panels. Cleanings will be conducted on an as needed basis, with a variable frequency depending on the amount of rainfall received. Because normal rain events

serve as a natural cleaning system, manual cleanings are typically needed infrequently. It is anticipated that water required for these cleanings will be purchased from the Princess Anne municipal water supply or from an off-site certified water service provider. No use of cleaning solutions is proposed. If a cleaning solution is necessary in the future, a certified bio-degradable product meeting local, State, and federal requirements will be used. Storm water quality and quantity controls will be implemented to ensure prevention of water quality impacts.

20.79.03.02.B(3)(d) Mitigation and Minimization Techniques Evaluated

No impacts to water quality or appropriation are anticipated. As a result, mitigation and minimization techniques are not warranted or proposed.

20.79.03.02.B(3)(e) Information and Forms

COMAR 26.17.06.07 describes the regulations pertaining to water appropriation or use permits and the conditions that may be imposed on such permits. Because the Project will not require surface or groundwater for construction or operation, it is not anticipated that a water use permit will be required for the Great Bay Solar project. Therefore, the information and forms associated with water use permits are not applicable.

COMAR 26.17.07 regulates water appropriation in the Potomac River Basin, no part of which is located in Somerset County. Consequently, this requirement is not applicable to the Great Bay Solar project.

20.79.03.02.B(4) WETLANDS

This section describes wetlands resources within the Project site, based on review of publicly available data (e.g., aerial photography, State and federal wetland mapping, mapped hydric soils, etc.) and on-site field evaluations.

Review of National Wetlands Inventory (NWI) mapping indicates that there are numerous federally-mapped wetlands located in the vicinity of the Project site (Figure 9). The NWI maps indicate that palustrine forested wetlands are the most prevalent, followed by palustrine open water, palustrine emergent wetlands, and intertidal estuarine wetlands. All cropland within the Project site has been reviewed by the NRCS and has been designated Prior Converted Cropland, upland, or is currently in the process of receiving a determination.

State-mapped wetlands are also shown in Figure 9. These wetlands were mapped by the DNR using Maryland's Digital Orthophoto Quarter Quads, which were obtained over a period from 1988 to 1995. The State also maintains maps of Wetlands of Special State Concern. These wetlands are the best examples of Maryland's nontidal wetland habitats and are afforded special protection under the State's nontidal wetlands regulations. These areas provide

exceptional ecological and educational value and often provide habitat for rare and threatened plants and animals. Several Wetlands of Special State Concern are located in the immediate vicinity of the Project site.

EDR conducted field surveys in March 2015 to identify all wetlands and streams within or adjacent to the proposed footprint of Project components. Within Project parcels, specific tasks performed include a field delineation of all potential State and federal jurisdictional areas, a survey of jurisdictional area boundaries utilizing a Global Positioning System (GPS) with sub-meter accuracy, and a description of jurisdictional areas based on hydrology, vegetation, and soils data collected in the field. Additionally, a conference call with Steve Dawson of the MDE was held on April 7, 2015 to discuss the jurisdictional status of areas within the Project site. A follow-up site visit with Steve Dawson and Gene Morgenthaler of the U.S. Army Corps of Engineers (the Corps) was held on April 15, 2015 to further clarify the jurisdictional status of these areas. Along potential ROWs, approximate wetland boundaries were identified based on aerial photo interpretation, LIDAR elevation data, and limited reconnaissance-level field review. The wetland report is summarized below and attached in full as Exhibit D.

EDR ecologists identified a total of four (4) wetlands and twenty-four (24) streams/ditches within the generating parcels. These areas included emergent wetlands, scrub-shrub wetlands, and streams (intermittent ditches). The primary functions provided by these wetlands appear to include maintaining surface water flows (including drainage of agricultural fields), recharging groundwater supplies, water quality improvement, and nutrient production and cycling. Many of the delineated wetlands are portions of much larger systems that may provide significant functions and values. Wetland features along the potential electrical collection line route typically consist of scattered forested wetlands and stream crossings. Forested areas were generally mixed pine-hardwood forests dominated by loblolly pine (wetland indicator status FAC[3]), red maple (FAC), sweetgum (FAC), and black gum (FAC). Standing water was visible in many of these areas, either from public roadways or on aerial imagery, indicating the presence of wetland hydrology. Delineated and approximated streams and wetlands are mapped in Figure 10. Additional, more-detailed mapping is included in Exhibit D.

The four (4) wetlands and twenty-four (24) streams delineated by EDR are assumed to be under federal and/or State jurisdiction. All three wetland criteria (hydrophytic vegetation, hydric soils, and evidence of wetland hydrology) and/or a significant nexus with traditional navigable waters were observed at each of these locations. However, the Corps and/or the MDE must make final determination of jurisdictional status for all areas.

[3] Wetland indicator status is used to represent the likelihood that a particular plant occurs in a wetland or upland. The five indicator statuses are: Obligate (OBL) plants that always occur in standing water or in saturated soils; Facultative Wet (FACW) plants that nearly always occur in areas of prolonged flooding or require standing water or saturated soils but may, on rare occasions, occur in non-wetlands; Facultative (FAC) plants that occur in a variety of habitats, including wetland and mesic to xeric non-wetland habitats but commonly occur in standing water or saturated soils; Facultative Upland (FACU) plants that typically occur in xeric or mesic non-wetland habitats but may infrequently occur in standing water or saturated soils; and Upland (UPL) plants that almost never occur in water or saturated soils.

20.79.03.02.B(4)(a) Effect on Public Health and Welfare

The operation of the Project will not produce, emit, or discharge any significant noise, air pollutants, or water pollutants that would have an effect on public health or welfare. The Project will also not generate, transport, store, treat, and/or dispose of hazardous waste. As described in Section 20.79.03.01.B, each 1 to 2 MW block of panels will have a power conversion station that will contain DC to AC power inverters, MVTs, and control and distribution cabinets. The liquid used to cool and insulate the transformers will either be typical mineral oil or a low flammability alternative such as a biodegradable ester. These transformers will be positioned on concrete slabs that meet the requirements of the National Electric Code and will be inspected and monitored per the EPA's SPCC requirements.

20.79.03.02.B(4)(b) Effect on Marine Fisheries

The Project will not impact marine fisheries.

20.79.03.02.B(4)(c) Effect on Shell Fisheries

The Project will not impact shell fisheries.

20.79.03.02.B(4)(d) Effect on Wildlife

The Project would not significantly impact wildlife or wildlife habitat. All of the generating sites are located within active or recently fallowed agricultural fields, which provide limited value to wildlife. No critical habitat for any federally or State-listed species occurs within the study area. For additional information on potential impacts to wildlife, please see Section 20.79.03.02.B(1)(b)(ii).

20.79.03.02.B(4)(e) Protection of Life and Property

This section addresses the protection of life and property from flood, hurricane, or other natural disaster. According to Maryland's Digital Flood Insurance Rate Maps (DFIRM) Outreach Program (2015), there are 100-year floodplains associated with the major watercourses in the study area: Taylor Branch, Jones Creek, King's Creek, and Back Creek. In addition, there are small fringes of 500-year floodplain located along the margins of some of the 100-year floodplains. Several of the potential ROW easements for electrical collection lines cross these floodplains. However, the majority of generating sites are located outside the mapped floodplains. Consequently, there is minimal risk of flood damage.

All components of the Project will be designed per the local and State building codes. In the event of a flood, hurricane, tornado, earthquake, or other natural disaster, only the solar panels would be subject to damage. Even total destruction

of the PV panels would have no adverse effects on surrounding life or property as the panels would not release harmful liquids or gases.

20.79.03.02.B(4)(f) Mitigation and Minimization Techniques Evaluated

The Applicant will mitigate any potential for impact to surface waters (streams) and wetlands by siting Project components to avoid these resources to the greatest extent practicable. The Applicant intends to keep permanent wetland and stream impacts below the 5,000 square foot limit for minor projects. As such, the Project will be exempt from compensatory mitigation requirements. In development of the Project, a number of steps have been taken to reduce permanent impacts below 5,000 square feet and to minimize potential impacts including avoidance of forested areas (a high proportion of which are wetlands in the Project area), alterations of the Project layout to avoid wetlands and minimize fill to the maximum extent possible, the use of directional boring for interconnection lines where wetlands cannot be avoided, the use of culverts to maintain natural flows, and the elimination of Project parcels that would require significant wetland and/or stream impacts.

No compensatory mitigation for indirect or temporary impacts to wetlands or streams is proposed because these impacts will not result in any loss of wetland acreage. However, to the extent that Project activities may result in other temporary direct and indirect impacts to wetlands/streams (other than loss of wetland acreage which will not occur as a result of temporary impacts), such impacts will be minimized during construction as discussed below.

The direct impacts to wetlands/streams will be minimized by utilizing existing or narrow crossing locations whenever possible. Upgrading existing crossings that are under-maintained/undersized will have a long-term beneficial effect on water quality, as it will help to keep not only Project-related components from disturbing surface waters, but also farm equipment and other vehicles that are unrelated to the Project and currently operate in the Project site. Special crossing techniques, equipment restrictions, herbicide use restrictions, and erosion and sedimentation control measures will be utilized to reduce adverse impacts to water quality, surface water hydrology, and aquatic organisms. In addition, clearing of vegetation along stream banks and in wetland areas will be avoided or minimized to the greatest extent practicable.

Where crossings of surface waters and wetlands are required, the Applicant will employ the Best Management Practices associated with particular, applicable streamside and wetland activities, as recommended by the MDE and the Corps, and required by the issued wetland/waters permits. Specific mitigation measures for protecting wetlands and surface water resources will include the following:

- No Equipment Access Areas. Wetlands, streams, and waterbodies will be designated "No Equipment Access," thus prohibiting the use of motorized equipment in these areas except where crossed by permitted Project activities.
- Restricted Activities Area. A buffer zone of 100 feet, referred to as "Restricted Activities Area," will be established where Project construction traverses streams, wetlands and other bodies of water. Restrictions will include:
    - No deposition of slash within or adjacent to a waterbody;
    - No accumulation of construction debris within the area;
    - Herbicide restrictions within 100 feet of a stream or wetland (or as required per manufacturer's instructions);
    - No degradation of stream banks;
    - No equipment washing or refueling within the area; and
    - No storage of any petroleum or chemical material.
- Access Through Wetlands - When crossing wetlands, routing around edges, utilizing higher ground, and crossing the narrowest portion of the wetland will be the preferred crossing options. Wherever feasible, low impact crossing methods will be used, such as timber mats or similar materials. Geotextile mats, corduroy, and/or gravel may also be used to create temporary wetland road widening. Where permanent roadways are installed and impoundment of water is possible, the installation of culverts will maintain the natural water levels/flows on each side of the road.
- Streams – The Project Sponsor will adhere to any permit special conditions pertaining to low-impact stream crossing techniques, including seasonal restrictions and/or alternative stream crossing methods, such as temporary bridging and installation of crossings "in the dry" on protected streams. Open-bottomed or elliptical culverts could be required on certain streams to minimize loss of aquatic habitat and restriction of fish passage. Adherence to these restrictions should avoid or minimize any adverse impacts on fish and other aquatic organisms.
- Sediment and Siltation Control – A soil erosion and sedimentation control plan will be developed and implemented as part of the SWPPP and Sediment and Erosion Control Plan for the Project. To protect surface waters, wetlands, groundwater and stormwater quality, silt fences and temporary siltation basins will be installed and maintained throughout Project development. Exposed soil will be seeded and/or mulched to assure that erosion and siltation is kept to a minimum along the wetland boundaries. The location of these features will be indicated on construction drawings and reviewed by the contractor prior to construction. To assure impacts are minimized to the maximum extent practicable, sediment and erosion control measures will be implemented wherever project construction occurs within, or adjacent to, wetlands and/or streams. In addition, a Final SWPPP will be implemented during construction. These features will be inspected to assure

that they function properly throughout the period of construction, and until completion of all restoration work (final grading and seeding).

To assure compliance with proposed mitigation measures during construction, the Applicant will provide the construction contractor copies of all MDE and Corps permits, and site specific plans detailing construction methodologies, sediment and erosion control plans, and required natural resource protection measures.

The Applicant will direct its contractors to adhere to any special conditions of permits issued by the MDE and the Corps, which may include low impact stream crossing techniques, seasonal restrictions, and/or alternative stream crossing methods. Wetlands temporarily disturbed during construction will be restored to their original grade. This will allow wetland areas to redevelop naturally following construction.

20.79.03.02.B(4)(g) Information and Forms

COMAR 26.23 and 26.24 relate to permit applications for impacts to tidal and non-tidal wetlands, respectively. As described above, the Applicant intends to keep permanent wetland and stream impacts below the 5,000 square foot limit for minor projects. As such, it is not anticipated that wetlands permits will be required for the Great Bay Solar project. Therefore, the information and forms associated with these permits are not applicable.

Notwithstanding this, routine wetland determination data sheets are included as Appendix B of the Wetland Delineation Report, attached hereto as Exhibit D.

20.79.03.02.B(5) DISPOSAL OF PLANT-GENERATED WASTES

The storage and use of fuel, lubricants, and other fluids could create a potential contamination hazard during Project construction. Any spills or leaks of hazardous fluids could potentially contaminate soil and groundwater. The impact of leaks and spills will be minimized or avoided by restricting the location of refueling activities and by requiring immediate cleanup of spills and leaks of hazardous materials. An appropriate absorbing material such as "PIG mat" will be used for any spills, and the resulting waste would then be processed by an experienced waste handler service such as Safety-Kleen.

Oil and diesel fuel will be stored in clearly marked tanks onsite and stored within secondary containment structures to prevent potential spills from impacting soil or groundwater. Construction equipment will be maintained regularly, and the source of any leaks will be identified and repaired immediately. Any soil contaminated by fuel or oil spills would be removed and disposed of at an approved disposal site. Lubricating oils, acids for equipment cleaning, and concrete

curing compounds are potentially hazardous wastes that may be associated with construction activities. These will be placed in containers within secondary containment structures, and disposed of at a licensed treatment and/or disposal facility in accordance with local or State regulations and in compliance with the manufacturer's recommendations.

Temporary portable sanitary facilities would be installed during construction and sanitary wastes would be disposed of by a contractor.

Project construction will generate some solid waste, primarily plastic, wood, cardboard and metal packing/packaging materials, construction scrap, and general refuse. Construction waste will be collected from Project site parcels and disposed of in dumpsters located at the laydown areas. A private contractor will empty the dumpsters on an as-needed basis and dispose of the refuse at a licensed solid waste disposal facility. Waste volumes are expected to be minimal and will not affect the life expectancy of the Somerset County Landfill.

As indicated above in Section 20.79.03.01.C, staff will monitor Project operations from an off-site location, and conduct periodic cleaning and on-site maintenance procedures, as needed. The minimal wastes generated from these activities will be removed from the Project site and disposed of in accordance with federal, State, and local regulations. There will be no sanitary sewer waste generated by Project operations.

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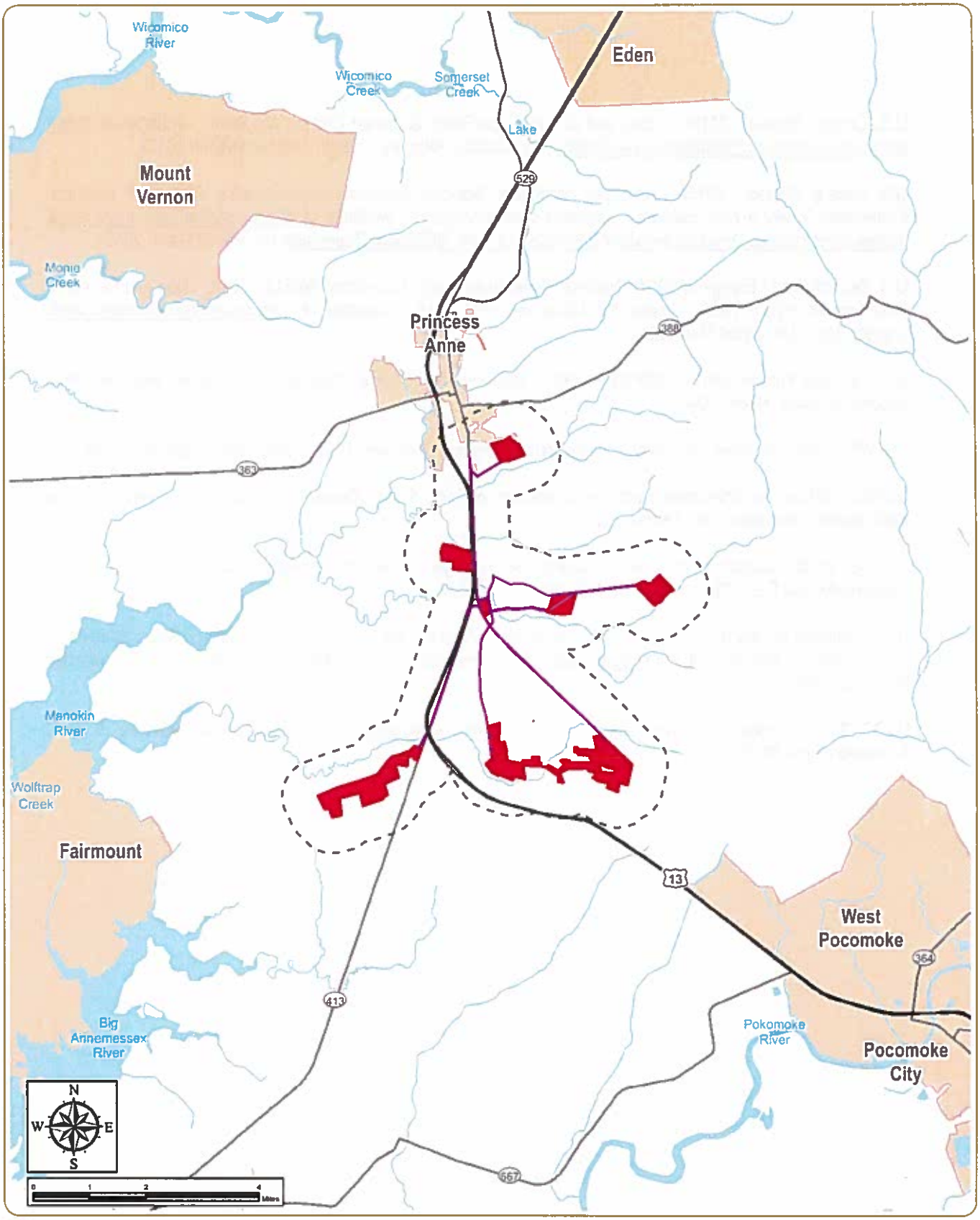


Great Bay Solar Project

Somerset County, Maryland

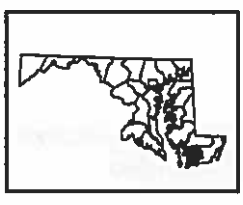
Figure 1: Regional Project Location

May 2015

Potential Collection Line Route

Half-Mile Study Area

Project Site



Notes: 1. Basemap: ESRI StreetMap North America, 2008

2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

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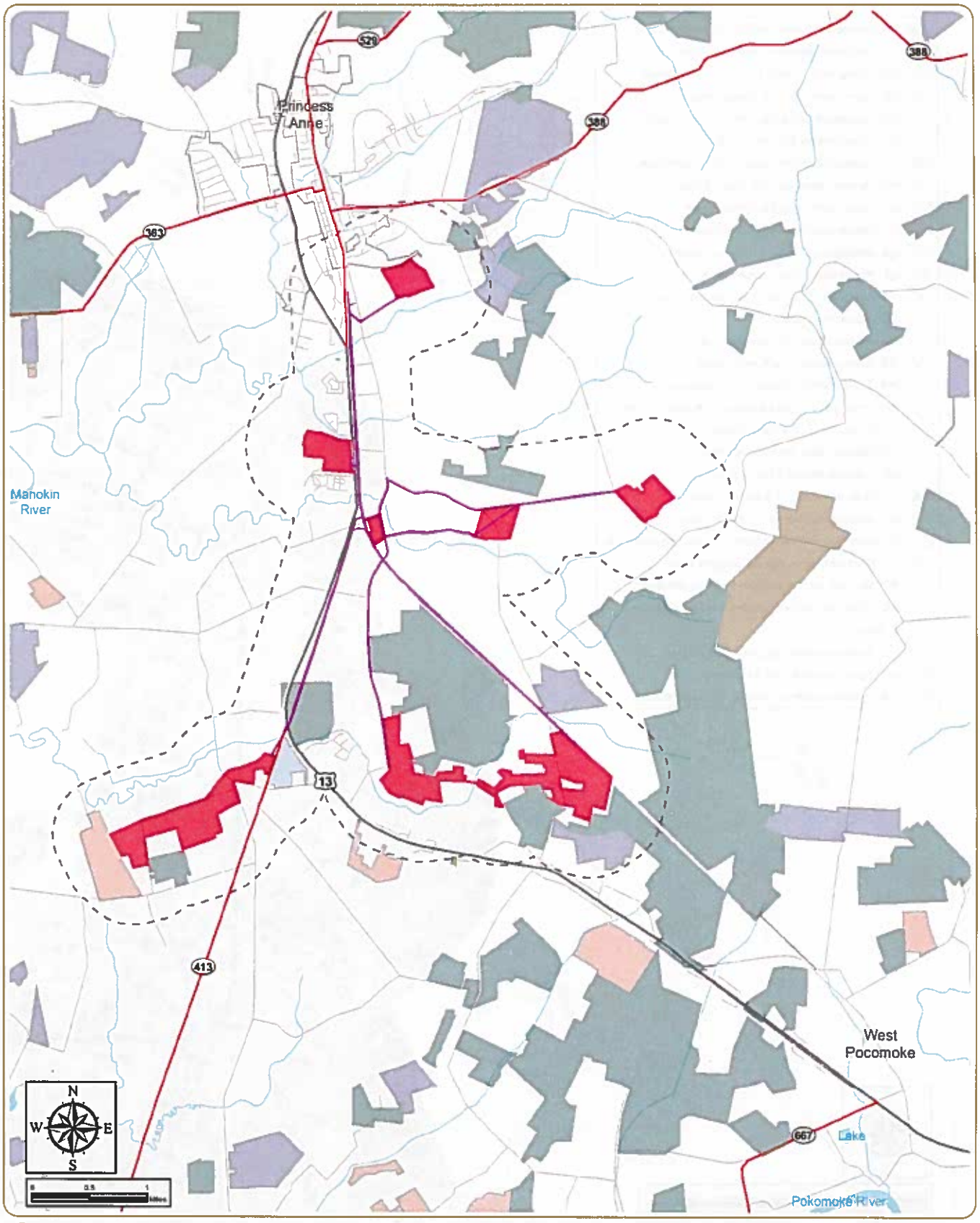

Great Bay Solar Project

Somerset County, Maryland

Figure 2: Project Site

May 2015

Notes: 1. Basemap: ESRI StreetMap North America, 2008
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Potential Collection Line Route
- Half-Mile Study Area
- Project Site

State Lands and Conservation Easements

- Chesapeake Forest Lands
- Conservation Reserve Enhancement Program
- Green Hill Fl
- Non-DNR Private Inholding or Adjacent Property
- Wellington WMA

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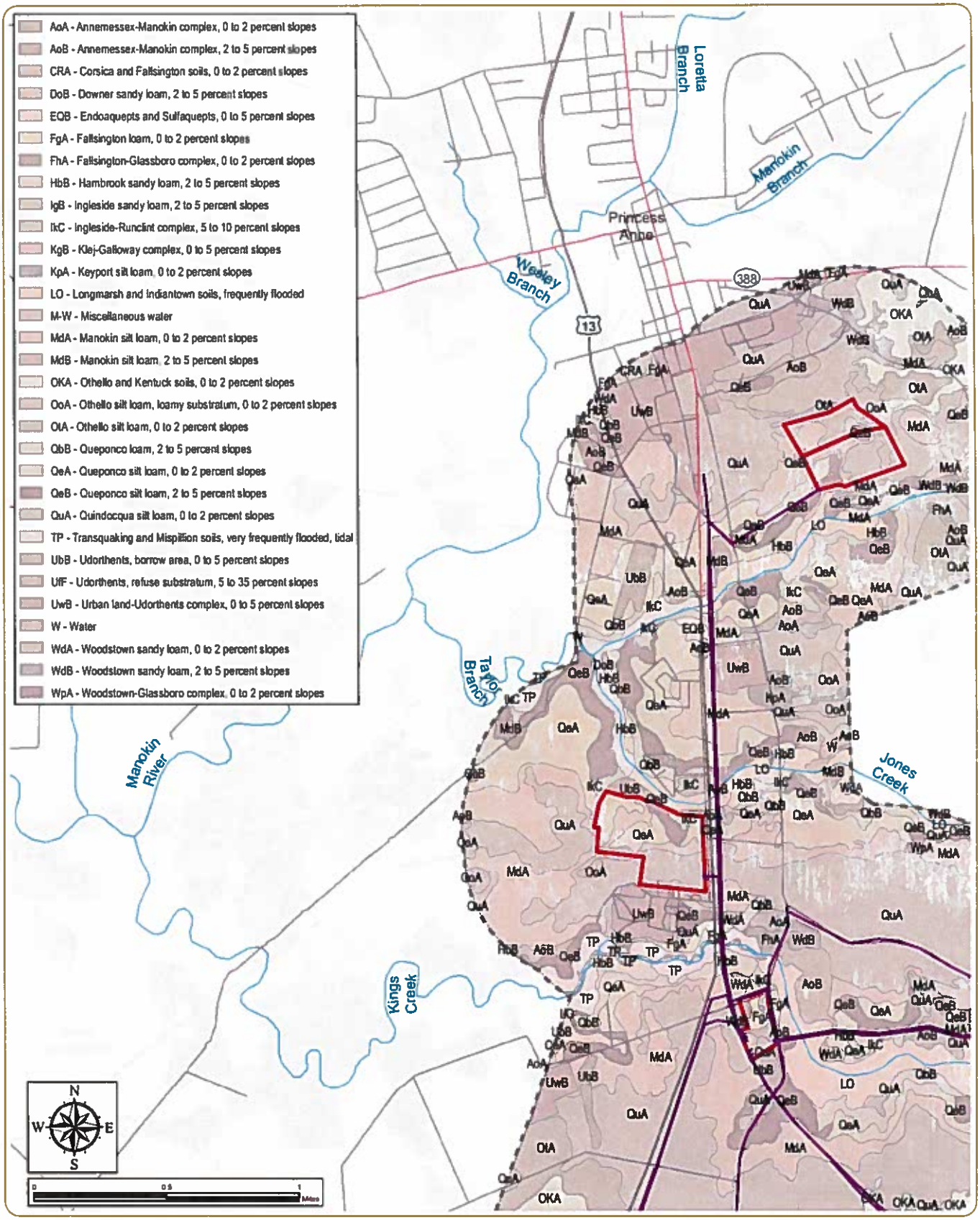


Great Bay Solar Project

Somerset County, Maryland

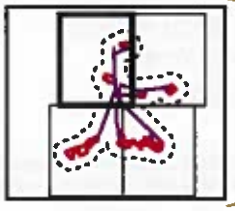
Figure 3: Soil Resources

May 2015 Page 1 of 4

Potential Collection Line Route

Half-Mile Study Area

Project Site



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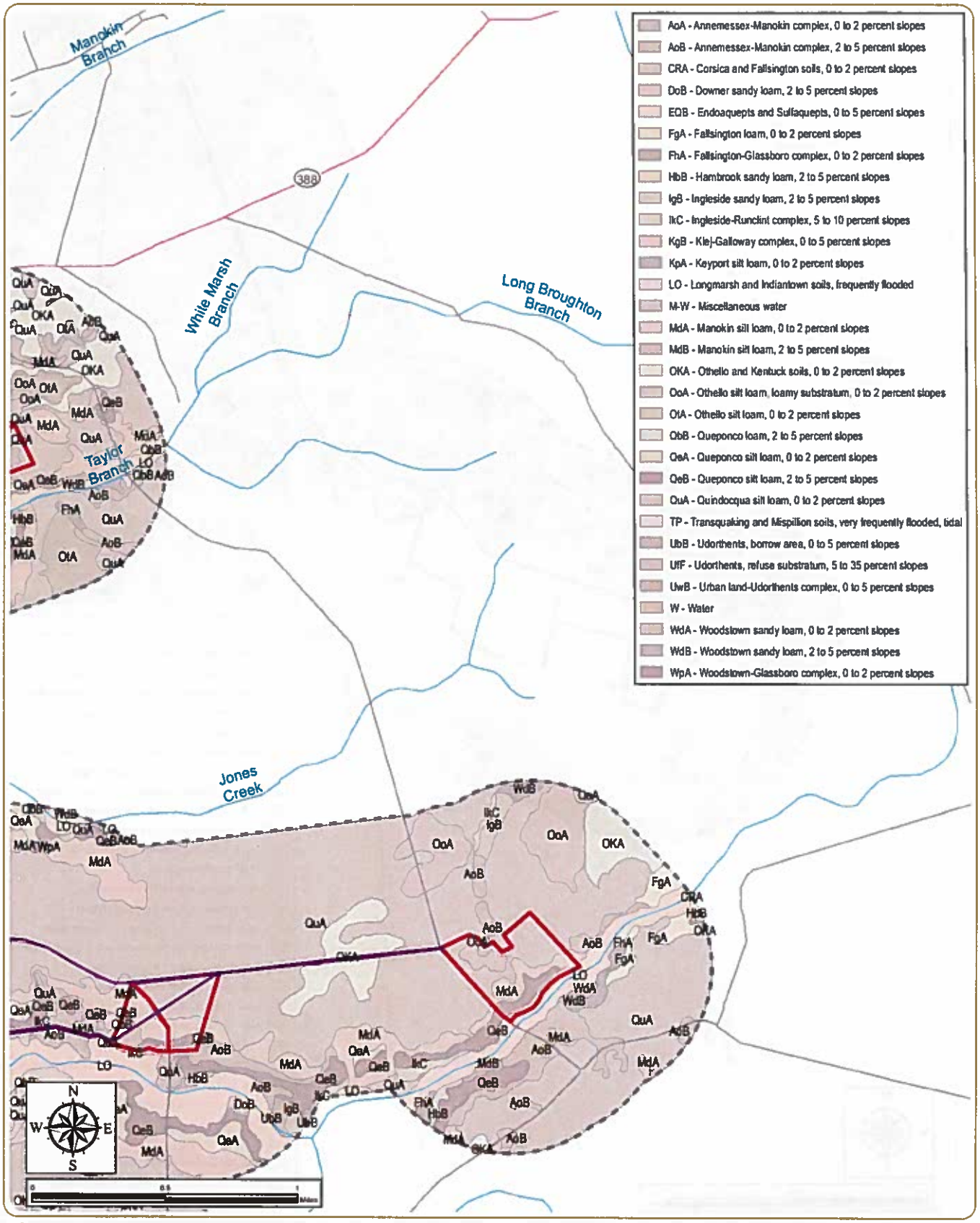


Great Bay Solar Project

Somerset County, Maryland

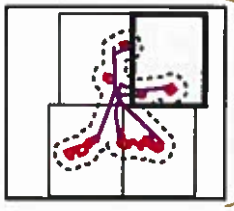
Figure 3: Soil Resources

May 2015 Page 2 of 4

Potential Collection Line Route

Half-Mile Study Area

Project Site



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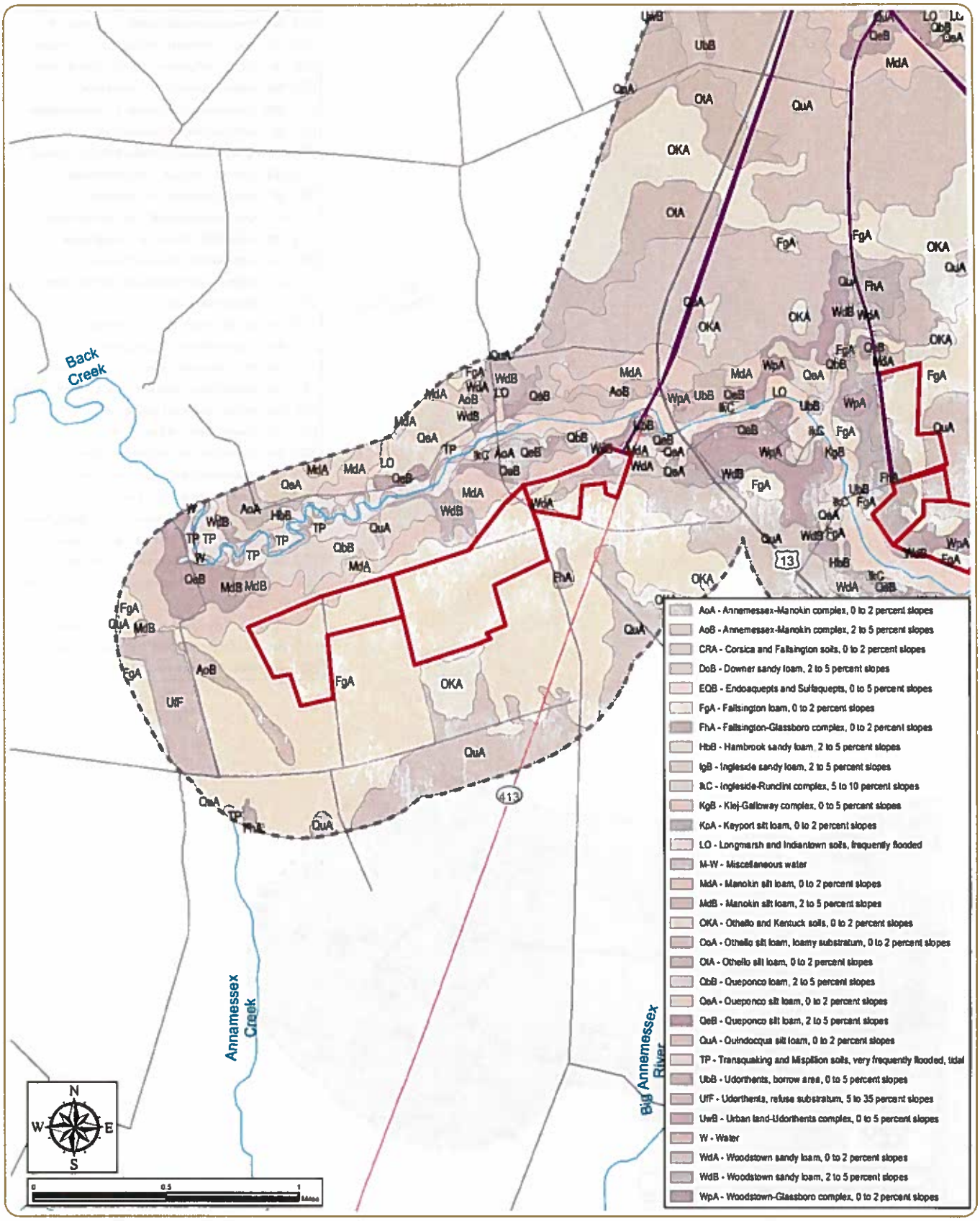


Great Bay Solar Project

Somerset County, Maryland

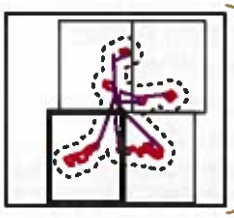
Figure 3: Soil Resources

May 2015 Page 3 of 4

Potential Collection Line Route

Half-Mile Study Area

Project Site



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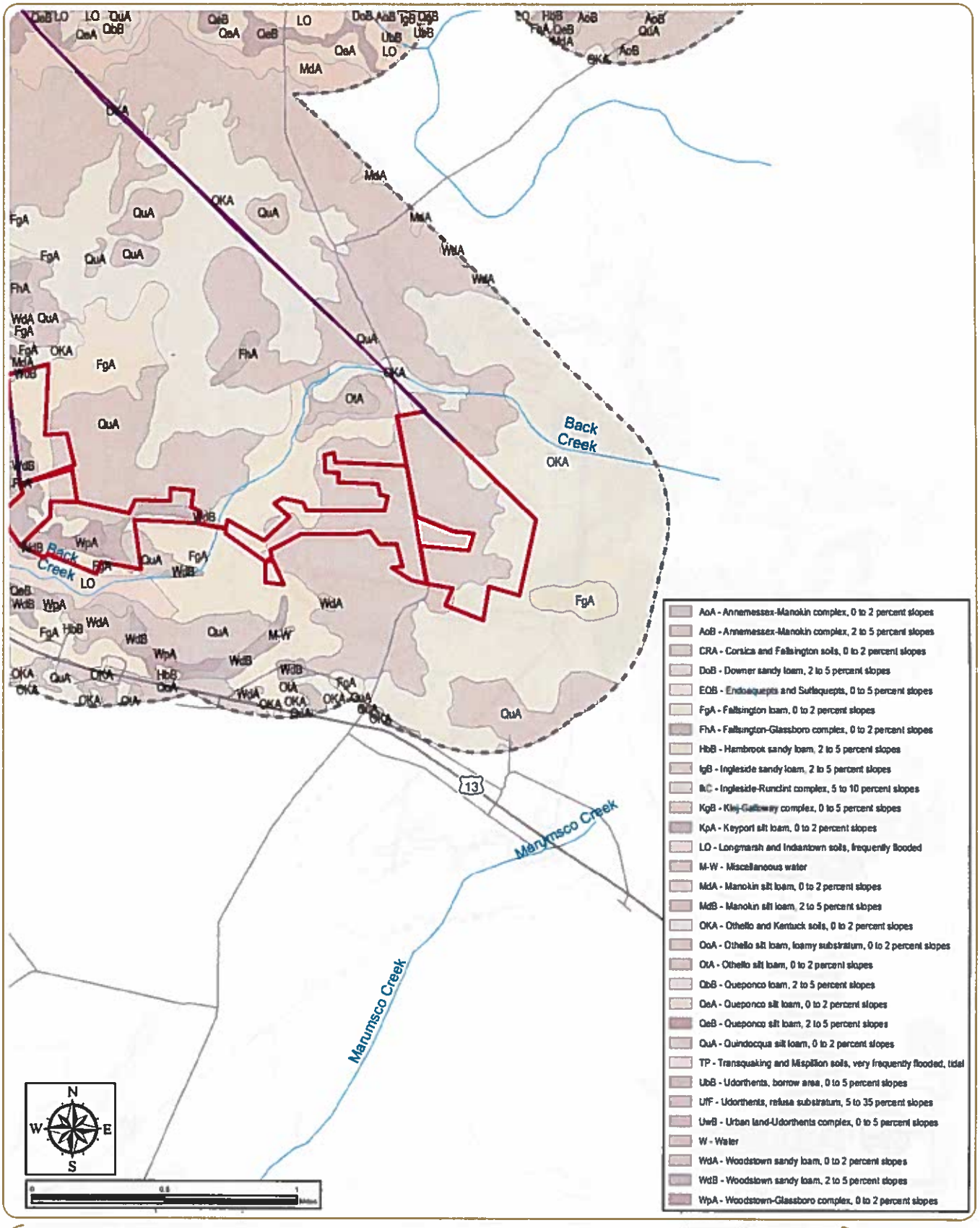


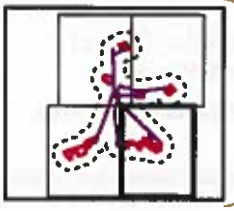
Great Bay Solar Project

Somerset County, Maryland

Figure 3: Soil Resources

May 2015 Page 4 of 4

Potential Collection Line Route
Half-Mile Study Area
Project Site



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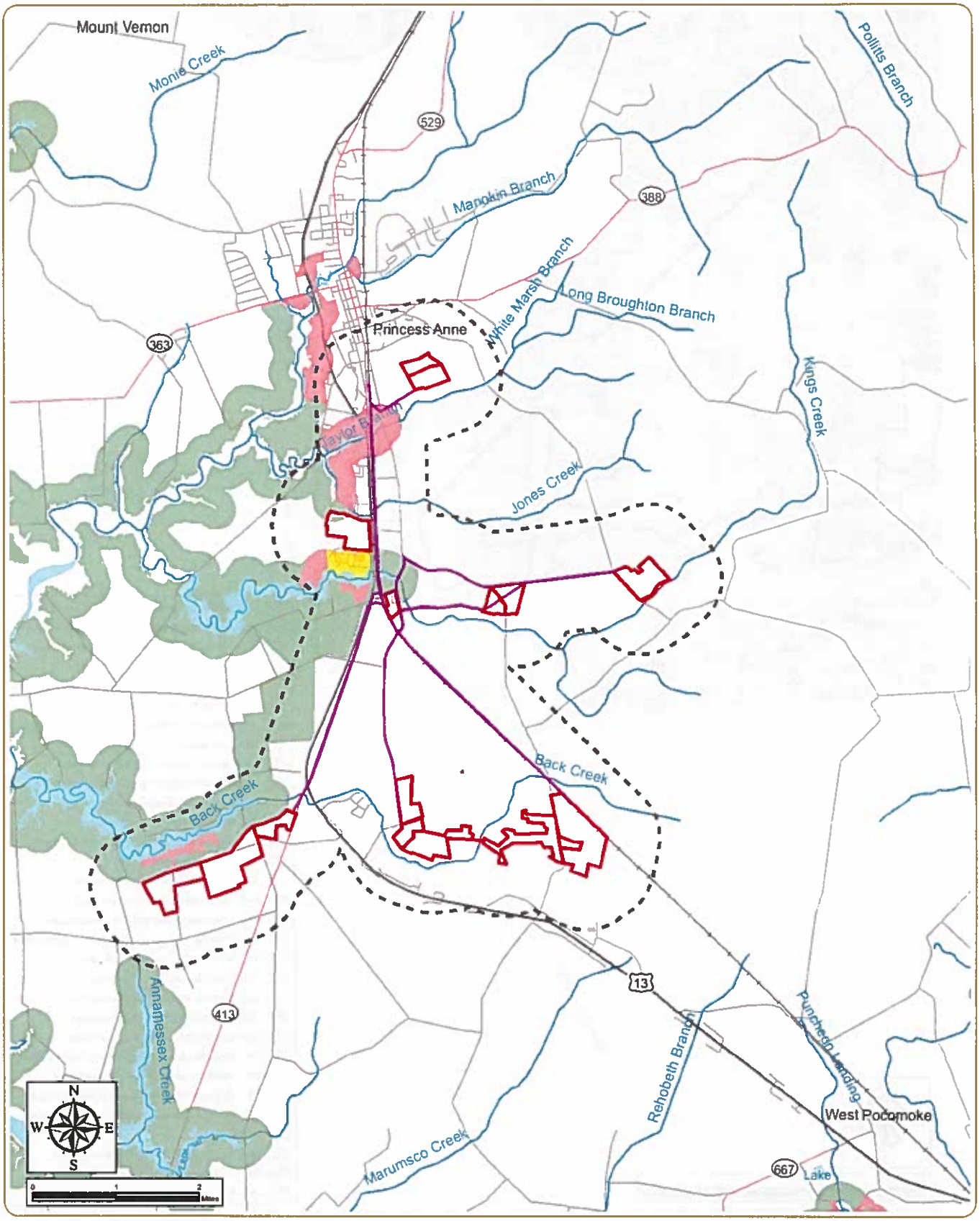

Great Bay Solar Project

Somerset County, Maryland

Figure 4: Maryland Critical Areas

May 2015

Notes: 1. Basemap: ESRI StreetMap North America, 2008
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

Potential Collection Line Route
Project Site
Half-Mile Study Area

Maryland Critical Areas
Intensely Developed Area
Limited Development Area
Resource Conservation Area
Tidal Wetland

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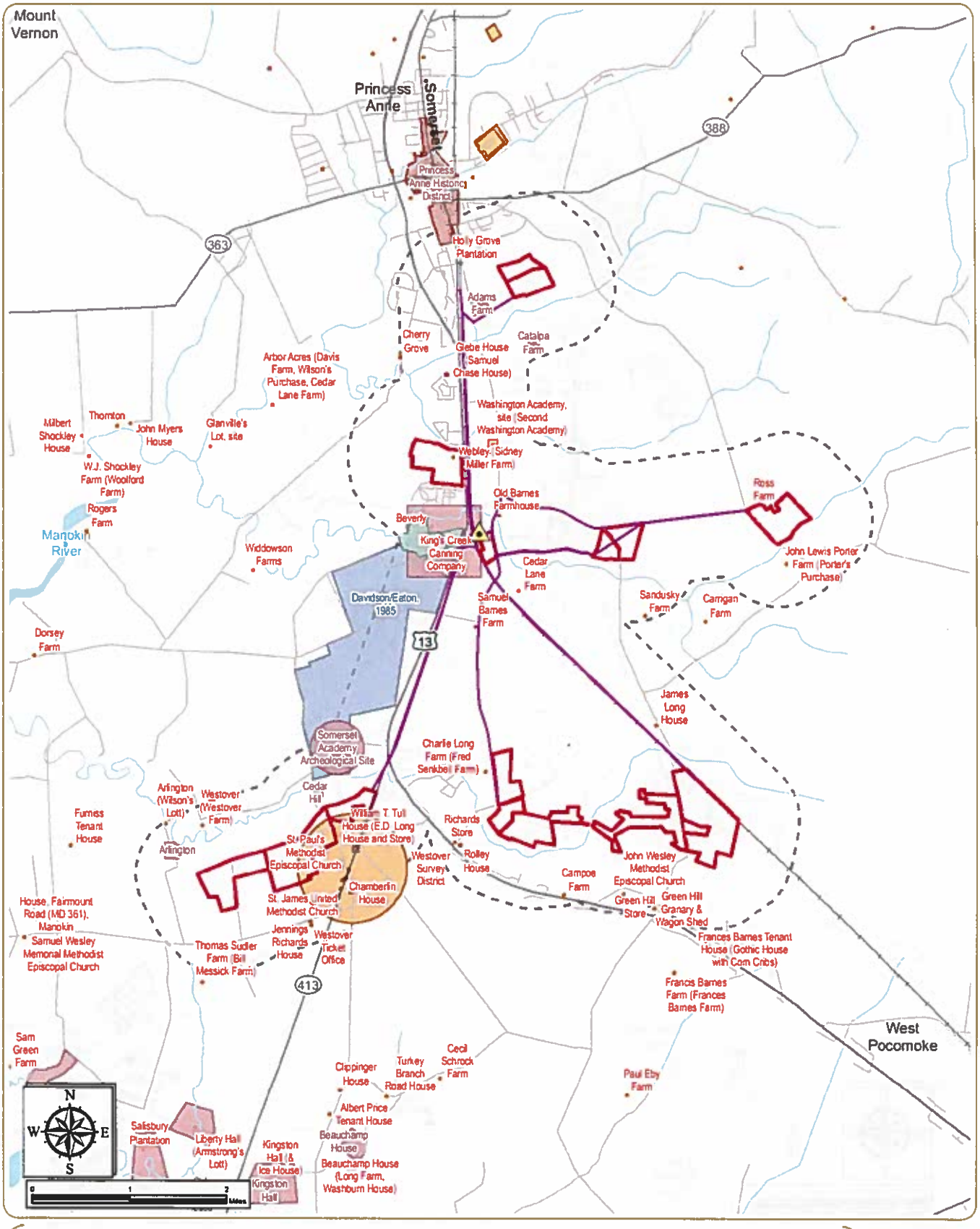

Great Bay Solar Project

Somerset County, Maryland

Figure 5. Historic Resources

May 2015

Notes: 1. Basemap: ESRI StreetMap North America, 2008

2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Kings Creek Substation
- Potential Collection Line Routes
- Half-Mile Study Area
- Project Site (Participating Parcel)
- NRHP-Listed Site
- MIHP-Listed Site
- MHT Easements
- Previous Cultural Resource Study

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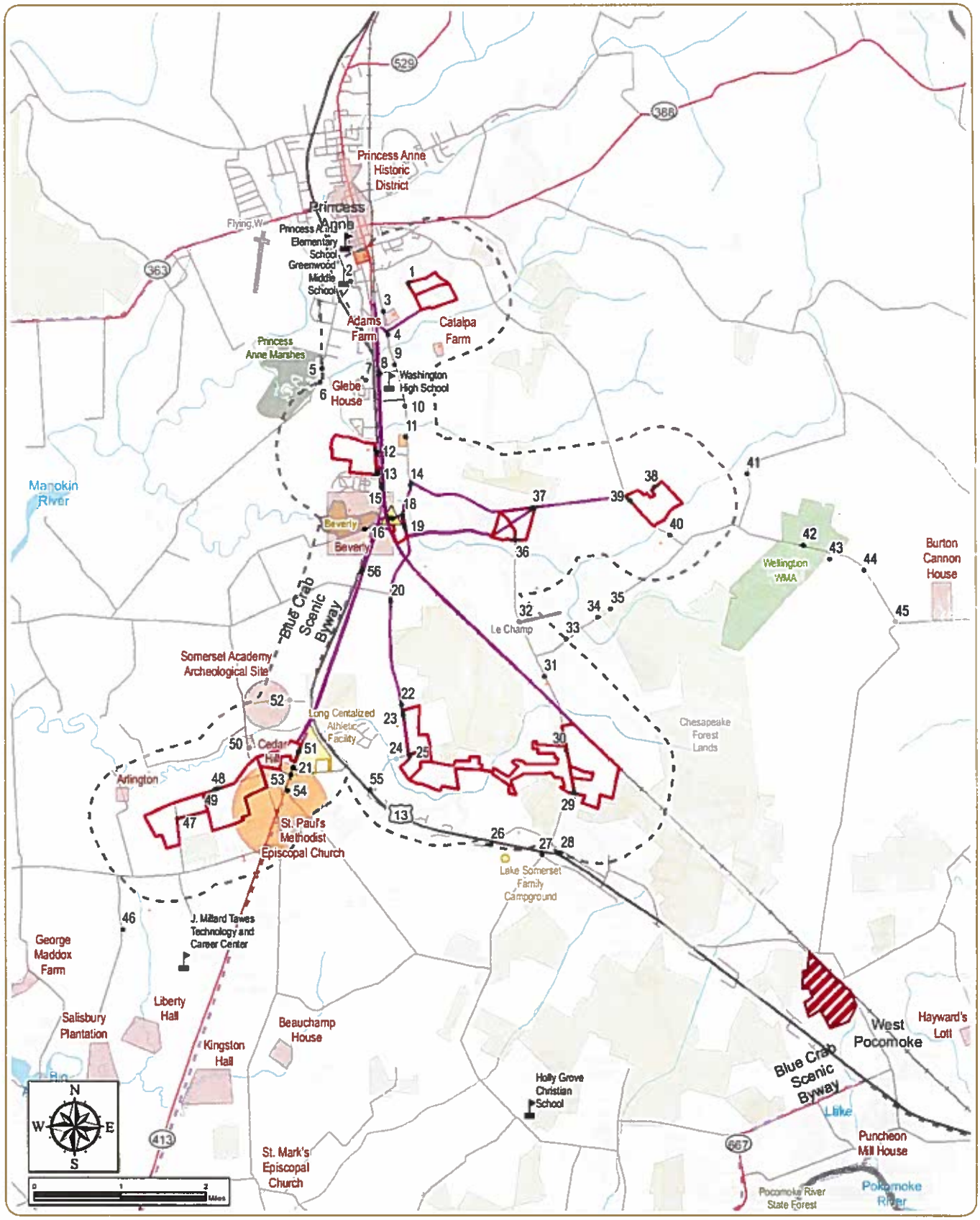

Great Bay Solar Project

Somerset County, Maryland

Figure 6. Aesthetic Resources

May 2015

Notes: 1. Basemap: ESRI StreetMap North America, 2008
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Viewpoint
- Kings Creek Substation
- School
- Scenic Byway
- Potential Collection Line Route
- Half-Mile Study Area
- Project Site (Participating Parcel)
- Existing Solar Facility
- NRHP-Listed Site
- MHP-Listed Site
- MHT Easements
- Wildlife Management Area
- Chesapeake Forest Lands
- Airport
- Local Park
- Private Conservation Property

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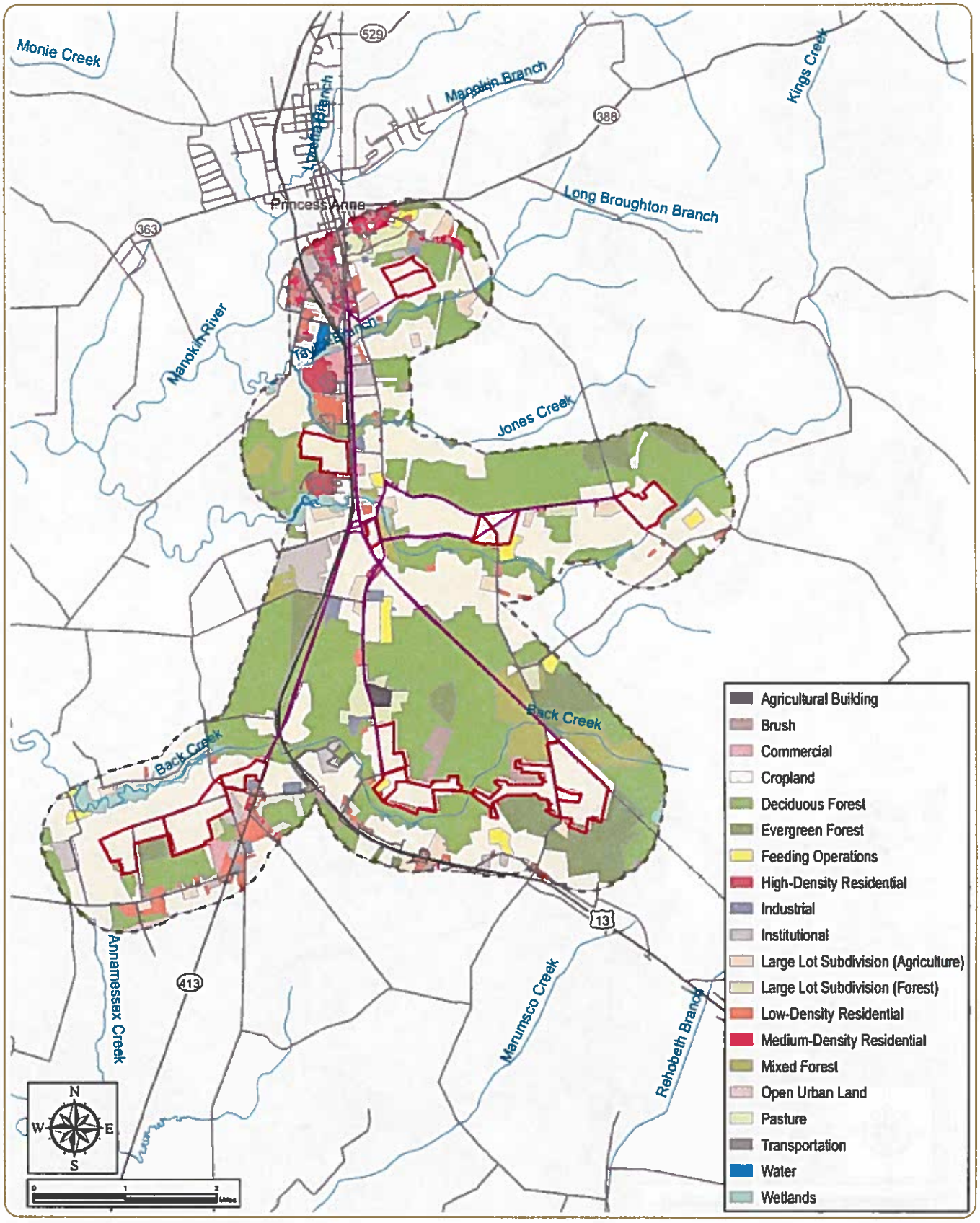

Great Bay Solar Project

Somerset County, Maryland

Figure 7: Land Use

May 2015

Potential Collection Line Route

Project Site

Half-Mile Study Area

Notes: 1. Basemap: ESRI StreetMap North America, 2008. National Agriculture Imagery Program (NAIP), 2008.
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

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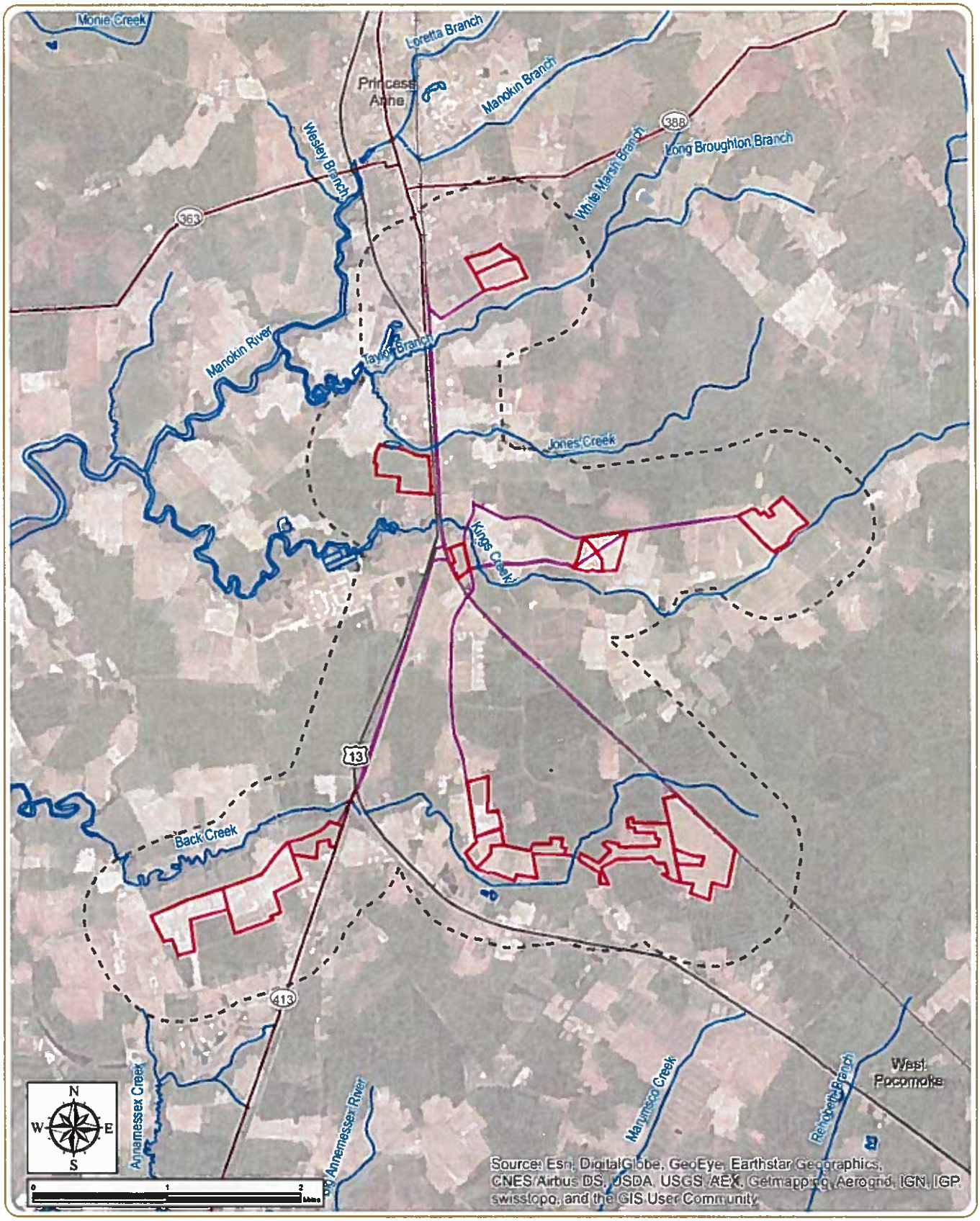

Great Bay Solar Project

Somerset County, Maryland

Figure 8: Mapped Streams

May 2015

Notes: 1. Basemap: ESRI ArcGIS online "World Imagery" Map Service
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Rivers or Streams
- Potential Collection Line Route
- Project Site
- Half-Mile Study Area

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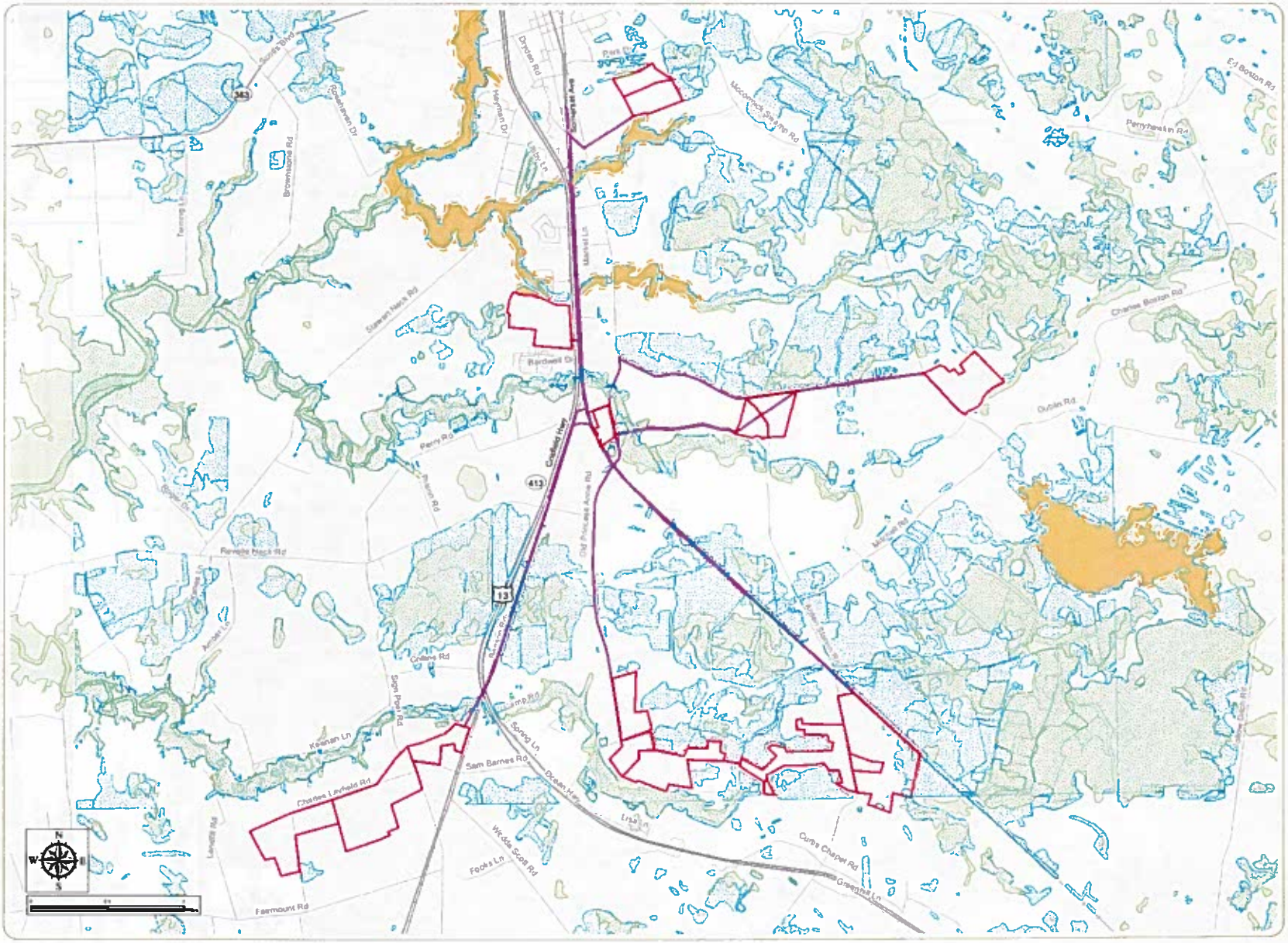

Great Bay Solar Project

Somerset County, Maryland

Figure 9: Mapped Wetlands

May 2015

- MD Wetland of Special State Concern
- 100-ft WSSC Buffer
- NWI Wetland
- MDE Mapped Wetland
- Project Site
- Potential Collection Line Route

Notes:
1. Basemap: ESRI StreetMap North America, 2012
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

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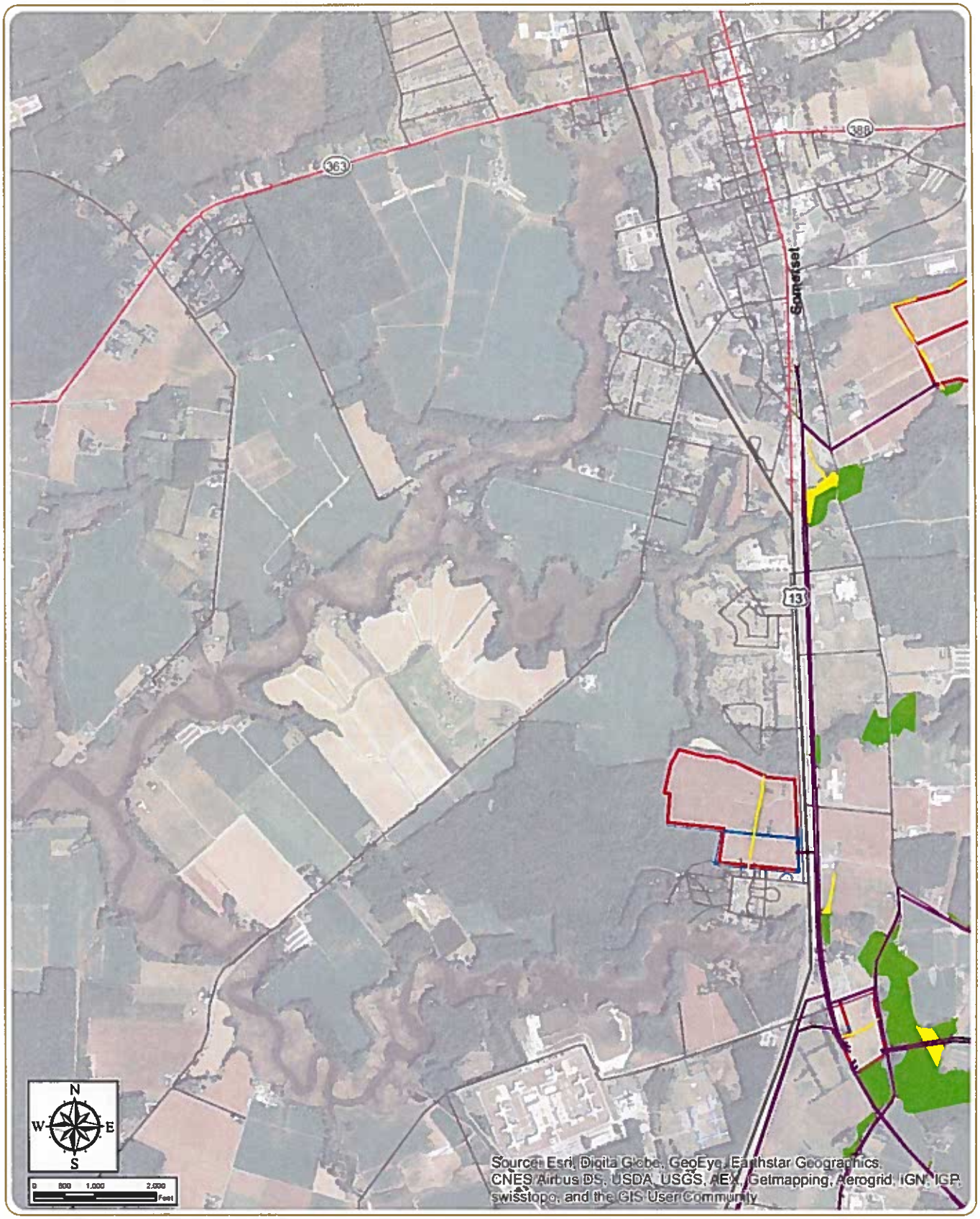


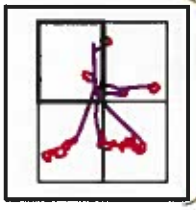
Great Bay Solar Project

Somerset County, Maryland

Figure 10: Delineated and Approximate Wetlands

May 2015 Page 1 of 4

- Potential Collection Line Route
- Delineated Wetlands and Streams
- Delineated Assumed Non-Jurisdictional Drainage Features
- Approximate Wetlands and Streams
- Project Site



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Notes: 1. Basemap: ESRI ArcGIS Online "World Imagery" Map Service
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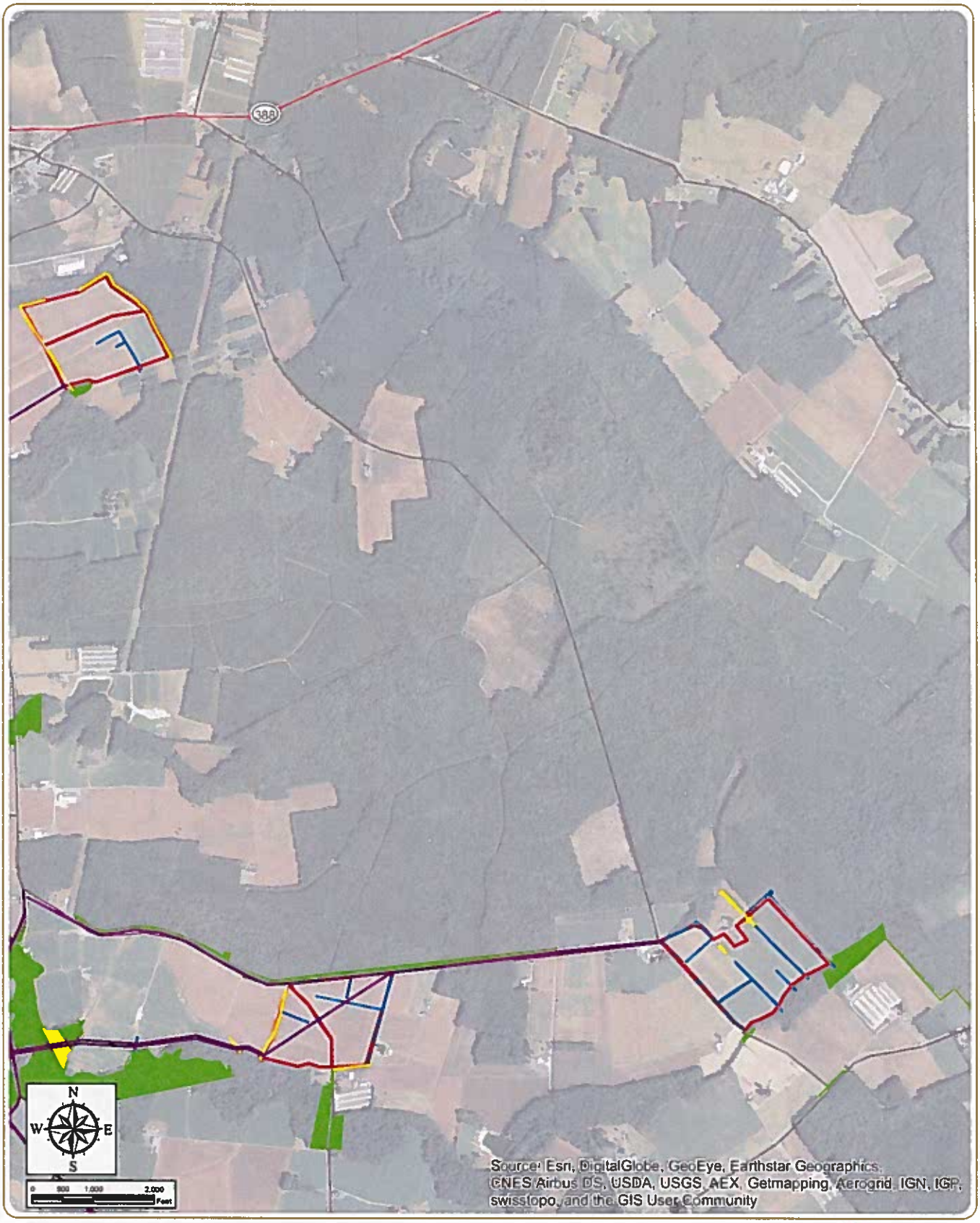


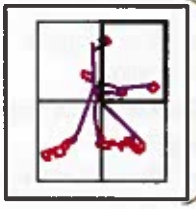
Great Bay Solar Project

Somerset County, Maryland

Figure 10: Delineated and Approximate Wetlands

May 2015 Page 2 of 4

- Potential Collection Line Route
- Delineated Wetlands and Streams
- Delineated Assumed Non-Jurisdictional Drainage Features
- Approximate Wetlands and Streams
- Project Site



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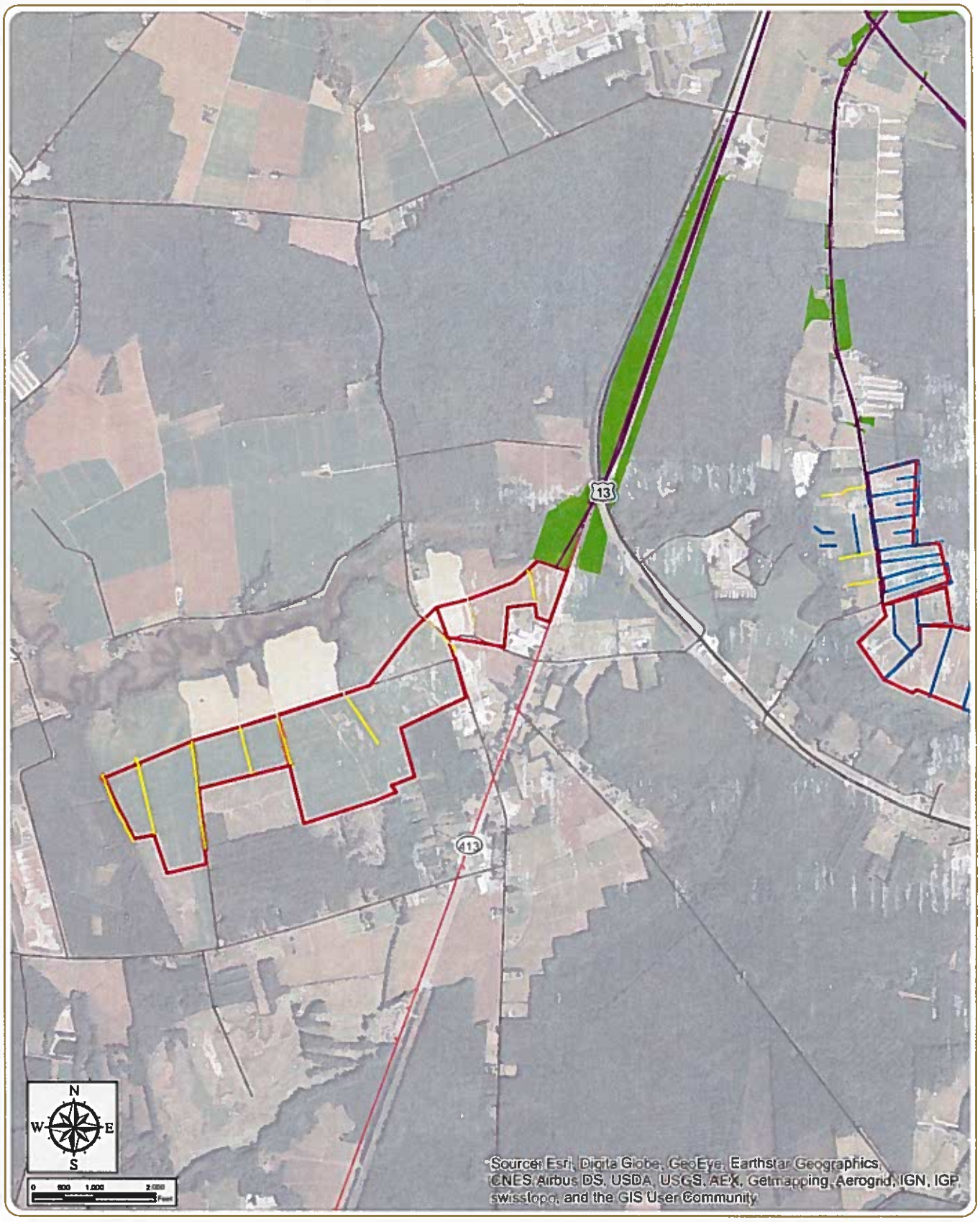


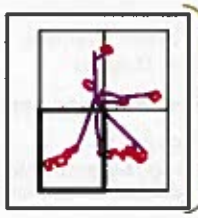
Great Bay Solar Project
Somerset County, Maryland

Figure 10: Delineated and Approximate Wetlands

May 2015 Page 3 of 4

Notes: 1. Basemap: ESRI ArcGIS Online "World Imagery" Map Service
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Potential Collection Line Route
- Delineated Wetlands and Streams
- Delineated Assumed Non-Jurisdictional Drainage Features
- Approximate Wetlands and Streams
- Project Site



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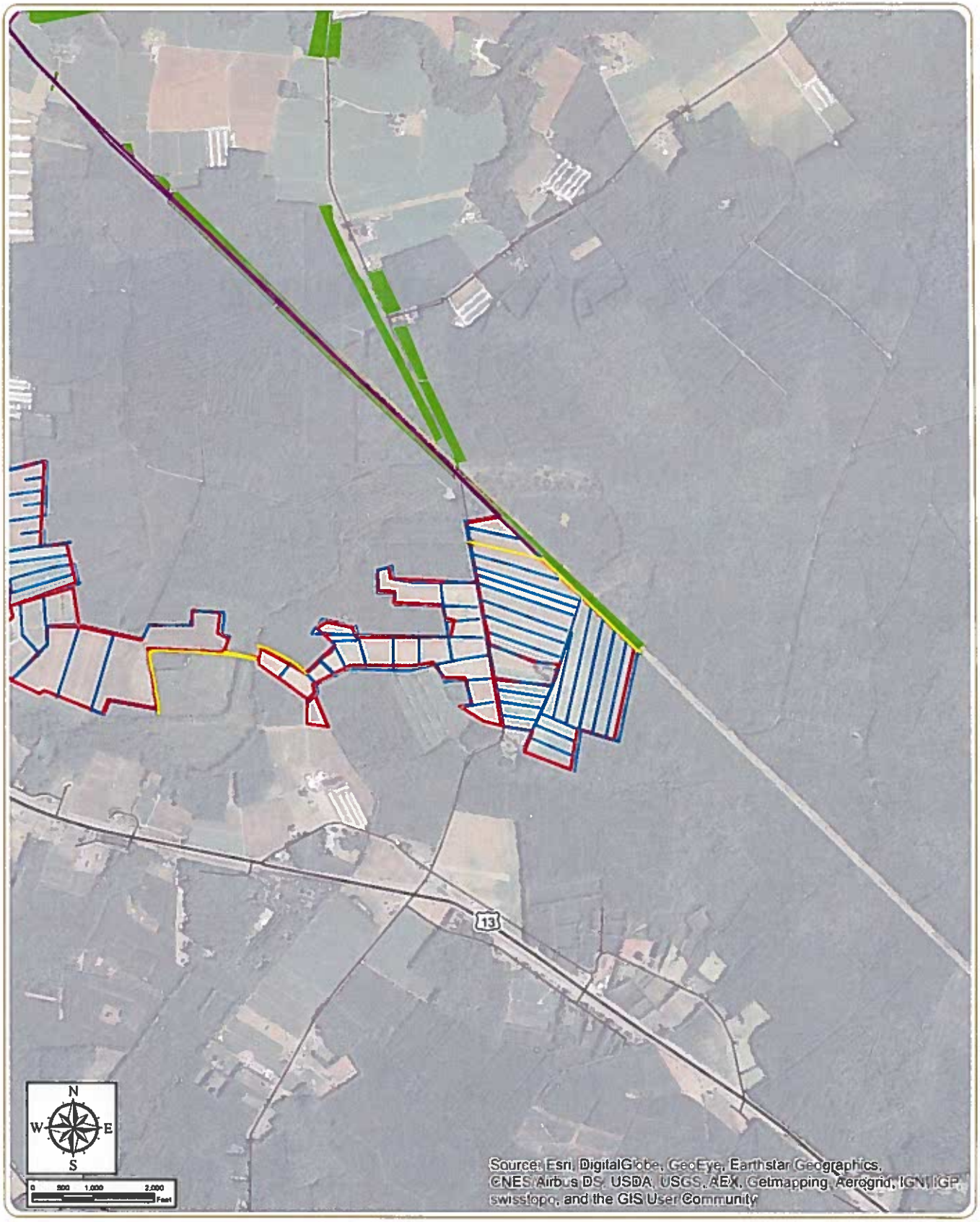

Great Bay Solar Project

Somerset County, Maryland

Figure 10: Delineated and Approximate Wetlands

May 2015 Page 4 of 4

Notes: 1. Basemap: ESRI ArcGIS Online "World Imagery" Map Service
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Potential Collection Line Route
- Delineated Wetlands and Streams
- Delineated Assumed Non-Jurisdictional Drainage Features
- Approximate Wetlands and Streams
- Project Site

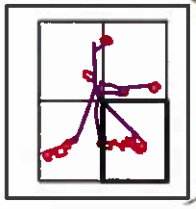

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EXHIBIT A

Agency Correspondence

U.S. Fish and Wildlife Service

Trust Resources List

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

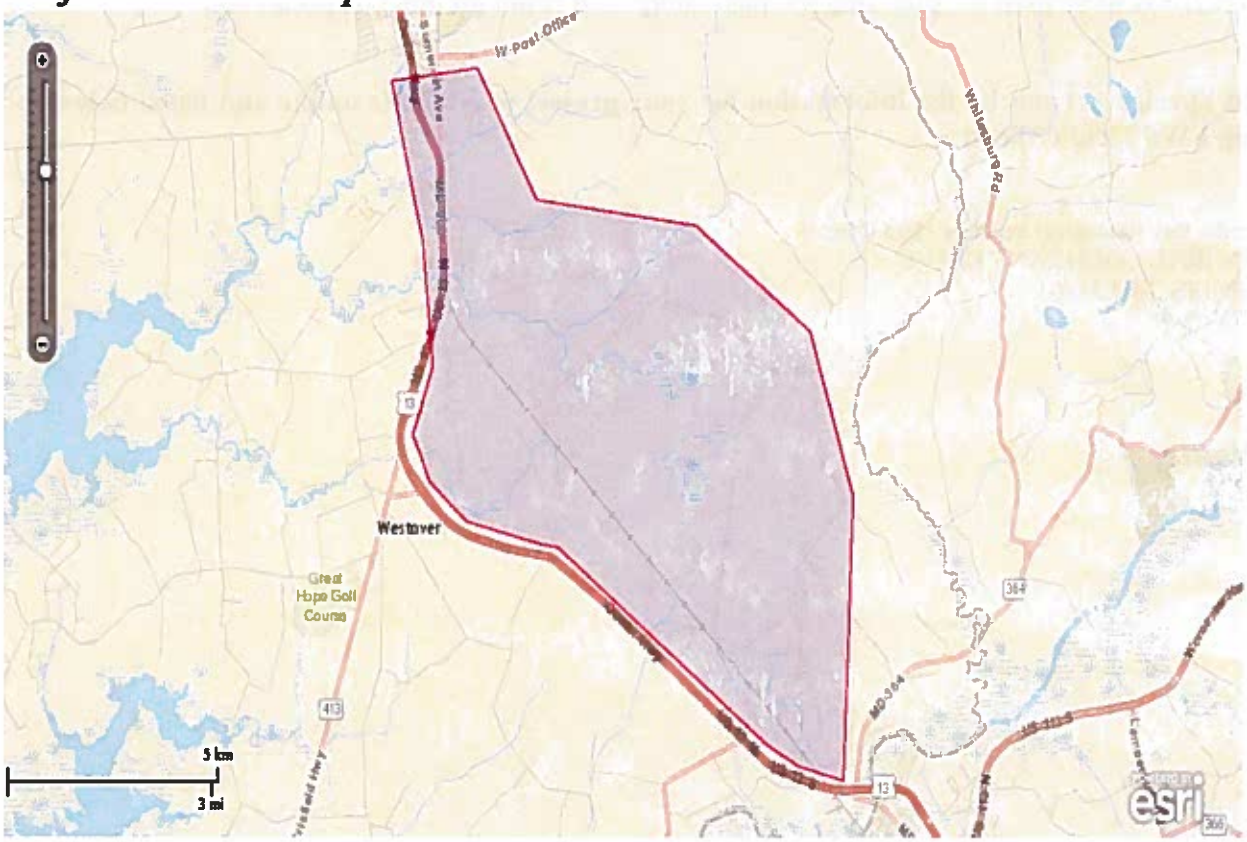
Chesapeake Bay Ecological Services Field Office
177 ADMIRAL COCHRANE DRIVE
ANNAPOLIS, MD 21401
(410) 573-4599

Project Name:
GBS

U.S. Fish and Wildlife Service

Trust Resources List

Project Location Map:



Project Counties:

Somerset, MD

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-75.679408 38.1997724, -75.663289 38.1776452, -75.619687 38.1733269, -75.5884446 38.1555112, -75.5767716 38.1279694, -75.5795182 38.0801515, -75.5918778 38.0825836, -75.6004609 38.0860966, -75.6577786 38.1193267, -75.6625852 38.1198669, -75.6828584 38.1236481, -75.693158 38.1304, -75.6976212 38.1382313, -75.6921109 38.1498417, -75.6948747 38.1706278, -75.7030972 38.197614, -75.679408 38.1997724)))

Project Type:

Power Generation

U.S. Fish and Wildlife Service

Trust Resources List

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of 2 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Flowering Plants	Status		Has Critical Habitat	Contact
sensitive joint-vetch (*Aeschynomene virginica*)	Threatened	species info		Chesapeake Bay Ecological Services Field Office
Mammals				
Delmarva Peninsula fox squirrel (*Sciurus niger cinereus*) Population: Entire, except Sussex Co., DE	Endangered	species info		Chesapeake Bay Ecological Services Field Office

Critical habitats within your project area:

There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no refuges found within the vicinity of your project.

FWS Migratory Birds (USFWS Migratory Bird Program).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be

unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

To search and view summaries of year-round bird occurrence data within your project area, go to the Avian Knowledge Network Histogram Tool links in the Bird Conservation Tools section at: http://www.fws.gov/migratorybirds/CCMB2.htm.

For information about conservation measures that help avoid or minimize impacts to birds, please visit:
http://www.fws.gov/migratorybirds/CCMB2.htm.

Migratory birds of concern that may be affected by your project:
There are **29** birds on your Migratory birds of concern list. The underlying data layers used to generate the migratory bird list of concern will continue to be updated regularly as new and better information is obtained. User feedback is one method of identifying any needed improvements. Therefore, users are encouraged to submit comments about any questions regarding species ranges (e.g., a bird on the USFWS BCC list you know does not occur in the specified location appears on the list, or a BCC species that you know does occur there is not appearing on the list). Comments should be sent to the ECOS Help Desk.

Species Name	Bird of Conservation Concern (BCC)	Species Profile	Seasonal Occurrence in Project Area
American Oystercatcher (*Haematopus palliatus*)	Yes	species info	Year-round
American bittern (*Botaurus lentiginosus*)	Yes	species info	Wintering
Bald eagle (*Haliaeetus leucocephalus*)	Yes	species info	Year-round
Black rail (*Laterallus jamaicensis*)	Yes	species info	Breeding

Trust Resources List

Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Yes	species info	Breeding
Brown-headed Nuthatch (*Sitta pusilla*)	Yes	species info	Year-round
Fox Sparrow (*Passerella liaca*)	Yes	species info	Wintering
Gull-billed Tern (*Gelochelidon nilotica*)	Yes	species info	Breeding
Hudsonian Godwit (*Limosa haemastica*)	Yes	species info	Migrating
Least Bittern (*Ixobrychus exilis*)	Yes	species info	Breeding
Least tern (*Sterna antillarum*)	Yes	species info	Breeding
Lesser Yellowlegs (*Tringa flavipes*)	Yes	species info	Wintering
Marbled Godwit (*Limosa fedoa*)	Yes	species info	Wintering
Nelson's Sparrow (*Ammodramus nelsoni*)	Yes	species info	Wintering
Peregrine Falcon (*Falco peregrinus*)	Yes	species info	Wintering
Pied-billed Grebe (*Podilymbus podiceps*)	Yes	species info	Year-round
Prairie Warbler (*Dendroica discolor*)	Yes	species info	Breeding
Prothonotary Warbler (*Protonotaria citrea*)	Yes	species info	Breeding
Purple Sandpiper (*Calidris maritima*)	Yes	species info	Wintering
Red Knot (*Calidris canutus rufa*)	Yes	species info	Wintering
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	Yes	species info	Year-round
Rusty Blackbird (*Euphagus carolinus*)	Yes	species info	Wintering
Saltmarsh Sparrow (*Ammodramus caudacutus*)	Yes	species info	Year-round
Seaside Sparrow (*Ammodramus maritimus*)	Yes	species info	Year-round

Short-billed Dowitcher (*Limnodromus griseus*)	Yes	species info	Wintering
Short-eared Owl (*Asio flammeus*)	Yes	species info	Wintering
Snowy Egret (*Egretta thula*)	Yes	species info	Breeding
Wood Thrush (*Hylocichla mustelina*)	Yes	species info	Breeding
Worm eating Warbler (*Helmitheros vermivorum*)	Yes	species info	Breeding

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

Data Limitations, Exclusions and Precautions

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

U.S. Fish and Wildlife Service

Trust Resources List

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The following wetland types intersect your project area in one or more locations:

Wetland Types	NWI Classification Code	Total Acres
Estuarine and Marine Deepwater	E1UBL	182.2382
Estuarine and Marine Wetland	E2EM1P	223.8218
Freshwater Emergent Wetland	PEM1/SS1Bd	12.2701
Freshwater Emergent Wetland	PEM1Ad	2.9022
Freshwater Emergent Wetland	PEM1/SS4Bd	24.6654
Freshwater Emergent Wetland	PEM1Bd	387.6599
Freshwater Emergent Wetland	PEM1E	7.6367
Freshwater Emergent Wetland	PEM1C	93.0944
Freshwater Emergent Wetland	PEM1A	252.171
Freshwater Emergent Wetland	PEM1B	64.4218
Freshwater Emergent Wetland	PEM1Cd	1.0868
Freshwater Forested/Shrub Wetland	PFO1Ad	261.0303
Freshwater Forested/Shrub Wetland	PFO4B	135.7426
Freshwater Forested/Shrub Wetland	PSS4/1Bd	229.5094
Freshwater Forested/Shrub Wetland	PSS1/4Bd	69.9086

Trust Resources List

Freshwater Forested/Shrub Wetland	PSS1/FO1Bd	10.5186
Freshwater Forested/Shrub Wetland	PSS1/EM1A	9.9612
Freshwater Forested/Shrub Wetland	PFO1/4B	113.0954
Freshwater Forested/Shrub Wetland	PFO1/4A	53.9946
Freshwater Forested/Shrub Wetland	PFO4Bd	437.747
Freshwater Forested/Shrub Wetland	PFO1/4C	84.5461
Freshwater Forested/Shrub Wetland	PFO4/1Bd	670.0695
Freshwater Forested/Shrub Wetland	PFO1/EM1A	43.8747
Freshwater Forested/Shrub Wetland	PSS4C	28.7522
Freshwater Forested/Shrub Wetland	PSS4B	49.2474
Freshwater Forested/Shrub Wetland	PSS4A	122.6984
Freshwater Forested/Shrub Wetland	PFO1/4Bd	257.7177
Freshwater Forested/Shrub Wetland	PSS1/4B	26.0324
Freshwater Forested/Shrub Wetland	PFO1/3E	299.2856
Freshwater Forested/Shrub Wetland	PSS4Bd	719.7537
Freshwater Forested/Shrub Wetland	PSS4/1B	16.5869
Freshwater Forested/Shrub Wetland	PSS1Bd	47.0032
Freshwater Forested/Shrub Wetland	PSS1/EM1Bd	45.9969
Freshwater Forested/Shrub Wetland	PFO1Bd	460.9416
Freshwater Forested/Shrub Wetland	PFO1R	16.5566
Freshwater Forested/Shrub Wetland	PFO1/SS4Bd	144.8412
Freshwater Forested/Shrub Wetland	PFO4/1E	15.9395
Freshwater Forested/Shrub Wetland	PSS1/FO1B	32.7903
Freshwater Forested/Shrub Wetland	PSS4Ed	22.4759
Freshwater Forested/Shrub Wetland	PSS4/EM1Bd	160.2488
Freshwater Forested/Shrub Wetland	PFO1B	294.0792

Trust Resources List

Freshwater Forested/Shrub Wetland	PSS1A	9.1075
Freshwater Forested/Shrub Wetland	PFO1C	856.0277
Freshwater Forested/Shrub Wetland	PFO1A	488.4884
Freshwater Forested/Shrub Wetland	PFO4/1C	17.1368
Freshwater Forested/Shrub Wetland	PFO4/1B	187.6805
Freshwater Forested/Shrub Wetland	PFO1E	830.3104
Freshwater Pond	PUBFx	0.2712
Freshwater Pond	PUBHh	0.1786
Freshwater Pond	PUBHx	49.6342
Freshwater Pond	PUBF	0.5813
Other	Pf	14.4056

U.S. Fish and Wildlife Service

Trust Resources List

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

Chesapeake Bay Ecological Services Field Office
177 ADMIRAL COCHRANE DRIVE
ANNAPOLIS, MD 21401
(410) 573-4599

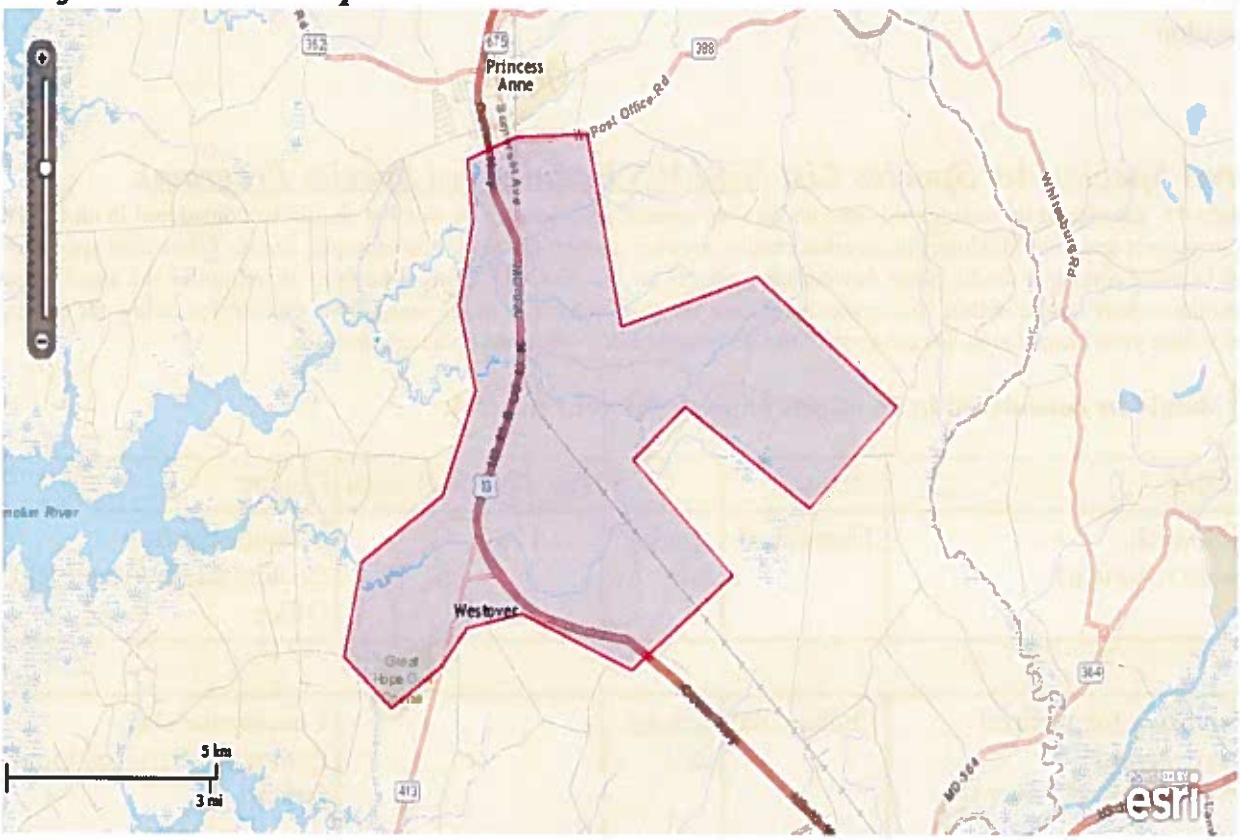
Project Name:

GBS

U.S. Fish and Wildlife Service

Trust Resources List

Project Location Map:



Project Counties:

Somerset, MD

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-75.6704821 38.2026397, -75.6612124 38.1702573, -75.6237902 38.1786242, -75.5853381 38.1567605, -75.6093707 38.1397508, -75.6437029 38.1567605, -75.6581225 38.1478511, -75.6306567 38.1284089, -75.6584658 38.1124731, -75.6887297 38.121927, -75.7037844 38.1194961, -75.7103247 38.1132835, -75.7243838 38.1059898, -75.7374472 38.1146341, -75.7326579 38.1305694, -75.7103419 38.141911, -75.7014155 38.15946, -75.7058787 38.1737661, -75.7021021 38.1877996, -75.7034754 38.1983229, -75.6900859 38.2021001, -75.6704821 38.2026397)))

U.S. Fish and Wildlife Service

Trust Resources List

Project Type:

Power Generation

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of 2 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Flowering Plants	Status		Has Critical Habitat	Contact
sensitive joint-vetch (*Aeschynomene virginica*)	Threatened	species info		Chesapeake Bay Ecological Services Field Office
Mammals				
Delmarva Peninsula fox squirrel (*Sciurus niger cinereus*) Population: Entire, except Sussex Co., DE	Endangered	species info		Chesapeake Bay Ecological Services Field Office

Critical habitats within your project area:

There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no refuges found within the vicinity of your project.

U.S. Fish and Wildlife Service

Trust Resources List

FWS Migratory Birds (USFWS Migratory Bird Program).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

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For information about Birds of Conservation Concern, go to:
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For information about conservation measures that help avoid or minimize impacts to birds, please visit:
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Migratory birds of concern that may be affected by your project:
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Species Name	Bird of Conservation Concern (BCC)	Species Profile	Seasonal Occurrence in Project Area
American Oystercatcher (*Haematopus palliatus*)	Yes	species info	Year-round

Trust Resources List

American bittern (*Botaurus lentiginosus*)	Yes	species info	Wintering
Bald eagle (*Haliaeetus leucocephalus*)	Yes	species info	Year-round
Black rail (*Laterallus jamaicensis*)	Yes	species info	Breeding
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Yes	species info	Breeding
Brown-headed Nuthatch (*Sitta pusilla*)	Yes	species info	Year-round
Fox Sparrow (*Passerella liaca*)	Yes	species info	Wintering
Gull-billed Tern (*Gelochelidon nilotica*)	Yes	species info	Breeding
Hudsonian Godwit (*Limosa haemastica*)	Yes	species info	Migrating
Least Bittern (*Ixobrychus exilis*)	Yes	species info	Breeding
Least tern (*Sterna antillarum*)	Yes	species info	Breeding
Lesser Yellowlegs (*Tringa flavipes*)	Yes	species info	Wintering
Marbled Godwit (*Limosa fedoa*)	Yes	species info	Wintering
Nelson's Sparrow (*Ammodramus nelsoni*)	Yes	species info	Wintering
Peregrine Falcon (*Falco peregrinus*)	Yes	species info	Wintering
Pied-billed Grebe (*Podilymbus podiceps*)	Yes	species info	Year-round
Prairie Warbler (*Dendroica discolor*)	Yes	species info	Breeding
Prothonotary Warbler (*Protonotaria citrea*)	Yes	species info	Breeding
Purple Sandpiper (*Calidris maritima*)	Yes	species info	Wintering
Red Knot (*Calidris canutus rufa*)	Yes	species info	Wintering
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	Yes	species info	Year-round
Rusty Blackbird (*Euphagus carolinus*)	Yes	species info	Wintering

Trust Resources List

Saltmarsh Sparrow (*Ammodramus caudacutus*)	Yes	species info	Year-round
Seaside Sparrow (*Ammodramus maritimus*)	Yes	species info	Year-round
Short-billed Dowitcher (*Limnodromus griseus*)	Yes	species info	Wintering
Short-eared Owl (*Asio flammeus*)	Yes	species info	Wintering
Snowy Egret (*Egretta thula*)	Yes	species info	Breeding
Wood Thrush (*Hylocichla mustelina*)	Yes	species info	Breeding
Worm eating Warbler (*Helmitheros vermivorum*)	Yes	species info	Breeding

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

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The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work

conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

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Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The following wetland types intersect your project area in one or more locations:

Wetland Types	NWI Classification Code	Total Acres
Estuarine and Marine Deepwater	E1UBL	237.7267
Estuarine and Marine Wetland	E2EM1P	366.3351
Freshwater Emergent Wetland	PEM1/SS4Bd	24.6654
Freshwater Emergent Wetland	PEM1Bd	57.6259
Freshwater Emergent Wetland	PEM1E	1.4356
Freshwater Emergent Wetland	PEM1C	93.0944
Freshwater Emergent Wetland	PEM1A	230.3437
Freshwater Emergent Wetland	PEM1B	58.4986
Freshwater Emergent Wetland	PEM1Ad	2.9022
Freshwater Emergent Wetland	PEM1Cd	1.0868

Trust Resources List

Freshwater Forested/Shrub Wetland	PSS1/4B	26.0324
Freshwater Forested/Shrub Wetland	PFO1/4Bd	188.2226
Freshwater Forested/Shrub Wetland	PFO1/3E	299.2856
Freshwater Forested/Shrub Wetland	PFO1Ad	259.2252
Freshwater Forested/Shrub Wetland	PSS4Bd	223.6806
Freshwater Forested/Shrub Wetland	PSS4/1B	41.5047
Freshwater Forested/Shrub Wetland	PFO4B	66.5497
Freshwater Forested/Shrub Wetland	PSS4/1Bd	30.4987
Freshwater Forested/Shrub Wetland	PSS1/4Bd	49.445
Freshwater Forested/Shrub Wetland	PFO1S	4.1735
Freshwater Forested/Shrub Wetland	PSS1/EM1A	9.9612
Freshwater Forested/Shrub Wetland	PFO1R	8.3844
Freshwater Forested/Shrub Wetland	PFO1Bd	136.3977
Freshwater Forested/Shrub Wetland	PSS1R	9.0973
Freshwater Forested/Shrub Wetland	PFO1/4B	79.2339
Freshwater Forested/Shrub Wetland	PFO4Bd	206.4383
Freshwater Forested/Shrub Wetland	PFO1/4A	25.8656
Freshwater Forested/Shrub Wetland	PFO1/4C	84.5461
Freshwater Forested/Shrub Wetland	PFO4/1Bd	265.8972
Freshwater Forested/Shrub Wetland	PSS1/FO1B	32.7903
Freshwater Forested/Shrub Wetland	PSS4Ed	22.4759
Freshwater Forested/Shrub Wetland	PFO1/EM1A	43.8747
Freshwater Forested/Shrub Wetland	PSS4/EM1Bd	131.8262
Freshwater Forested/Shrub Wetland	PFO1B	332.2357
Freshwater Forested/Shrub Wetland	PSS4C	28.7522
Freshwater Forested/Shrub Wetland	PSS1A	9.1075

Trust Resources List

Freshwater Forested/Shrub Wetland	PSS4B	31.9029
Freshwater Forested/Shrub Wetland	PFO1C	512.0423
Freshwater Forested/Shrub Wetland	PSS4A	24.836
Freshwater Forested/Shrub Wetland	PFO1A	656.8059
Freshwater Forested/Shrub Wetland	PFO4/1B	534.6371
Freshwater Forested/Shrub Wetland	PFO1E	704.2208
Freshwater Pond	PUBHx	71.7996
Freshwater Pond	PUBF	0.5813
Freshwater Pond	PUBHh	0.1786
Other	Pf	13.751

EDR

APR 13 2015

RECEIVED

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

April 3, 2015

Ms. Sara R. Stebbins
Environmental Design & Research
217 Montgomery Street, Suite 1000
Syracuse, NY 13202

RE: Environmental Review for Great Bay Solar Project, Photovoltaic Solar Energy Facility with 150MW Capacity, PJM Interconnection at Kings Creek Substation, Somerset County, Maryland.

Dear Ms. Stebbins:

The Wildlife and Heritage Service's database indicates that there are the following areas of potential concern along the project route that are associated with rare, threatened and endangered (RT&E) species. Further consultation with the Wildlife and Heritage Service may be warranted to develop avoidance and minimization measures for possible impacts to these areas. It is also important to note that the utilization of state funds, or the need to obtain a state authorized permit may warrant additional evaluations that could lead to protection or survey recommendations by the Wildlife and Heritage Service. These areas are:

The northern part of the study area overlaps with a Habitat Protection Area (HPA) designated as Somerset County Listed Species Site (SO L-03) which is also designated as a Wetland of Special State Concern (WSSC), due to the RT&E species' habitat this wetland system provides. The HPA is designated by the local jurisdiction's Critical Area program, and the WSSC is regulated by Maryland Department of the Environment. Your project may need review by these agencies for any necessary permits associated with this important wetland area. This area, collectively referred to as Princess Anne Marshes, supports the following occurrences of RT&E species, broken down by the specific streams in which they are documented:

Wesley Branch is located west of US Route 13 and drains into the Manokin River in an area where there are records for:

Scientific Name	Common Name	State Status
Bidens trichosperma	Tickseed Sunflower	Rare/watchlist
Bidens mitis	Small-fruited Beggar-ticks	Endangered
Aeschynomene virginica	Sensitive Joint-vetch	Endangered, also Federally listed

Loretto Branch is located on the east side of US Route 13 and supports occurrences of:

Scientific Name	Common Name	State Status
Enneacanthus obesus	Banded Sunfish	Rare
Etheostoma fusiforme	Swamp Darter	In Need of Conservation
Acantharcus pomotis	Mud Sunfish	In Need of Conservation

Manokin Branch is located on the east side of US Route 13 and supports an occurrence of the Banded Sunfish.

Taylor Branch and Jones Creek are located on both sides of US Route 13 and drain into a part of the creek that supports records of Sensitive Joint-vetch.

In the Dublin area of the project site, there are records for the Swamp Darter and the Banded Sunfish. These are documented in Moore Branch which drains to Kings Creek.

In the Dublin Swamp area, the wetland here is designated as a Nontidal Wetland of Special State Concern (NTWSSC) and is regulated, along with its 100-foot upland buffer, as such. There is a record here for Button Sedge (*Carex bullata*) which was once an RT&E species, but has since been de-listed to watchlist status in Maryland. We would not ask for any protection recommendations at this site based on the status of the Button Sedge, however, MDE is the regulatory authority for NTWSSCs.

South of Follow Ditch Road, there is a record for the Banded Sunfish in Puncheon Landing Branch.

Where the project site crosses Kings Creek, there are records in close proximity for Leafy Pond (*Potamogeton foliosus*) and Long's Bittercress (*Cardamine longii*), both state-listed endangered species.

Our analysis of the information provided also suggests that the forested area on or adjacent to the project site contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird Species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of FIDS habitat is strongly encouraged by the Department of Natural Resources, and mandated within the Critical Area. The following guidelines could be applied to help minimize the project's impacts on FIDS and other native forest plants and wildlife:

1. Avoid placement of new utility lines or related construction in the forest interior. If forest loss or disturbance is absolutely unavoidable, restrict development to the perimeter of the forest (i.e., within 300 feet of the existing forest edge), and avoid line placement in areas of high quality FIDS habitat (e.g., old-growth forest). Maximize the amount of remaining contiguous forested habitat.
2. Do not remove or disturb forest habitat during April-August, the breeding season for most FIDS. This seasonal restriction may be expanded to February-August if certain early nesting FIDS (e.g., Barred Owl) are present.
3. Maintain forest habitat as close as possible to the utility line, and maintain canopy closure where possible.
4. Maintain grass height at least 10" during the breeding season (April-August).

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2015.0390.so
Cc: W. Knapp, DNR
F. Kelley, DNR
K. Charbonneau, CAC

EXHIBIT B

MHT Consultation

MARYLAND HISTORICAL TRUST

PROJECT REVIEW FORM

Request for Comments from the Maryland Historical Trust/ MDSHPO on State and Federal Undertakings

MHT USE ONLY	
Date Received:	Log Number:

Project Name	Great Bay Solar	County	Somerset

Primary Contact:

Contact Name	Paul Harris	Company/Agency	Great Bay Solar, LLC
Mailing Address	1802 Lavaca, #200		
City	Austin	State: Texas	Zip: 78701
Email	paul.harris@pioneergreen.com	Phone Number: +1 (512) 348-0606	Ext.

Project Location:

Address	Multiple parcels totaling over 1,100 acres (see attached Project description).	City/Vicinity	Westover, Kingston
Coordinates (if known): Latitude		Longitude	Waterway

Project Description:

List federal and state sources of funding, permits, or other assistance (e.g. Bond Bill Loan of 2013, Chapter #; HUD/ CDBG; MDE/COE permit; etc.).	Agency Type	Agency/Program/Permit Name	Project/Permit/Tracking Number (if applicable)
	State	Maryland Public Service Commission CPCN	

This project includes (check all applicable): ☒ New Construction ☐ Demolition ☐ Remodeling/Rehabilitation

☐ State or Federal Rehabilitation Tax Credits ☒ Excavation/Ground Disturbance ☒ Shoreline/Waterways/Wetlands

Other\Additional Description:

Known Historic Properties:

This project involves properties (check all applicable): ☐ Listed in the National Register ☐ Subject to an easement held by MHT

☒ Included in the Maryland Inventory of Historic Properties ☐ Designated historic by a local government

☐ Previously subject to archeological investigations

Property\District\Report Name: Multiple, see attached map entitled "Historic Resources"

Attachments:

All attachments are required. Incomplete submittals may result in delays or be returned without comment.

☒ Aerial photograph or USGS Quad Map section with location and boundaries of project clearly marked.

☒ Project Description, Scope of Work, Site Plan, and\or Construction Drawings.

☒ Photographs (print or digital) showing the project site including images of all buildings and structures.

☒ Description of past and present land uses in project area (wooded, mined, developed, agricultural uses, etc).

MHT Determination:

☐ There are **NO HISTORIC PROPERTIES** in the area of potential effect

☐ The project will have **NO EFFECT** on historic properties

☐ The project will have **NO ADVERSE EFFECT** on historic properties

☐ The project will have **NO ADVERSE EFFECT WITH CONDITIONS**

☐ The project will have **ADVERSE EFFECTS** on historic properties

☐ **MHT REQUESTS ADDITIONAL INFORMATION**

MHT Reviewer: Date:

Submit printed copy of form and all attachments by mail to: Beth Cole, MHT, 100 Community Place, Crownsville, MD 21032

Project Description

Great Bay Solar I, LLC (GBS or the Applicant), a wholly owned subsidiary of Pioneer Green Solar, LLC (Pioneer), is proposing to develop a photovoltaic (PV) solar energy facility with a nominal rated capacity of up to 150 megawatts (MW) alternating current (AC). The Project will be constructed on up to approximately 1,100 acres of private land (the Project site) currently under lease or purchase option between Princess Anne and Pocomoke City in Somerset County, Maryland. The Project site also includes easements that will be utilized for electrical collection lines. The collection line easements are mostly adjacent to existing public roads and/or railroad right-of-ways (ROWs).

The Project will connect to the PJM Interconnection, LLC (PJM) grid at the existing Kings Creek Substation, owned by Delmarva Power. GBS has a purchase option on the parcel immediately south of the Kings Creek Substation. GBS plans to build its substation on the southern portion of the parcel and connect to the Kings Creek Substation via a short (<500 feet) 138 kilovolt generation tie line.

The generating sites will be served by a network of unpaved access roads. The main access driveway for each generating site will be approximately 20 feet wide, while the lateral driveways providing access to the solar fields for maintenance will be narrower (between 8 and 12 feet wide). Parking areas for maintenance vehicles within the solar facility will be constructed with compacted gravel. During Project construction, temporary lay down areas will be used for storage of construction equipment and supplies.

The Project will contain one or more on-site solar meteorological stations (SMSs), which would consist of irradiance (solar energy) meters as well as air temperature and wind meters. The proposed facility would be enclosed with security fencing 7 to 10 feet high. The Project's access points will be gated. Security lighting will be installed to operate with motion detectors. Additional security measures may be utilized as necessary, such as monitoring by cameras and/or electronic security systems.

Parcels under lease or purchase option to host the generating facility are located along Old Princess Anne Road, Market Lane, Dublin Road, Wallace Taylor Road, Costen Road, and Arden Station Road (see enclosed "Project Layout Map"). The collection easements are anticipated to include a combination of the following: (1) an easement along portions of the Norfolk Southern railroad ROW that spans the Project site from Princess Anne to Pocomoke City; (2) easements that would allow buried collection lines adjacent to existing public roads, including Dublin and Old Princess Anne Roads; and (3) private easements to allow for buried or overhead collection lines that would cross privately owned property.

Cultural Resources Review

A Phase 1A archeological survey report (EDR, 2013) and a Historic Resources Assessment Compliance Report (EDR, 2014) were recently completed for the Great Bay Wind Energy Center (GBWEC), located in Somerset County, Maryland, in close proximity to the Project site. The northeastern portion of the GBWEC study area overlaps part of the Project site and associated study area for the Great Bay Solar Project.

Staff from Environmental Design & Research, Landscape Architecture, Engineering, & Environmental Services, D.P.C. (EDR) conducted a site visit to the Project Site between March 9 and 12, 2015. As a component of the site visit, all participating parcels within the Project Site were photographed (see enclosed exhibits entitled "Properties with Proposed Infrastructure" [map] and "Photographs of Properties with Proposed Infrastructure"). This included photographs of all extant standing structures located on these parcels, as described below.

Relative to archeological features, the Phase 1A for the GBWEC noted a total of 23 previously identified archeological sites located in the vicinity of the wind project, which included 11 prehistoric sites, nine historic-period sites, and three sites that contain both prehistoric and historic-period materials. None of these sites is located within the study area (or participating parcels/Project Site) for the Great Bay Solar Project.

Relative to historic architectural resources, several NRHP-listed and MIHP-listed properties, including the southern portion of the NRHP-listed Princess Anne Historic District, are located within a 0.5-mile radius of the Project Site (see enclosed "Historic Resources Map"). Three of the MIHP properties are located within or immediately adjacent to a participating parcel within the Project Site – of these, two are no longer standing (i.e., they have been demolished subsequent to their inclusion in the MIHP). Cultural resources within the Project Site are listed in Table 1 and mapped on the attached Historic Resources map.[1]

Table 1. MIHP Properties within the Project Site

MIHP Site Identifier	Property Name, Address, and/or Description	NRHP/MIHP Status	Distance to Project Site
S-202	Charlie Long Farm (Fred Senkbell Farm)	Demolished	Within Participating Parcel
S-343	Webley (Sidney Miller Farm)	Demolished	Within Participating Parcel
S-212	Ross Farm	Undetermined	Adjacent to Participating Parcel

[1] Although a portion of the Westover Survey District is depicted within the Project Site on the Historic Resources Map, no MIHP-listed properties included in the district are located within or immediately adjacent to participating parcels. In addition, several MIHP properties that are depicted on the Historic Resources Map were found to be no longer standing during the Historic Resources Assessment conducted by EDR for the Great Bay Wind Energy Center (on file with MHT).

Three MIHP properties are located within or immediately adjacent to a participating parcel within the Project Site[2]:

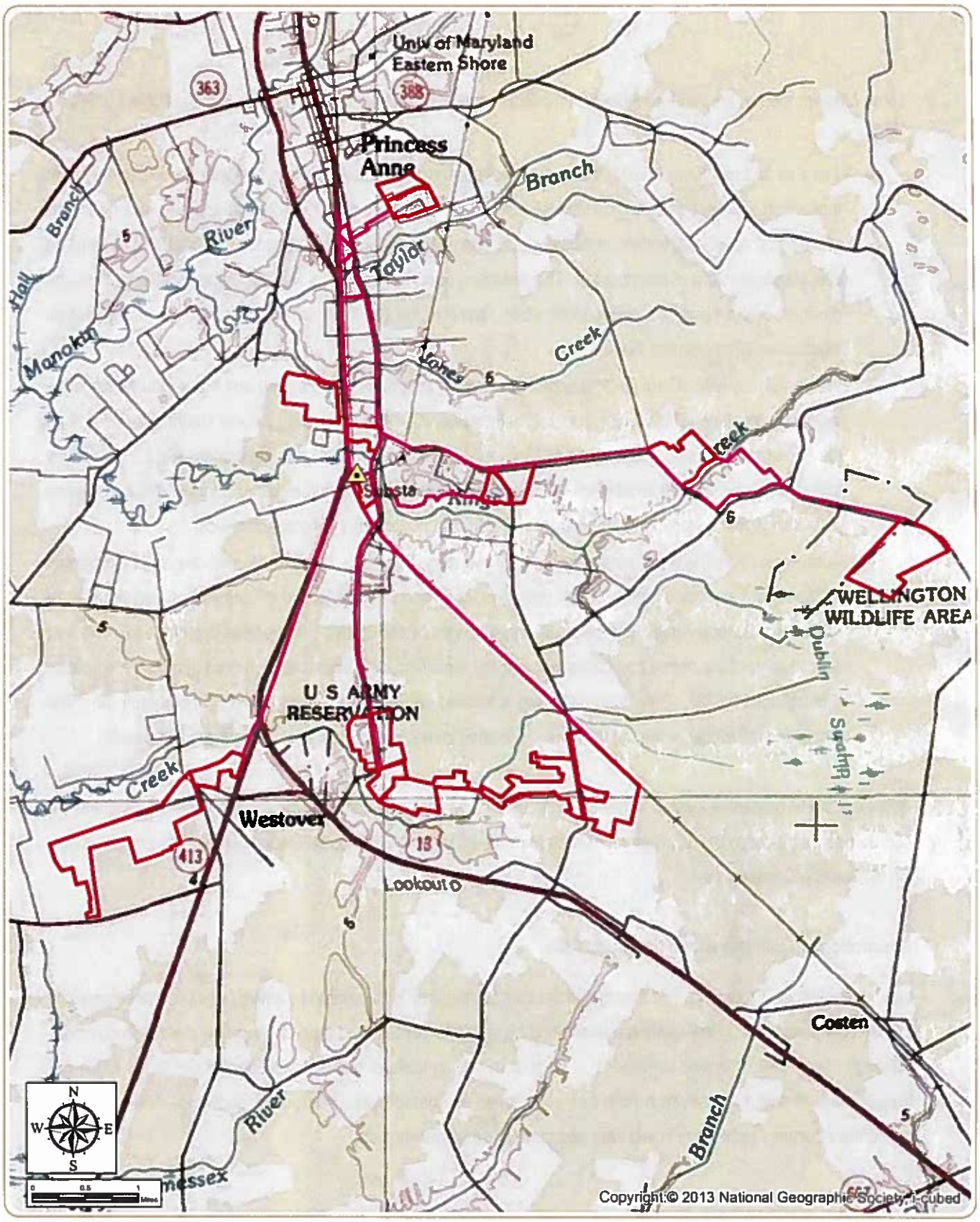
- The Charlie Long Farm (S-202) was a two-and-a-half story hall/parlor-style house with associated hay barn located on the west side of Old Princess Anne Road near Westover. The house and barn are no longer standing. A small, unidentified outbuilding visible in a photograph from a previous survey (1984) remains on site, but shows signs of deterioration. The remaining buildings on site are two, corrugated steel-sided storage garages, and a shed with cinder block walls. None of the buildings on site appear to be of any historic significance (Photographs 12-16).
- Webley/Sidney Miller Farm (S-343) is part of a tract of land owned by the King and Miller families since the eighteenth century. The Webley tract originally included an early Somerset County Courthouse as well as the Second Washington Academy (S-412, no longer standing), located east and across US 13. The Sidney Miller Farm was formerly located on the west side of US Route 13, and included a farmhouse and several outbuildings, but no structures are currently standing on the property (Photographs 3-5).
- Ross Farm (S-212) is a mid-nineteenth century two-story, three-bay vernacular farmhouse clad in wood with a hipped roof and twin corbelled brick chimneys, and associated collection of outbuildings, located east of McCormick Swamp Road. The house is currently vacant and shows considerable deterioration. The rear service wing of the house has collapsed, and the remaining outbuildings exhibit considerable deterioration (Photographs 28-38). Only one outbuilding is located within the Project site parcel (Photograph 38). The house and remainder of the outbuildings are located immediately adjacent to the participating parcel.

Additional MIHP properties located in close proximity to participating parcels with the Project study area include the Old Barnes Farmhouse (S-112), Samuel Barnes Farm (S-201), the NRHP-Listed Cedar Hill (S-211), and the King's Creek Canning Company (S-341).

Description of Land Use within the Study Area

Land use within the Project site and throughout the surrounding area is dominated by active farmland and commercial loblolly pine plantations. Row crops are dominated by corn and soybeans. Large chicken farms are also common. Although many residences are farmsteads, a number of non-agricultural residential properties are found within the Project area, as well, most of which have been developed as frontage lots along public roadways. The majority of residential structures within the Project area appear to be single-family units.

[2] Site descriptions are based on MIHP survey forms in the MHT Library in Crownsville, MD and/or *Somerset: An Architectural History* (Touart, 1990), EDR site visits conducted in 2013 as part of cultural resource investigations for the proposed Great Bay Wind Energy Center, and EDR site visits conducted in 2015 for support studies as part of the Great Bay Solar project.



Great Bay Solar Project

Somerset County, Maryland

Project Layout

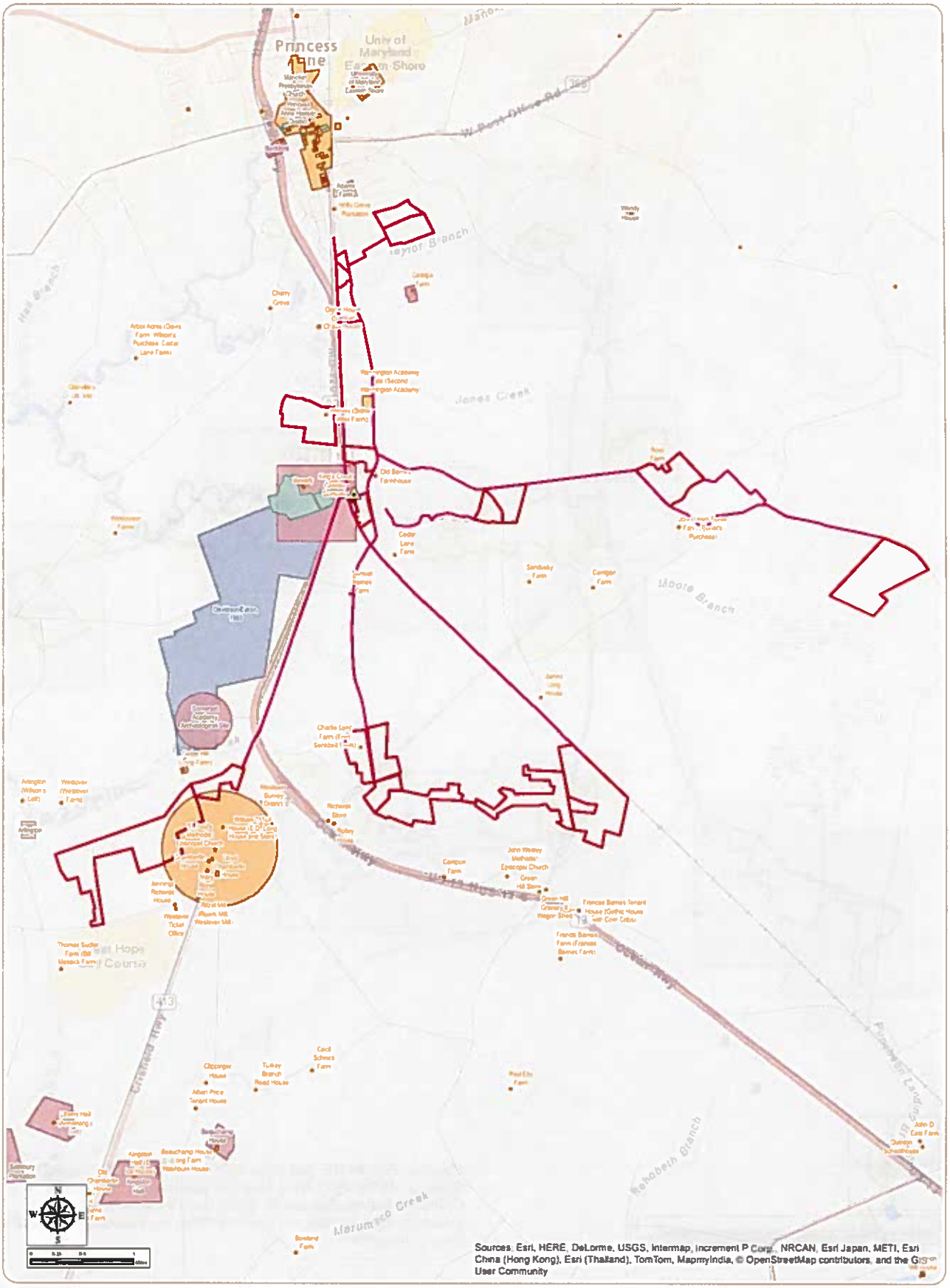
April 2015

Notes: 1. Basemap: ESRI ArcGIS Online map service "USA Topo Maps".
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Kings Creek Substation
- Potential Collection Line Route
- Project Site (Participating Parcel)

edr

www.edrdpc.com



Great Bay Solar Project

Somerset County, Maryland

Historic Resources

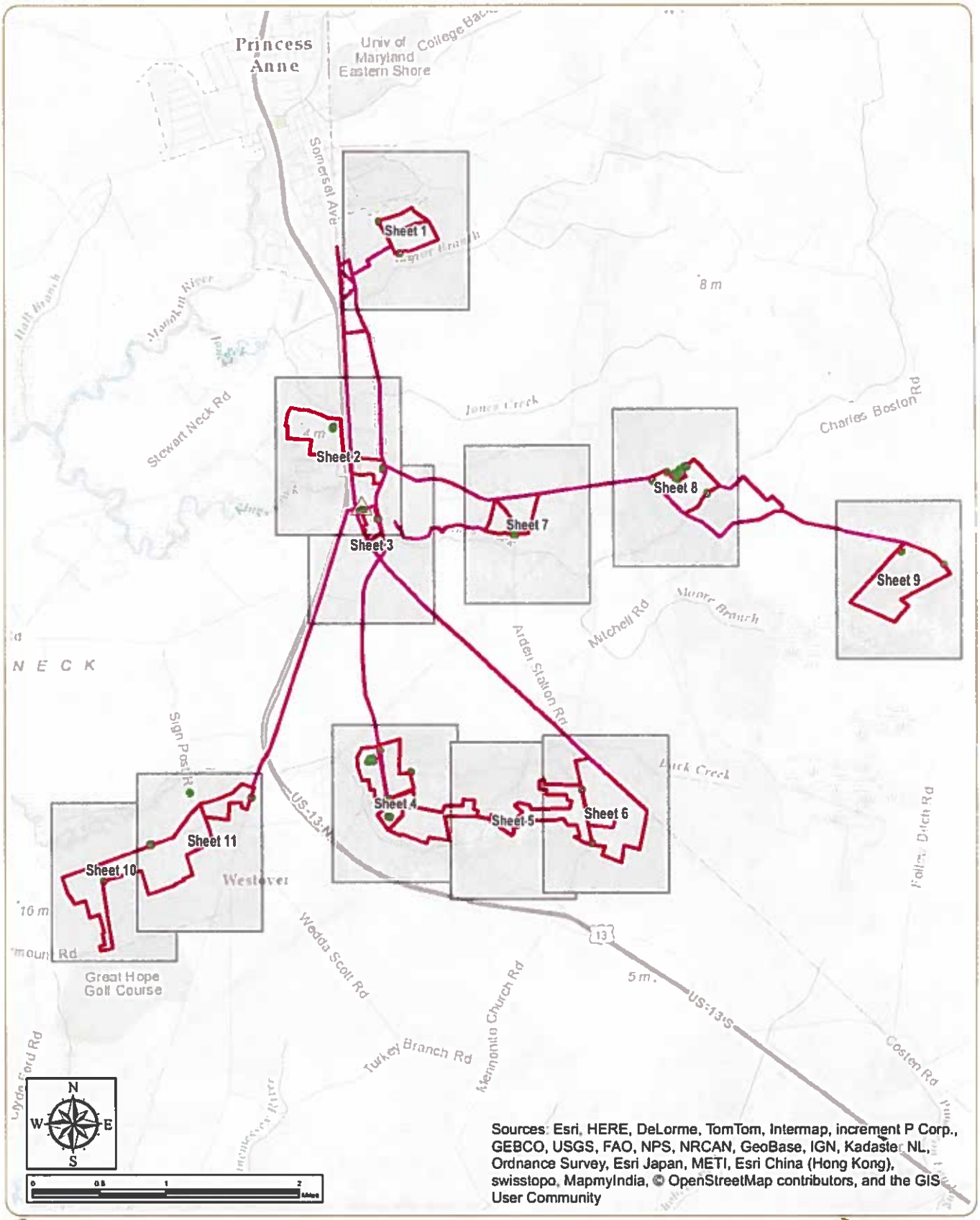
April 2015

Kings Creek Substation
Potential Collection Line Route
Project Site (Participating Parcel)
NRHP-Listed Site
MIHP-Listed Site
MHT Easements
Previous Cultural Resource Study

Notes: 1. Basemap: ESRI Word Imagery map service and StreetnMap North America, 2012
2. This is a color graphic. Reproduction in greyscale may misrepresent the data.

edr

www.sordpc.com



Great Bay Solar Project

Somerset County, Maryland

Properties With Proposed Infrastructure - Sheet Index

April 2015

- Photograph Locations
- Kings Creek Substation
- Potential Collection Line Routes
- Project Site (Participating Parcel)
- Sheets Index

Notes: 1. Basemap: ESRI ArcGIS Online "World Topography" map service.
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

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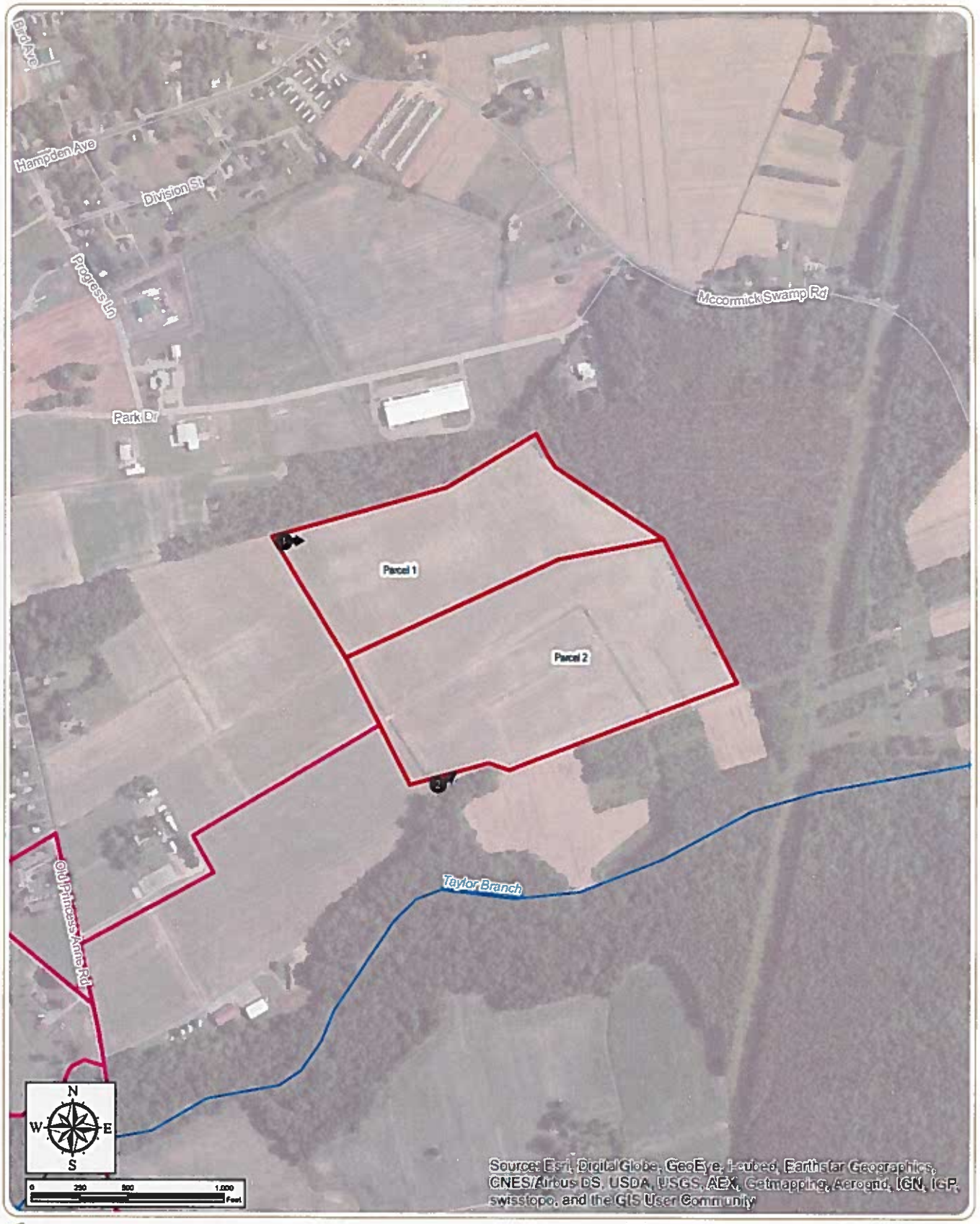

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

Notes:

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2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Photograph Locations
- Kings Creek Substation
- Potential Collection Line Routes
- Project Site (Participating Parcel)

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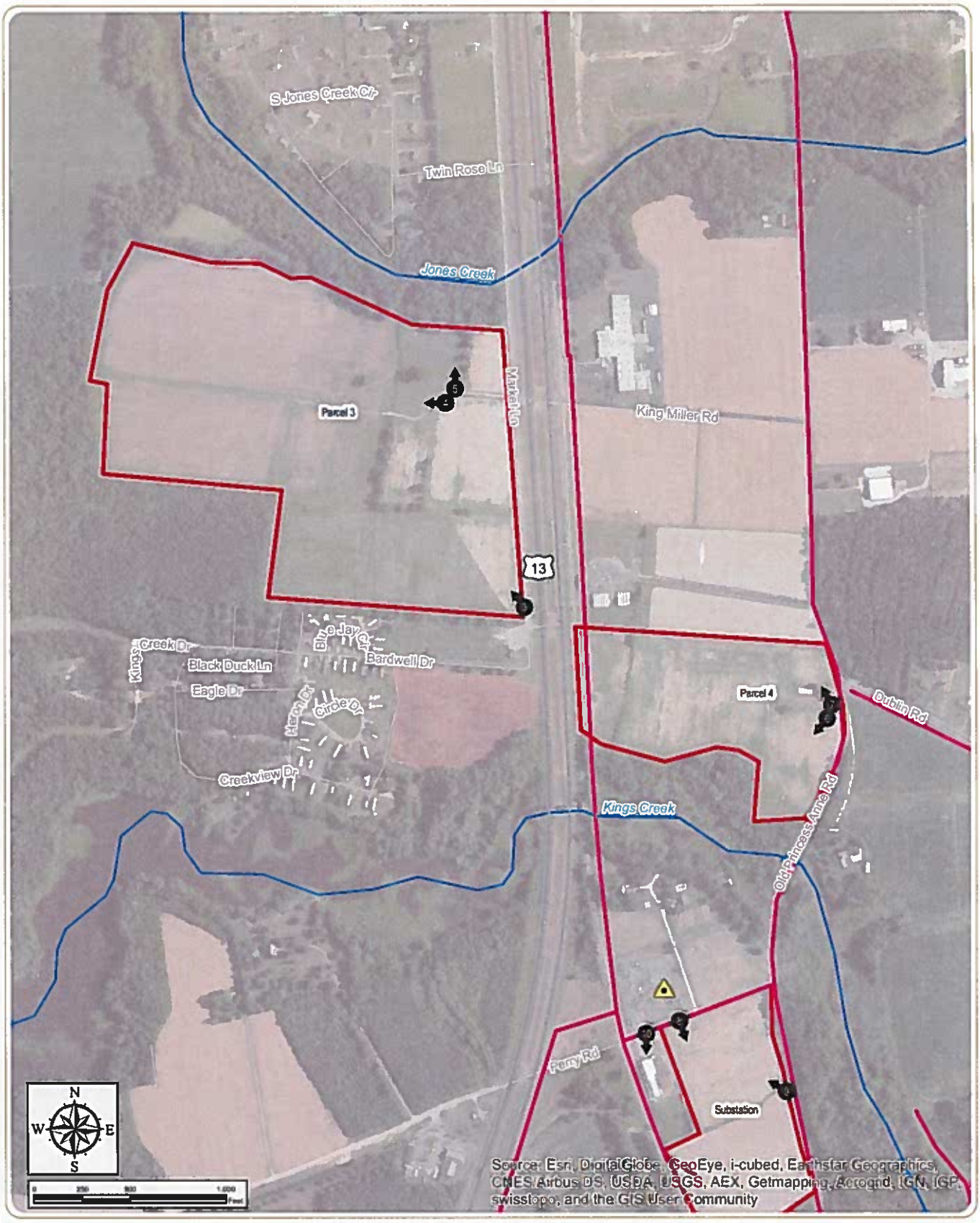

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

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- Photograph Locations
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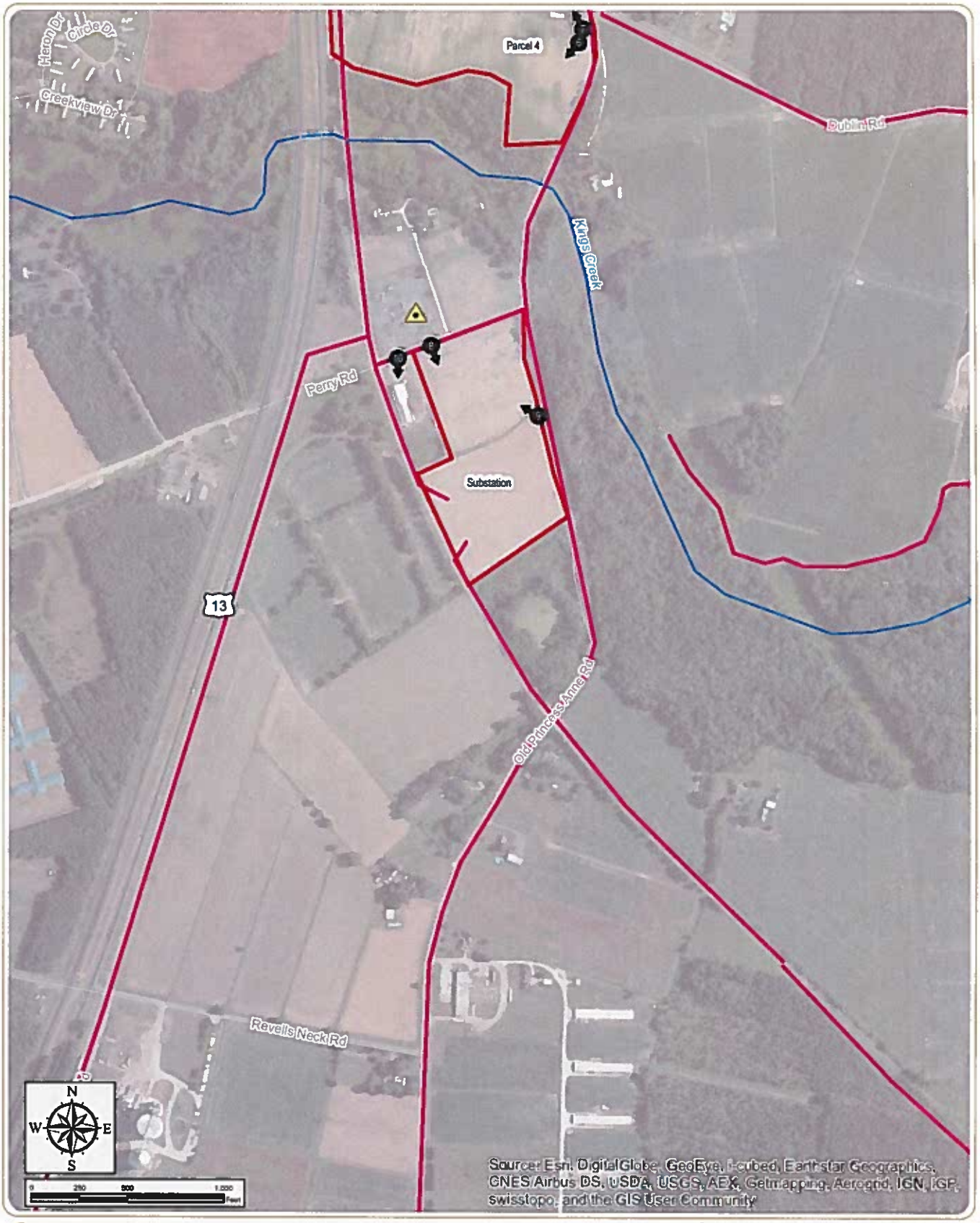

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

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- Photograph Locations
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- Project Site (Participating Parcel)

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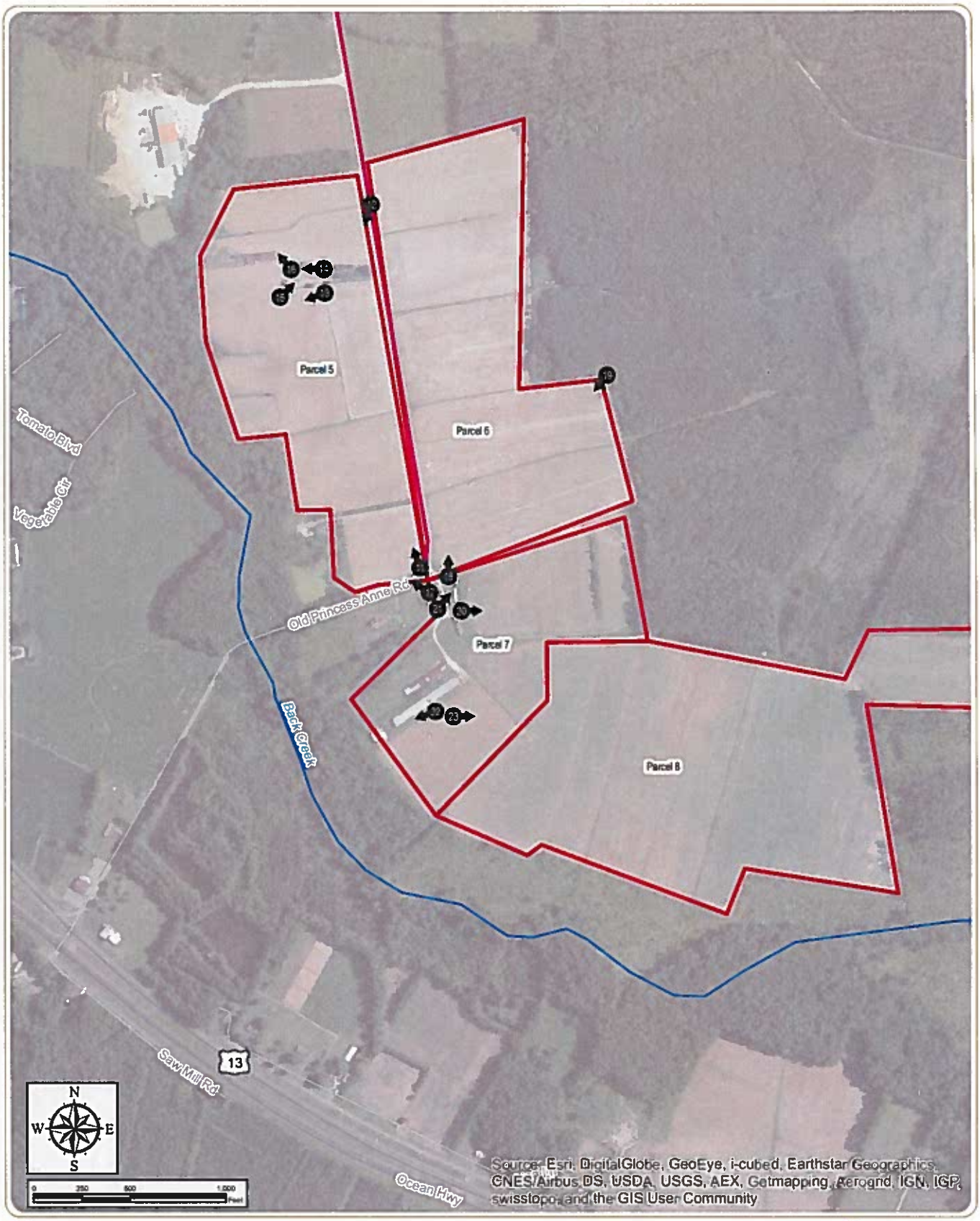

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

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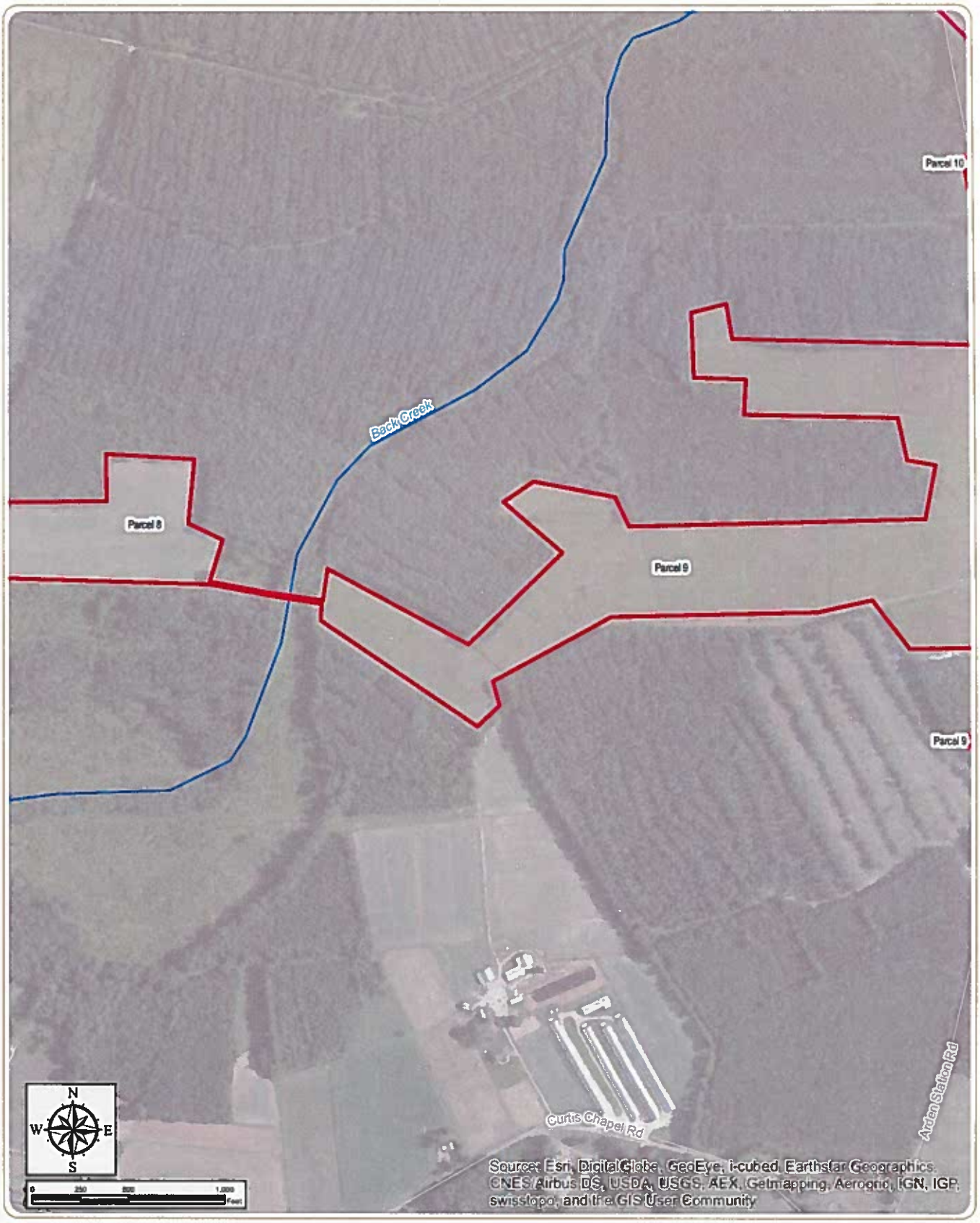

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

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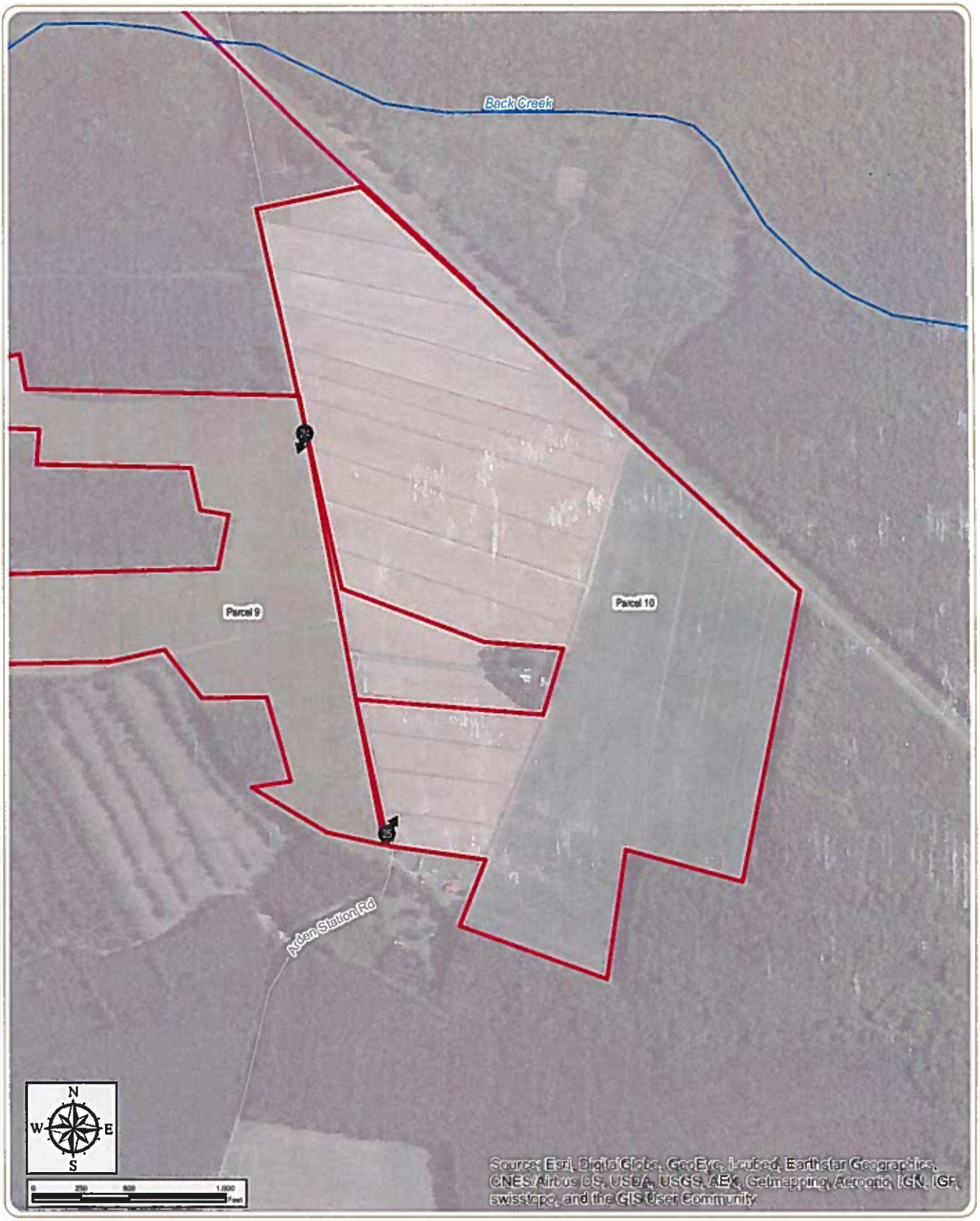

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

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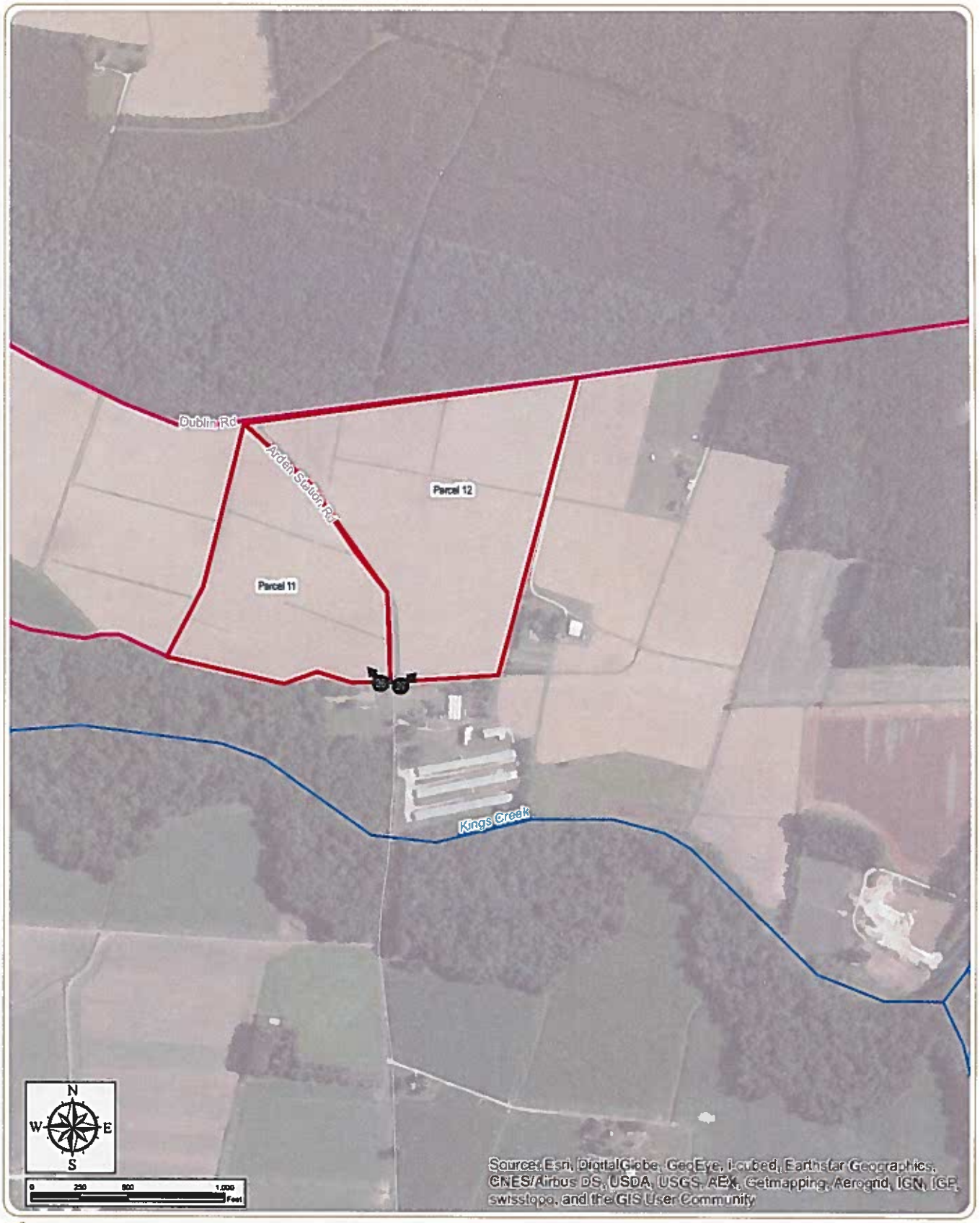

Great Bay Solar Project

Somerset County, Maryland

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Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

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Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

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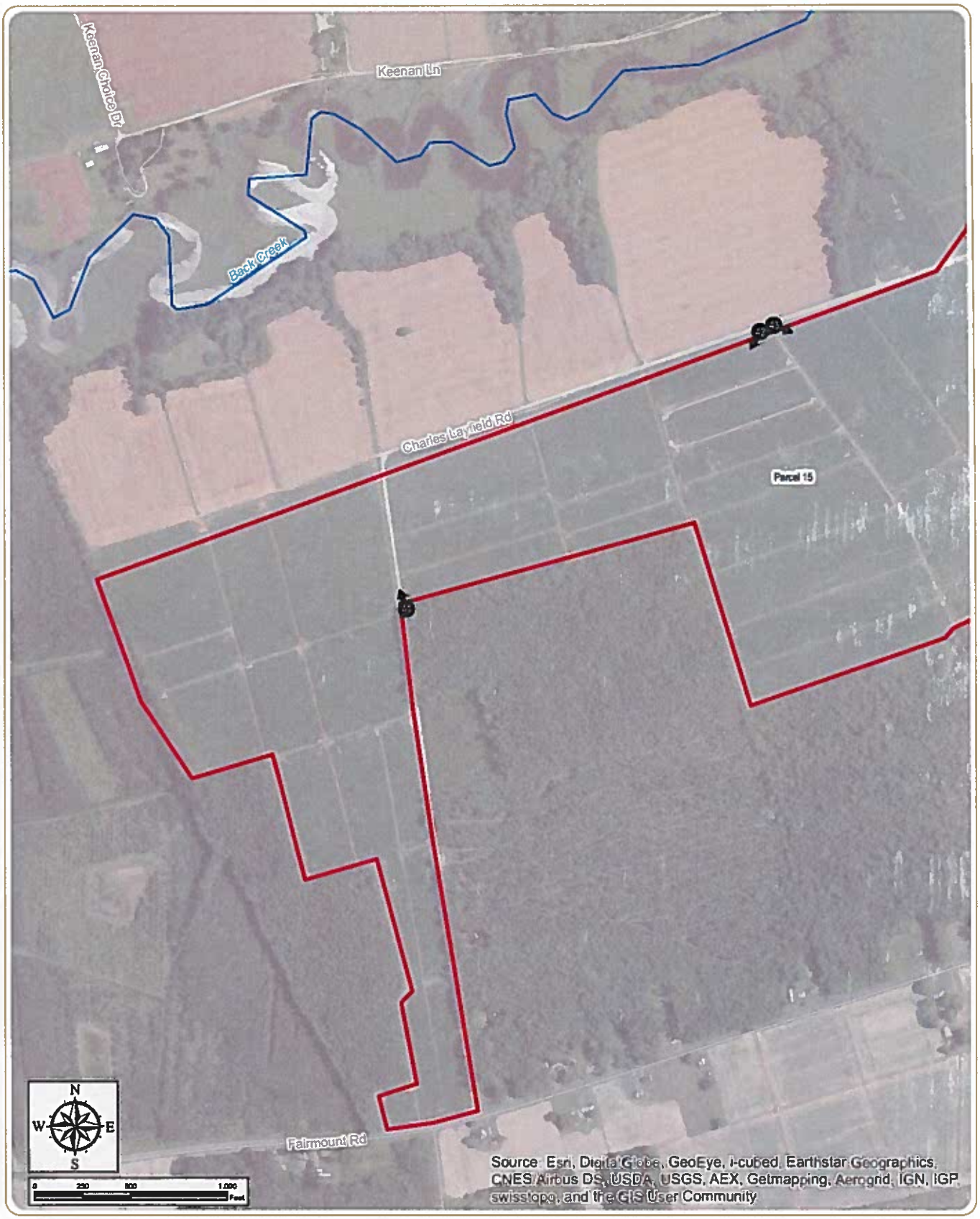

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

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- Photograph Locations
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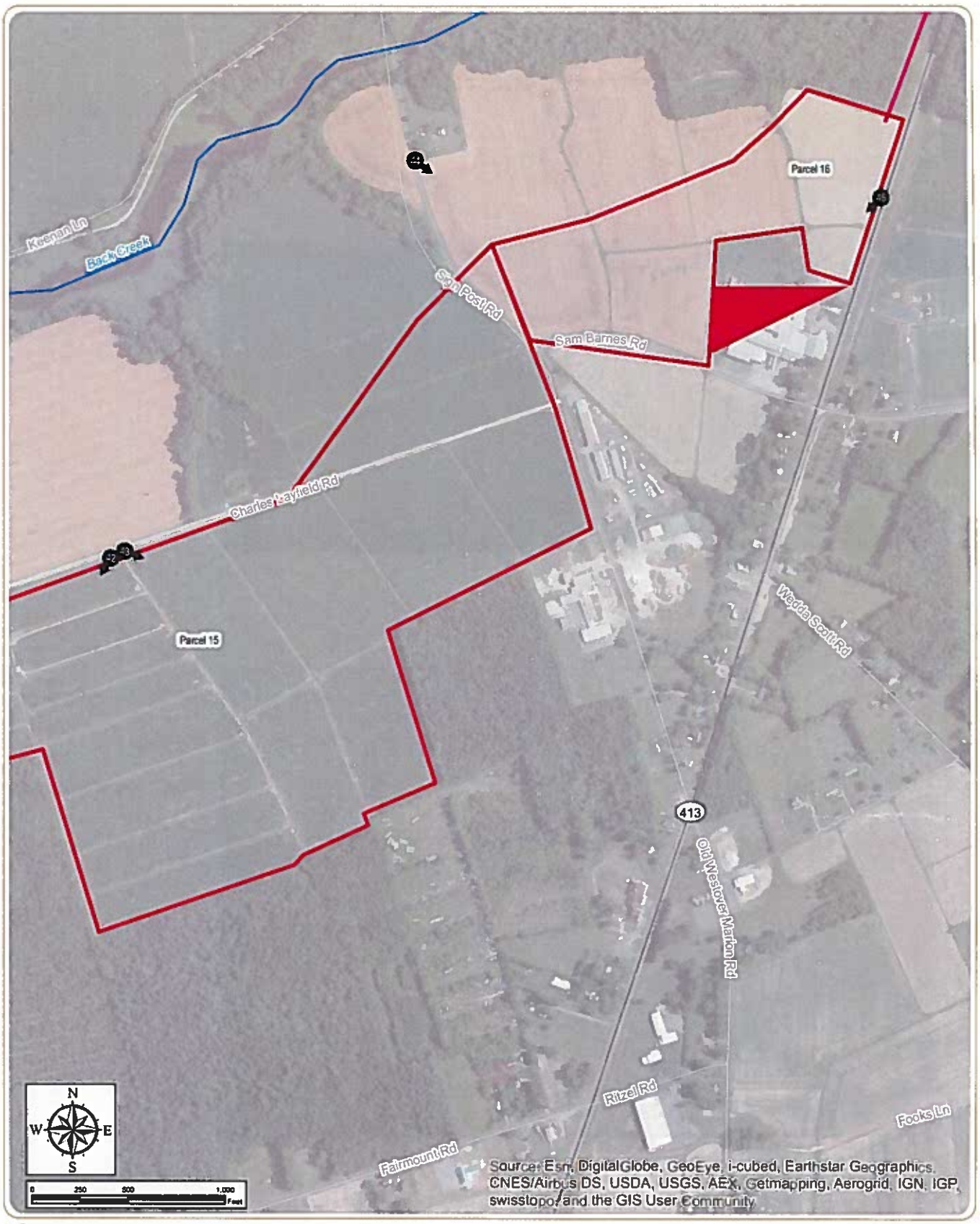

Great Bay Solar Project

Somerset County, Maryland

Properties with Proposed Infrastructure

April 2015

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2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

- Photograph Locations
- Kings Creek Substation
- Potential Collection Line Routes
- Project Site (Participating Parcel)

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Parcel 1
Old Princess Anne Road

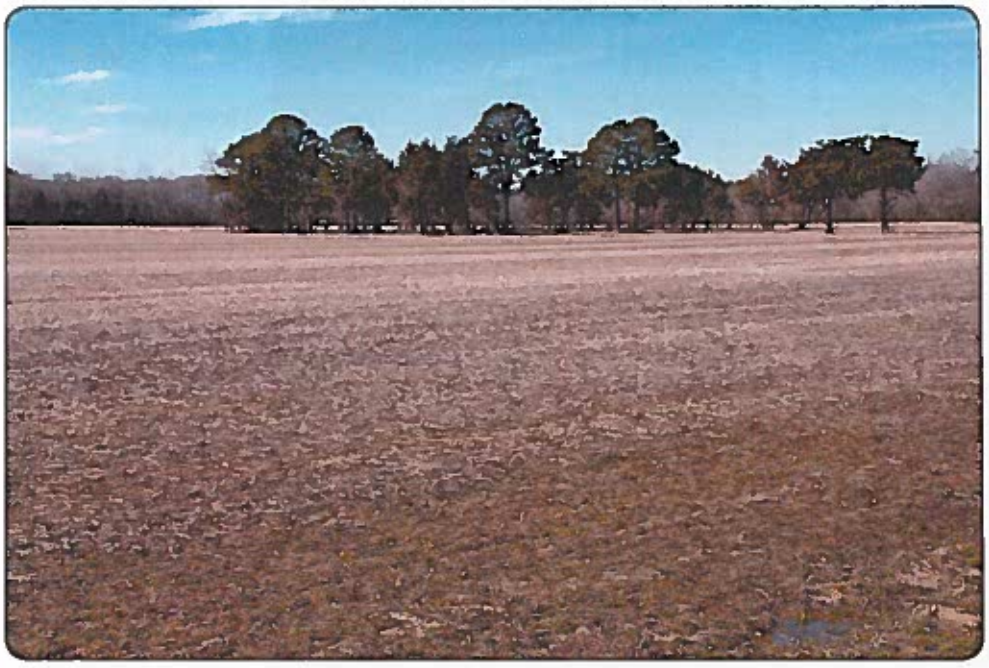
Photograph 1

Parcel 1, view to the east.

Parcel 2
Old Princess Anne Road

Photograph 2

Parcel 2, view to the northeast.



Parcel 3
MD State Route 13

Photograph 3

Parcel 3, view to the northwest.

Webley/Sidney Miller Farm
(S-343)

Parcel 3
MD State Route 13

Photograph 4

Parcel 3, view to the west.

Webley/Sidney Miller Farm
(S-343)

Parcel 3
MD State Route 13

Photograph 5

Parcel 3, view to the north.

Webley/Sidney Miller Farm (S-343)

Parcel 4
Old Princess Anne Road

Photograph 6

Parcel 4, view to the south-west.

Parcel 4
Old Princess Anne Road

Photograph 7

Parcel 4, view to the northwest toward farmhouse.

Substation Parcel
Perry Road

Photograph 8

Substation Parcel, view to the south-southeast.

Substation Parcel
Perry Road

Photograph 9

Substation Parcel, view to the northwest.

Substation Parcel
Perry Road

Photograph 10

Former location of King's Creek Canning Company (S-341), view to the south.

Parcel 5
Old Princess Anne Road

Photograph 11

Parcel 5, view to the northwest.

Parcel 5
Old Princess Anne Road

Photograph 12

Parcel 5, view to the southwest.

Charlie Long Farm (S-202)

Parcel 5
Old Princess Anne Road

Photograph 13

Parcel 5, view to the southwest toward outbuilding.

Charlie Long Farm (S-202)

Parcel 5
Old Princess Anne Road

Photograph 14

Parcel 5, view to the west toward outbuilding.

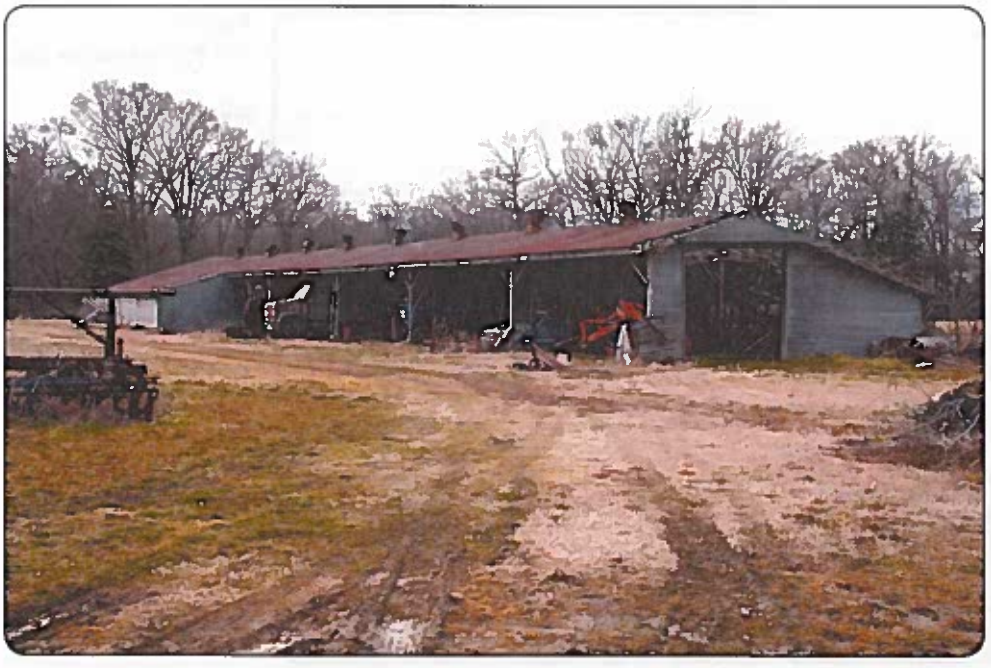
Charlie Long Farm (S-202)

Parcel 5
Old Princess Anne Road

Photograph 15

Parcel 5, view to the northeast toward outbuilding.

Charlie Long Farm (S-202)



Parcel 5
Old Princess Anne Road

Photograph 16

Parcel 5, view to the northwest toward outbuilding.

Charlie Long Farm (S-202)

Parcel 5
Old Princess Anne Road

Photograph 17

Parcel 5, view to the northwest.

Parcel 6
Old Princess Anne Road

Photograph 18

Parcel 6, view to the northeast.

Parcel 6
Old Princess Anne Road

Photograph 19

Parcel 6, view to the southwest.

Parcel 7
Old Princess Anne Road

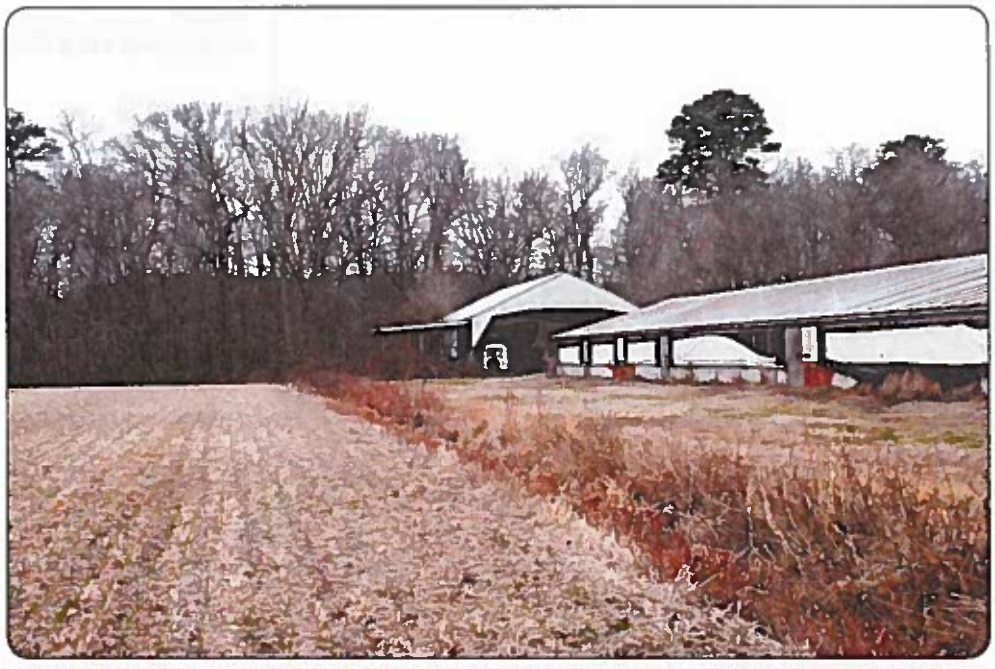
Photograph 20

Parcel 7, view to the east.

Parcel 7
Old Princess Anne Road

Photograph 21

Parcel 7, view to the northeast toward outbuilding.



Parcel 7
Old Princess Anne Road

Photograph 22

Parcel 7, view to the southwest toward outbuildings.

Parcel 8
Old Princess Anne Road

Photograph 23

Parcel 8, view to the east.

Parcel 9
Arden Station Road

Photograph 24

Parcel 9, view to the west.

Parcel 10
Arden Station Road

Photograph 25

Parcel 10, view to the north-east.

Parcel 11
Arden Station Road

Photograph 26

Parcel 11, view to the northwest.

Parcel 12
Arden Station Road

Photograph 27

Parcel 12, view to the northeast.

Parcel 13
Dublin Road

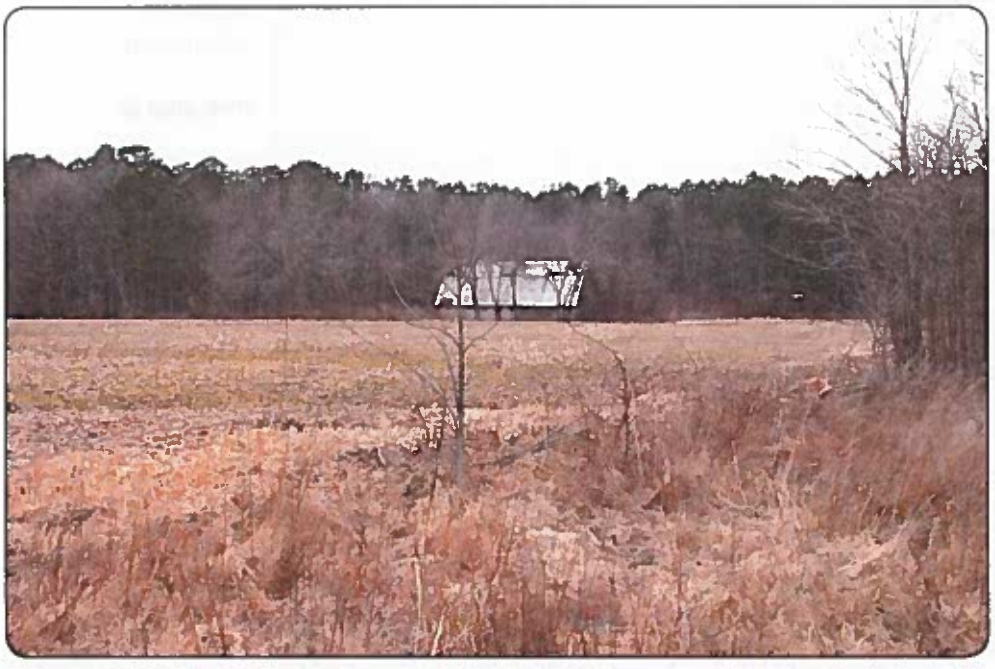
Photograph 28

Parcel 13, view to the northeast.

Parcel 13
Dublin Road

Photograph 29

Parcel 13, view to the south.



Parcel 13
Dublin Road

Photograph 30

Ross Farm outbuilding, view to the west.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 31

Ross Farm house and outbuilding, view to the east.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 32

Ross Farm house, view to the north.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 33

Ross Farm house service wing, view to the west.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 34

Ross Farm outbuilding, view to the north.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 35

Ross Farm outbuilding, view to the northeast.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 36

Ross Farm outbuilding, view to the west.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 37

Ross Farm outbuilding, view to the northwest.

Ross Farm (S-212)

Parcel 13
Dublin Road

Photograph 38

Parcel 13, view to the west toward outbuilding.

Ross Farm (S-212)

Parcel 14
Dublin Road

Photograph 39

Parcel 14, view to the southwest.

Parcel 14
Dublin Road

Photograph 40

Parcel 14, view to the southwest.

Parcel 15
Charles Layfield Road

Photograph 41

Parcel 15, view to the north-northwest.

Parcel 15
Charles Layfield Road

Photograph 42

Parcel 15, view to the southwest.

Parcel 15
Charles Layfield Road

Photograph 43

Parcel 15, view to the southwest.

Parcel 16
Sam Barnes Road

Photograph 44

Parcel 16, view to the southeast.

Parcel 16
Sam Barnes Road

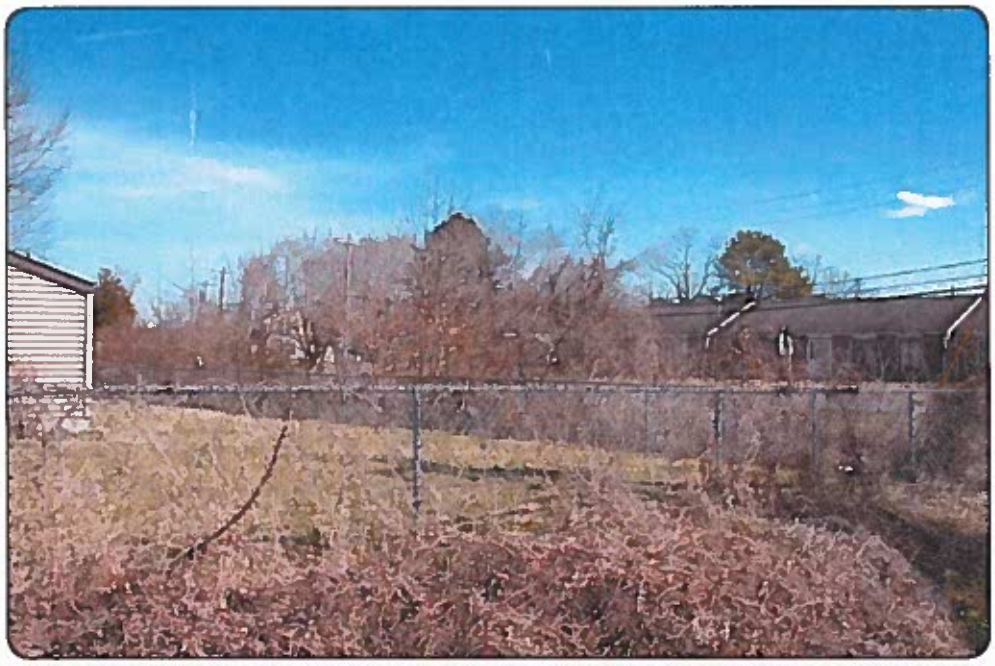
Photograph 45

Parcel 16, view to the southwest.

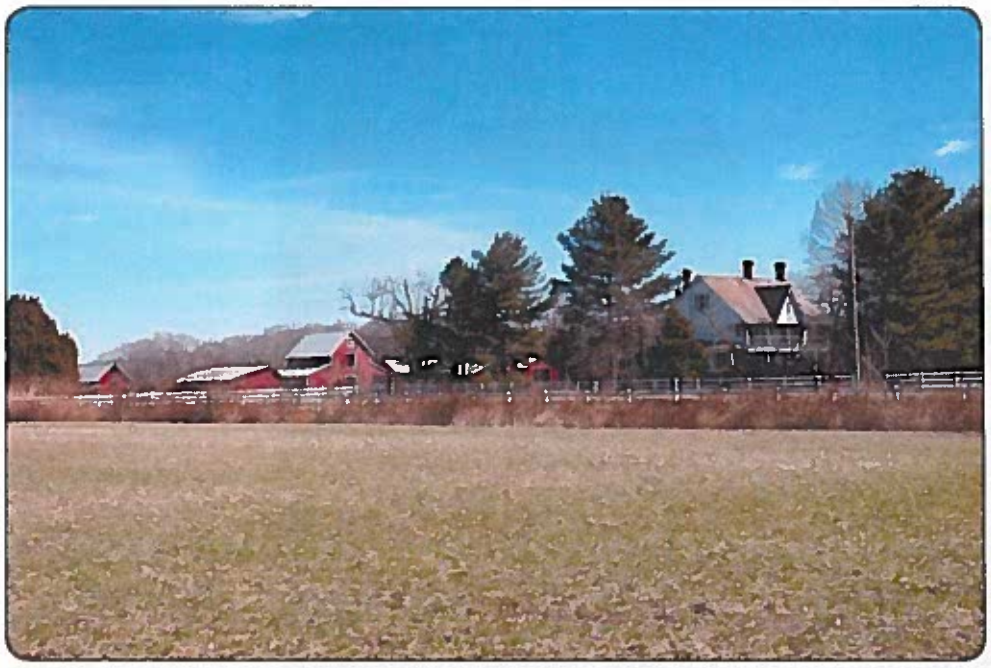
EXHIBIT C

Visual Assessment Photographs

Viewpoint 1



Viewpoint 2



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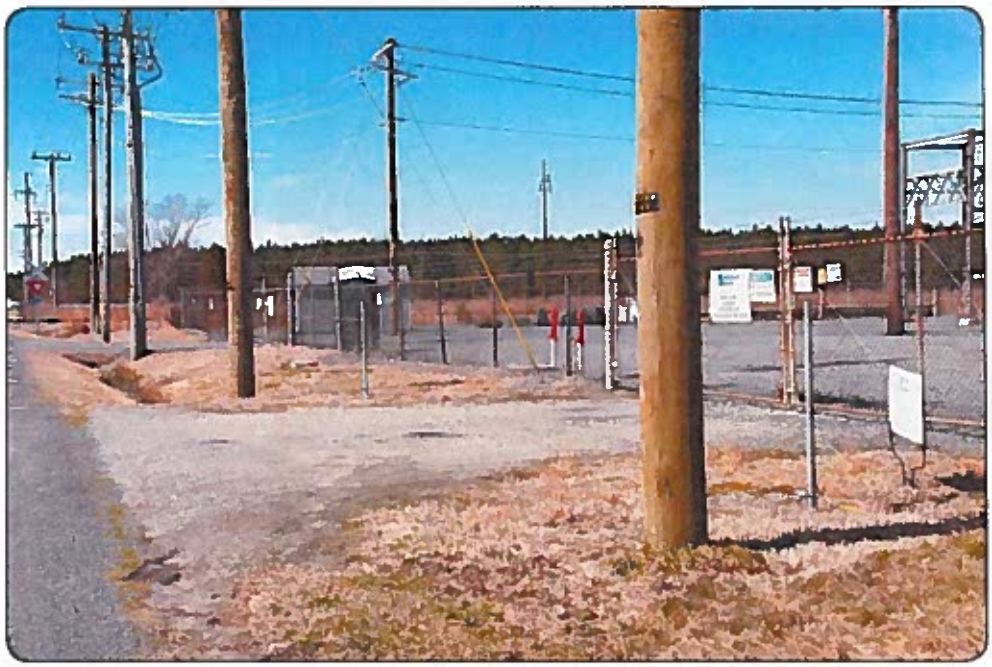

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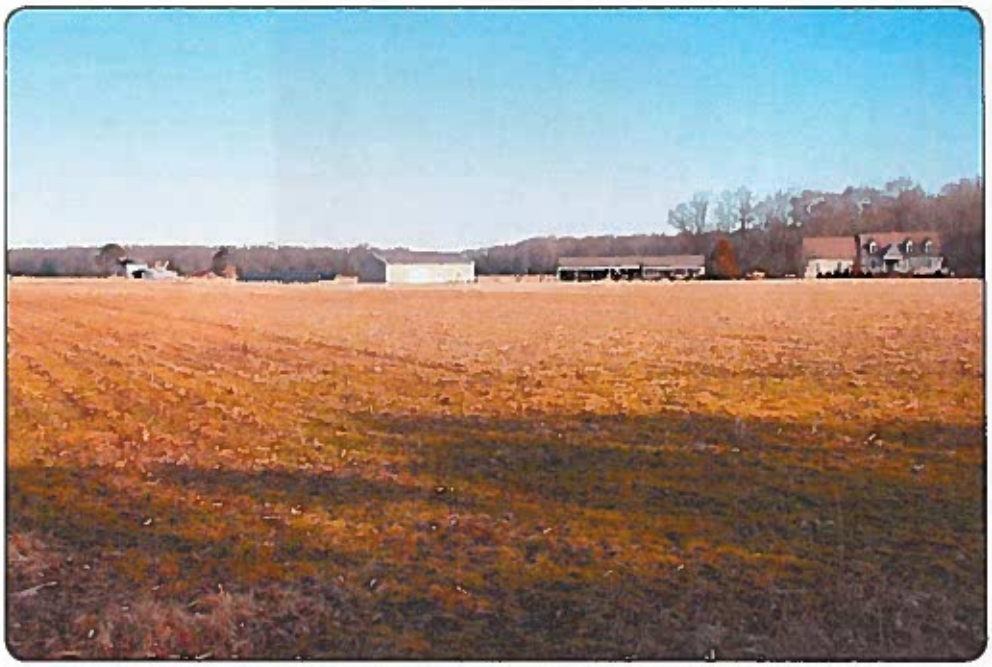

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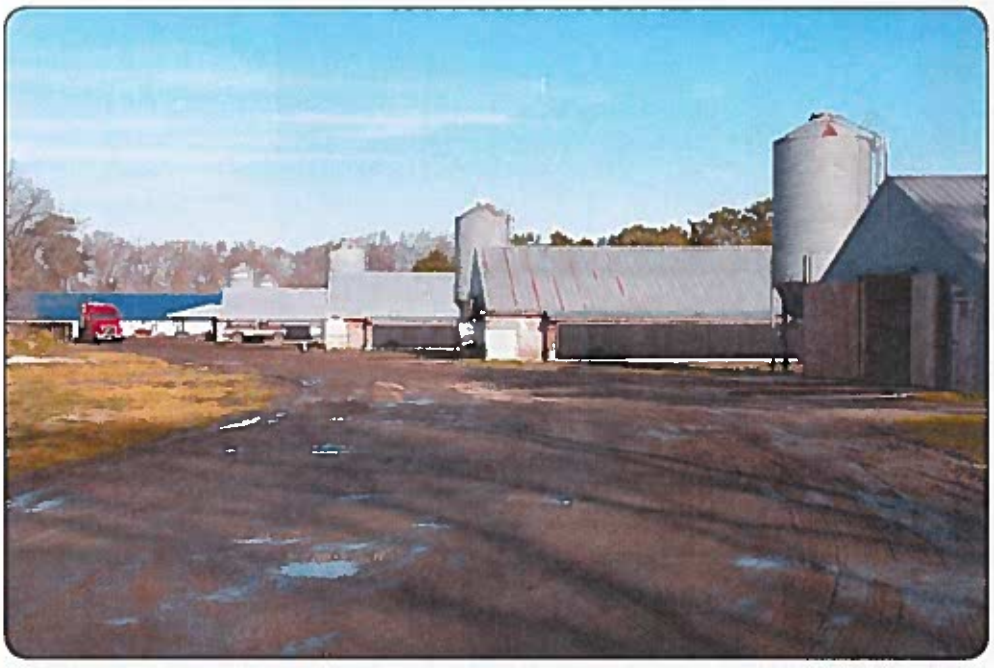

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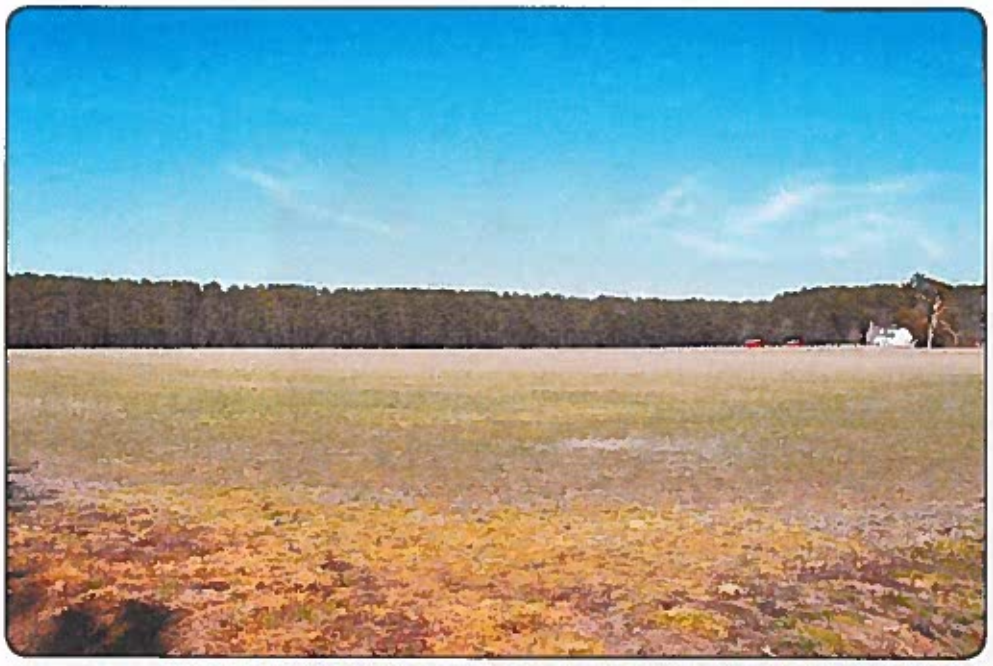

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EXHIBIT D

Wetland Delineation Report

WETLAND DELINEATION REPORT

Great Bay Solar Project

Somerset County, Maryland

Prepared For:

Great Bay Solar I, LLC
11674 Somerset Avenue D
Princess Anne, Maryland 21853
P: 512.348.0606

Prepared By:

Environmental Design & Research,
Landscape Architecture, Engineering
& Environmental Services, D.P.C.
217 Montgomery Street, Suite 1000
Syracuse, New York 13202
P: 315.471.0688

April 2015

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1.0 INTRODUCTION

1.1 Project Description

Great Bay Solar I, LLC (GBS), is proposing to develop a photovoltaic (PV) solar energy facility referred to as the Great Bay Solar Project (the Project). The Project will have a nominal rated capacity of up to 150 megawatts (MW) alternating current (AC), and will be constructed on up to 1,000 acres of private land currently under lease or purchase option between Princess Anne and Pocomoke City in Somerset County, Maryland (see Figure 1). The Project Study Area also includes easements on privately owned property and along existing road and/or railroad rights-of-way (ROWs) that will be utilized for the installation of electrical collection lines (see Figure 2).

The Project will connect to the PJM Interconnection, LLC (PJM) grid at the existing Kings Creek Substation, owned by Delmarva Power. GBS has a purchase option on the parcel immediately south of the Kings Creek Substation, and plans to build its substation on the southern portion of that parcel, and connect to the Kings Creek Substation via a short (<500 feet) 138 kilovolt generation tie line.

The sites accommodating the solar panels (generating sites) will be served by a network of unpaved access roads. The main access driveway for each generating site will be approximately 20 feet wide, while the lateral driveways providing maintenance access to the solar fields will be between 8 and 12 feet wide. Parking areas for maintenance vehicles within the solar facility will be constructed with compacted gravel. During Project construction, temporary lay down areas will be used for storage of construction equipment and supplies.

The Project will contain one or more on-site solar meteorological stations (SMSs), which will consist of irradiance (solar energy) meters as well as air temperature and wind meters.

The proposed facility would be enclosed with security fencing 7 to 10 feet high. The Project's access points will be gated. Security lighting may be installed to operate with motion detectors. Additional security measures may be utilized as necessary, such as monitoring by cameras and/or electronic security systems.

Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) was retained by GBS to identify all wetlands and streams within or adjacent to the footprint of proposed Project components. During March 2013, wetlands and streams were delineated within participating Project parcels and approximate wetland boundaries were mapped along potential electrical collection line routes.

1.2 Purpose

The purpose of this study was to identify and describe all wetlands and streams that may fall under state or federal jurisdiction within Project parcels and along potential electrical collection routes. Specific tasks performed include a field delineation of all potential state and federal jurisdictional areas within Project parcels, a subsequent survey of jurisdictional area boundaries utilizing a Global Positioning System (GPS) with sub-meter accuracy, and a detailed description of all delineated jurisdictional areas based on hydrology, vegetation, and soils data collected in the field. Along collection routes, reconnaissance-level field review was limited due to lack of property access and exact jurisdictional area boundaries and the presence of wetland indicators have not yet been confirmed. Approximate wetland boundaries were identified based on aerial photo interpretation, LIDAR elevation data, and reconnaissance-level field review from adjacent public roadways. Additionally, a site visit with representatives of the Maryland Department of the Environment and the U.S. Army Corps of Engineers (the Corps) further refined the location of approximate wetland boundaries visible from roadways and along the railroad right-of-way (ROW).

This report describes the results of data collection efforts conducted by EDR as well as a description of the wetlands and waterbodies that were identified and delineated. This document is intended to provide all the information necessary for an agency jurisdictional determination, and to support a permit application to be submitted to the MDE.

1.3 Resources

Materials and literature supporting this investigation have been derived from a number of sources, including United States Geological Survey (USGS) topographic mapping (Princess Anne, Kingston, Dividing Creek, and Pocomoke City 7.5 minute quadrangles), United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping, MDE freshwater wetlands mapping, United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, MD iMAP LIDAR data, the NRCS List of Hydric Soils of the State of Maryland, and recent aerial photography.

Vascular plant names follow nomenclature found in the National Wetland Plant List, and wetland indicator status for vegetative species was also determined by reference to the National Wetland Plant List (Lichvar et al., 2014). Wetland community types were characterized according to the wetlands and deepwater habitats classification system used in NWI mapping (Cowardin et al., 1979).

1.4 Qualifications

EDR Ecologists Michael Martin and Connor Liddell performed the field delineations of potentially jurisdictional wetlands and streams. EDR's Environmental Division Manager, Benjamin Brazell oversaw the delineation effort and subsequent data analysis and report preparation.

Mr. Martin is an Environmental Analyst with 8 years of experience in the environmental field. He received his Master of Natural Resources - Analysis and Assessment degree from North Carolina State University. His specialties include wetland delineations, ecological surveys, wildlife and endangered species management, and environmental impact analysis. Prior to joining EDR, Mr. Martin served on the Board of Directors for the North Carolina Association of Environmental Professionals and the Research Triangle Chapter of the Society for Risk Analysis.

Mr. Liddell is an Environmental Analyst with 3 years of experience in the environmental field. He received a Bachelor of Science degree in Biological Sciences and a Graduate degree in Natural Resource Management from James Cook University in Townsville, Australia. His professional expertise includes conservation and environmental research, endangered species and wildlife management, habitat restoration, ecological surveys, invasive species management, wetland/coastal mitigation and monitoring, environmental impact assessment, wetland and stream delineations, and GPS survey and mapping.

Mr. Brazell is a Principal and the Director of Environmental Services at EDR, with 15 years of experience in the environmental field. He received a Bachelor's Degree in Natural Resources, Ecosystem Assessment from North Carolina State University. Professional expertise includes wetland and stream delineations, federal and state wetland/stream permitting, plant and wildlife identification, stream restoration, ecological surveys, regulatory compliance, and environmental impact analysis.

In addition to EDR's professional expertise, GBS engaged the services of Thomas Nobile of Environmental Resources, Inc. to provide review of delineated wetland boundaries and advise on permitting strategies. Mr. Nobile attended the United States Military Academy at West Point, New York. Subsequently, Mr. Nobile received a Bachelor of Science Degree in Environmental Resource Management and initiated course work towards a Master of Science in Forest Hydrology from Pennsylvania State University. Mr. Nobile has over 30 years of experience in the environmental field throughout the mid-Atlantic region, and his professional expertise includes wetland delineation, mitigation, federal and state wetland permitting, and soil interpretation, mapping, and physical descriptions using the USDA and the Unified Soil Classification System (USCS) methods.

2.0 PHYSICAL CHARACTERISTICS AND RESOURCES

2.1 Physiography and Soils

The Study Area is located within the Embayed section of the Coastal Plain province in the Atlantic Plain physiographic division (USGS, 2003). The terrain within the Study Area is generally flat with elevations ranging from 0 to 15 feet above mean sea level (amsl). Land use within the Study Area is comprised of active agriculture, silviculture, farms and single family residences.

The USDA NRCS Web Soil Survey indicates that 33 soil mapping units are present within the Study Area (Figure 3). Of these, Quindacqua silt loam and Fallsington loam are dominant. Soil drainage in the Study Area is predominantly poorly drained and soil textures are primarily silt loams. Table 1 lists the soil mapping units found within the Study Area and their characteristics.

Table 1. Study Area Soils

Mapping Unit	Name	Slope (%)	Drainage[1]	Hydric[2]
AoA	Annemessex-Manokin complex	0-2	SPD	Yes
AoB	Annemessex-Manokin complex	2-5	SPD	Yes
EQB	Endoaquepts and Sulfaquepts	0-5	PD	Yes
FgA	Fallsington loam	0-2	PD	Yes
FhA	Fallsington-Glassboro complex	0-2	PD	Yes
HbB	Hambrook sandy loam	2-5	WD	No
IkC	Ingleside-Runclint complex	5-10	WD	No
KgB	Klej-Galloway complex	0-5	SPD	Yes
KpA	Keyport silt loam	0-2	MWD	Yes
LO	Longmarsh and Indiantown soils, frequently flooded	--	VPD	Yes
MdA	Manokin silt loam	0-2	MWD	Yes
MdB	Manokin silt loam	2-5	MWD	Yes
MuA	Mullica-Berryland complex	0-2	MWD	Yes
OKA	Othello and Kentuck soils	0-2	VPD	Yes
OoA	Othello silt loam, loamy substratum	0-2	PD	Yes
OtA	Othello silt loam	0-2	PD	Yes
QbB	Queponco loam	2-5	WD	No
QeA	Queponco silt loam	0-2	WD	No
QeB	Queponco silt loam	2-5	WD	No
QuA	Quindacqua silt loam	0-2	PD	Yes
TP	Transquaking and Mispillion soils, very frequently flooded, tidal	--	VPD	Yes
UbB	Udothents, borrow area	0-5	MWD	Yes
UwB	Urban land-Udorthents complex	0-5	--	No
WdA	Woodstown sandy loam	0-2	MWD	Yes
WdB	Woodstown sandy loam	2-5	MWD	Yes
WpA	Woodstown-Glassboro complex	0-2	SPD	Yes

[1]Soil drainage is represented by the following abbreviations: "ED" = excessively drained, "WD" = well drained, "MWD" = moderately well drained, "SPD" = somewhat poorly drained, "PD" = poorly drained, and "VPD" = very poorly drained.
[2]"Yes" indicates this soil is listed in the 2012 National Hydric Soil List (USDA, NRCS, 2012).

2.2 Hydrology

The Study Area is located approximately 8 miles east of the Chesapeake Bay and is roughly bounded by the Manokin River to the north, Back Creek and Big Annemessex River to the west, Tony's Creek to the east, and the Pocomoke River to the south. This area is in the Pocomoke and Blackwater-Wicomico Watersheds (USGS Hydrologic Units 02060007 and 02060009), which are part of the larger Chesapeake Bay Watershed. As is the case throughout the Eastern Shore, the majority of surface hydrology in the Study Area is generated by high water table, precipitation, and surface water run-off from adjacent land. Total annual precipitation (from 1961 to 2000) averages 43.52 inches in nearby Princess Anne, Maryland (USDA, NRCS, 2015). NOAA precipitation data indicates precipitation in the Study Area has been roughly average for the current water year. For the 90 days prior to this investigation, precipitation was running roughly 10 – 25% above normal. Mapped surface water resources within the Study Area are described below. NOAA analysis of snow depth indicates substantial snow melt occurred in the two weeks prior to the field investigation (NOAA, 2015). These factors resulted in wetter than normal conditions at the time of the site visit.

Taylor Branch, Jones Creek, Kings Creek, and Back Creek are the dominant hydrologic features within the Study Area (Figure 4). Several unnamed tributaries pass through the Study Area and drain to one of these streams. Taylor Branch drains to Jones Creek approximately 0.5 mile west of the Study Area. Jones Creek then flows to Kings Creek approximately 1.75 miles west of the Study Area, which then flows west for approximately 10 miles to the Manokin River, Tangier Sound, and the Chesapeake Bay. Back Creek flows west and drains to the Manokin River approximately 5.5 miles west of the Study Area before reaching Tangier Sound and the Chesapeake Bay.

Streams in the Study Area, both named and unnamed, are primarily low-gradient drainage features that meander through wetlands, agricultural fields, and pastures. Most of these streams are less than 10 feet wide with variable substrates and vegetative cover characteristics. Some Study Area streams have been channelized and are characterized by well-defined and abrupt banks, while the banks of others transition into adjacent wetland vegetation, and thus are essentially indiscernible. Tributaries to these streams typically consist of maintained ditches that drain agricultural fields.

3.0 FEDERAL AND STATE JURISDICTIONAL AREAS

3.1 Waters of the United States

As defined by the Corps, Waters of the United States include all lakes, ponds, streams (intermittent and perennial), and wetlands. Jurisdictional wetlands are defined as "Those areas that are inundated or saturated by surface or ground

water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (EPA, 2001). Such areas are indicated by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence of wetland hydrology during the growing season (Environmental Laboratory, 1987). However, as a result of the Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers Supreme Court case (No. 99-1178; January 9, 2001), it has been determined that the Corps does not have jurisdictional authority over waters that are "nonnavigable, isolated, and intrastate" (EPA, 2001). Subsequent Supreme Court rulings have indicated that jurisdictional waters include headwaters and wetlands that have a "significant nexus" to navigable or interstate waterways.

3.2 State of Maryland Freshwater Wetlands and Streams

Non-tidal wetlands are defined by the Code of Maryland Regulations (COMAR) as:

> "(a) an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation;
> (b) is determined according to the Federal Manual;
> (c) does not include tidal wetlands regulated under Natural Resources Article, Title 9, Annotated Code of Maryland."

The Maryland Nontidal Wetlands Act gives the MDE jurisdiction over state-protected wetlands and adjacent areas (25-foot upland buffer). Under the Nontidal Wetlands Act, the MDE regulates the following activities:

- Grading or filling
- Excavating or dredging
- Changing existing drainage patterns
- Disturbing the water level or water table
- Destroying or removing vegetation

All waters (streams) of the state are assigned a use classification by the MDE according to the intended human and aquatic life objective, use, or goal for each water body. The State has defined the following use categories:

- Use I: Water Contact Recreation and Protection of Aquatic Life
- Use I-P: Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply
- Use II: Shellfish Harvesting Waters
- Use II-P: Tidal Fresh Water Estuary-includes applicable Use II and Public Water Supply
- Use III: Nontidal Cold Water – Natural Trout Water

- Use III-P: Nontidal Cold Water and Public Water Supply
- Use IV: Recreational Trout Waters
- Use IV-P: Recreational Trout Waters and Public Water Supply

3.3 Federal and State Mapped Wetlands and Streams

Review of NWI mapping indicates that there are numerous federally-mapped wetlands located in the vicinity of the Study Area (Figure 4). The NWI maps indicate that palustrine forested wetlands are the most prevalent wetland type, followed by palustrine open water, palustrine emergent wetlands, and intertidal estuarine wetlands. All cropland within the Study Area has been reviewed by the NRCS and has been designated Prior Converted Cropland, upland, or is currently in the process of receiving such a determination.

State-mapped wetlands are also shown in Figure 4. These wetlands were mapped by the Maryland Department of Natural Resources using Maryland's Digital Orthophoto Quarter Quads, which were obtained over a period from 1988 to 1995. The state also maintains maps of Wetlands of Special State Concern. These wetlands are the best examples of Maryland's nontidal wetland habitats and are afforded special protection under the State's nontidal wetlands regulations. These areas provide exceptional ecological and educational value and often provide habitat for rare and threatened plants and animals. Several Wetlands of Special State Concern are located in the immediate vicinity of the Study Area.

All mapped streams within the Study Area are classified as Use I waters. COMAR outlines an anti-degradation policy that requires all streams be protected and maintained for their designated uses. Under this classification, specific designated uses for Use I waters include:

- Water contact sports;
- Play and leisure time activities where individuals may come in direct contact with the surface water;
- Fishing;
- The growth and propagation of fish (other than trout), other aquatic life, and wildlife;
- Agricultural water supply; and
- Industrial water supply.

4.0 ON-SITE JURISDICTIONAL AREA DELINEATION

4.1 Methodology

EDR personnel performed field delineation of wetlands and streams within the Study Area in March 2015.

The identification of wetland boundaries was made by EDR personnel based on the methodology described in the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987). Determination of wetland boundaries was also guided by the methodologies presented in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (USACE, 2010). According to USACE methodologies, wetland hydrology, when combined with a hydrophytic plant community and hydric soils, indicate the presence of a wetland. Attention was also given to the identification of potential hydrologic connections between wetlands and areas that could influence their jurisdictional status. For this delineation, the federal methodology was used to define the boundaries of both federal and state jurisdictional wetlands on-site.

Wetland boundaries were defined in the field with sequentially-numbered pink surveyor's flagging, which was subsequently mapped using a Trimble GeoXH 6000 GPS unit with reported sub-meter accuracy. Data were collected from one or more sample plots in each delineated wetland (depending on the size of the delineated area), and recorded on Routine Wetland Determination forms (Appendix B). The data collected for each of the wetlands delineated by EDR personnel included vegetation, hydrology indicators, and soils characteristics.

The Regional Supplement lists the following indicators as evidence of wetland hydrology: (A1) surface water, (A2) high water table, (A3) saturation, (B1) water marks, (B2) sediment deposits, (B3) drift deposits, (B4) algal mat or crust, (B5) iron deposits, (B7) inundation visible on aerial imagery, (B9) water-stained leaves, (B13) aquatic fauna, (C1) hydrogen sulfide odor, (C3) oxidized rhizospheres on living roots, (C4) presence of reduced iron, (C6) recent iron reduction in tilled soils, and (C7) thick muck surface. These hydrology indicators are considered "primary indicators," and any one of these indicators is sufficient evidence that wetland hydrology is present. "Secondary indicators" of wetland hydrology include: (B6) surface soil cracks, (B8) sparsely vegetated concave surface, (B10) drainage patterns, (B16) moss trim lines, (C2) dry-season water table, (C8) crayfish burrows, (C9) saturation visible on aerial imagery, (D2) geomorphic position, (D3) shallow aquitard, (D5) FAC-neutral test, and (D8) sphagnum moss. Any two of these secondary indicators are sufficient evidence of the presence of wetland hydrology.

Assessment of vegetation focused on the dominant plant species in four categories: trees (>3" diameter at breast height), saplings/shrubs (<3.0" diameter at breast height and >3.28' tall), herbs (<3.2' tall), and woody vines. Dominance within each stratum was measured by visually estimating those species having the largest relative basal

area (trees), greatest height (saplings/shrubs), greatest number of stems (woody vines), and greatest percentage of aerial coverage (herbaceous) by species. Wetland indicator status for dominant plant species was determined by reference to the National Wetland Plant List (Lichvar et al., 2014). Wetland communities are typically dominated by species with an indicator status of OBL, FACW, or FAC.

Hydric soils are poorly drained, and are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil layer. The presence of hydric soils is indicative of the likely occurrence of wetlands (Environmental Laboratory, 1987). The Regional Supplement lists the following indicators as evidence of hydric soils: (A1) Histosol, (A2) Histic Epipdeon, (A3) Black Histic, (A4) Hydrogen Sulfide, (A5) Stratified Layers, (A6) Organic Bodies, (A7) 5 cm Mucky Mineral, (A8) Muck Presence, (A9) 1 cm Muck, (A11) Depleted Below Dark Surface, (A12) Thick Dark Surface, (A16) Coast Prairie Redox, (S1) Sandy Mucky Mineral, (S4) Sandy Gleyed Matrix, (S5) Sandy Redox, (S6) Stripped Matrix, (S7) Dark Surface, (S8) Polyvalue Below Surface, (S9) Thin Dark Surface, (F1) Loamy Mucky Mineral, (F2) Loamy Gleyed Matrix, (F3) Depleted Matrix, (F6) Redox Dark Surface, (F7) Depleted Dark Surface, (F8) Redox Depressions, (F10) Marl, (F11) Depleted Ochrick, (F12) Iron-Manganese Masses, (F13) Umbric Surface, (F17) Delta Ochric, (F18) Reduced Vertic, (F19) Piedmont Floodplain Soils, and (F20) Anomalous Bright Loamy Soils. Hydric soils were determined in the field through observation of composition, color, and morphology. Soils data were collected by EDR personnel on-site using spades and using moistened soil and Munsell Soil Charts (Munsell Color Company, 2000). Information concerning soil series, color, texture, and matrix and mottle color was recorded for each delineated wetland and was used to determine whether the soils displayed hydric characteristics.

Photographs were taken of each wetland delineated within the Study Area. Photographs representative of the delineated wetland communities are included in Appendix C.

4.2 Results

EDR Ecologists delineated a total of four (4) wetlands and twenty-four (24) streams and/or agricultural ditches within the Study Area. Information pertaining to individual wetlands and streams is summarized in Table 2. Wetlands were classified according to the Cowardin classification system (Cowardin et al., 1979) as one or more of the following three community types: emergent wetland, scrub shrub wetland, or intermittent stream/ditch. All delineated wetlands and streams are depicted in Figures 5. Descriptions of each of the communities are presented below.

Table 2. Delineated Wetlands and Streams

Delineation ID	Wetland Present	Stream Present	Wetland Type[1]	Acreage within Study Area	Stream Type	Stream Name	Assumed Jurisdictional[2]	Wetland of Special State Concern	Figure 5, Sheet #
A	No	Yes	--	0.36	RIN/Ditch	--	Yes	No[3]	3[4]
B	No	Yes	--	0.20	RIN/Ditch	--	Yes	No	1
C	No	Yes	--	0.35	RIN/Ditch	--	Yes	No	1
D	Yes	Yes	PEM	0.21	RIN/Ditch	--	Yes	No	3
E	No	Yes	--	0.45	RIN/Ditch	--	Yes	No	15[4]
F	No	Yes	--	0.16	RIN/Ditch	--	Yes	No	15[4]
G	Yes	No	PEM	0.47	--	--	Yes	No	13[4]
I	Yes	No	PSS	0.08	--	--	Yes	No	13
L	No	Yes	--	0.23	RIN/Ditch	--	Yes	No	6[4]
N	Yes	No	PEM	1.56	--	--	Yes	No	3
P	No	Yes	--	0.03	RIN/Ditch	--	Yes	No[3]	2
Q	No	Yes	--	0.10	RIN/Ditch	--	Yes	No	5[4]
R	No	Yes	--	0.17	RIN/Ditch	--	Yes	No	3[4]
S	No	Yes	--	0.07	RIN/Ditch	--	Yes	No	15
U	No	Yes	--	0.69	RIN/Ditch	--	Yes	No	7[4]
V	No	Yes	--	0.71	RIN/Ditch	--	Yes	No	5[4]
X	No	Yes	--	0.14	RIN/Ditch	--	Yes	No	5[4]
Y	No	Yes	--	0.27	RIN/Ditch	--	Yes	No	10
Z	No	Yes	--	0.20	RIN/Ditch	--	Yes	No	10
AA	No	Yes	--	0.16	RIN/Ditch	--	Yes	No	10
BB	No	Yes	--	0.28	RIN/Ditch	--	Yes	No	9,10
CC	No	Yes	--	0.90	RIN/Ditch	--	Yes	No	9
DD	No	Yes	--	0.25	RIN/Ditch	--	Yes	No	10
EE	No	Yes	--	0.37	RIN/Ditch	--	Yes	No	10
FF	No	Yes	--	0.09	RIN/Ditch	--	Yes	No	9
GG	No	Yes	--	0.08	RIN/Ditch	--	Yes	No	5[4]
HH	No	Yes	--	0.11	RIN/Ditch	--	Yes	No	9

[1] Wetland community types noted are based upon the Cowardin et al. classification system: PSS = Palustrine Scrub Shrub, PEM = Palustrine Emergent, RIN = Riverine Intermittent Stream.

[2] Based on site visit with the Corps and MDE. Final jurisdictional determination to be made by the Corps and/or the MDE.

[3] Ditches mapped within the study area are likely to have hydrological connection to offsite WSSC.

[4] Map sheet details hydrological connection to ditches assumed to be non-jurisdictional based on site visit with the Corps and MDE.

4.2.1 Wetlands

Emergent wetland – Three emergent wetlands were identified within the Study Area (Wetlands D, G, and N). Emergent wetlands typically occur where surface water collects in shallow basins and/or adjacent to open water. These wetlands are characterized by more persistent and/or deeper inundation, often containing soils that remain inundated throughout the year. Emergent wetlands delineated in the Study Area are dominated by herbaceous plants such as rushes (*Juncus spp.*, wetland indicator status OBL), sedges (*Carex spp.*, wetland indicator status OBL), woolgrass (*Scirpus cyperinus*, wetland indicator status OBL), and common reed (*Phragmites australis*, wetland indicator status FACW). Typical hydric soil conditions include low chroma matrix colors ranging from dark gray to gray (10YR 3/1, 10YR 6/1, 2.5Y 5/1) and high chroma redox features (10YR 5/6). Soil texture in the emergent wetlands included silt loam, sand, and clay loam. The soils sampled within emergent wetlands are considered sandy S5 Sandy Redox or loamy/clayey F3 Depleted Matrix soils. Evidence of wetland hydrology in the emergent wetlands identified within the Study Area included standing surface water, high water table, soil saturation, algal mat or crust, drainage patterns, and water-stained leaves.

Scrub shrub wetland – One scrub shrub wetland was found within the Study Area (Wetland H). This area was dominated by sweetgum saplings (*Liquidambar styraciflua*, wetland indicator status FAC) and herbaceous plants such as rushes (wetland indicator status OBL), sedges (wetland indicator status OBL), woolgrass (wetland indicator status OBL), and other unidentified grasses. Hydric soil conditions include low chroma matrix colors (10YR 6/1 and 10YR 5/1) with high chroma redox features (e.g., 10YR 5/8, 10YR 6/6). Soil texture was silt loam, and these soils were classified as loamy/clayey F3 Depleted matrix soils. Evidence of wetland hydrology included standing surface water, high water table, and saturation.

4.2.2 Streams

A total of twenty-four intermittent streams and/or agricultural ditches were delineated within the Study Area (Streams A, B, C, D, E, F, L, P, Q, R, S, U, V, X, Y, Z, AA, BB, CC, DD, EE, FF, GG, and HH). These ditches were generally found adjacent to or extending through agricultural fields. Typically, these areas are excavated and receive regular maintenance. As a result, these ditches have well defined banks and limited vegetation. Surface/subsurface waters drain to these ditches, resulting in persistent and/or deeper flow throughout a significant portion of the year. These channels generally had a gentle gradient (0-3%) and substrates most commonly consisted of silt and sand. At the time of delineation, water depths within the channels with ranged from 6 inches to greater than 2 feet. All of these channels are classified as Use I streams and are protected by the MDE under the no-degradation policy. A number of agricultural drainage ditches were observed that were straight line features with no flow, and drained only upland areas. These drainage features were not considered jurisdictional.

4.2.3 *Approximate Wetlands*

Approximate wetland and stream boundaries were mapped along potential electrical collection line routes. These areas typically consist of forested wetlands and several stream crossings (see Figure 5). Forested areas were generally mixed pine-hardwood forests dominated by loblolly pine (*Pinus taeda*, wetland indicator status FAC), red maple (*Acer rubrum*, wetland indicator status FAC), sweetgum (wetland indicator status FAC), and black gum (*Nyssa sylvatica*, indicator status FAC). Standing water was visible in many of these areas, either from public roadways or on aerial imagery, indicating the presence of wetland hydrology. State- and NWI-mapped wetlands, soil maps, and LIDAR elevation data were used to aid mapping of ditch locations and approximate wetland boundaries.

5.0 CONCLUSIONS

EDR ecologists identified a total of four (4) wetlands and twenty-four (24) streams/ditches within the Study Area. These wetlands and streams were identified based on the presence of hydrophytic vegetation, wetland hydrology, and hydric soils. The identified areas included emergent wetlands, scrub shrub wetlands, and streams (intermittent agricultural ditches). The primary functions provided by these wetlands appear to include maintaining surface water flows (including drainage of agricultural fields), recharging groundwater supplies, water quality improvement, and nutrient production and cycling. Many of the delineated wetlands are portions of much larger systems, which may provide significant functions and values.

In order to assure the accuracy of the areas delineated, EDR participated in a conference call with Steve Dawson of the MDE on April 8, 2015 and attended a site visit with Steve Dawson and Eugene Morgenthaler of the Corps on April 22, 2015. In this process it was determined the Corps and MDE would not assume jurisdiction over agricultural and roadside ditches that run in straight lines, do not flow or are unlikely to flow for 3 or more months out of the year, and are not tidally influenced. As a result, most of the surface water features present during EDR's site visit would not be considered jurisdictional because they are excavated features for draining fields and do not carry seasonal flow. These assumed non-jurisdictional ditches are shown on Figure 5. These ditches may not be jurisdictional but may function as conveyances between jurisdictional areas and affect the isolation status of those areas.

The four (4) wetlands and twenty-four (24) streams delineated by EDR are assumed to be under federal and/or state jurisdiction. All three wetland criteria (hydrophytic vegetation, hydric soils, and evidence of wetland hydrology) and/or a significant nexus with traditional navigable waters were observed at each of these locations. However, the Corps and/or the MDE must make final determination of jurisdictional status for all areas.

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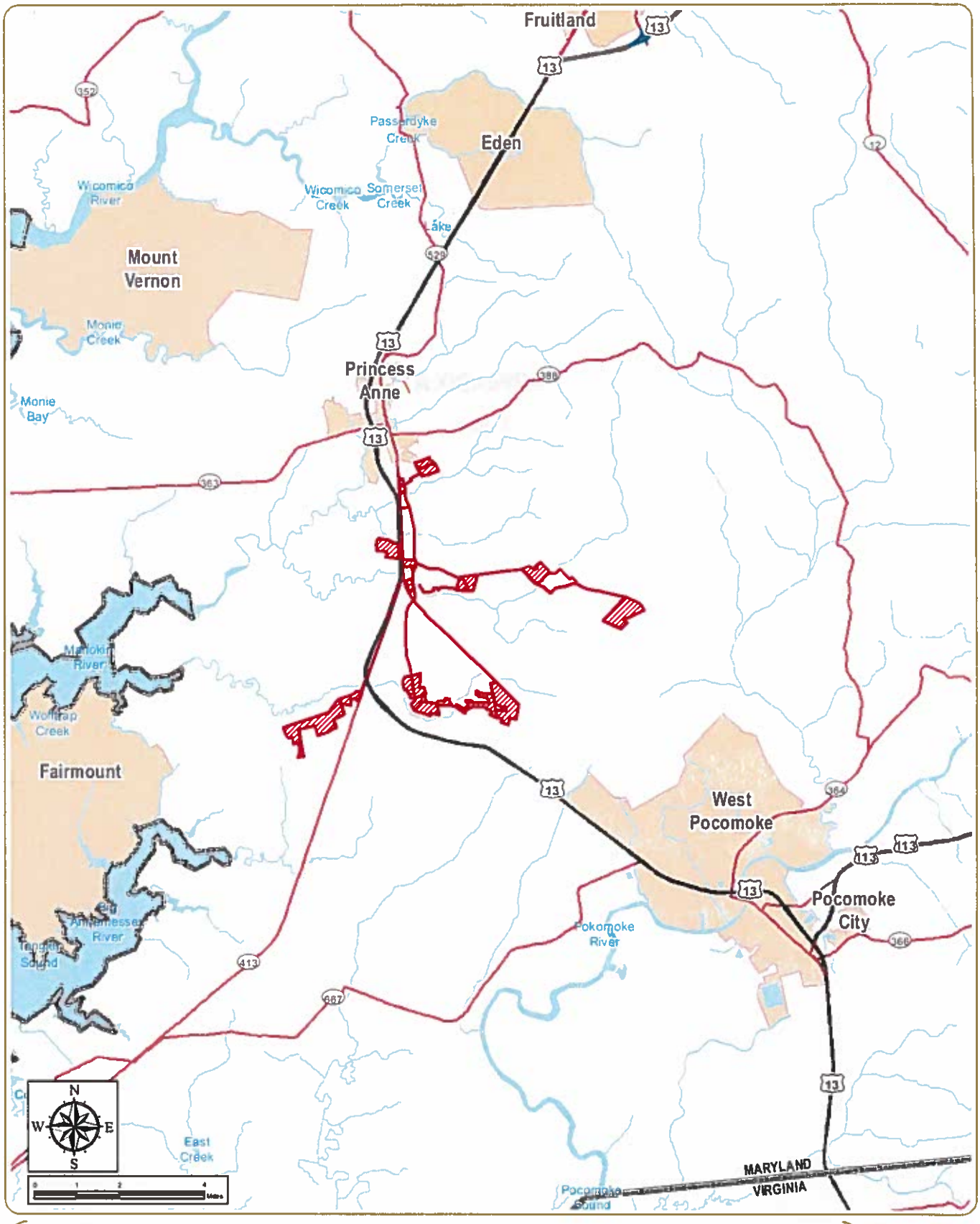
APPENDIX A

Figures



Great Bay Solar Project

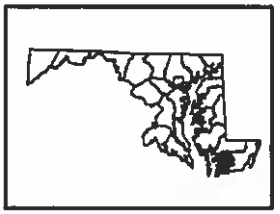
Somerset County, Maryland

Figure 1: Project Site

April 2015

Inventoried Area

Delineated Area



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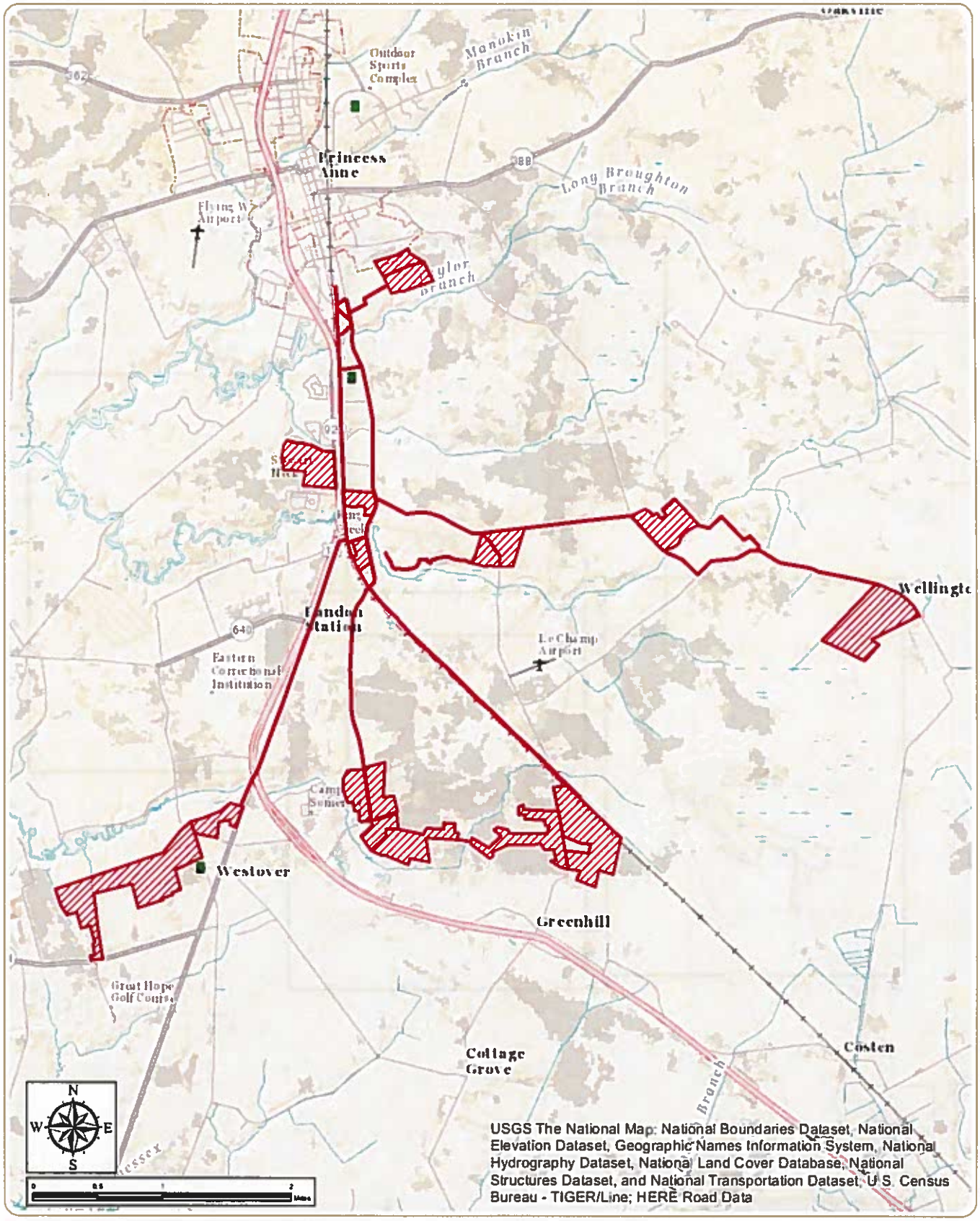


Great Bay Solar Project

Somerset County, Maryland

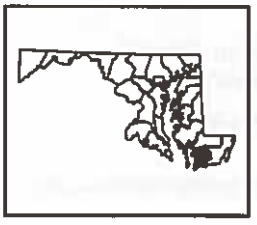
Figure 2: Site Location

April 2015

Notes: Basemap: ESRI "USGS The National Map" map service.

Inventoried Area

Delineated Area



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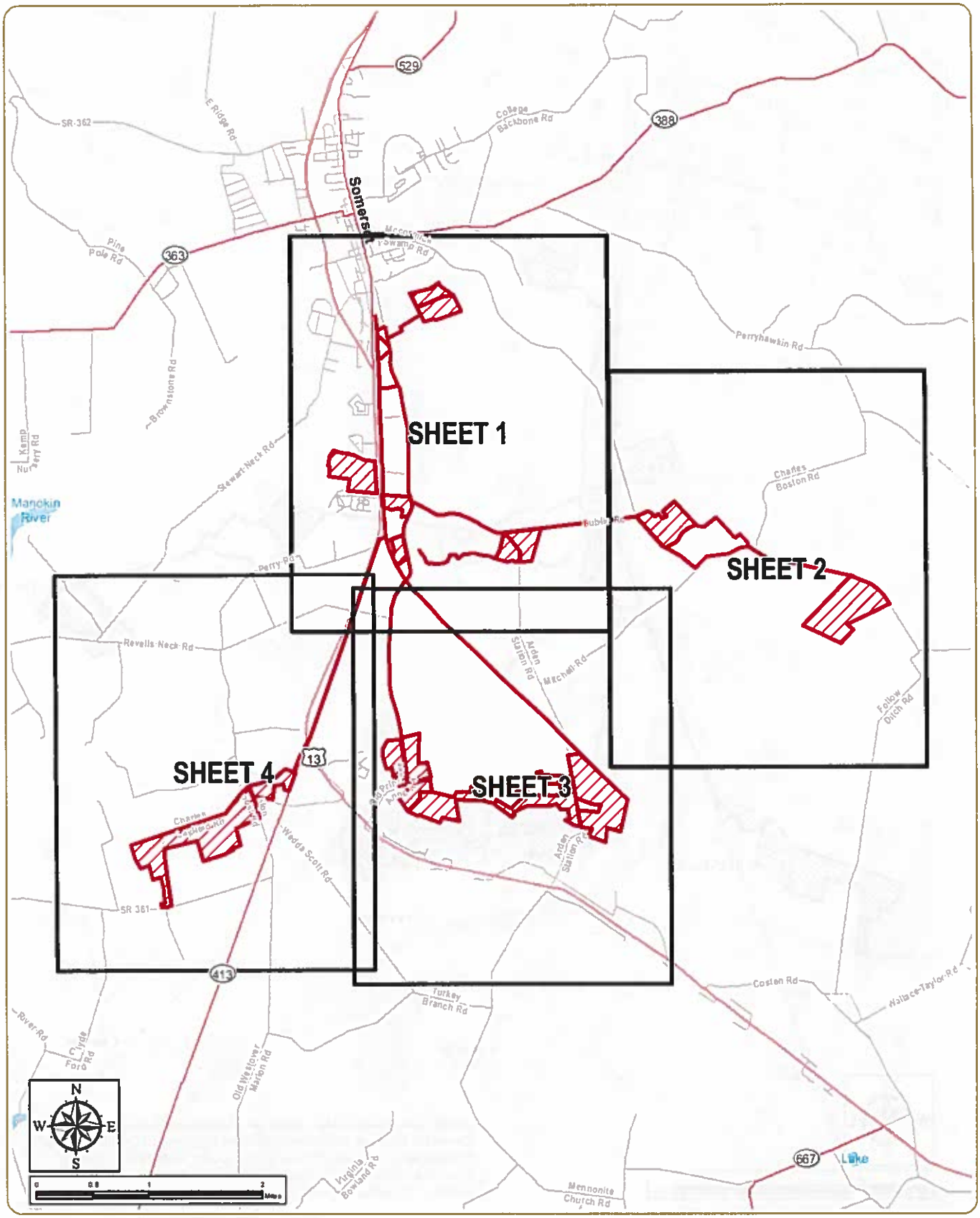
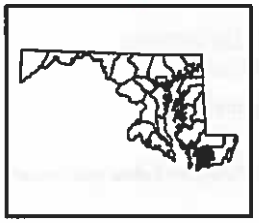


Great Bay Solar Project
Somerset County, Maryland

Figure 3: Soils Index Map
April 2015

Notes: Basemap: ESRI StreetMap North America, 2008

Inventoried Area
Delineated Area



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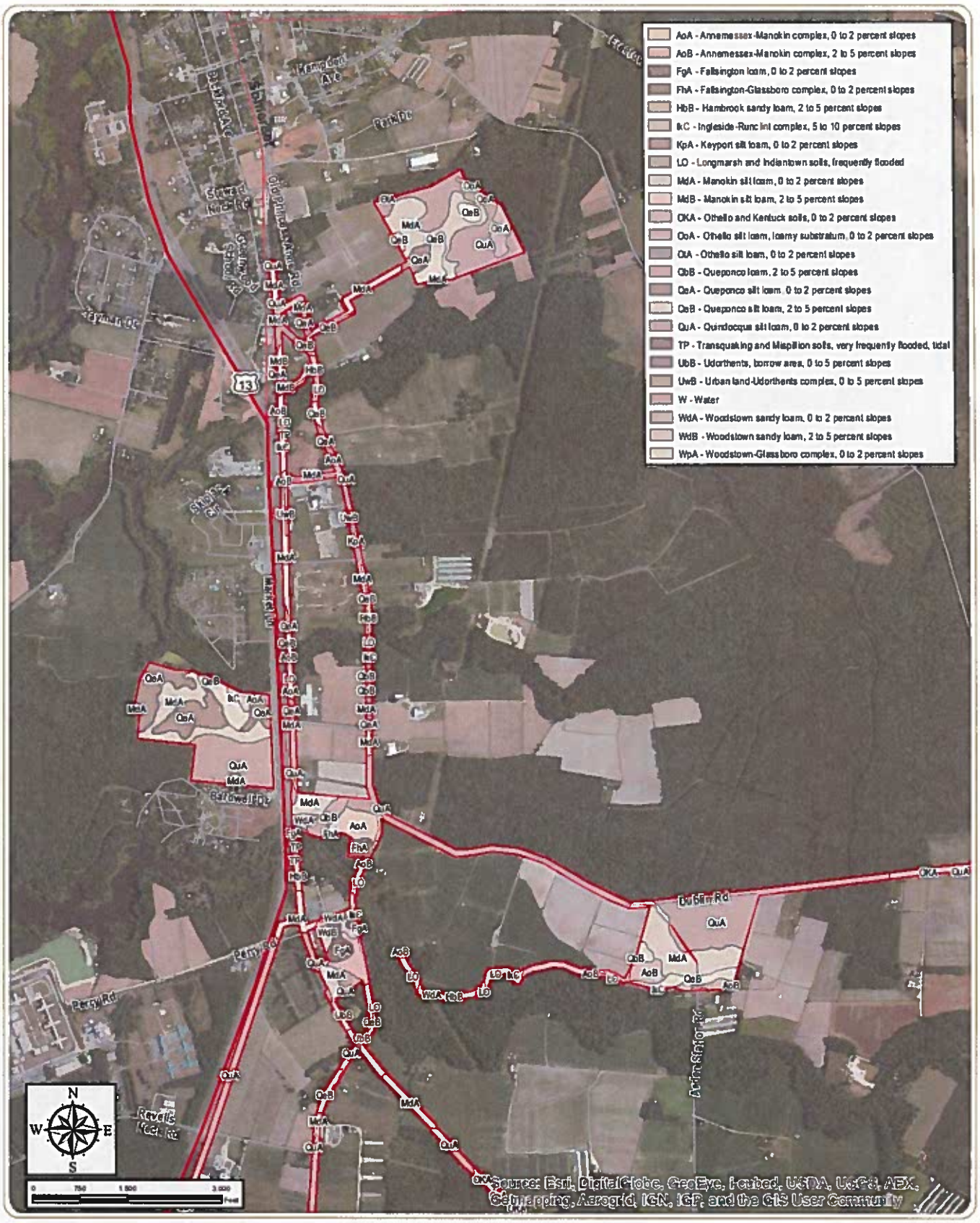


Great Bay Solar Project

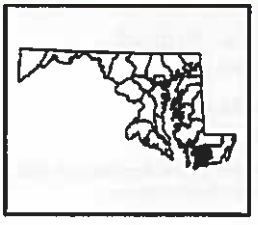
Somerset County, Maryland

Figure 3: Soils Map

Sheet 1 of 4 April 2015

Notes: 1. Basemap: ESRI StreetMap North America, 2008.
2. Soils data retrieved from Web Soil Survey.

Study Area



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Great Bay Solar Project

Somerset County, Maryland

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Sheet 2 of 4 April 2015

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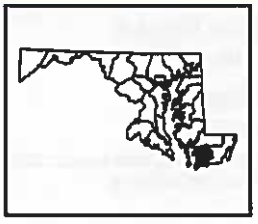

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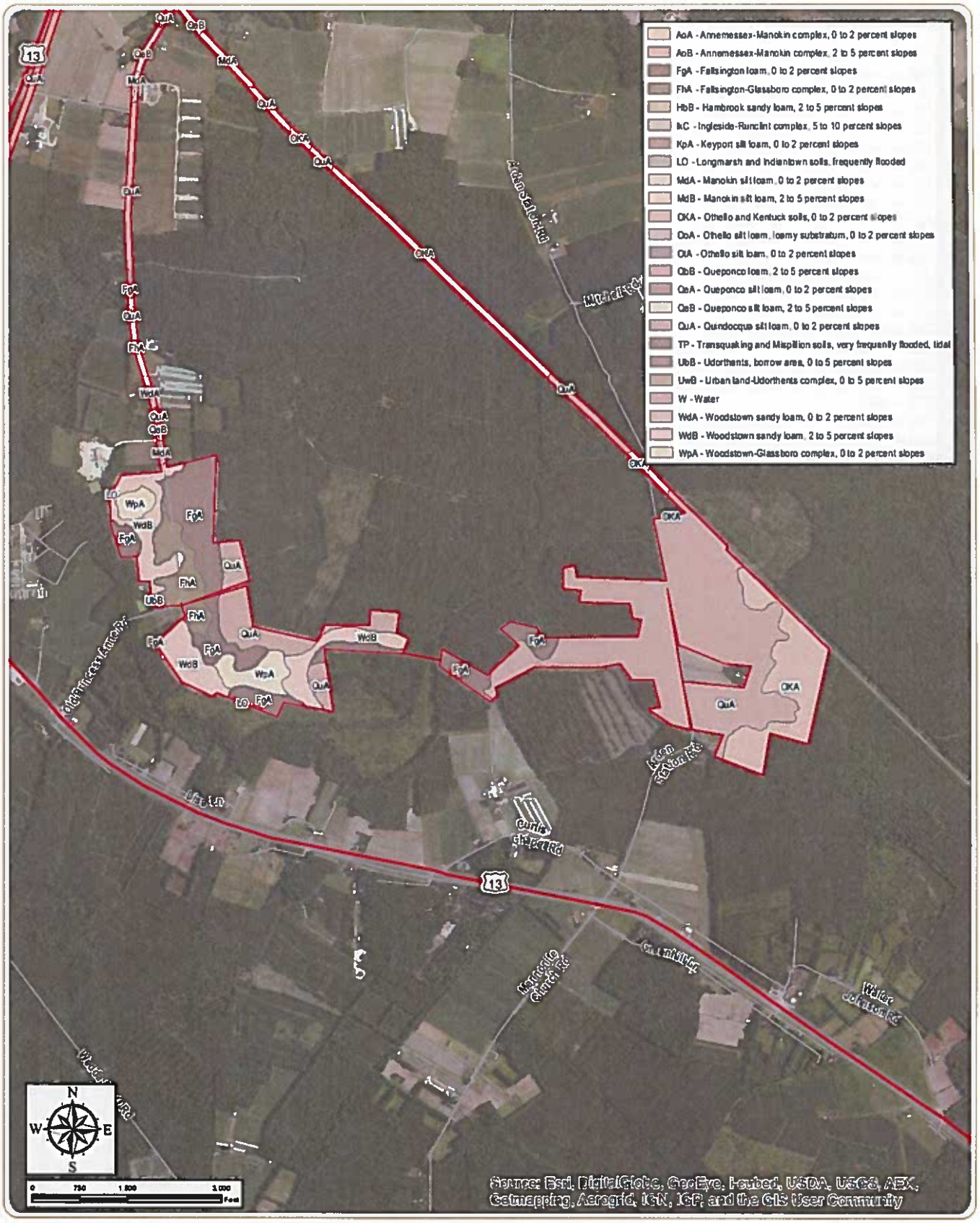

Great Bay Solar Project

Somerset County, Maryland

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Sheet 3 of 4 April 2015

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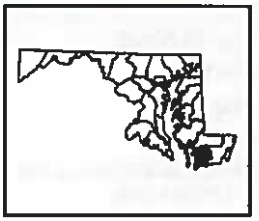

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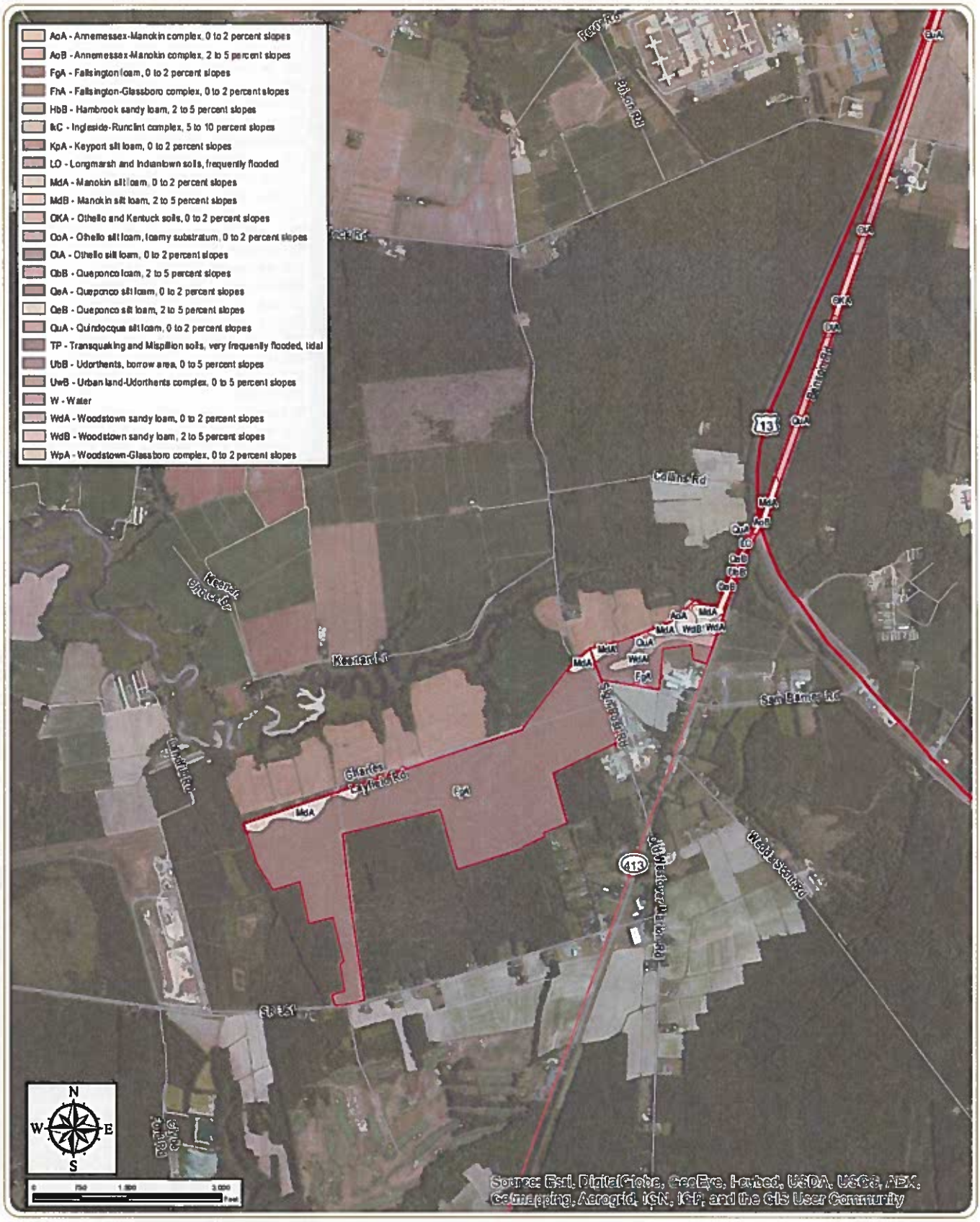

Great Bay Solar Project

Somerset County, Maryland

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Sheet 4 of 4 April 2015

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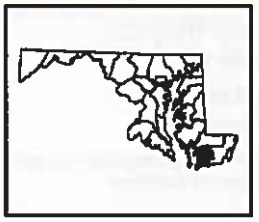

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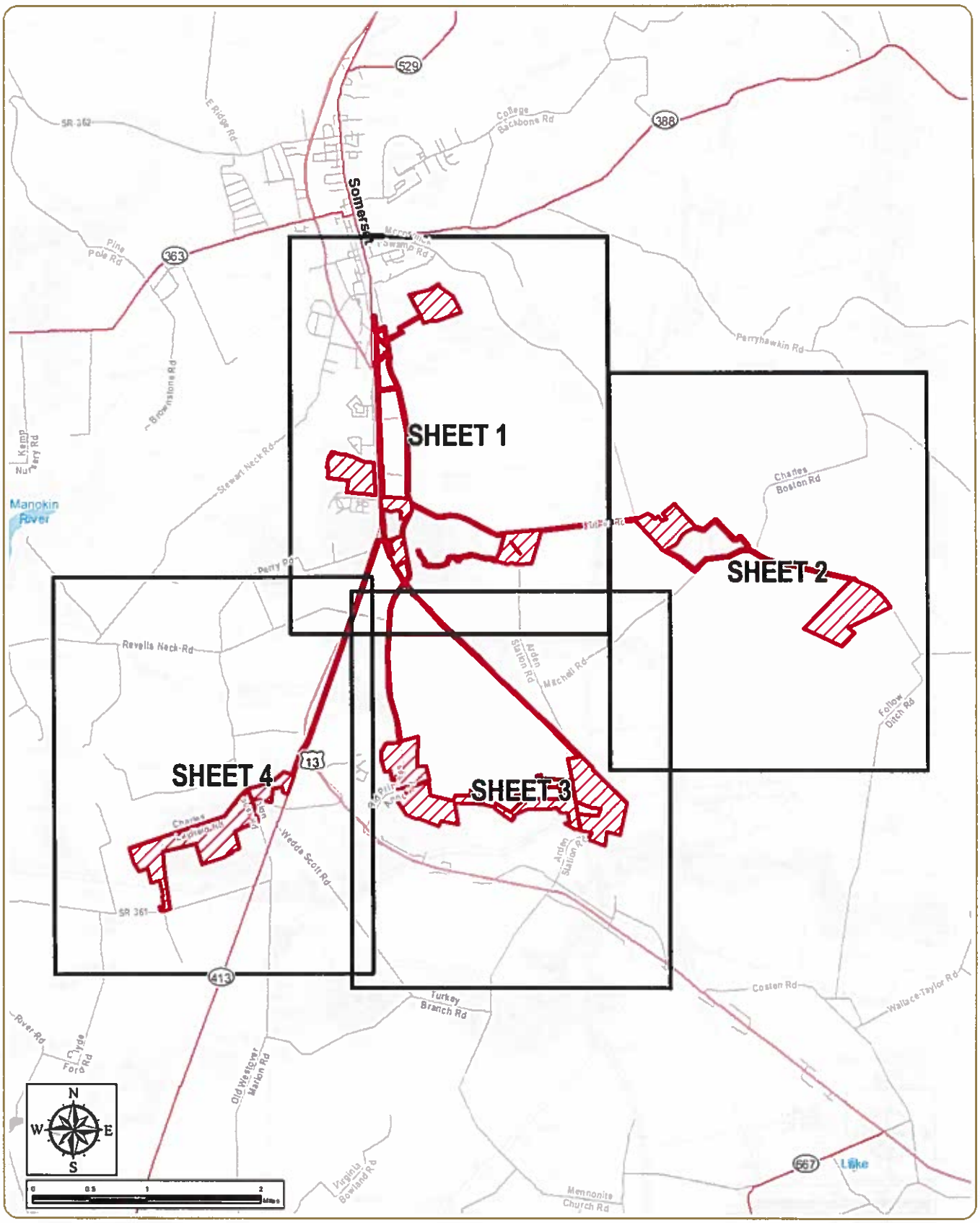
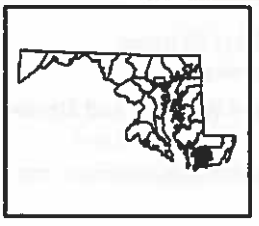


Great Bay Solar Project
Somerset County, Maryland

Figure 4: Mapped Wetlands and Streams Index Map
April 2015

Notes: Basemap: ESRI StreetMap North America, 2008

Study Area



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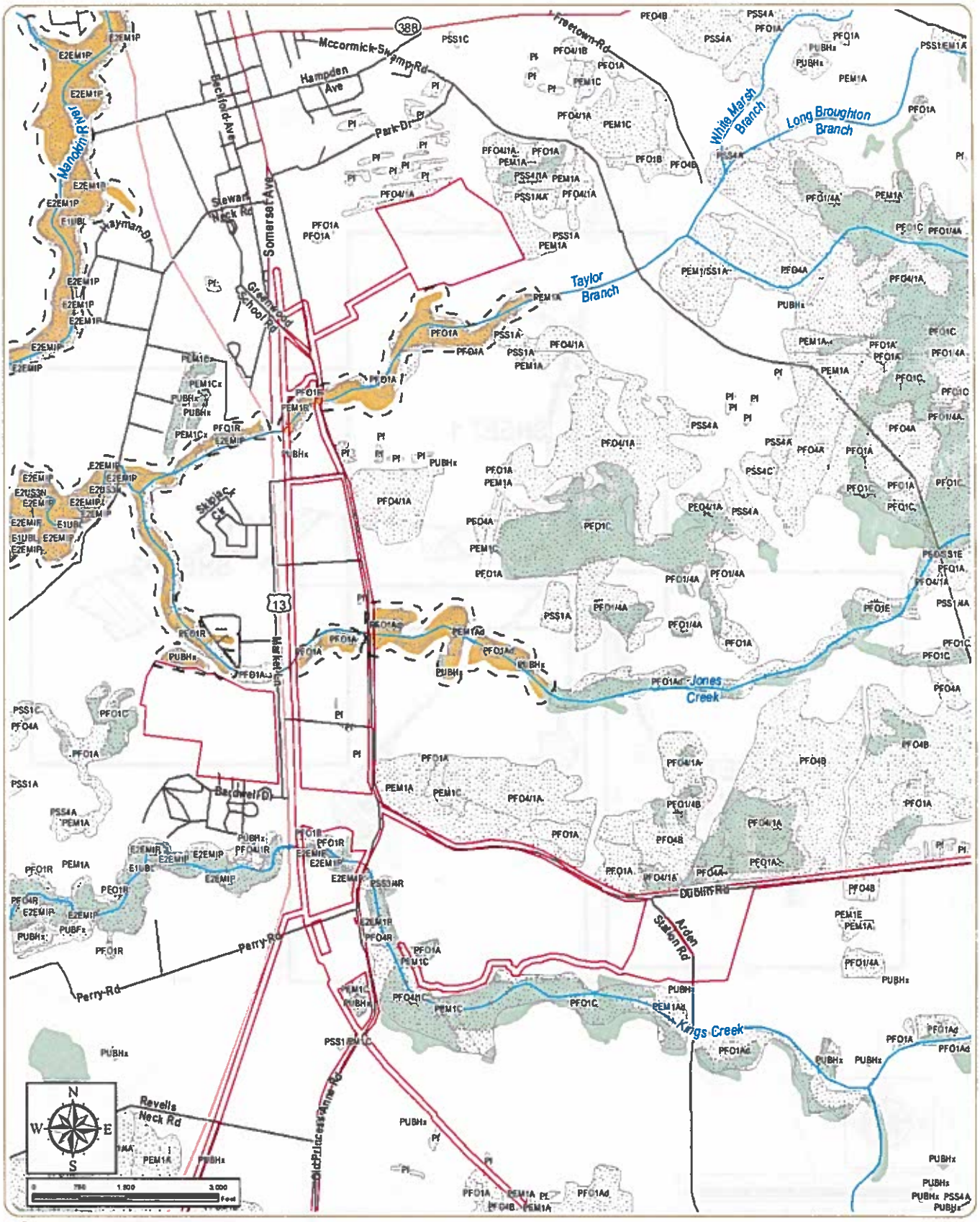


Great Bay Solar Project

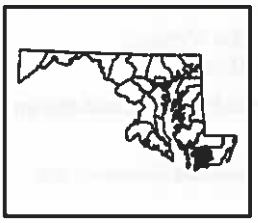
Somerset County, Maryland

Figure 4: Mapped Wetlands and Streams

Page 1 of 4 March 2015

Notes: 1. Basemap: ESRI StreetMap North America, 2008.

- Rivers or Stream
- MDE Mapped Wetland
- NWI Wetland
- MD Wetland of Special State Concern
- Study Area



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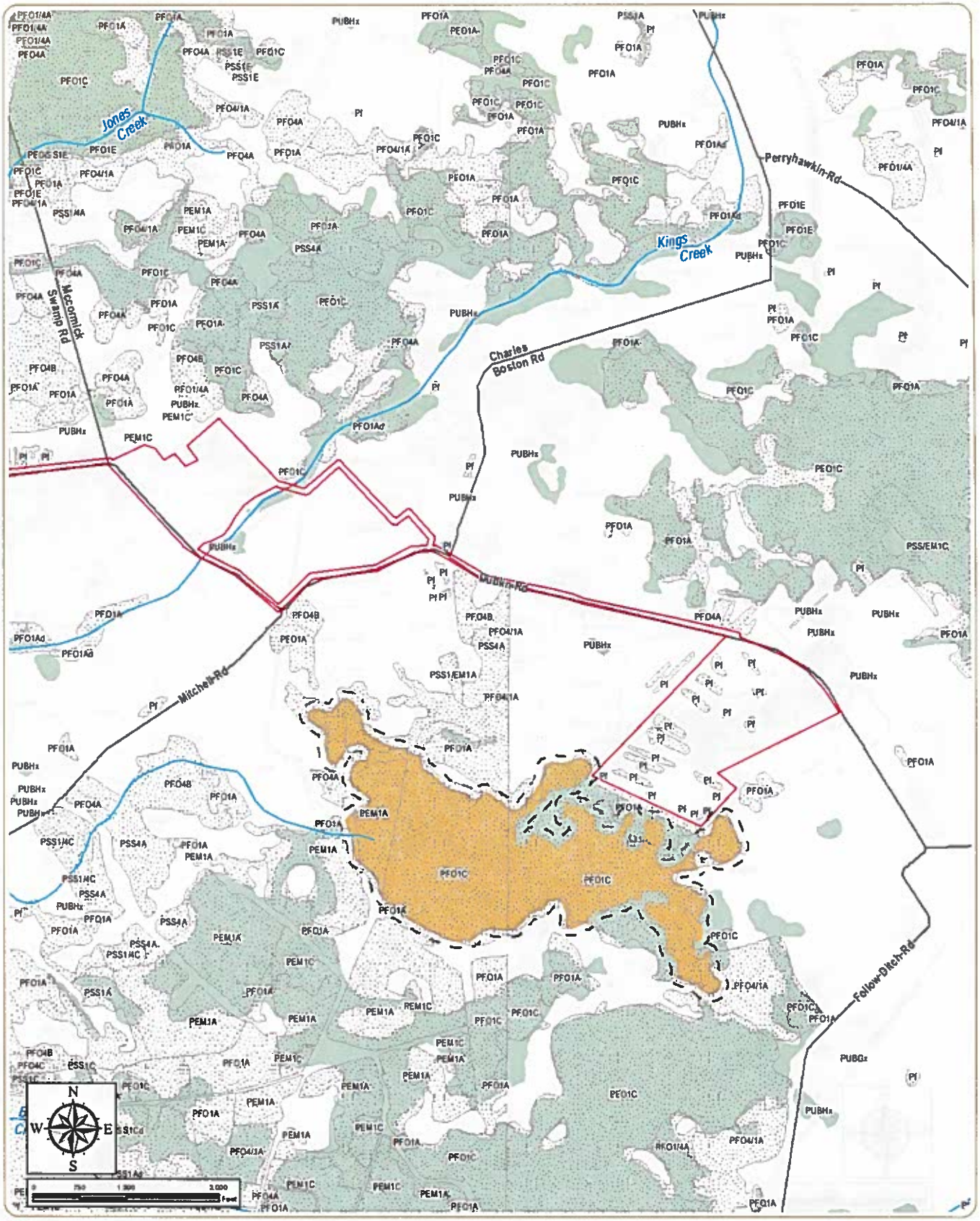

Great Bay Solar Project

Somerset County, Maryland

Figure 4: Mapped Wetlands and Streams

Page 2 of 4 March 2015

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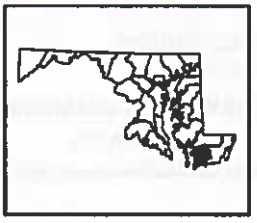

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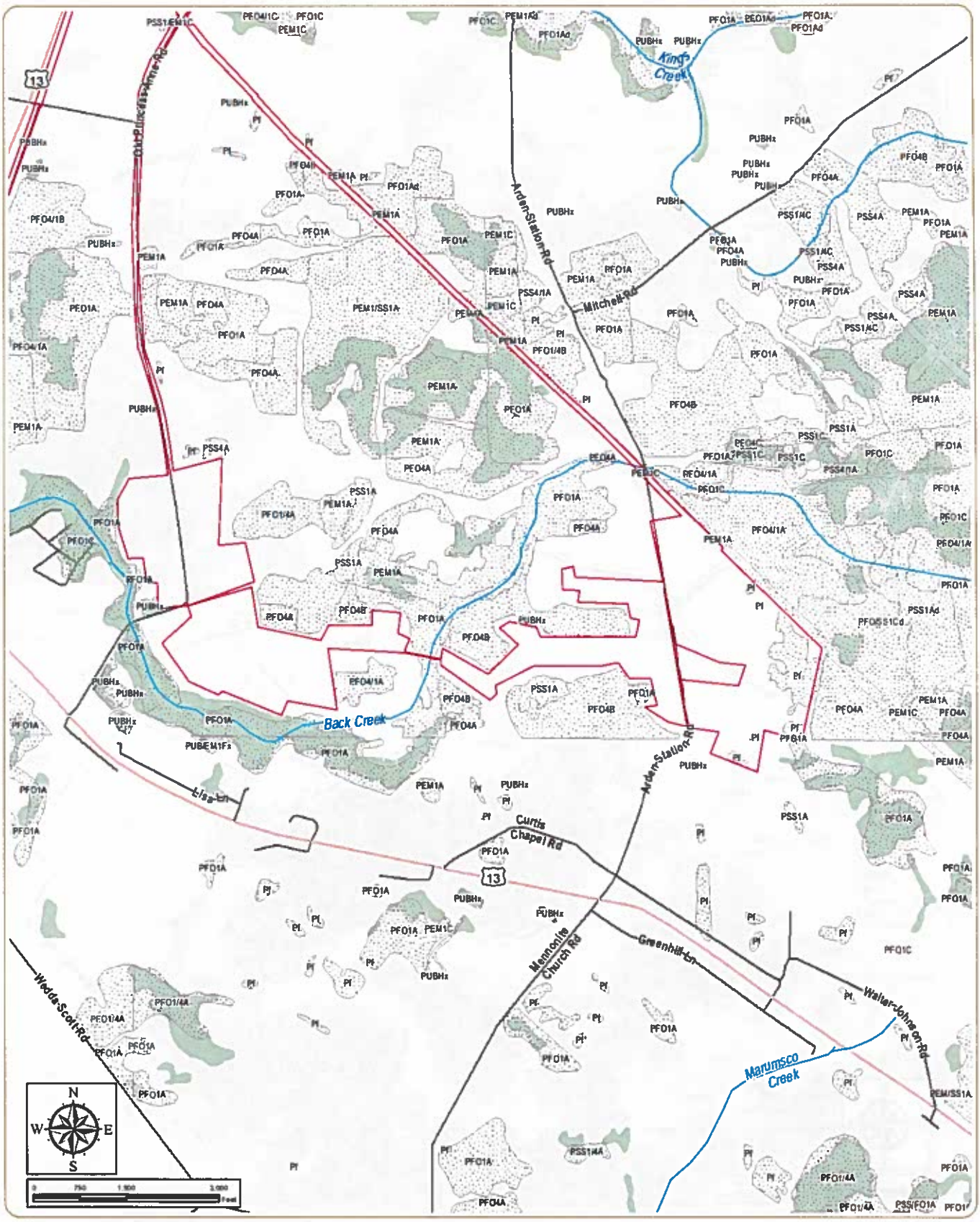

Great Bay Solar Project

Somerset County, Maryland

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Page 3 of 4 March 2015

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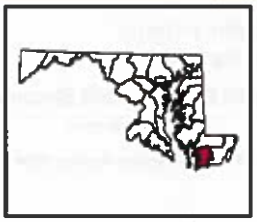

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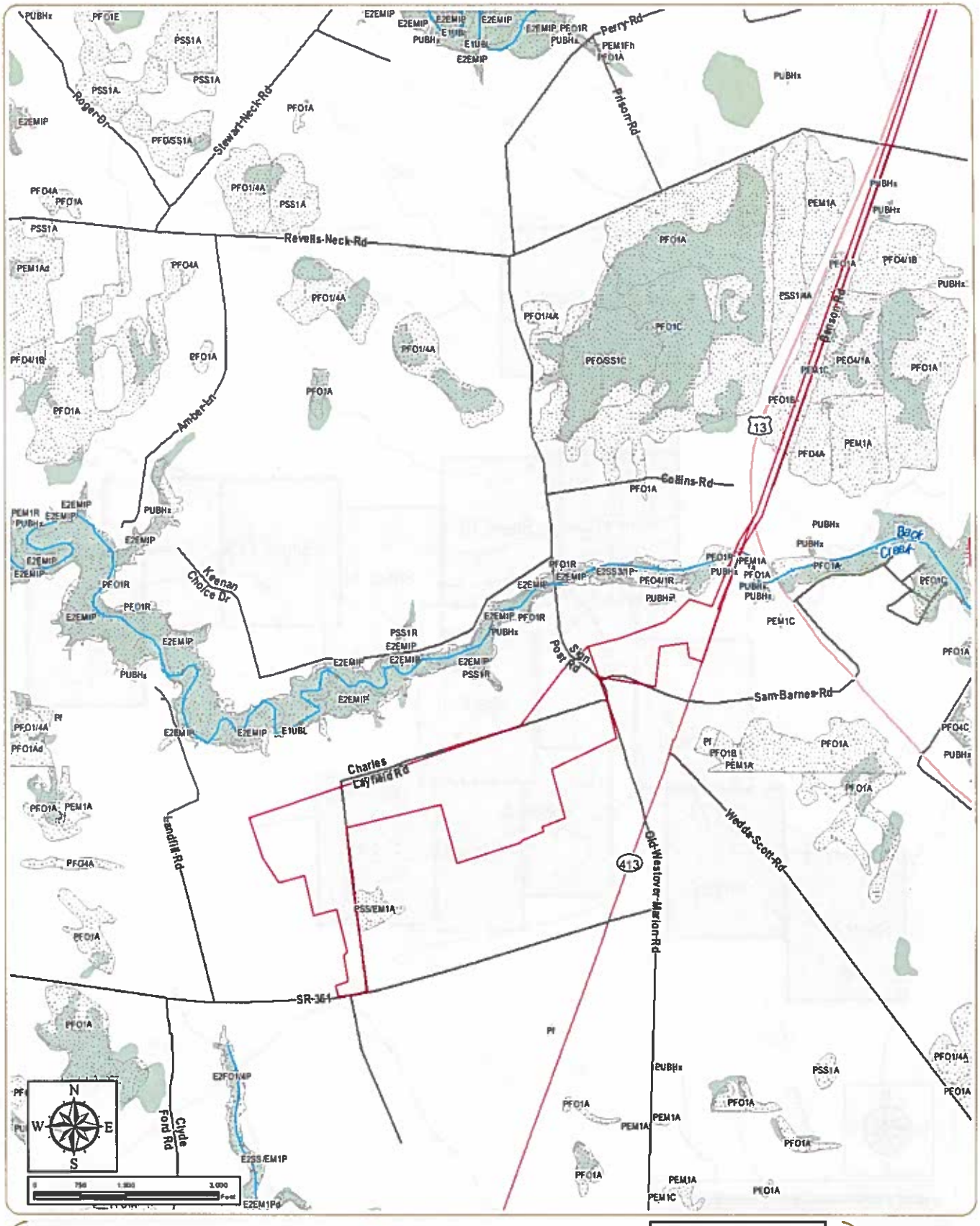

Great Bay Solar Project

Somerset County, Maryland

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Page 4 of 4 March 2015

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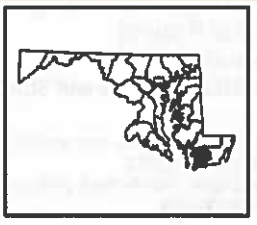

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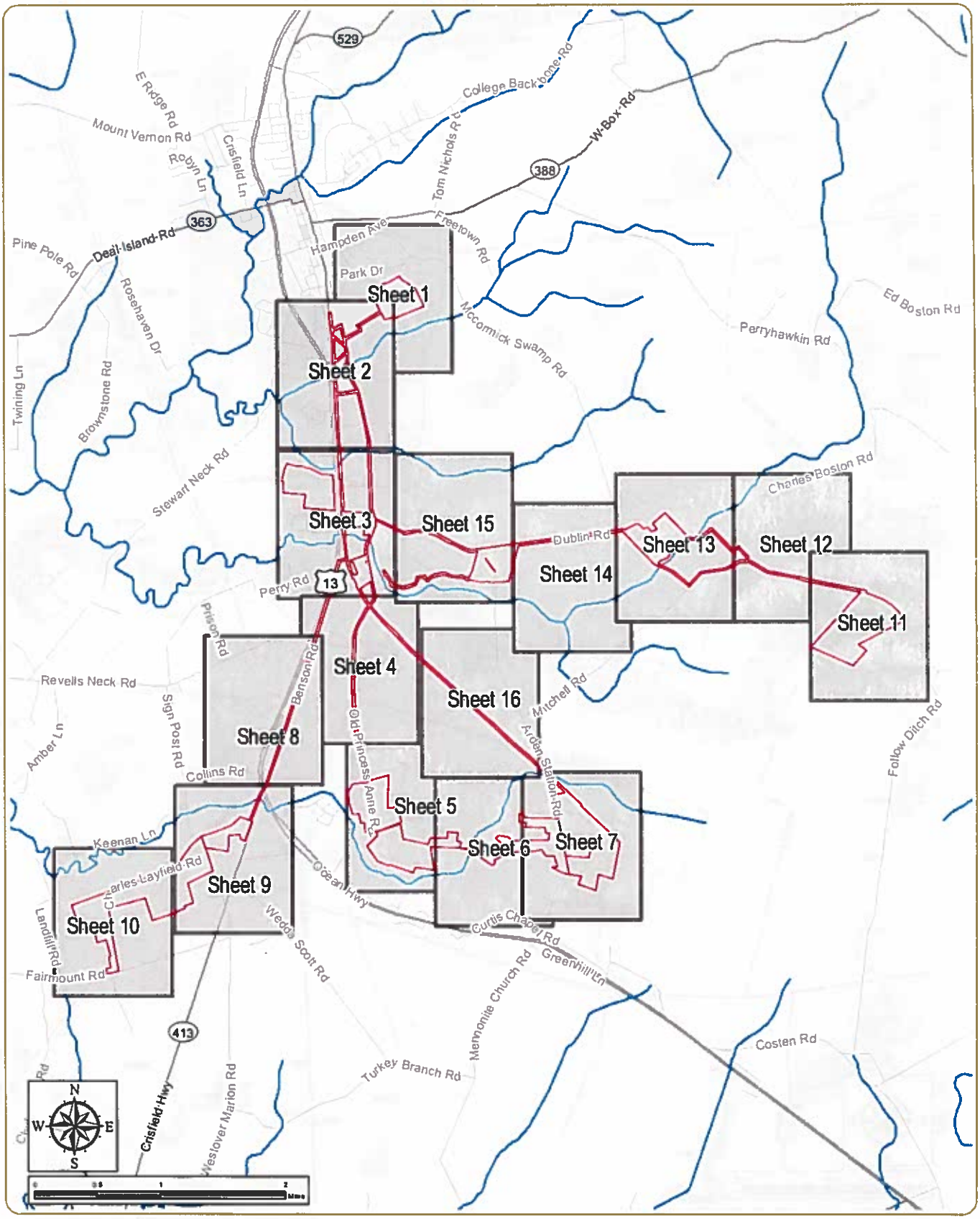

Great Bay Solar Project

Somerset County, Maryland

Figure 5: Delineated Wetlands and Streams Map Index

April 2015

Notes: 1. Basemap: ESRI ArcGIS "Imagery" map service and StreetMap North America, 2012.
2. This is a color graphic. Reproduction in grayscale may misrepresent the data.

Wetland Study Area

Wetland Field Map Index

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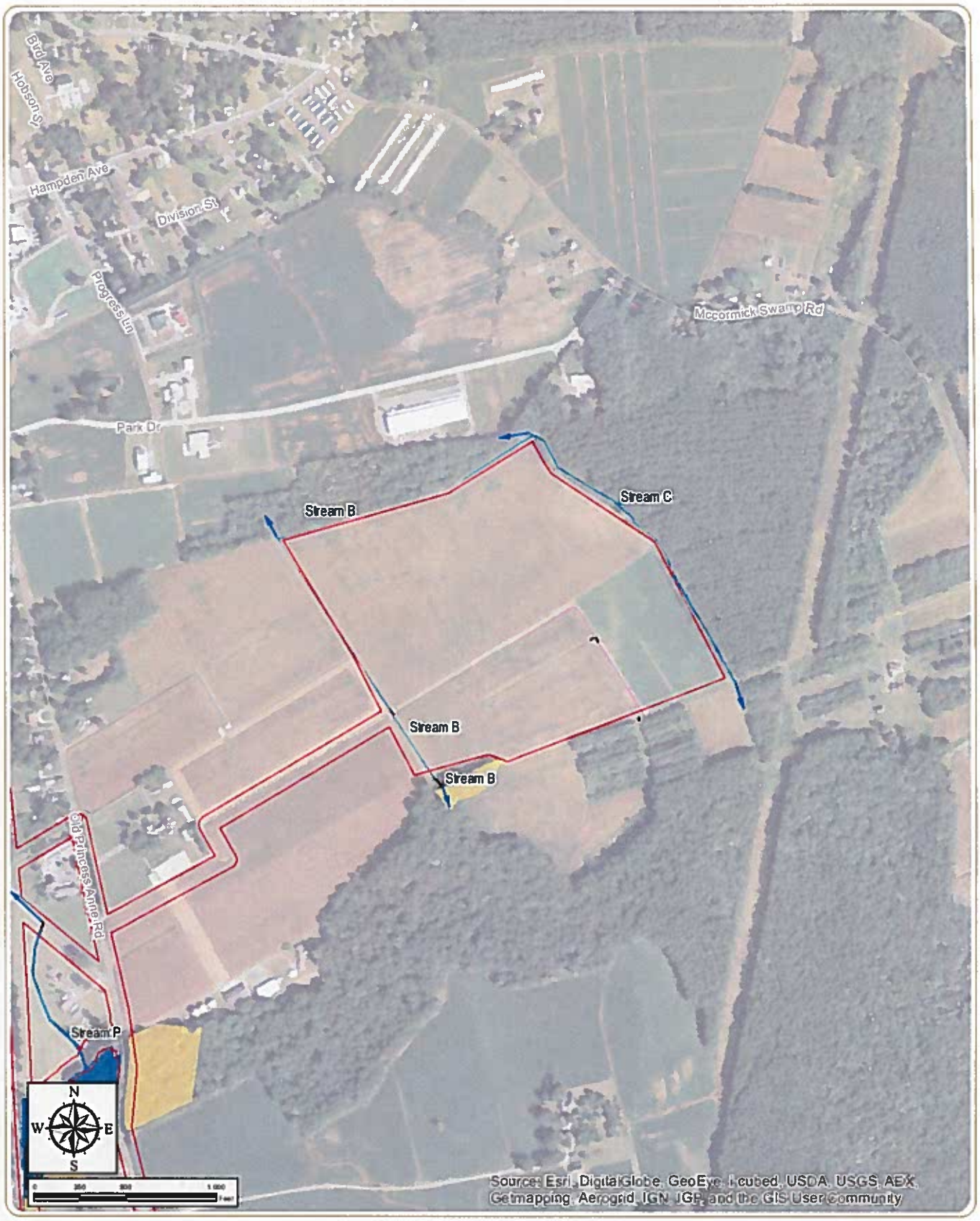

Great Bay Solar Project

Somerset County, Maryland

Figure 5: Delineated Wetlands and Streams

May 2015

Culvert
Study Area
Open Ended Wetland
Delineated Wetland or Stream
Approximate Wetland or Stream
Delineated Assumed Non-Jurisdictional Ditch

Notes: 1. Basemap: ESRI ArcGIS "Imagery" map service and StreetMap North America, 2012. 2. This is a color graphic. Reproduction in grayscale may misrepresent the data. 3. Delineated wetland boundaries determined during site specific investigations, conducted by wetland biologists, based on the presence of wetland indicators (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology). 4. Approximate wetland boundaries based on aerial photo interpretation, LIDAR elevation data, and limited reconnaissance-level field review; however, due to lack of property access the presence of wetland indicators has not yet been determined.

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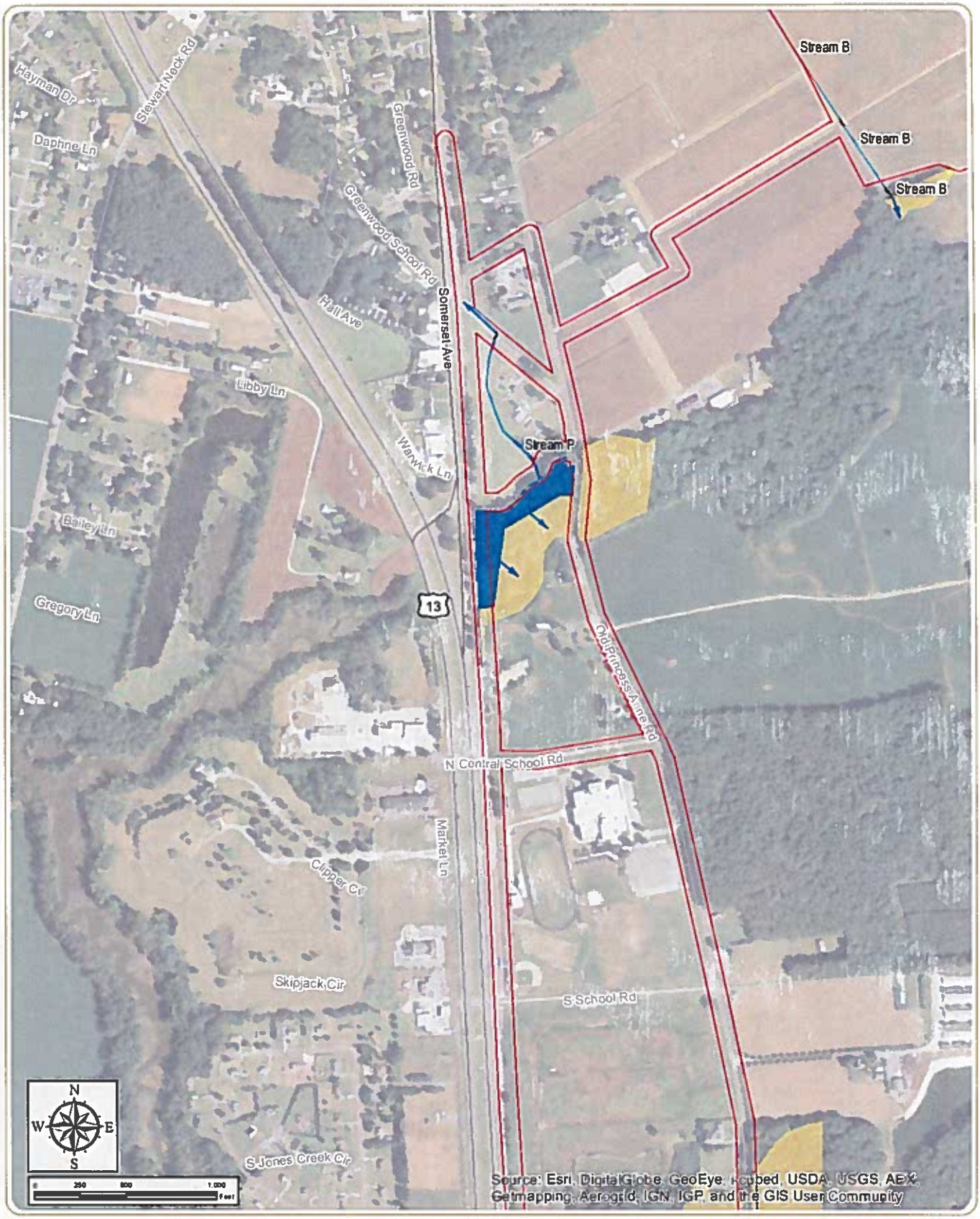

Great Bay Solar Project

Somerset County, Maryland

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Study Area
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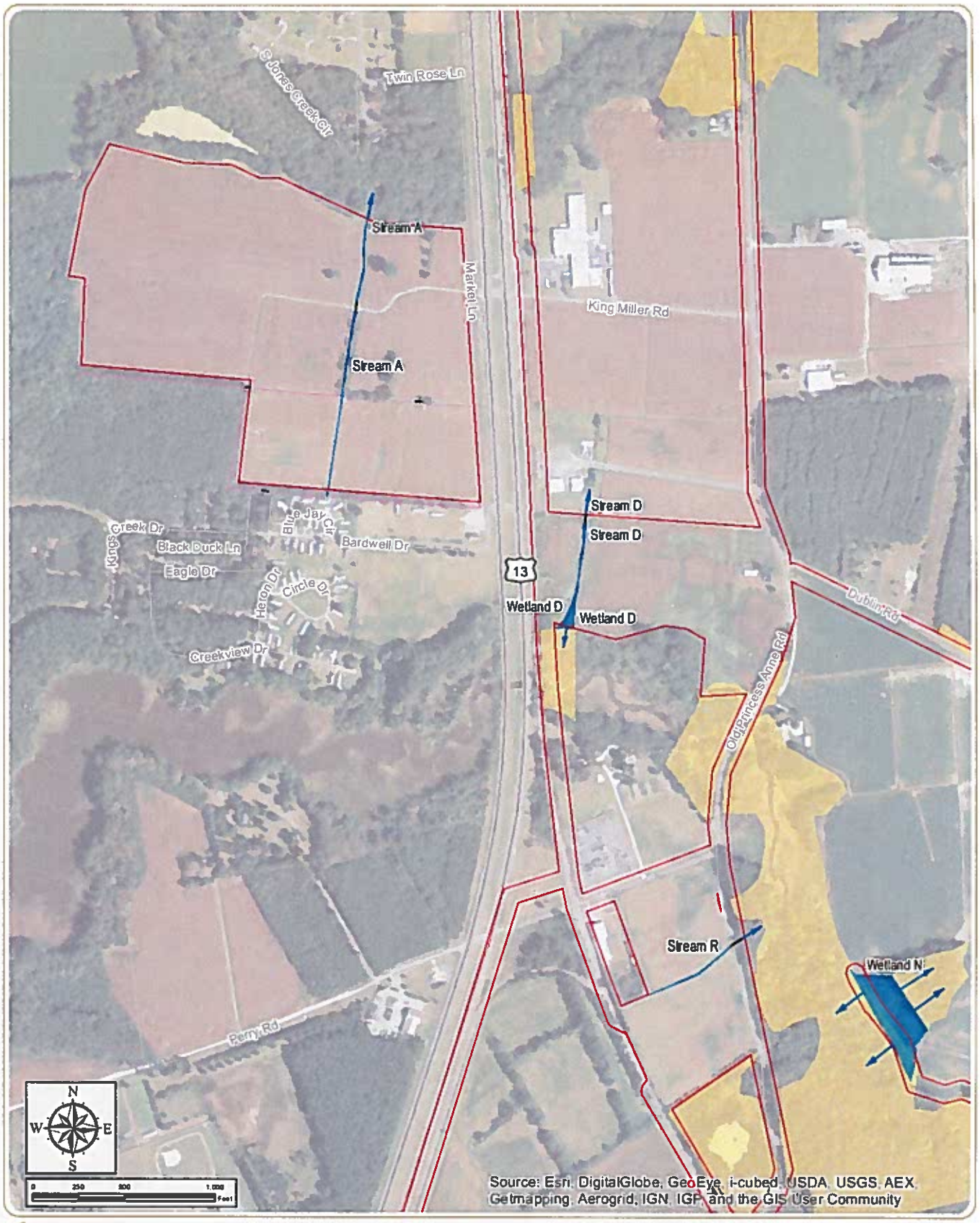

Great Bay Solar Project

Somerset County, Maryland

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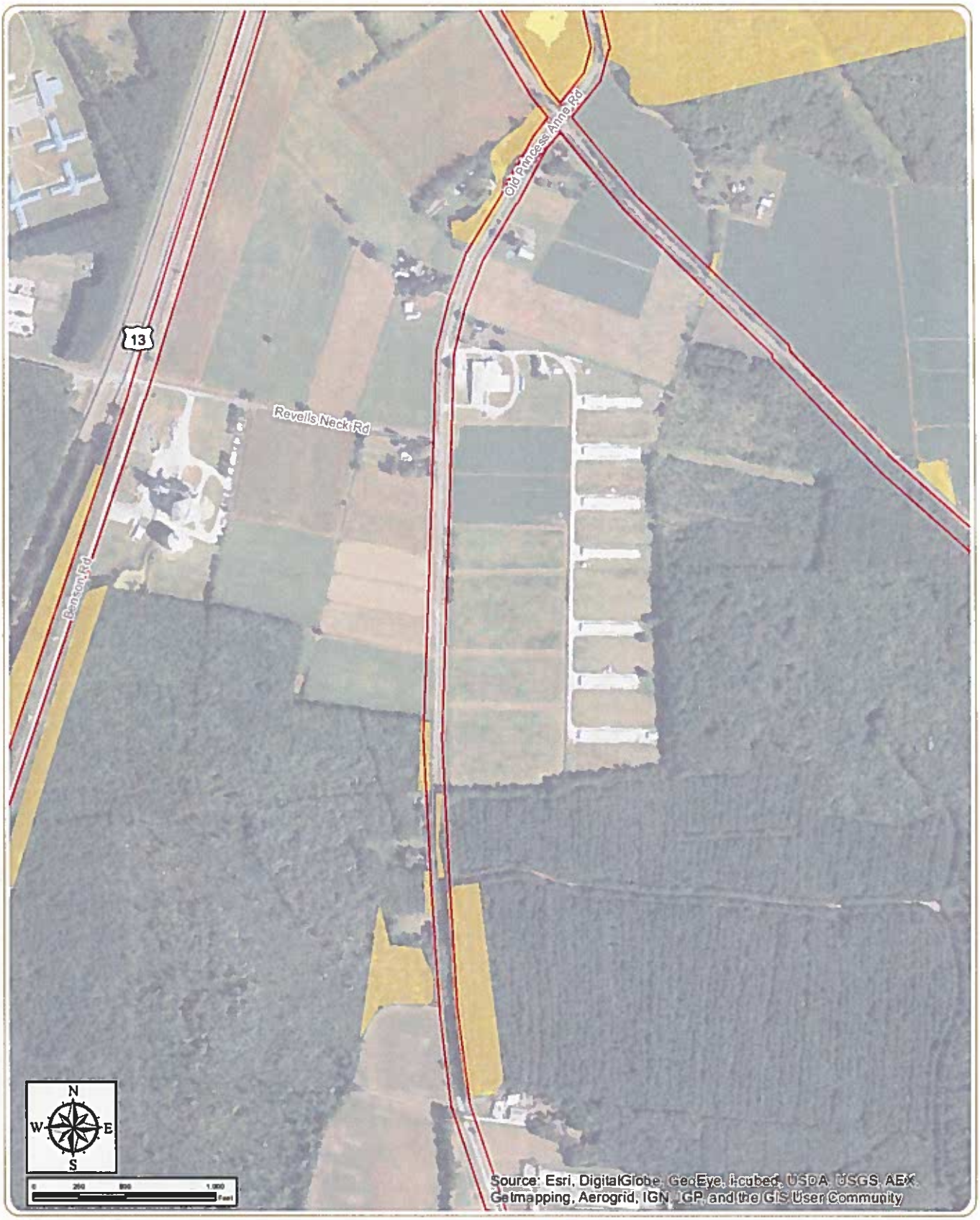

Great Bay Solar Project

Somerset County, Maryland

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May 2015

Culvert
Study Area
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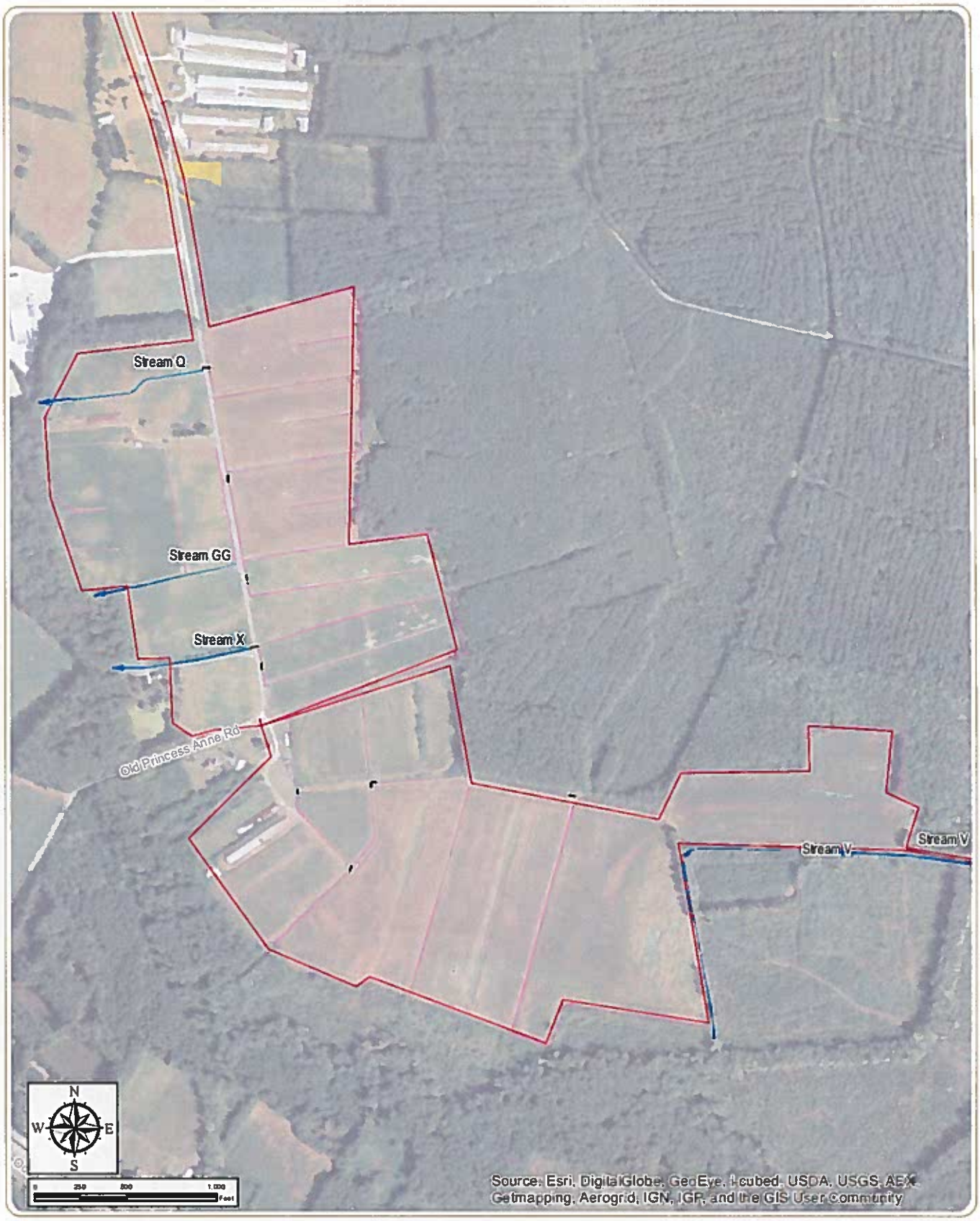

Great Bay Solar Project

Somerset County, Maryland

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May 2015

Culvert
Study Area
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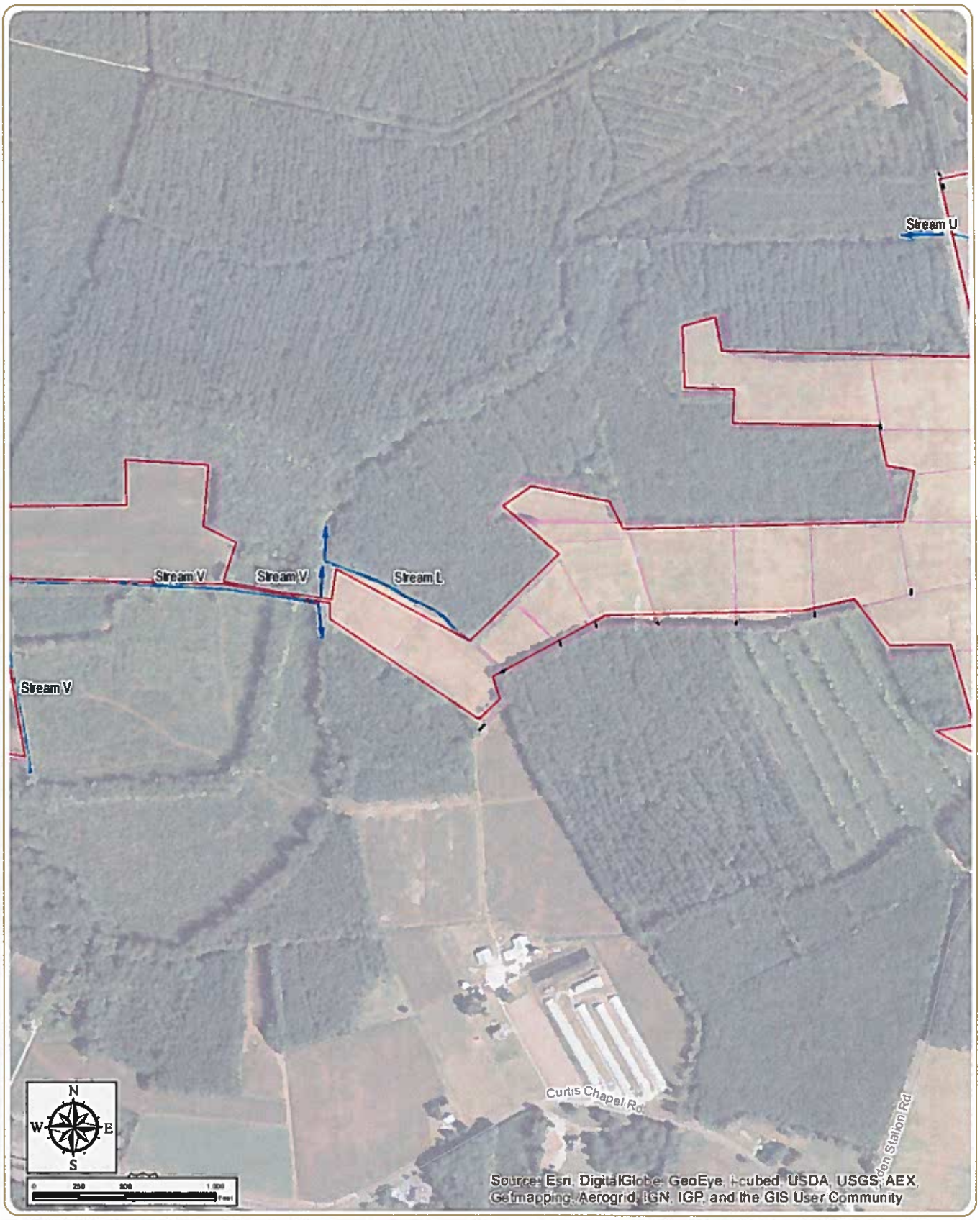

Great Bay Solar Project

Somerset County, Maryland

Figure 5: Delineated Wetlands and Streams

May 2015

Culvert
Study Area
Open Ended Wetland
Delineated Wetland or Stream
Approximate Wetland or Stream
Delineated Assumed Non-Jurisdictional Ditch

Notes: 1. Basemap: ESRI ArcGIS "Imagery" map service and StreetMap North America, 2012. 2. This is a color graphic. Reproduction in grayscale may misrepresent the data. 3. Delineated wetland boundaries determined during site specific investigations, conducted by wetland biologists, based on the presence of wetland indicators (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology). 4. Approximate wetland boundaries based on aerial photo interpretation, LIDAR elevation data, and limited reconnaissance-level field review; however, due to lack of property access the presence of wetland indicators has not yet been determined.

Great Bay Solar Project

Somerset County, Maryland

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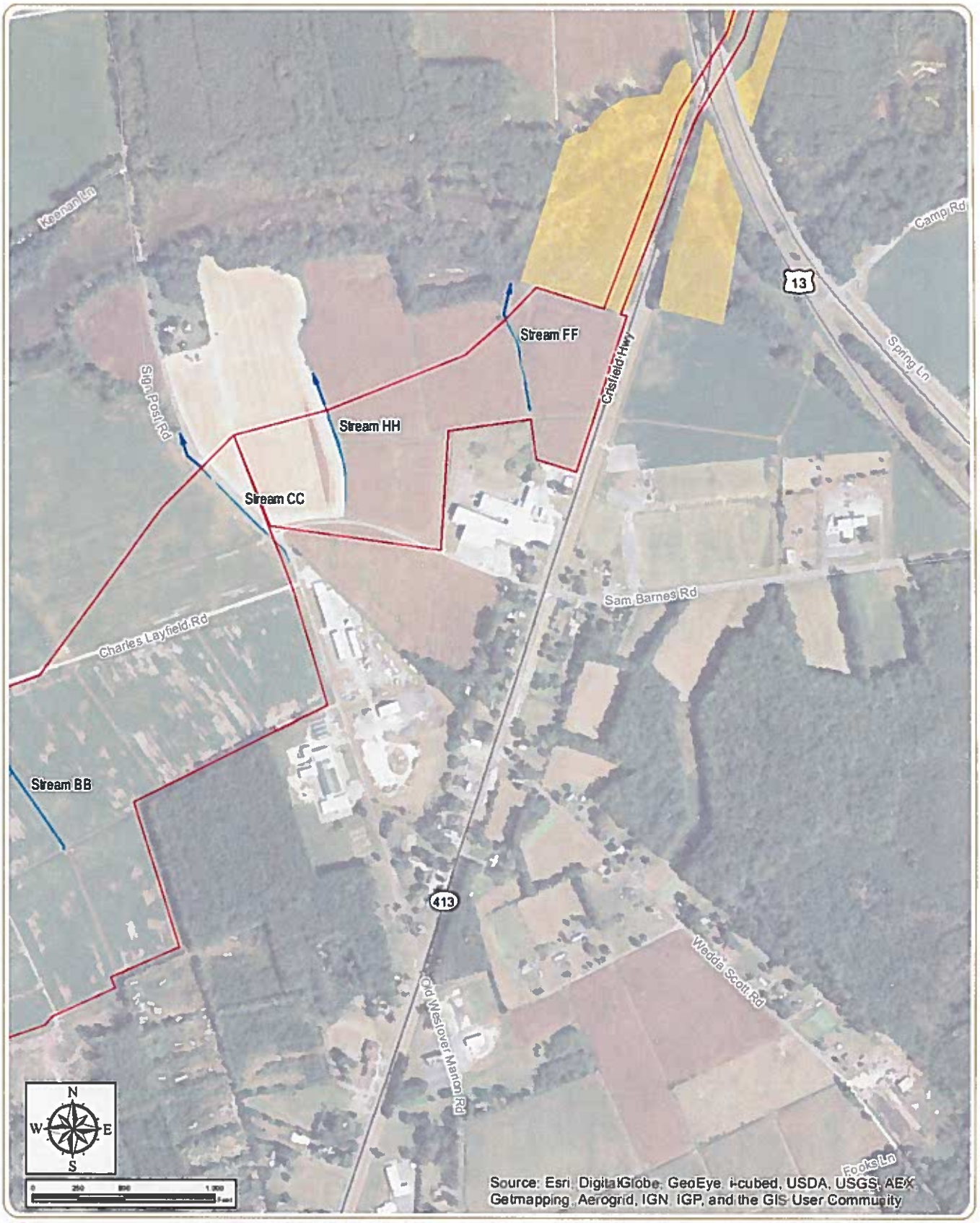

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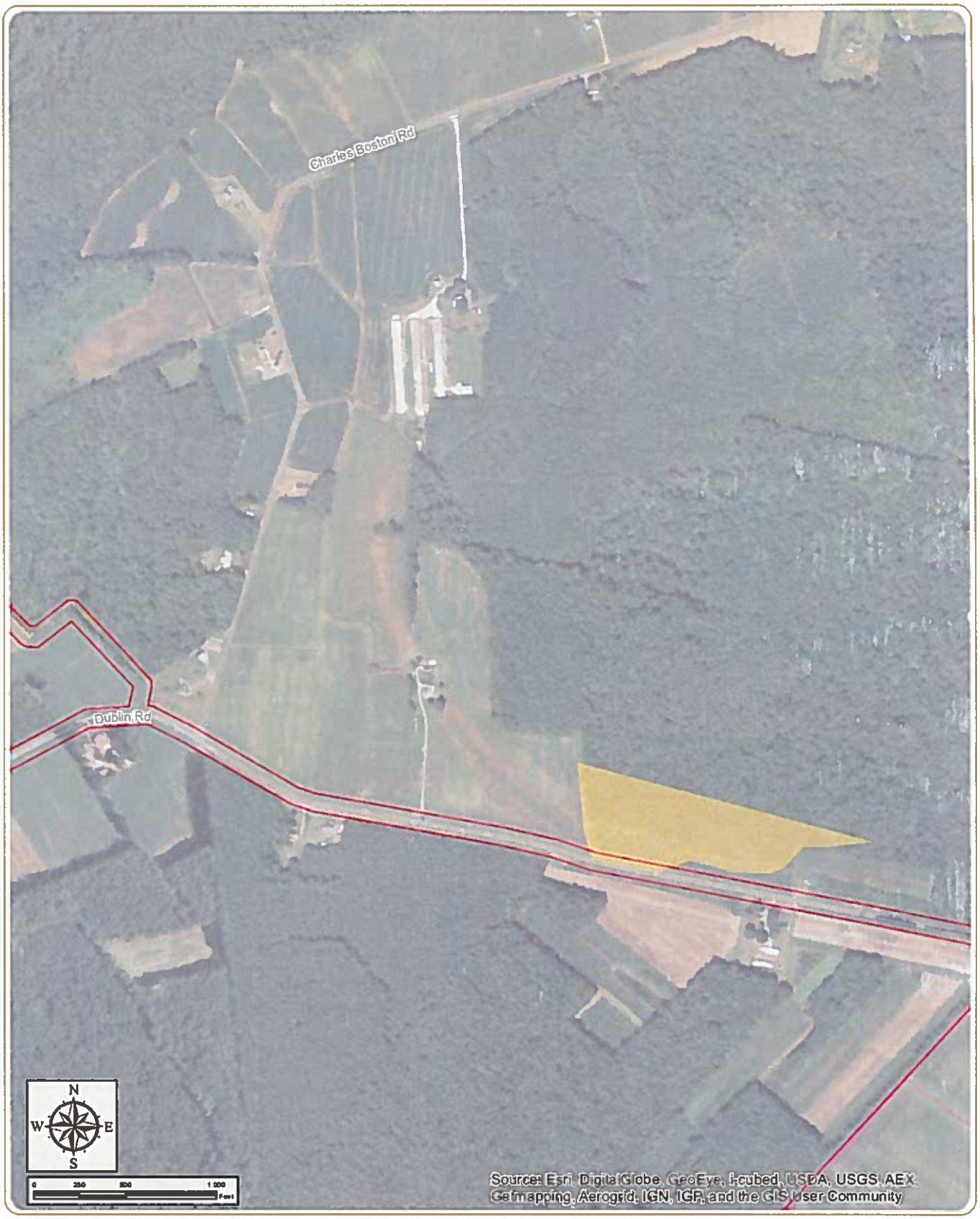

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Somerset County, Maryland

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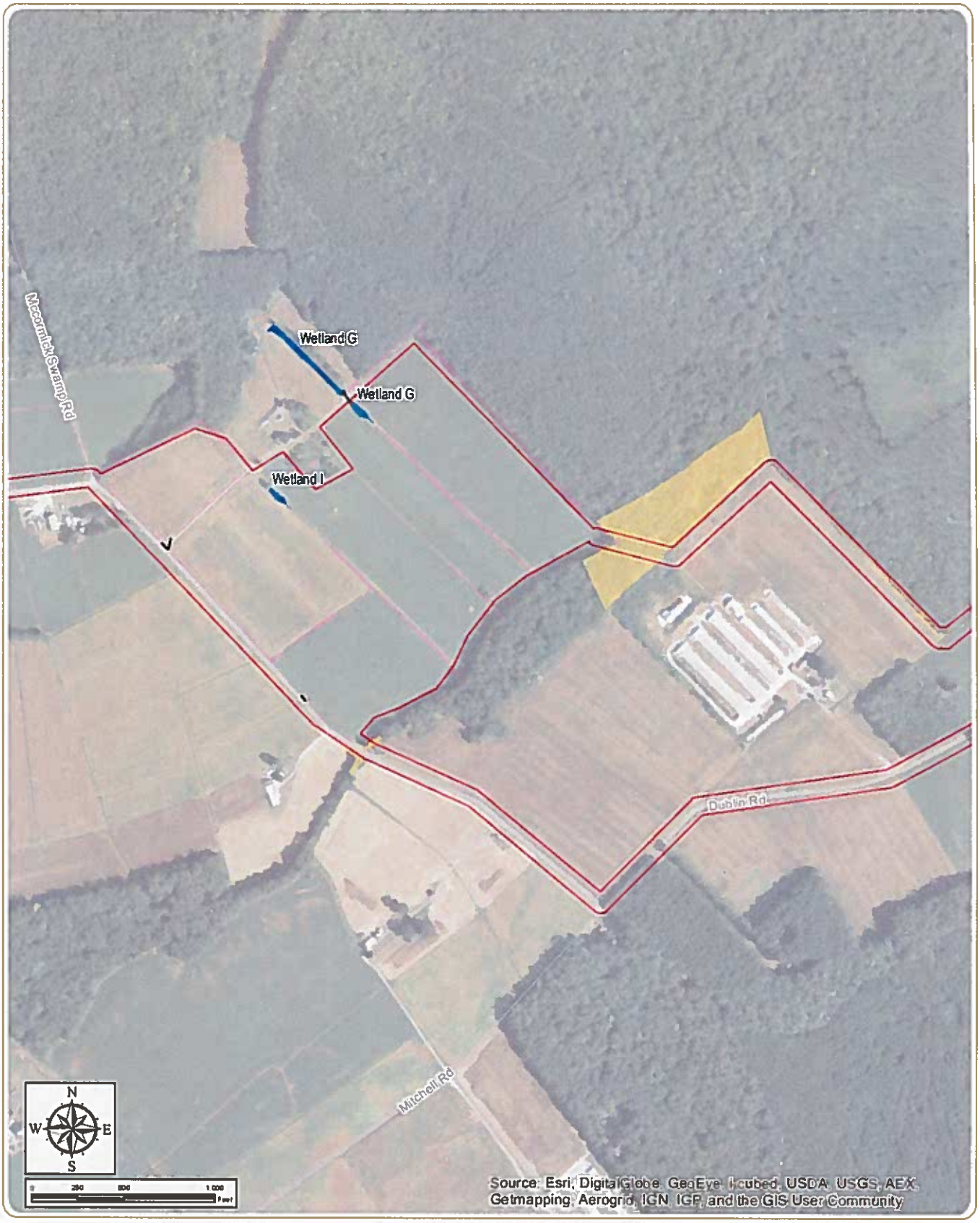

Great Bay Solar Project

Somerset County, Maryland

Figure 5: Delineated Wetlands and Streams

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Great Bay Solar Project
Somerset County, Maryland
Figure 5: Delineated Wetlands and Streams
May 2015

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Great Bay Solar Project

Somerset County, Maryland

Figure 5: Delineated Wetlands and Streams

May 2015

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Great Bay Solar Project

Somerset County, Maryland

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APPENDIX B

Routine Wetland Determination Data Sheets

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 45°F, Cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-10-2015

Stream Name: unnamed (Stream A)

Stream Location (nearest road, structure, etc.): Market Lane

Adjacent Community: Ag fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 12'

Stream Width: 5'

Water Depth: 8"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows north to forested wetland

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 45°F Cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-10-15

Stream Name: unnamed (Stream B)

Stream Location (nearest road, structure, etc.): Old Princess Anne Road

Adjacent Community: Ag Fields

Stream Gradient - gentle /
- moderate
- steep

Bank Width: 10'

Stream Width: 3'

Water Depth: 8"

Substrate:
- Bed Rock
- Boulder
- Cobble
- Gravel
- Sand /
- Silt /
- Clay

Instream Cover:
- Undercut bank
- Overhanging vegetation
- Logs/woody debris
- Deep pools
- Other

Flow:
- Permanent
- Intermittent /

Photo #
Flag #'s

Additional Comments:

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 45°F, Cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-10-15

Stream Name: unnamed (Stream C)

Stream Location (nearest road, structure, etc.): Old Princess Anne Road

Adjacent Community: Ag Field, Pine Plantation

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 6'

Stream Width: 3'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___

Flag #'s ___

Additional Comments: ___

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: GR Solar City/County: Somerset Sampling Date: 3-10-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: 1W@WetD

Investigator(s): MM, CL Section, Township, Range: _____

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): LRR-T Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: WdA NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? no Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? no (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☒ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No _____ Depth (inches): 15

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 1WBWetD

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Sapling/Shrub Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Herb Stratum (Plot size: 9 ft rad)			
1. Phragmites australis	100	Y	FACW
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
12. _____			
160 = Total Cover			
50% of total cover: 80 20% of total cover: 32			
Woody Vine Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: WetD

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/1.5	80	5YR 4/4	20	C	M	clay loam	
10-20	10YR 5/1	80	5YR 4/4	20	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: GB Solar City/County: Somerset Sampling Date: 3-10-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: 1UP/WetD

Investigator(s): MM, CL Section, Township, Range: _____

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR or MLRA): LRR-T Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: WdA NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? no Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? no (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
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- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
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- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UP@WetD

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 75q ft)			
1. Sorn	100	y	upl
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 1U@WetD

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/3.5	100					sandy loam	
12-20	10YR 5/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 50°F, Cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-10-15

Stream Name: unamed (Stream D)

Stream Location (nearest road, structure, etc.):
US 13 N
Adjacent Community: Ag field, Emergent wetland

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 12'

Stream Width: 3'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ✓
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows south to emergent (Phragmites) + forested wetlands.

Stream Inventory

EDR

Observer:
Name: Martin
Weather: cloudy, 45°F

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-11-15

Stream Name: unnamed, Stream E

Stream Location (nearest road, structure, etc.): Dublin Rd, Arden Station Rd

Adjacent Community: Ag Fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 12'

Stream Width: 3'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows S to forested wetland

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 45°F, cloudy

Project Information:
Name: Great Bay Solar
Number: 1501 2 Date: 3-11-15

Stream Name: unnamed, Stream F

Stream Location (nearest road, structure, etc.): [redacted] Arden Station Rd.

Adjacent Community: Ag field, Residential

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 10ft

Stream Width: 6ft

Water Depth: 1ft

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___

Flag #'s ___

Additional Comments: Flows W then S along Arden Station to creek.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Great Bay Solar (15012) City/County: /Somerset Sampling Date: 3-10-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: Iw@21,let6

Investigator(s): C.L. M.M. S.B. J.W. Section, Township, Range:

Landform (hillslope, terrace, etc.): Corn Field Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR-T Lat: Long: Datum: WGS-84

Soil Map Unit Name: QuA NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? no Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? no (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 3	
Water Table Present?	Yes ✓	No ____	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0	Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: swbWetG

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: 30ft rad.)			
1. Willow (Salix sp.)	10	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 = Total Cover		

50% of total cover: 5 20% of total cover: 2

Herb Stratum (Plot size: 9ft rad)			
1. Scirpus Cyperinus	90	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 = Total Cover		

50% of total cover: 45 20% of total cover: 18

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: HydWetG

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 6/1	75	10YR 5/6	25	C	M	sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Great Bay Solar (15012) City/County: /Somerset Sampling Date: 3-10-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: UpWet6

Investigator(s): C.L. M.M. S.B. J.W. Section, Township, Range:

Landform (hillslope, terrace, etc.): ag field Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR-T Lat: Long: Datum: WGS-84

Soil Map Unit Name QuA NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 1UplWetG

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		= Total Cover	

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		= Total Cover	

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 9 ft rad)			
1. Corn	100	Y	upl
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: UP@Wet6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/3	100	-	-	-	-	silt loam	
6-20	10YR 4/4	100	-	-	-	-	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Great Bay Solar (15012) City/County: /Somerset Sampling Date: 3-10-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: 1WQuilt

Investigator(s): C.L. M.M. S.B. J.W. Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR-T Lat: Long: Datum: WGS-84

Soil Map Unit Name: CxuA NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	Is the Sampled Area within a Wetland?	Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____		
Wetland Hydrology Present?	Yes ✓ No ____		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 16
Water Table Present?	Yes ✓	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 8

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Inv@WetI

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: 30 ft rad)			
1. [redacted]	[redacted]		
2. [redacted] Liquidambar styraciflua	30	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		

50% of total cover: 15 20% of total cover: 6

Herb Stratum (Plot size: _____)			
1. Juncus sp.	30	Y	FACW
2. Typha latifolia	25	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55 = Total Cover		

50% of total cover: 22.5 20% of total cover: 11

Woody Vine Stratum (Plot size: _____)			
1. Smilax	20		
2.			
3.			
4.			
5.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 1WDWetI

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					Salo	
4-20	10YR 4/2	70	7.5YR 4/6	30	C	M	salo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Great Bay Solar (15012) City/County: /Somerset Sampling Date: 3-10-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: UpWetT

Investigator(s): C.L. M.M. S.B. J.W. Section, Township, Range:

Landform (hillslope, terrace, etc.): Ag Field Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR-T Lat: Long: Datum: WGS-84

Soil Map Unit Name: QuA NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? N Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 1v@WetI

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 9ft rad)			
1. Corn	100	y	upl
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
100 = Total Cover			

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No /

Remarks: (If observed, list morphological adaptations below).

SOIL Sampling Point: 10 DWet I

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					silo	
4-10	2.5Y 6/3	90	7.5YR 4/6	10	C	M	clay loam	
10-18+	2.5Y 7/1	70-75	7.5YR 4/6	25-30	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Stream Inventory

EDR

Observer:
Name: CH, JW
Weather: Cloudy, 45°F

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-11-15

Stream Name: Unnamed, Stream L

Stream Location (nearest road, structure, etc.): Arden Station Rd

Adjacent Community: Forest, Ag field

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 4'

Stream Width: 10'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows west to creek

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Great Bay Solar (15012) City/County: /Somerset Sampling Date: 3-12-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: 1W@WetN

Investigator(s): C.L. M.M. S.B. J.W. Section, Township, Range:

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR-T Lat: Long: Datum: WGS-84

Soil Map Unit Name: Lo NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? no Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? no (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2	
Water Table Present?	Yes ✓	No ____	Depth (inches): 4	
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0	Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: Wetland N

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 9 ft rad)			
1. Phragmites australis	80	y	FACW
2. Typha latifolia	10	n	OBL
3. Carex sp.	5	n	FACW
4. Scirpus cyperinus	15	n	OBL
5. Juncus sp.	5	n	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	115 = Total Cover		

50% of total cover: 67.5 20% of total cover: 23

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species _____	x 1 =	_____
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: _____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (If observed, list morphological adaptations below).

SOIL Sampling Point: iW@Wet N

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5Y 4/2	85	5YR 4/6	15	C	M	silt loam	
3-22	2.5Y 5/1	65	5YR 4/6	35	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Great Bay Solar (15012) City/County: /Somerset Sampling Date: 7-1-15

Applicant/Owner: Pioneer Green State: MD Sampling Point: UWDWetN

Investigator(s): C.L. M.M. S.B. J.W. Section, Township, Range:

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR or MLRA): LRR-T Lat: Long: Datum: WGS-84

Soil Map Unit Name: Ln NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) (LRR U)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UP Wet-N

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: 9ft rad)			
1. Carex	100	Y	upl
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species _____	x 1 =	_____
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: _____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: LU@WetN

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y6/4						Sandy loam	
4-18	2.5YR3/6						sandy loam	
18+	2.5Y4/2	95	7.5YR4/6	5			silo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Stream Inventory

EDR

Observer:
Name: Martin, Liddell
Weather: 40F, Sunny

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-12-15

Stream Name: unnamed, Stream P

Stream Location (nearest road, structure, etc.): Mulder Branch Rd, Old Princess Anne Rd

Adjacent Community: Lawn

Stream Gradient - gentle ___
- moderate /
- steep ___

Bank Width: 12'

Stream Width: 4'

Water Depth: 1'

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand /
- Silt /
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent /

Photo # ___
Flag #'s ___

Additional Comments: Drains to forested wetland south of project site.

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 55°F, Cloudy/drizzle

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-11-15

Stream Name: Unnamed (Stream B)

Stream Location (nearest road, structure, etc.): Old Princess Anne Rd

Adjacent Community: Ag fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 9'

Stream Width: 3'

Water Depth: 5"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows west to forested wetland

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 50°F, Cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-10-15

Stream Name: Unammed (Stream R)

Stream Location (nearest road, structure, etc.): Old Princess Anne Rd

Adjacent Community: Ag fields

Stream Gradient - gentle Ø
- moderate /
- steep ___

Bank Width: 15'

Stream Width: 2'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand /
- Silt /
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent /

Photo # ___
Flag #'s ___

Additional Comments: Flows NE to forested/emergent wetland

Stream Inventory

EDR

Observer:
Name: Martin
Weather: Sunny, 40°F

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-12-15

Stream Name: Unnamed, Stream 5

Stream Location (nearest road, structure, etc.): Dublin Rd

Adjacent Community: [redacted] Ag Fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 12'

Stream Width: 4'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___

Flag #'s ___

Additional Comments: Flows S to forested wetland

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 55°F, Cloudy/drizzle

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-11-15

Stream Name: unnamed (Stream U)

Stream Location (nearest road, structure, etc.): Arden Station Rd.

Adjacent Community: Ag fields, RR

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 9'

Stream Width: 6'

Water Depth: 1.5'

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: ___

Stream Inventory

EDR

Observer:
Name: [redacted] MM, CL
Weather: cloudy, 45°F

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-11-15

Stream Name: Unnamed, Stream V

Stream Location (nearest road, structure, etc.): Old Princess Anne Rd

Adjacent Community: Forest, Ag Field

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 4'

Stream Width: 8'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows east to creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 55°F, Cloudy/drizzle

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-11-15

Stream Name: Unnamed (Stream X)

Stream Location (nearest road, structure, etc.): Old Princess Anne Rd.

Adjacent Community: _____

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 10'

Stream Width: 3'

Water Depth: 1'

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other _____

Flow:
- Permanent ___
- Intermittent ✓

Photo # _____
Flag #'s _____

Additional Comments: Flows west to forested wetland

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 4-15-15

Stream Name: unnamed, Stream Y

Stream Location (nearest road, structure, etc.): Charles Mayfield Rd

Adjacent Community: Ag field, Forest

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 10'

Stream Width: 3'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___

Flag #'s ___

Additional Comments: Flows north to Back Creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 4-15-15

Stream Name: Unnamed (Stream 2)

Stream Location (nearest road, structure, etc.): Charles Layfield Rd.

Adjacent Community: Ag fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 10'

Stream Width: 4'

Water Depth: 6'

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows north to Back Creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 4-15-15

Stream Name: unnamed (Stream AA)

Stream Location (nearest road, structure, etc.): Charles Layfield Rd

Adjacent Community: Ag fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 10'

Stream Width: 5'

Water Depth: 4"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___

Flag #'s ___

Additional Comments: Flows north to Back Creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, overcast

Project Information:
Name: Great Bay Solar
Number: 1501.2 Date: 4-15-15

Stream Name: Unnamed (Stream BB)

Stream Location (nearest road, structure, etc.): Charles Layfield Rd.

Adjacent Community: Ag Fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 12'

Stream Width: 2'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___

Flag #'s ___

Additional Comments: Flows north to Back Creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, overcast

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 4-15-15

Stream Name: Unnamed (Stream CC)

Stream Location (nearest road, structure, etc.): ~~Sign~~ Sign Post Rd

Adjacent Community: Ag field, Sign Post Rd

Stream Gradient - gentle ___
- moderate ✓
- steep ___

Bank Width: 12'

Stream Width: 4'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows N along Sign Post Rd to Back Creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, cloudy

Project Information:
Name: Great Bay Solar
Number: 1502 Date: 4-15-15

Stream Name: Unnamed, Stream PD

Stream Location (nearest road, structure, etc.): Charles Hayfield Rd.

Adjacent Community: Ag Fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 12'

Stream Width: 3'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows north to Back Creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, Cloudy

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 4-15-15

Stream Name: unnamed, Stream EE

Stream Location (nearest road, structure, etc.): Charles Layfield Rd.

Adjacent Community: Ag Fields

Stream Gradient - gentle ✓
- moderate
- steep

Bank Width: 12'

Stream Width: 2'

Water Depth: 6"

Substrate:
- Bed Rock
- Boulder
- Cobble
- Gravel
- Sand ✓
- Silt ✓
- Clay

Instream Cover:
- Undercut bank
- Overhanging vegetation
- Logs/woody debris
- Deep pools
- Other

Flow:
- Permanent
- Intermittent ✓

Photo #

Flag #'s

Additional Comments: Flows north to Back Creek

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, overcast

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 4-15-15

Stream Name: Unnamed (Stream FF)

Stream Location (nearest road, structure, etc.): SR413

Adjacent Community: Ag fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 10ft

Stream Width: 3ft

Water Depth: 6in

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows N. to Back Creek.

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 55°F, Cloudy/drizzle

Project Information:
Name: Great Bay Solar
Number: 15012 Date: 3-11-15

Stream Name: Unnamed (Stream GG)

Stream Location (nearest road, structure, etc.): Old Princess Anne Rd

Adjacent Community: Ag fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 9'

Stream Width: 4'

Water Depth: 12"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ✓
- Silt ✓
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows west to forested wetland.

Stream Inventory

EDR

Observer:
Name: Martin
Weather: 60°F, overcast

Project Information:
Name: Great Bay Solar
Number: 1501.2 Date: 4-15-15

Stream Name: Unnamed (Stream HH)

Stream Location (nearest road, structure, etc.): SR 413

Adjacent Community: Ag fields

Stream Gradient - gentle ✓
- moderate ___
- steep ___

Bank Width: 10'

Stream Width: 4'

Water Depth: 6"

Substrate:
- Bed Rock ___
- Boulder ___
- Cobble ___
- Gravel ___
- Sand ___
- Silt ___
- Clay ___

Instream Cover:
- Undercut bank ___
- Overhanging vegetation ___
- Logs/woody debris ___
- Deep pools ___
- Other ___

Flow:
- Permanent ___
- Intermittent ✓

Photo # ___
Flag #'s ___

Additional Comments: Flows N to Back Creek

APPENDIX C

Photos of Representative Wetland Communities

Photo 01

Typical agricultural drainage ditch.

Photo 02

Typical agricultural drainage ditch.

Photo 03

Emergent Wetland D.

Photo 04

Agricultural field at Wetland D.

Photo 05

Emergent Wetland G.

Photo 06

Agricultural field at Wetland G.

Photo 07

Scrub shrub Wetland I.

Photo 08

Agricultural field at Wetland I.

Photo 09

Emergent Wetland N.

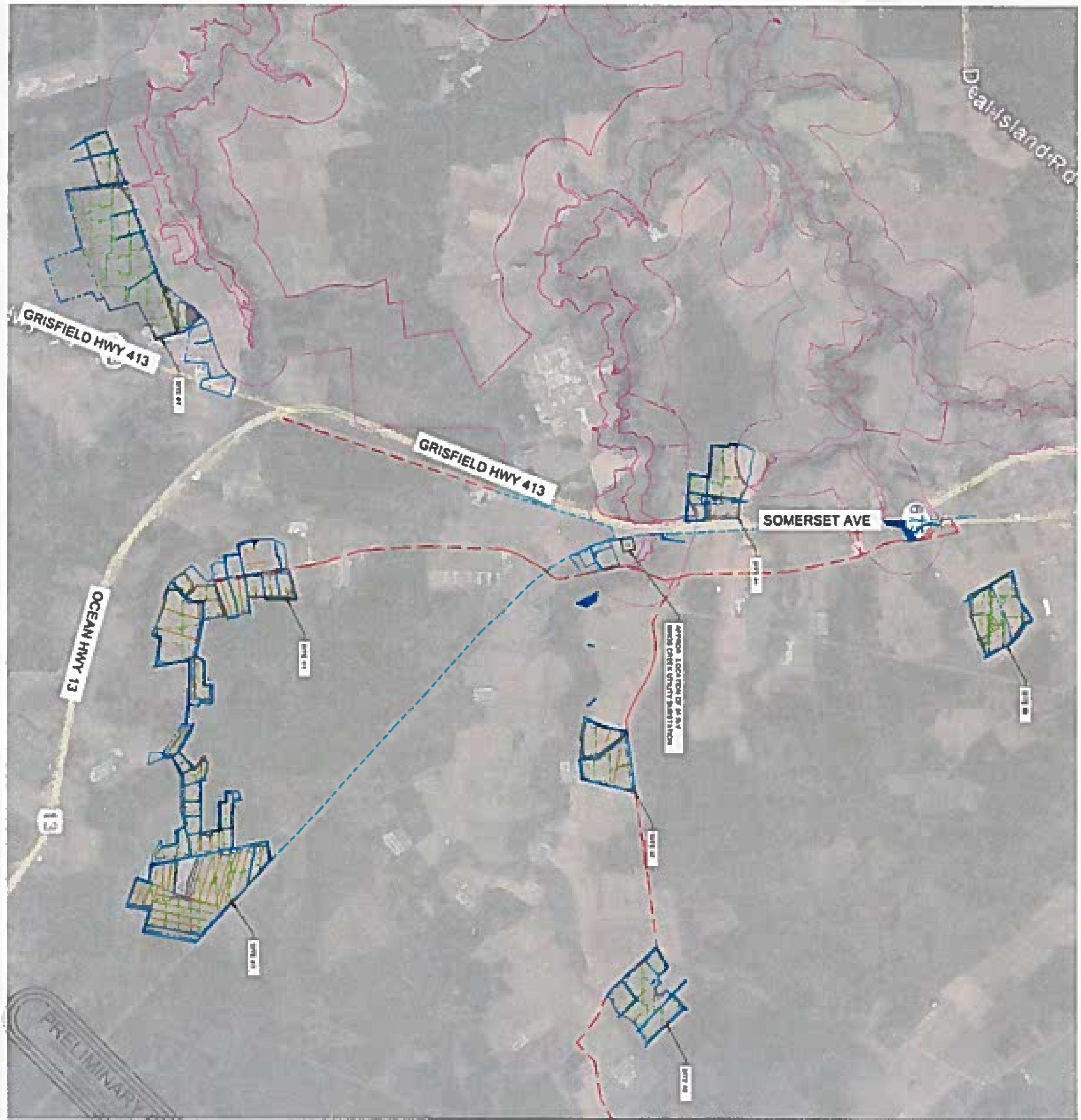
Photo 10

Agricultural field at Wetland N.

EXHIBIT E

Conceptual Site Plan

APPROX. NORTH



SYSTEM SUMMARY

LEGEND

KEYED NOTES

W-110

GREAT BAY SOLAR PROJECT

SOMERSET COUNTY
MARYLAND

OVERALL ARRAY LAYOUT

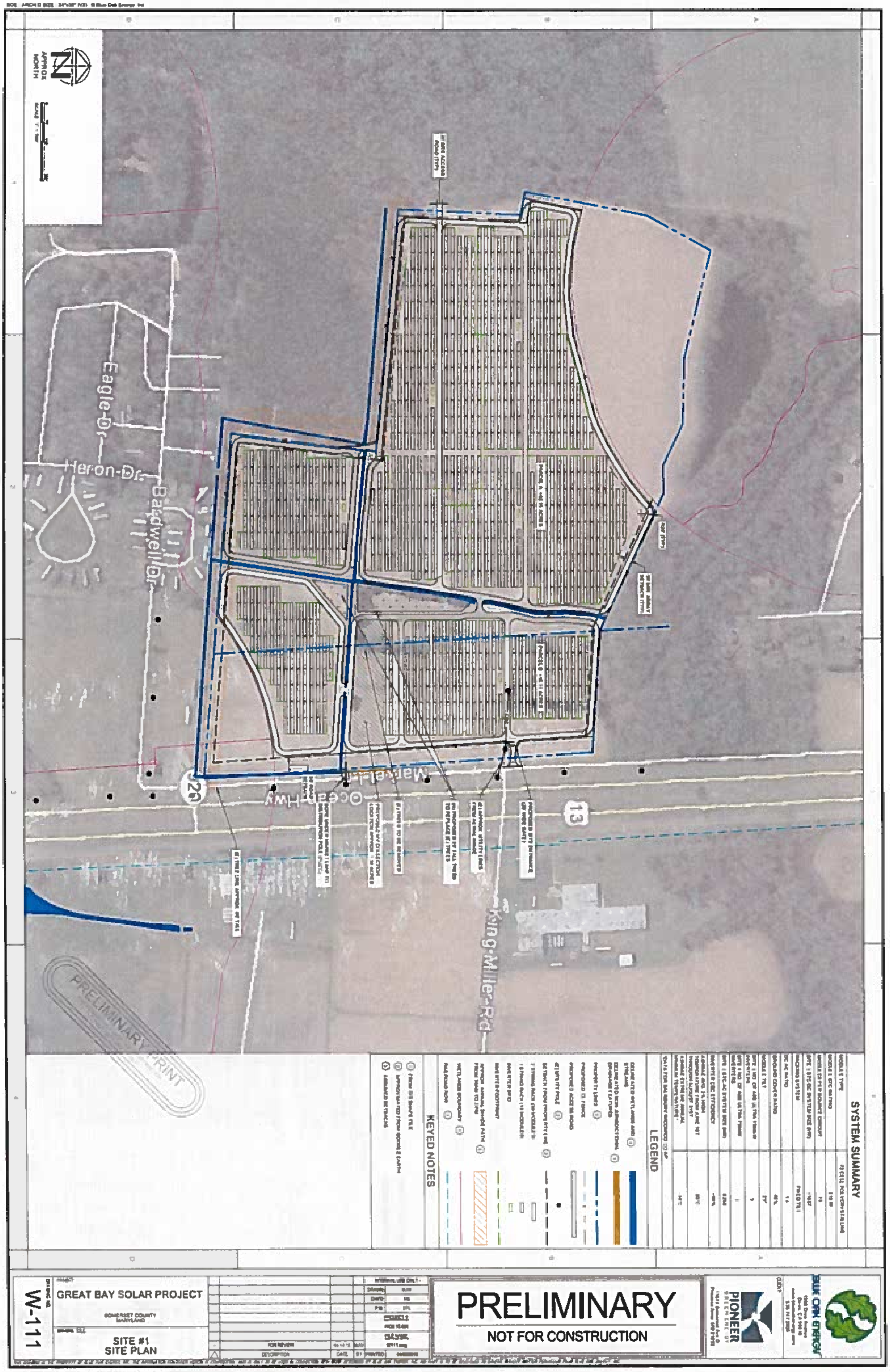
FOR REVIEW

PRELIMINARY

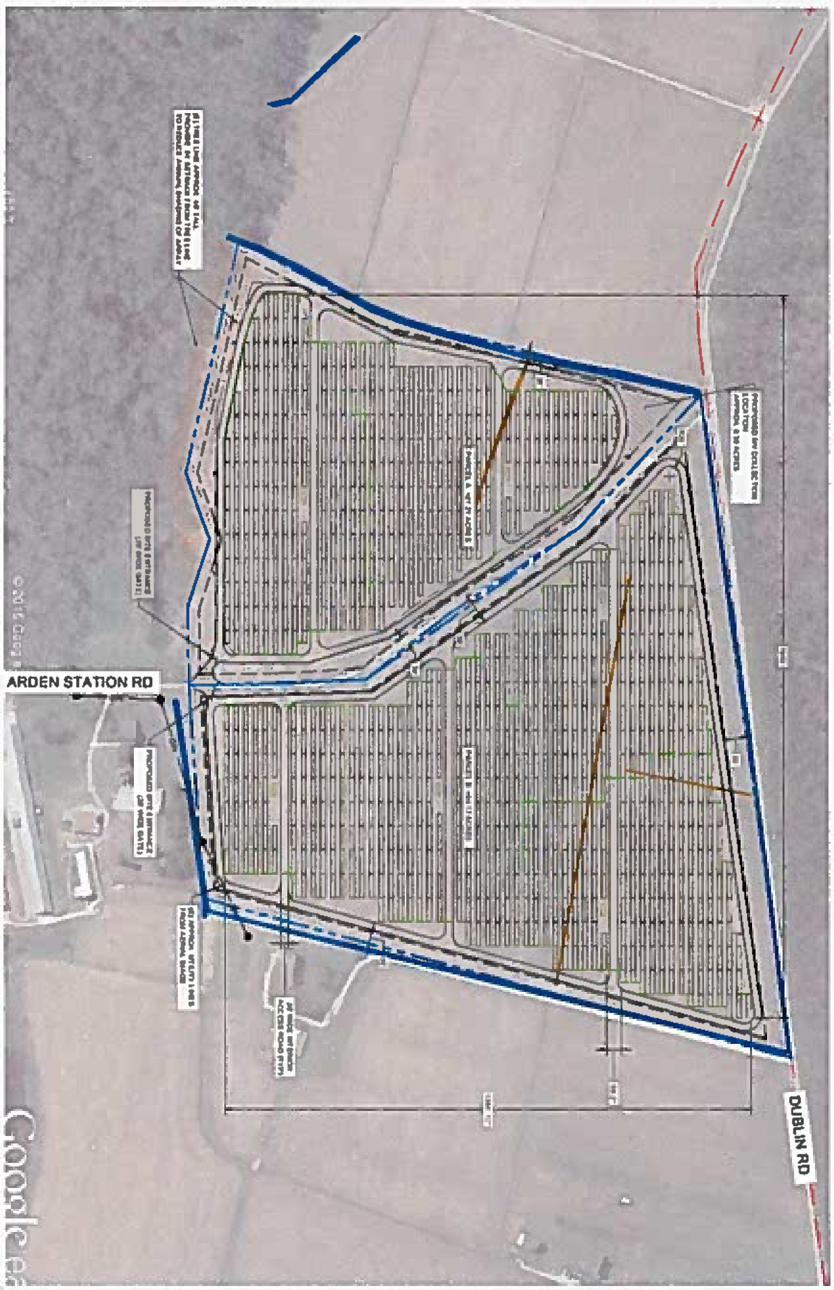
NOT FOR CONSTRUCTION

PIONEER GREEN ENERGY

BLUE OAK ENERGY


APPROX NORTH
Eagle Dr
Heron Dr
Ocean Hwy
13
20
King Miller Rd
PRELIMINARY PRINT
SYSTEM SUMMARY
LEGEND
KEYED NOTES
GREAT BAY SOLAR PROJECT
SOMERSET COUNTY MARYLAND
SITE #1
SITE PLAN
W-111
FOR REVIEW
DESCRIPTION
DATE
PRELIMINARY
NOT FOR CONSTRUCTION
PIONEER
BLUE OAK ENERGY

APPROX. NORTH



SYSTEM SUMMARY

LEGEND

KEYED NOTES

GREAT BAY SOLAR PROJECT

SOMERSET COUNTY
MARYLAND

SITE #2
SITE PLAN

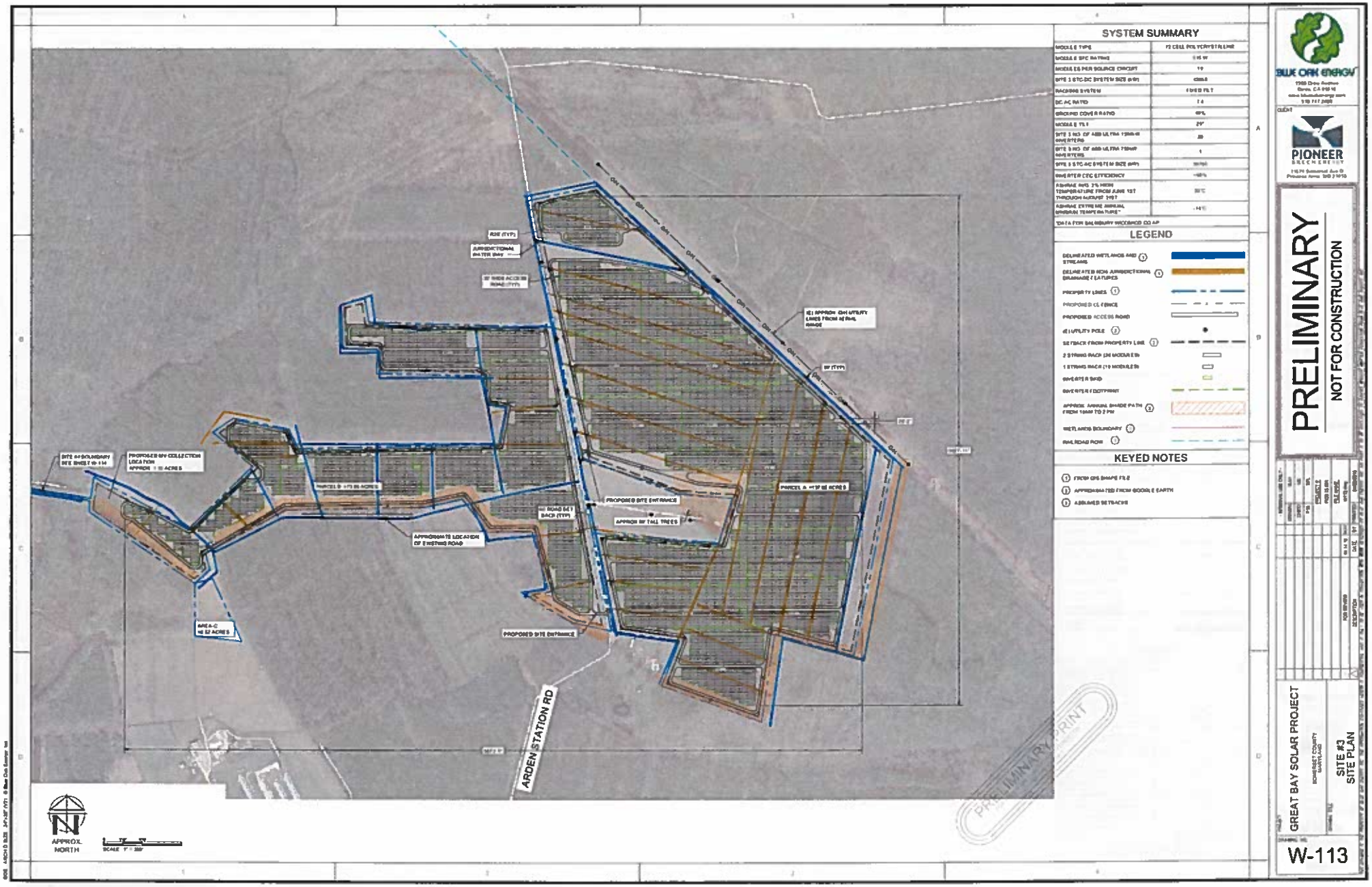
W-112

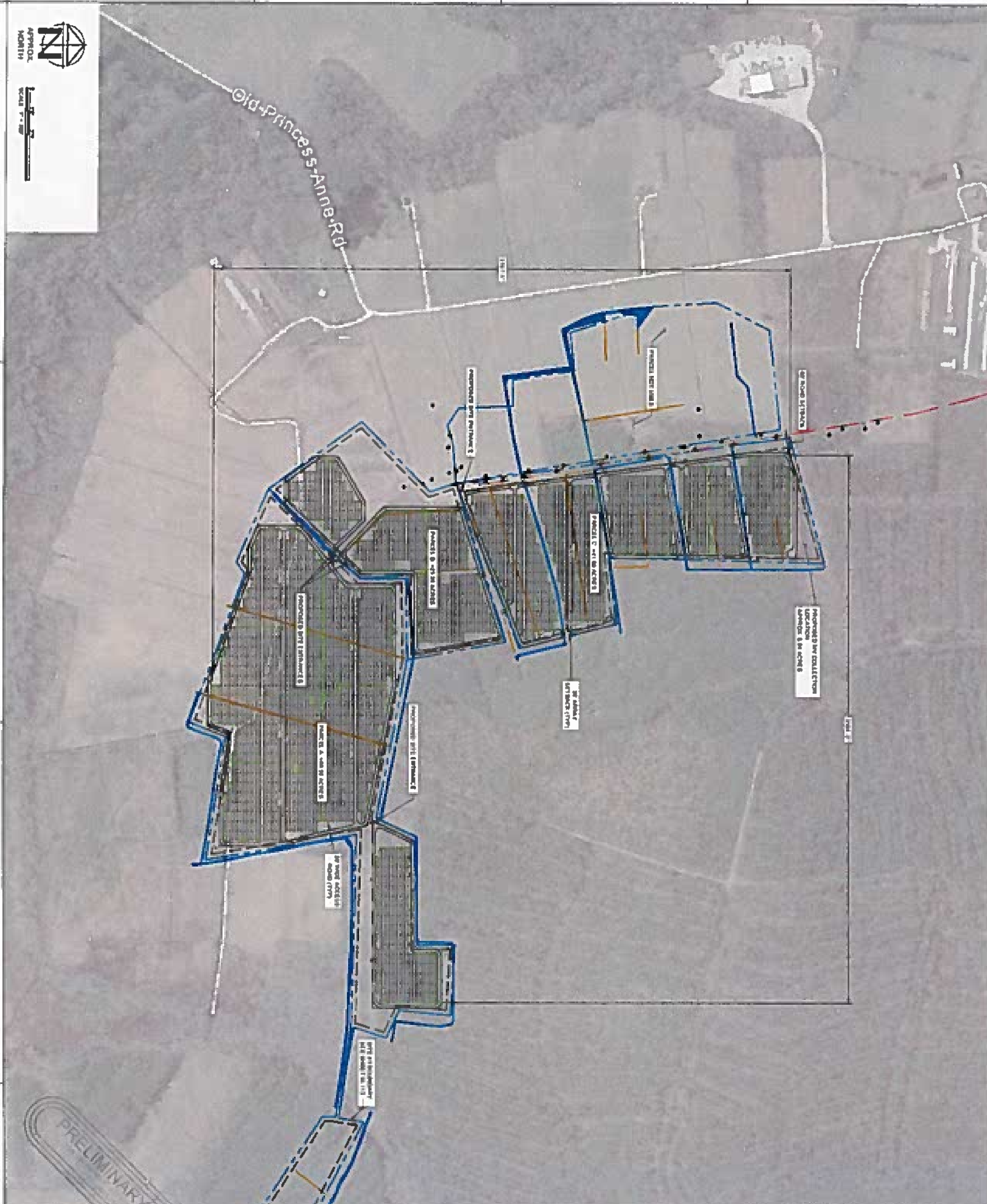
PRELIMINARY

NOT FOR CONSTRUCTION

PIONEER GREEN ENERGY

BLUE OAK ENERGY


SYSTEM SUMMARY
LEGEND
KEYED NOTES
PROPOSED SITE ENTRANCE
ARDEN STATION RD
APPROX. NORTH
PRELIMINARY
NOT FOR CONSTRUCTION
BLUE OAK ENERGY
PIONEER
GREAT BAY SOLAR PROJECT
SITE #3
SITE PLAN
W-113



SYSTEM SUMMARY

LEGEND

KEYED NOTES

PRELIMINARY

NOT FOR CONSTRUCTION

PIONEER GREEN ENERGY

BLUE OAK ENERGY

GREAT BAY SOLAR PROJECT

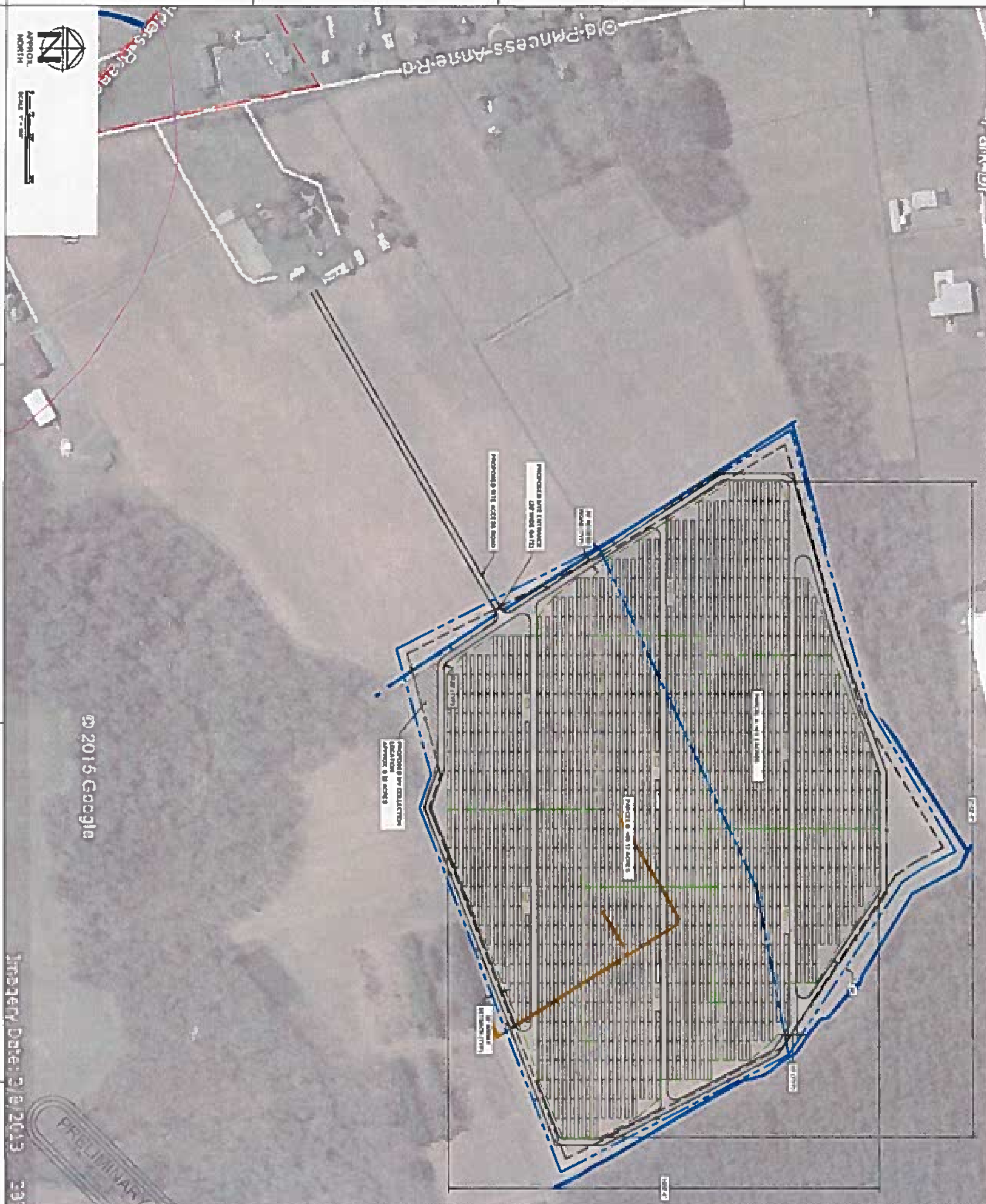
SOMERSET COUNTY MARYLAND

SITE #4
SITE PLAN

FOR REVIEW

DESCRIPTION | DATE | BY

W-114



PRELIMINARY PRINT

SYSTEM SUMMARY

LEGEND

KEYED NOTES

PRELIMINARY

NOT FOR CONSTRUCTION

BLUE OAK ENERGY

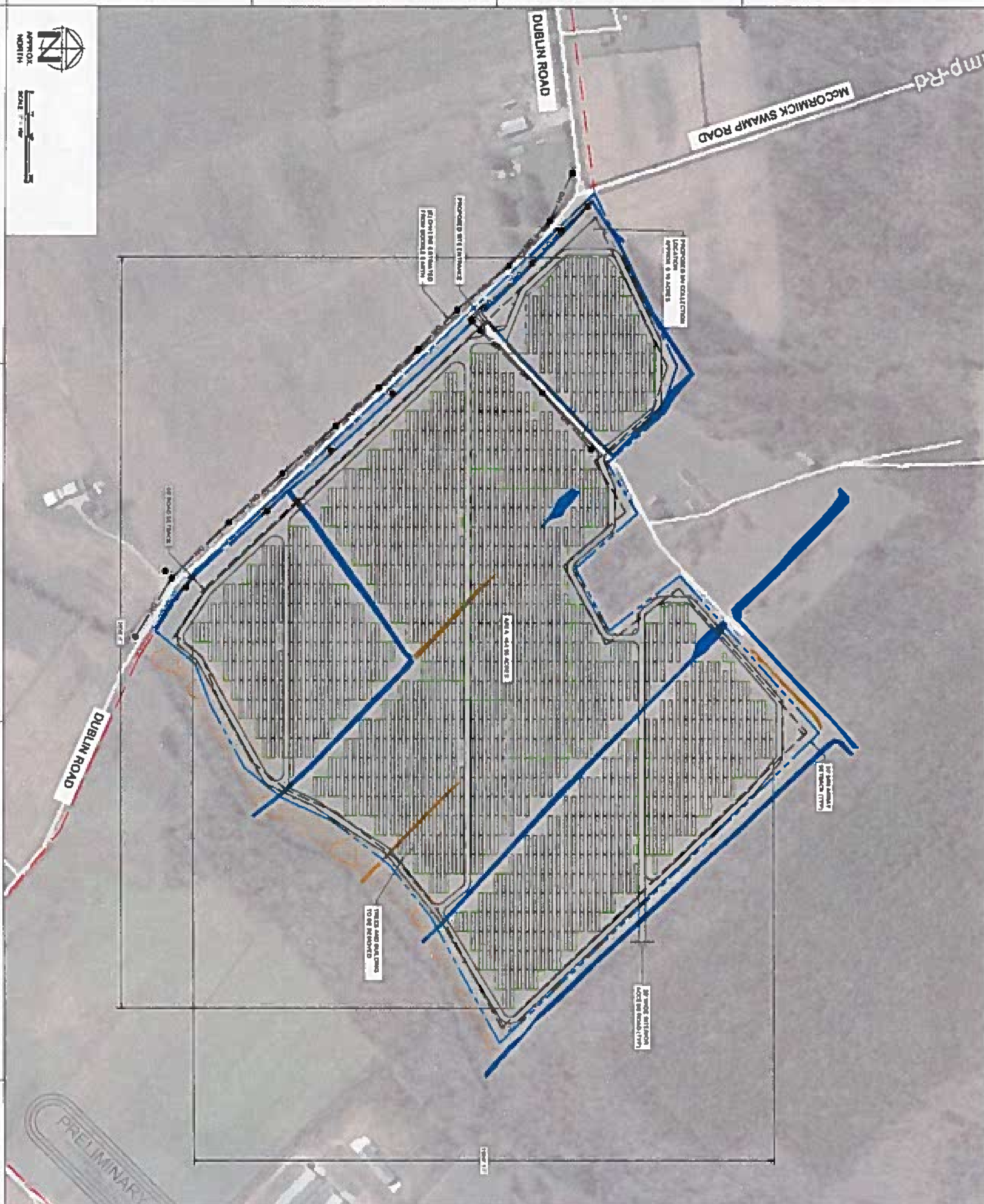
PIONEER GREEN ENERGY

GREAT BAY SOLAR PROJECT

SOMERSET COUNTY
MARYLAND

SITE #5
SITE PLAN

W-115



SYSTEM SUMMARY

LEGEND

KEYED NOTES

PRELIMINARY

NOT FOR CONSTRUCTION

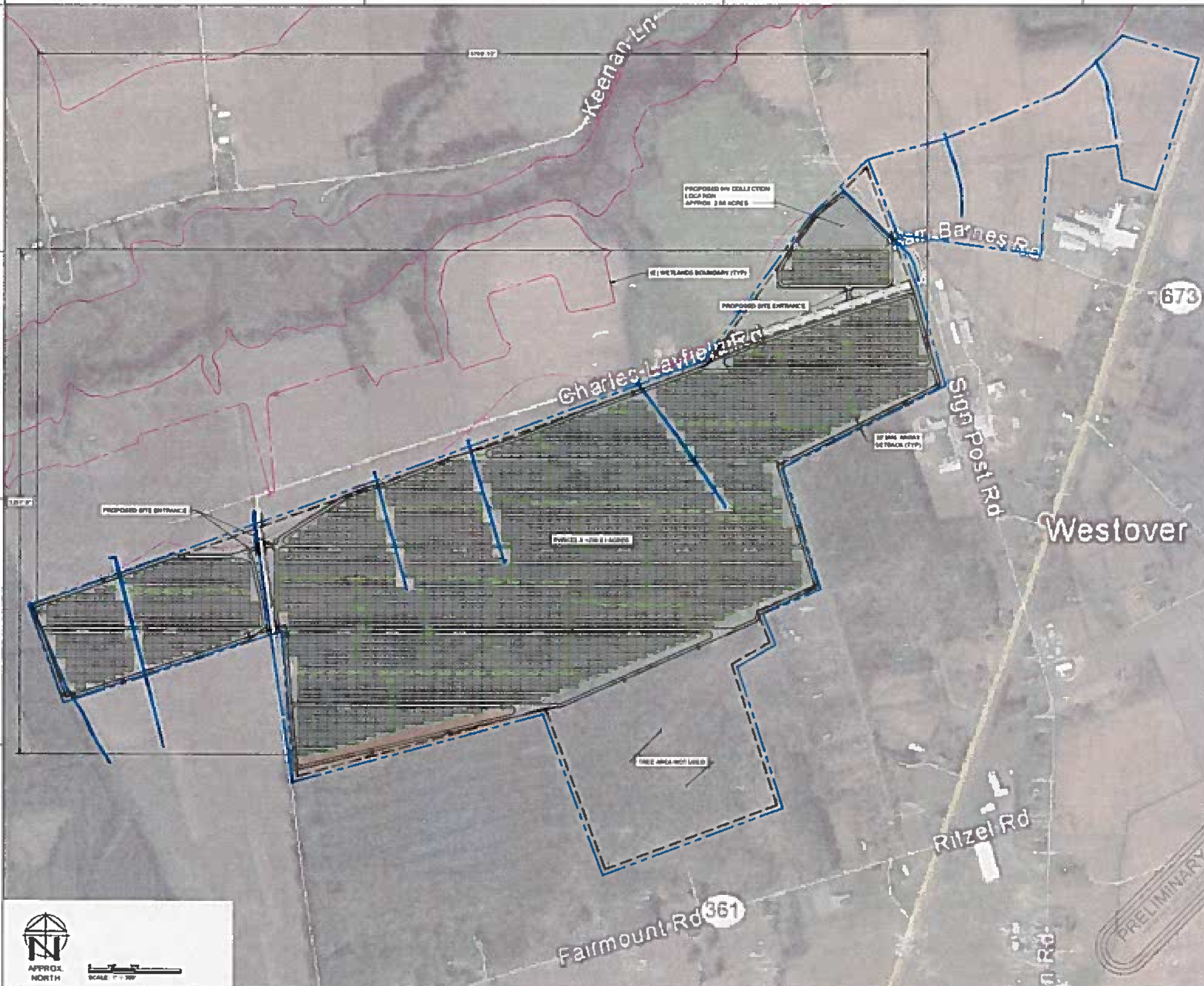
PIONEER

GREAT BAY SOLAR PROJECT

SOMERSET COUNTY
MARYLAND

SITE #6
SITE PLAN

W-116



SYSTEM SUMMARY

MODULE TYPE	72 CELL POLYCRYSTALLINE
MODULE STC RATING	[illegible]
MODULES PER SOURCE CIRCUIT	[illegible]
SITE 7 STC DC SYSTEM SIZE (MW)	[illegible]
RACKING SYSTEM	FIXED TILT
DC:AC RATIO	[illegible]
GROUND COVER RATIO	[illegible]
MODULE TILT	[illegible]
SITE 7 NO. OF [illegible] INVERTERS	[illegible]
SITE 7 NO. OF [illegible] INVERTERS	[illegible]
SITE 7 STC AC SYSTEM SIZE (MW)	[illegible]
INVERTER CEC EFFICIENCY	[illegible]
AVERAGE AND 2% HIGH TEMPERATURE FROM JUNE 1ST THROUGH AUGUST 31ST	[illegible]
AVERAGE EXTREME ANNUAL MINIMUM TEMPERATURE*	[illegible]

*DATA FOR SALISBURY [illegible]

LEGEND

- DELINEATED WETLANDS AND STREAMS
- DELINEATED NON-JURISDICTIONAL DRAINAGE FEATURES
- PROPERTY LINES
- PROPOSED CL FENCE
- PROPOSED ACCESS ROAD
- (E) UTILITY POLE
- SETBACK FROM PROPERTY LINE
- 2 STRING RACK (38 MODULES)
- 1 STRING RACK (19 MODULES)
- INVERTER SKID
- INVERTER FOOTPRINT
- APPROX. ANNUAL SHADE PATH FROM 10AM TO 2 PM
- WETLANDS BOUNDARY
- RAILROAD ROW
- GREAT BAY SOLAR ROW FOR [illegible]

KEYED NOTES

1. FROM GIS SHAPE FILE
2. APPROXIMATED FROM GOOGLE EARTH
3. ASSUMED [illegible]

BLUE OAK ENERGY

PIONEER GREEN ENERGY

PRELIMINARY

NOT FOR CONSTRUCTION

GREAT BAY SOLAR PROJECT

SOMERSET COUNTY, MARYLAND

SITE #7
SITE PLAN

W-117