Appendix C: Geographic Information Systems (GIS) Sources, Technical Notes and Additional Maps

Geographic Information Systems (GIS)

The maps and three-dimensional representations contained in this report were created using Geographic Information Systems (GIS) software from ESRI. Two-dimensional maps were created using ArcGIS 10.0 with ArcInfo license and utilizing the Spatial Analyst extension. Three-dimensional maps were created using ArcScene 10.0 with 3D Analyst extension. Primary and Secondary Source Layers utilized for the project are detailed in Tables C1 and C2, with additional technical notes for Primary Layers following. Maps that were utilized in the analysis but do not appear in the report are included in the subsection Additional Maps.

TABLE C1: Secondary Source Layer Inventory

Table C1: Secondary Source Layer Inventory				
Layer Name	Source	Type	Accessed	Comments
NJ 2007 Orthophotography	NJGIN	Orthophoto	Sep-10	D8A7, D8A8, D8A11, D8A12, D8A13, D8A15, D8A16, D8B5, D8B9
Counties of New Jersey, New Jersey State Plane NAD83	NJGIN	Polygon	Sep-10	County Boundaries
Municipalities of New Jersey, New Jersey State Plane NAD83	NJGIN	Polygon	Sep-10	Municipal Boundaries
2007 Land Use/Land Cover	NJDEP	Polygon	Sep-10	
FLOODWAY	FEMA	Polygon	Nov-10	Designated floodway areas
FLD_ZONE	FEMA	Polygon	Nov-10	Designated flood zones
LIDAR for Hunterdon County	Highlands Council	Raster	Nov-10	6-inch LIDAR (light detection and ranging)
State of New Jersey Composite of Parcels Data, New Jersey State Plane NAD83 and MOD-IV Tax List Search Database	NJGIN	Polygon	Nov-10	Parcel Boundaries
Municipal Boundaries	Hunterdon County	Polygon	Sep-10	
Annual Solar Radiation	USDOE	Polygon	Oct-10	10 km solar resources (kWh/m²/day)
Notes:				
NJGIN (New Jersey Geographic Information Network) available from https://njgin.state.nj.us/NJ_NJGINExplorer/index.jsp				
NJDEP (New Jersey Department of Environmental Protection) data available from http://www.state.nj.us/dep/gis/				
FEMA (Federal Emergency Management Agency) data can be ordered from FEMA				
Highlands Council data available from http://www.state.nj.us/njhighlands/actmaps/maps/gis_data.html				
Hunterdon County data available from http://gis.co.hunterdon.nj.us/				
USDOE (United States Department of Energy) data available from http://www.nrel.gov/gis/				

TABLE C2: Primary Source Layer Inventory

Table C2: Primary Source Layer Inventory

Layer Name	Type	Created	Comments
Fenceline Farm	Line	Oct-10	Line feature defining boundary of area of "Borough Farm" parcel comprising site design area.
Fenceline Mill	Line	Oct-10	Line feature defining boundary of area of Curtis Mill parcel comprising site design area.
Solar Site Plan Farm	Feature Dataset	Oct-10	Feature Dataset of containing layers Access Road [line], Solar Arrays [polygon], Transformer Stations [polygon], and Inverter Stations [polygon] for Curtis Mill site design.
Solar Site Plan Mill	Feature Dataset	Oct-10	Feature Dataset containing layers Access Road [line], Solar Arrays [polygon], Transformer Stations [polygon], and Inverter Stations [polygon] for "Borough Farm" site design.
Wind Site Plans Both	Feature Dataset	Oct-10	Feature Dataset containing layers for 20 meter, 50 meter, and 82 meter turbine site designs for both Curtis Mill and "Borough Farm" sites
Solar Panels 3D Farm	Multipatch	Oct-10	Three-dimensional representation of solar panel array and inverter stations site design for Curtis Mill Site.
Solar Panels 3D Mill	Multipatch	Oct-10	Three-dimensional representation of solar panel array and inverter stations site design for "Borough Farm" Site.
Small Height Wind Turbines 3D Farm	Multipatch	Oct-10	Three-dimensional representation of 20 meter turbine site design for "Borough Farm" Site.
Medium Height Wind Turbines 3D Farm	Multipatch	Oct-10	Three-dimensional representation of 50 meter turbine site design for "Borough Farm" Site.
Large Height Wind Turbines 3D Farm	Multipatch	Oct-10	Three-dimensional representation of 82 meter turbine site design for "Borough Farm" Site.
Small Height Wind Turbines 3D Mill	Multipatch	Oct-10	Three-dimensional representation of 20 meter turbine site design for Curtis Mill Site.
Medium Height Wind Turbines 3D Mill	Multipatch	Oct-10	Three-dimensional representation of 50 meter turbine site design for Curtis Mill Site.
Large Height Wind Turbines 3D Mill	Multipatch	Oct-10	Three-dimensional representation of 82 meter turbine site design for Curtis Mill Site.

Note: All primary layers were created with the NJ 2007 Orthophotography as the basemap

Primary Source Layers Technical Notes

Fence Line Mill

The Fence Line Mill line feature class was created by manually tracing the area of the Curtis Mill Site defined by Frenchtown Road to east; Delaware Avenue, the property line, and the forested area to the north; the train tracks to the west; and the municipal boundary to the south.

Fence Line Farm

The Fence Line Farm line feature class was created by manually tracing the area of the "Borough Farm" Site defined by the tree line surrounding the contiguous cleared area.

Solar Site Plan Farm

The "Borough Farm" Solar Feature dataset was created to the specifications of the New Jersey Cedar Solar Project in Mannington. The Access Road line feature defines a roadway 25.83 feet wide down the centerline and 15.75 feet wide for access to the inverters. The Solar Arrays polygon feature contains 1983 25.83 foot by 8.75 foot rectangles each depicting a frame with twelve solar panels, based on the dimensions of a Suntech 280-Watt utility-scale solar panel set at an 25 degree angle viewed from directly overhead. They are oriented to the south. As per the site plan for Mannington, the seventy-seven rows of panels are spaced at 12' intervals. The array is set back 50 feet from the fence line. The Inverter Station polygon feature contains seven rectangles each depicting one inverter, based on the dimensions of a PVP (PVPowered) 260kW inverter station. The Farm Transformer polygon feature contains one square with 50 foot sides, depicting the concrete slab containing the one transformer station.

Solar Site Plan Mill

The Curtis Mill Solar Feature dataset was created to the specifications of the New Jersey Cedar Solar Project in Mannington. The Access Road line feature defines a roadway 25.83 feet wide down the centerline and 15.75 feet wide for access to the inverters. The Solar Arrays polygon feature contains 1704 25.83 foot by 15.75 foot rectangles each depicting a frame with twelve solar panels, based on the dimensions of a Suntech 280-Watt utility-scale solar panel set at an 25 degree angle viewed from directly overhead. They are oriented toward the south. As per the site plan for Mannington, the sixty-seven rows of panels are spaced at 12' intervals. The array is set back 50 feet from the fence line. The Inverter Station polygon feature contains six rectangles each depicting one inverter, based on the dimensions of a PVP (PVPowered) 260kW inverter station. The Mill Transformer polygon feature contains one square with 50 foot sides, depicting the concrete slab containing the one transformer station.

Wind Site Plans Both

The Wind feature dataset contains site designs for 20 meter, 50 meter, and 82 meter wind turbine arrangements for both the Curtis Mill and "Borough Farm" sites (total six). The turbines are oriented northwest. They are spaced according to recommendations obtained through the New York State Wind Energy Toolkit.

Solar Panels 3D Farm

The 3D Solar Panels Farm multipatch feature is a three-dimensional representation of the site design depicted in the two-dimensional "Borough Farm" solar feature dataset. Solar panels and frames were constructed in Sketch-up to the dimensions of 25.83 foot by 8.75 (depicting a frame with twelve solar panels) and imported into ArcScene as multipatch features. The Sketch-up model for one solar panel was taken from a model uploaded by user: photovoltaikbuero to Google's 3D Warehouse. The Sketchup-model for the solar power inverters were taken from a model uploaded by user: Hillson to Google's 3D Warehouse. The Sketchup-model for the transformer was taken from a model uploaded by user: geronimo to Google's 3D Warehouse.

Small, Medium, and Large Height Wind Turbines 3D Farm (3)

The Small, Medium, and Large Height Wind Turbines Farm multipatch features are a three-dimensional representation of the wind turbine site designs for the "Borough Farm" site as depicted in the two-dimensional Wind layer. The three multipatch features are scaled to 20 meters, 50 meters, and 82 meters, respectively. The Sketchup-model for the three-dimensional turbines was taken from a model uploaded by user: Pete.Young to Google's 3D Warehouse. This model was roughly based on Suzlon's wind turbines.

Small, Medium, and Large Height Wind Turbines 3D Mill (3)

The Small, Medium, and Large Height Wind Turbines Farm multipatch features are a three-dimensional representation of the wind turbine site designs for Curtis Mill site as depicted in the two-dimensional Wind layer. The three multipatch features are scaled to 20 meters, 50 meters, and 82 meters, respectively. The Sketchup-model for the three-dimensional turbines was taken from a model uploaded by user: Pete.Young to Google's 3D Warehouse. This model was roughly based on Suzlon's wind turbines.

Additional Maps

Figures C.1 shows the slope of both study sites. The Curtis Mill site is almost entirely flat (pale blue), while the "Borough Farm" site shows sections with slopes in the 5 to 10 degree range (darker blue). The areas with steep slopes (purple) are almost entirely beyond the fenceline of either site. Figure C.2 shows the aspect (direction of slope) of the "Borough Farm Site". The map shows that much of the the area of the Farm site with a slope above 5 degrees faces the south.
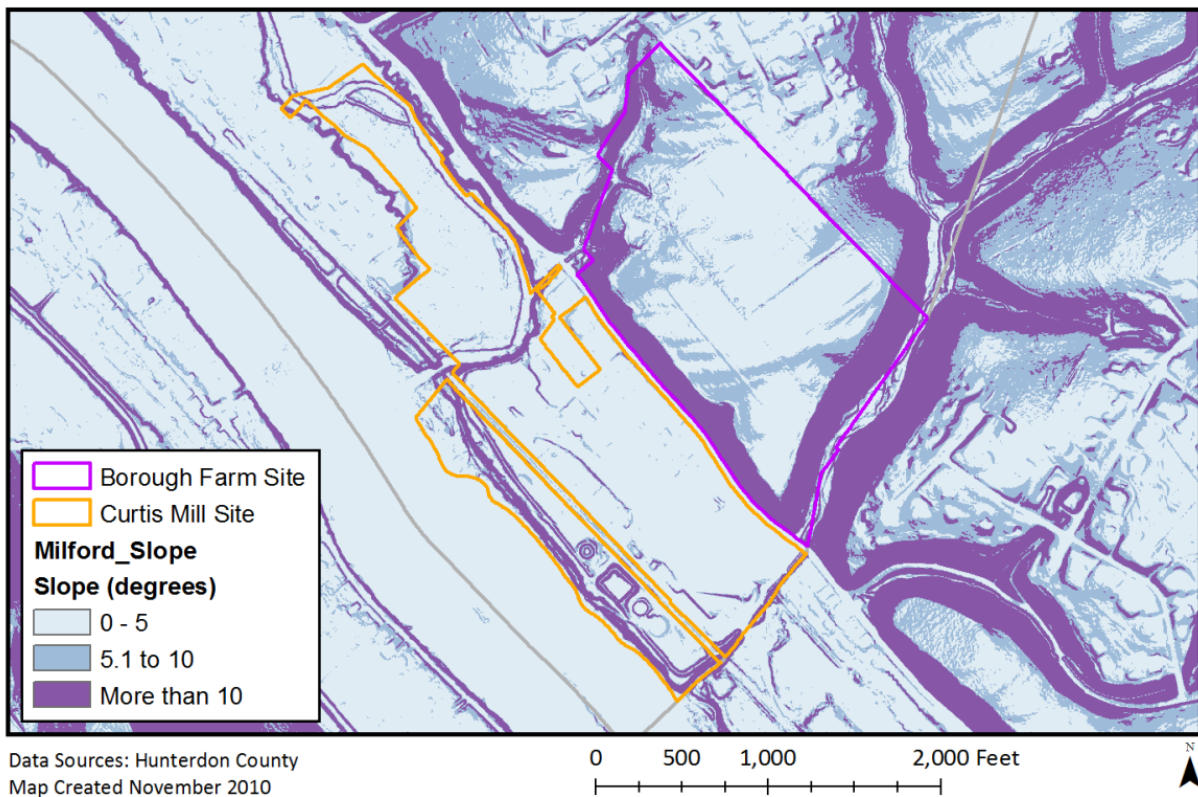
FIGURE C.1: Slope

FIGURE C.2: Borough Farm Aspect

Slope Direction
- Flat (-1)
- North (0-22.5)
- Northeast (22.5-67.5)
- East (67.5-112.5)
- Southeast (112.5-157.5)
- South (157.5-202.5)
- Southwest (202.5-247.5)
- West (247.5-292.5)
- Northwest (292.5-337.5)
- North (337.5-360)

Data Source: Hunterdon County
Map Created November 2010

0   375   750   1,500 Feet