Exhibit BB
Visual Impact Assessment
Westwood
April 29, 2021

DICKINSON WRIGHT PLLC

A REPORT FOR
ENVIRONMENTAL SERVICES

Grover Hill Wind Project

Visual Impact Assessment

APRIL 29, 2021

PREPARED FOR: STARWOOD ENERGY GROUP

PREPARED BY: Westwood

Westwood

Visual Impact Assessment

Grover Hill Project
Paulding County, Ohio

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Executive Summary

This visual impact assessment report was prepared in support of the proposed Grover Hill Wind Project ("the Facility"), a wind powered electric generation facility within 3 miles of the Village of Grover Hill in southern Paulding County, Ohio (**Exhibit 1**). The Facility is proposed to consist of up to 23 electric generating wind turbines, access roads, electric collection cables, an operations and maintenance facility, a substation, a temporary laydown yard for construction staging, and meteorological towers. The electricity produced at the Facility will be delivered to one point of interconnection (POI) at the existing Haviland 138 kilovolt (kV) substation. The Facility will have an output capacity of up to 150 megawatts (MW) and will operate at a generating capacity of 30% to 35%, generating a total of approximately 394,000 to 460,000 megawatt hours (MWh) per year to the regional electric power grid. Construction is scheduled to begin in 2022

This assessment's purpose is to:

- Describe the appearance of the visible components of the proposed Project.
- Describe the visual character of the Project study area.
- Inventory and evaluate existing visual resources and viewer groups.
- Evaluate potential Project visibility within the proposed study area.
- Identify key views for the visual assessment.
- Assess visual impacts associated with the proposed Project.

This report will evaluate the projected visual impacts of this Facility on the municipalities (villages and townships) within a 10-mile radius from the Facility (Study Area, **Exhibit 2**).

The Grover Hill Wind Project is not expected to produce significant adverse visual impacts throughout the communities within the Study Area. Many turbines from existing wind farms are currently visible in the west (**Exhibit 13**).

This assessment was prepared by professionals with experience in developing visual impact assessments and is consistent with established assessment methodologies. This report satisfies the requirements of Ohio Administrative Code Chapter 4906-04-08(D)(4) for the Ohio Power Siting Board (OPSB).

Part I: Introduction

This visual impact assessment report was prepared to support the proposed Grover Hill Project located in Paulding County, Ohio (**Exhibit 1**). The Project will consist of electric generating wind turbines, access roads, electric collection cables, an operations and maintenance facility, an electric substation, a temporary construction staging laydown yard, and meteorological towers to collect site weather data. The electricity generated at the Project will be delivered to the POI at the existing Haviland 138 kV substation. The Project will have a nameplate capacity of 138.0 MW and will operate at a generating capacity of 30% to 35%, generating a total of approximately 394,000 to 460,000 MWh per year to the regional power grid. Construction is scheduled to begin in 2022.

The Study Area for this report includes the following municipalities in Paulding, Putnam and Van Wert Counties in Ohio which are within a 10-mile radius of the Study Area:

- Village of Grover Hill, Paulding Co.
- Latty Township, Paulding Co.
- Village of Broughton, Paulding Co.
- Village of Oakwood, Paulding Co.
- Village of Haviland, Paulding Co.
- Village of Melrose, Paulding Co.
- Village of Oakwood, Paulding Co.
- Village of Dupont, Putnam Co.
- Village of Cloverdale, Putnam Co.
- Village of Ottoville, Putnam Co.
- Village of Scott, in Paulding Co. and Van Wert Co.
- City of Van Wert, Van Wert Co.

Part II: Project Description

Project Site

The Facility will be located within 3 miles of the Village of Grover Hill on approximately 2,500 acres of private land leased in Latty Townships in Paulding County, Ohio (Project Area). The Project Area is bounded on the north by Township Road 72, on the east by County Highway 151 on the south by Township Road/County Highway 12 and on the west Township Road 131.

Proposed Project

Starwood proposes the up to 150- MW Grover Hill Wind Project is located in southern Paulding County, Ohio. It will consist of wind turbine generators, private access roads, electric collection cables, a new collection substation, a temporary laydown yard for construction staging, a permanent operations and maintenance facility, and up to three permanent meteorological towers. The Facility will generate electricity that will be delivered to a new collection substation. The power will be delivered from the collection substations to the POI at the existing 138 KV switching station immediately west of the Village of Haviland.

Wind Turbines

The Applicant is proposing to construct up to 23 wind turbines for the Project. Five turbine models are being considered for installation Turbines currently under consideration are summarized in Table 1.

Table 1: Turbines Models Considered

Siemens Gamesa SG 5.0-145 turbine		
Hub	102.5m	335ft
Blade rotor diameter (rd)	145m	476ft
Total height	174m	573ft
GE 3 3.03-140 turbine		
Hub	98m	321ft
Blade (rd)	140m	459ft
Total height	168m	551ft
Vestas V150-4.5 turbine		
Hub	105	344ft
Blade (rd)	150	192ft
Total height	180	591ft
Vestas V150-4.5 turbine		
Hub	120m	394ft
Blade (rd)	150m	492ft
Total height	195m	370ft
Vestas V162-6.0 Turbine		
Hub	119m	390ft
Blade (rd)	162m	532ft
Total height	200m	656ft

The turbines being considered for installation range in potential output capacity between 3MW to 6MW. The hub heights range from 98 meters to 119 meters (321 – 390 feet). Rotor diameter range from 140 meters to a62 meters (459 – 532 feet). The largest of the turbine models under consideration are Vestas V162-6.0. With a hub height of 119 meters (390 feet) and a rotor diameter of 162 meters (532 feet), it represents the tallest of the five turbine options with a total height of 200 meters (656 feet). Turbines are the tallest and most visible component of the Project and are, therefore, the focus of this investigation. The dimensions from the Vesta V162-6.0 turbine were used in modeling visual impacts because it is the tallest model being considered.

Each wind turbine consists of three major components: the tower, the nacelle, and the rotor assembly. Towers are tapered columns made of steel. They are manufactured in multiple sections, bolted together and mounted to a concrete foundation that is established at ground level. The tower is assumed to have a base diameter of 18 feet and a top diameter of 10 feet. Each tower will have a locked access door at the base. Towers will be painted white or off-white, in following Federal Aviation Administration (FAA) regulations (**Exhibit 3**).

Nacelles are enclosures that contains the mechanical components of the wind turbine; it includes the drive train, gearbox, and electric generator. Its dimensions are approximately 36ft long, 13ft tall and 13ft wide. Nacelles will also be white or off-white in color. An external anemometer and a wind vane that communicates wind speed and direction information to an electronic controller

are attached along with two red night flashing aviation warning lights specified by FAA (L-864). The nacelle is bolted to the top of the tower and the turbine hub is bolted to the drive train of the electrical generator.

A rotor assembly consists of 3 composite material turbine blades connected to the hub. The assembly is mounted to the drive train in the nacelle. The rotor assembly will also be white or off-white in color. Rotor speed will range from 0 to 15.3 revolutions per minute (RPM).

Electrical System

The Facility will have an underground electrical collection system that will connect each wind turbine to a new collection substation. As the electrical conductor (powerline) will be underground from the turbine to the collection substation, it will not be visible with the exception of its two ends. The conductor will extend from the turbine generator inside the tower to the base of each turbine where a locked ground mounted electrical connection box approximately 1 meter tall, wide and long will be located; the conductor wire (collection line) will proceed underground until the final connection is made to the substation which may be overhead. A typical drawing of an underground collection system has been prepared (**Exhibit 4**). Vegetative clearing associated with the installation of the buried collection lines is shown in the simulations prepared for this document.

One collection substation will be constructed for this Facility. It is proposed to be located ¼ mile west of Grover Hill in the northwest quarter of section 26, south of Road 114. The substation will include dead-end structures, circuit breakers, air break switches, metering units, relaying, communication equipment, and a control house. The collection substation will be approximately 350 feet by 250 feet in size and enclosed by a 6-8ft tall chain link fence topped with 3 strands of barbwire. The tallest component of the substation will be lightning masts at approximately 60 feet tall. The station will be accessed via a gravel entrance will provide access from State Highway 114.

Access Roads

Gravel access roads will be constructed to each turbine from a nearby public road to provide access for operation and maintenance (**Exhibit 1**). Approximately 7 miles of private access gravel roads will be constructed to service the wind turbines. During construction, temporary access roads will also be constructed. They may consist of gravel or mats and be up to 32 feet wide to accommodate the installation equipment. Existing farm drives will be upgraded for use as Project access roads where feasible, in order to minimize impacts. Once construction is complete, access road width will be reduced and temporarily disturbed areas adjacent to the road will be restored to their designed elevations. Permanent access roads are designed to be gravel-surfaced with a width of 16 feet. Access roads and vegetation clearing necessary to accommodate construction, may be shown in the post construction simulated photographs.

Meteorological Towers

Meteorological Towers (met masts or met towers) are approximately 375-foot tall steel structures installed with weather sensors that are used to control the turbines. Up to three met towers will be used. A red aviation warning lighting is mounted at the top of each met tower. See an existing met tower on viewpoint 43 on pages 317 of the photograph log (**Appendix A**).

Operation and Maintenance Facility

An operation and maintenance (O&M) building and associated storage yard will be constructed to house facility staff, maintenance equipment, and materials; it will provide operations staff parking. The O&M building will be similar to an agricultural building common throughout the rural area; it will up to 6,000 square feet in size. The area of permanent disturbance, including the O&M building, storage yard and parking lot will not exceed 3.0 acres.

Laydown Yard

A fenced and locked temporary laydown yard will be required to stage and store Facility components, equipment, and personnel trailers as the project is being constructed. It will be located on leased private lands; its location has yet to be finalized. It is anticipated to be approximately 10 acres. Temporary lighting will be installed to ensure safety and security. Because the laydown yard is temporary and will be removed/restored at the end of construction, it is not represented in the visual simulations or evaluated as part of this study.

Part III: Visual Study Area

A 10-mile radius around the Project Area is listed as the visual Study Area for the identification of scenic and historic resources in an application according to Chapter 4906-4 Section (D)(1) of the Ohio Administrative Code (OAC) (OPSB, 2018); this radius around the Grover Hill Wind Farm encompasses a total of approximately 400 square miles. It includes portions of Emerald, Auglaize, Brown, Benton, Blue Creek, Latty, Union, Hoaglin and Monterey Townships in Paulding County; portions of Monroe, Perry, and Jackson Townships in Putnam County; and portions of Washington, Pleasant and Ridge Townships in Van Wert County (**Exhibit 5**).

Physiographic Visual Setting

Landforms

The landform of the visual Study Area is located within the Huron-Erie Lake Plains Sections of the Central Lowland Interior Plains Physiographic Province in Ohio. It occurs within the Maumee Lake Plains Region and Paulding Clay Basin. In the Maumee Lake Plain, it is characterized as a flat-lying lake basin with beach ridges, bars, dunes, deltas, and clay flats. It contained the former Black Swamp and is slightly dissected by modern streams and ditches with elevations from 570 to 800 feet above mean sea level (MSL). In the Paulding Clay Basin it is a nearly flat lacustrine plain with mostly clayey soils, has low-gradient highly meandering streams and numerous ditches with easily ponded soils and elevations between 700 and 725 feet MSL (Ohio Division of Geological Survey, 1998).

Vegetation

Vegetation in the Project Area is very flat and is dominated by agricultural row crops such as corn and soybeans. The distant views of these farm fields are broken by a grid of gravel and paved roads, farmsteads, small deciduous woodlots with maples (*Acer* spp.), oaks (*Quercus* spp.), American elm (*Ulmus americana*), American beech (*Fagus grandifolia*), and shagbark hickory (*Carya ovata*) and wooded wetlands and water courses.

Land Use

Study Area land use is primarily large row crop agricultural fields. There are farms and remnant farmsteads, small villages and small town residential developments. The villages in this area are small as remnants of a past rural landscape. According to the 2010 census, the city of Van Wert in the south had a population of 10,846, and the villages of Paulding (3,605) and Continental (1,120) had residents, respectively. The cities and villages are generally characterized a main street, small business district and residential neighborhoods. Some villages have convenience stores and gas stations with commercial frontage development along the outskirts mostly servicing the agricultural customers of the area. Larger area communities have diversified businesses and government services and restaurants, residential and commercial developments. Commercial and industrial land uses within the study area occur on the outskirts of the larger cities, and along portions of state and county highways.

Surface Water Features

Surface water in the Study Area is primarily made of rivers and watercourses that associate with the Auglaize Watershed which is a tributary of the Maumee River and Lake Erie. Tributaries of the Auglaize River within the study area include numerous ditches, small streams, excavated and impounded ponds, and reservoirs. The streams generally flow from the southwest to the northeast. The following named tributaries are in the area: Barcer Run, Big Run, Blue Creek, Cunningham Creek, Dog Creek, Dry Creek, Eagle Creek, Flat Rock and Little Flat Rock Creeks, Hagerman Creek, Hog Run Creek, Little Auglaize Creek, Middle Creek, Prairie Creek, Town Creek, West Branch Creek, and Zielke Ditch. As a result of a high water table, many rural residents have excavated basins adjacent to their houses and larger water bodies such as the Paulding reservoir are located in the area. These water features are typically surrounded by mature trees and associated floodplains which would visually obscure much of the Facility.

Landscape Similarity Zones

Landscape Similarity Zones (LSZs), are categorized by the similarity of the landscape and land use features they possess such as their distinctive landforms, topography, vegetation, water features, land uses, transportation, including characteristics affecting visual sensitivity, like recreational activity, prominent vistas or open views and scenic integrity. These zones were identified with established visual assessment methodologies (Smardon et al., 1988; USDA Forest Service, 1995; USDOT Federal Highway Administration, 1981; USDOI Bureau of Land Management, 1980). They are also used by the U.S. Geological Survey (USGS) in the National Land Cover Dataset (NLCD) (**Exhibit 6**). The landscape character, land use, and types of views available from each of the identified LSZs that occur within the Study Area are described below, and include: 1. Rural Residential/Agricultural Zone; 2. City/Village Zone; 3. Suburban Residential Zone; 4. Transportation Corridor Zone. The general landscape character, use, and potential views to the proposed Project within each of the four LSZs that occur within the study area are described as follows.

Rural Residential and Agricultural Zone (1)

The Rural Residential and Agricultural Landscape Similarity Zone (1) is the predominant landscape type that occurs throughout the Project visual Study Area. This landscape zone consists of section blocks of contiguous tracts of level row crop farmland with gravel and paved roads at the

section breaks. They are interspersed with active or relic farmsteads having wind rows of trees and shrubs. Corn and soybeans are the common crops grown in this area; there are small areas of pasture often associated with drained wetlands. Views through these areas are broken by wet woodlots and wooded watercourse. Views within this LSZ are the most open throughout the study area. Views typically occur from a gravel or paved public road or intersection and extend across several farm fields until a farmstead, woodlot or wooded water feature restrict the view. Views throughout Rural Residential/Agricultural LSZ include farmsteads with barns, machine sheds and grain bins, or clustered residences, nearby existing wind farms to the west and north. Scenic quality generally ranges from low to moderate depending on the variety and arrangement of landscape features in the view. Since the area consist primarily of large flat agricultural fields, and the proposed wind turbines are exclusively within this zone, open foreground (0-0.5 mile), midground (0.5-3.5 miles), and background (greater than 3.5 miles) views of the proposed Facility will be available from nearly all areas within the Rural Residential/Agricultural LSZ.

See a 360 degree example panoramic photograph series from the Rural Residential/Agricultural Landscape Similarity Zone. From Rd 60 and Town highway 131 (viewpoint 76 on pages 526-534 Appendix A).

City and Village Zone (2)

The City and Village Landscape Similarity Zone (2) includes the city of Van Wert, and the villages of Continental and Paulding. This zone is defined by high to moderate-density buildings having a main street business setting and commercial development surrounding. Vegetation associated with this zone is limited but may include public boulevard trees. It has a flat landform that contributes to the visual character in the city and village areas. Structure heights range from one to three stories constructed of wood, brick, block or metal exteriors often with flat roofs. Buildings supporting agriculture are present. Within this zone the Facility is obscured because of the height and density of buildings.

See two 360 degree example panoramic photograph series of the city and village uses from the City and Village Similarity Zone. From Ohio 114 and 637 in Grover Hill (viewpoint 79 on pages 554-561) and Paulding (viewpoint 25 on pages 166-171 Appendix A).

Suburban Residential Zone (3)

This zone is located around the perimeter of the city and village zone. Single family residential neighborhoods characterize the land use of this zone. It occurs around all cities and villages. Residences are 1-2 stories in height clad in wood or brick with windows and pitched shingled roofs. Lot sizes often vary from one-sixth to one-fourth acre with lawns and personalized landscaping and home styles that reflect the architecture common during the time they were constructed. Small lot size neighborhood play parks are occasionally interspersed; each municipality often has one or two larger parks sometimes associated with a public school that offer recreational or trail or water resources. They often have baseball fields, soccer and football fields. Scenic quality reflects the socioeconomic condition of the landowners and the community. Open views from this zone is limited because of the trees and houses.

See two 360 degree example panoramic photograph series from the Suburban Residential Landscape Similarity Zone. Grover Hill east of the elementary school and from Van Wert (viewpoints 44 & 45 on pages 319-333 Appendix A).

Transportation Corridor Zone (4)

The Transportation Corridor Zone includes paved divided, multi-lane highways with limited access and right of ways that are several hundred feet in width. They allow heavily truck and personal vehicle traffic at speeds between 55 and 65 miles per hour. These are state and federal highways. Examples include US 24, and 30. Views from these highways include signage, bridges, intersecting local roads and drainages; they are open without trees and long only broken by adjacent topography and vegetation. They are arteries between larger cities but may connect to smaller villages. Scenic quality is changes with the surrounding landscape.

See two 360 degree example panoramic photograph series from the Transportation Corridor Landscape Similarity Zone. From US Hwy 224/30 and John Brown Rd/ Twp. Hwy 83 in Van Wert; and from US Hwy 30 and Co Hwy 418 (Lincoln Highway Historic Byway) (viewpoints 50 & 51 on pages 352-362) Appendix A).

Viewer- User Groups

Three categories of viewer user groups were exist within the visual Study Area. They include local residents, commuters, through area travelers and recreational users and tourists.

Local Residents

Local residents live and work in this visual Study Area. People view the landscape from their property, neighborhoods and community. They are more concentrated in the larger city of Van Wert, and the larger villages of Continental and Paulding and more dispersed in small villages and residential developments. Local residents are likely to spend much of their time between their home and their workplace. Local residents view the landscape from their home through windows, from ground level while in their yards or walking or recreating or from vehicles while driving. Local residents' sensitivity to visual quality is individually value dependent, and people are sensitive to changes in particular views that are important to them.

Commuters and Travelers

Commuters and travelers consist of people moving between work, worship, community, recreational events and home or by passing through the area to a distant destination. They view the landscape from moving vehicles typically 55 miles/hour or faster on their way between destinations. Commuters and through travelers have a relatively narrow forward looking field of view focusing on the road and traffic but they have the opportunity to view passing scenery. Fewer in number are passengers in these moving vehicles, they will have greater opportunities for prolonged views. Major area roads include U.S. Hwys 30 (Lincoln Memorial Hwy) 127 and 224; and State Routes 49, 111, 114, 613, and 637.

Recreational Users and Tourists

Recreational users and tourists will be area residents and visitors from more distant areas. They participate in recreational, cultural and festival activities at the parks, sports fields, campgrounds, recreational sites, and historic sites, as well as hunting and fishing areas. These people are primarily concentrated in the facilities and sites located within the visual Study Area which are concentrated in the cities and villages and the Auglaize River. People in this group view the landscape from these destinations and while traveling to them. These people will be bicyclists, hikers and bird watchers, recreational boaters, hunters, fishermen campers and picnickers. Recreational

users and tourists will often have continuous views of landscape features over relatively long periods of time and will view the surrounding landscape from ground-level. Frequently, the areas where these activities occur have mature trees which can limit long vistas.

See a 360 degree example panoramic photograph series from a recreational users and tourists destination. From Huggybear Campground; (viewpoints 55 on pages 378-384 Appendix A).

Visually Sensitive Resources

There are no National Parks, National Forests, National Wildlife Refuges, National Natural Landmarks, State Nature Preserves, State Forests, National Scenic Trail or federally designated Wild, Scenic or Recreational Rivers within the visual Study Area. The Study Area includes several sites that could be considered area scenic resources of significance. These include historic sites, a state park, five wildlife areas, and the state-designated Lincoln Highway. A table and description of sensitive site resources are attached (**Appendix C**).

Historic Sites

The study area includes sites listed on the National Register of Historic Places (NRHP). In Van Wert County they include: the Round Barn site in Paulding Township; the Paulding County Courthouse, and the Carnegie Library in the Village of Paulding. In Van Wert County they include Brumback Library, the Downtown Historic District, Van Wert Bandstand and courthouse, and the George H Mash site in Van Wert, Other historic resources within the visual study area include sites determined to be eligible for listing on the NRHP and state historic markers. In addition, the Cultural Resources Records Review identified numerous properties and sites listed in the Ohio Historic Inventory (OHI) and the Ohio Archaeological Inventory (OAI) within 10 miles of the Project Site. NRHP-listed sites and districts most likely to experience views of the Facility are those located within 5-miles of the turbines.

A review of the OHI files was conducted for the current Project by Weller and Associates (2018). They determined that there were relatively few (n=10) previously documented cultural resources or inventoried standing structures located within the Project Area. There are 210 previously inventoried OHI resources identified within the 10 mile study area (Weller Report Table 2). These are scattered through the study area, but outside the project, and many were identified/evaluated from previous cultural resource and standing structure inventories. A full list of the previously inventoried OHI resources is provided in the Weller and Associates report Table 2. A graphic distribution of the previously inventoried OHI resources is also provided in Figures #2 – 150 in the same report (Weller & Associates, Inc. 2019). The previously inventoried OHI sites locate within the Project Area are summarized in **Table 2** below.

Table 2 OHI Resources within the Project Area

OHI Number	Present Name	Additional Title	Address	Municipality	Architectural Style	Historic Use	Date
PAU0000309	Roy Green House		SR 114	Haviland	Vernacular	Single Dwelling	1890
PAU0000409	Alfred & Henry Sherer House		Scott Rd S of SR 114	Haviland	Vernacular	Single Dwelling	1880
PAU0000707	Little Auglaize Aqueduct		Miami-Erie Canal S of SR 613	Melrose		Canal Related	1900
PAU0003307	CH Cunningham House	John W Ayres House	CR 179	Brown (Township of)	Federal	Single Dwelling	1840

PAU0005311	Middle Creek Zion Baptist Church		Jct TR 48 & CR 177	Roselms	Vernacular	Church/Religious Structure	1910
PAU0005411	Aaron Bidlack House	P Ballard House	TR 48 near CR 177	Roselms	Vernacular	Single Dwelling	1900
PAU0034106		Smith Property	SR 637 N of SR 613	Hedges	Queen Anne	Single Dwelling	1880
PAU0034206		McCabe Property	SWC SR 613 & SR 637	Hedges	Vernacular	Single Dwelling	1915
VAN0001703	Helen & Catherine Lindsay	NB Lindsay House	SR 127	Hoaglin (Township of)	Queen Anne	Single Dwelling	1890
VAN0007803	Grand Victory Church	Ohio Dist. Pentecostal Church/God	NWC Feasby St & Wisner St	Hoaglin (Township of)	Late Gothic Revival	Church/Religious Structure	1913

See two 360 degree example panoramic photograph series from the Round Barn and the Carnegie Library in Paulding historic sites; (viewpoints 19 and 26 on pages 129-135 and 172-176 Appendix A).

State Parks

There are no State parks are not located within the Study Area. The nearest State park is the *Independence Dam State Park*: along the banks of the Maumee River in the City of Defiance.

Wildlife Areas

Two designated wildlife areas are located within 10 miles of the Project Area and has the potential for views of the proposed Project.

Ottoville Quarry Wildlife Area: Ottoville Quarry Wildlife Area is a 7-acre park located in the Village of Ottoville, 8.9 miles southeast of the nearest proposed turbine. Ottoville Quarry Wildlife Area is not included on the Ohio Department of Natural Resources list of state wildlife management areas. A small informal parking area is located off of County Road 25, which provides access to the wildlife area. Located in the Rural Residential Agricultural LSZ, open views are available from this area where foreground vegetation remains relatively low.

Cascade Wayside Wildlife Area is 36 acres located east of Cloverdale in Putnam County, along the Auglaize River. It is 9.5 miles east of the nearest proposed turbine. Cascade Wayside Wildlife Area is included on the Ohio Department of Natural Resources list of state wildlife management areas. Recreational activities include fishing, hunting and wildlife watching. Located in the Rural Residential/Agricultural LSZ, open views are available from this area where foreground vegetation remains relatively low.

Scenic Byways

The Study Area includes one state-designated scenic byway. The Lincoln Highway Historic Byway includes portions of U.S. Route 30 that travel south of the visual study area through both Ohio and Indiana. At its closest point, the byway is 7.6 miles south from the nearest proposed turbine. The Lincoln Highway was constructed in 1913 and was the first transcontinental road in the United States. Original signs, monuments, and painted telephone poles that initially marked the route remain. Open outward views of the surrounding landscape are available to vehicle drivers and passengers all along the highway. Views of automobile-era, such as tree-lined roads, business districts, countryside, and agricultural fields and rolling pastures exist.

Areas of Intensive Land Use Cities and Villages

There are 15 areas of intensive land use. The smaller villages within the study area, including the villages of Paulding, Junction, Latty, Broughton, Melorse, Oakdale, Haviland, Grover Hill, Roselms, Mandale Cloverdale, Scott, Hoaglin, Ottoville, and the city of Van Wert. These population centers consist of medium-density residential neighborhood development surrounded by a broad expanse of agricultural fields. Buildings and residential structures are arranged along a city street that screens outward views and focus views along the main streets and cross roads. In most villages, mature trees and landscaping along the streets screen views within the villages. Public street corridors and adjacent agricultural land, offer more unobstructed views of the surrounding landscape.

The Cities of Van Wert and Paulding are the largest communities in the study area. Larger populations exist here and they are characterized by moderate to high-density residential buildings surrounding a central business district. With these areas, commercial development is present, and the developed area consists of buildings 2-3 stories tall. These cities and larger villages are generally surrounded by open agricultural fields, although vegetation within the district typically includes urban street trees and suburban yard plantings. The landscape is altered and modified by individual landowners. Views within these areas are focused along the streets and buildings. Outward views across lawns and fields exist on the outskirts of the villages and cities. Long-distance views are mostly screened by built structures.

Local Community Parks

Community and/or town parks in the study area with potential views of the proposed Project include Welcome Park in Grover Hill, Paulding Athletic Field, Lafountain Park, Paulding County Fairgrounds, Bresler Park, Latty Town Park, Charloe Community Park, Oakwood Community Park, and Melrose Town Park, and Casoade Park in Putnam County, and Jubilee Park, Wesley Park, Fountain Park, Memorial Park, and Smiley Park in Van Wert County, Ohio. Community parks in the study area have mowed lawns and often contain playgrounds. They often include green space, picnic tables, pavilion areas, athletic fields, or nature trails. Local parks are mostly located in the City/Village LSZ and Suburban Residential LSZ. Views from the parks vary depending on their location within cities and villages and they may have screening by trees and structures. The scenic quality and viewer sensitivity in these areas are considered to be relatively high.

Local nature parks within the visual study area include Black Swamp Nature Center in Paulding County. Black Swamp Nature Center consists of 51 acres of woodland, wetlands, and old meadow. The preserve provides access to creeks and ponds, along with hiking trails and wildlife observation areas. Open views from Black Swamp are generally limited by intervening mature forest, but breaks in the tree canopy and meadow areas may offer outward views. Scenic quality and viewer sensitivity in this area is relatively high due to its natural character and the recreational use it receives.

See two 360 degree example panoramic photograph series from the Black Swamp Nature Center Park near Paulding and from Welcome Park in Grover Hill; (viewpoints 28 and 43 on pages 182-187 and 308-318 Appendix A).

Water Resources

Within the visual study area, there are seventeen named water resources, including creeks, rivers, excavated basins and reservoirs, streams, and ditches. The Auglaize River is a major water resource within the visual study area Other water resources are described below: Barcer Run, Big Run, Blue Creek, Cunningham Creek, Dog Creek, Dry Creek, Eagle Creek, Flat Rock and Little Flat Rock Creeks, Hagerman Creek, Hog Run Creek, Little Auglaize Creek, Middle Creek, Prairie Creek, Town Creek, West Branch Creek, and Zielke Ditch.

Flatrock Creek in the northern portion of the VIA is a tributary of the Auglaize River. It is a 57.2-mile long stretch of creek from northeastern Indiana and northwestern Ohio. It drains a primarily rural farming area in the Lake Erie watershed. Flatrock Creek rises from a group of headwater streams along the border between Adams County, Indiana and Van Wert County, Ohio. The creek flows northwest from Ohio into eastern Allen County, Indiana, then turns northeast at Monroeville, Indiana and flows into Paulding County, Ohio. It joins the Auglaize River from the west approximately 10 miles southwest of Defiance, Ohio (USGS, 2011). At its closest point, Flatrock Creek is 7.8 miles northwest of the nearest proposed turbine. The creek is primarily located in the Rural Residential/Agricultural LSZ, although the river itself is primarily surrounded by forest communities, and also travels through some developed areas. Open views to the surrounding landscape are generally limited due to the abundance of forest vegetation bordering Flatrock Creek.

The Paulding Reservoir is located south of Paulding in Paulding County, Ohio and is 67 acres in size having 1.3 miles of shoreline. Access to the Reservoir is from Reservoir Drive by way of CR 107 and there are two parking areas north of the reservoir. In addition to providing water to village residents, Paulding Reservoir also allows opportunities for recreational shoreland fishing for bluegill, perch and catfish. At its closet point, Paulding Reservoir is 7.3 miles northwest of the nearest proposed turbine. It is located within the Rural Residential/Agricultural LSZ. To the north, Paulding Reservoir is bordered by Flatrock Creek, where outward views are generally screened by the mature forest along the creek banks. A shrub hedgerow extends from these communities along the eastern border of Paulding Reservoir, limiting potential for open views toward the proposed Project. The reservoir is primarily surrounded by agricultural fields which provide opportunities for long, open views to the south and southeast.

Little Auglaize River is a tributary of the Auglaize River in the southeast portion of the VIA and is a 47.0-mile long stretch of river in the eastern part of the study area. It drains a primarily agricultural area in the Lake Erie watershed. Little Auglaize River rises in southern Van Wert County and flows northeast past the Village of Middle Point. The river turns north-northwest near Ottoville. It joins the Auglaize River from the south near Melrose in eastern Paulding County. At its closest point, Little Auglaize River is 5.3 miles east of the nearest proposed turbine. The river is primarily located in the Rural Residential/Agricultural LSZ, although the river itself is primarily surrounded by a floodplain forest communities, and also flows through some villages. Opportunities for open views to the surrounding landscape are generally limited due to the abundance of forest vegetation bordering Little Auglaize River.

Auglaize River, in the eastern portion of the VIA is a tributary of the Maumee River. It is a 113-mile long stretch of river on the eastern side of the proposed Project. It drains a rural farming area in the Lake Erie watershed. Auglaize River rises in southeastern Allen County, approximately 10

miles southeast of Lima, and flows southwest to Wapakoneta, then north past Delphos, Fort Jennings and Oakwood. It joins the Maumee River from the south at Defiance. At its closest point, Auglaize River is 6.5 miles northeast of the nearest proposed turbine. The river is primarily located in the Rural Residential/Agricultural LSZ, although the river itself is primarily surrounded by forest communities, and also travels through some developed areas. Opportunities for open views to the surrounding landscape are generally limited due to the abundance of forest vegetation bordering Auglaize River.

See two 360 degree example panoramic photograph series from the Auglaize River; (viewpoints 12 and 13 on pages 81-92 Appendix A).

Other surface water features within the visual study area occur on private land and have no public access other than public road crossings, and therefore receive limited recreational use. These resources primarily consist of drainage corridors and ditches within an agricultural landscape. These water bodies are not major visual components of the landscape but most have a wooded fringe that breaks up long views. They typically can only be seen at, or in proximity to, public road crossings. As such, scenic quality and viewer sensitivity in these areas are considered to be relatively low.

See a 360 degree example panoramic photograph series from Hoaglin Creek, south of Grover Hill; (viewpoint 86 on pages 618-626 Appendix A).

Cemeteries

Several cemeteries are found throughout the visual study area. They are often located on flat or elevated sites adjacent to churches, watercourses or wooded areas and they are frequently adjacent to agricultural fields. Tombstones are arranged in orderly rows and extend back toward the field edge, which are often backed by a hedgerow. In some cases, the cemeteries occur in conjunction with an adjacent church. They are covered by a mowed lawn and there may be mature trees or shrubs along the edges of the cemeteries, but generally there are only specific planted trees allowed within the cemeteries creating an open park setting where people may place flowers by the grave sites of their loved-ones.

Several of the cemeteries occur within the Rural Residential/Agricultural LSZ where adjacent agricultural fields provide open, long-distance views. In some directions, views from the cemetery may be screened by landscaping and adjacent woodlots that back the cemeteries. At several cemeteries, many turbines can be seen from existing wind farms in the west.

See two 360 degree example panoramic photograph series of area cemeteries; (viewpoints 67 and 74 on pages 454-458 and 507-515 Appendix A).

Part IV: Visual Impact Assessment Methodology

The Visual Impact Assessment methods used for this report comply with the requirements of Ohio Administrative Code Chapter 4906-04- 08(D)(4) for the Ohio Power Siting Board, and the methodologies developed by the U.S. Department of the Interior, Bureau of Land Management (1980), U.S. Department of Agriculture, National Forest Service (1974), the U.S. Department of Transportation, Federal Highway Administration (1981), and other recognized state and federal agencies. They are standard visual impact methodologies used to assess wind energy projects

(CEIWEP, 2007). The techniques used to assess proposed visibility and visual impacts are described below.

Project Visibility

Proposed turbine visibility was assessed to identify the locations where there is potential for the proposed Project to be seen from ground-level vantage points within the visual Study Area. This assessment included identifying potentially visible areas identified on the viewshed map and then by verifying them in the field.

Viewshed Analysis

Viewshed analyses were based on topographic models such as the United States Geological Survey (USGS) 10-meter resolution digital elevation model (DEM) data, the 2011 USGS National Land Cover Database (NLCD) and high resolution LiDAR data for portions of Paulding, Putnam and Van Wert Counties.

Viewshed Analysis Vegetation

Within the study area, the 24m DEM from Airbus Defense and Space GmbH data were used with ESRI ArcGIS Pro® software to determine which areas or resources would be screened from view of the proposed turbines (**Exhibit 7 and 8**). This analysis is based upon the line of sight from a viewpoint to a proposed turbine. The topographic viewshed maps with trees in the area from which any proposed turbine could be seen. Since the screening provided by trees and shrubs and buildings is considered in this analysis, the topographic viewshed represents an actual visibility assessment.

Two viewshed maps were prepared with a 10-mile radius around the proposed project; one shows "worst case" daytime visibility with a maximum blade tip height of 656 feet above ground level (AGL); a second map shows predicted visibility of turbine FAA standard warning lights from the top of the nacelle height of 361 feet AGL (FAA, 2016).

Field Verification

Visibility of the proposed Project was completed in the field during a two-day site visit conducted on March 16-17, 2020. The purpose of this site visit was to document photographs during leaf-off conditions and verify predictive turbine visibility in the field for visual simulations. The composite map prepared for the Project shows visibility, sensitive resources and viewpoint locations (**Exhibit 9**). Weather conditions ranged from cloudy with light rain to clear and photographs were taken from early morning until after sunset providing a photographic record that depicts a variety of sky and daylight conditions.

Photographs were taken from public roads and public vantage points to represent areas where other viewers would have access and determine if the proposed turbines would likely be visible. The determination of proposed Project visibility at a specific location was made based on the visibility of existing structures located in proximity to the proposed turbine sites (existing turbines, communication towers, silos, roads, etc.), which served as locational and scale references. Photographs were taken from 100 different viewpoints throughout the study area. All photos were obtained using a Nikon D5300 digital SLR camera with a lens focal length between 28 and 35 mm which is equivalent to a 45 and 55 mm, 35 mm film camera lens. This focal length is used in visual impact assessment because it closely approximates a human eye perception of spatial relationships and scale in the landscape. The camera also captures position using an internal

global positioning system (GPS). Redundant photographs were also taken with a cell phone and a second DSLR camera. A PDF document compiling the panorama photographs was prepared with three panels; on the top showing the photograph with the direction faced the coordinates and the elevation above sea level; on the bottom left a USGS quad map overlay centered with the direction the photograph was taken; on the bottom right overlain on a recent aerial photograph; date and time is used in the photograph name. Care was taken to select viewpoints that represented the most open views available toward the proposed Project from the various LSZs, distances, directions, visually sensitive resources, and areas of common public use within (**Exhibit 10**). Locations of the viewpoints are shown and a log of photographs, including a representative photograph toward the Project Site from each viewpoint, is included (**Appendix A**).

Visual Impact

Visual impacts from the proposed Project components (wind turbines, met tower(s), access roads and associated clearing), were assessed on the aesthetic resources and viewers. Visual impact assessment involved creating computer models of the proposed Project turbines layout, selecting representative viewpoints within the study area, and preparing computer photo-simulations of the proposed Project. These photo-simulations were used to show the visual impact resulting from the Project.

Viewpoint Selection

Eight viewpoints were selected from the photographs taken during field verification on March 16 and 17, 2020 for photo-simulations. These viewpoints were selected based upon the following criteria:

- They show unobstructed views of the proposed Project
- They show the proposed Project from sensitive sites or resources.
- They show common public views from LSZs.
- They show common views of the proposed Project that may be seen by the public.

They show typical views of turbines from a variety of distances, lighting and sky conditions to show a range of visual change that will occur with the proposed Project.

The zoomed location the viewpoints used for the photog-simulations is shown in a plan view and oblique view (**Exhibit 11 and 12**). Locational details and the criteria for selection of each simulation viewpoint are summarized in Table 3.

Table 3 Viewpoints Selected for Photo-simulation and Evaluation						
Viewpoint Number	**Photo Simulation**	**Location, Visually Sensitive Resource**	**LSZ Represented**	**Viewer Group Represented**	**Viewing Distance To nearest turbine (Mi.)**	**View Orientation**
39	1A	Intersection Rd. 137/60	Rural Residential/Agricultural Zone 1	Local Residents	0.8	SSE
41	1B	Zion Cemetery/ Prairie Creek Natural Area	Rural Residential/Agricultural Zone 1	Local Residents	1.7	SW
94	1B alt	Uncle Fudd's Diner/Ohio 637	Transportation Corridor/Rural Residential Zones 4 & 1	Local Residents/Tourists/Commuters	0.5	S
91	2A	Ohio 114/Rd. 137	Rural Residential/Agricultural Zone 1	Local Residents	0.4	SSW
43	2B	Welcome Park Ball Field Grover Hill	City/ Village /Agricultural Zones 2 & 1	Local Residents/ Tourists/Recreational Users	0.4	NNW
44	2B Alt	Grover Hill Elementary School/ Playground Neighborhood	Suburban Residential/City Village Zone 3	Local Residents/Recreational Users	0.5	WNW
86	3A	Hoaglin Creek	Rural Residential/Agricultural Zone 1	Local Residents/Recreational Users	0.4	NW
84	3B	Ohio 637/18	Transportation Corridor Zone 4	Commuters/ Through Travelers/Local Residents	0.9	N

Visual Simulations

Computer-enhanced photo-simulated images were created using actual photographs of the project area in the 8 selected viewpoints above. The simulations were developed by constructing a three-dimensional computer model of the proposed turbine base, blade and nacelle and a geo-referenced replication of the proposed project layout with data provided by Grover Hill.

Proposed turbine conditions were made by geo-referencing each existing condition photographic viewpoint with the created computer model of the proposed turbine and layout. This involves using a combination of aerial imagery, the DTM relief, the 3-dimentional simulated turbine model and original GPS coordinates of the photograph within an AutoCAD Civil 3D® drawing. This is imported into Autodesk 3ds MAX® to make a three-dimensional component that can be manipulated with a digital camera view of the proposed turbine. These data were draped on top of the photographs from each of the viewpoints. This process projects the Project elements in relation, proportion, perspective, and proper rotation to the existing photograph. Result is a

realistic photographic rendering of the proposed feature with its dimensions and location simulating the proposed condition.

Features can be edited to represent the proposed exterior color and finish of the turbine along with variable light from the daily changes of the sun's angle. Manipulating this information in the software also allows for highlights, shading and shadows.

Photographic Simulations

Following OPSB regulations: "*The applicant shall provide photographic simulations or artist's pictorial sketches of the proposed facility from at least one vantage point in each area of three square miles within the project area, showing views to the north, south, east, and west. The photographic simulations or artists pictorial sketches shall incorporate the environmental and atmospheric conditions under which the facility would be most visible.*" The applicant prepared 8 visual simulations of the proposed project.

A 3-square mile grid was placed over the proposed turbine area to determine the number and location of the simulated photographs. With the 3-square mile grid overlaid on the Project Area, it was determined that 4 separate grid cells encompassed some portion of the Project Area (**Exhibit 12 and 13**).

A 3-dimentional point cloud of the view and structure throughout the Project Area was created using 3D Studio Max®. Elevation data were used to create a 3D topographic model of existing site topography. To account for the color of the trees and the ground plane, recent geo-referenced aerial photography was used to determine a color value for existing structures and vegetation. A vantage north, east, south, or west vantage was simulated.

Simulated turbines were also assigned a red color in each sample to differentiate existing turbine and proposed turbines. The environmental conditions represented reflect the conditions when the photographs were taken providing a high contrast background. The simulated photographs of the turbines show high visibility viewing conditions from each direction (Appendix B),

Part V: Visual Impact Assessment Results

Project Visibility

Viewshed Analysis

The DEM viewshed analysis shows only a few areas, primarily in streams and rivers where the proposed Project is not visible because this site area quite flat. Upper portions of most of the turbines are visible from the visually sensitive sites within the Study Area. Trees limit the visibility of lower turbine portions.

When topography, vegetation and structures are incorporated into the assessment, using GIS tools, it was calculated that the blade tip viewshed covers 90% of the 10 mile Study Area; using the lower height of the FAA light, the viewshed from the nacelle covers 83% of the Study Area (**Exhibit 7**). Because the site is so flat, in rural areas visibility will be reduced near woodlots or where trees occur and along riparian corridors. In developed villages and cities, visibility will be reduced or eliminated when views are screening from landscaping trees and structures. Areas that are largely screened from views of the proposed Project are the cities of Van Wert and Paulding;

narrow corridors with restricted visibility will exist along the larger forested riparian corridors. Areas that have moderate screening will include portions of each village in the Study Area where mature trees and buildings block the view of the turbine blades and FAA lights.

The DSM viewshed analysis with vegetation indicates that views of the proposed Project will be mostly screened in Paulding and Van Wert within the 10-mile radius Study Area. The remaining resources are indicated as having at least partially screened views, depending on the exact location of the viewer within the resource's mapped boundary. Areas with potential nighttime views of the turbines, as indicated by the FAA warning light viewshed analysis (**Exhibit 8**)

As a result of the wind resource in the area, several wind farms have been constructed resulting in several wind turbines visible in the area (**Exhibit 13**).

Field Review Analysis

The field review for the Project was completed in March when leaf-off conditions exist. This season allowed the greatest visibility of the year and it showed that the project will be visible throughout nearly all of the study area due to the flat topography and agricultural land use that presents long views. Geo-referenced photographs in a 360 degree panorama were taken from 100 locations around the Project at or near a broad range of specific sensitive receptors (Appendix A).

The field review also confirmed that most sensitive receptors were clustered near buildings and trees in villages and cities which screen views toward the proposed Project. Also confirmed during the field review, was the observation that many existing turbines are visible for miles in the western direction making the existing landscape dotted with turbines. Views of the proposed Project, from most of the residences and other sensitive visual resources, in the villages and cities that often have trees and structures around them, will experience partial or complete screening. This changes along the edge of these communities where the transition to agricultural land use begins and few or no trees are near. In these cases, the Project, above distant tree height, will be prominently visible. With the motion of turning blades drawing the attention of viewers.

The field review also showed that when driving in this flat area, the Project will also be visible because nearby trees will transition past the moving driver and passenger when moving from background, mid-ground and foreground positions presenting frequent views of the wind turbines. The field review showed that the Rural Residential Agricultural zone will also experience significant visibility of the Project. Some screening will occur when structures and tall landscaping provide a visual barrier. The Round Barn site located on the north side of route 168 near the intersection with Route 123 in Paulding Township; the ruins of the barn remain; no further review of the Round Barn property was completed.

A Field review of the *Lincoln Highway Historic Byway* (US Route 30) was completed. It is located along the south side of the VIA area north of Van Wert. With a wide right-of-way and no trees in this zone, the proposed project will be visible. However, the view of wind turbines adds a diversity to the view of agricultural fields and farmsteads throughout the area. In views to the north, existing turbines occur in the foreground, midground and background views. The proposed Project turbines will be in the background distance zone and will expand but not change the visual character of the northern landscape. During the night, the red FAA turbine lights attract attention from drivers and passengers on this route.

Other local/community parks that were visited as part of the VIA field investigation process included, the Black Swamp Nature Center, Smiley Park, Middle Point and Welcome Parks. Amenities of these parks include natural areas with trails and wildlife, such as Black Swamp Nature Center; large community parks with ballfields and other recreational facilities/activities, such as Smiley and Welcome; and small community parks and playground designed mainly for children, such as Smiley and Middle Point. Field review of these parks indicated that visibility from those with wooded trails and active areas associated with these types of parks will generally be screened by the associated vegetation at the perimeter of the park. However, the Project will be visible from Welcome Park because turbines will be located less than ½ mile away. Park recreation is often focused on active sports and this will reduce people's attention to the Project.

Photograph Simulation Analysis of Existing and Proposed Views

To document anticipated visual changes, photo simulations of the proposed Project from each of the 8 selected viewpoints described in Table 3 were used to evaluate Project visibility, appearance, and contrast with the existing landscape. These images, and photographs of the existing view, show a wider area existing view with photograph direction, coordinates, and elevation. Two additional maps are provided for each simulated view point. On the left is the USGS Quad map showing the viewpoint location and number along with an arrow pointing in the direction of the photograph. In the lower right panel an aerial photograph shows existing conditions. Three images follow the first image; first is the existing conditions, second is a red highlighted simulation of the proposed Project and third is the proposed Project with natural conditions. They show a comparison of the visual character of each view with existing and proposed conditions (**Appendix B**).

Photograph Simulation of Existing & Proposed Views

Photo Simulation Viewpoint 39 (1A)

Existing Conditions

This photo-simulation depicts LSZ 1 near the address 17002 Road 60 in Grover Hill, Ohio 45849 at the intersection of routes 137 & 60 on pages 1-4 (**Appendix B**). This viewpoint is 0.8 mile north of the nearest proposed turbine. A 360 degree panoramic photograph series from this location starts on page 266 **Appendix A**.

Proposed Project

The proposed Project simulation shows multiple turbines at varying distances with portions of the more distant turbines are partially screened by structures and vegetation.

Photo Simulation Viewpoint 41 (1B)

Existing Conditions

This photo-simulation depicts LSZ 1 near 5347 Road 151 Paulding, Ohio 45879 from Mount Zion Cemetery on pages 5-8 (**Appendix B**). This viewpoint is 1.7 mile northwest of the nearest proposed turbine and also shows an existing met tower. A 360 degree panoramic photograph series from this location starts on page 292 **Appendix A**.

Proposed Project

The proposed Project simulation shows multiple turbines at varying distances with portions of the more distant turbines are partially screened by structures and vegetation.

Photo Simulation Viewpoint 94 (1B Alt)

Existing Conditions

This photo-simulation depicts LSZ 4&1 taken next to the highway and Uncle Fudd's Diner on NW side of 637 and Road 54 north of Grover Hill, Ohio on pages 9-12 (**Appendix B**). This viewpoint is 0.5 mile south of the nearest proposed turbine. A 360 degree panoramic photograph series from this location starts on page 701 **Appendix A**.

Proposed Project

The proposed Project simulation shows multiple turbines at varying distances with portions of the more distant turbines are partially screened by distribution structures, houses and vegetation.

Photo Simulation Viewpoint 91 (2A)

Existing Conditions

This photo-simulation depicts a rural residence in LSZ 1 taken south of the intersection of route 114/137 west of Grover Hill, Ohio on pages 13-16 (**Appendix B**). This viewpoint is 0.4 mile south-southwest of the nearest proposed turbine. A 360 degree panoramic photograph series from this location starts on page 674 **Appendix A**.

Proposed Project

The proposed Project simulation shows multiple turbines at varying distances with portions of the more distant turbines are partially screened by a house and vegetation in the foreground.

Photo Simulation Viewpoint 43 (2B)

Existing Conditions

This photo-simulation depicts LSZ 1&2 with agricultural land and a residence and met tower in the distance. The photograph was taken from Welcome Park near the ball fields on the north edge of Grover Hill on pages 17-20 (**Appendix B**). This viewpoint is 0.4 mile north-northwest of the nearest proposed turbine. A 360 degree panoramic photograph series from this location starting on page 317 **Appendix A**.

Proposed Project

The proposed Project simulation shows multiple turbines at varying distances with lower portions of the more distant turbines are partially screened by trees.

Photo Simulation Viewpoint 44 (2B Alt)

Existing Conditions

This photo-simulation depicts LSZ 3 in a residential area overlooking the elementary playground in the village of Grover Hill. There are trees in the mid and background. The photograph was take in front of the elementary school at 206 W Perry St Grover Hill, Ohio 45849 shown on pages 21-24 (**Appendix B**). This viewpoint is 0.5 mile west-northwest of the nearest proposed turbine. A 360 degree panoramic photograph series from this location starting on page 327 **Appendix A**.

Proposed Project

The proposed Project simulation shows one turbine the top is visible and the bottom obscured by trees in the midground.

Photo Simulation Viewpoint 86 (3A)

Existing Conditions

This photo-simulation depicts LSZ 3 in a rural residential/Agricultural Zone 1 overlooking Hoaglin Creek. There is a creek lined with trees in foreground and midground. The photograph was take from the bridge at 17413 Road 24 Grover Hill, Ohio 45849 on pages 25-28 (**Appendix B**). This viewpoint is 0.4 mile northwest of the nearest proposed turbine. A 360 degree panoramic photograph series from this location starts on page 620 **Appendix A**.

Proposed Project

The proposed Project simulation shows three turbines, one significantly visible in the midground and two partially visible in the background.

Photo Simulation Viewpoint 84 (3B)

Existing Conditions

This photo-simulation depicts LSZ 4 along the west edge of highway 637/18 south of Grover Hill. The photograph was take 17985 Road 18 Grover Hill, Ohio 45849 on pages 29-32 (**Appendix B**). This viewpoint is 0.9 mile north of the nearest proposed turbine. A 360 degree panoramic photograph series from this location starts on page 598 **Appendix A**.

Proposed Project

The proposed Project simulation shows several turbines, four are significantly visible in the midground on both sides of the highway and the others are two partially visible in the background behind trees.

Cumulative Visual Impacts

Following the requirements of the OAC Rule 4906-04-08(D)(4) for the Ohio Power Siting Board, the potential cumulative visual impacts of the Project along with other nearby operating wind energy projects must be considered. Cumulative impacts are two or more individual visual effects which, when taken together, are significant or that compound or increase other similar visual effects. This section reports the potential cumulative visual impacts that may arise from interactions between the proposed Project and the currently operating the Blue Creek Wind Farm 146 turbines, Cooper Farms Wind 3 turbines, Haviland Plastic Products 3 turbines and the Northwest Ohio Energy Wind Project with 39 turbines. These facilities are located approximately 0.5 mile from the nearest point of the proposed Project (Exhibit 13).

The visibility and visual effect of wind turbines within the Study Area will vary based on viewer's distance, their viewer orientation to the adjacent turbines, and the number of turbines that are visible in the distance. It will also depend upon the potential screening effects of vegetation and structures. As with the proposed Project, the land use and landscape is essentially the same as the adjacent wind farms. They are visible from differing amounts of screening throughout the proposed Project Area. They will be viewed as midground and background features in most views but will appear connected to the proposed Project if viewed directly west. If viewed to the southwest, longer views with more numerous wind turbines will fill the landscape. The visual simulations, from villages and cities where populations are greater and mature trees and structures are frequent (Suburban Residential and City/Village LSZs) screening provided will limit or reduce open views to the surrounding wind turbines in the background landscape.

Zones where cumulative project visibility will occur most include the Rural Residential/Agricultural and the Transportation Corridor LSZs. The landscape is flat agricultural land and the Rural Residential/Agricultural LSZ offers the greatest opportunity to see longer distances and more turbines from adjacent wind farms. The greater number of turbines will increase visual impact. Many of the exiting turbines will be viewed distances greater than 3 miles, which reduces their visual impact. The view of turbines from the Transportation Corridor LSZ, from multiple projects will be visible at a variety of direction, distances and weather conditions as travelers and passengers drive through the Study Area.

There may be locations where the existing wind farms and the proposed Project will have a larger cumulative visual effect. These instances will be relatively infrequent and will often affect large numbers of viewers that are particularly sensitive to visual change. Therefore, the additional turbines from the proposed Project in this working agricultural landscape where many wind turbines operate is not anticipated to have a significant adverse cumulative visual impact.

Nighttime Impacts

A series of nighttime photos were taken towards the adjacent operating wind farms with the same FAA compliant L-864 aviation warning lights that will be used for the proposed Project (Appendix D). The photos show the appearance of the FAA lights in a sunset and dark sky, and they represent the type of nighttime visual impact the proposed Project with FAA aviation warning lights will produce. Current FAA guidelines requires turbines over 500 feet tall must be equipped with two lights per turbine.

As shown in the night photographs, the existing aviation warning lights contrast with the night sky.

The FAA warning lights on the proposed Project will generally be screened for the cities and villages within the Study Area. Nighttime proposed Project visibility will most likely be experienced by transportation users and by residents in the rural/agricultural areas of the study area. In many cases, existing views will already include lights associated with distant cities, and villages, barns, communication towers, and other tall structures such as grain elevators, water towers and existing turbines.

Part VI: Conclusions

Conclusions

The viewshed analysis and field review for the Project conclude that the proposed Project will be visible from most of the land within the Study Area because the area is flat agricultural land and the height of the wind turbines significantly exceeds the height of the screening in the background and mid-ground. In the foreground, when screening by trees and structures exists, visibility of the Project is reduced or eliminated. Many existing wind turbines dot the western landscape. The Tourist/Recreational users are primarily found in areas where water and trees exist, at parks, along streams and rivers, and wooded natural areas. The Project has limited visibility from areas where riparian corridors exist with trees along the edges.

Constructing the proposed Project will add more turbines to the existing broad landscape around the Village of Grover Hill rather than adding turbines to a landscape absent of turbines so the landscape character will not significantly change since there are currently many turbines in the landscape. The Transportation Corridor LSZ delivers long, open, and constantly changing views as users move though the area. The Suburban Residential Zone changes depending upon the activity of the people. The most viewers and visually sensitive sites occur within the City/Village/ LSZ. Therefore, for the majority of viewers and sensitive sites located within the Study Area, views of the Project will be partially or fully screened by nearby structures and trees. Rural Residential/Agricultural LSZ consists of the largest area and the smallest number of people. It also has the most visibility because this area is primarily agricultural land. The visual characteristics of the agricultural area has the least sensitivity to visual changes from the Project.

Photo simulations of the Project show the visual impact will vary depending on the LSZ viewpoint if trees exist in the foreground or midground. When trees exist in the background it tends to break up the lower view of the proposed Project.

The nighttime photographs show the red flashing lights which are required to alert pilots. The number of people outside during the night is significantly reduced compared to being outside during the day.

Part VII: Mitigation

Mitigation options are limited, given the height of the wind turbines and the siting requirements. The mitigation measures below were considered.

Screening

Screening views of the proposed turbines from area villages and cities, where the majority of the sensitive receptors and historic sites was considered but due to the size and distance of the proposed turbines, this alternative is not practicable.

Relocation

Relocation of turbines to another location was considered but since the structures are so tall and visible from distances of 10 or more miles, relocation is not considered a viable mitigation alternative as it would not significantly reduce the visual impact.

Camouflage

Altering the color of the wind turbines was considered. However, white colored wind turbines are mandated by the FAA to eliminate the need for day time lighting minimizes. Changes in weather conditions affect the visibility of the turbines. One color may reduce turbine visibility and contrast for a specific atmospheric condition but another atmospheric may cause that same turbine color to be more visually prominent.

Reducing Turbine Height

Reducing the height of the wind turbine was considered but rejected because is not an economically viable mitigation option. Wind resources require turbine structures to be tall in order to capture the wind within the engineered rotor swept distance. Reducing the height of the turbine reduces the available wind resource. If shorter turbines were selected, more would be required to generate the same quantity of electricity causing more adverse visual impacts.

Turbine Lighting

Eliminating or reducing turbine lighting was considered but rejected because it is required by FAA regulations. The Project will adhere to these FAA regulations.

Maintenance

The Applicant will maintain the turbines and the turbine sites to conform to leases and permits.

Offsets

Mitigation of an existing adverse aesthetic condition within the viewshed is a potential mitigation option. The Applicant will consider entering into an agreement with OHPO to enhance and restore visual resources in the visual study area. Options may include actions such as maintaining cemeteries or restoring historic buildings, and etc. and will be evaluated in consultation with OHPO.

Co-Located Projects

Co-locating the proposed Project in this area, adjacent to existing wind farms, can be considered a form of mitigation. People accustomed to seeing several wind turbines in an area are less likely to be adversely affected by adding more turbines compared to adding turbines to an area where no turbines currently exist.

Part VIII: References

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Exhibits

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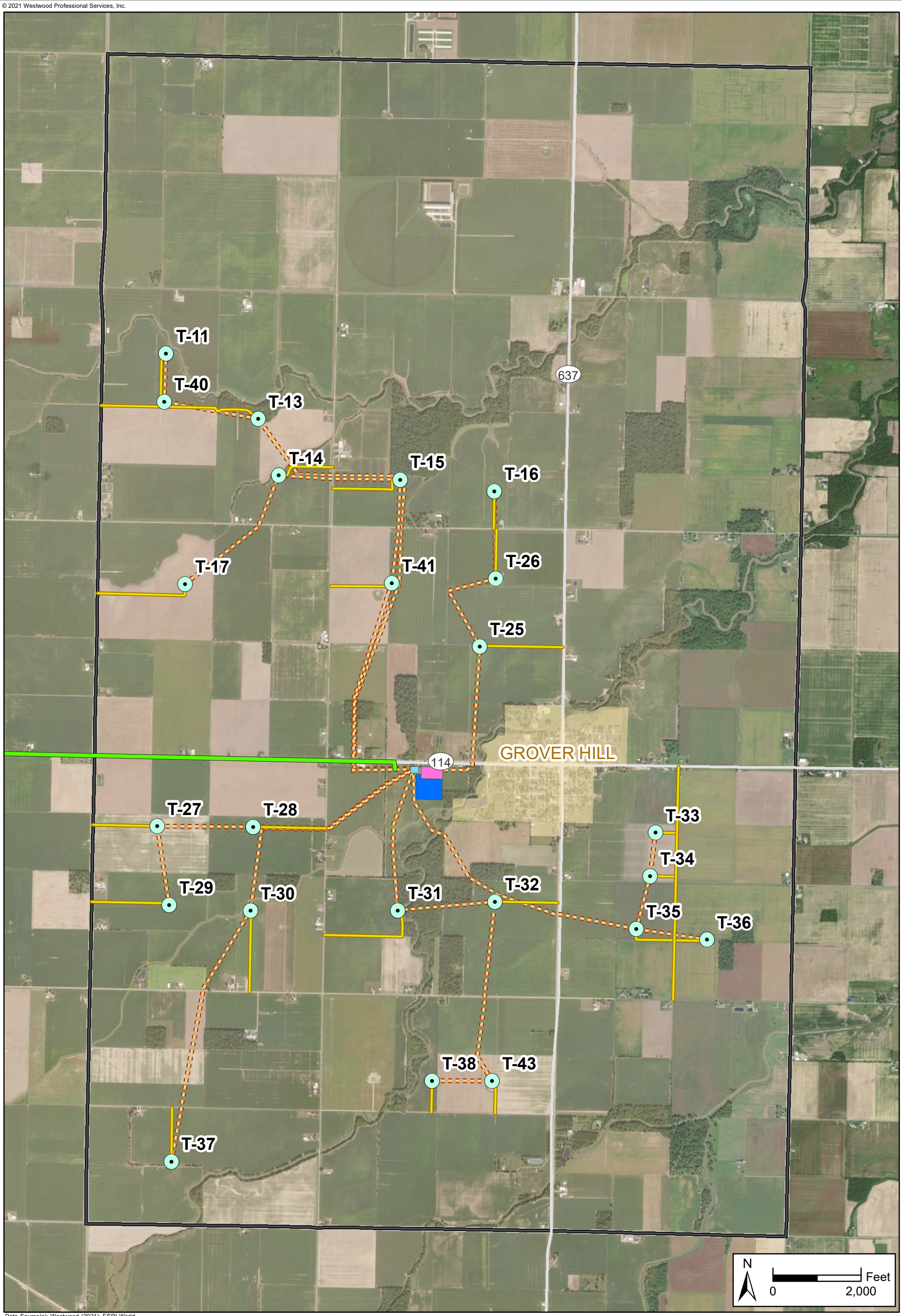

Data Source(s): Westwood (2021); ESRI World Imagery (Accessed 2021); ODOT (2020) .

Legend

- Proposed Wind Turbine
- Project Premises Boundary
- Substation
- Laydown Yard
- O&M Building
- Access Roads
- Collection Line
- Crane Path
- Transmission Line

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Grover Hill Wind Project

Paulding County, Ohio

Proposed Project Layout

EXHIBIT 1

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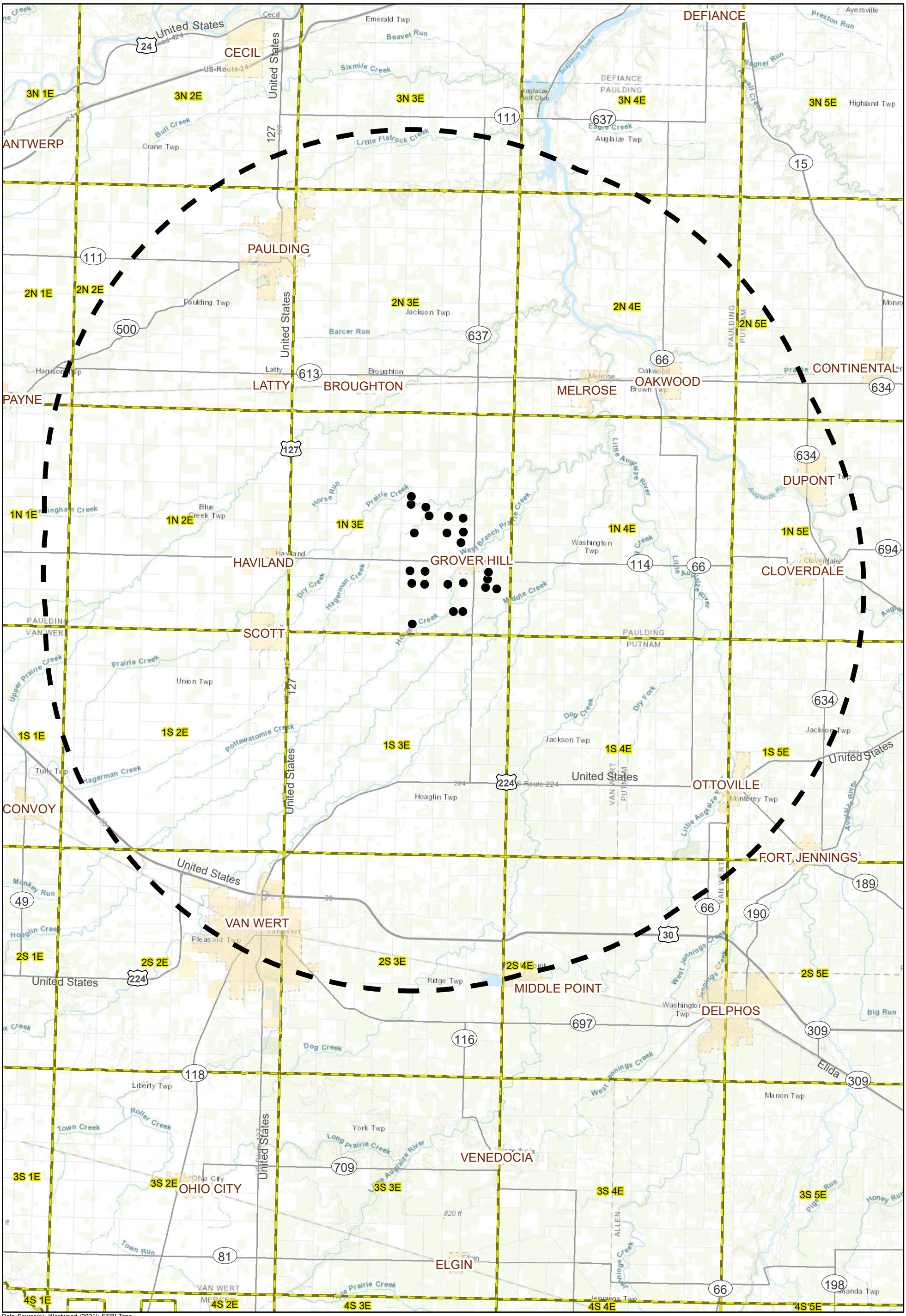

Data Source(s): Westwood (2021); ESRI Topo Basemap (Accessed 2021); ODOT (2020) .

Legend

- Proposed Wind Turbine
- 10-Mile Visual Study Area
- PLS Township

N

0 2.5 Miles

Grover Hill Wind Project

Paulding County, Ohio

Visual Impact Study Area

EXHIBIT 2

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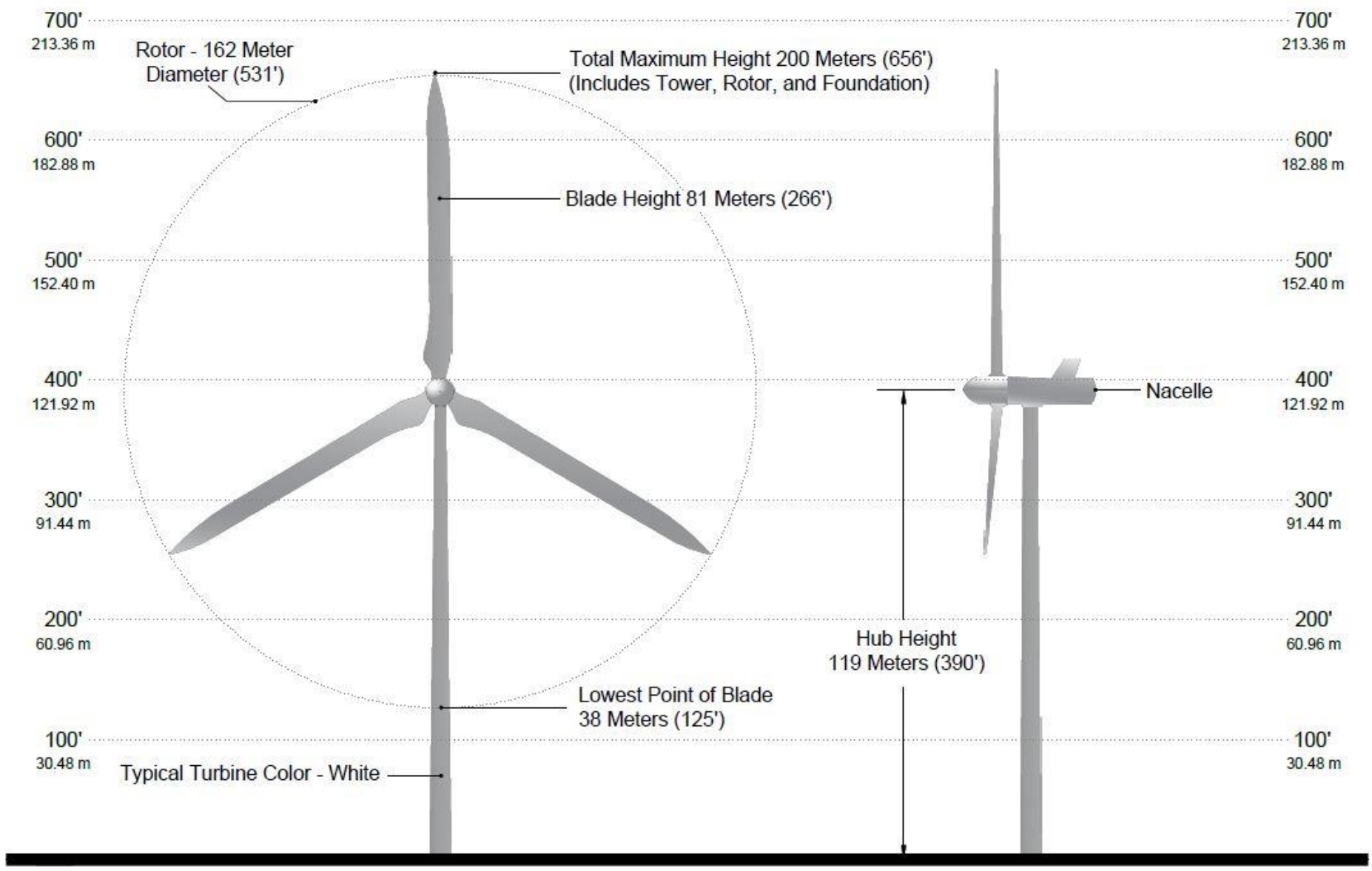
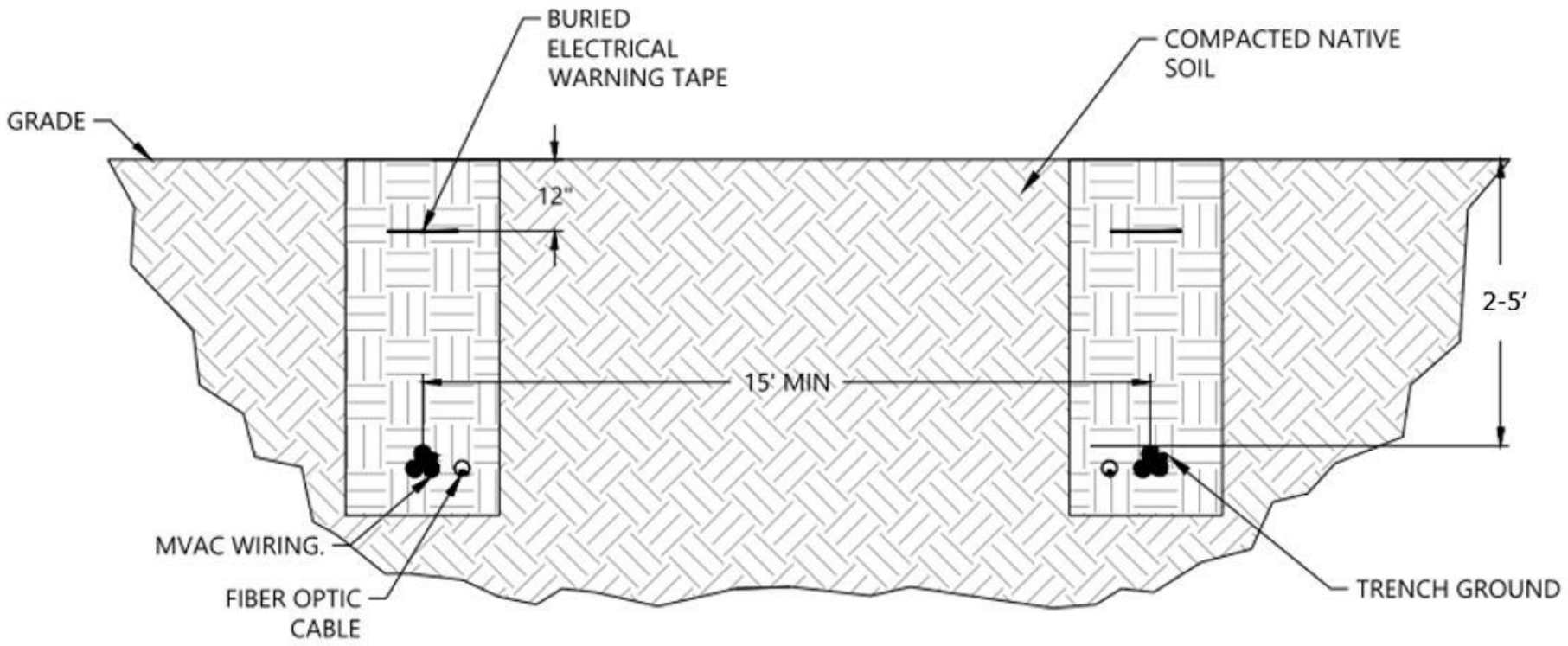


Elevation Model of Proposed Turbine Exhibit 3



Typical Underground Collection System View Exhibit 4

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Data Source(s): Westwood (2021); ESRI Topo Basemap (Accessed 2021); ODOT (2020).

Grover Hill Wind Project

Paulding County, Ohio

Viewpoint Locations

Legend

- Proposed Wind Turbine
- 10-Mile Visual Study Area
- Viewpoint Location
- Photo Simulation Point

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EXHIBIT 5

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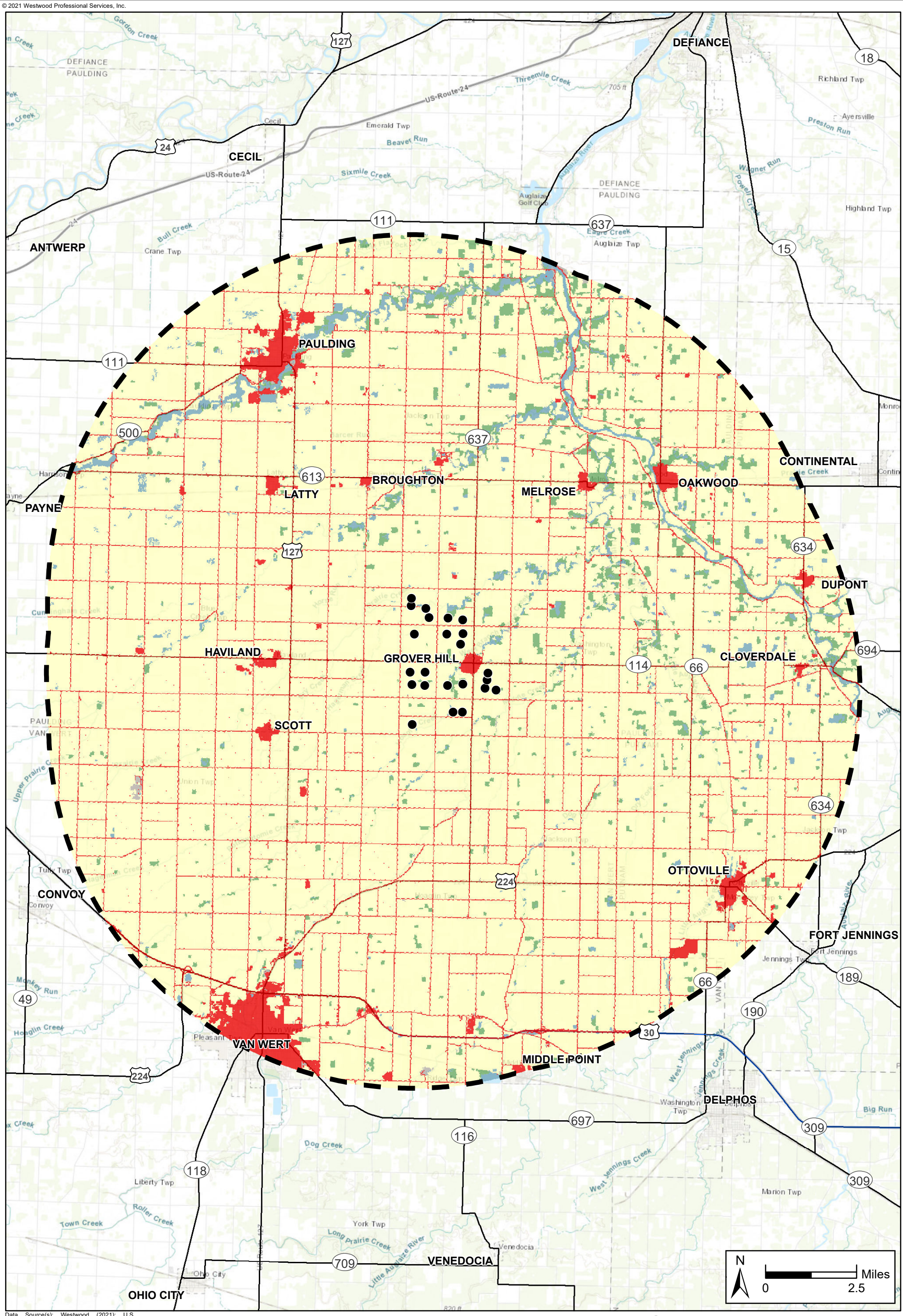

Data Source(s): Westwood (2021); U.S. Geological Survey (2016); ESRI World Imagery (Accessed 2021); ODOT (2020); NLCD (2016) .

Legend

- Proposed Wind Turbine
- 10-Mile Visual Study Area

Land Cover:

- Agriculture
- Developed
- Barren Land
- Water Resources
- Forest

Grover Hill Wind Project

Paulding County, Ohio

Land Cover

EXHIBIT 6

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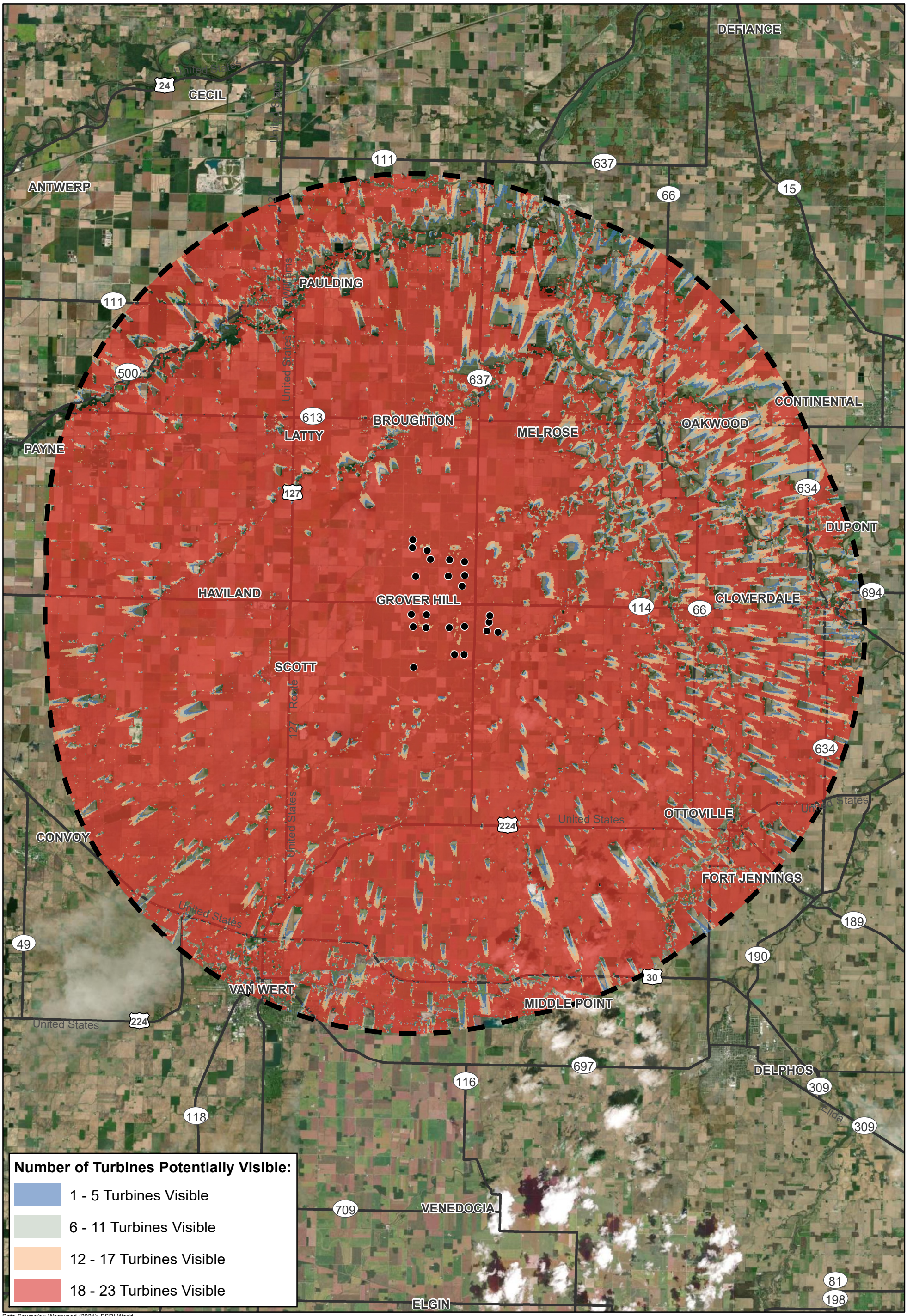

Data Source(s): Westwood (2021); ESRI World Imagery Basemap (Accessed 2021); ODOT (2020) .

Legend

- Wind Turbine
- 10-Mile Visual Study Area

N

0 Miles 2.5

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Grover Hill Wind Project

Paulding County, Ohio

Viewshed Analysis

EXHIBIT 7
Wind Turbine Blade Tip Visibility

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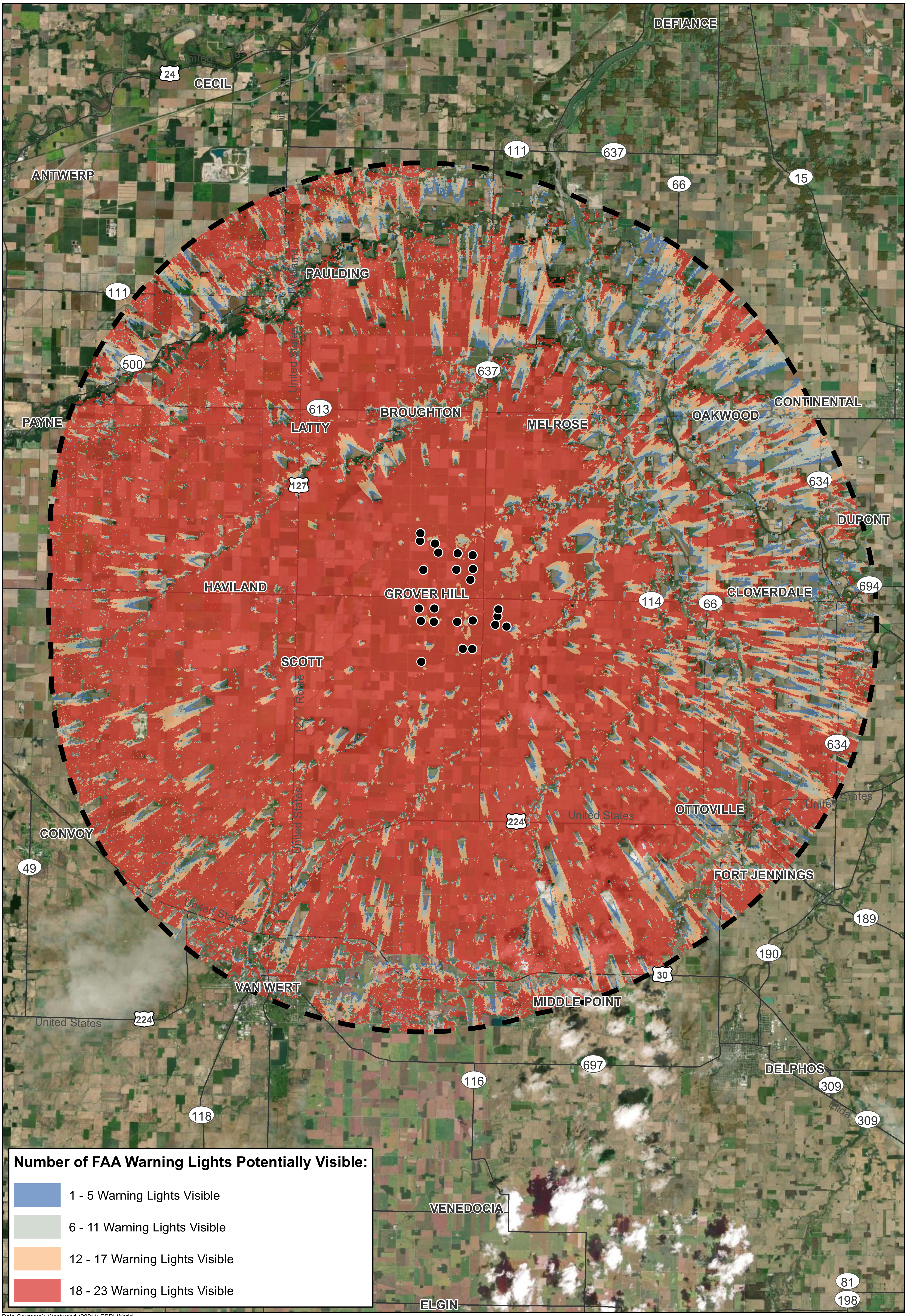

Data Source(s): Westwood (2021); ESRI World Imagery Basemap (Accessed 2021); ODOT (2020).

Legend

● Wind Turbine

10-Mile Visual Study Area

N

0 2.5 Miles

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Grover Hill Wind Project

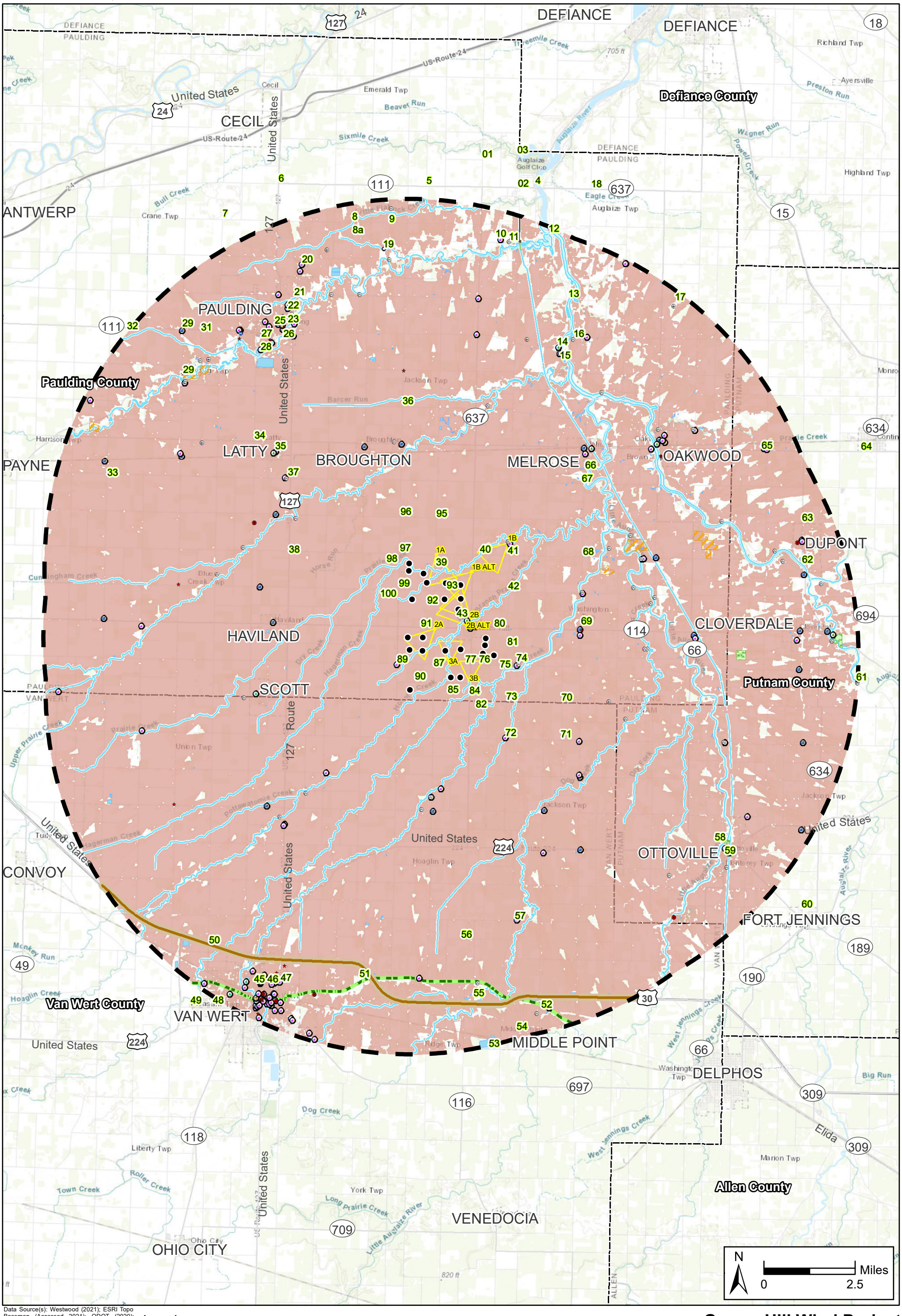
Paulding County, Ohio

Viewshed Analysis

EXHIBIT 8

Wind Turbine FAA Warning Light Visibility

Map Document: N:\0015695.00\GIS\Analysis\210402_EMB\VisualStudy_Exhibits\GH_Visual_Composite_210419.mxd 4/28/2021 8:37:38 AM emboisen



Data Source(s): Westwood (2021); ESRI Topo Basemap (Accessed 2021); ODOT (2020); USGS NHD Dataset (2015); NRHP (Accessed 2020); Google Earth (Accessed 2021).

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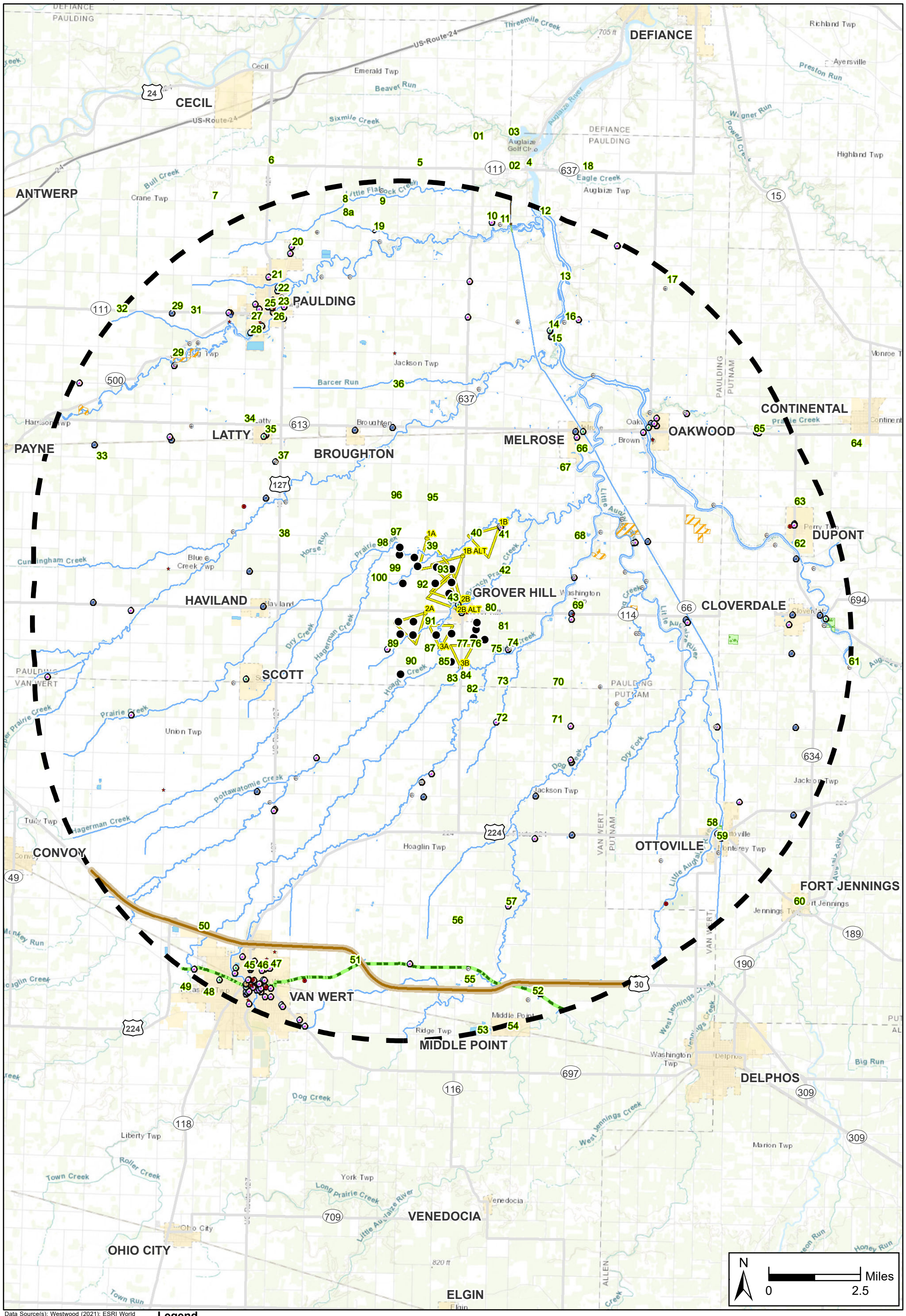
Grover Hill Wind Project

Paulding County, Ohio

Composite Map

EXHIBIT 9

Map Document: N:\0015695.00\GIS\Analysis\210402_EMB\VisualStudy_Exhibits\GH_Visual_SensitiveResources_210419.mxd 4/28/2021 8:38:11 AM emboisen



Data Source(s): Westwood (2021); ESRI World Imagery (Accessed 2021); ODOT (2020); NRHP (Accessed 2020); USGS NHD Dataset (2015); Google Earth (Accessed 2021).

Legend

- Proposed Wind Turbine
- 10-Mile Visual Study Area
- River or Stream
- Waterbody
- State Bike Route
- Scenic Byways
- Airport
- Cemetery
- Church
- Government Building
- Historic Bridge
- Historical Structure
- Hospital
- Library
- Misc
- Park
- Post Office
- Viewpoint Location
- Photo Simulation Point
- Conservation Easement
- State Conservation Area
- State Park

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Grover Hill Wind Project

Paulding County, Ohio

Visually Sensitive Resources

EXHIBIT 10

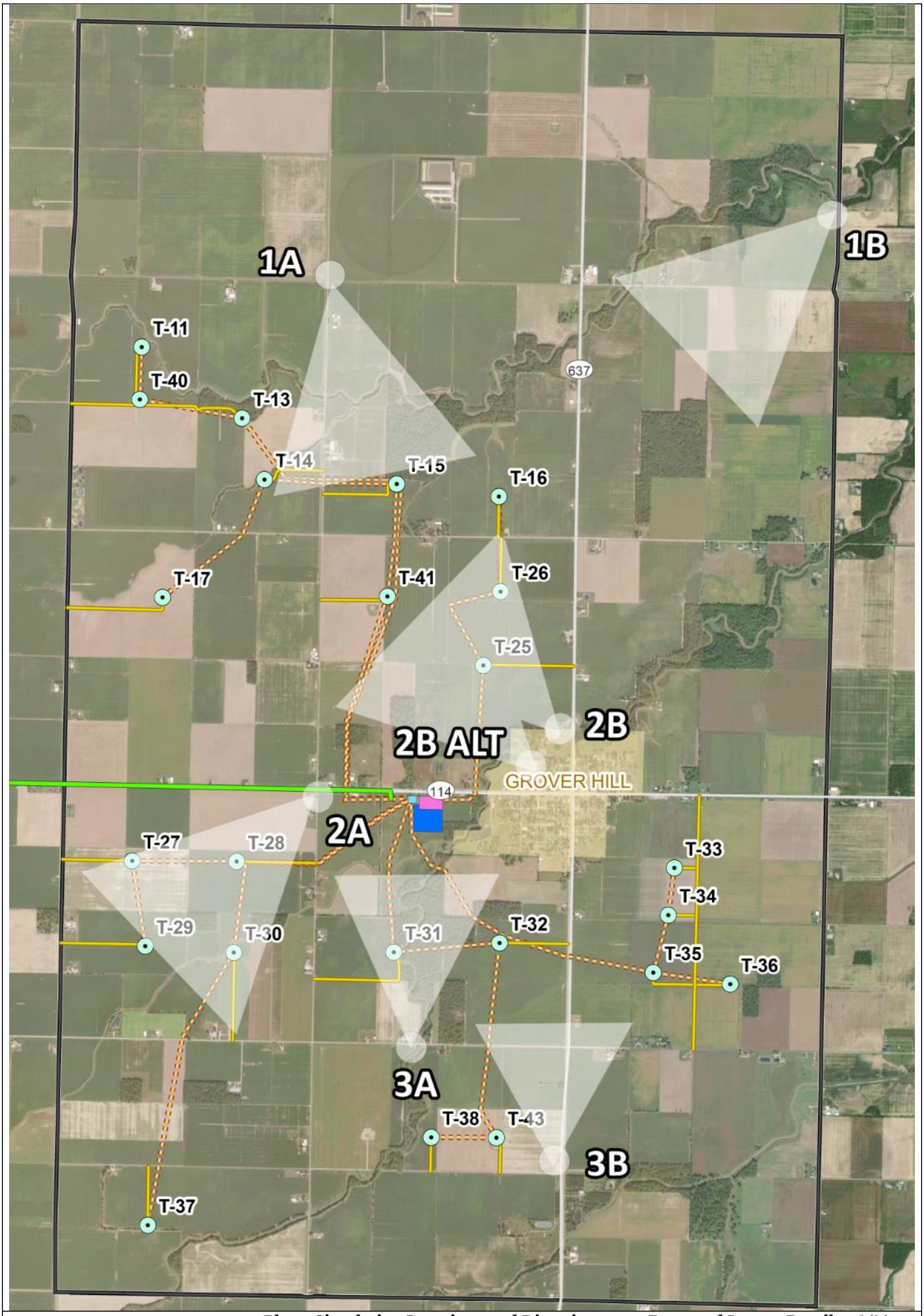

Photo Simulation Locations and Directions over Proposed Layout Detail **Exhibit 11**

Oblique View of Photo Simulation Locations over Proposed Layout **Exhibit 12**

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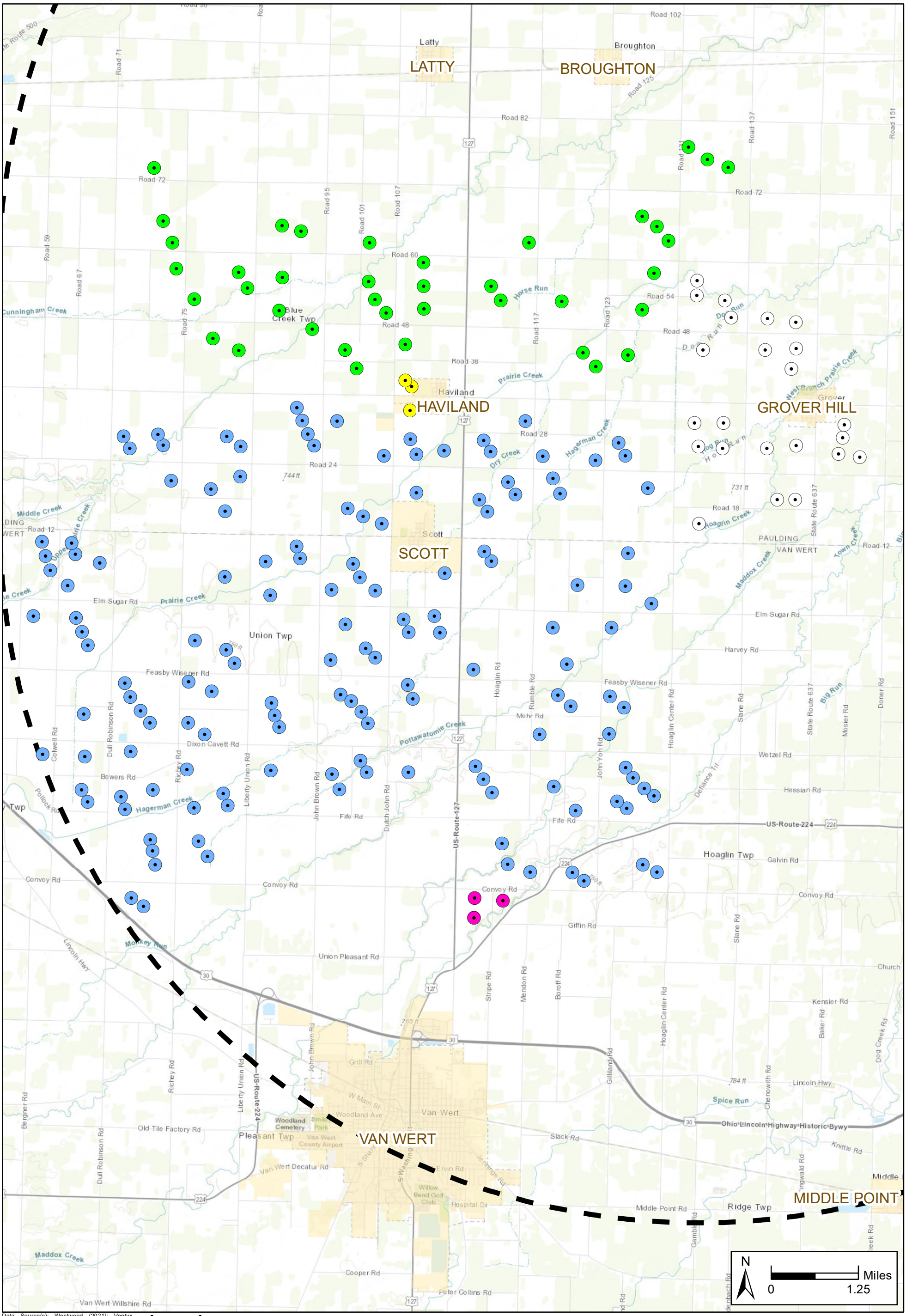

Data Source(s): Westwood (2021); Ventyx Energy LLC. (2021); ESRI Topo Basemap (Accessed 2021); ODOT (2020) .

Legend

- Proposed Grover Hill Wind Farm (23 Turbines)
- 10-Mile Visual Study Area
- Blue Creek Wind Farm (146 Turbines)
- Cooper Farms Wind (3 Turbines)
- Haviland Plastic Products (3 Turbines)
- Northwest Ohio Wind Energy (39 Turbines)

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Grover Hill Wind Project

Paulding County, Ohio

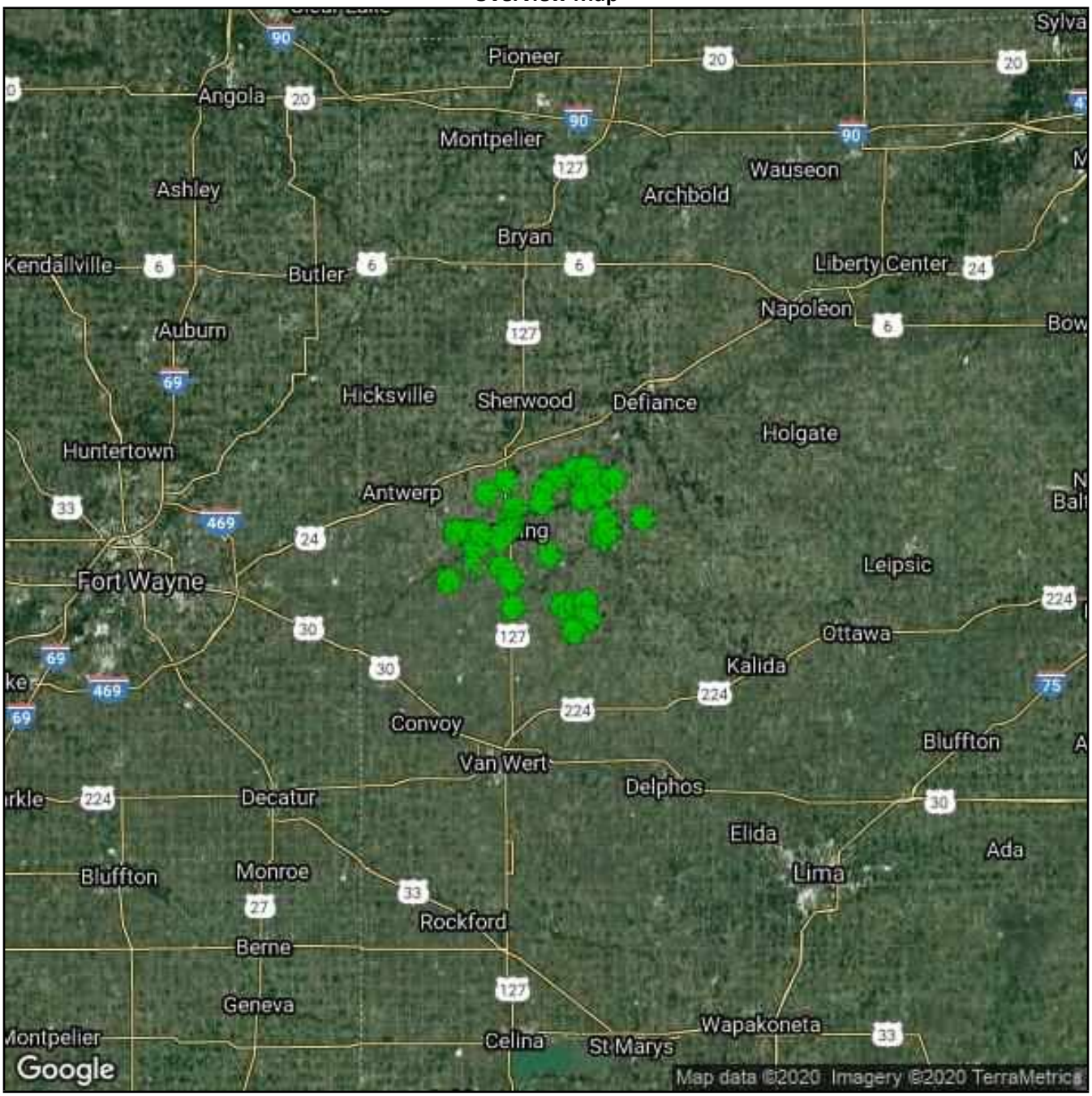
Existing Area Turbines and Proposed Project

EXHIBIT 13

Appendix A

Grover Hill

Overview Map



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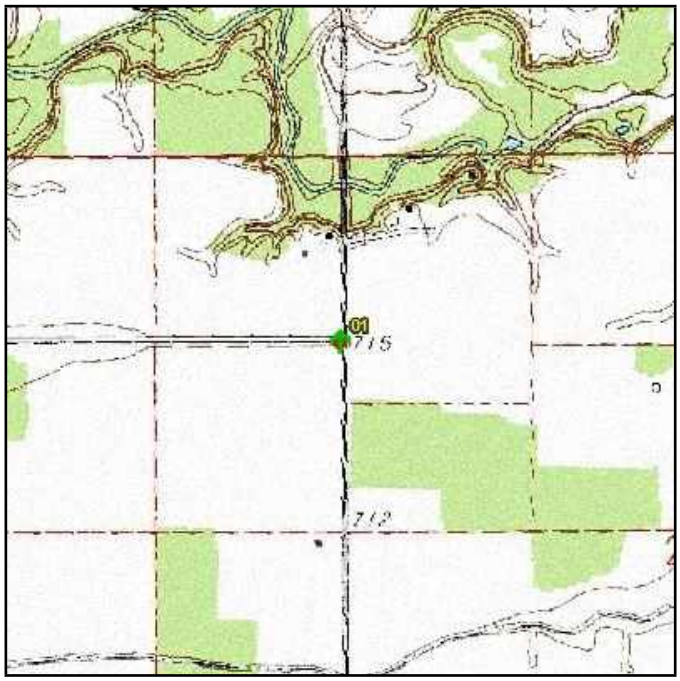

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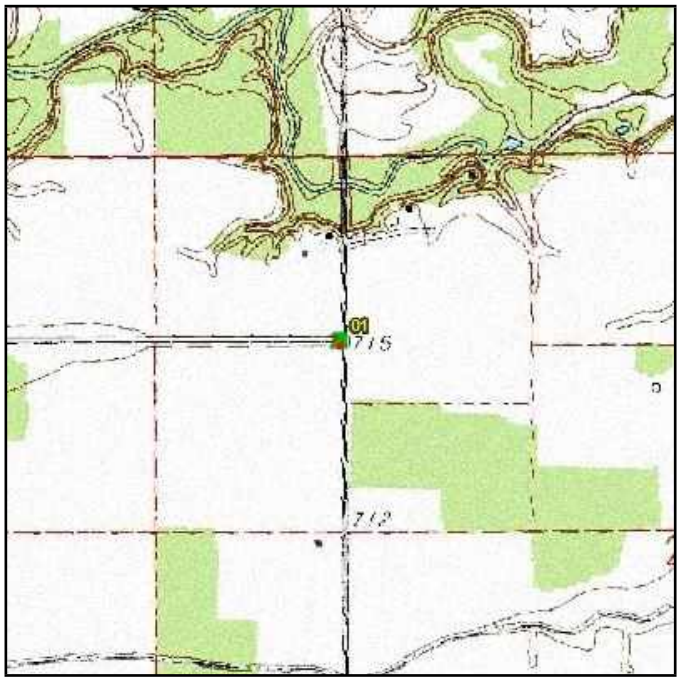

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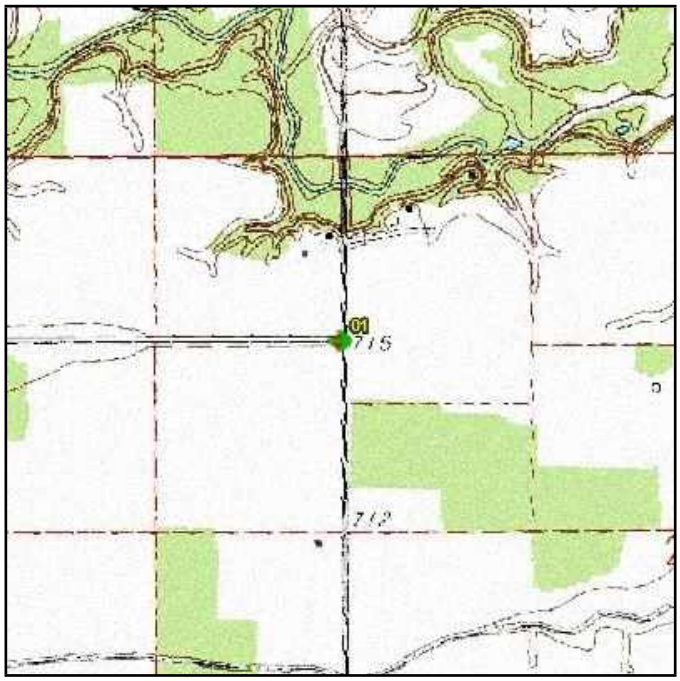

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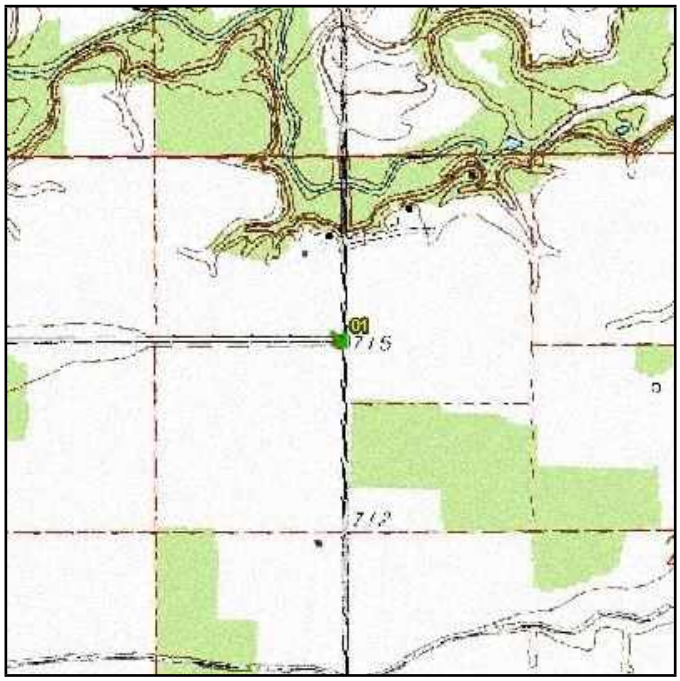

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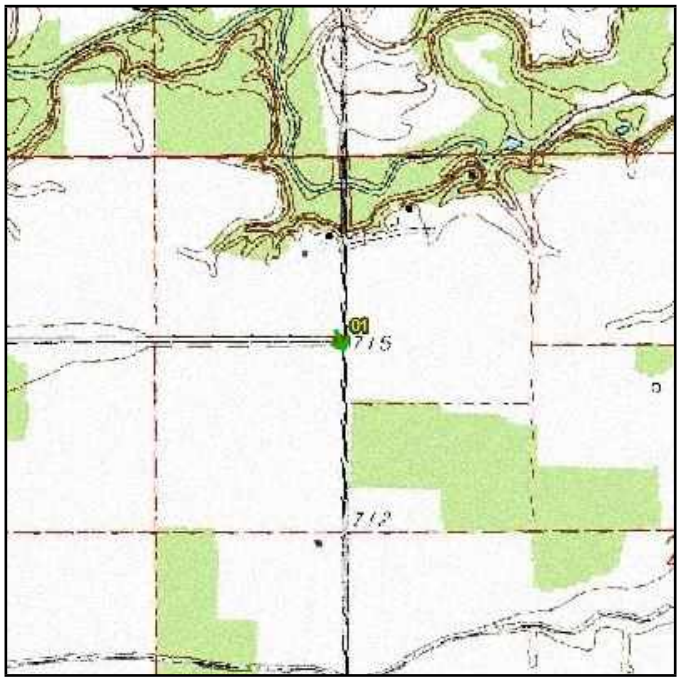

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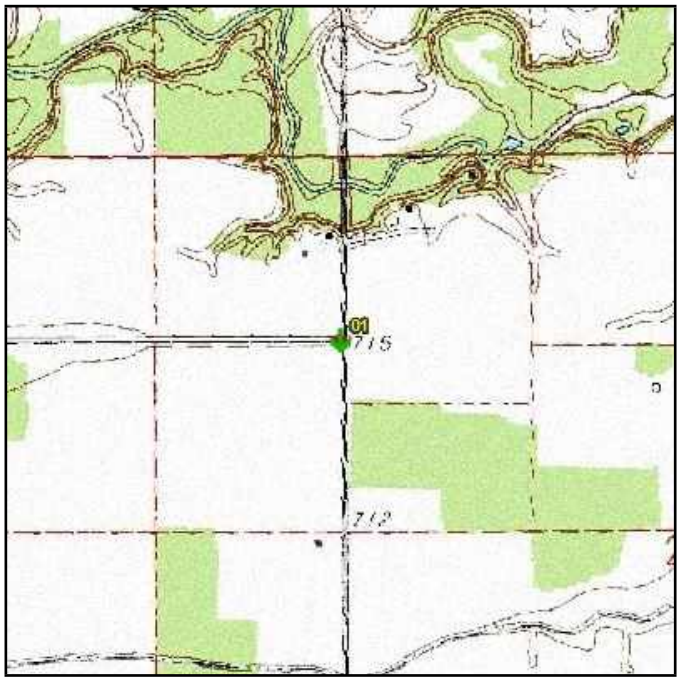

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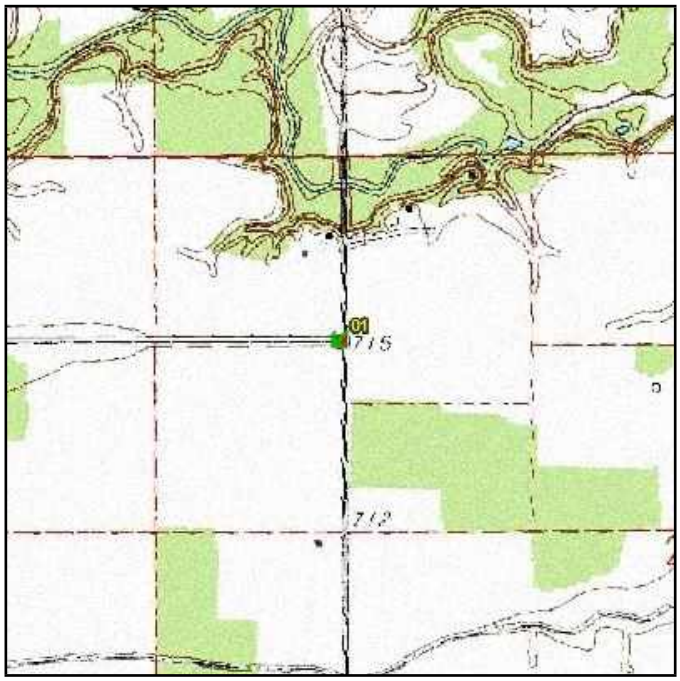

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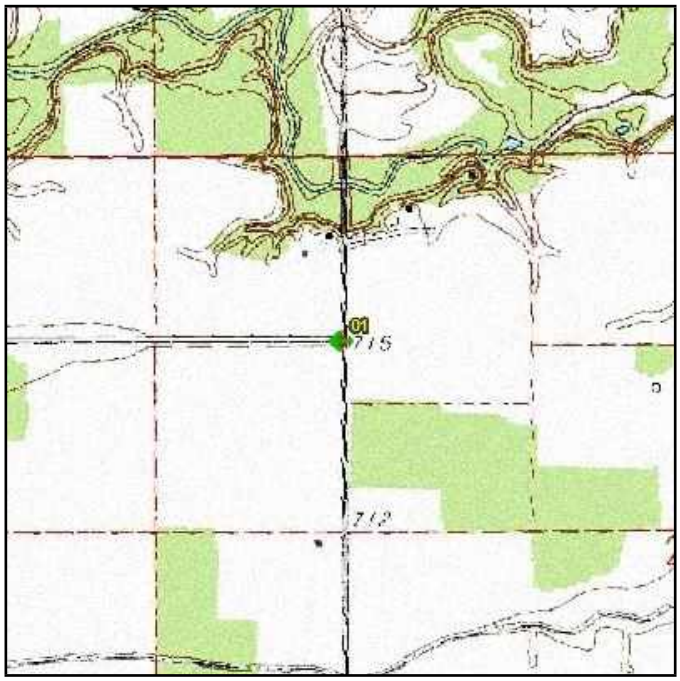

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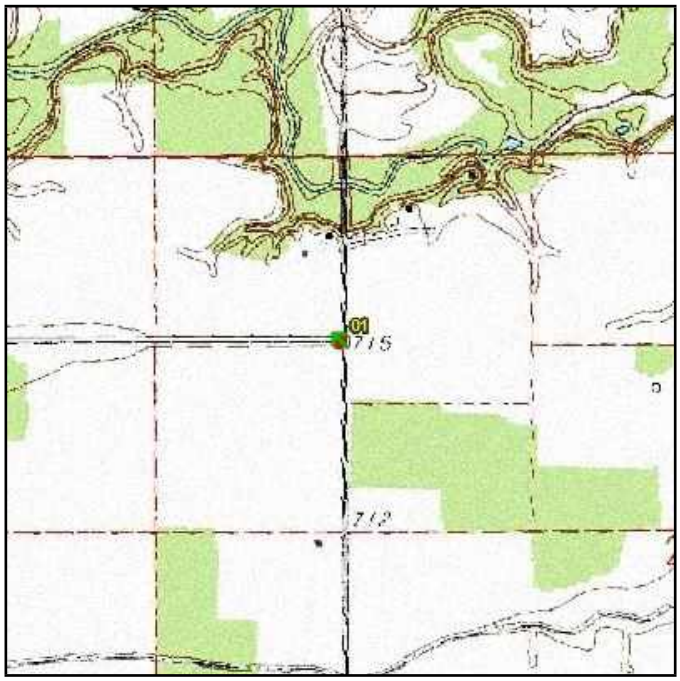

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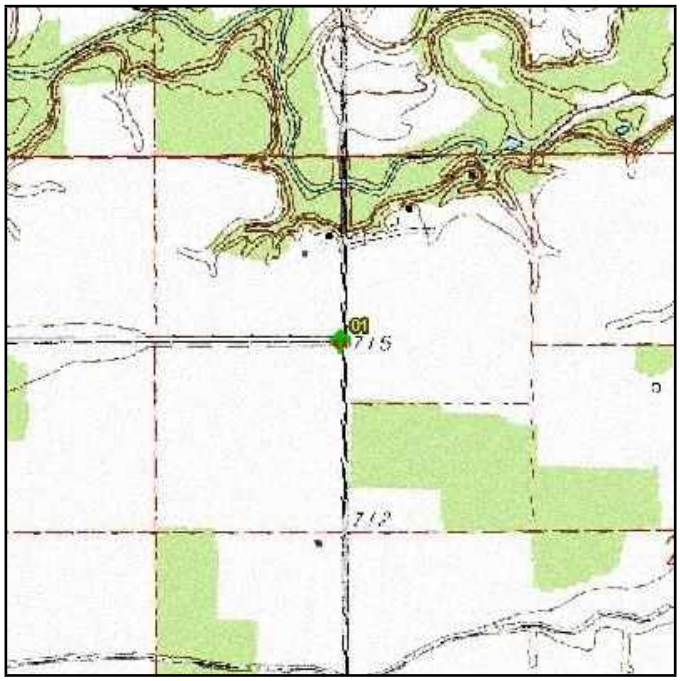

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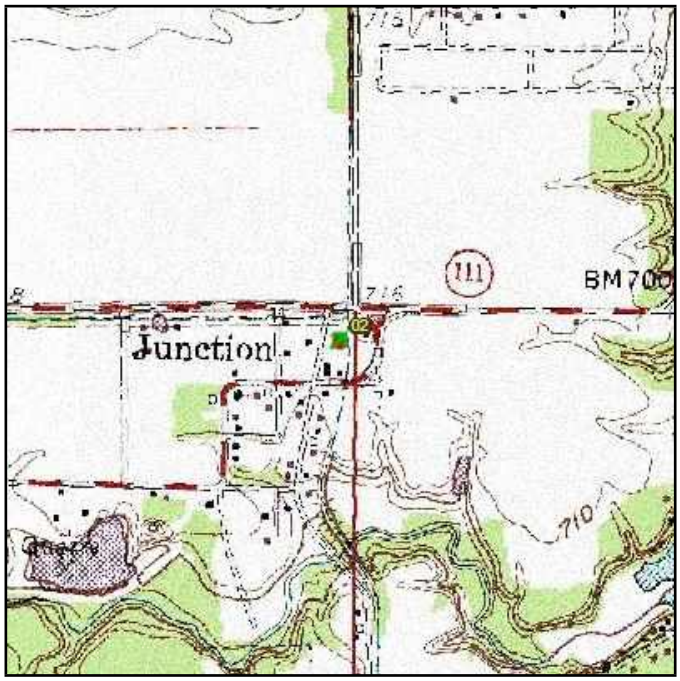

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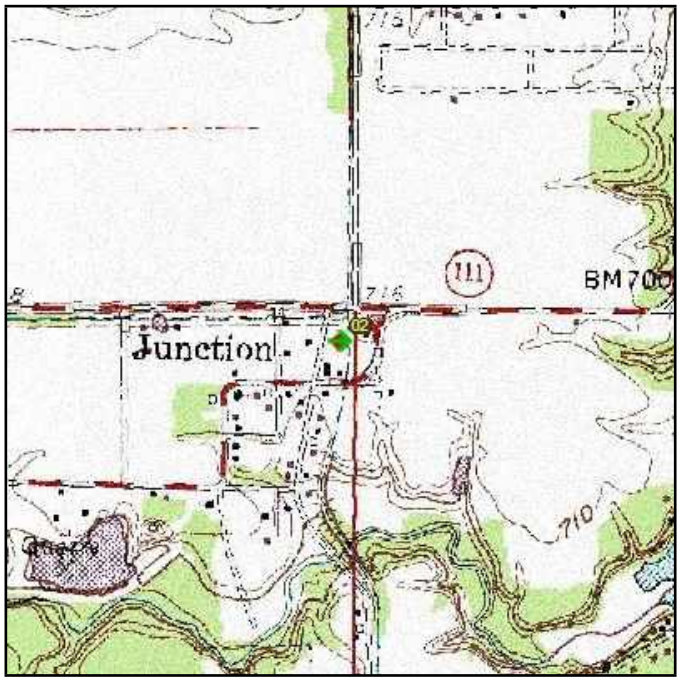

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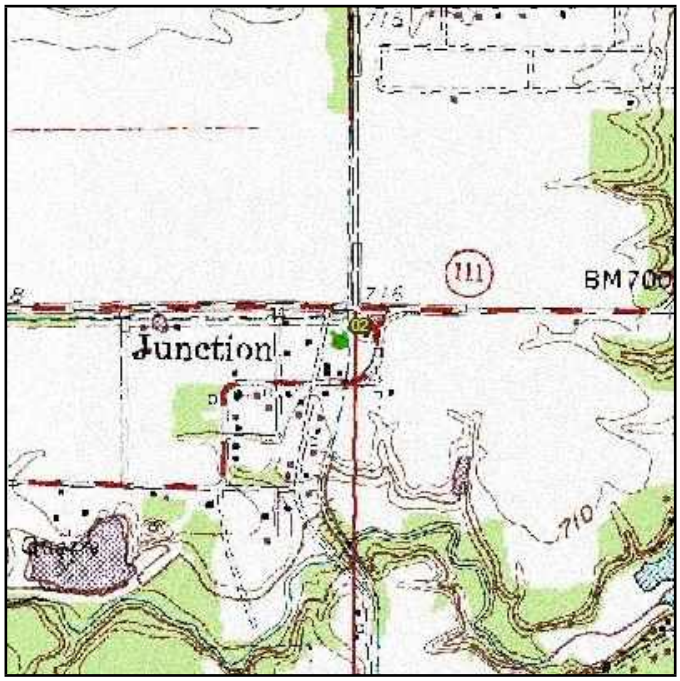

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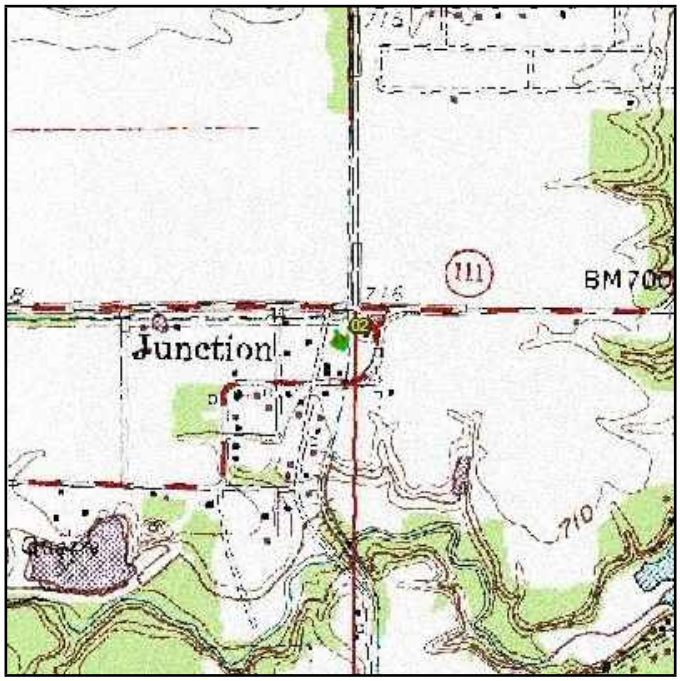

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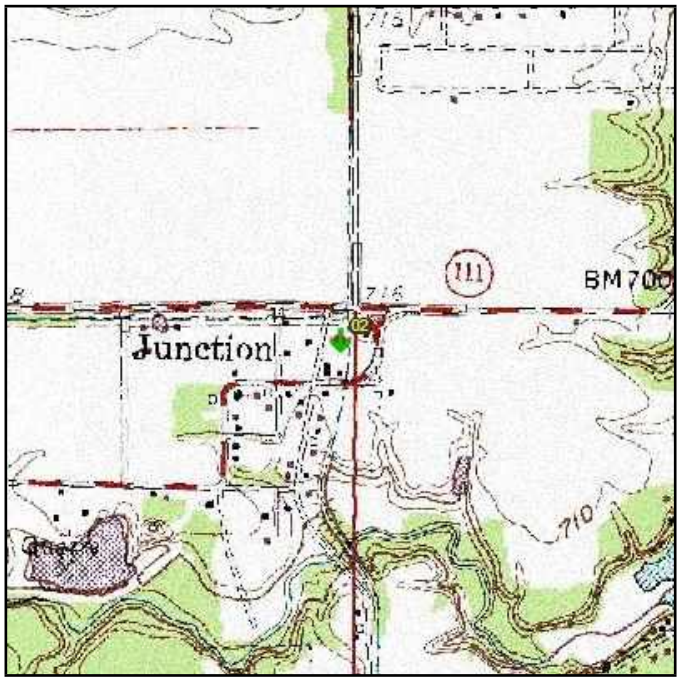

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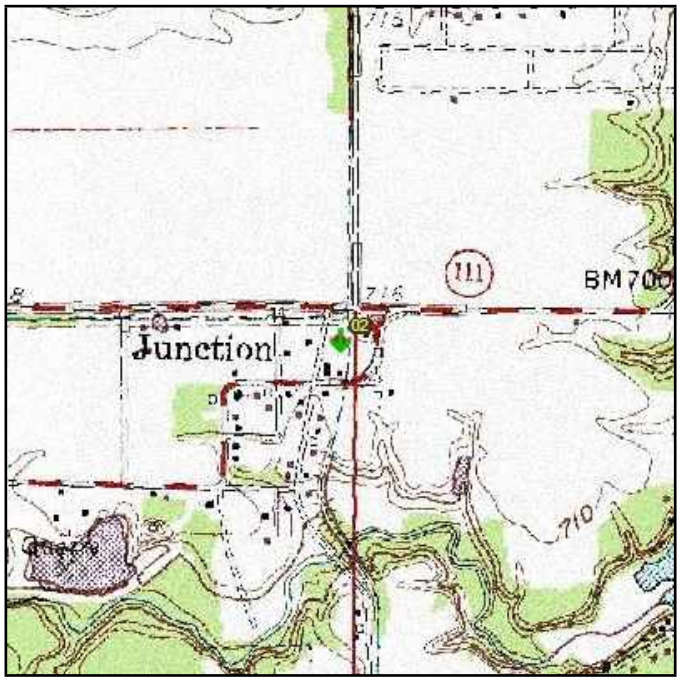

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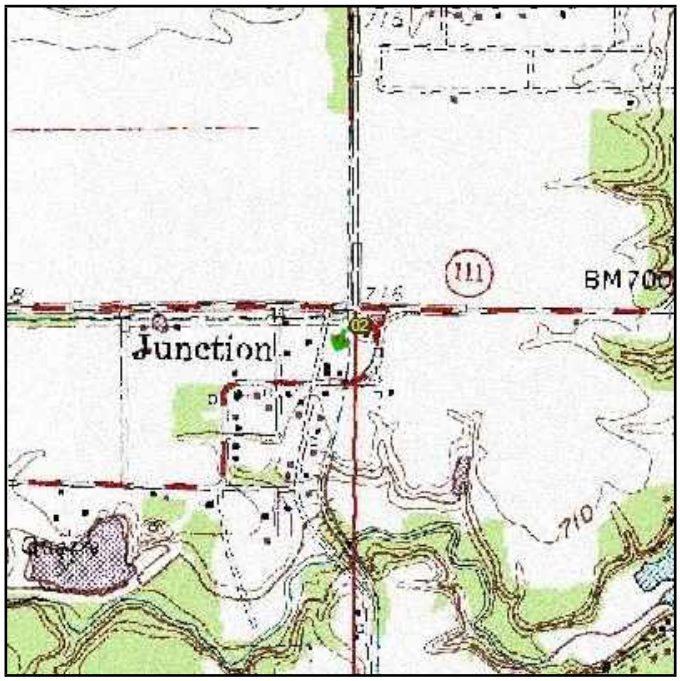

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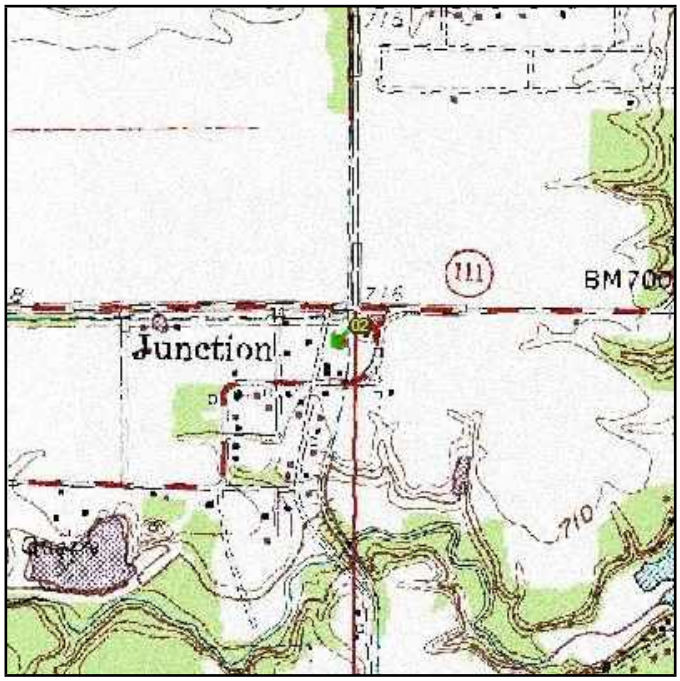

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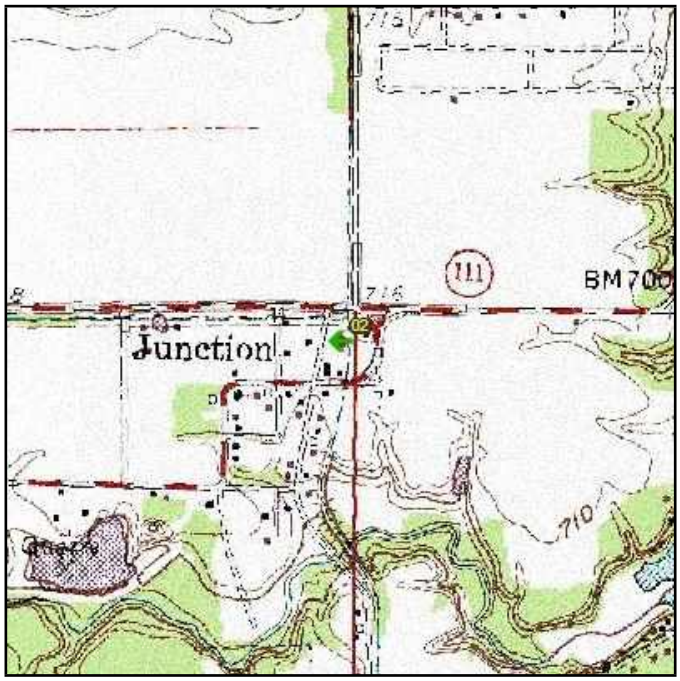

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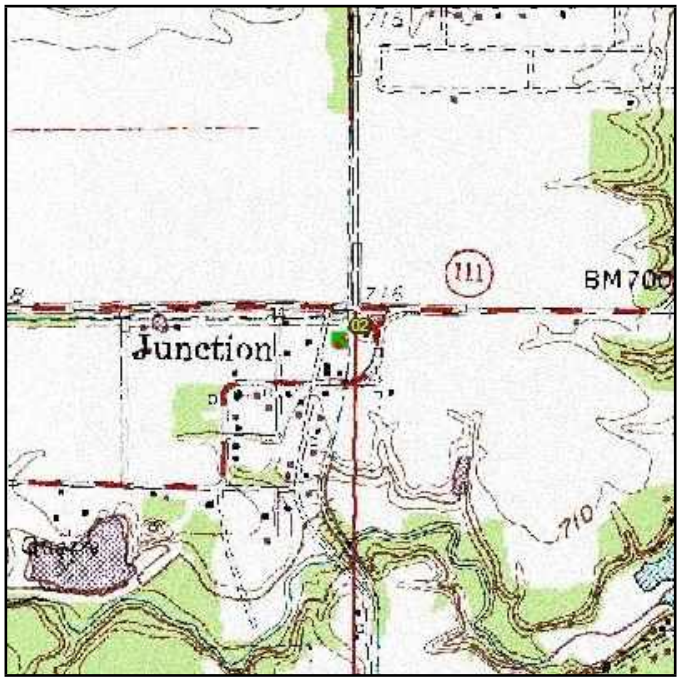

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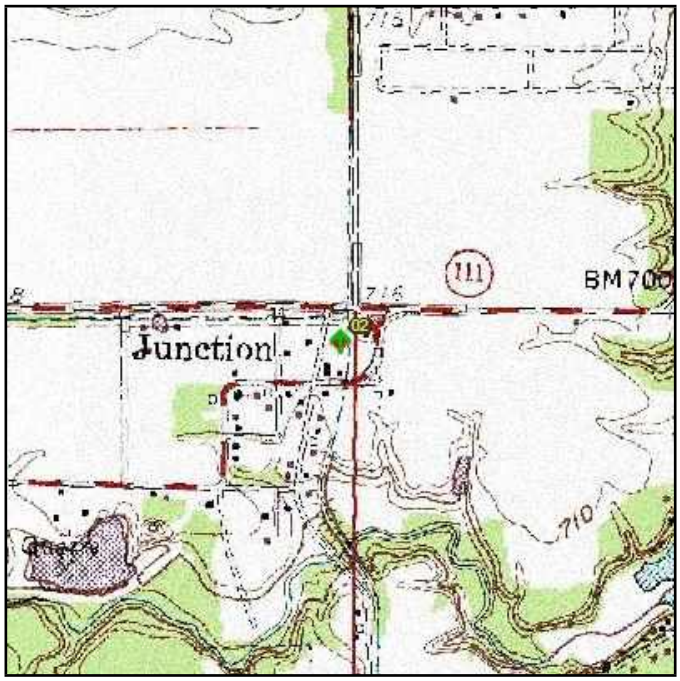

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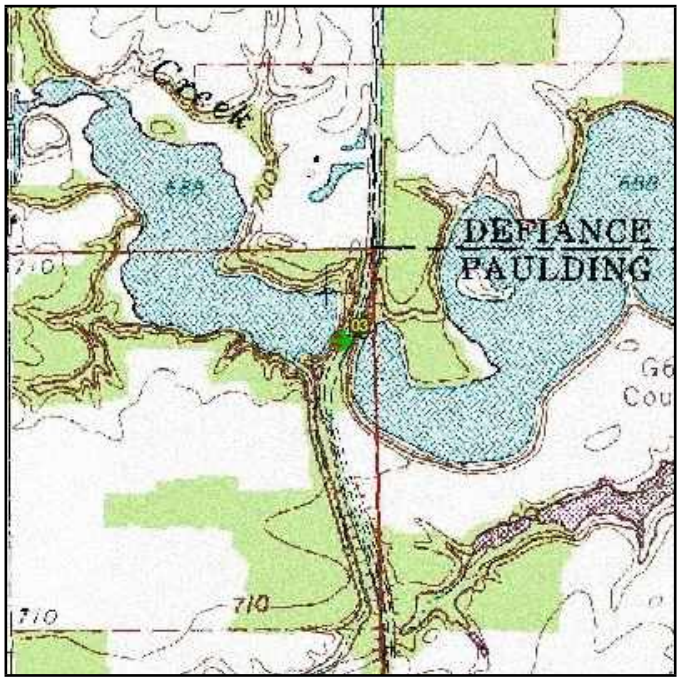

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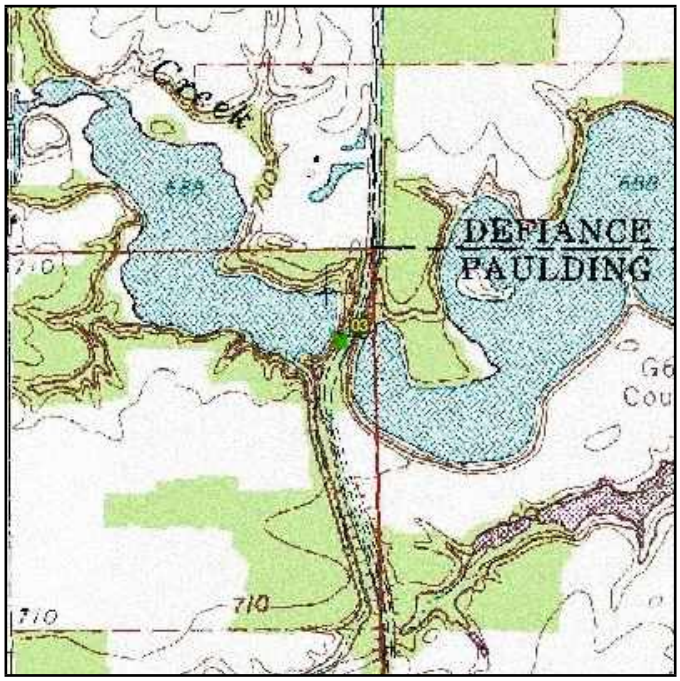

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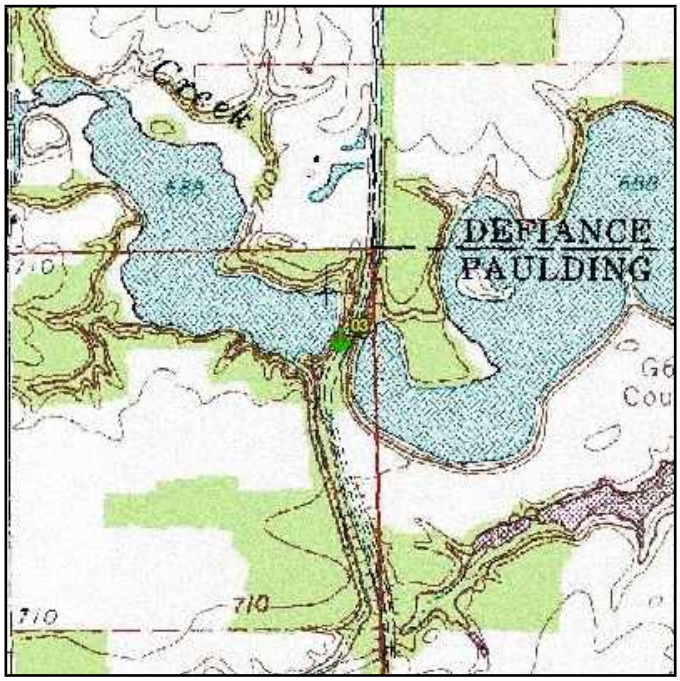

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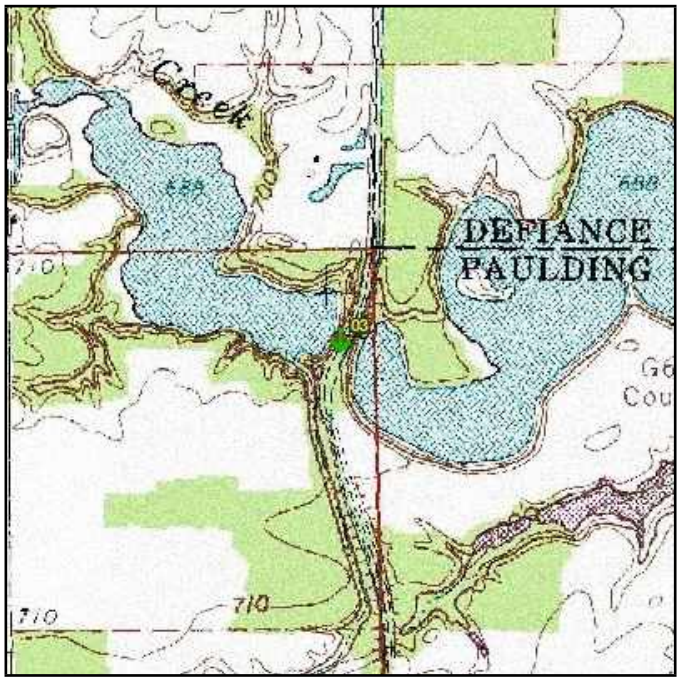

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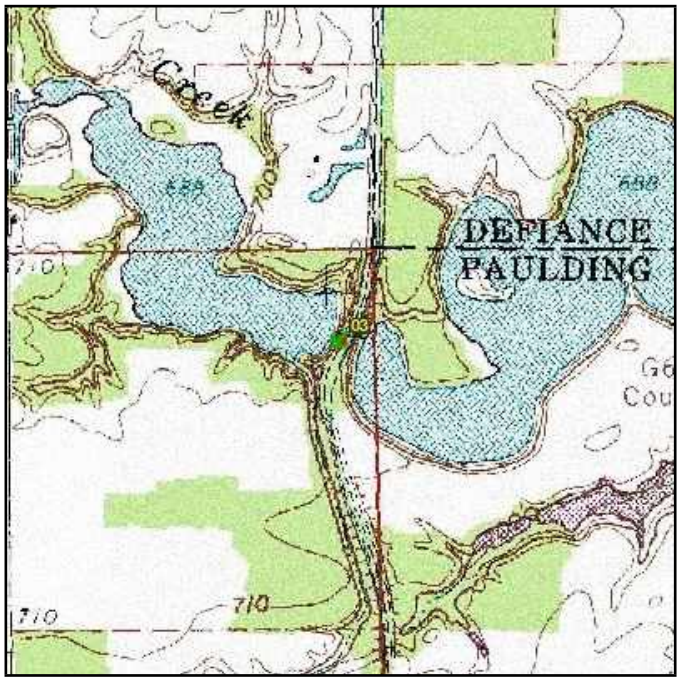

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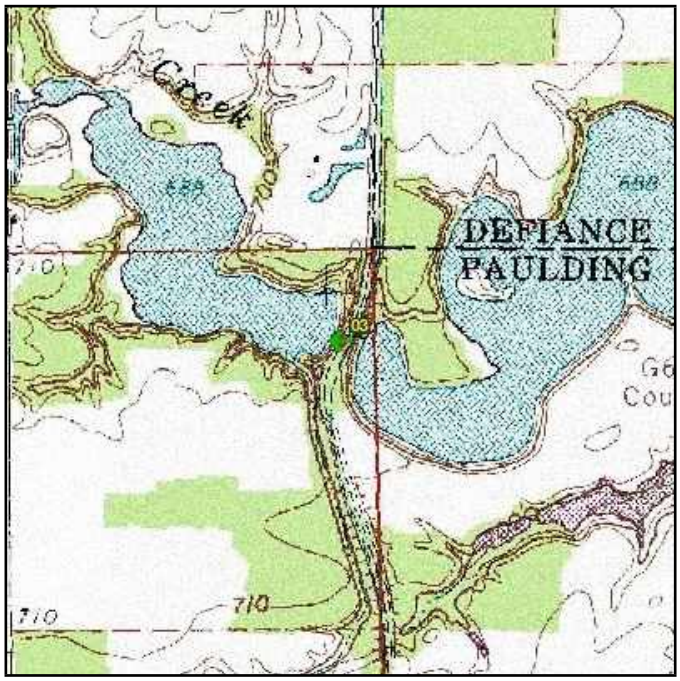

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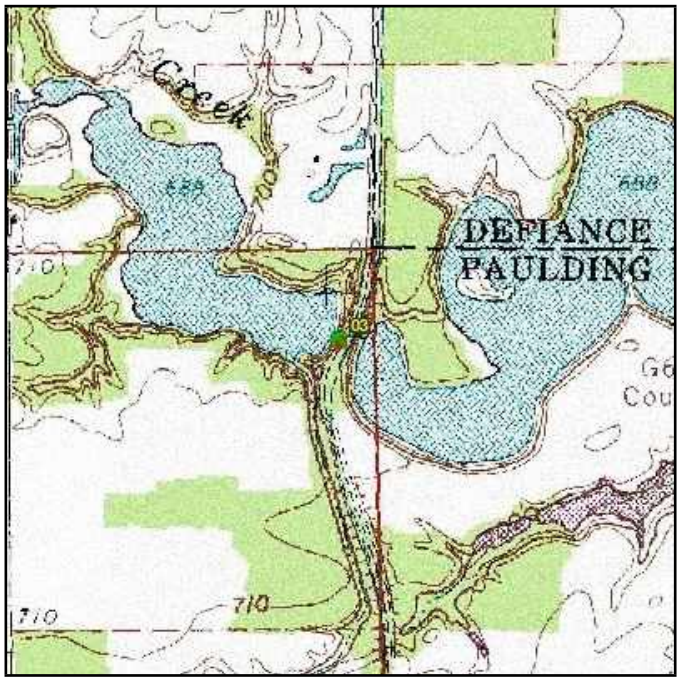

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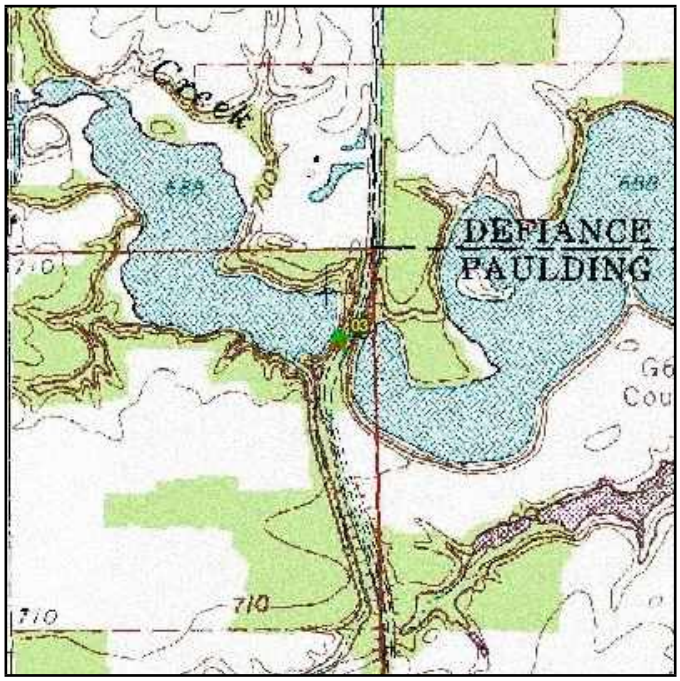

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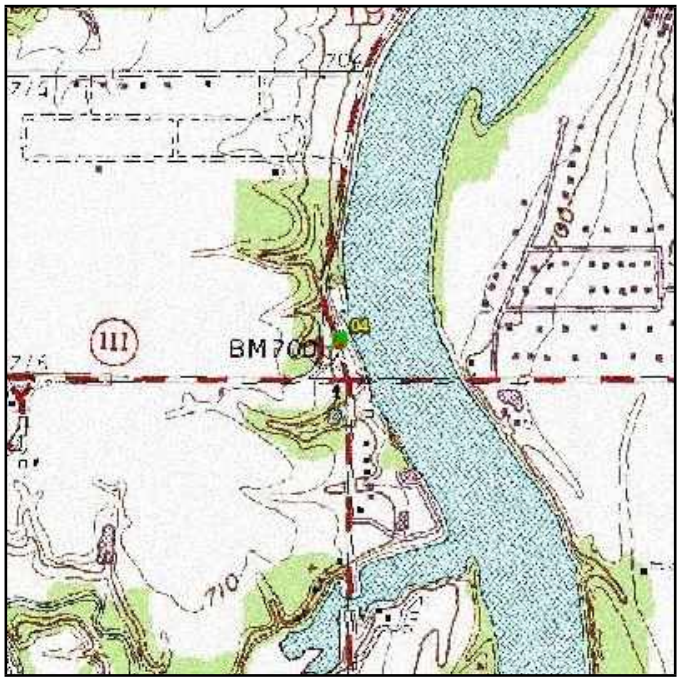

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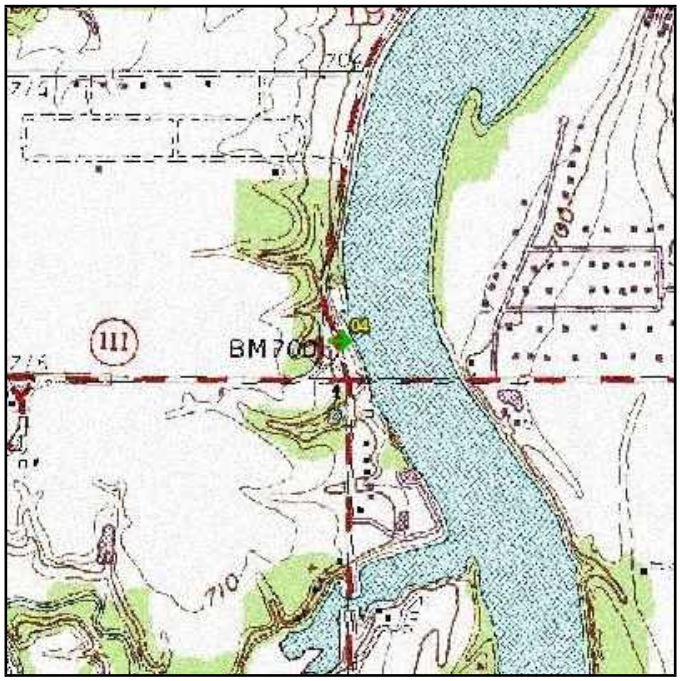

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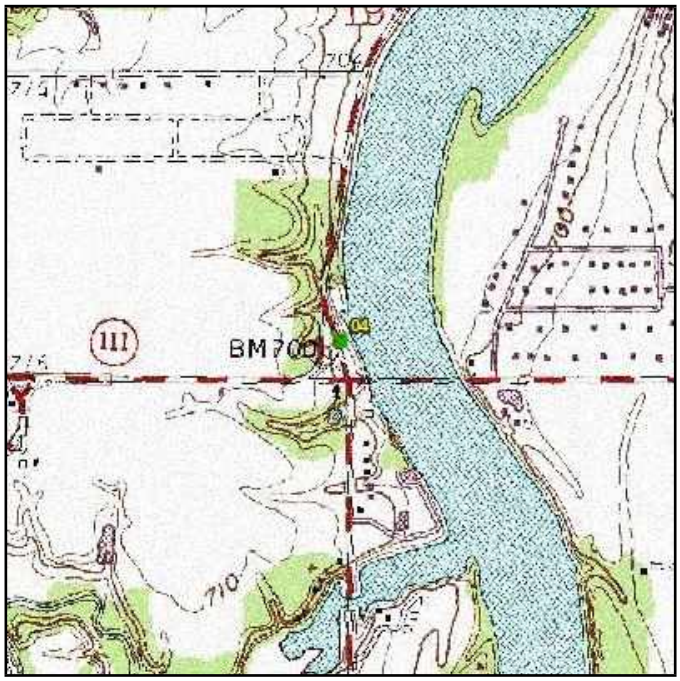

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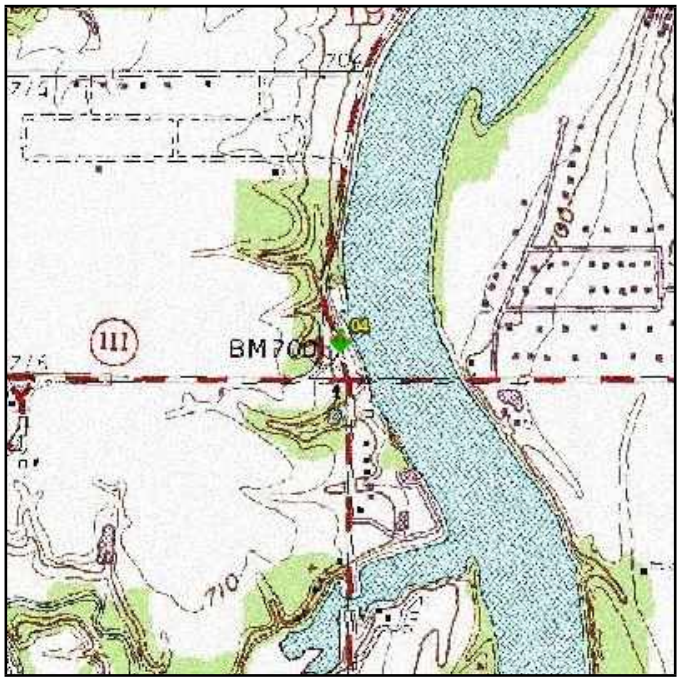

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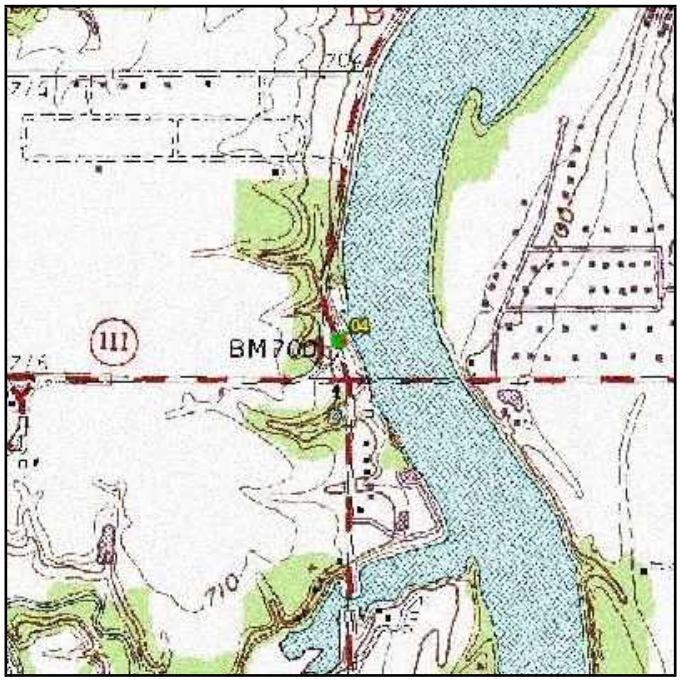

Summary: Application - 34 of 40 (Exhibit BB – Part 1 of 4 - Visual Impact Assessment) electronically filed by Christine M.T. Pirik on behalf of Grover Hill Wind, LLC