Bright Mountain Solar Project
Site Assessment Report
Case No. 2022-00274

Bright Mountain
SOLAR

Exhibit F – Traffic and Dust Study

December 2022

TRAFFIC AND DUST STUDY

Bright Mountain Solar, LLC

Proposed Solar Electric-Generating Facility

Perry County, KY

Prepared for:

Kentucky Electric Generation and Transmission Siting Board

PREPARED BY:
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Architecture
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ON BEHALF OF:
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FIGURES

TABLES

APPENDIX

INTRODUCTION

Bright Mountain Solar, LLC proposes a solar electric generation facility ("Project") to be constructed in Perry County, Kentucky, less than 10 miles from Hazard, Kentucky. A Site location map is provided below in **Figure 1.** The purpose of this Traffic and Dust Study is to identify the conditions of existing roadways and private access roads that will be necessary for construction and long-term operations of the solar electric generating facility, as well as review traffic safety, dust review, and railroad assessment. As such, a Site Assessment Report requires a traffic and dust study for the proposed facility and must be prepared for the Project as part of an application for a construction certificate from the Kentucky Electric Generation and Transmission Siting Board.

Figure 1 - Site Location Map

For parcel boundaries, refer to **Exhibit 1**. The Project will be capable of generating approximately 80 megawatts alternating current (MW) of electricity. The Project is proposed to be located on approximately 800 acres of leased land and includes inverters, solar modules, electrical collection lines, a collector substation, and access roads.

1. Bright Mountain Solar, LLC Project Traffic Study

1.1. Existing Roadway Network and Traffic Conditions

There is one preferred access route into the project site. From all points, traffic will enter the site via Kentucky Highway 15 (KY 15) at Sam Campbell Branch Road, also known as Couch Branch Road. Kentucky Highway 15 runs north-south to Sam Campbell Branch Road, with two lanes traveling northbound, one lane traveling southbound, and one two-way left-turn lane. Sam Campbell Branch Road is a single lane road and access to the Site continues to Jarets Branch, which is also at the intersection with Meadow Branch Road and Rocklick Branch Road. As shown in **Exhibit 1**, Jarets Branch continues to the intersection of Couch Bridge Road and to the west is the proposed site entrance. The intersection of Jarets Branch at Couch Bridge Road is shown in **Exhibit 2.1**. Both KY 15 and Sam Campbell Branch Road are asphalt, while Jarets Branch and roadways closer to the site are aggregate. The existing asphalt shows damage and roadway buckling or sinking in some locations. In general, both Sam Campbell Branch Road and Jarets Branch are narrow, with no shoulders present. The access route to the site is lined with trees and vertical rock walls on one side of the road, with a slope down on the other side. The access route into the Project does not involve any water crossings or bridges. The proposed site entrance and other site layout features are included in this report as **Exhibit 1**. The site entrance gate itself is shown in **Exhibit 2.2**, while an unpaved internal roadway is shown in **Exhibit 2.3**. The summary of the access route roadways can be found in the **Table 1.**

Table 1 – Access Road Characteristics

Access Route Road Name	Highway Functional Classification	Lane Width (Feet)	Paved	Shoulder	Access Route Length
KY 15	Principal Arterial	12	Yes	Yes	N/A
Sam Campbell Branch Road	County Road	18-22	Yes	No	3.5 miles
Jarets Branch	Private Road	12-18	No	No	1.1 miles

The Kentucky Transportation Cabinet (KYTC) collects and publishes traffic information, including annual average daily traffic (AADT), for various roadways. For each roadway, AADT shows the average daily traffic volumes at a given location over the entire year. A summary of the AADT along the access route is provided in **Table 2**.

Table 2 – Access Road Traffic Volumes

Access Route Road Name	Station ID	Milepoint (MP)	Annual Average Daily Traffic (AADT)	Year
KY 15	097780	15.807 - 20.693	15,543	2021
Sam Campbell Branch Road	N/A	N/A	230	2021
Jarets Branch	N/A	N/A	No	No

As part of the existing conditions analysis, crash data for the most recent three-year period from October 1, 2019, through October 1, 2022, was obtained from the Kentucky State Police website. Over this three-year period, the crash data reports six property damage crashes and one injury crash within the study area, consisting of the access route and within a 0.25-mile radius of the intersection of KY 15 and Sam Campbell Branch Road. As shown in **Table 3**, of the seven total crashes shown in the table below, the two most prevalent causes involved animals and mid-block (other roadway) crashes, within the intersection of KY 15 and Sam Campbell Branch Road.

Table 3 – Crash Data Summary

	KY 15 NB (Milepoint, MP)	KY 15 SB	Sam Campbell Branch Road (Milepoint, MP)	Jarets Branch	Total
Year					
10/1/2019-9/30/2020	1	0	2	0	3
10/1/2020-9/30/2021	2	0	1	0	3
10/1/2021-9/30/2022	1	0	0	0	1
Total	**4**	**0**	**3**	**0**	**7**
Crash Type					
Angle	1 (MP 17.819)	0	0	0	1
Front to Front	0	0	0	0	0
Front to Rear	0	0	0	0	0
Other Roadway/Mid-Block	1 (MP 17.856)	0	1 (MP 0.08)	0	2
Other - Animal	1 (MP 17.741)	0	1 (MP 2.042)	0	2
Rear to Rear	0	0	0	0	0
Rear to Side	0	0	0	0	0
Sideswipe, Opposite Direction	0	0	0	0	0
Sideswipe, Same Direction	1 (MP 17.891)	0	0	0	1
Fixed Object Non-Intersection	0	0	1 (MP 0.07)	0	1
Total	**4**	**0**	**3**	**0**	**7**
Severity					
Fatal Injury (K)	0	0	0	0	0
Suspected Serious Injury (A)	0	0	0	0	0
Suspected Minor Injury (B)	0	0	1	0	1
Possible Injury (C)	0	0	0	0	0
No Apparent Injury (O)	4	0	2	0	6
Unknown	0	0	0	0	0
Total	**4**	**0**	**3**	**0**	**7**

To address any traffic safety concerns during the construction of the proposed site, Bright Mountain Solar, LLC will ensure that the contractor will develop a traffic management plan, in accordance with the KYTC. Several of the traffic safety techniques to be used are outlined below.

1.2. Bright Mountain Solar, LLC Project Construction Traffic

1.2.1. Traffic During Construction of Proposed Site

The Project preferred access route entrance on Jarets Branch will provide ingress and egress during construction. The construction activities are expected to take 18 to 24 months for completion. During construction, a temporary increase in traffic volume associated with travel of construction laborers, delivery of construction equipment and materials, delivery of solar panel components and equipment is anticipated. Laborer commutes with passenger vehicles and pick-up trucks will occur daily during the morning peak and afternoon peak hours, as they go to and from work. At the beginning of construction, heavy machinery will be delivered to the sites; however, throughout the construction process, deliveries of equipment and materials will occur on trailers, flatbeds, or other large vehicles periodically at various times of day. Although there are various local County and State maintained roadways near the Project, this study assumed KY 15 would generate the majority of worker and material delivery traffic entering and exiting the site. With the City of Hazard located just south of the Project, it is assumed that 75% of traffic will enter from the south via KY 15 and 25% of traffic will enter from the north via KY 15. A summary of the anticipated construction vehicle trips per day are shown in **Table 4**, assuming double occupancy of employee passenger vehicle traffic.

Table 4 – Summary of Anticipated Construction Vehicle Trips

Construction Vehicle Type	Vehicle Trips Per Day (Avg.)
Employee Passenger Vehicles	300
Heavy-Duty Vehicles	5
Water Trucks	4

It is anticipated that heavy-duty, Class 21 vehicles, similar to a moving van or gooseneck trailer, will be needed during construction. Bright Mountain Solar, LLC will inform and obtain permits from State and local road authorities as needed for Class 21 vehicles transport to the site. Consulting with road officials will help to identify any special transportation requirements for heavy trucks during construction, including temporary closures and detours of highway traffic. Since the access route into the Project does not include water crossings or bridges, there do not appear to be any conflicts with existing bridge infrastructure and associated weight limits. Bright Mountain Solar, LLC will comply with all permit requirements and will coordinate with proper road officials as needed.

1.2.2. Traffic Safety Precautions During Site Construction

In an effort to increase driver safety and reduce the risk of any vehicular accidents, appropriate signage and traffic guidance will be used during construction, in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and KYTC. Currently, guardrail is present along KY 15 at Sam Campbell Branch Road, though the access route is otherwise limited with existing safety features and posted speed limit signage. It is not anticipated that long-term lane closures will be required during the construction of the solar facilities. However, when construction work nears the access route or when larger deliveries arrive, temporary lane or shoulder closures may be used for the safety of the traveling public and construction workers. If temporary closures are needed on KY 15, Bright Mountain Solar, LLC will coordinate with State road officials to identify the necessary transportation requirements for heavy trucks during construction.

Similar coordination will be needed with Perry County road officials on Sam Campbell Branch Road. These temporary closure measures could include the use of flaggers to temporarily stop highway traffic to allow a delivery truck and trailer to safely turn into the site or the use of a shoulder closure as workers place transmission-line utility poles near the roadway. "Construction Work" signs will be placed along the roadside to alert motorists that construction traffic may be present on the roadway, in accordance with the MUTCD and KYTC.

1.2.3. Physical Impact on Existing Roadway Infrastructure

While the increase in localized construction traffic and use of heavy trucks may wear the existing roadways along paved KY 15, paved Sam Campbell Branch Road, unpaved Jarets Branch, and other unpaved internal site roads, significant degradation is not expected based on the minimal number of trips from workers accessing the site, as shown in **Table 4**. Bright Mountain Solar, LLC will adhere to local and state requirements related to repair of the affected roadway infrastructure following construction.

Roadway improvements along the access route may need to be made prior to construction to allow for large semi-truck deliveries, including possibly widening of the access route, as well as surface repairs. The contractor will verify site access and determine whether improvements are necessary. Intersection sight distances were considered at the single site entrance via Jarets Branch and other unpaved internal site roads. KY 15 and intersections along the access route were analyzed and have adequate sight lines. Jarets Branch is narrow, with horizontal and vertical curvature. Safety measures should be put in place, such as use of radio communication and pilot vehicles, traffic flagmen, and signage to ensure traffic safety.

1.3. Bright Mountain Solar, LLC Project Operation and Maintenance Traffic

During the operational phase of the Project, typical traffic is anticipated to include up to two to three full-sized pickup trucks, three to five days per week. Vehicular traffic to and from the Project site will be limited to typical weekday work hours. Employees driving these full-sized pickup trucks will be comparable to the traffic of a typical single-family home. Therefore, the operation of this solar facility will not significantly increase traffic within the vicinity of the Project and along the access route.

1.4. Bright Mountain Solar, LLC Project Traffic Summary and Conclusion

Traffic operation on rural highways is based upon the geometric and traffic characteristics of each road, including travel speed, delay, and roadway capacity. By taking into account these characteristics, Level of Service (LOS) is used to qualitatively describe the operating conditions of a roadway. LOS A represents free-flowing traffic with individual users virtually unaffected by other vehicles in the traffic stream, while LOS F represents forced traffic flow, in which the amount of traffic approaching a point exceeds the amount that can be served. LOS D is generally considered the limit of acceptable motorist delay. Although traffic within the vicinity of the Project and along the access route is predicted to increase during the construction phase of the Project, the existing average daily traffic on KY 15 has ample capacity to continue to perform at an acceptable level of service. KY 15 has an AADT of approximately 15,000 vehicles per day. Planning level analysis of a two-lane roadway with turn lanes at key intersections would indicate that the roadway can handle up to 18,300 vehicles per day before approaching LOS E. Therefore, the roadway system is expected to perform at an acceptable level of service during the morning and evening peak hours, as construction workers enter and exit the Project site for periodic delivery of construction materials and equipment.

Bright Mountain Solar, LLC will ensure that a traffic management plan will be developed by the contractor, which will outline measures to address highway traffic impacts due to construction activities. During construction, appropriate signage and traffic guidance will be provided to ensure driver safety. Significant damage to the existing roadway infrastructure is not anticipated. Solar electric-generating facilities are not highway traffic generators. Therefore, during the operation phase of this solar facility, there will be no significant increase in traffic and there will be little, if any, volume impact to the existing roadway system.

2. Bright Mountain Solar, LLC Project Dust Study

2.1. Bright Mountain Solar, LLC Project Dust Impacts

Land disturbing activities associated with the proposed Project may temporarily contribute to an increase in airborne dust particles, known as fugitive dust per the Kentucky Energy and Environment Cabinet. Fugitive dust is defined as dust that is not emitted from a defined point source, which includes haul roads and construction sites. Fugitive dust is regulated under Kentucky's state fugitive emissions regulation. As best management practices, to reduce wind erosion of disturbed areas, appropriate revegetation measures, application of water, or covering of spoil piles may occur. In addition, any open-bodied truck transporting dirt will be covered when the vehicle is in motion. The existing site is a brownfield and this Project is not likely to introduce dust impacts to other receptors, though there is a lack of receptors nearby. The size of the Project site, distance to nearby structures and roadways, combined with existing vegetative buffers along the property boundaries will aid in managing off-site dust impacts. Internal roads to access the site will be gravel, which may result in an increase in airborne dust particles during dry conditions and when internal roadway traffic is heavy during construction. During construction activities, water or dust suppressants may be applied to the internal roadway system to reduce dust generation, as authorized under the Kentucky Pollutant Discharge Elimination System (KYDES) as a non-stormwater discharge activity, which will be required for the proposed Project. In addition to these measures, posted and enforced speed limits on dusty roads, use of gravel or water at site exit points to remove caked-on dirt, and washing equipment at the end of the day or prior to site removal are measures that the Kentucky Energy and

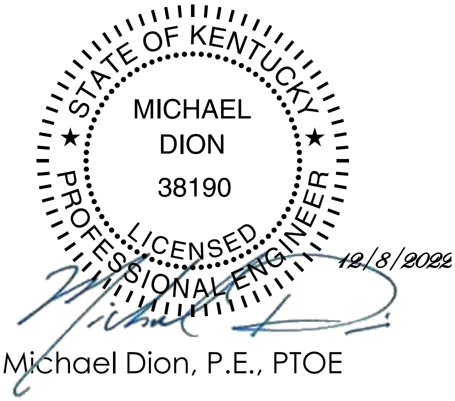
Environment Cabinet identifies to ensure that the fugitive emissions regulation is not violated.

3. Bright Mountain Solar, LLC Project Rail Impacts

3.1. Impacts on Existing Railways

There is one CSX rail line that runs along North Fork Kentucky River, south and west of the proposed Project boundary. This rail line also runs near the intersection of Sam Campbell Branch Road and Jarets Branch at Meadow Branch Road and Rocklick Branch Road. However, the construction and operation of the Project will not affect or be affected by this rail line because it is outside both the Project boundary and access route. As such, all construction activities and potential additional roadway traffic created during the proposed construction will not have any impact on the CSX Railway.

Signatures of Professionals

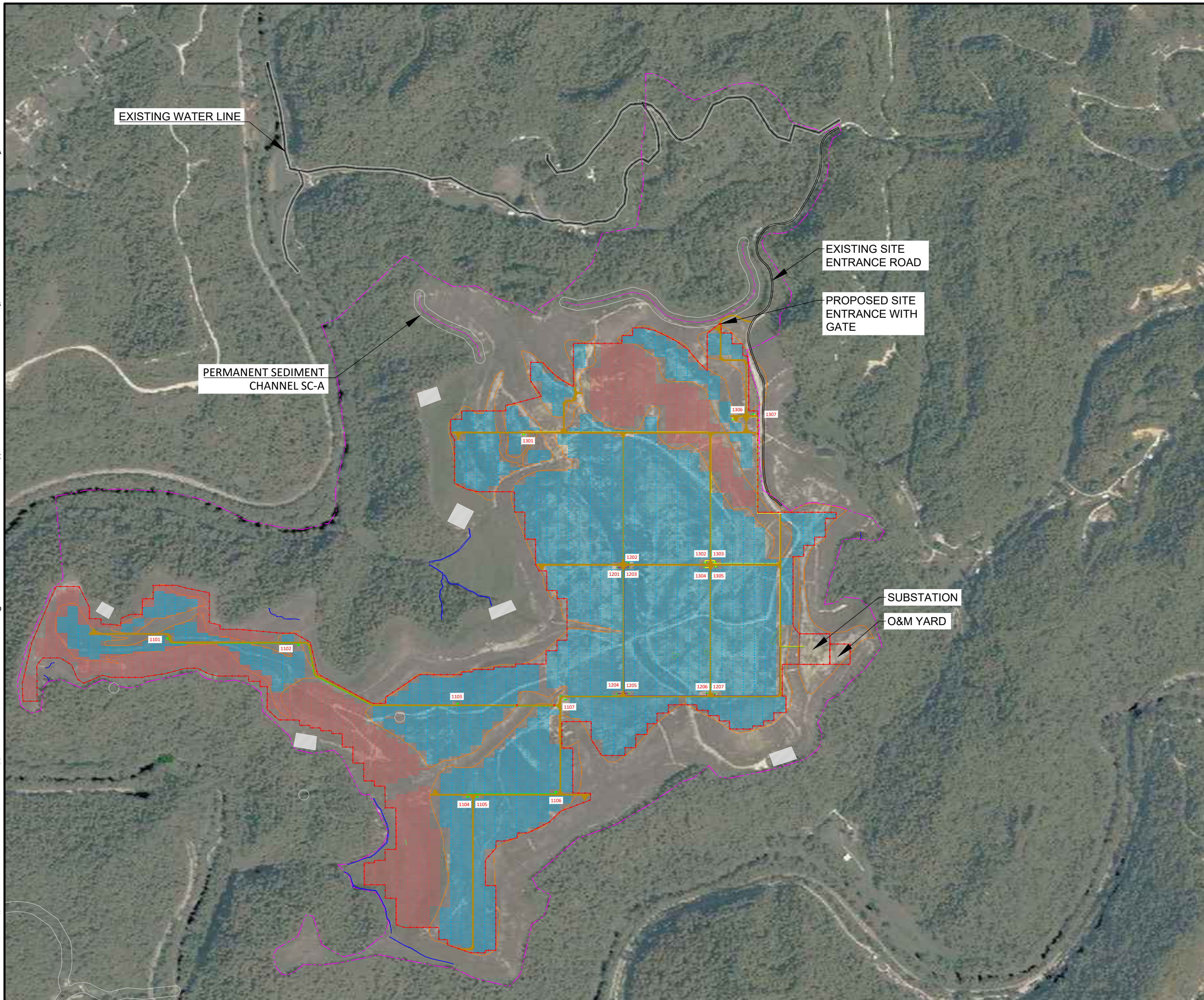


Michael Dion, P.E., PTOE

Senior Project Manager

BL Companies

EXHIBIT 1 - CONCEPTUAL SOLAR SITE LAYOUT



SYSTEM SPECIFICATIONS	
CLIENT	Avangrid
SITE LOCATION	Perry, Kentucky
SYSTEM STC DC RATING (MW)	103.39
SYSTEM AC RATING AT POI (MW)	73.85
DC/AC RATIO	1.4
MODULE MANUFACTURER	Longi
MODULE MODEL	LR5-72HBD-540M
MODULE STC DC RATING (W)	540
MODULE COUNT	191,464
MODULE PER STRING	28
STRING COUNT	6838
INVERTER MANUFACTURER	PE
INVERTER MODEL	HEM FS4200M
INVERTER NAMEPLATE (kVA)	4200
QUANTITY OF INVERTERS	21
PCS TRANSFORMER RATING (kVA @ 50°)	3900
QUANTITY OF TRANSFORMERS	21
DC SYSTEM VOLTAGE (V)	1500
SYSTEM VOLTAGE (kV)	34.5
RACKING MANUFACTURER	Sol Components
RACKING SYSTEM	Fixed
TILT ANGLE	28
AZIMUTH	Custom Azimuth
GCR	0.5625
PITCH (FEET)	26.214
2 STRING RACKS (2P X 28 RACKS)	3419
TOTAL SITE BOUNDARY (ACRES)	804.5
TOTAL BUILDABLE AREA (ACRES)	338.0

LEGEND

- PROPERTY LINE
- PROPOSED ROADS
- FENCE LINE
- PV MODULES (2 STRING RACK)
- INVERTER SKID
- SEDIMENT CHANNEL
- CATCH BASINS
- POSSIBLE FUTURE MODULES
- DELINEATED STREAM

NOT TO BE USED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER SHALL VERIFY TRACEABILITY OF THIS DRAWING TO THE LATEST CONTROLLED VERSION

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
E	06/13/23	RE-ISSUED FOR INFORMATION	JJS		JJB	JJB	
D	05-24-23	RE-ISSUED FOR INFORMATION	VB		JJB	JJB	
C	05/16/23	RE-ISSUED FOR INFORMATION	JJS		JJB	JJB	
B	05/01/23	RE-ISSUED FOR INFORMATION	JJS		JJB	JJB	
A	08/25/22	ISSUED FOR INFORMATION	KBS		DCP	DCP	

N

0 500' 1000'

1" = 500'

BLACK & VEATCH

DESIGNER | DRAWN | CHECKED | DATE

AVANGRID
BRIGHT MOUNTAIN

CONCEPTUAL SOLAR SITE LAYOUT
FT

PROJECT | DRAWING NUMBER: BRM-E-800-02 | REV: E

CODE | AREA

ANSI D 34x22
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EXHIBIT 2 – SITE PHOTOGRAPHS

Exhibit 2.1 – Jarets Branch at Couch Bridge Road Access

Exhibit 2.2 – Site Entrance Gate

Exhibit 2.3 – Unpaved Internal Roadway

Bright Mountain Solar Project
Site Assessment Report
Case No. 2022-00274

Exhibit G – Bright Mountain
Solar Project Sound Assessment

Bright Mountain Solar Project

Bright Mountain Solar Project Sound Assessment

August 2023

Bright Mountain Solar Project, LLC, a wholly owned subsidiary of Avangrid Renewables, LLC

Executive Summary

This report documents the expected sound levels during construction and operation of the Bright Mountain Solar Project, a solar-powered electric generation facility in Perry County, Kentucky. The sound assessment was conducted in compliance with the Kentucky Electric Generation and Transmission Siting Board noise analysis requirements detailed in Kentucky Revised Statutes Chapter 278.706(2)(d) and 278.708(3)(a)(8) and (d). Construction activities will utilize typical equipment that is nominally 85 decibels on an A-weighted scale (dBA) at 50 feet. Sound levels will decrease with increased distance from the construction activities. Construction represents a temporary disturbance and will be limited to daytime hours; blasting is not anticipated to be required. Operational sound levels are predicted not to exceed 42 dBA at the closest participating residence for both the fixed-tilt and single-axis layouts. At the closest nonparticipating residence, the predicted level is 37 dBA for the fixed-tilt layout and 35 dBA for the single-axis layout.

Contents

Acronyms and Abbreviations

Ambient noise	Composite of noise from all sources near and far; normal or existing level of environmental noise at a given location
ANSI	American National Standards Institute
Applicant	Bright Mountain Solar Project, LLC, a wholly owned subsidiary of Avangrid Renewables, LLC
dB	decibel
dBA	decibel (A-weighted scale)
facility	Solar-powered electric generation facility for the Bright Mountain Solar Project
FTA	Federal Transit Administration
ISO	International Organization for Standardization
Jacobs	Jacobs Engineering Group Inc.
L_{50}	Sound level exceeded for 50 percent of the measurement interval
L_{eq}	equivalent sound level
L_n	night sound level
L_w	sound power level
MVA	megavolt ampere
NSR	noise-sensitive receptor
Project	Bright Mountain Solar Project
Project area	825-acre area of private land on which the Project will be situated

1. Introduction

Bright Mountain Solar Project, LLC (Applicant), a wholly owned subsidiary of Avangrid Renewables, LLC, retained Jacobs Engineering Group Inc. (Jacobs) to conduct a sound assessment of the Bright Mountain Solar Project (Project), a proposed solar-powered electric generation facility in Perry County, Kentucky. Under the direction of acoustical engineer Mark Bastasch, who is Board Certified by the Institute of Noise Control Engineering, Jacobs conducted an assessment of expected sound levels during Project construction and operation, and of existing ambient sound levels in the Project area. The assessment was conducted in compliance with Kentucky Electric Generation and Transmission Siting Board noise analysis requirements.

The proposed Project is a solar-powered electric generation facility with an alternating current generating capacity of up to 80 megawatts, to be located on a reclaimed, mountaintop-removal coal mine site in an unincorporated area of Perry County. The Project will be situated on approximately 825 acres of private land (the Project area). Within this area, the footprint of the Project will be approximately 375 acres.

1.1 Regulatory Requirements

Kentucky Electric Generation and Transmission Siting Board noise analysis requirements are specified in Kentucky Revised Statutes Chapter 278.706(2)(d) and 278.708(3)(a)(8) and (d). Table 1-1 presents the requirements.

Table 1-1. Noise Analysis Requirements from Kentucky Revised Statutes

278.706(2)(d)	**Application for certificate to construct merchant electric generating facility -- Fees -- Replacement or repair does not constitute construction.** (2) *(d) A statement certifying that the proposed plant will be in compliance with all local ordinances and regulations concerning noise control and with any local planning and zoning ordinances. The statement shall also disclose setback requirements established by the planning and zoning commission as provided under KRS 278.704(3);*
278.708(3)(a)(8) and (d)	**278.708 Site assessment report -- Consultant -- Mitigation measures.** (3) *A completed site assessment report shall include:* *(a) A description of the proposed facility that shall include a proposed site development plan that describes:* *…* *8. Evaluation of the noise levels expected to be produced by the facility;* *…* *(d) Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary;*

The Kentucky siting process defaults to local jurisdiction for noise concerns. The Project is located in unincorporated Perry County northwest of Hazard, Kentucky. The county has no established noise standards or other noise-related ordinances.

1.2 Acoustical Background

An understanding of how noise is defined and measured provides useful background for this sound assessment. Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several different ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Table 1-2 summarizes the technical noise terms used in this report.

Table 1-2. Definitions of Acoustical Terms

Term	Definition
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location. The ambient noise level is typically defined by the L_{eq} level.
Sound pressure (noise) level dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
A-weighted sound pressure (noise) level (dBA)	The sound level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound (noise) levels in this report are A-weighted.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level, on an equal energy basis, during the measurement period.
Statistical noise level (Ln)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L_{50} is the level exceeded 50 percent of the time).

Figure 1-1 (figures are presented at the end of this report) depicts the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

An understanding of the difference between a sound *pressure* level (or noise level) and a sound *power* level also can be useful. A sound power level (commonly abbreviated as PWL or Lw) is analogous to the wattage of a light bulb; it is a measure of the acoustical energy emitted by the source and is, therefore, independent of distance. A sound pressure level is analogous to the brightness or intensity of light experienced at a specific distance from a source and is measured directly with a sound level meter. Sound pressure levels always should be specified with a location or distance from the noise source.

Sound power level data are used in acoustical models to predict sound pressure levels. This is because sound power levels take into account the size of the acoustical source and the total acoustical energy emitted by the source.

It is also important to note that decibels cannot be directly added arithmetically, that is, 50 decibels (A-weighted scale) (dBA) + 50 dBA does not equal 100 dBA. When two sources of equal level are added together, the result will always be 3 decibels (dB) greater; that is 50 dBA + 50 dBA = 53 dBA and 70 dBA + 70 dBA = 73 dBA. If the difference between the two sources is 10 dBA, the level (when rounded to the nearest whole decibel) will not increase; that is 40 dBA + 50 dBA = 50 dBA and 60 dBA + 70 dBA = 70 dBA.

The decrease in sound level caused by distance from any single sound source normally follows the inverse square law; that is, the sound pressure level changes in inverse proportion to the square of the distance from the sound source. In a large open area with no obstructive or reflective surfaces, it is a general rule that at distances greater than approximately the largest dimension of the noise-emitting surface, the sound pressure level from a single source of sound drops off at a rate of 6 dB with each doubling of the distance from the source. Sound energy is absorbed in the air as a function of temperature, humidity, and the frequency of the sound. This attenuation can be up to 2 dB over 1,000 feet. The drop-off rate will also vary based on terrain conditions and the presence of obstructions in the sound's propagation path. These factors are considered in the development of the acoustical model.

2. Construction Sound Levels

Solar facilities do not require the construction of substantial or deep foundations necessary to support the heavy loads associated with other power facilities. Blasting is not anticipated to be required. Rather, solar panels are mounted to racks attached to metal posts that are installed with a small hydraulic driver specifically designed for this purpose. While these solar-specific drivers may use a hammering action, they should not be confused with pile drivers used in general or heavy construction; such pile drivers are substantially larger and louder. The sound levels of solar-specific drivers are expected to be similar to other general construction equipment with a nominal sound level of approximately 85 dBA at 50 feet (e.g., dozer, grader, and pneumatic tools). The earth moving and equipment used to erect structures for the facility are anticipated to be consistent with general construction equipment used on a variety of infrastructure projects.

Sound levels from construction activities were estimated based on data from the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). This manual represents the most recent and comprehensive tabulation of sound from common pieces of construction equipment. Representative sound levels from the FTA (2018) manual are presented in Table 2-1.

Table 2-1. Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level 50 feet from Source, dBA	Equipment	Typical Noise Level 50 feet from Source, dBA
Air Compressor	80	Jack Hammer	88
Backhoe	80	Loader	80
Compactor	82	Paver	85
Concrete Mixer	85	Pneumatic Tool	85
Concrete Pump	82	Pump	77
Concrete Vibrator	76	Roller	85
Crane, Derrick	88	Saw	76
Crane, Mobile	83	Scarifier	83
Dozer	85	Scraper	85
Generator	82	Shovel	82
Grader	85	Truck	84
Impact Wrench	85		

Source: Table 7-1, FTA 2018.

As described by FTA, the average noise level from each piece of equipment is determined by the following formula for geometric spreading:

$$\text{Typical Noise Level at 50 feet} + 10*\log(Adj_{usage}) - 20*\log(\text{distance to receptor}/50) - 10*G*\log(\text{distance to receptor}/50)$$

The following parameters were used in this analysis: usage factor (Adj_{usage}) is 1 (i.e., equipment is operating continuously, a conservative assumption), and ground effect factor (G) is 0, representing hard ground (i.e., a ground condition that does not result in additional attenuation). The total noise level was then solely a function of the equipment operating and distance. This results in a conservative assessment of propagation over long distances, which can be further attenuated by atmospheric absorption.

Review of construction equipment noise emission levels presented in Table 2-1 indicates that the loudest equipment generally emits noise of approximately 80 to 90 dBA at 50 feet. Sound levels at any specific receptor are dominated by the closest and loudest equipment. The types, numbers, and duration of equipment anticipated to be used during construction near any specific receptor location will vary over time. The construction sound level estimate was based on the assumptions of multiple pieces of loud equipment operating in close proximity. Assumptions include the following:

- One piece of equipment generating a reference noise level of 85 dBA at 50 feet at the edge of the construction activity.
- Two pieces of equipment generating reference noise levels of 85 dBA located 50 feet farther away from the edge of construction.
- Two more pieces of equipment generating reference noise levels of 85 dBA located 100 feet farther away the edge of construction.

Expected average construction equipment noise levels at various distances, based on this scenario, are presented in Table 2-2 and Exhibit 1.

Table 2-2. Average Construction Equipment Noise Levels versus Distance

Distance from Construction Activity (feet)	Anticipated Construction Activities L_{eq} Noise Level (dBA)
50	87
100	83
200	78
400	73
800	67
1,600	62
3,200	56

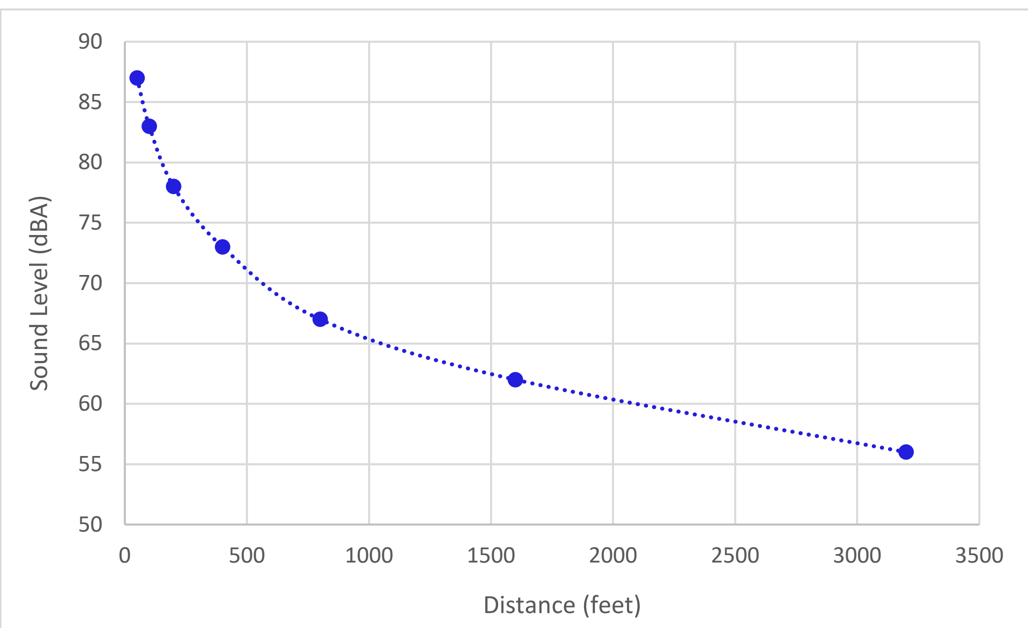


Exhibit 1. Plot of Sound Level versus Distance

Sensitive receptors in the Project area are shown on Figure 2-1. The closest residence to the solar panel area is approximately 420 feet away. While construction is occurring in proximity to this residence, the sound level is expected to be approximately 73 dBA. As construction progresses to more distant locations, the sound level will be lower, as indicated in Table 2-2. Construction is a temporary and intermittent activity. Noisy construction activities will be limited to the hours of 7:00 a.m. to 9:00 p.m., Monday through Saturday.

3. Operational Sound Levels

Solar facilities convert sunlight into electricity that is subsequently transmitted to the electrical grid as alternating current. The primary sound-emitting equipment type associated with this process is the inverter, which converts the direct current from the solar panels to alternating current for transmission to the grid and transformers. The transformers in turn modify the voltage to be consistent with electrical grid requirements.

An acoustical model of the proposed facility was developed using source input levels derived from data supplied by manufacturers, the Applicant, and information found in the technical literature. The sound levels presented represent the anticipated steady-state level from the facility with essentially all equipment operating.

Standard acoustical engineering methods were used in the noise analysis. The acoustical model, Cadna/A by DataKustik GmbH of Munich, Germany (DataKustik 2022), is a sophisticated tool that enables one to fully model complex industrial plants. The sound propagation factors used in the model have been adopted from International Organization for Standardization (ISO) 9613-2 *Acoustics—Sound Attenuation During Propagation Outdoors* (Part 2: General Method of Calculation). Atmospheric absorption was estimated for conditions of 10 degrees Celsius and 70 percent relative humidity (conditions that favor propagation) and computed in accordance with ISO 9613-1 *Acoustics—Sound Attenuation During Propagation Outdoors* (Part 1: Calculation of the Absorption of Sound by the Atmosphere). The model divides the proposed facility into a list of individual sound sources representing each piece of sound-emitting equipment. The sound power levels representing the standard performance of each of these components are assigned based on data supplied by manufacturers or information found in the technical literature. Using these sound power levels as a basis, the model calculates the sound pressure level that would occur at each receptor from each source after losses from distance, air absorption, and other factors are considered. The sum of all these individual levels is the total plant level at the modeling point.

The ISO 9613-2 method is based on an omnidirectional downwind condition. That is, the sound prediction algorithms assume every point at which sound level is calculated is downwind of all sound-emitting equipment simultaneously. In essence, the prediction assumes each receiver or prediction point is a “black hole” and the wind is blowing from each source and into this black hole. While this is physically impossible, the ISO 9613-2 model has been widely and successfully used to develop acoustical models for power facilities. Numerous agencies and regulatory bodies rely on properly conducted ISO 9613-2 modeling. The ISO 9613-2 parameters used in this assessment are a receptor height of 2 meters and mixed ground (G = 0.5, where G may vary between 0 for hard pavement or water and 1 for acoustically absorptive ground such as plowed earth).

The Applicant proposes either of two photovoltaic array layouts for the facility, one of which consists of a fixed-tilt racking system (fixed-tilt layout) and the other of which consists of a single-axis, tracking-style racking system (single-axis layout). For the fixed-tilt layout, the arrays will be oriented in a roughly east-west direction and tilted 28 degrees to face southward toward the sun. For the single-axis layout, arrays will face east at sunrise, rotate throughout the day, and end up facing west at sunset. The fixed-tilt layout is based on 21 inverters, 21 small transformers (5 megavolt ampere [MVA]) that are collocated with the inverters, and 1 primary substation transformer (167 MVA). The single-axis layout is based on 12 inverters, 12 small transformers (5 MVA) that are collocated with the inverters, and 1 primary substation transformer (167 MVA). Jacobs modeled both layouts. Refer to Appendix A for modeled equipment locations.

The sound power levels used in the model are summarized in Table 3-1. As is typical at this stage of a project, these data are representative and detailed vendor specifications will ultimately be developed to ensure the facility complies with the applicable requirements. As noted above, sound power level data are used in acoustical models to predict sound pressure levels. The operational sound pressure levels, what one would directly measure or hear, from inverters is nominally 73 dBA when evaluated at 26 feet. This would decrease at a rate of approximately 6 dBA per doubling of distance. At 52 feet, the sound level would be 67 dBA. A sound level of 65 dBA is similar to that of a normal conversation. The inverters and transformers are mounted to the ground and generally located on the interior of the solar panel array, increasing the distance between the equipment and potential noise-sensitive receivers.

Table 3-1. Equipment Sound Power Levels Used to Model the Facility

Source	dBA
5-MVA Transformer	83
Primary Substation Transformer	98
Inverter	99

Modeled sound pressure level contours are presented on Figures 3-1 and 3-2 and tabulated model results are presented in Appendix B for each identified noise-sensitive receptor. The highest predicted operational sound level at a sensitive receptor is 42 dBA at noise-sensitive receptor (NSR) 232 for the fixed-tilt layout and 39 dBA at NSR 232 for the single-axis layout. NSR 232 is a participating residence. The highest predicted operational sound level at a nonparticipating residence is 37 dBA for the fixed-tilt layout and 35 dBA for the single-axis layout. As this is a solar facility, these levels would occur during the daytime and represent the expected sound level when the inverters are operating at their full capacity during conditions that require maximum cooling fan operations.

When the facility is not operating at full load, the sound level will be less. During the nighttime hours, the inverters are not at full capacity and emit substantially less noise. In the event that reactive power from the inverters is required during the nighttime hours, the sound levels from the inverters are anticipated to be at least 10 dBA quieter at night. Additionally, the cooling requirements for the transformers are expected to be diminished as the transformer is not loaded during the nighttime hours, allowing the fans to operate at lower speed or not at all, resulting in lower sound levels. Noise generated during the testing and commissioning phase of the facility is not expected to be substantially different from that produced during normal full-load operation. Operational traffic is anticipated to be minimal, primarily pickup trucks used by a small operation and maintenance staff for periodic maintenance.

4. Proposed Mitigation

Typical construction noise minimization measures are anticipated to be implemented, such as ensuring construction equipment and associated mufflers are in good working order, limiting noisy construction activities to the hours of 7:00 a.m. to 9:00 p.m., Monday through Saturday, and establishing a complaint resolution process.

5. Existing Sound Levels

Existing ambient sound levels may vary both temporally and spatially for a number of reasons. There is no single, existing sound level because ambient sound levels vary. For example, wind may result in rustling vegetation noise on one day, whereas foggy or calm conditions on another would result in different sound levels, even at the same location. Changes in traffic patterns can also result in different levels of sound. The American National Standards Institute (ANSI) standard 12.9-2013/Part 3 provides a table of approximate background sound levels based on land use and population density. The ANSI standard divides land uses into six distinct categories. Descriptions of these land use categories, along with the typical day and nighttime levels, are provided in Table 5-1. Of the six categories, the residences in the vicinity of the Project area are generally within land use Category 6, where sound levels are expected to be approximately 40 dBA during the day. At times, one could reasonably expect periods that are louder or quieter than the levels stated, and ANSI notes that the "95% prediction interval [confidence interval] is on the order of +/- 10 dB." Of additional note is that railroad tracks are located to the south and west of the Project site and the site was at one time an active coal mine, suggesting that historical sound levels were likely higher than the ANSI levels shown in Table 5-1. Existing sound sources in the area include the railroad tracks to the south and west and mining activities noted to be active approximately 2-miles north of the Project.

6. Conclusion

Expected sound levels during Project construction and operation are documented in this report, consistent with the requirements of Kentucky Revised Statutes Chapter 278.706(2)(d) and 278.708(3)(a)(8) and (d). The equipment used for Project construction is similar to that used in general construction and sound levels are estimated to be up to 73 dBA when equipment is working in proximity to the closest residence. As construction progresses to more distant areas, lower sound levels will be realized. Construction is temporary; noisy construction activities are limited to daytime hours, and blasting is not anticipated to be required. An operational sound model was developed based on the ISO 9613-2 standard for outdoor propagation. The modeling predicts a sound level of 42 dBA at the closest participating residence. At the closest nonparticipating residence, the predicted level is 37 dBA for the fixed-tilt layout and 35 dBA for the single-axis layout.

7. References

DataKustik, GmbH, Munich, Germany (DataKustik). 2022. CadnaA. Accessed November 2022. http://www.datakustik.de/frameset.php?lang=en.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual.* FTA Report No. 0123. September.

International Organization for Standardization (ISO) 1993. ISO 9613-1*, Acoustics—Sound Attenuation During Propagation Outdoors*. Part 1: Calculation of the Absorption of Sound by the Atmosphere. Geneva, Switzerland.

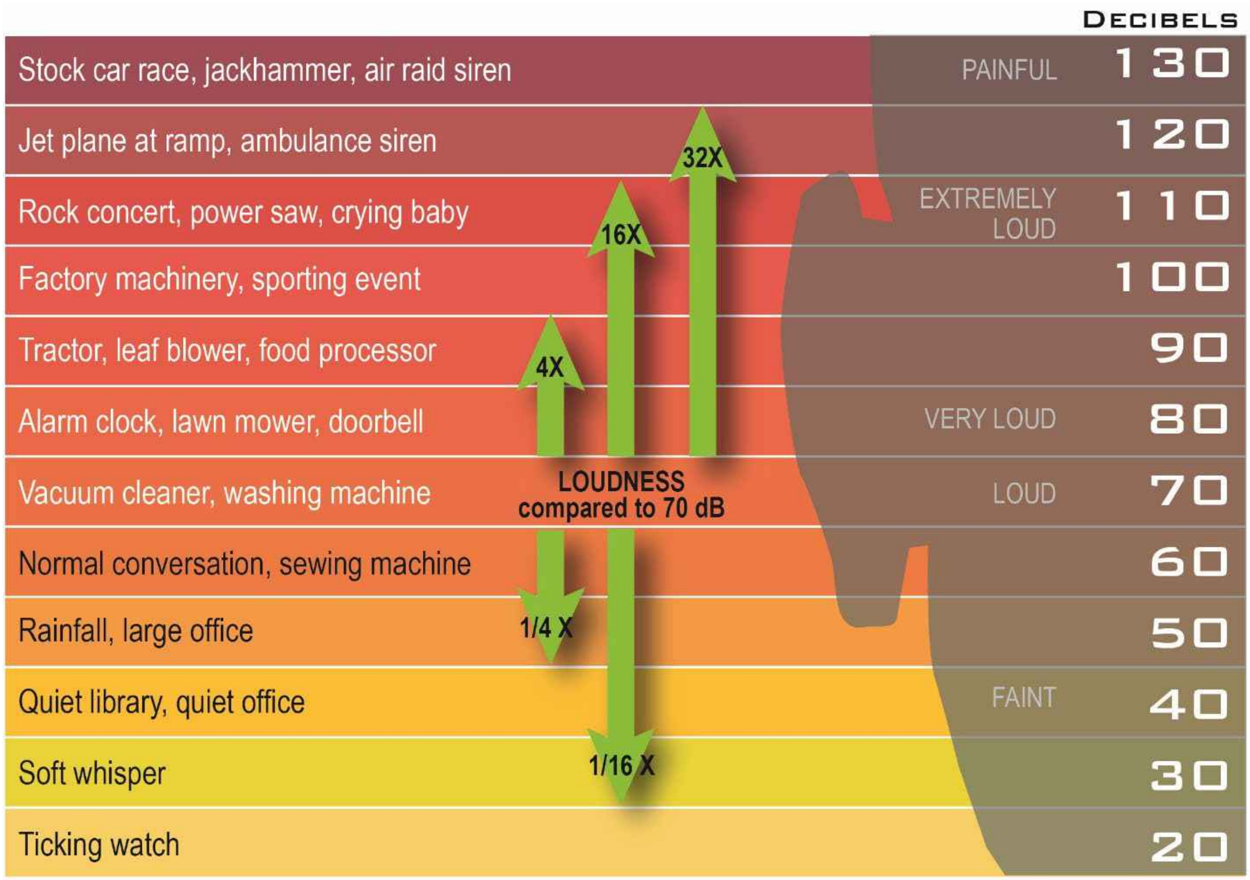
International Organization for Standardization (ISO). 1996. ISO 9613-2, *Acoustics—Sound Attenuation During Propagation Outdoors*. Part 2: General Method of Calculation. Geneva, Switzerland

Table 5-1. A-weighted Sound Levels Corresponding to Land Use and Population Density

Category	Land Use	Description	People per Square Mile	Day (dBA)	Night (dBA)
1	Noisy Commercial and Industrial Areas and Very Noisy Residential Areas	Very heavy traffic conditions, such as in busy “downtown” commercial areas; at intersections for mass transportation or for other vehicles, including elevated trains, heavy motor trucks, and other heavy traffic; and at street corners where many motor buses and heavy trucks accelerate.	63,840	66	58
2	Moderate Commercial and Industrial Areas and Noisy Residential Areas	Heavy traffic areas with conditions similar to Category 1 but with somewhat less traffic; routes of relatively heavy or fast automobile traffic, but where heavy truck traffic is not extremely dense.	20,000	61	54
3	Quiet Commercial, Industrial Areas, and Normal Urban and Noisy Suburban Residential Areas	Light traffic conditions where no mass transportation vehicles and relatively few automobiles and trucks pass, and where these vehicles generally travel at moderate speeds. Residential areas and commercial streets and intersections with little traffic comprise this category.	6,384	55	49
4	Quiet Urban and Normal Suburban Residential Areas	These areas are similar to Category 3 above, but for this group the background is either distant traffic or is unidentifiable. Typically, the population density is one-third the density of Category 3.	2,000	50	44
5	Quiet Residential Areas	These areas are isolated, far from significant sources of sound, and may be situated in shielded areas such as a small wooded valley.	638	45	39
6	Very Quiet, Sparse Suburban, or Rural Residential Areas	These areas are similar to Category 4 above, but are usually in sparse suburban or rural areas, and for this group there are few if any near sources of sound.	200	40	34

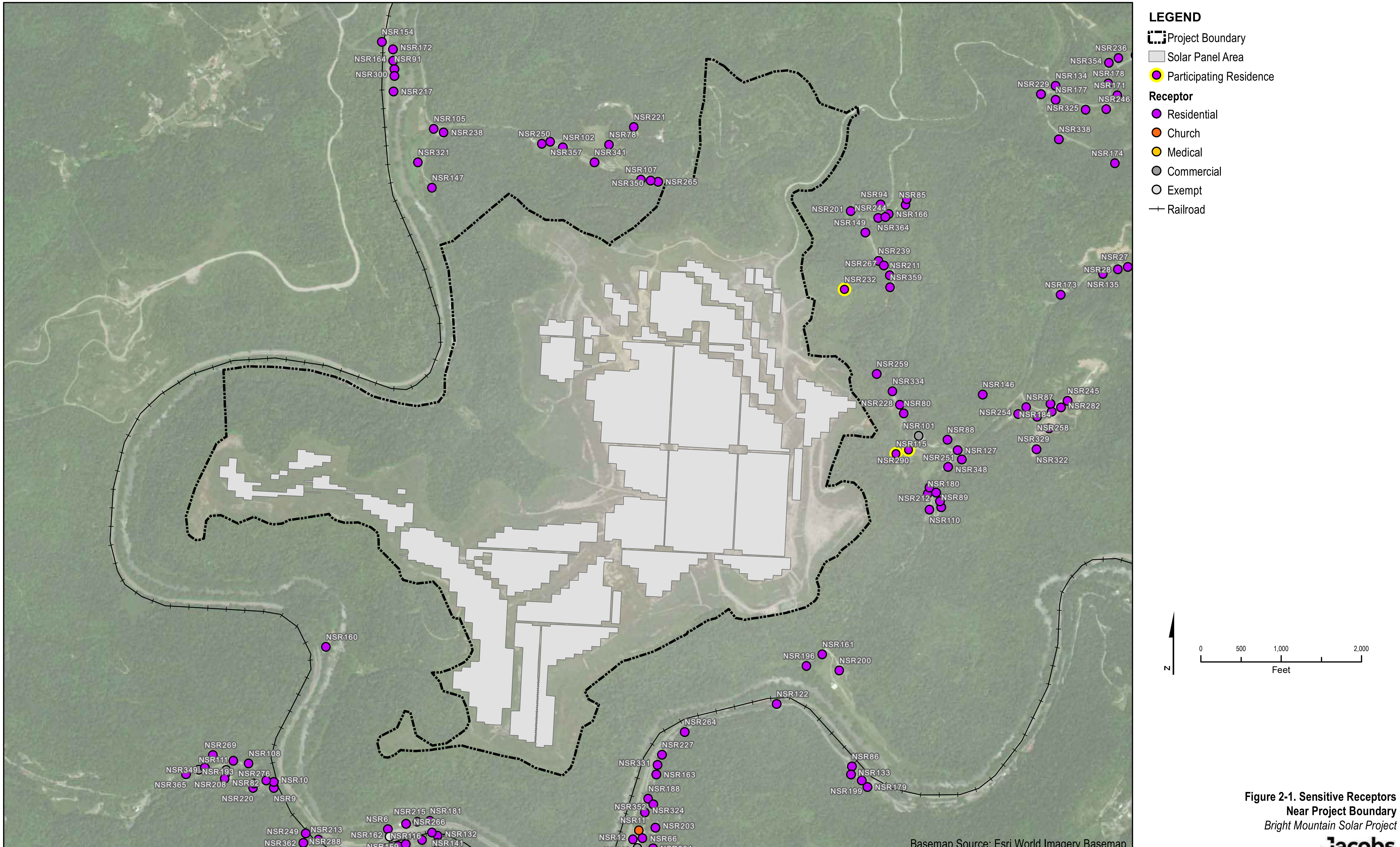
Source: ANSI S12.9-2013/Part 3.

Figures



Source: American Academy of Otolaryngology (https://www.entnet.org/content/block-out-noise); Centers for Disease Control and Prevention (https://www.cdc.gov/vitalsigns/hearingloss/infographic.html#infographic); Center for Hearing and Communication (http://chchearing.org/noise/common-environmental-noise-levels/), Hearing Sense (http://hearingsense.com.au/hearing-tests-services/ear-protection/).

Figure 1-1. Summary of Typical Sound Levels
Bright Mountain Solar Project

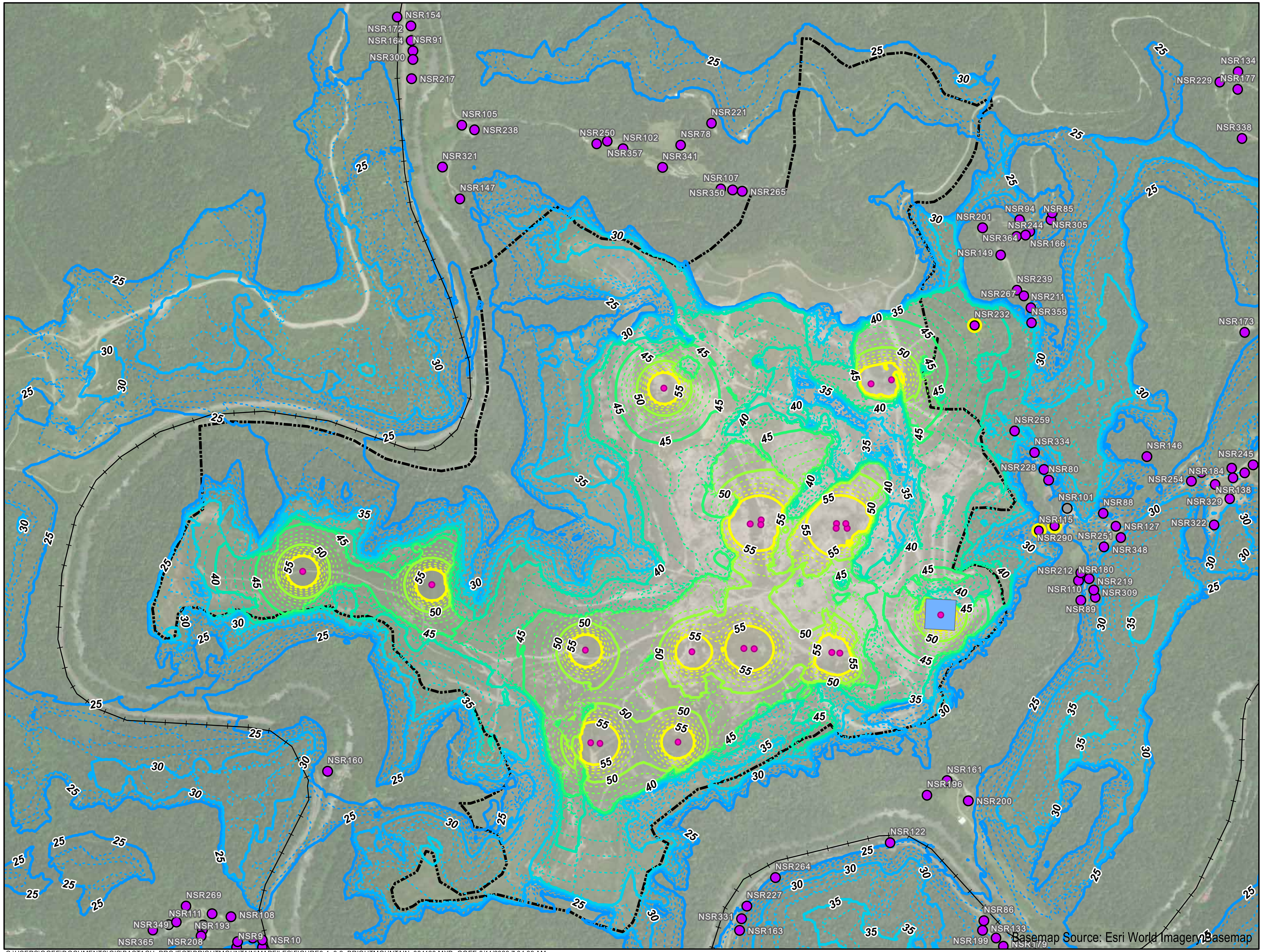


C:\USERS\GGEE\DOCUMENTS\GIS\BASTACH_PROJECT\BRIGHTMOUNTAIN\MAPFILES\FIGURE2-1_BRIGHTMOUNTAIN_111122.MXD GGEE 12/2/2022 5:33:23 PM

Figure 2-1. Sensitive Receptors Near Project Boundary

Bright Mountain Solar Project

Jacobs



C:\USERS\GGEE\DOCUMENTS\GIS\BASTACH_PROJECT\BRIGHTMOUNTAIN\MAPFILES\FIGURE3-1_3-2_BRIGHTMOUNTAIN_081123.MXD GGEE 8/11/2023 7:34:39 AM

LEGEND

Predicted Sound Level (dBA)
- 5 dBA Contour Interval
- 1 dBA Contour Interval
- Inverter
- Substation
- Project Boundary
- Participating Residence

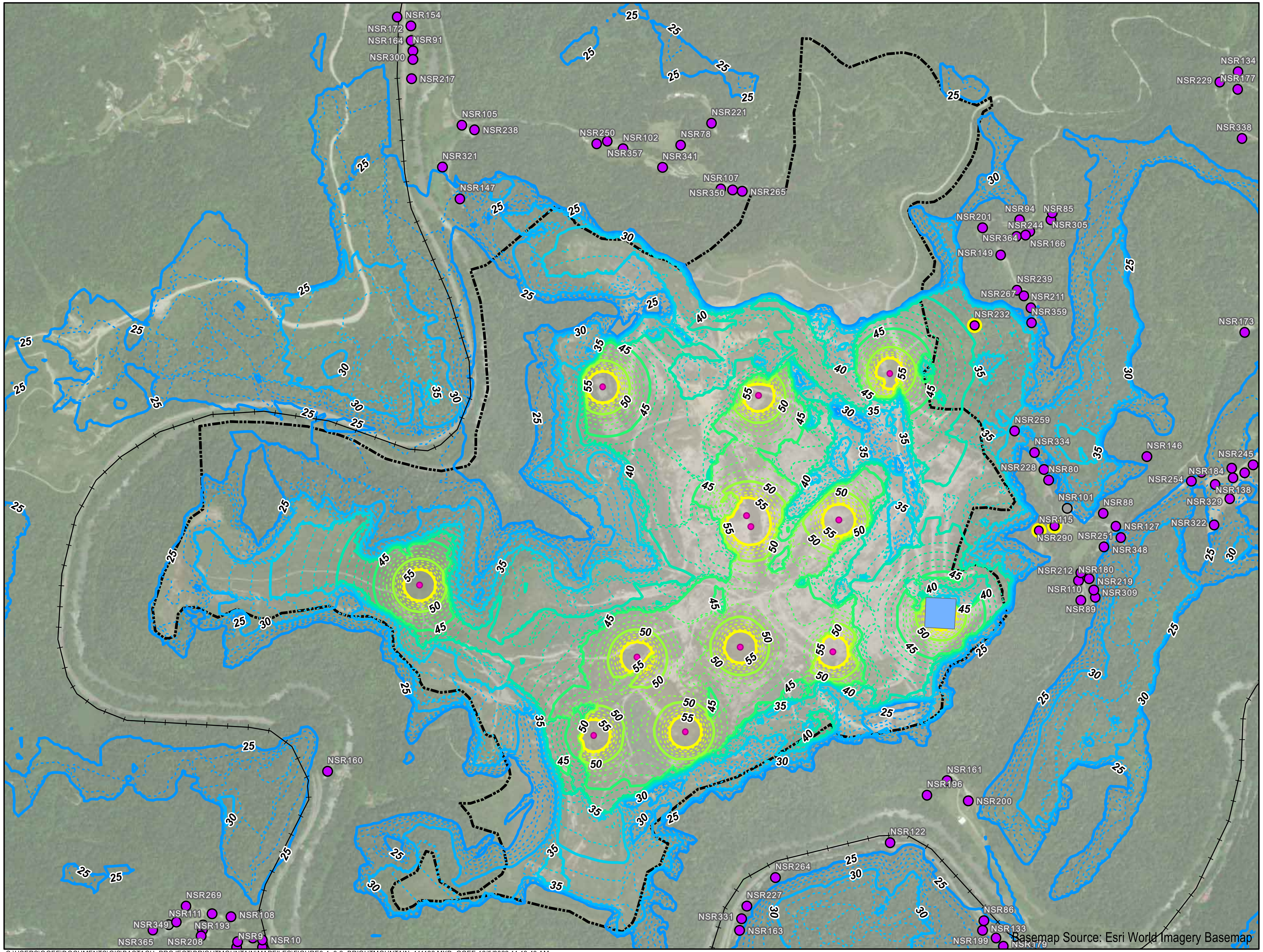
Receptor
- Residential
- Church
- Medical
- Commercial
- Exempt
- Railroad

N

0 500 1,000 2,000
Feet

Figure 3-1. Predicted Operational Sound Pressure Levels (dBA)
Fixed-tilt Layout
Bright Mountain Solar Project

Jacobs



LEGEND

Predicted Sound Level (dBA)

- 5 dBA Contour Interval
- 1 dBA Contour Interval
- Inverter
- Substation
- Project Boundary
- Participating Residence

Receptor

- Residential
- Church
- Medical
- Commercial
- Exempt
- Railroad

Figure 3-2. Predicted Operational Sound Pressure Levels (dBA) Single-axis Tracking Layout

Bright Mountain Solar Project

Jacobs

C:\USERS\GGEE\DOCUMENTS\GIS\BASTACH_PROJECT\BRIGHTMOUNTAIN\MAPFILES\FIGURE3-1_3-2_BRIGHTMOUNTAIN_111122.MXD GGEE 12/5/2022 11:12:43 AM

Appendix A
Modeled Equipment

Table A1. Modeled Sources

Layout	Source Type	Sound Power Level (dBA)	Coordinates (UTM NAD83, meters)		
			X	Y	Z
Fixed-tilt	Inverter	99	296746	4129018	2.3
Fixed-tilt	Inverter	99	297237	4129288	2.3
Fixed-tilt	Inverter	99	297213	4129291	2.3
Fixed-tilt	Inverter	99	296945	4129303	2.3
Fixed-tilt	Inverter	99	297227	4129682	2.3
Fixed-tilt	Inverter	99	297227	4129668	2.3
Fixed-tilt	Inverter	99	297395	4130119	2.3
Fixed-tilt	Inverter	99	296703	4130094	2.3
Fixed-tilt	Inverter	99	295604	4129537	2.3
Fixed-tilt	Inverter	99	296464	4129297	2.3
Fixed-tilt	Inverter	99	297259	4129668	2.3
Fixed-tilt	Inverter	99	296509	4129014	2.3
Fixed-tilt	Inverter	99	297332	4130107	2.3
Fixed-tilt	Inverter	99	297256	4129683	2.3
Fixed-tilt	Inverter	99	296788	4129293	2.3
Fixed-tilt	Inverter	99	295997	4129496	2.3
Fixed-tilt	Inverter	99	296480	4129016	2.3
Fixed-tilt	Inverter	99	296977	4129302	2.3
Fixed-tilt	Inverter	99	296965	4129681	2.3
Fixed-tilt	Inverter	99	296998	4129694	2.3
Fixed-tilt	Inverter	99	296997	4129679	2.3
Fixed-tilt	Small Transformer	83	296746	4129018	2.3
Fixed-tilt	Small Transformer	83	297237	4129288	2.3
Fixed-tilt	Small Transformer	83	297213	4129291	2.3
Fixed-tilt	Small Transformer	83	296945	4129303	2.3
Fixed-tilt	Small Transformer	83	297227	4129682	2.3
Fixed-tilt	Small Transformer	83	297227	4129668	2.3
Fixed-tilt	Small Transformer	83	297395	4130119	2.3
Fixed-tilt	Small Transformer	83	296703	4130094	2.3
Fixed-tilt	Small Transformer	83	295604	4129537	2.3
Fixed-tilt	Small Transformer	83	296464	4129297	2.3
Fixed-tilt	Small Transformer	83	297259	4129668	2.3
Fixed-tilt	Small Transformer	83	296509	4129014	2.3
Fixed-tilt	Small Transformer	83	297332	4130107	2.3
Fixed-tilt	Small Transformer	83	297256	4129683	2.3
Fixed-tilt	Small Transformer	83	296788	4129293	2.3
Fixed-tilt	Small Transformer	83	295997	4129496	2.3
Fixed-tilt	Small Transformer	83	296480	4129016	2.3
Fixed-tilt	Small Transformer	83	296977	4129302	2.3
Fixed-tilt	Small Transformer	83	296965	4129681	2.3
Fixed-tilt	Small Transformer	83	296998	4129694	2.3
Fixed-tilt	Small Transformer	83	296997	4129679	2.3
Single-axis	Inverter	99	296768	4129049	2.3
Single-axis	Inverter	99	295960	4129496	2.3
Single-axis	Inverter	99	296935	4129307	2.3
Single-axis	Inverter	99	296621	4129276	2.3
Single-axis	Inverter	99	297390	4130139	2.3
Single-axis	Inverter	99	296954	4129707	2.3
Single-axis	Inverter	99	296990	4130072	2.3

Table A1. Modeled Sources

Layout	Source Type	Sound Power Level (dBA)	Coordinates (UTM NAD83, meters)		
			X	Y	Z
Single-axis	Inverter	99	296517	4130098	2.3
Single-axis	Inverter	99	297235	4129694	2.3
Single-axis	Inverter	99	296490	4129038	2.3
Single-axis	Inverter	99	296967	4129673	2.3
Single-axis	Inverter	99	297216	4129293	2.3
Single-axis	Small Transformer	83	296768	4129049	2.3
Single-axis	Small Transformer	83	295960	4129496	2.3
Single-axis	Small Transformer	83	296935	4129307	2.3
Single-axis	Small Transformer	83	296621	4129276	2.3
Single-axis	Small Transformer	83	297390	4130139	2.3
Single-axis	Small Transformer	83	296954	4129707	2.3
Single-axis	Small Transformer	83	296990	4130072	2.3
Single-axis	Small Transformer	83	296517	4130098	2.3
Single-axis	Small Transformer	83	297235	4129694	2.3
Single-axis	Small Transformer	83	296490	4129038	2.3
Single-axis	Small Transformer	83	296967	4129673	2.3
Single-axis	Small Transformer	83	297216	4129293	2.3
Fixed-tilt and Single-axis	Substation	98	297545	4129404	4.0

Notes:

dBA = decibel (A-weighted scale)

NAD83 = North American Datum 1983

UTM = universal transverse Mercator

Appendix B
Tabulated Model Results

Table B1. Predicted Sound Levels – Fixed-tilt Layout

Map ID	Participating Status	Sound Pressure Level (dBA)	Height	X	Y
NSR232	Participating	42	2.0	297647	4130285
NSR259	Nonparticipating	37	2.0	297769	4129964
NSR359	Nonparticipating	34	2.0	297821	4130293
NSR251	Nonparticipating	30	2.0	298092	4129640
NSR334	Nonparticipating	30	2.0	297830	4129898
NSR329	Nonparticipating	30	2.0	298423	4129757
NSR138	Nonparticipating	29	2.0	298433	4129821
NSR348	Nonparticipating	29	2.0	298040	4129611
NSR322	Nonparticipating	29	2.0	298376	4129679
NSR258	Nonparticipating	29	2.0	298378	4129801
NSR282	Nonparticipating	29	2.0	298468	4129836
NSR127	Nonparticipating	29	2.0	298077	4129675
NSR245	Nonparticipating	29	2.0	298493	4129861
NSR184	Nonparticipating	29	2.0	298429	4129850
NSR309	Nonparticipating	29	2.0	298009	4129481
NSR254	Nonparticipating	28	2.0	298306	4129811
NSR89	Nonparticipating	28	2.0	298014	4129458
NSR133	Nonparticipating	28	2.0	297672	4128446
NSR179	Nonparticipating	28	2.0	297735	4128398
NSR86	Nonparticipating	28	2.0	297675	4128476
NSR199	Nonparticipating	28	2.0	297713	4128423
NSR87	Nonparticipating	28	2.0	298337	4129837
NSR88	Nonparticipating	27	2.0	298038	4129714
NSR101	Nonparticipating	27	2.0	297929	4129729
NSR228	Nonparticipating	27	2.0	297858	4129847
NSR163	Nonparticipating	27	2.0	296933	4128446
NSR80	Nonparticipating	27	2.0	297872	4129814
NSR85	Nonparticipating	27	2.0	297879	4130605
NSR305	Nonparticipating	26	2.0	297884	4130627
NSR331	Nonparticipating	26	2.0	296938	4128482
NSR211	Nonparticipating	26	2.0	297819	4130338
NSR219	Nonparticipating	26	2.0	297995	4129514
NSR115	Participating	26	2.0	297843	4129661
NSR264	Nonparticipating	25	2.0	297041	4128606
NSR227	Nonparticipating	25	2.0	296955	4128520
NSR220	Nonparticipating	25	2.0	295404	4128395
NSR94	Nonparticipating	25	2.0	297784	4130606
NSR212	Nonparticipating	25	2.0	297970	4129533
NSR110	Nonparticipating	25	2.0	297970	4129450
NSR122	Nonparticipating	25	2.0	297390	4128712
NSR82	Nonparticipating	24	2.0	295454	4128423
NSR276	Nonparticipating	24	2.0	295407	4128412
NSR200	Nonparticipating	24	2.0	297627	4128840

Table B1. Predicted Sound Levels – Fixed-tilt Layout

Map ID	Participating Status	Sound Pressure Level (dBA)	Height	X	Y
NSR9	Nonparticipating	24	2.0	295482	4128395
NSR147	Nonparticipating	24	2.0	296083	4130669
NSR166	Nonparticipating	24	2.0	297815	4130570
NSR180	Nonparticipating	24	2.0	297963	4129509
NSR173	Nonparticipating	24	2.0	298468	4130264
NSR364	Nonparticipating	23	2.0	297802	4130559
NSR290	Participating	23	2.0	297891	4129676
NSR10	Nonparticipating	23	2.0	295482	4128417
NSR221	Nonparticipating	23	2.0	296848	4130900
NSR321	Nonparticipating	23	2.0	296029	4130766
NSR281	Nonparticipating	23	2.0	295296	4128429
NSR160	Nonparticipating	23	2.0	295680	4128929
NSR154	Nonparticipating	22	2.0	295892	4131222
NSR217	Nonparticipating	22	2.0	295936	4131035
NSR172	Nonparticipating	22	2.0	295934	4131194
NSR164	Nonparticipating	22	2.0	295935	4131151
NSR244	Nonparticipating	22	2.0	297775	4130555
NSR91	Nonparticipating	22	2.0	295940	4131119
NSR300	Nonparticipating	21	2.0	295940	4131093
NSR196	Nonparticipating	21	2.0	297503	4128857
NSR208	Nonparticipating	21	2.0	295299	4128448
NSR365	Nonparticipating	20	2.0	295149	4128447
NSR146	Nonparticipating	19	2.0	298171	4129886
NSR267	Nonparticipating	19	2.0	297797	4130375
NSR302	Nonparticipating	19	2.0	295302	4128462
NSR201	Nonparticipating	18	2.0	297671	4130581
NSR149	Nonparticipating	18	2.0	297727	4130499
NSR134	Nonparticipating	18	2.0	298448	4131055
NSR111	Nonparticipating	18	2.0	295198	4128464
NSR78	Nonparticipating	18	2.0	296754	4130833
NSR239	Nonparticipating	18	2.0	297776	4130391
NSR349	Nonparticipating	17	2.0	295221	4128472
NSR161	Nonparticipating	16	2.0	297564	4128901
NSR105	Nonparticipating	16	2.0	296089	4130893
NSR177	Nonparticipating	15	2.0	298448	4131002
NSR108	Nonparticipating	15	2.0	295387	4128487
NSR265	Nonparticipating	15	2.0	296941	4130692
NSR229	Nonparticipating	14	2.0	298393	4131024
NSR350	Nonparticipating	14	2.0	296911	4130696
NSR341	Nonparticipating	13	2.0	296699	4130765
NSR102	Nonparticipating	13	2.0	296579	4130822
NSR193	Nonparticipating	13	2.0	295329	4128497
NSR107	Nonparticipating	13	2.0	296876	4130700

Table B1. Predicted Sound Levels – Fixed-tilt Layout

Map ID	Participating Status	Sound Pressure Level (dBA)	Height	X	Y
NSR357	Nonparticipating	12	2.0	296531	4130844
NSR238	Nonparticipating	12	2.0	296127	4130879
NSR250	Nonparticipating	12	2.0	296499	4130837
NSR269	Nonparticipating	11	2.0	295250	4128519
NSR338	Nonparticipating	9	2.0	298461	4130852

Notes:

dBA = decibel (A-weighted scale)

ID = identifier

NSR = noise-sensitive receptor

Table B2. Predicted Sound Levels – Single-axis Layout

Map ID	Participating Status	Sound Pressure Level (dBA)	Height	X	Y
NSR232	Participating	39	2.0	297647	4130285
NSR259	Nonparticipating	35	2.0	297769	4129964
NSR359	Nonparticipating	30	2.0	297821	4130293
NSR147	Nonparticipating	27	2.0	296083	4130669
NSR329	Nonparticipating	27	2.0	298423	4129757
NSR334	Nonparticipating	27	2.0	297830	4129898
NSR138	Nonparticipating	27	2.0	298433	4129821
NSR282	Nonparticipating	27	2.0	298468	4129836
NSR245	Nonparticipating	27	2.0	298493	4129861
NSR251	Nonparticipating	26	2.0	298092	4129640
NSR184	Nonparticipating	26	2.0	298429	4129850
NSR133	Nonparticipating	26	2.0	297672	4128446
NSR258	Nonparticipating	26	2.0	298378	4129801
NSR179	Nonparticipating	26	2.0	297735	4128398
NSR199	Nonparticipating	26	2.0	297713	4128423
NSR254	Nonparticipating	26	2.0	298306	4129811
NSR322	Nonparticipating	25	2.0	298376	4129679
NSR80	Nonparticipating	25	2.0	297872	4129814
NSR86	Nonparticipating	25	2.0	297675	4128476
NSR87	Nonparticipating	25	2.0	298337	4129837
NSR163	Nonparticipating	25	2.0	296933	4128446
NSR101	Nonparticipating	25	2.0	297929	4129729
NSR228	Nonparticipating	25	2.0	297858	4129847
NSR309	Nonparticipating	25	2.0	298009	4129481
NSR89	Nonparticipating	24	2.0	298014	4129458
NSR127	Nonparticipating	24	2.0	298077	4129675
NSR321	Nonparticipating	24	2.0	296029	4130766
NSR348	Nonparticipating	24	2.0	298040	4129611
NSR331	Nonparticipating	24	2.0	296938	4128482
NSR211	Nonparticipating	24	2.0	297819	4130338
NSR88	Nonparticipating	24	2.0	298038	4129714
NSR227	Nonparticipating	23	2.0	296955	4128520
NSR85	Nonparticipating	23	2.0	297879	4130605
NSR94	Nonparticipating	23	2.0	297784	4130606
NSR305	Nonparticipating	23	2.0	297884	4130627
NSR219	Nonparticipating	23	2.0	297995	4129514
NSR220	Nonparticipating	23	2.0	295404	4128395
NSR122	Nonparticipating	22	2.0	297390	4128712
NSR217	Nonparticipating	22	2.0	295936	4131035
NSR9	Nonparticipating	22	2.0	295482	4128395
NSR300	Nonparticipating	22	2.0	295940	4131093
NSR164	Nonparticipating	22	2.0	295935	4131151
NSR172	Nonparticipating	22	2.0	295934	4131194

Table B2. Predicted Sound Levels – Single-axis Layout

Map ID	Participating Status	Sound Pressure Level (dBA)	Height	X	Y
NSR91	Nonparticipating	22	2.0	295940	4131119
NSR200	Nonparticipating	22	2.0	297627	4128840
NSR82	Nonparticipating	22	2.0	295454	4128423
NSR154	Nonparticipating	21	2.0	295892	4131222
NSR166	Nonparticipating	21	2.0	297815	4130570
NSR276	Nonparticipating	21	2.0	295407	4128412
NSR173	Nonparticipating	21	2.0	298468	4130264
NSR115	Participating	21	2.0	297843	4129661
NSR264	Nonparticipating	21	2.0	297041	4128606
NSR110	Nonparticipating	21	2.0	297970	4129450
NSR212	Nonparticipating	20	2.0	297970	4129533
NSR10	Nonparticipating	20	2.0	295482	4128417
NSR221	Nonparticipating	20	2.0	296848	4130900
NSR364	Nonparticipating	20	2.0	297802	4130559
NSR290	Participating	19	2.0	297891	4129676
NSR281	Nonparticipating	19	2.0	295296	4128429
NSR244	Nonparticipating	18	2.0	297775	4130555
NSR365	Nonparticipating	18	2.0	295149	4128447
NSR180	Nonparticipating	18	2.0	297963	4129509
NSR196	Nonparticipating	18	2.0	297503	4128857
NSR105	Nonparticipating	17	2.0	296089	4130893
NSR160	Nonparticipating	17	2.0	295680	4128929
NSR146	Nonparticipating	17	2.0	298171	4129886
NSR149	Nonparticipating	17	2.0	297727	4130499
NSR201	Nonparticipating	17	2.0	297671	4130581
NSR267	Nonparticipating	16	2.0	297797	4130375
NSR111	Nonparticipating	16	2.0	295198	4128464
NSR208	Nonparticipating	15	2.0	295299	4128448
NSR78	Nonparticipating	15	2.0	296754	4130833
NSR349	Nonparticipating	15	2.0	295221	4128472
NSR134	Nonparticipating	15	2.0	298448	4131055
NSR239	Nonparticipating	15	2.0	297776	4130391
NSR161	Nonparticipating	14	2.0	297564	4128901
NSR265	Nonparticipating	13	2.0	296941	4130692
NSR177	Nonparticipating	13	2.0	298448	4131002
NSR302	Nonparticipating	13	2.0	295302	4128462
NSR350	Nonparticipating	12	2.0	296911	4130696
NSR102	Nonparticipating	12	2.0	296579	4130822
NSR107	Nonparticipating	11	2.0	296876	4130700
NSR341	Nonparticipating	11	2.0	296699	4130765
NSR238	Nonparticipating	11	2.0	296127	4130879
NSR357	Nonparticipating	11	2.0	296531	4130844
NSR229	Nonparticipating	10	2.0	298393	4131024

Table B2. Predicted Sound Levels – Single-axis Layout

Map ID	Participating Status	Sound Pressure Level (dBA)	Height	X	Y
NSR250	Nonparticipating	10	2.0	296499	4130837
NSR108	Nonparticipating	9	2.0	295387	4128487
NSR193	Nonparticipating	8	2.0	295329	4128497
NSR269	Nonparticipating	8	2.0	295250	4128519
NSR338	Nonparticipating	6	2.0	298461	4130852

Notes:

dBA = decibel (A-weighted scale)

ID = identifier

NSR = noise-sensitive receptor

Bright Mountain Solar Project
Site Assessment Report
Case No. 2022-00274

Exhibit H – Visibility Assessment

Technical Memorandum

Visibility Assessment Technical Memorandum

Bright Mountain Solar Project

Perry County, Kentucky

Case No. 2022-00274

Prepared for:

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2701 NW Vaughn Street, Suite 300
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August 2023

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EXECUTIVE SUMMARY

On behalf of Bright Mountain Solar, LLC (Applicant), Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) conducted a visibility assessment for the proposed Bright Mountain Solar Project (the Project), located in Perry County, Kentucky. The proposed Project is a solar-powered electric generation facility with a generating capacity of up to 80 megawatts (MW). The proposed Project includes a total of approximately 805 acres (the Project Area). Within this area, the footprint of the Project will be approximately 360 acres.

This memorandum assesses the potential visibility of the Project within a 2-mile radius of the Project Area (visual study area) through the use of a viewshed analysis and field verification. The Project is situated atop a large topographic feature in an area that was previously used for a surface coal mine. The site is surrounded on all sides by dense forest vegetation.

The viewshed analysis indicated that approximately 286 acres of offsite area (2% of the visual study area) could have a view of some portion of the Project. Generally, field review suggests that areas with Project visibility will be substantially fewer and smaller than suggested by the viewshed analysis, and that any views toward the Project are not likely to affect the scenic quality of the view. Because the vegetation bordering the site will largely remain intact, there will be significant screening of Project components and it is not anticipated that the Project will result in adverse visual effects from any visual resources.

1.0 PURPOSE OF THE INVESTIGATION

This visibility assessment was conducted by a team of experienced visual resource assessment experts, and in consideration of Kentucky Revised Statutes (KRS) 278.708(3)(b), which requires an evaluation of the compatibility of the Project with scenic surroundings. The proposed Bright Mountain Solar Project is a solar-powered electric generation facility with a generating capacity of up to 80 MW located in Perry County, Kentucky. The proposed Project includes a total of approximately 805 acres (the Project Area; Figure 2-1). Within this area, the footprint of the Project will be approximately 360 acres.

The purpose of this visibility analysis is to:

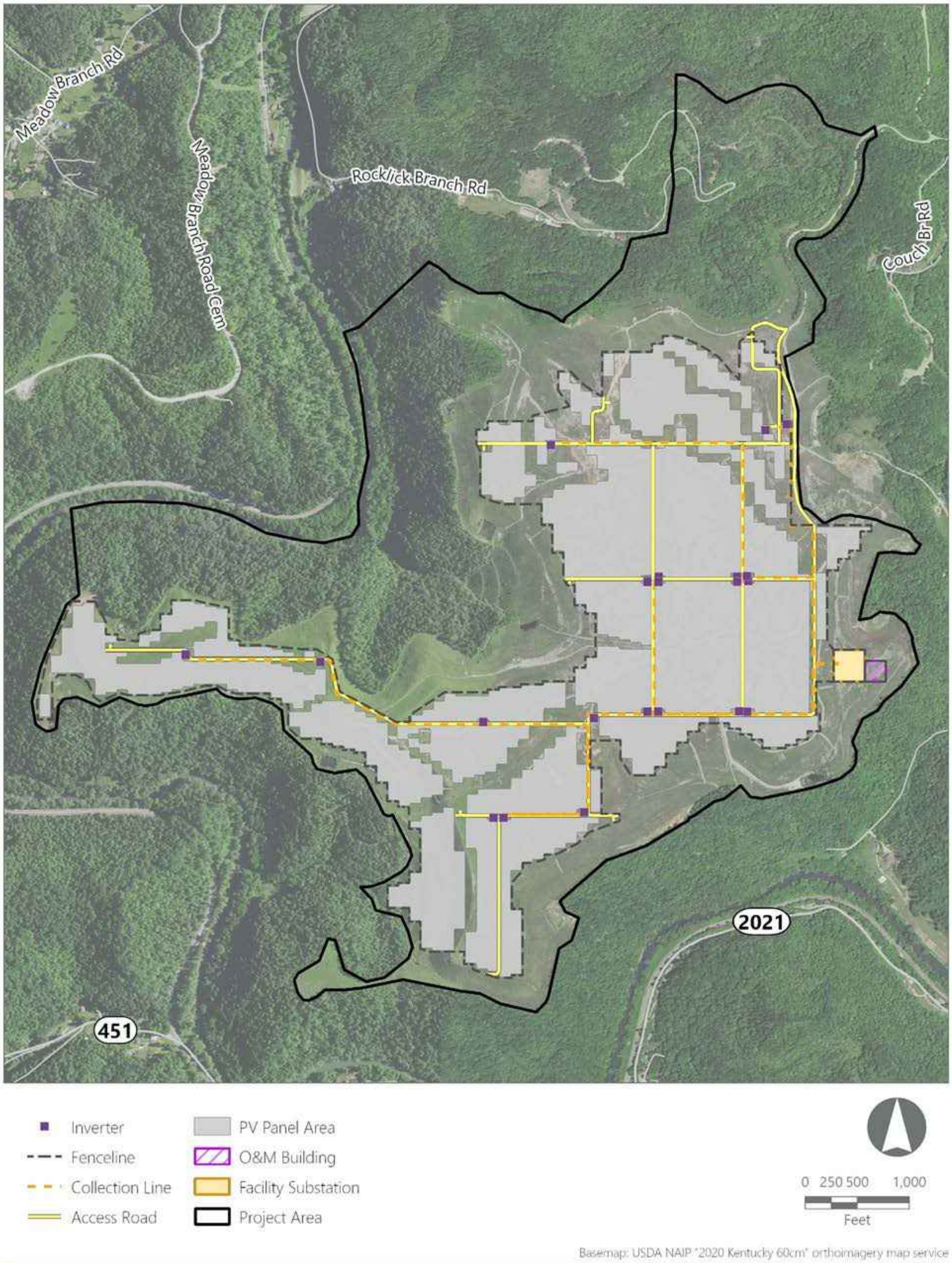
- Identify and inventory potential sensitive viewing locations within 2 miles of the proposed Project (the visual study area [VSA]). A 2-mile radius reflects accepted standards and studies which confirm that, for low-profile solar projects, visual impacts will be entirely contained within 2 miles of the project. Additionally, in the case of the proposed Project, significant vegetative screening, topography, and the low profile of the Project components suggest that a 2-mile VSA provides a conservative assessment.
- Determine the geographic areas predicted to have potential Project visibility through the use of a viewshed analysis.
- Field evaluate Project visibility predicted by the viewshed analysis and determine whether the Project could result in adverse visual effects to the surrounding communities and visually sensitive resources within 2 miles of the Project.

2.0 PROJECT DESCRIPTION

The Project will use arrays of ground-mounted photovoltaic (PV) modules, commonly known as solar panels, to provide renewable energy to the Kentucky bulk power transmission system. Solar panels will be affixed to a metal racking system mounted on piles in rows or arrays. Arrays will be grouped in separate, contiguous clusters, and all of the array clusters will be within a contiguous agricultural-style fence (Figure 2-1), which will be gated for equipment security and public safety.

There are two PV array layouts currently proposed for the Project, one of which consists of a single-axis tracking-style racking system, while the other consists of a fixed-tilt style racking system. For the fixed-tilt layout, the arrays will be oriented in a roughly east-west direction and tilted 28 degrees to face southward toward the sun. For the single-axis tracking layout, arrays will face east at sunrise, rotate throughout the day, and end up facing west at sunset. The panel arrays will be connected to inverters which will convert the direct current (DC) power generated by the solar panels to alternating current (AC). From the inverters, a series of below-ground interconnection cables will deliver the electricity to the collector substation. At the collector substation, the voltage will be stepped-up to allow connection to the regional electrical grid via a point of interconnection (POI) at the existing Bonnyman Substation, owned by Kentucky Power, a wholly-owned subsidiary of American Electric Power.

Figure 2-1. Proposed Project Layout



3.0 VISUAL STUDY AREA INVENTORY

This section includes a description of the visual environment associated with the Project Area and VSA and an inventory of visually sensitive resources within the VSA. A 2-mile radius around the proposed Project Area was defined as the VSA. EDR has determined through multiple solar facility visual assessments that any potential visual impacts resulting from the Project will be contained within 2 miles of the Project Area. The VSA covers approximately 24.7 square miles (15,833 acres) and includes portions of Perry County and a very small portion of Leslie County to the southwest. The location and extent of the VSA is illustrated in Figure 3-3.

3.1 Topography

The Project Area occupies an area formerly used for surface coal mining which is situated atop a large topographic feature rising from a distinct meander in the North Fork Kentucky River. The site is bordered by the North Fork Kentucky River on the south and west sides. As a reclaimed surface coal mine, the Project Area contains some terraced areas and some areas with sparse vegetative cover. The Project Area topography ranges from 1,435 feet on the east side to 970 feet on the west side. The entire former mine is surrounded on all sides by dense forest vegetation. Because the former coal extraction at the site involved a practice known as mountaintop removal, the Project Area can be thought of as a shelf, beyond which the topography descends sharply to the North Fork Kentucky River (Figure 3-1 and Figure 3-2).

Figure 3-1. North to South Cross Section Illustrating Project Area Topography

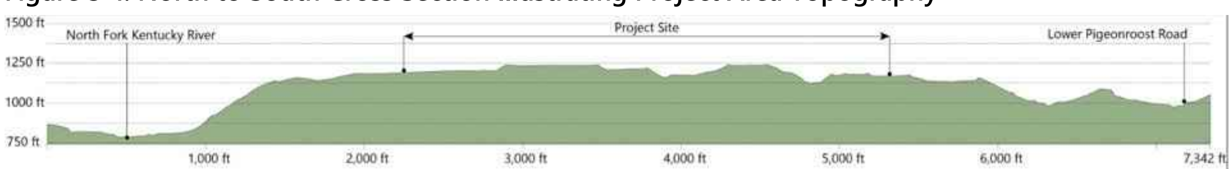


Figure 3-2. East to West Cross Section Illustrating Project Area Topography

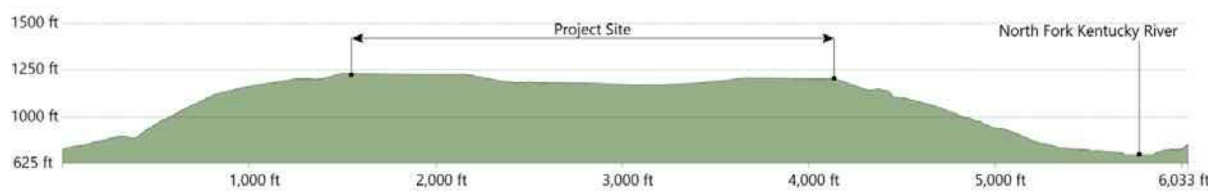
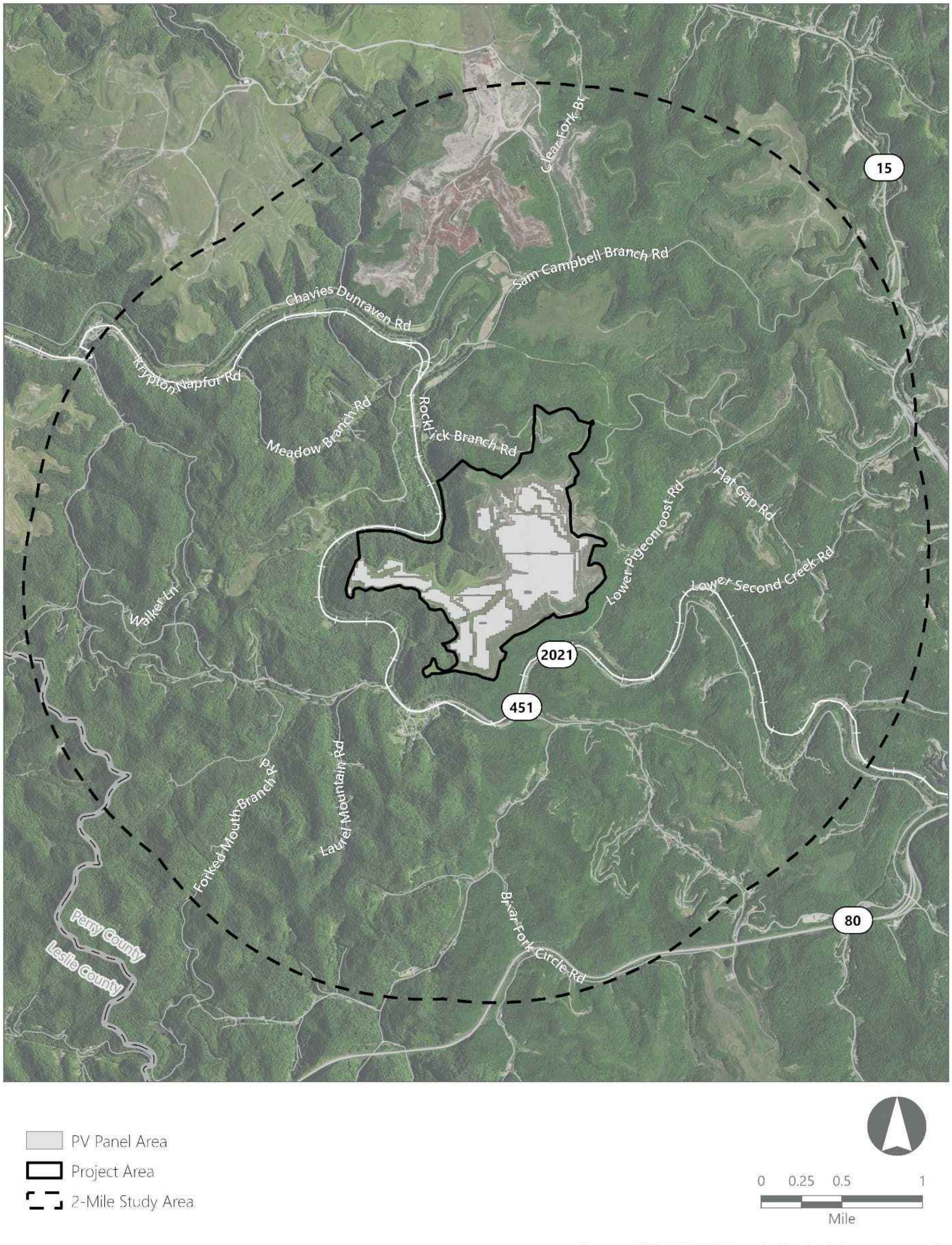


Figure 3-3. Visual Study Area



3.2 Land Cover

A desktop review of available land cover data was conducted to further characterize the VSA. According to the 2019 U.S. Geological Survey (USGS) National Landcover Database (NLCD), the VSA consists primarily of forested land, which makes up approximately 76% or 19 square miles. Low intensity development (typically including house lots and roads) and pasture/grasslands cumulatively make up about 16% or 4 square miles. Approximately 1 square mile (2%) of the VSA consist of active or former mining land, which is classified by the NLCD as "barren land." The remainder of the VSA consists of open water (0.3%), developed land (1%), and scrub shrub vegetation (4.4%).

3.3 Visually Sensitive Resources

Neither Kentucky nor Perry County specifically identify resources or regions that may qualify as sensitive to visual change. However, drawing from guidance in other states (New York and Ohio), EDR has identified specific categories of designated scenic or aesthetic resources and public viewing locations, described in this report as visually sensitive resources (VSRs). These VSRs include the following:

- **Properties of Historic Significance:** National Historic Landmarks; sites listed on the State or National Registers of Historic Places (S/NRHP); properties eligible for listing on the S/NRHP; National or State Historic Sites
- **Designated Scenic Resources:** Rivers designated as National or State Wild, Scenic, or Recreational; sites, areas, lakes, highways, or overlooks designated or eligible for designation as scenic; scenic areas of statewide significance; other designated scenic resources
- **Public Lands and Recreational Resources:** National Parks, Recreation Areas, Seashores, and/or Forests; Heritage Areas; State Parks; State nature and historic preserve areas; state forest preserve lands; wildlife management areas/wildlife refuges; state forests; other state lands; state boat launches/waterway access sites; designated trails; local parks and recreation areas; publicly accessible conservation lands/easements; rivers and streams with public fishing rights easements; named lakes, ponds, and reservoirs
- **High Use Public Areas:** State, U.S., and interstate highways; cities; schools

A total of eight VSRs were identified within the VSA. A discussion of VSRs that occur within the Project viewshed is presented in Section 5.3.

4.0 VIEWSHED ANALYSIS METHODOLOGY

To identify areas where views of the proposed Project would potentially be available, a digital surface model (DSM) viewshed analysis was conducted. A DSM viewshed analysis evaluates potential Project visibility considering the screening effects of topography, structures, and vegetation. A viewshed analysis based on a bare earth digital elevation model (DEM) considering topography alone is not provided because the results of such an analysis do not accurately represent areas of potential Project visibility within the VSA, due to their exclusion of surface screening elements such as vegetation and buildings. Because it accounts for the screening provided by topography, vegetation, and structures, the DSM viewshed analysis is a more accurate representation of Project visibility than a DEM viewshed. The DSM viewshed analysis for the proposed Project was prepared using the following data and parameters:

- A DSM created using the 2017 USGS lidar dataset
- Sample points representing PV panel locations placed 200 feet apart in a grid pattern throughout all proposed PV arrays
- An assumed maximum PV panel height of 15 feet applied to each sample point
- An assumed viewer height of 6 feet
- Esri ArcGIS Pro® software with the Spatial Analyst extension

A few modifications were made to the lidar-derived DSM prior to analysis to increase the accuracy of results. Existing transmission lines and road-side utility lines that are included in the lidar data are generally misrepresented in DSMs as solid walls/screening features. In order to correct this inaccuracy, DSM elevation values within transmission line corridors and within 50 feet of road centerlines were replaced with bare earth elevation values. It is important to note that this clearing of the DSM may also eliminate legitimate roadside screening features, which may result in an overstatement of potential visibility along road corridors within the VSA. In addition to the clearing process described for existing transmission lines and road-side utilities, all DSM elevation values within the Project's proposed limits of disturbance were replaced with bare earth elevation to reflect potential vegetation clearing, site clearing, or demolition in these locations. This process was also applied to areas within and adjacent to the Project Area that have apparently been cleared of trees since 2017 when the lidar data were collected in order to better reflect existing conditions of the surrounding area. This modified DSM was then used as a base layer for the viewshed analysis.

Once the viewshed analysis was completed, a conditional statement was used within ArcGIS® to set the solar panel visibility to zero in locations where the DSM elevation exceeded the bare earth elevation by 6 feet or more, indicating the presence of vegetation or structures that exceed viewer height. This was done for two reasons: 1) in locations where trees or structures are present in the DSM, the viewshed would reflect visibility from the vantage point of standing on the tree top or building roof, which is not the intent of this analysis; and, 2) to reflect the fact that ground-level vantage points within buildings or areas of vegetation exceeding 6 feet (1.8 meters) in height generally will be screened from views of the solar panels.

It should be noted that because certain characteristics of the Project and the VSA that may serve to restrict visibility (color, atmospheric/weather conditions, distance from viewer, human visual acuity, etc.) are not taken into consideration in the viewshed analysis, being located within the DSM viewshed does not necessarily equate to actual Project visibility, nor does it indicate that adverse visual impacts will occur within these geographic locations. There is also the possibility of the DSM overstating visual screening, and therefore underestimating visibility, in locations where views are available through deciduous trees during the dormant season (leaf-off conditions).

5.0 PROJECT VISIBILITY

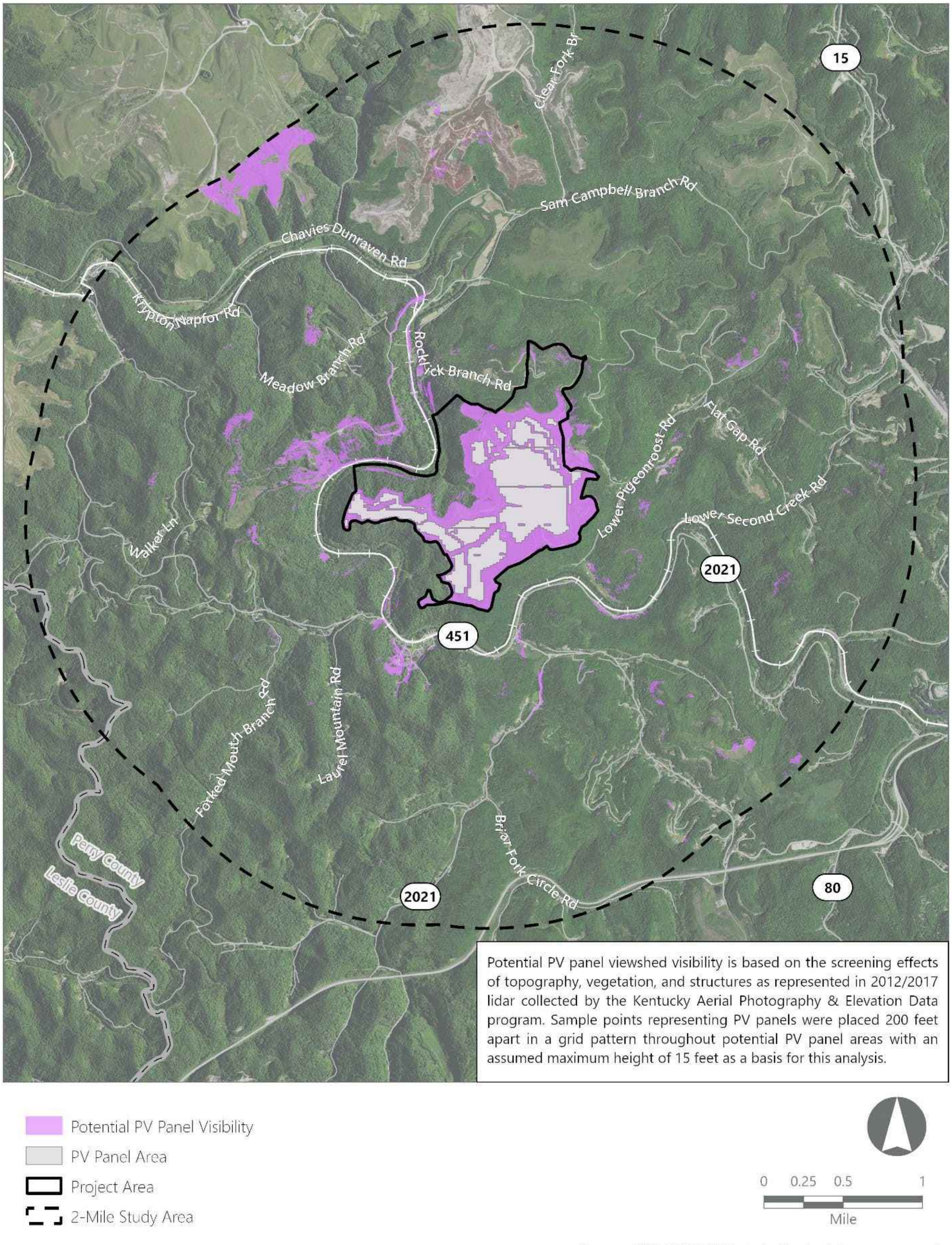
This section describes the potential visibility of the Project within the VSA based on the viewshed results, field verification of those results, and visibility from identified VSRs.

5.1 Viewshed Results

Within the VSA, the DSM viewshed analysis suggests that 870 acres, or 5.5% of the VSA, has potential views of some portion of the proposed Project; this area is referred to as the area of potential effect (APE). Of the APE, 67% (584 acres) occurs within the Project Area itself; therefore, only 286 acres, or 2% of the VSA, has potential visibility of the Project from offsite locations (Figure 5-1).

Predicted visibility of the Project appears to mainly occur on elevated mountain sides that have been cleared of vegetation as a result of mining operations or along roads traversing nearby hillsides. For example, one of the largest areas of contiguous visibility occurs northwest of Napfor, north of Chavies Dunraven Road, near the limit of the VSA. In this area, the mountain top appears to have remediated terraces along with a network of unimproved access roads meandering across the top. There appears to be minimal site access for the public, and it appears unlikely that the site contains any visual resources of concern. Additional areas of potential visibility occur to the northwest of the Project Area along Meadow Branch Road and Left Wilder Road. Again, this road appears to be primarily associated with a coal extraction mine and railroad loading facility. Several small, discrete areas of potential visibility are indicated along Couchtown Road, which hosts a number of small communities, including residences and businesses. These small areas of visibility are south of the Project and occur in sporadic areas within 1 mile of the Project Area. A number of these areas were visited during field review to determine the extent of potential visibility, as described in Section 5.2.

Figure 5-1. DSM Viewshed Result



5.2 Field Verification

On September 8, 2022, EDR conducted a site visit for the purposes of documenting potential views toward the proposed Project and to verify the viewshed analysis results. During the site visit, weather conditions were partly cloudy and visibility was high. The photographer visited locations along public roads and within the Project viewshed and took a series of photographs in the direction of the Project. The context of each location was captured by taking individual photographs covering an approximate 180-degree arc. Field review suggests that areas with Project visibility will be substantially fewer and smaller than suggested by the viewshed analysis. For example, viewpoint 3 (Figure 5-2) was photographed from State Route 451 in the direction of the Project. As illustrated in the photograph, substantial vegetation on top of the middle ground hill (which would remain in place) is likely to substantially or completely screen the proposed Project from this location.

Figure 5-2. Viewpoint 3 looking northeast from State Route 451

Similarly, viewpoint 4 (Figure 5-3) is looking northeast toward the Project and again, substantial vegetation bordering the Project Area offers significant screening. While glimpses of the Project may be available from this location during leaf-off conditions, the views will be limited to specific, discrete locations that would likely go unnoticed to casual observers. Similar results were observed at seven separate locations throughout the VSA and the field review determined that, while the viewshed results are likely overstated, opportunities for discrete views may be available toward the proposed Project. However, these views will likely only be of a very small portion of the Project and are not likely to affect the scenic quality of the view or the observer's experience.

Figure 5-3. Viewpoint 4 looking northeast from State Route 451

5.3 Visibility From Visually Sensitive Resources

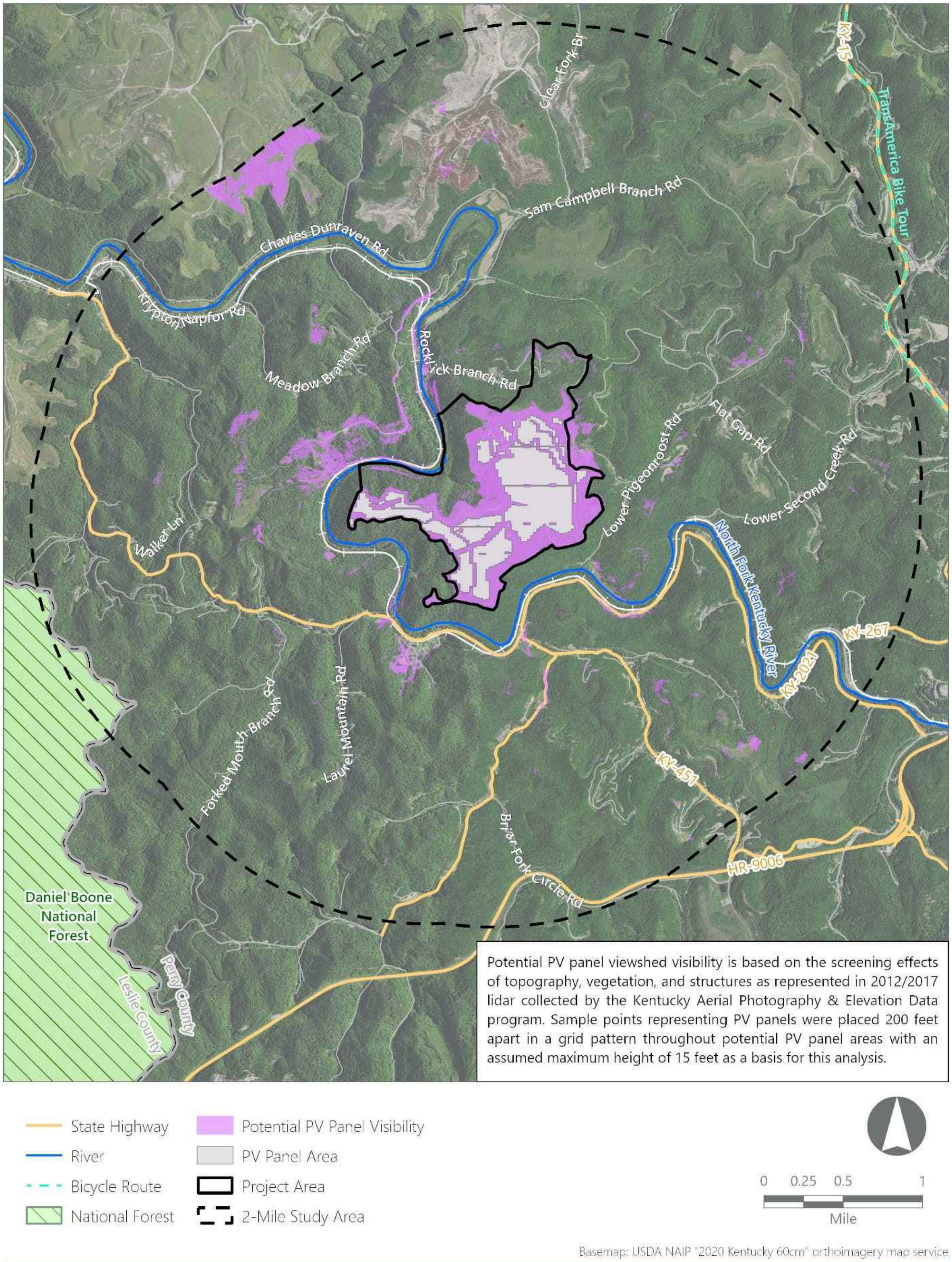
Of the eight VSRs identified within the VSA, four were indicated to occur within the Project viewshed (Table 5-1). See Figure 5-4 for mapped locations of the VSRs.

Table 5-1. Visually Sensitive Resources with Potential Project Visibility

Visually Sensitive Resource	County	Distance from Project Area	Nature of Potential Visibility
Daniel Boone National Forest	Leslie County	1.7 miles	The viewshed indicated a very small, non-descript area of potential visibility at the boundary of the forest. Because the area of potential visibility is so small and occurs in a remote forested area, it is not likely for viewers to see the Project from this location.
North Fork Kentucky River	Perry County	0.0 miles	Portions of the banks of the North Fork Kentucky River occur within the Project viewshed. Field review confirmed that, while discrete views toward the Project may be available, the Project would not be noticed by casual observers due to the presence of extensive, tall vegetation surrounding the Project Area. This was confirmed at viewpoints 1, 2, 3, and 4.
Kentucky State Route 2021	Perry County	0.2 mile	A portion of this highway follows the aforementioned North Fork Kentucky River and the visibility results are very similar. Field review confirmed that, while tightly framed views may include very small portions of the Project, it would likely go unnoticed by casual observers.

Visually Sensitive Resource	County	Distance from Project Area	Nature of Potential Visibility
Kentucky State Route 451	Perry County	0.2 mile	This road also runs along the North Fork Kentucky River in the vicinity of the Project, and the visibility results are similar to those of Kentucky State Route 2021. State Route 451 and State Route 2021 are concurrent for approximately one quarter mile where both routes turn away from the North Fork Kentucky River. As the visibility results are similar to those of State Route 2021, it is not anticipated that this resource will have visibility of significant portions of the Project, and any views will be discrete and will only include very small portions of the Project. This type of visibility is likely to go completely unnoticed by observers.

Figure 5-4. Visually Sensitive Resources within the VSA



6.0 CONCLUSIONS

As described previously, the viewshed analysis suggests that only 286 acres, or 2% of the VSA, has potential visibility of the Project from offsite locations. Eight VSRs were identified within the VSA, and four were determined by the DSM viewshed analysis to have potential views of some portion of the Project. As discussed in Section 5.3, the identified views include such small pockets of potential visibility that viewers are unlikely to see/recognize Project components.

The Project is located on the former site of a surface coal mine, situated on top of a topographic feature and surrounded by vegetation. Because the vegetation bordering the site will largely remain intact, there will be significant screening of the relatively low-profile Project components. Due to the lack of visibility throughout the VSA, the Project will not result in adverse visual effects from any visual resources.

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Bright Mountain Solar Project
Site Assessment Report
Case No. 2022-00274

Exhibit I – Solar Glare Analysis Report

Solar Glare Analysis Report

Bright Mountain Solar Project

Perry County, Kentucky

Case No. 2022-00274

Prepared for:

Bright Mountain Solar, LLC
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August 2023

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1.0 FACILITY OVERVIEW

Bright Mountain Solar, LLC (Bright Mountain or the Applicant), a wholly-owned subsidiary of Avangrid Renewables, LLC, is proposing to construct and operate the Bright Mountain Solar Project in Perry County, Kentucky (hereafter referred to as the Facility). This report, prepared by Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR), provides an assessment of the potential for glare and glint produced by the proposed solar panels that could be experienced at residences, airports, and roadways located near the proposed Facility.

The Facility is proposed to be to be located on a reclaimed, mountaintop-removal coal mine site in an unincorporated area of Perry County, Kentucky. The Facility area is approximately 2.5 miles west of Hazard and 9 miles east of Buckhorn, Kentucky (Figure 1). Topography in the vicinity of the Facility is variable, with elevations ranging from approximately 970 feet above mean sea level (amsl) to 1,435 feet amsl. Land cover near the Facility is dominated by forests and mining operations, with single-family residences generally located along road frontages. The area immediately surrounding the Facility is dominated by mature trees that provide substantial screening.

The Applicant is proposing the use of either "fixed-tilt" racking or single-axis "tracking" photovoltaic (PV) arrays. Each PV array will be comprised of linear rows of PV modules. For the fixed-tilt layout, the arrays will be oriented in a roughly east-west direction and tilted 28 degrees to face southward toward the sun. The tracking arrays would be oriented in a north-south direction and equipped with electric motors that slowly rotate the PV panels to track the movement of the sun and minimize the angle of incidence between the sun and the panels. The tracking PV arrays will have a 52-degree resting angle (i.e., will face east at sunrise). With the tracking arrays, the height of the panels will vary as the structures tilt to follow the sun throughout the day, with a maximum height of approximately 15 feet, while the fixed-tilt arrays will have a set height of 10 feet. For this analysis, the panels were combined into one contiguous solar array area, which covered a total of approximately 365 acres of land and represented the maximum buildout of the Facility (Figure 2).

As further described in the next section of this report, tracking PV arrays maintain low incidence angles by following the sun's position throughout the day. This increases the amount of incoming solar radiation absorbed by the panels and limits the amount reflected. For this reason, tracking PV arrays rarely reflect enough sunlight to produce retinal irradiance values sufficient to result in glare with potential to cause a temporary after-image. Therefore, this report will focus on the potential for glare to occur from the fixed-tilt design.

Figure 1. Regional Facility Location

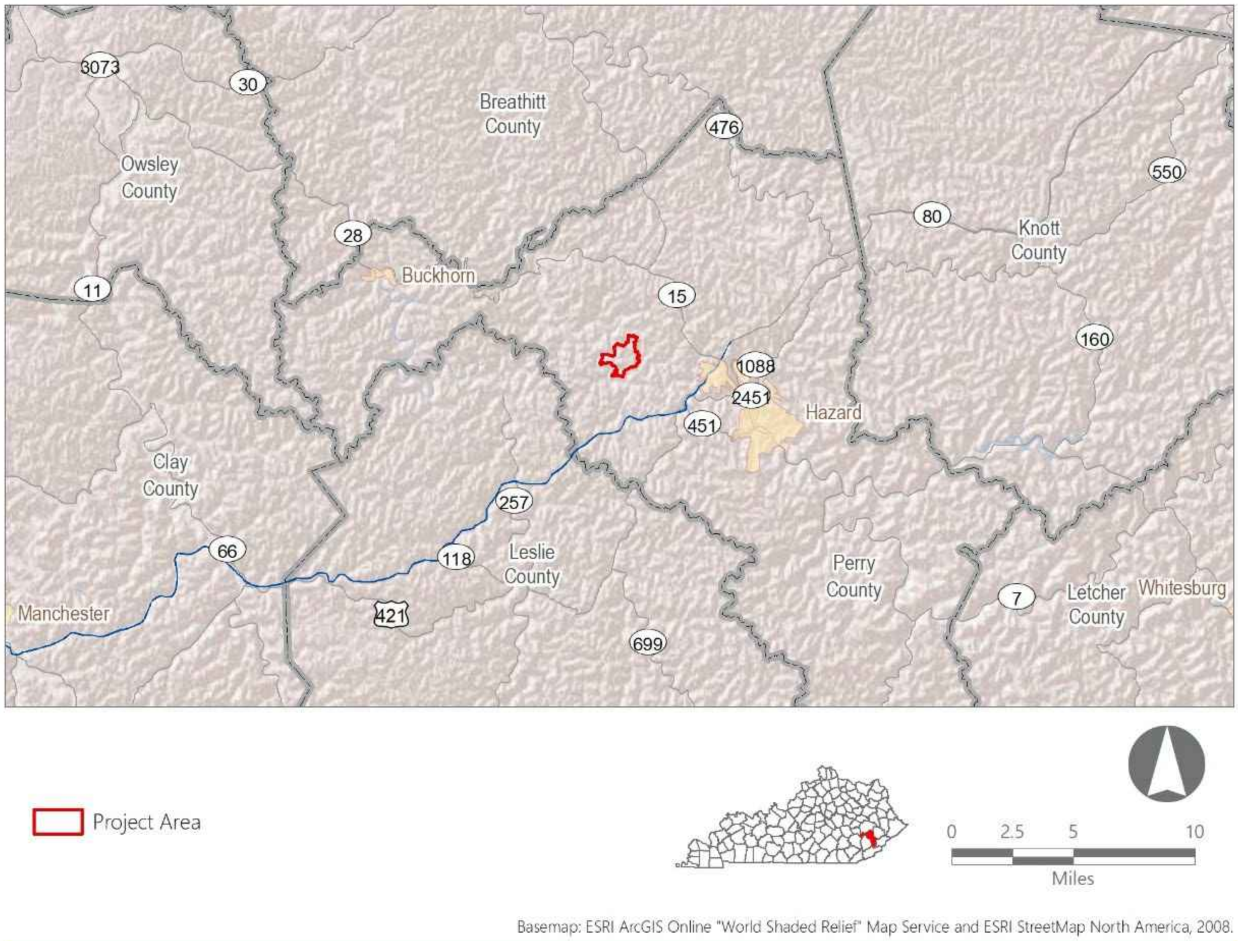

Figure 2. Approximate Facility PV Area

Basemap: USDA NAIP "2020 Kentucky 2-foot" orthoimagery map service

2.0 BACKGROUND

Glare and glint are closely related, but distinct, types of reflections from flat-plane surfaces. Glare is defined as a continuous source of bright light, whereas glint is defined as a momentary flash of bright light. Both glint and glare are common in the existing environment. The sun and artificial light sources can cause glare or glint either directly (such as from a sunset when driving westbound) or indirectly (such as from the sun's reflection off a lake or glass window). Glare can be received by observers that are either stationary or moving, whereas glint is generally possible only when the observer is moving rapidly, as is often the case with motorists and aviators. As an example, a motorist traveling along a lake with a forested shoreline may have only brief glimpses of sunlight reflected off the water at sunset (i.e., glint), whereas an adjacent home with visibility of the water through a break in the foliage may have a continuous source of bright light (i.e., glare) while sunlight strikes the water at a certain angle.

The potential effects of glare include annoyance impacts, such as distraction, after-image in the viewer's vision, or temporary avoidance of a view due to the presence of reflected light (Dwyer, 2017; Slana, 2018); safety impacts, such as the potential to disorient motorists or pilots (Auffray et al., 2008; Ho et al., 2011; Riley and Olson, 2011); and human health impacts, such as permanent retinal damage (Ho et al., 2009).[1] Although less pronounced when compared to glare, the effects of glint are similar and have been conservatively treated the same as glare in all analyses presented in this report. Accordingly, reflected light from the PV panels is collectively referred to as glare in the remainder of this report.

There is an inverse correlation between light absorption and reflection, and PV panels are designed to absorb as much of the solar spectrum as possible to maximize efficiency. Virtually all PV panels installed in recent years have at least one anti-reflective (AR) coating to minimize reflection and maximize absorption. However, the front-facing surfaces of PV modules are smooth, specular surfaces that have the potential to reflect incoming solar radiation at high incidence angles, much like windows on a building or the surface of a pond or lake at sunrise or sunset (Parretta et al., 1999).

Under clear sky conditions, fixed-tilt PV arrays can produce glare in the early morning and evening when the sun is low on the horizon and the incidence angle between the PV panels and the sun is approximately 60 degrees or greater (Riley and Olsen, 2011). Unlike fixed-tilt systems, tracking PV arrays maintain relatively low incidence angles and thereby minimize the potential for glare to be produced.

Glare that may be produced by a flat-plate PV array can be separated into two general categories: glare with a potential to cause a temporary after-image (i.e., "yellow glare") and glare with a low potential to produce an after-image (i.e., "green glare").[2] After-image is when an image continues to appear in the eyes after the exposure has occurred. Green glare is relatively low in intensity and is unlikely to produce an after-image. Yellow glare is similar in intensity to glare received from other sources regularly encountered by

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1. Human health impacts are typically only associated with concentrating solar power plants or other concave reflective surfaces (e.g., concave curtain wall buildings) that concentrate the incoming solar radiation. Flat-plate PV systems, such as the proposed Facility, do not produce the retinal irradiance levels necessary to result in permanent retinal damage.
2. "Red" glare, which is glare that has the potential to cause eye damage, is typically not possible for non-concentrating solar energy facilities such as the proposed Facility.

motorists (e.g., the rising or setting sun and the reflection of the sun off water features, windows, curtain wall buildings, and other smooth surfaces), and has the potential to temporarily affect nearby receptors.

In order to accurately determine the occurrence, duration, and intensity of glare produced by a PV system at a given observation point, the following information is needed:

(1) Location, orientation, and reflectance of the PV panels;
(2) Location of the observation point;
(3) Position of the sun;
(4) Direct Normal Irradiance (DNI – see definition below); and
(5) Geospatial characteristics of any topography, vegetation, buildings, or other potential obstructions located between the observation point and the PV panels producing glare, and between the PV panels and the sun.

With these inputs, the location and duration of glare can be predicted using computer modeling programs together with follow-up visibility and climatological analyses, as needed.

The following terms are commonly used for glare assessments.

Direct Normal Irradiance (DNI):	The amount of solar radiation received per unit area by a surface that is always held perpendicular to the rays that come in a straight line from the sun at its current position in the sky.
Diffuse Solar Radiation:	Solar radiation scattered by molecules and particles in the atmosphere.
Direct Solar Radiation:	Solar radiation that has travelled from the sun to the earth's surface in a straight line without scattering. Direct radiation is the component of solar radiation that causes visible glare from flat-plate photovoltaic systems.
Glare:	A source of bright reflected light.
Incidence Angle:	The angle between the direct component of insolation (i.e., the sun) and a ray perpendicular to the PV panel.
PV Panels:	Photovoltaic panels that are fixed to a ground-mounted racking system. On this Facility, both fixed-tilt and single-axis tracking system options are proposed.
Solar Array:	A contiguous group of PV panels.
Specular Reflection:	The mirror-like reflection of waves, such as light, from a surface.

3.0 METHODS

ForgeSolar, an industry standard commercial software based on the Solar Glare Hazard Analysis Tool (SGHAT) that was developed by Sandia National Laboratories, was used to evaluate the potential for glare for this Facility. This software was initially developed for use by the Federal Aviation Administration (FAA) in evaluating safety impacts to pilots while landing aircraft (Ho et al., 2015). The scope of SGHAT's analytical capabilities has expanded to include the potential for a PV system to produce glare that may be received by terrestrial receptors, such as residences and motorists. ForgeSolar provides a quantified assessment of when and where glare may occur throughout the year from solar installations, as well as identifying the potential effects on the human eye when glare does occur. However, the application of this tool in determining the occurrence, duration, and intensity of glare ensures a conservative analysis, because it is based on a completely clear sky and bare earth model (i.e., it does not take into account atmospheric conditions that scatter incoming solar radiation and terrestrial obstructions that visually block the receipt of glare by an observer). Accordingly, SGHAT outputs represent the worst-case scenario.

No consistent national, state, county, or local standards exist that set parameters that could be used to guide the development of a study area for assessing solar glare. However, standards developed in other countries may provide some guidance. In Germany and Switzerland, solar glare assessments must be conducted for all dwellings that are located within 100 meters of a solar-powered electric generating facility (Zehndorfer Engineering, 2019). For this Facility, glare was analyzed for the following potentially sensitive receptors:

(1) The 40 nearest habitable structures (e.g. residences, commercials buildings) from the Facility (i.e., the maximum number of receptors the model will input).
(2) Airports; however, no airports are located within 2 miles of the Facility. [3]

Residences evaluated in this analysis are labeled and shown in Figure 3. Input variables and assumptions used for solar glare modeling calculations for the proposed Facility are described below in Table 1 and in detail in Appendix A.

To more accurately calculate the potential for glare to be visible at the receptors, ForgeSolar allows for the input of obstructions (i.e., trees, buildings, etc.). Obstructions may provide screening of the residences or they may block incoming sun from reaching the panels and thus prevent glare from occurring. Where these obstructions do not completely block a receptor's view of the PV arrays, they often disrupt that view. To account for obstructions at the Facility, EDR utilized aerial imagery and lidar data, in addition to field confirmation. The majority of the Facility is screened by dense vegetation, with a general height over 50 feet. As such, the height of obstacles was placed at 50 feet across the Facility.

3. A 2-mile radius was selected in this case as ForgeSolar's modeling software uses a 2-mile approach/departure distance (i.e., the selected study area is large enough to include not only adjacent airports, but potential approach/departure routes that intersect the Facility as well).

Figure 3. Nearest 40 Receptors

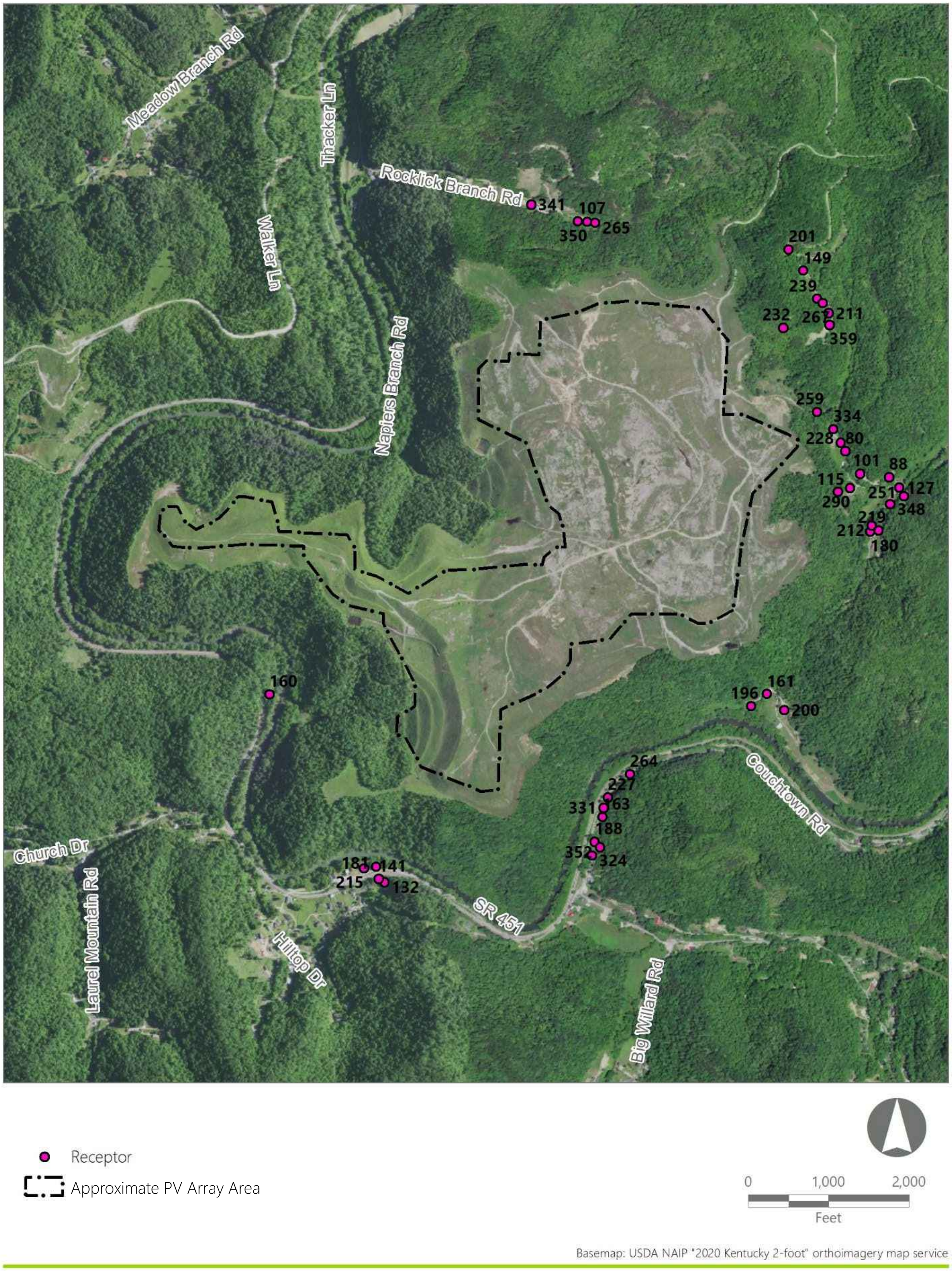

Table 1. Summary of SGHAT Model Inputs

Group	Parameter	Purpose	Value
	DNI:	The maximum DNI at the given location at solar noon. This variable is given in units Watts (W)/m^2. The peak DNI at solar noon is approximately 1,000 W/m^2 on a clear, sunny day.	Variable, based on sun position
	Receptor height:	Height above ground of the average human eye viewing level.	5.4 feet
	Array height:	Height above ground for the highest height and average height of the solar panels.	10 feet (maximum)
	Axis tracking:	Indicates the type of tracking used by the panels (if any).	N/A (fixed-tilt racking used)
Fixed-Tilt	Orientation of array:	Orientation of the array in degrees, measured clockwise from true north.	180° (facing south)
Fixed-Tilt	Tilt of solar panels:	Tilt (elevation angle) of the modules in degrees, where 0° is facing up and 90° is facing horizontally.	28 °
Single-Axis Tracking	Tilt of tracking axis:	The elevation angle of the tracking axis in degrees, where 0° is facing up and 90° is facing horizontally. The panels rotate about the tracking axis.	N/A (fixed-tilt racking used)
Single-Axis Tracking	Orientation of tracking axis:	The orientation of the tracking axis in degrees, measured clockwise from true north. Panels facing south at solar noon would have an orientation of 180°. Panels facing east at solar noon would have an orientation of 90°.	N/A (fixed-tilt racking used)
Single-Axis Tracking	Offset angle of module:	The vertical offset angle between the tracking axis and the panel (if any).	N/A (fixed-tilt racking used)
Single-Axis Tracking	Maximum tracking angle:	The maximum angle the panel will rotate in both the clockwise and counterclockwise directions.	N/A (fixed-tilt racking used)
Single-Axis Tracking	Resting angle:	The angle at which the panel will rest overnight.	N/A (fixed-tilt racking used)
	Module surface material:	The type of material comprising the PV modules.	Smooth glass w/ AR coating

4.0 RESULTS

Results from the glare analysis determined that no glare would be received at any of the identified residences. As the Facility is significantly screened, this result is expected. Results show that no red glare is modeled to occur at any location. Appendix A provides a detailed breakdown of the results for each receptor evaluated.

5.0 CONCLUSIONS

On behalf of the Applicant, EDR conducted a baseline solar glare analysis using ForgeSolar's SGHAT software to identify potential glare impacts that may result from operation of the Facility. This analysis was conducted using industry standard methods and model inputs. The results of this analysis indicate that none of the 40 potentially sensitive receptors closest to the Facility will receive glare from the proposed PV arrays. Because the Facility is not anticipated to result in any glare impacts to identified receptors, no impact avoidance or mitigation measures are necessary.

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Appendix A

ForgeSolar Glare Analysis

FORGESOLAR GLARE ANALYSIS

Project: **Bright Mountain Solar**
Site configuration: **Bright Mountain**

Created 01 Dec, 2022
Updated 06 Dec, 2022
Time-step 1 minute
Timezone offset UTC-5
Site ID 80390.14005
Category 100 MW to 1 GW
DNI peaks at 1,000.0 W/m^2
Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
Methodology V2

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
1	28.0	180.0	0	0.0	0	0.0	-

Total annual glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 80	0	0.0	0	0.0
OP 88	0	0.0	0	0.0
OP 101	0	0.0	0	0.0
OP 107	0	0.0	0	0.0
OP 115	0	0.0	0	0.0
OP 127	0	0.0	0	0.0
OP 132	0	0.0	0	0.0
OP 141	0	0.0	0	0.0
OP 149	0	0.0	0	0.0
OP 160	0	0.0	0	0.0
OP 161	0	0.0	0	0.0
OP 163	0	0.0	0	0.0
OP 180	0	0.0	0	0.0
OP 181	0	0.0	0	0.0
OP 188	0	0.0	0	0.0
OP 196	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 200	0	0.0	0	0.0
OP 201	0	0.0	0	0.0
OP 211	0	0.0	0	0.0
OP 212	0	0.0	0	0.0
OP 215	0	0.0	0	0.0
OP 219	0	0.0	0	0.0
OP 227	0	0.0	0	0.0
OP 228	0	0.0	0	0.0
OP 232	0	0.0	0	0.0
OP 239	0	0.0	0	0.0
OP 251	0	0.0	0	0.0
OP 259	0	0.0	0	0.0
OP 264	0	0.0	0	0.0
OP 265	0	0.0	0	0.0
OP 267	0	0.0	0	0.0
OP 290	0	0.0	0	0.0
OP 324	0	0.0	0	0.0
OP 331	0	0.0	0	0.0
OP 334	0	0.0	0	0.0
OP 341	0	0.0	0	0.0
OP 348	0	0.0	0	0.0
OP 350	0	0.0	0	0.0
OP 352	0	0.0	0	0.0
OP 359	0	0.0	0	0.0

Component Data

PV Arrays

Name: 1
Axis tracking: Fixed (no rotation)
Tilt: 28.0°
Orientation: 180.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.296760	-83.285390	1196.49	10.00	1206.49
2	37.296170	-83.285400	1187.01	10.00	1197.01
3	37.294210	-83.285550	1163.06	10.00	1173.06
4	37.294210	-83.284680	1194.33	10.00	1204.33
5	37.293560	-83.282750	1197.88	10.00	1207.88
6	37.293390	-83.282360	1200.39	10.00	1210.39
7	37.293120	-83.282360	1193.36	10.00	1203.36
8	37.291540	-83.284250	1191.44	10.00	1201.44
9	37.289780	-83.284710	1209.06	10.00	1219.06
10	37.287570	-83.285030	1205.06	10.00	1215.06
11	37.287090	-83.286090	1212.88	10.00	1222.88
12	37.287100	-83.286510	1217.65	10.00	1227.65
13	37.287400	-83.287300	1223.89	10.00	1233.89
14	37.287390	-83.289390	1235.44	10.00	1245.44
15	37.286520	-83.290300	1239.57	10.00	1249.57
16	37.286350	-83.291950	1243.85	10.00	1253.85
17	37.285760	-83.291980	1239.08	10.00	1249.08
18	37.285270	-83.292340	1233.33	10.00	1243.33
19	37.284780	-83.293080	1233.06	10.00	1243.06
20	37.284100	-83.294920	1237.12	10.00	1247.12
21	37.281370	-83.295010	1203.47	10.00	1213.47
22	37.281310	-83.295730	1201.06	10.00	1211.06
23	37.282120	-83.298300	1113.71	10.00	1123.71
24	37.282640	-83.298640	1057.03	10.00	1067.03
25	37.283150	-83.299000	1003.03	10.00	1013.03
26	37.283200	-83.299370	968.62	10.00	978.62
27	37.283840	-83.299330	981.52	10.00	991.52
28	37.284180	-83.298600	1050.57	10.00	1060.57
29	37.284940	-83.298570	1095.82	10.00	1105.82
30	37.286980	-83.299960	1153.12	10.00	1163.12
31	37.287330	-83.299960	1179.63	10.00	1189.63
32	37.287590	-83.301390	1157.06	10.00	1167.06
33	37.287970	-83.302130	1172.68	10.00	1182.68
34	37.289260	-83.303390	1182.02	10.00	1192.02
35	37.289610	-83.303380	1179.06	10.00	1189.06
36	37.289660	-83.305900	1174.38	10.00	1184.38
37	37.289500	-83.308120	1165.46	10.00	1175.46
38	37.289570	-83.309000	1164.25	10.00	1174.25
39	37.290120	-83.309580	1157.40	10.00	1167.40
40	37.290780	-83.309520	1153.33	10.00	1163.33
41	37.290920	-83.309160	1157.19	10.00	1167.19
42	37.290920	-83.308800	1155.38	10.00	1165.38
43	37.290410	-83.308460	1163.29	10.00	1173.29
44	37.290150	-83.308000	1164.06	10.00	1174.06
45	37.290550	-83.306980	1153.79	10.00	1163.79
46	37.290870	-83.306630	1155.74	10.00	1165.74
47	37.291270	-83.306220	1156.06	10.00	1166.06
48	37.291260	-83.305860	1159.45	10.00	1169.45
49	37.291110	-83.304760	1163.70	10.00	1173.70
50	37.290470	-83.304530	1174.96	10.00	1184.96
51	37.290110	-83.304460	1174.02	10.00	1184.02
52	37.290020	-83.301910	1171.04	10.00	1181.04
53	37.290010	-83.301550	1173.06	10.00	1183.06
54	37.289540	-83.301200	1174.28	10.00	1184.28
55	37.288840	-83.301200	1183.73	10.00	1193.73
56	37.288610	-83.300270	1185.11	10.00	1195.11
57	37.288030	-83.298900	1226.15	10.00	1236.15
58	37.288270	-83.298420	1227.42	10.00	1237.42
59	37.288820	-83.297310	1231.06	10.00	1241.06

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 80	80	37.293000	-83.280330	1025.50	5.40
OP 88	88	37.292130	-83.278430	1020.40	5.40
OP 101	101	37.292240	-83.279670	1007.10	5.40
OP 107	107	37.300750	-83.291800	996.00	5.40
OP 115	115	37.291610	-83.280620	1019.00	5.40
OP 127	127	37.291790	-83.277980	979.40	5.40
OP 132	132	37.278190	-83.299820	848.60	5.40
OP 141	141	37.278300	-83.300060	830.60	5.40
OP 149	149	37.299130	-83.282160	1182.70	5.40
OP 160	160	37.284550	-83.304800	822.30	5.40
OP 161	161	37.284710	-83.283560	822.30	5.40
OP 163	163	37.280470	-83.290540	850.40	5.40
OP 180	180	37.290270	-83.279220	978.90	5.40
OP 181	181	37.278700	-83.300160	823.80	5.40
OP 188	188	37.279630	-83.290860	851.80	5.40
OP 196	196	37.284290	-83.284230	828.90	5.40
OP 200	200	37.284170	-83.282820	846.10	5.40
OP 201	201	37.299860	-83.282810	1250.50	5.40
OP 211	211	37.297700	-83.281070	1185.40	5.40
OP 212	212	37.290490	-83.279150	980.80	5.40
OP 215	215	37.278650	-83.300700	829.40	5.40
OP 219	219	37.290330	-83.278860	998.80	5.40
OP 227	227	37.281140	-83.290320	845.10	5.40
OP 228	228	37.293290	-83.280490	1031.70	5.40
OP 232	232	37.297180	-83.283000	1242.00	5.40
OP 239	239	37.298180	-83.281560	1181.00	5.40
OP 251	251	37.291470	-83.277800	999.40	5.40
OP 259	259	37.294320	-83.281530	1064.70	5.40
OP 264	264	37.281940	-83.289370	856.70	5.40
OP 265	265	37.300700	-83.291070	1006.80	5.40
OP 267	267	37.298030	-83.281330	1181.90	5.40
OP 290	290	37.291760	-83.280080	993.10	5.40
OP 324	324	37.279160	-83.290980	865.90	5.40
OP 331	331	37.280790	-83.290490	843.40	5.40
OP 334	334	37.293750	-83.280830	1046.00	5.40
OP 341	341	37.301310	-83.293820	974.90	5.40
OP 348	348	37.291210	-83.278380	985.90	5.40
OP 350	350	37.300740	-83.291400	1002.20	5.30
OP 352	352	37.279450	-83.290630	876.00	5.40
OP 359	359	37.297300	-83.281040	1194.80	5.40

Obstruction Components

Name: Obstruction 1
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.299639	-83.295811	1246.10
2	37.299468	-83.294824	1251.80
3	37.299144	-83.293890	1256.70
4	37.298845	-83.292967	1258.70
5	37.299067	-83.292013	1217.50
6	37.299135	-83.290940	1195.10
7	37.299383	-83.290210	1192.30
8	37.299494	-83.289320	1175.10
9	37.299195	-83.288676	1164.30
10	37.299374	-83.288097	1123.20

Name: Obstruction 10
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.288778	-83.309638	1130.00
2	37.288727	-83.309198	1131.40
3	37.288625	-83.308533	1129.00
4	37.288582	-83.307481	1132.90
5	37.288599	-83.306880	1120.30
6	37.288667	-83.306140	1104.30
7	37.288864	-83.305421	1118.20
8	37.288795	-83.304767	1110.50
9	37.288667	-83.303930	1123.60
10	37.288582	-83.302986	1154.90

Name: Obstruction 2
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.288582	-83.304059	1113.10
2	37.288390	-83.303109	1146.60
3	37.287839	-83.302739	1131.90
4	37.287361	-83.302310	1129.90
5	37.286986	-83.302042	1122.20
6	37.286559	-83.301741	1110.00
7	37.286602	-83.300786	1133.30
8	37.286550	-83.300261	1135.80
9	37.286230	-83.299944	1130.80
10	37.285671	-83.299649	1116.50

Name: Obstruction 3
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.285603	-83.287148	1118.26
2	37.285603	-83.286499	1099.47
3	37.285757	-83.285818	1091.73
4	37.285876	-83.285228	1081.22
5	37.286094	-83.284305	1067.00
6	37.286422	-83.283715	1066.67
7	37.287400	-83.283490	1116.58
8	37.287908	-83.282996	1118.71
9	37.288505	-83.282138	1110.63
10	37.289154	-83.281559	1118.03

Name: Obstruction 5
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.283085	-83.292963	1121.80
2	37.282666	-83.293060	1117.30
3	37.282180	-83.293124	1098.60
4	37.281966	-83.293350	1110.70
5	37.281804	-83.293586	1123.80
6	37.281420	-83.293736	1120.30
7	37.281036	-83.293790	1110.10
8	37.280549	-83.294004	1103.80
9	37.280344	-83.294262	1107.00
10	37.280182	-83.294809	1111.00

Name: Obstruction 5A
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.283247	-83.293682	1150.07
2	37.284049	-83.292277	1138.55
3	37.284263	-83.291805	1131.44
4	37.284442	-83.291097	1119.49
5	37.284741	-83.290410	1125.24
6	37.285159	-83.289530	1127.59
7	37.285637	-83.289004	1143.78
8	37.286064	-83.288087	1163.20
9	37.285684	-83.287618	1130.76
10	37.285611	-83.287234	1120.68

Name: Obstruction 6
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.280677	-83.302008	1081.70
2	37.280805	-83.301686	1095.80
3	37.280874	-83.300967	1090.60
4	37.280899	-83.300377	1086.10
5	37.280788	-83.300002	1068.60
6	37.280515	-83.299615	1037.10
7	37.280473	-83.299143	1016.10
8	37.280720	-83.298789	1070.60
9	37.280968	-83.298242	1113.90
10	37.280959	-83.297695	1117.80

Name: Obstruction 7
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.294757	-83.283151	1115.74
2	37.294279	-83.282464	1125.25
3	37.293515	-83.282056	1145.95
4	37.292922	-83.281584	1128.08
5	37.292448	-83.281316	1101.93
6	37.291966	-83.281681	1109.71
7	37.291940	-83.282410	1127.24
8	37.291112	-83.282593	1135.21
9	37.290489	-83.281724	1140.66
10	37.289179	-83.281396	1107.59

Name: Obstruction 8
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.283238	-83.299873	966.88
2	37.283571	-83.300227	947.08
3	37.284041	-83.300270	963.52
4	37.284135	-83.299755	994.61
5	37.284203	-83.299218	1025.31
6	37.284502	-83.298896	1059.63
7	37.284894	-83.298939	1083.65
8	37.285210	-83.299234	1097.32
9	37.285697	-83.299529	1124.31

Name: Obstruction 9
Top height: 50.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	37.297932	-83.284953	1262.50
2	37.297505	-83.284706	1234.40
3	37.297249	-83.284266	1230.20
4	37.297087	-83.283934	1229.90
5	37.296925	-83.283987	1215.20
6	37.296686	-83.284181	1175.70
7	37.296387	-83.283977	1163.50
8	37.295952	-83.284063	1133.00
9	37.295572	-83.284272	1119.70
10	37.294902	-83.284223	1130.80

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
1	28.0	180.0	0	0.0	0	0.0	-

Total annual glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 80	0	0.0	0	0.0
OP 88	0	0.0	0	0.0
OP 101	0	0.0	0	0.0
OP 107	0	0.0	0	0.0
OP 115	0	0.0	0	0.0
OP 127	0	0.0	0	0.0
OP 132	0	0.0	0	0.0
OP 141	0	0.0	0	0.0
OP 149	0	0.0	0	0.0
OP 160	0	0.0	0	0.0
OP 161	0	0.0	0	0.0
OP 163	0	0.0	0	0.0
OP 180	0	0.0	0	0.0
OP 181	0	0.0	0	0.0
OP 188	0	0.0	0	0.0
OP 196	0	0.0	0	0.0
OP 200	0	0.0	0	0.0
OP 201	0	0.0	0	0.0
OP 211	0	0.0	0	0.0
OP 212	0	0.0	0	0.0
OP 215	0	0.0	0	0.0
OP 219	0	0.0	0	0.0
OP 227	0	0.0	0	0.0
OP 228	0	0.0	0	0.0
OP 232	0	0.0	0	0.0
OP 239	0	0.0	0	0.0
OP 251	0	0.0	0	0.0
OP 259	0	0.0	0	0.0
OP 264	0	0.0	0	0.0
OP 265	0	0.0	0	0.0
OP 267	0	0.0	0	0.0
OP 290	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 324	0	0.0	0	0.0
OP 331	0	0.0	0	0.0
OP 334	0	0.0	0	0.0
OP 341	0	0.0	0	0.0
OP 348	0	0.0	0	0.0
OP 350	0	0.0	0	0.0
OP 352	0	0.0	0	0.0
OP 359	0	0.0	0	0.0

PV: 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 80	0	0.0	0	0.0
OP 88	0	0.0	0	0.0
OP 101	0	0.0	0	0.0
OP 107	0	0.0	0	0.0
OP 115	0	0.0	0	0.0
OP 127	0	0.0	0	0.0
OP 132	0	0.0	0	0.0
OP 141	0	0.0	0	0.0
OP 149	0	0.0	0	0.0
OP 160	0	0.0	0	0.0
OP 161	0	0.0	0	0.0
OP 163	0	0.0	0	0.0
OP 180	0	0.0	0	0.0
OP 181	0	0.0	0	0.0
OP 188	0	0.0	0	0.0
OP 196	0	0.0	0	0.0
OP 200	0	0.0	0	0.0
OP 201	0	0.0	0	0.0
OP 211	0	0.0	0	0.0
OP 212	0	0.0	0	0.0
OP 215	0	0.0	0	0.0
OP 219	0	0.0	0	0.0
OP 227	0	0.0	0	0.0
OP 228	0	0.0	0	0.0
OP 232	0	0.0	0	0.0
OP 239	0	0.0	0	0.0
OP 251	0	0.0	0	0.0
OP 259	0	0.0	0	0.0
OP 264	0	0.0	0	0.0
OP 265	0	0.0	0	0.0
OP 267	0	0.0	0	0.0
OP 290	0	0.0	0	0.0
OP 324	0	0.0	0	0.0
OP 331	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 334	0	0.0	0	0.0
OP 341	0	0.0	0	0.0
OP 348	0	0.0	0	0.0
OP 350	0	0.0	0	0.0
OP 352	0	0.0	0	0.0
OP 359	0	0.0	0	0.0

1 and OP 80

Receptor type: Observation Point
No glare found

1 and OP 88

Receptor type: Observation Point
No glare found

1 and OP 101

Receptor type: Observation Point
No glare found

1 and OP 107

Receptor type: Observation Point
No glare found

1 and OP 115

Receptor type: Observation Point
No glare found

1 and OP 127

Receptor type: Observation Point
No glare found

1 and OP 132

Receptor type: Observation Point
No glare found

1 and OP 141

Receptor type: Observation Point
No glare found

1 and OP 149

Receptor type: Observation Point
No glare found

1 and OP 160

Receptor type: Observation Point
No glare found

1 and OP 161

Receptor type: Observation Point
No glare found

1 and OP 163

Receptor type: Observation Point
No glare found

1 and OP 180

Receptor type: Observation Point
No glare found

1 and OP 181

Receptor type: Observation Point
No glare found

1 and OP 188

Receptor type: Observation Point
No glare found

1 and OP 196

Receptor type: Observation Point
No glare found

1 and OP 200

Receptor type: Observation Point
No glare found

1 and OP 201

Receptor type: Observation Point
No glare found

1 and OP 211

Receptor type: Observation Point
No glare found

1 and OP 212

Receptor type: Observation Point
No glare found

1 and OP 215

Receptor type: Observation Point
No glare found

1 and OP 219

Receptor type: Observation Point
No glare found

1 and OP 227

Receptor type: Observation Point
No glare found

1 and OP 228

Receptor type: Observation Point
No glare found

1 and OP 232

Receptor type: Observation Point
No glare found

1 and OP 239

Receptor type: Observation Point
No glare found

1 and OP 251

Receptor type: Observation Point
No glare found

1 and OP 259

Receptor type: Observation Point
No glare found

1 and OP 264

Receptor type: Observation Point
No glare found

1 and OP 265

Receptor type: Observation Point
No glare found

1 and OP 267

Receptor type: Observation Point
No glare found

1 and OP 290

Receptor type: Observation Point
No glare found

1 and OP 324

Receptor type: Observation Point
No glare found

1 and OP 331

Receptor type: Observation Point
No glare found

1 and OP 334

Receptor type: Observation Point
No glare found

1 and OP 341

Receptor type: Observation Point
No glare found

1 and OP 348

Receptor type: Observation Point
No glare found

1 and OP 350

Receptor type: Observation Point
No glare found

1 and OP 352

Receptor type: Observation Point
No glare found

1 and OP 359

Receptor type: Observation Point
No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

Bright Mountain Solar Project
Site Assessment Report
Case No. 2022-00274

Exhibit J – Decommissioning Plan

DECOMMISSIONING PLAN

Bright Mountain Solar, LLC

BLACK & VEATCH PROJECT NO. 411507
B&V FILE NO. 25.2000

PREPARED FOR:

Bright Mountain Solar, LLC
2701 NW Vaughn St, Suite 300
Portland, Oregon 97210

12 DECEMBER 2022

BLACK & VEATCH

Table of Contents

1.0 Introduction

Bright Mountain Solar Project, LLC ("Bright Mountain Solar", "Owner") contracted with Black & Veatch to prepare a decommissioning plan for the Bright Mountain Solar Project ("Project") proposed on approximately 800 acres of leased land located in Perry County, Kentucky.

This decommissioning plan ("Plan") addresses the end-of-life removal of the Project and return of the land to its pre-use condition to the extent practicable. The purpose of this Plan is to outline the procedures to decommission the facility and to restore the properties to the original site condition to the greatest extent possible after the operational life of the Project. Estimated costs are provided based on the solar field design and associated facilities proposed for the Project.

Bright Mountain Solar will commit to financial assurance for decommissioning with Perry County as a beneficiary.

The Project components consist of photovoltaic (PV) modules mounted on a racking system, inverters with transformers (inverter skids), underground electrical collection system, electrical substation and associated facilities, solar meteorological station, supervisory control and data acquisition (SCADA) hardware, private gravel access roads with gated ingress/egress points, and security fencing. Temporary facilities associated with initial project construction will include a laydown yard that will serve as facilities for construction office trailers and logistics area for handling and loading material. Collectively, the facilities listed in this paragraph comprise the "Project Facilities." See Exhibit A–Site Plan for further details of the proposed Project.

The site restoration process will include removal of above and below ground equipment to a depth up to 36" associated with the Project, including the electrical substation. Any electrical casing or conduit that crosses public roads, buried utilities, and sensitive areas (wetlands, etc.) will remain in place to minimize disruption to the land and other facilities. Gravel access roads will be removed unless the landowner requests that they remain in place.

2.0 Solar Facility Components

The primary components of the Project include the following solar components and associated infrastructure. For the Bright Mountain Project, the solar PV facility may employ either a fixed tilt design or a single-axis tracking (SAT) design. From a decommissioning perspective, the fixed tilt design is considered more conservative (i.e., having a greater decommissioning effort), as it would have greater quantities of installed PV modules. Therefore, this decommissioning plan has been developed considering a fixed tilt design for the project. The quantities listed are preliminary and subject to change as detailed design is not yet complete.

- PV modules: 196,784
- Racking system: 3,514 racks
- Steel foundation posts: 24,597
- Collector Substation: one main power transformer, control enclosure with associated data monitoring equipment, electrical breakers and switches, miscellaneous steel structures and concrete foundations.
- Inverter Skids: 21
- Data monitoring systems (i.e., SCADA): 1
- Private gravel access roads: 26,100 feet
- Security fencing: 28,050 feet

3.0 Decommissioning Process

The Owner will be responsible for removal of all above ground solar equipment, facilities, devices, roads, foundations, solar inverters, substation, electrical lines, and any other property designed and used primarily for the purpose of generating and transferring electric energy at the end of the Project's commercial operation. Underground facilities such as electrical cable, concrete foundations, and support posts/piles will be removed to a depth of 36 inches.

Decommissioning will include removal of all PV modules, racking system, support posts, inverter skids, above grade cable, transformers, and substation equipment. Removal of site access roads and security fencing is also included. Site grading performed during Project construction will remain, including any stormwater facilities installed. Standard decommissioning practices will be used for dismantlement and scrap material will be recycled, sold for salvage value, or disposed of appropriately. All applicable local and state approvals and permits for the removal of the Project facilities will be obtained prior to the start of decommissioning.

4.0 Removal and Disposal of Components

The decommissioning contractor will be responsible for the removal of equipment and materials as described previously, making sure they are recycled or properly disposed of.

The removal and disposal of Project components are listed below:

PV modules: The PV modules will be transported to a local recycling facility and the salvageable material from the modules is assumed to offset the cost of transportation.

Racking System: The racking system will be disassembled, transported to a salvage yard, and sold as scrap.

Steel Foundation Posts: All steel posts for racking will be removed to a depth of at least 36 inches and processed to a size appropriate for transportation to a nearby salvage yard. The steel will be sold for scrap value. Posts may be removed the full depth at contractor discretion, as this may be a more cost-effective approach.

Underground Collection System: The underground electrical collection system will be removed to a depth of 36 inches or greater if practical.

Inverter Skids: The estimate includes removal of the inverter skids. The internal components (mainly copper core and coil) will be separated from the electronics and will be sold as scrap.

Substation: Substation removal is included in the decommissioning scope of work. All electrical equipment components, including transformers, will be disassembled, and separated into bins for transportation to a salvage yard or landfill. All copper, steel, and aluminum are assumed to be extracted from the equipment for its salvage value. All transformer oil will be drained and properly disposed of.

Concrete Foundations: The estimate includes removal of foundations for the inverter skid to a depth of 36 inches or greater if practical. It also includes removal of substation concrete foundations to a depth of 36 inches or greater if practical. All concrete will be crushed and transported off site.

Fencing: Fencing will be the removed, unless requested to be kept by the landowners through mutual agreement, from around the perimeter of the solar field and the collector substation. The metal from the fencing and posts will be sold as scrap.

Access Roads: All access roads will be removed, unless requested to keep by the landowners through mutual agreement. This estimate includes costs for the removal of aggregate access roads to their design depth. If access roads are to be removed, fill material will be placed to grade the road areas level with surrounding areas. Any possible salvage value of the aggregate is assumed to be offset by the costs associated with transporting the aggregate off site and re-screening by an aggregate recycler.

5.0 Site Restoration

The Owner will restore the site as noted above unless the landowner(s) request that certain site features may remain for future use. Given that the site is former surface coal mine land, those areas that are restored will be returned to an open field and will be planted with a suitable seed mix. The site restoration plan includes the following:

1. Minimize new disturbance and removal of native vegetation during the decommissioning process.
2. Removal of all above and below grade foundations, equipment, and access roads to the design depth and backfill with suitable material.
3. Any topsoil removed during decommissioning will be stockpiled and reused for restoration. The topsoil will be spread to assist new vegetation.
4. The soil will be stabilized and planted with seed mix suitable for the soil conditions with local seed sources where feasible.
5. During and after the decommissioning process, temporary site erosion and sediment control measures will be in place for disturbed areas where the potential for erosion exists, consistent with stormwater management requirements.

6.0 Estimate Assumptions

The decommissioning costs detailed in Section 7.0 include labor and material expenses for removal of PV modules, steel posts, transformers and inverters, access roads, perimeter fencing, cable, and other Project Facilities. The estimate provided includes both the cost of decommissioning (including site restoration) and the salvage value from the recovered materials. Solar components anticipated to have a resale or salvage value are as noted in Section 7. Salvaging for scrap value and reselling these valuable materials is a common practice in demolition and decommissioning of facilities because of the high value of these components.

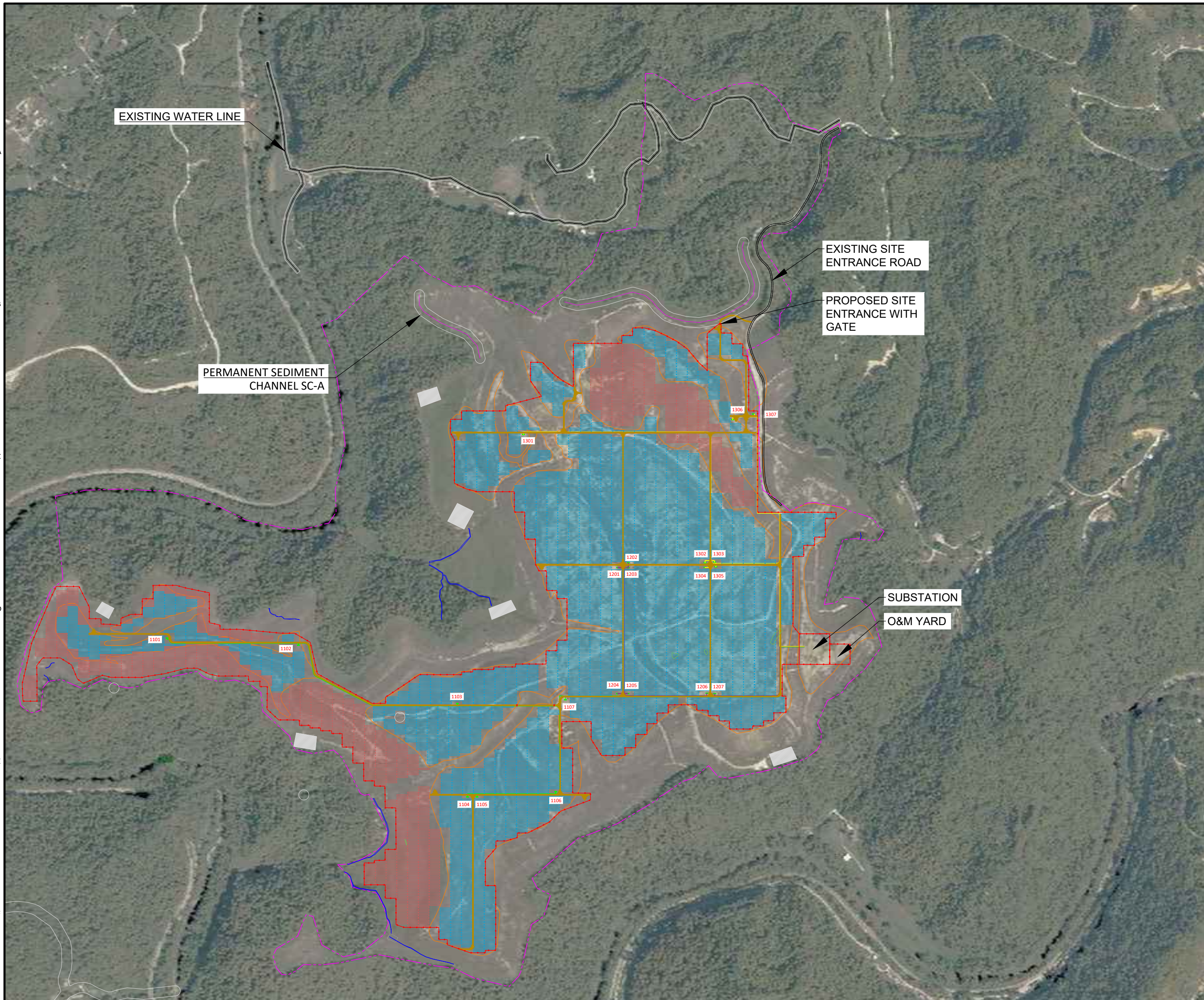
Materials that have no value at the time of decommissioning will be recycled when possible or hauled offsite to a licensed solid waste disposal facility. The cost of removal, transportation, and disposal is included in this estimate.

1. Initial decommissioning cost is based on fourth quarter (Q4) 2022 US Dollars and includes net salvage values.
2. Quantities are based on the Project reference drawing “Bright Mountain Conceptual Solar Site Layout FT, BRM-E-800-02” dated 25 August 2022. See Exhibit A.
3. The estimate includes costs for new materials required for restoration.
4. Decommissioning contractor overhead and profit (indirect costs) are included in the estimate and are based on a percentage of the direct costs.
5. Approximate weights of salvageable metals were calculated and included in the salvage cost estimate.
6. The estimated salvage material was separated into classifications such as bare copper, insulated copper wire, aluminum, and steel. The cost estimate is based on the salvage weight and approximate scrap value for each material classification in order to determine the total salvage value and net total cost.
7. Based on an end of project life decommissioning assumption, the module re-sale value will be zero; Therefore, the modules will be transported to a local recycling facility and the recoverable salvage material is assumed to offset the cost of off-site transportation.

7.0 Cost Estimate

Decommissioning Task Description	Cost ($ 2022)
Site Restoration	$ 1,354,930
Remove Racking	$ 1,005,707
Posts Removal	$ 410,651
Module Removal	$ 750,904
Cable and Inverter Removal	$ 978,067
Substation Demolition	$ 81,719
Indirect Costs (Construction Equipment, Supervision, General Conditions)	$ 1,646,546
Contingency	$ 622,852
Contractor Overhead and Profit	$ 934,387
Total Gross Decommissioning Cost	**$ 7,785,763**
Salvageable Material	$ (1,146,763)
Net Decommissioning Cost	**$ 6,639,000**

Exhibit A: Site Plan



SYSTEM SPECIFICATIONS	
CLIENT	Avangrid
SITE LOCATION	Perry, Kentucky
SYSTEM STC DC RATING (MW)	103.39
SYSTEM AC RATING AT POI (MW)	73.85
DC/AC RATIO	1.4
MODULE MANUFACTURER	Longi
MODULE MODEL	LR5-72HBD-540M
MODULE STC DC RATING (W)	540
MODULE COUNT	191,464
MODULE PER STRING	28
STRING COUNT	6838
INVERTER MANUFACTURER	PE
INVERTER MODEL	HEM FS4200M
INVERTER NAMEPLATE (kVA)	4200
QUANTITY OF INVERTERS	21
PCS TRANSFORMER RATING (kVA @ 50°)	3900
QUANTITY OF TRANSFORMERS	21
DC SYSTEM VOLTAGE (V)	1500
SYSTEM VOLTAGE (kV)	34.5
RACKING MANUFACTURER	Sol Components
RACKING SYSTEM	Fixed
TILT ANGLE	28
AZIMUTH	Custom Azimuth
GCR	0.5625
PITCH (FEET)	26.214
2 STRING RACKS (2P X 28 RACKS)	3419
TOTAL SITE BOUNDARY (ACRES)	804.5
TOTAL BUILDABLE AREA (ACRES)	338.0

LEGEND

- PROPERTY LINE
- PROPOSED ROADS
- FENCE LINE
- PV MODULES (2 STRING RACK)
- INVERTER SKID
- SEDIMENT CHANNEL
- CATCH BASINS
- POSSIBLE FUTURE MODULES
- DELINEATED STREAM

NOT TO BE USED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER SHALL VERIFY TRACEABILITY OF THIS DRAWING TO THE LATEST CONTROLLED VERSION

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
E	06/13/23	RE-ISSUED FOR INFORMATION	JJS		JJB	JJB	
D	05-24-23	RE-ISSUED FOR INFORMATION	VB		JJB	JJB	
C	05/16/23	RE-ISSUED FOR INFORMATION	JJS		JJB	JJB	
B	05/01/23	RE-ISSUED FOR INFORMATION	JJS		JJB	JJB	
A	08/25/22	ISSUED FOR INFORMATION	KBS		DCP	DCP	

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N

0 500' 1000'
1"= 500'

BLACK & VEATCH

DESIGNER | DRAWN
CHECKED | DATE

AVANGRID
BRIGHT MOUNTAIN

CONCEPTUAL SOLAR SITE LAYOUT
FT

PROJECT | DRAWING NUMBER: BRM-E-800-02 | REV: E
CODE
AREA