

Appendix J: Visual Impact Analysis

**Nestlewood Solar
Visual Impact Assessment**

Clermont and Brown Counties, Ohio

December 2018

Prepared for

Nestlewood Solar I LLC

Prepared by



**2 Lan Drive, Suite 210
Westford, MA 01886**

TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
2.0 VISUAL CHARACTERISTICS OF NESTLEWOOD SOLAR.....	2
2.1 Description of the Project Area	2
2.2 Visual Characteristics of Nestlewood Solar.....	2
3.0 CHARACTER AND VISUAL QUALITY OF THE EXISTING LANDSCAPE.....	4
4.0 VIEWSHED ANALYSIS.....	5
4.1 Key Aesthetic Resources.....	5
4.2 Areas of Potential Visibility	5
4.3 Landscape Similarity Zones.....	5
4.4 Viewer Groups.....	6
5.0 PHOTOGRAPHIC SIMULATIONS.....	7
5.1 Methodology.....	7
5.2 Photo Simulation Results.....	7
6.0 CONCLUSIONS.....	8

LIST OF FIGURES

Figure 1 – Project Area

Figure 2 – Visual Impact Assessment Study Area – Topographic Map

Figure 3 – Visual Impact Assessment Study Area – Aerial Map

Figure 4 – Cultural and Recreational Areas

Figure 5 – Photo Simulation Locations

Figure 6 – Landscape Similarity Zones

Figure 7 – Photo Location 1 Simulation

Figure 8 – Photo Location 2 Simulation

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
amsl	above mean sea level
APE	Area of Potential Effect
kV	kilovolts
MW	megawatt
the NPA	Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission
OAC	Ohio Administrative Code
the Project	Nestlewood Solar
the Project Area	approximately 610 acres in Clermont and Brown counties within which Nestlewood Solar is proposed
the Study Area	the area within a 5-mile radius of the Project Area
VIA	Visual Impact Assessment

1.0 INTRODUCTION

This Visual Impact Assessment (VIA) has been prepared to evaluate the potential visual effects of Nestlewood Solar, a proposed 80-megawatt (MW) solar photovoltaic facility (the Project). Landmarks and potential visibility within a 10-mile radius have been considered, as specified in Ohio Administrative Code (OAC) 4906-4-08(D)(4)(d); however, given the low profile of Project-related features and character of the surrounding area, a 5-mile radius was considered to be a conservative area for detailed visual study (the Study Area).

The Project is proposed to be located within an approximately 610-acre area (the Project Area) in Clermont and Brown counties, Ohio (see Figure 1). The following sections reflect the requirements of OAC 4906-04-08(D)(4) as well as established VIA methodologies, and has been prepared by and under the direction of a professional with experience in completing such assessments. The following sections address:

- The visual characteristics of the Project;
- The character and visual quality of the existing landscape within the Study Area;
- An evaluation of the viewshed, including a discussion of key aesthetic resources, areas of potential visibility, landscape similarity zones, and viewer groups within the Study Area;
- Presentation of visual simulations; and
- A discussion regarding the anticipated visual impact of the Project within the Study Area.

2.0 VISUAL CHARACTERISTICS OF NESTLEWOOD SOLAR

2.1 Description of the Project Area

The Project Area encompasses approximately 610 acres of land predominantly in active agricultural use. As can be seen on Figure 1, forested areas surround the majority of the Project Area, either in the form of scattered woodlots or more narrow strips of fencerow vegetation. A 345-kilovolt (kV) electric transmission corridor traverses the center of the Project Area in an east-west orientation. Scattered residences located in the vicinity.

The Project Area is located in unincorporated portions of Clermont and Brown counties. More densely settled areas include the Village of Bethel (over 2.5 miles to the northwest), the Village of Hammersville (over 1 mile to the east), and Felicity (at the southwestern edge of the 5-mile radius from the Project Area).

Several local roads extend through and around the Project Area. Leonard Road (CR 59) extends along the western portion of the Project Area. Liming Lake Road extends in a generally north orientation from Leonard Road to Route 125. Leonard Road ends to the southwest at its intersection with Bethel-Maple Road. Bethel-Maple Road forms the southerly extent of the majority of the Project Area, with approximately 48 acres of the Project Area extending further south. Bethel-Maple Road continues to the west and then north, along the western extent of the Project Area. Antioch Road extends south from Bethel-Maple Road to traverse the area west of the southernmost Project Area. Sodom Road traverses the area from east to west, approximately 0.5 mile north of the Project Area. Oak Corner Road bisects the Project Area, extending in a north-south orientation from Bethel-Maple Road to Sodom Road. Vandament Road extends in a generally east-west orientation between Oak Corner Road and Leonard Road.

Only 26 residences are located within 250 feet of the Project Area, as is typical for the area. Two additional residences are located within the Project Area; however, they will be demolished in order to accommodate the Project and, therefore, do not reflect a potential viewer.

The Project Area has moderate relief, with an approximate high elevation of 947 feet above mean sea level (amsl) in the central-eastern portion and a low elevation of 916 feet amsl in the western portion. Within 5 miles of the Project Area, terrain is also relatively flat.

2.2 Visual Characteristics of Nestlewood Solar

The Project will consist of 80 MW of photovoltaic solar panels within the Project Area, as shown on Figure 1. The panels will be mounted on metal racking and will be configured in long rows or "arrays." The arrays will be grouped in clusters throughout the Project Area. The racking system will employ tracking that will be oriented in east-west rows, with the panels facing south to maximize solar capture. At their maximum height the panels are expected to be 14 feet tall.

The Project Area will be enclosed with 7-foot tall wire fencing and locked gates to provide for equipment security and public safety. Other aboveground components of the Project include: 16-foot-wide gravel roads that will provide access to the Project Area during Project construction and operation; small concrete pads upon which inverters and transformers (less than 9 feet and 3 feet tall, respectively) will be constructed; up to three solar meteorological stations that will occupy less than 400 square feet and be less than 15 feet tall; and the Project substation and utility-owned switchyard equipment that will be located in the southern corner of the Project Area, just north of Bethel-Maple Road, immediately adjacent to the existing 69-kV electrical line (approximately 50 feet tall) that extends along that street. The electrical equipment in the substation/switchyard area will also be fenced, and its tallest component will be its lightning mast (with a maximum height of 70 feet). Given the low profile of the solar facility's

ancillary features and the similar nature and limited footprint of the substation/switchyard area, this VIA focuses on potential visual effects associated with the solar panels.

A key design goal of the Project is to maintain the existing vegetation surrounding the Project Area to take advantage of existing screening to the greatest extent possible.

3.0 CHARACTER AND VISUAL QUALITY OF THE EXISTING LANDSCAPE

OAC 4906-4-08(D)(4)(d) states that the visual impacts to cultural and recreational resources within 10 miles of the Project be evaluated. The visual impact of any facility diminishes the farther one moves from it, as reflected in the definition of Area of Potential Effect (APE) for cell towers included in the Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission (the NPA). The NPA states:

the presumed APE for visual effects for construction of new Facilities is the area from which the Tower will be visible: a. Within a half mile from the tower site if the proposed Tower is 200 feet or less in overall height; b. Within $\frac{3}{4}$ of a mile from the tower site if the proposed Tower is more than 200 but no more than 400 feet in overall height; or c. Within $1\frac{1}{2}$ miles from the proposed tower site if the proposed Tower is more than 400 feet in overall height.

In this case, the Project's single 70-foot lightning mast and the 14-foot tall panels are considerably shorter than 200 feet in height. For this reason, the conservative but smaller 5-mile Study Area was selected for evaluation of the Project's visual effect. The Study Area for the Project encompasses approximately 110 square miles and is within Clermont and Brown counties. Figures 2 and 3 illustrate the location and extent of the VIA.

As discussed above, the Villages of Bethel, Hammersville, and Felicity reflect more densely clustered population centers within the Study Area. The balance of the Study Area is more consistent with the character of the area immediately proximate to the Project Area, and is populated by scattered residences.

Landscape character is largely determined by the topography, land use (including density of development), vegetation, and water features that define and contribute to the available vistas and views. The Study Area has a more significant relief than the Project Area, with a high elevation of 996 feet amsl, approximately 3 miles southeast of the Project Area, near the intersection of State Route 505 and State Route 125; and a low elevation of 676 feet amsl, at the southern edge of the Study Area along Righey Road. The Study Area is predominantly in active agricultural and residential use, with the most densely developed area lying approximately 2.5 miles northwest of the Project Area in the Village of Bethel. Roadways, transmission lines, and streams traverse the Study Area in all directions surrounding the Project Area.

Forested areas within the Project Area and Study Area tend to be reflected by scattered woodlots, windrows associated with agricultural areas, and riparian corridors along major streams. Forested areas within the Project Area are limited to isolated woodlots between crop areas and along roads and field edges; although some forest areas are as large as 150 acres, the majority scattered within the Project Area range from approximately 5 acres to 20 acres in size.

Generally similar conditions extend throughout the Project Area and Study Area.

4.0 VIEWSHED ANALYSIS

The viewshed analysis considered key aesthetic resources located within the 5-mile radius that may be especially sensitive to visibility; the extent to which existing terrain and vegetation prevents views toward the Project; and the landscape patterns and anticipated uses of locations in the surroundings. Based upon this information, representative locations were selected for conducting specific visibility impact analysis. A description of this process is provided in the following sections.

4.1 Key Aesthetic Resources

As shown on Figure 4, there is one State park and 2 public parks located within 5 miles of the Project Area. East Fork State Park, located approximately 4.3 miles northwest of the Project Area, is the largest State park in Ohio and comprises 4,870 acres around East Fork Lake. Liming Park is the closest public park, located approximately 1.75 miles east of the Project Area. A privately-owned baseball complex is located 0.4 mile east of the Project Area. There are no identified parks, golf courses, wildlife refuges or recreational areas within the Project Area or within immediate proximity to the solar panels.

These areas received special consideration in the selection of potential vantage points for simulations, as did various cultural resources also identified as part of inventories completed for the Project (also shown on Figure 4).

No private-use air navigation facilities are located within 1 mile of the Project Area and no public-use airports are located within five miles. The Federal Aviation Administration's screening tool has been used to confirm that, based on the height of the tallest structure at the Project (the substation lightning mast, with a maximum height of 70 feet) no filing is required. The panels will be considerably shorter, approximately 14 feet tall.

4.2 Areas of Potential Visibility

In order to identify specific areas of potential visibility for the Project, a digital elevation model was used to evaluate the 14-foot tall solar panels and identify locations from which potential visibility could occur. Several layers of conservatism are built into this tool, including a conservatively estimated tree height; general land cover data; a modeling method that assumes viewers may be at the top of existing structures and vegetation. As shown in Figure 5, assuming a typical tree height of 65 feet, visibility of some portion of the relatively low solar panels would be restricted to the immediate area (within approximately 0.5 mile) surrounding the Project Area. This was determined to be the APE further evaluated in the VIA.

4.3 Landscape Similarity Zones

Within the APE, consideration was given to landscape types, as determined through an evaluation of topography, vegetation, water, land use, and user activities. The APE was determined to encompass three landscape similarity zones, as described below and shown on Figure 6.

- Rural residential/agricultural – This category reflects the most prevalent landscape type within the APE. Within these areas, where vegetation blocks line-of-sight, visibility would be obstructed, but where limited vegetation exists, the relatively flat terrain results in higher viewing potential. As distance increases, visibility would be expected to become less pronounced.
- Transportation corridors – Local roadways that extend along and within the APE.
- Utility corridors – In addition to local distribution lines and the 69-kV electric transmission line to which the Project will interconnect, a 345-kV electric transmission line extends across the APE.

4.4 Viewer Groups

Possible viewer groups within the APE were identified. These groups were determined based on the frequency and duration of exposure to views of the Project, the viewer's position in the landscape, and the viewer's activity and presumed sensitivity to changes in the visual landscape. Viewer groups identified are described below.

- **Local Residents:** Local residents have views that are likely to be stationary. They have knowledge of the local landscape and are sensitive to alterations to particular views that are important to them. The population density of viewers the APE is low, with a total of 148 residences identified within that area.
- **Through Travelers:** These individuals are travelling through the area on roadways. These viewers, because they are driving, are typically focused on the road and immediate surroundings and would experience only transitory views of their surroundings. Consequently, their views of the surrounding landscape will generally be peripheral and relatively brief in duration. Note that the majority of travelers on these roads would be local residents.

5.0 PHOTOGRAPHIC SIMULATIONS

5.1 Methodology

The areas of potential visibility were visited to groundtruth anticipated conditions. In traversing the roadways surrounding the Project Area within the 0.5-mile distance, it was observed that the majority of roads and properties in the surrounding area have intervening trees between potential viewers and the Project Area. As can be seen in Figure 5, line-of-sight is blocked from all but two general locations surrounding the Project Area.

Photographs were taken from each of these two locations (shown on Figure 5), which represent the areas with greatest potential for Project visibility. Global positioning system coordinates were recorded and a series of photographs were taken in order to create a panorama that approximates the manner in which the eye sees. Visual simulations were then created to illustrate visual conditions within the landscape setting once the Project has been constructed.

5.2 Photo Simulation Results

Figures 7 and 8 provide “before” and “after” images of the two selected vantage points. A description of existing and anticipated views is provided below.

Photo Location 1 location represents a view from a nearby home located approximately 50 feet northeast of the Project Area, along the eastern side of Leonard Road, as well as travelers along Leonard Road or Liming Lake Road, from the eastern side of the Project Area. As shown on Figure 7, the existing view from this area is an open agricultural field seen against the backdrop of wooded vegetation and distant electric transmission line towers. The condition of the agricultural field would change depending on what crops were planted in a given year and/or what type of agricultural activity was occurring within the area.

The simulation with the Project in place in Figure 7 indicates that the Project’s chain link fence would be in the immediate foreground, and that the solar panels would be visible from within the fence. The backdrop continues to reflect forested areas and electric transmission towers.

Photo Location 2 location represents the view from another nearby home, this one located approximately 150 feet northeast of the Project Area, along the western side of Oak Corner Road, as well as travelers along Oak Corner Road and Vandament Road, from the northern side of the Project Area. As shown in Figure 8, the existing view reflects local roadways in the foreground, with fields and forest, as well as electric distribution lines and safety signage within the viewshed. As in Photo Location 1, the condition of the agricultural fields would vary based on crops and use.

The simulation with the Project in place in Figure 8 indicates a considerably more distant view than from Photo Location 1. At this distance (approximately 150 feet) the security fencing is visible and can be distinguished; the panels, however, are not a distinct visual element beyond the fencing. A comparison between these two locations is very illustrative of the manner in which distance causes the Project to blend into the background vista, rather than being a focal element.

6.0 CONCLUSIONS

The effect of visual change can be very subjective. However, visual assessment methodologies consider the degree to which areas exist in the surroundings that are especially designated as a park or other cultural feature for which changes to the viewscape could cause harm, as well as the type of viewers within the area. No National Parks, National Forests, National Wildlife Refuges, National Natural Landmarks, federally designated scenic rivers or trails are located in the APE or the Study Area. Locations were selected consistent with OAC 4906-04-08(D)(4) to reflect the visual experience of typical viewers within the area (through travelers on local roads and residents of the local communities).

Photographic simulations have been completed to provide representative views from the locations surrounding the Project Area with the greatest potential for visibility. As can be seen from these simulations, the Project is likely to be visible from the immediate vicinity from locations where vegetation does not screen the views. However, the difference in visual effect from Photo Location 1 (approximately 50 feet from the fenceline) to Photo Location 2 (approximately 150 feet from the fenceline) illustrates that visual effect is greatly increased with distance (in some cases, only a little more distance) between the viewer and the Project.

The degree of impact would also vary based upon attitudes of the viewer towards solar energy. Some viewers find them a positive indication of a trend toward renewable energy, while others have more adverse reactions.

Only limited areas within the APE would be likely to result in views of the Project, and a limited number of homes are located within those areas. Mitigation measures, in the form of vegetative screening, will be offered to obstruct or soften views of the Project, where appropriate.

Figures

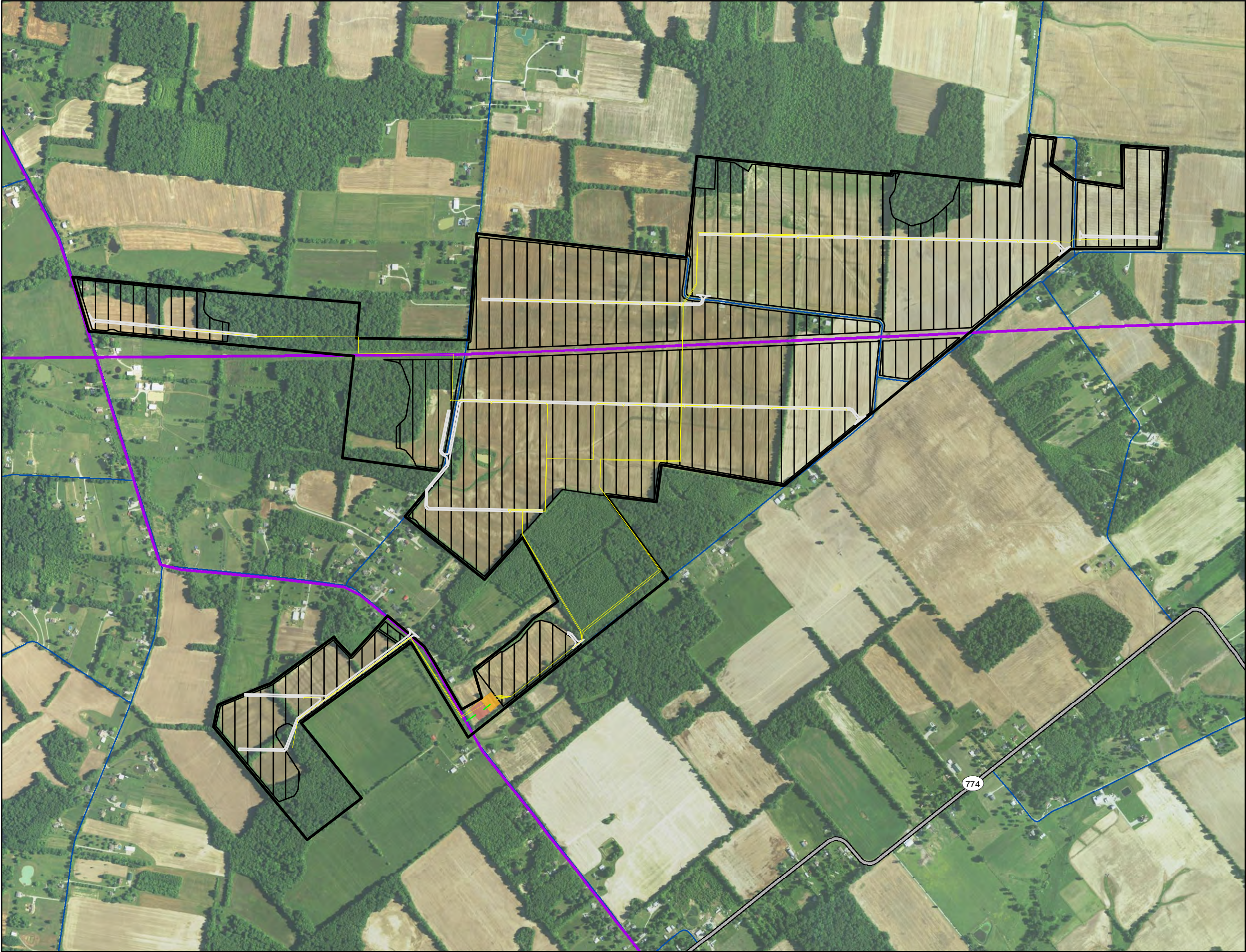










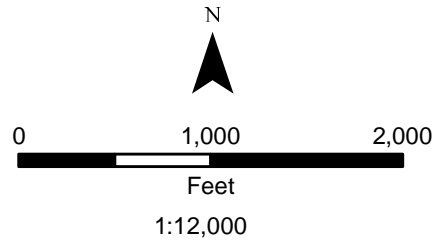


Figure 1
Project Area

Nestlewood Solar
Brown and Clermont Counties, Ohio

-  Project Area
-  Potential Solar Arrays
-  Project Substation
-  Utility-Owned Switchyard
-  Potential Collection Line
-  Gen-Tie Line
-  Potential Gravel Road
-  Existing Transmission Line
-  Highway
-  Existing Roads






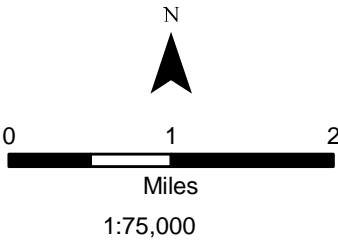
Source: ESRI (2016), NAIP (2017)



Figure 2
Visual Impact Assessment
Study Area -
Topographic Map

Nestlewood Solar
Brown and Clermont Counties, Ohio

-  Project Area
-  5-mile Buffer
-  Municipal Boundary




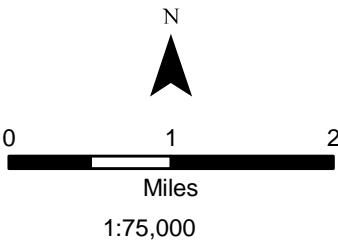
Source: USGS (1985)



Figure 3
Visual Impact Assessment
Study Area -
Aerial Photograph

Nestlewood Solar
Brown and Clermont Counties, Ohio

-  Project Area
-  5-mile Buffer
-  Highway
-  Existing Transmission Line
-  NHD Stream
-  NWI Wetland



Source: ESRI (2016), NAIP (2017)

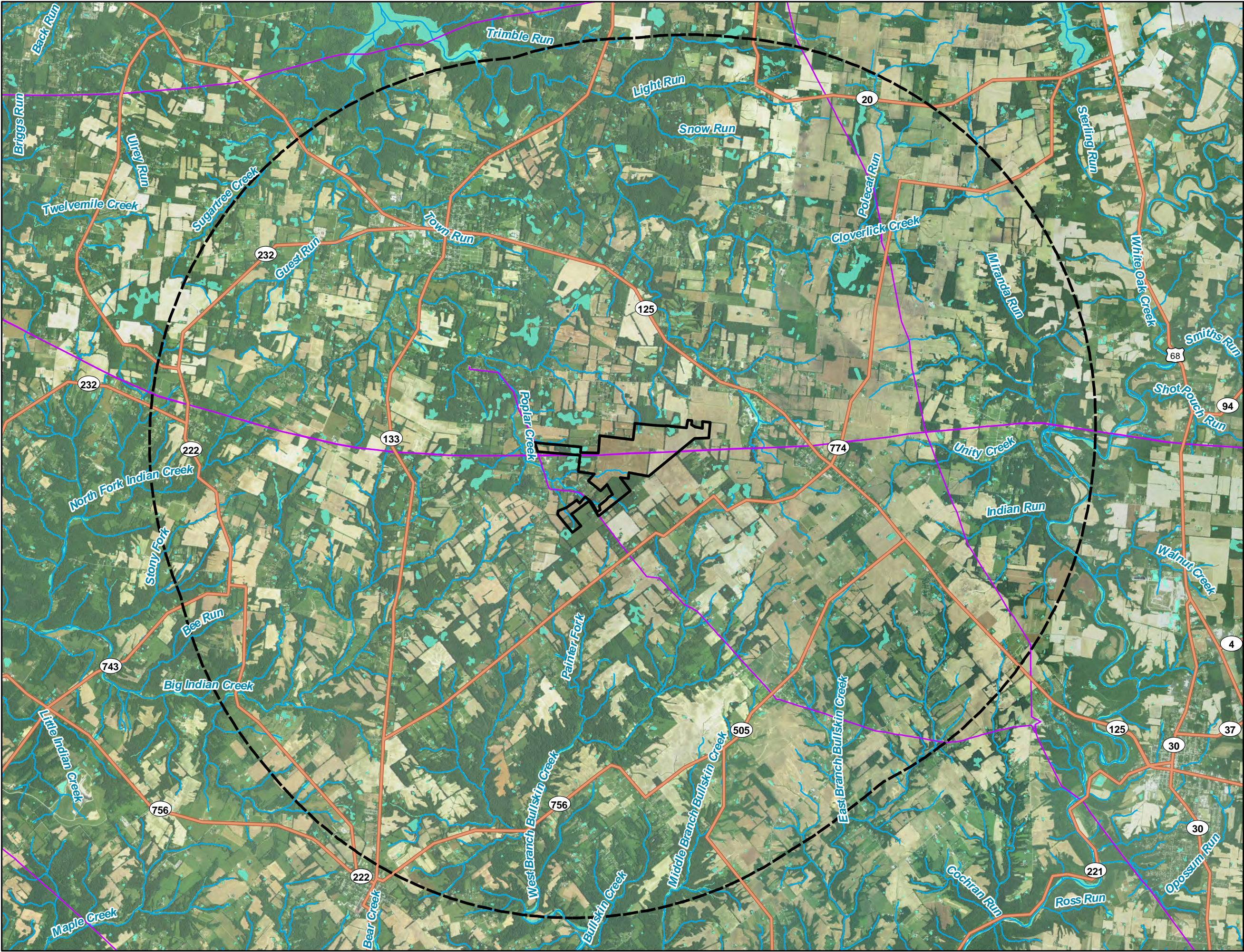
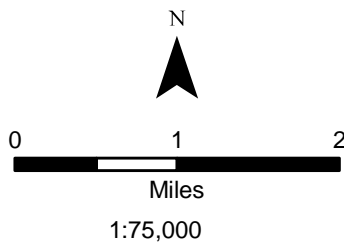


Figure 4
Cultural and
Recreational Areas

Nestlewood Solar
Brown and Clermont Counties, Ohio

- Project Area
- 5-mile Study Area
- Highway
- Cemetery
- NRHP Structure
- Golf Course
- Shared Use Trail
- Park



Source: ESRI (2016), NRHP (2018), ODNR (2018)

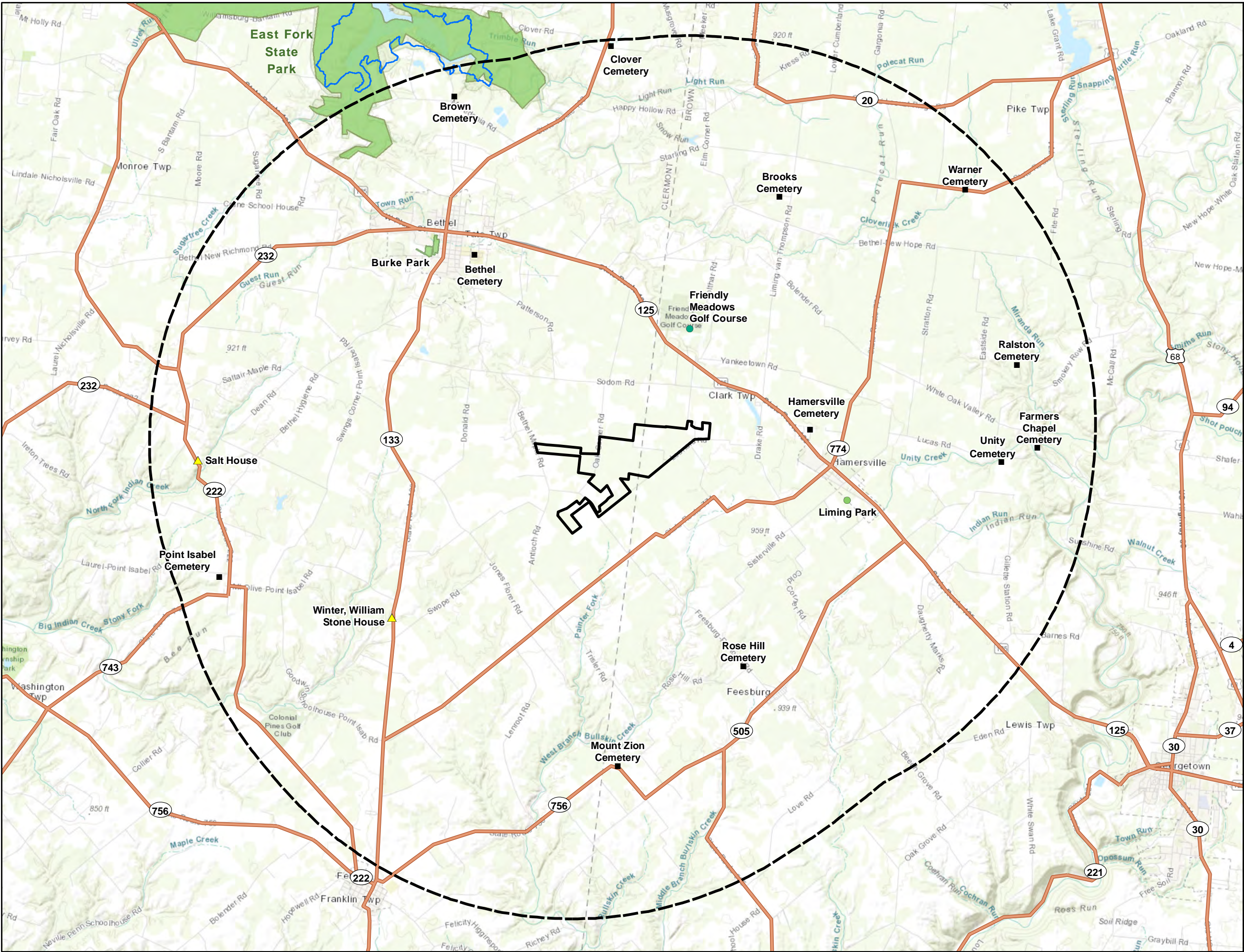


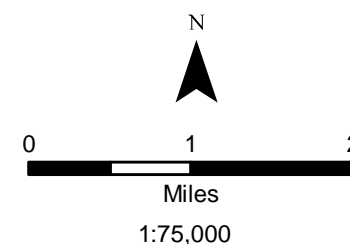


Figure 5
Viewshed and
Photo Simulation Locations

Nestlewood Solar
Brown and Clermont Counties, Ohio

-  Project Area
-  5-mile Area of Potential Effect
-  State Boundary
-  Potential Visibility
-  Photo Location









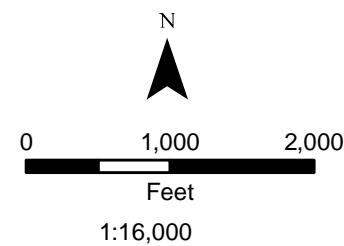
Source: NAIP (2017)



Figure 6
Landscape Similarity Zones

Nestlewood Solar
Brown and Clermont Counties, Ohio

-  Project Area
-  0.5-mile Buffer
-  Residence
-  Transportation Corridor
-  Utility Corridor
-  Rural Residential/Agriculture



Source: ESRI (2016), NAIP (2017)





Existing Condition

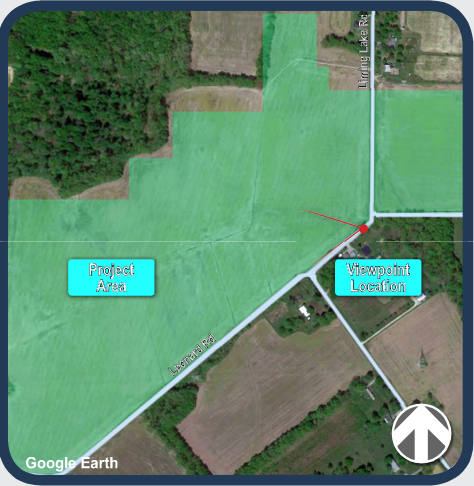


Simulated Condition

NESTLEWOOD
SOLAR

VISUAL
SIMULATIONS

Leonard Rd
&
Liming Lake Rd



VICINITY MAP

Photograph Information

Time of photograph: 4:35 PM
Date of photograph: 11-07-2018
Weather condition: Clear
Viewing direction: SW
Latitude: 38.9251° N
Longitude: -84.0204° W

Figure 7
Photo Location 1 Simulation

Nestlewood Solar
Clermont and Brown County, Ohio

NESTLEWOOD
SOLAR

VISUAL
SIMULATIONS

Oak Corner Rd
&
Vandament Rd



Existing Condition



Simulated Condition



VICINITY MAP

Photograph Information

Time of photograph: 4:24 PM
Date of photograph: 10-24-2018
Weather condition: Clear
Viewing direction: SE
Latitude: 39.9257° N
Longitude: -84.0433° W

Figure 8
Photo Location 2 Simulation

Nestlewood Solar
Clermont and Brown County, Ohio

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

12/14/2018 11:39:46 AM

in

Case No(s). 18-1546-EL-BGN

Summary: Application Appendix J electronically filed by Mr. Michael J. Settineri on behalf of Nestlewood Solar I LLC