Request No. 1:

Provide a copy of the report from the Kentucky Office of State Archelogy as soon as it is available.

Response No. 1:

Based on the absence of a federal nexus and the results of the Blue Moon Solar Project Critical Issues Analysis Report, Section 5-5, no Section 106 review is required to be provided to the Kentucky Office of State Archaeology. See attached Critical Issues Analysis Report.

Responding Witness: Jayce Walker

Critical Issues Analysis Report

Blue Moon Solar Project
Blue Moon Energy LLC

Harrison County, Kentucky

Cardno
Shaping the Future

Document Information

Prepared for	Blue Moon Energy LLC & Recurrent Energy
Project Name	Blue Moon Solar Project
Project Number	E320201601
Project Manager	Chad Martin
Date	April 27, 2020

Prepared for:

Recurrent Energy
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Prepared by:

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Acronyms

FEMA	Federal Emergency Management Agency
GIS	Geographic information systems
IPaC	Information for Planning and Consultation
KDFWR	Kentucky Department of Fish and Wildlife Resources
KGS	Kentucky Geological Survey
KHC	Kentucky Heritage Council
KSNCP	Kentucky State Natural Preserve Commission
NHD	National Hydrographic Dataset
NOI	Notice of National Hydrography Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTCHS	National Technical Committee for Hydric Soils
NWP	Nation Wide Permit
NWI	National Wetland Inventory
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
TNW	Traditionally Navigable Water
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geologic Survey
USEPA	Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WOUS	Waters of the U.S.

1 Executive Summary

Cardno was contracted by Blue Moon LLC, a wholly owned subsidiary of Recurrent Energy (Recurrent) to conduct a desktop environmental assessment on twenty agricultural tracts consisting of 1,825 acres, referenced as the Blue Moon Properties (Project) in Harrison County, Kentucky. The tasks performed as part of this environmental assessment included reviews of threatened and endangered (T&E) species, potential Waters of the U.S. (WOUS), and cultural resources. The methodology, results, and recommendations of the reviews as they pertain to the Project site are contained within and summarized below.

Cardno reviewed federal and state resources to determine if habitat may exist for listed species within the Project area. In total, there are ten federally listed endangered species and two federally listed threatened species with the potential to occur within or be affected by the Project. No critical habitat was identified within the Project area.

Potential habitat for federally listed bat species would be limited to forested areas within the Project area that may contain roosting trees (trees with loose bark or hollows greater than 5 inches DBH). A thorough habitat survey per U.S. Fish and Wildlife Service (USFWS) guidelines would need to be conducted in order to rule out potential roosting and/or foraging habitat within all forested areas of the Project. Formal presence/absence surveys are recommended should forested habitat be impacted during active bat season (mid-April through October).

Although seven federally listed freshwater mussel species are contained within the USFWS Information for Planning and Consultation (IPaC) list as potentially being affected by the Project, consideration for these species is not necessary given that potential impacts as a result of Project activities would not be anticipated to reach the South Fork Licking River.

The Project area could contain habitat for the federally listed endangered running buffalo clover, Short's goldenrod, and Virginia spiraea. Presence/absence surveys during the listed species flowering seasons: running buffalo clover's (April-August), Short's goldenrod (August-October) and Virginia spiraea (June-July) are recommended.

The USFWS National Wetland Inventory (NWI) mapping service and National Hydrography Dataset (NHD) were reviewed to determine if potential WOUS that would be considered jurisdictional by the U.S. Army Corps of Engineers (USACE), exist within the Project area. In total, **28** ponded areas and **13** streams were identified within the Project area. No wetlands were identified by the NWI within the Project area. From the desktop perspective, all ponded areas appear to be isolated, and 10 streams appear to function as ephemeral drainages between ponds, that lack a significant nexus to a Traditional Navigable Waterway (TNW). Only three streams, including South Fork Indian Creek and two unnamed tributaries, appear to possess a significant nexus to Indian Creek, which flows to the South Fork Licking River, a TNW.

The presence/absence of jurisdictional wetlands and streams cannot be determined through desktop analysis alone. A final determination of wetland status requires taxonomic classification of vegetation, review of hydrology, an identification of hydric soils. Field site visits are recommended to determine these criteria in potential wetland features, and to delineate the boundaries of all potential WOUS to determine potential nexus with a TNW. Identified wetland and waterbody features that are determined to possess a significant nexus to a TNW would most likely be considered jurisdictional under USACE guidance.

According to the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL), approximately 25.5 acres of the Project area occur within the 100-Year Floodplain of South Indian Creek. Additional permitting from the Fleming and Mason counties Floodplain Administrators may be required if construction will take place in these areas.

If any streams and/or wetlands are deemed 'jurisdictional' by the USACE, and will sustain impacts, the proposed Project could be completed under a Nationwide Permit (NWP) 12 and/or 51. Additionally, the Project would need to develop a Storm Water Pollution Prevention Plan (SWPPP) and provide Notice of Intent (NOI) prior to Project construction. As stated in the text of the NWPs, the discharge of dredged or fill material into wetlands and non-tidal WOUS must not cause the loss of greater than ½-acre of wetlands and non-tidal WOUS, including the loss of no more than 300 linear feet of stream bed. If impacts from the construction of the energy generation facility and associated infrastructure including roads, parking lots, stormwater management facilities, and pipelines permanently impact less than ½-acre then the Project may proceed under a NWP. Permanent impacts which exceed the ½-acre threshold for NWPs will require an Individual Permit.

Cardno performed a search for potential sinkhole areas utilizing Geographic Information Systems (GIS) data from the Kentucky Geological Survey (KGS). **One** sinkhole area comprising 0.3 acres was identified within the Project area.

Cardno's cultural resource specialists reviewed information regarding known archeological and historic sites, as well as prior cultural resources studies, available through the Kentucky Office of State Archaeology and Kentucky Heritage Council (April 2020). Cardno also reviewed USGS topographic maps, current, and historic aerial imagery for evidence of historic use within the Project area. Desktop analysis of the Project area identified 11 cultural resource surveys and seven archaeological sites recorded within one-mile of the Project area. Five surveyed historic structures were identified within the Project area, one was determined to be a National Register of Historic Places (NRHP). The research and historic value of any of these resources is not understood at this time, and would need to be evaluated as the project develops.

2 Introduction

Cardno was contracted by Blue Moon LLC, a wholly owned subsidiary of Recurrent Energy to perform a desktop assessment of potential habitat for federally listed T&E species, cultural resources, and WOUS that may exist within the Project area in Harrison County, Kentucky (**Figure 2-1**). The Project area consists of approximately 1,825 acres of land that was assessed by Cardno in April of 2020.

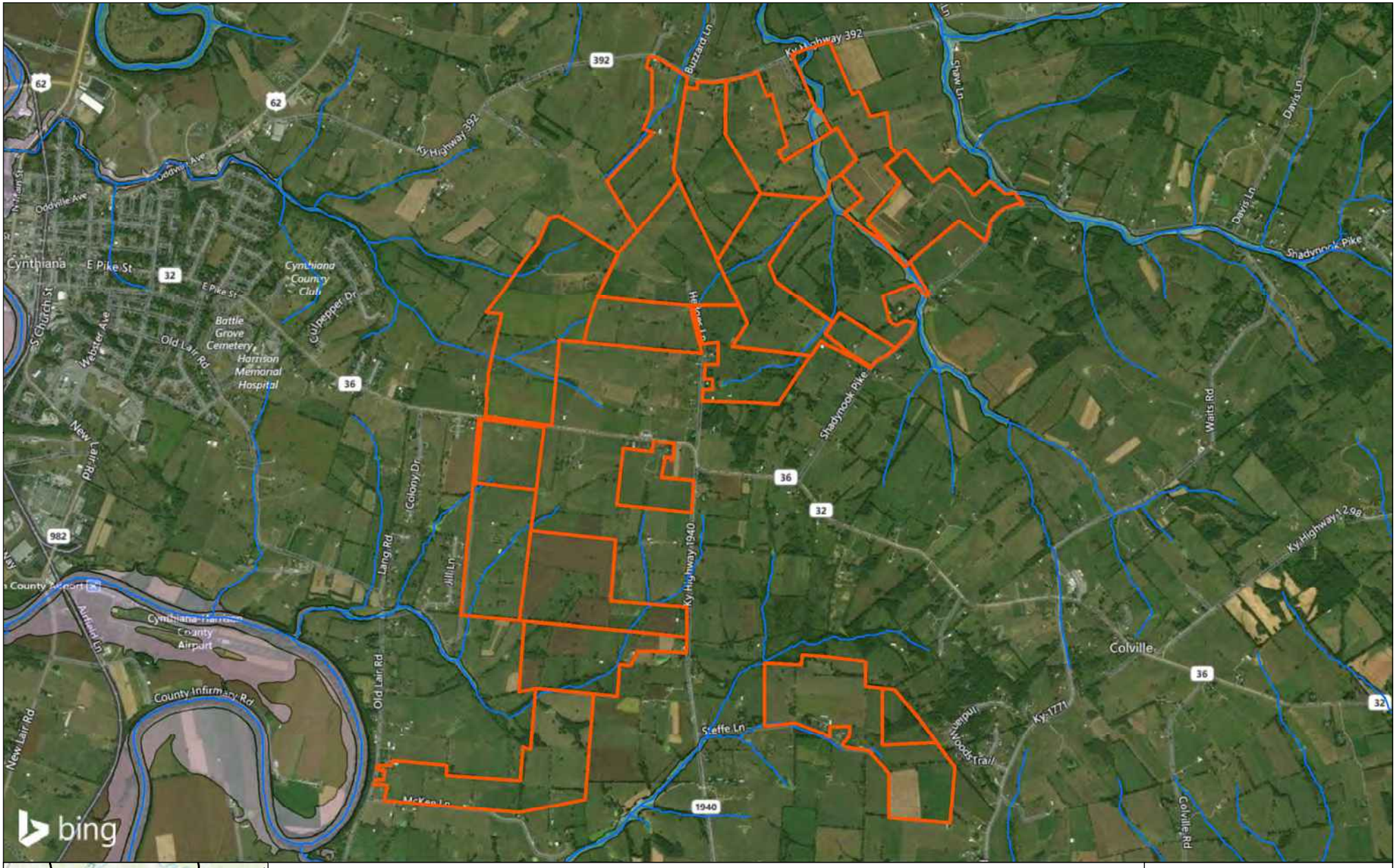
Cardno conducted desktop investigations to:

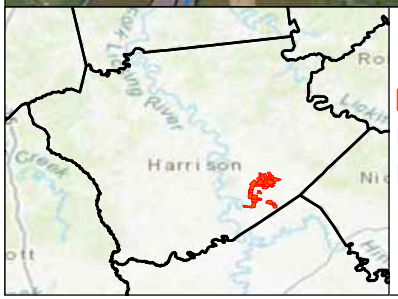
> Identify potential WOUS and their limits within the Project area;

> Evaluate the potential for federally listed T&E species habitat to occur within the Project area;

> Review and cultural resources that may be located within or in close proximity to the Project area that may be impacted by Project activities.

The results of the desktop assessments are provided in this report.





Legend

- Project Area
- 100-Year Floodplain (Unstudied BFE)
- 100-Year Floodplain (Studied BFE)

N

0 550 1,100 2,200

Feet

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Blue Moon Energy LLC Solar Project
Critical Issues Analysis
Harrison County, Kentucky

Project Overview Map

Date:	Project No:	Figure No:
April 2020	E320201801	2-1

Date Created: 4/18/2020 Date Revised: 4/18/2020 File Path: S:\PROJECTS\RecurrentEnergy\E#### - Blue Moon Solar\GIS\2-1 Overview.mxd

GIS Analyst: samuel.waltman

Data Source: Basemap: Bing Maps Aerial (2020)

3 Site Location

The Project is located east of the city of Cynthiana in Harrison County, Kentucky. According to the United States Environmental Protection Agency (USEPA) Level III and IV Ecoregions of Kentucky map accessed April 2020, within the Outer Bluegrass (71d) and Hills of the Bluegrass (71k) ecoregions.

The Outer Bluegrass ecoregion consist of sinkholes, springs, entrenched rivers, and intermittent and perennial streams. At the time of settlement, open savanna woodlands were found on most uplands. On less fertile, more acidic soils derived from Silurian dolomite, white oak stands occurred and had barren openings. Cane grew along streams and was especially common in the east. Today, pastureland and cropland are widespread and dissected areas are wooded (Kentucky 2013, Omernik 1987, 2004).

The Hills of the Bluegrass ecoregion consists of forested hills on steep terrain underlain by Upper Ordovician calcareous shale, siltstone, and limestone. Upland soils are fairly high in phosphorus, potassium, and lime but are not as naturally fertile as the Outer Bluegrass ecoregion. It supports young, mixed forests rich in white oak, hickory, and cedar. It has higher drainage density, and is prone to erosion. As a result, less than ten percent of the ecoregion is suited to row crop agriculture and the rest is wooded, pastureland, or hayland (Kentucky 2013, Omernik 1987, 2004).

The Project is located within the Lexington Limestone formation. This formation is largely composed of limestone, however shale is also usually present in varying amounts, and is dominant in some sub-units of the formation.

3.1 Land Use

The land located within and in proximity to the Project is rural, mostly of agricultural use, with scattered residential development. The Project is located on private land, with no public parks, wildlife areas, or critical habitat within or adjacent to the Project area.

3.2 Soil Series

Soils within the Project area can be generally described as well drained soils that occur on broad, nearly level land to gently sloping floodplains, uplands, interfluves, and ridges. According to the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) website accessed April 2020 (Soil Survey Staff, 2020), the Project is located within thirty-six soil map units, which are listed and described below (**Figure 3-1**). None of the map units within the Project area meets the hydric soils criteria as described by the National Technical Committee for Hydric Soils (NTCHS) (**Table 3-1**).

It should be noted that caution must be used when comparing the list of hydric components to soil survey maps. Many of the soils on the list have ranges in water table depths that allow the soil component to range from hydric to non-hydric depending on the location of the soil within the landscape as described in the map unit. Lists of hydric soils along with soil survey maps are good off-site ancillary tools to assist in wetland determinations, but they are not a substitute for observations made during onsite investigations.

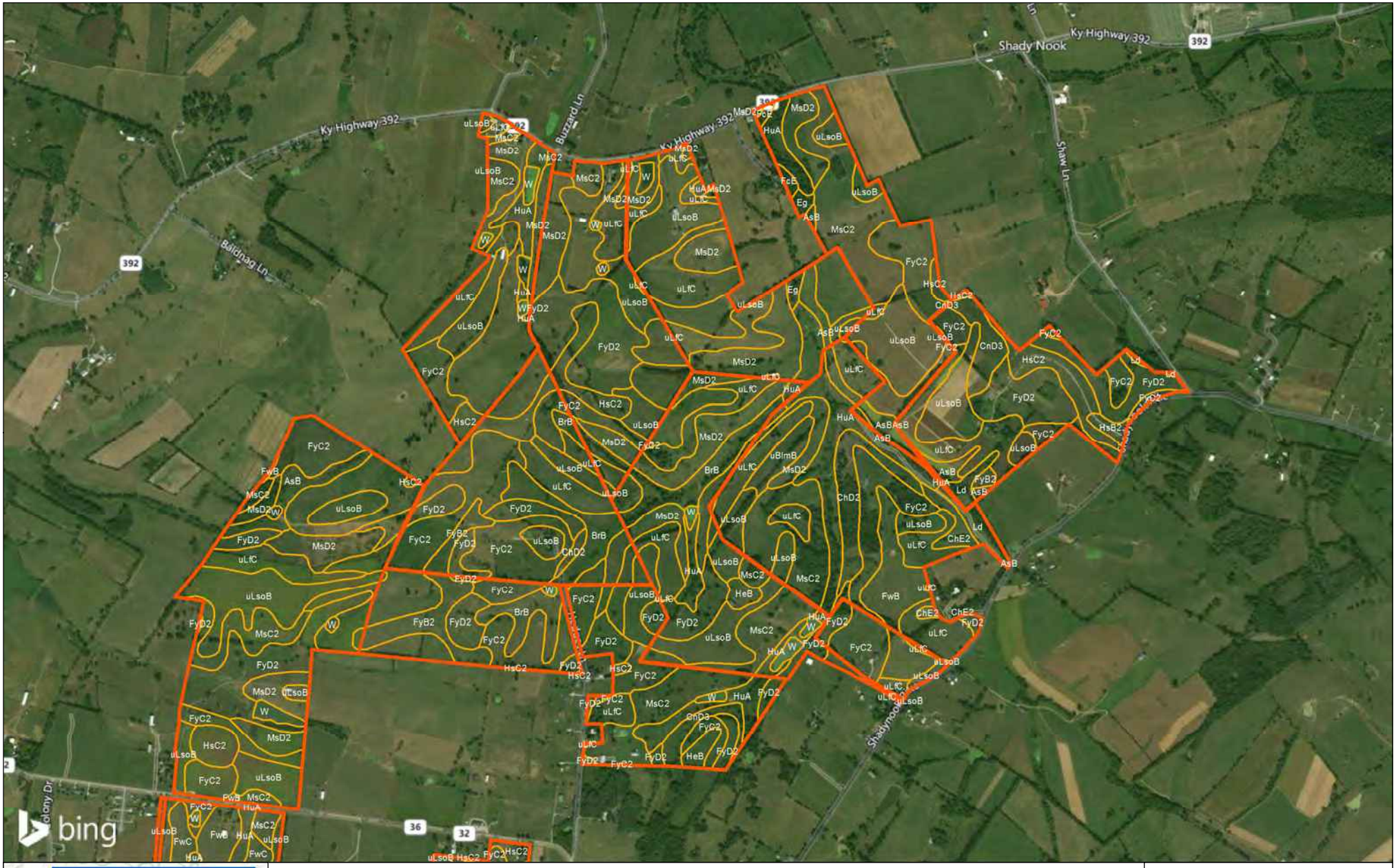
Table 3-1 Characteristics of Soil Mapping Units within the Project Area

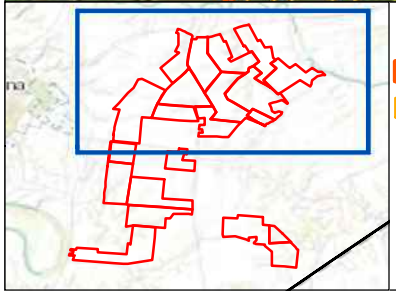
Soil Name	Soil Symbol	Drainage Class	Permeability	Surface Runoff	Meets Hydric Criteria	% of Project Area
Ashton silt loam, 2 to 6 percent slopes	AsB	Well drained	High	Low	No	2.10%
Brashear silt loam, 2 to 6 percent slopes	BrB	Well drained	High	Medium	No	2.00%
Cynthiana very stony silty clay loam, 12 to 20 percent slopes, eroded	ChD2	Well drained	High	High	No	0.70%
Cynthiana very stony silty clay loam, 20 to 30 percent slopes	ChE2	Well drained	Moderately High	High	No	0.30%
Cynthiana very stony clay, 12 to 20 percent slopes, severely eroded	CnD3	Well drained	High	High	No	0.70%
Egam silt loam	Eg	Well drained	Moderately High	Low	No	0.10%
Etowah silt loam, 2 to 6 percent slopes	EtB	Well drained	Moderately High	Low	No	0.10%
Fairmount and Cynthiana extremely rocky soils, 20 to 30 percent slopes	FcE	Well drained	Moderately High	Very High	No	0.10%
Faywood silt loam, 2 to 6 percent slopes	FwB	Well drained	High	High	No	4.80%
Faywood silt loam, 6 to 12 percent slopes	FwC	Well drained	Very High	Medium	No	6.80%
Faywood silty clay loam, 2 to 6 percent slopes, eroded	FyB2	Well drained	High	High	No	0.90%
Faywood silty clay loam, 6 to 12 percent slopes, eroded	FyC2	Well drained	Very High	Very High	No	16.20%
Faywood silty clay loam, 12 to 20 percent slopes, eroded	FyD2	Well drained	Very High	Very High	No	9.50%

Table 3-1 Characteristics of Soil Mapping Units within the Project Area

Soil Name	Soil Symbol	Drainage Class	Permeability	Surface Runoff	Meets Hydric Criteria	% of Project Area
Heitt silt loam, 2 to 6 percent slopes	HeB	Well drained	Moderately High	Medium	No	0.30%
Heitt silty clay loam, 2 to 6 percent slopes, eroded	HsB2	Well drained	Moderately High	Medium	No	0.10%
Heitt silty clay loam, 6 to 12 percent slopes, eroded	HsC2	Well drained	High	High	No	2.10%
Huntington silt loam, 0 to 4 percent slopes	HuA	Well drained	High	Negligible	No	4.50%
Lindside silt loam, 0 to 2 percent slopes, occasionally flooded	Ld	Moderately well drained	Moderately High	Low	No	0.40%
McAfee silt loam, 6 to 12 percent slopes, eroded	MsC2	Well drained	Very High	High	No	6.20%
McAfee silt loam, 12 to 20 percent slopes, eroded	MsD2	Well drained	Very High	High	No	6.30%
Mercer silt loam, 2 to 6 percent slopes	MtB	Moderately well drained	Moderately High	High	No	0.30%
Bluegrass-Maury silt loams, 2 to 6 percent slopes	uBlmB	Well drained	High	Low	No	2.30%
Lowell-Faywood silt loams, 6 to 12 percent slopes	uLfC	Well drained	Very High	Medium	No	11.60%
Lowell-Sandview silt loams, 2 to 6 percent slopes	uLsoB	Well drained	Very High	Low	No	19.50%
Maury-Bluegrass silt loams, 6 to 12 percent slopes	uMlmC	Well drained	High	Medium	No	1.10%

Source: Soil Survey Staff, 2020





Legend

- Project Area
- Soils Map Units

0 305 610 1,220

Feet

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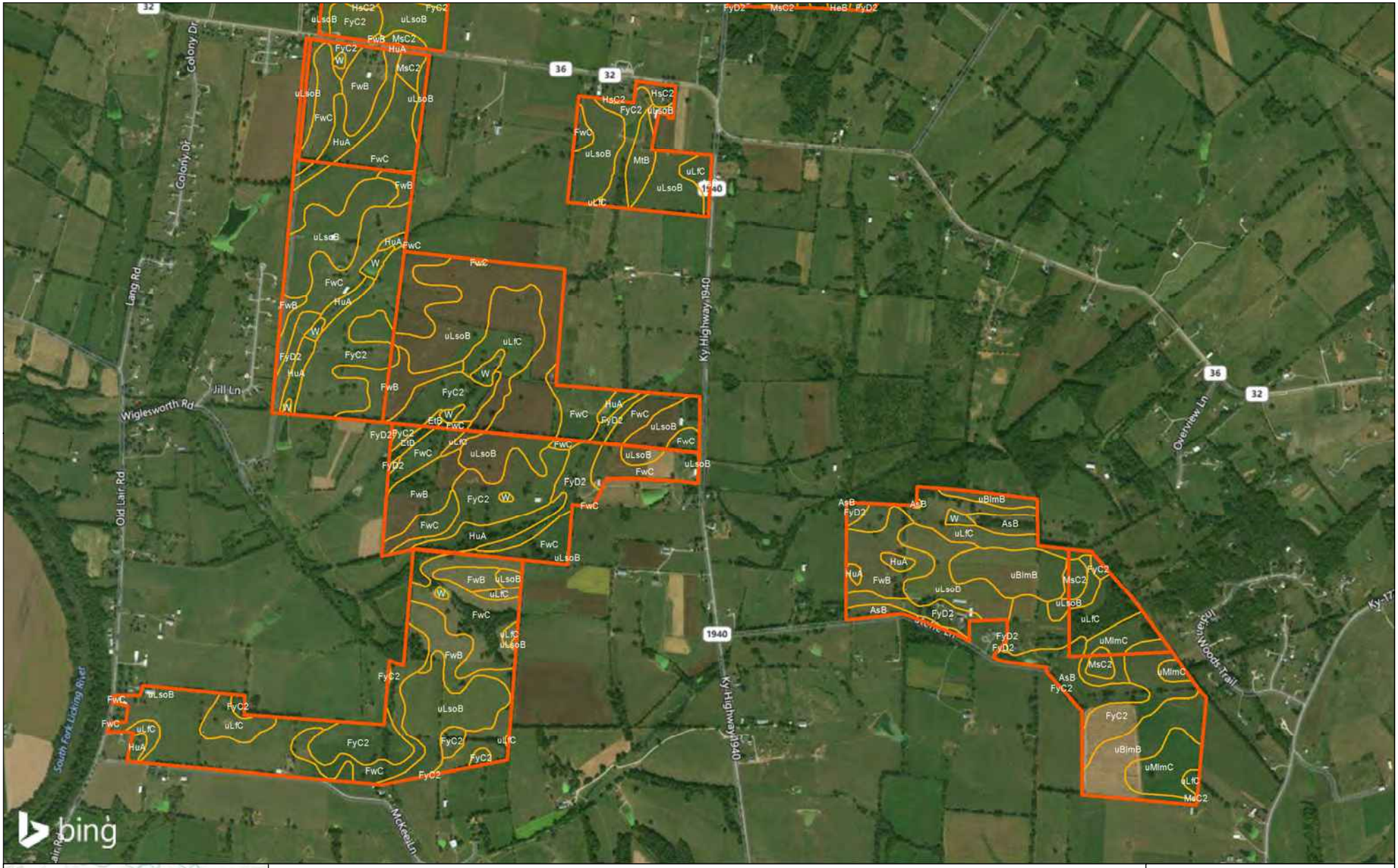
Blue Moon Energy LLC Solar Project
Critical Issues Analysis
Harrison County, Kentucky

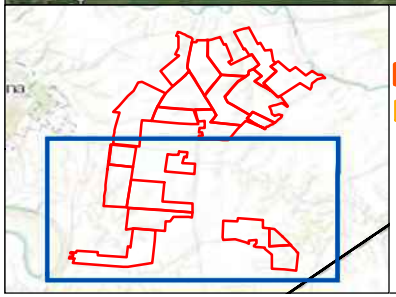
Soils within the Project Area

Date:	Project No:	Figure No:
April 2020	E320201801	**3-1(1)**

Date Created: 4/27/2020 Date Revised: 4/27/2020 File Path: S:\PROJECTS\RecurrentEnergy\E320201801 - Blue Moon Solar\GIS\3-1 Soils.mxd
GIS Analyst: corbin.hoffmann

Data Source: Basemap: Bing Maps Aerial (2020)





Legend

- Project Area
- Soils Map Units

0 305 610 1,220

Feet

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Blue Moon Energy LLC Solar Project
Critical Issues Analysis
Harrison County, Kentucky

Soils within the Project Area

Date:	Project No:	Figure No:
April 2020	E320201801	**3-1(2)**

Date Created: 4/27/2020 Date Revised: 4/27/2020 File Path: S:\PROJECTS\RecurrentEnergy\E320201801 - Blue Moon Solar\GIS\3-1 Soils.mxd

GIS Analyst: corbin.hoffmann

Data Source: Basemap: Bing Maps Aerial (2020)

4 Assessment Methodology

Cardno conducted a desktop environmental assessment of the Project area utilizing local and federal GIS data to identify potential wetlands, waterbodies, hydric soils, and floodplains that could affect the Project development process. Potential WOUS were identified from the USFWS NWI GIS data layer (USFWS 2020), USGS topographic maps, and FEMA Flood Insurance Rate Map (FEMA 2010).

Cardno also performed a review of potential T&E species individuals and their habitat that may be found at or near the Project area. Information from a current USFW IPaC report was reviewed, as well as the Kentucky Department of Fish and Wildlife Resources (KDFWR) which maintains a database of rare species and natural communities. All species listings were reviewed for compatible habitat within or near the Project boundaries.

Cardno's cultural resource specialists reviewed information regarding known archeological and historic sites, as well as prior cultural resources studies, available through the Kentucky Office of State Archaeology and Kentucky Heritage Council (April 2020). Cardno also reviewed USGS topographic maps, current, and historic aerial imagery for evidence of historic use within the Project area.

5 Results of Findings

5.1 Threatened and Endangered Species Review

Cardno conducted a desktop analysis utilizing information from the USFWS IPaC and the KDFWR to obtain information on state and federally-listed species that have the potential to occur within or be affected by the Project.

In total, there are ten federally listed endangered species and two federally listed threatened species with the potential to occur within or be affected by the Project (USFWS 2020, KDFWR 2013). No critical habitat was identified within the Project area. Each species and its habitat requirements are described in **Table 5-1**.

Potential habitat for federally listed bat species would be limited to forested areas within the Project area that may contain roosting trees (trees with loose bark or hollows greater than 5 inches DBH). A thorough habitat survey per USFWS guidelines would need to be conducted in order to rule out potential roosting and/or foraging habitat within all forested areas that may be impacted by the Project. Formal habitat or presence/absence surveys are recommended should forested habitat be impacted during active bat season (mid-April through October).

Although seven federally listed freshwater mussel species are contained within the IPaC list as potentially being affected by the Project, consideration for these species is not necessary given that potential impacts as a result of Project activities would not be anticipated to reach the South Fork Licking River.

The Project area could contain habitat for the federally listed endangered running buffalo clover, Short's goldenrod, and Virginia spiraea. Presence/absence surveys during the listed species flowering seasons: running buffalo clover's (April-August), Short's goldenrod (August-October) and Virginia spiraea (June-July) are recommended.

Table 5-1 Threatened and Endangered Species

Group	Common Name	Scientific Name	Likelihood of Occurrence	Habitat	Federal Status	State Status
Flowering Plants	Running Buffalo Clover	*Trifolium stoloniferum*	Moderate	This species occurs in disturbed soils, partially shaded woodlots, mowed areas (lawns, parks, cemeteries), and along streams and trails.	Endangered	Threatened
	Short's Goldenrod	*Solidago shortii*	Moderate	This species occurs in moist, gravelly, well-drained soils in full sun to part shade. Best performance is in full sun.	Endangered	Endangered
Freshwater Mussels	Clubshell	*Pleurobema clava*	None	This species is known to occur within the South Fork Licking River	Endangered	Endangered
	Fanshell	*Cyprogenia stegaria*	None	This species is known to occur within the South Fork Licking River	Endangered	Endangered

	Northern Riffleshell	*Epioblasma torulosa rangiana*	None	This species is known to occur within the South Fork Licking River	Endangered	Endangered
	Pink Mucket (pearlymussel)	*Lampsilis abrupta*	None	This species is known to occur within the South Fork Licking River	Endangered	Endangered
	Purple Cat's Paw	*Epioblasma obliquata*	None	This species is known to occur within the South Fork Licking River	Endangered	Endangered
	Rough Pigtoe	*Pleurobema plenum*	None	This species is known to occur within the South Fork Licking River	Endangered	Endangered
	Sheepnose Mussel	*Plethobasus cyphyus*	None	This species is known to occur within the South Fork Licking River	Endangered	Endangered
Mammals	Indiana Bat	*Myotis sodalis*	Moderate	Summer habitat includes small to medium river and stream corridors with well-developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests	Endangered	Endangered
	Northern Long-eared bat	*Myotis septentrionalis*	Moderate	Northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. This bat has also been found rarely roosting in structures, like barns and sheds.	Threatened	Endangered
	Gray Bat	Myotis grisescens	Low	With rare exceptions, gray bats live in caves year-round. During the winter gray bats hibernate in deep, vertical caves. In the summer, they roost in caves which are scattered along rivers. These caves are in limestone karst areas of the southeastern United States. They do not use houses or barns.	Endangered	Threatened

5.2 Wetlands

Utilizing the USFWS dataset, as well aerial and infrared imagery, Cardno performed a desktop search within the Project area for wetlands that could potentially be considered jurisdictional by the USACE. Cardno's investigations identified **28** ponded areas totaling 15.3 acres within the Project area. No wetlands were identified by the NWI within the Project area. From the desktop perspective, all ponded areas appear to be isolated, with potential ephemeral stream connections that do not possess a significant nexus to a TNW.

5.3 Waterbodies

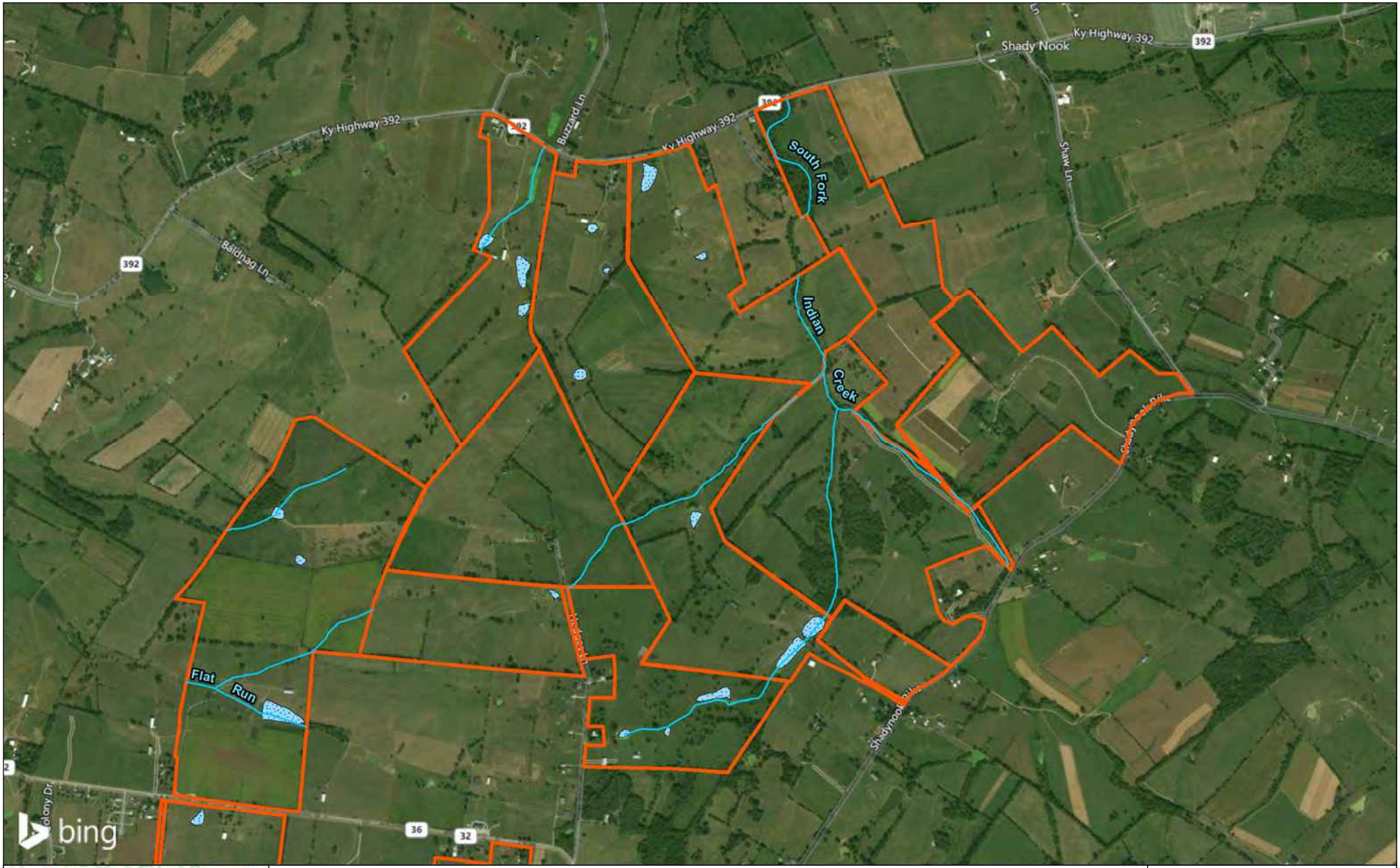
Utilizing the NHD as well aerial and infrared imagery, Cardno performed a desktop search within Project area for streams and drainages could potentially be considered jurisdictional by the USACE. Cardno's investigations identified **13** streams (**Figure 5-1** and **Table 5-2**) totaling **5.8** stream miles within the Project area. Most of the streams mapped by the NHD appear to function as ephemeral drainages between ponds, and lack a significant nexus to a TNW. Only three streams, including South Fork Indian Creek and two unnamed tributaries, appear to possess a significant nexus to Indian Creek, which flows to the South Fork Licking River, a TNW.

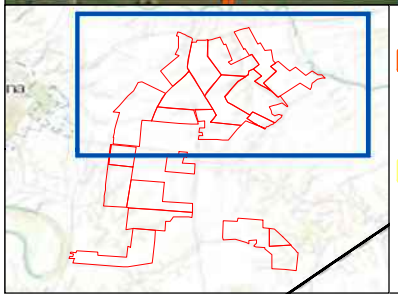
Table 5-2 NHD Streams Within the Project Area

Stream Name	Length within Project (Miles)
Flat Run	0.29
Sellers Run	0.7
South Fork Indian Creek	1.19
Unnamed Streams	3.62
Total Streams	**5.8**

5.4 Sinkholes

Cardno performed a search for potential sinkhole areas utilizing Geographic Information Systems (GIS) data from the Kentucky Geological Survey (KGS). **One** sinkhole area comprising 0.3 acres was identified within the Project area. The sinkhole area location is illustrated in **Figure 5-1**.





Legend

- Project Area
- NHD Streams
- Freshwater Ponds
- Potential Sinkhole Areas

N

0 305 610 1,220

Feet

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Blue Moon Energy LLC Solar Project
Critical Issues Analysis
Harrison County, Kentucky

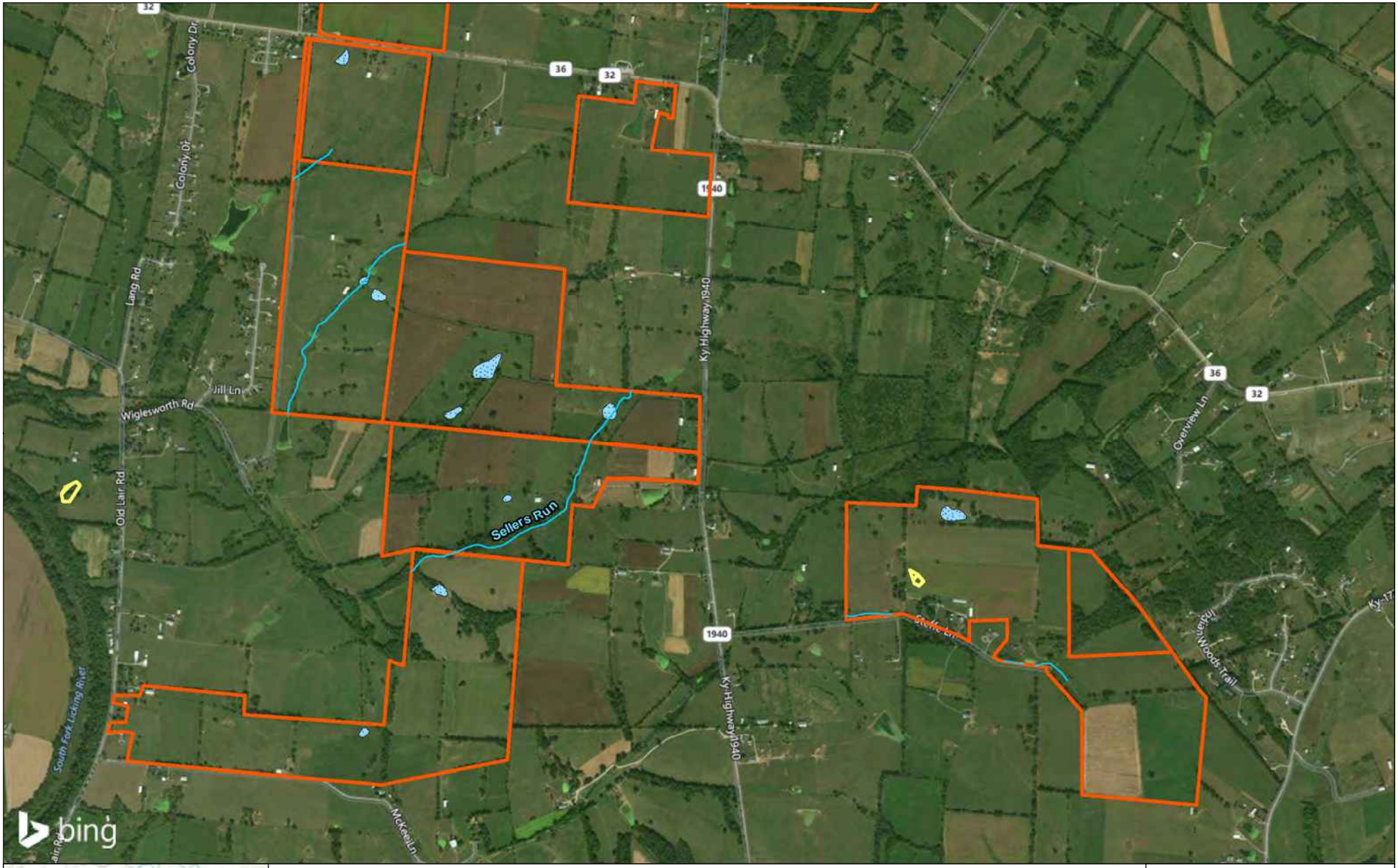
Potential Wetlands and Waterbodies

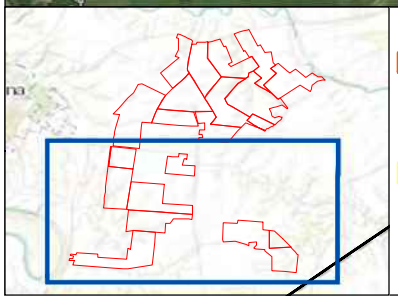
Date:	Project No:	Figure No:
April 2020	E320201801	**5-1(1)**

Date Created: 4/18/2020 Date Revised: 4/18/2020 File Path: S:\PROJECTS\RecurrentEnergy\E#### - Blue Moon Solar\GIS\5-1 Waterbodies and Wetlands.mxd

GIS Analyst: samuel.waltman

Data Source: Basemap: Bing Maps Aerial (2020)





Legend

- Project Area
- NHD Streams
- Freshwater Ponds
- Potential Sinkhole Areas

0 305 610 1,220

Feet

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Blue Moon Energy LLC Solar Project
Critical Issues Analysis
Harrison County, Kentucky

Potential Wetlands and Waterbodies

Date:	Project No:	Figure No:
April 2020	E320201801	**5-1(2)**

Date Created: 4/18/2020 Date Revised: 4/18/2020 File Path: S:\PROJECTS\RecurrentEnergy\E#### - Blue Moon Solar\GIS\5-1 Waterbodies and Wetlands.mxd

GIS Analyst: samuel.waltman

Data Source: Basemap: Bing Maps Aerial (2020)

5.5 Cultural Resources

Cardno's cultural resource specialists reviewed information regarding known archaeological and historic sites, as well as prior cultural resources studies, from the Kentucky Office of State Archaeology. Cardno also reviewed USGS topographic maps, and current and historic aerial photographs for evidence of historic use of the proposed Project area. The cultural review identified seven archaeological or historical resources have been previously recorded within one mile of the Project area (**Figure 5-2**). Eleven surveys have been completed within the study area, with only the one completed for the Cynthiana-Headquarters 69 kV transmission line in 2014 extending through the Project area.

A total of seven sites have been recorded within one mile of the Project area. Of these, four are indeterminate prehistoric lithic scatters and three are historic period farmsteads.

A review of historic topographic maps of the area, indicate approximately a half dozen structures having been razed within the last 70 years within the Project area that may need to be recorded as historic archaeological sites. The Old East Broadwell Cemetery located along Ruddles Mill Road on the Bradford farm is also contained within the Project area. It is recommended that the cemetery be avoided throughout the development process.

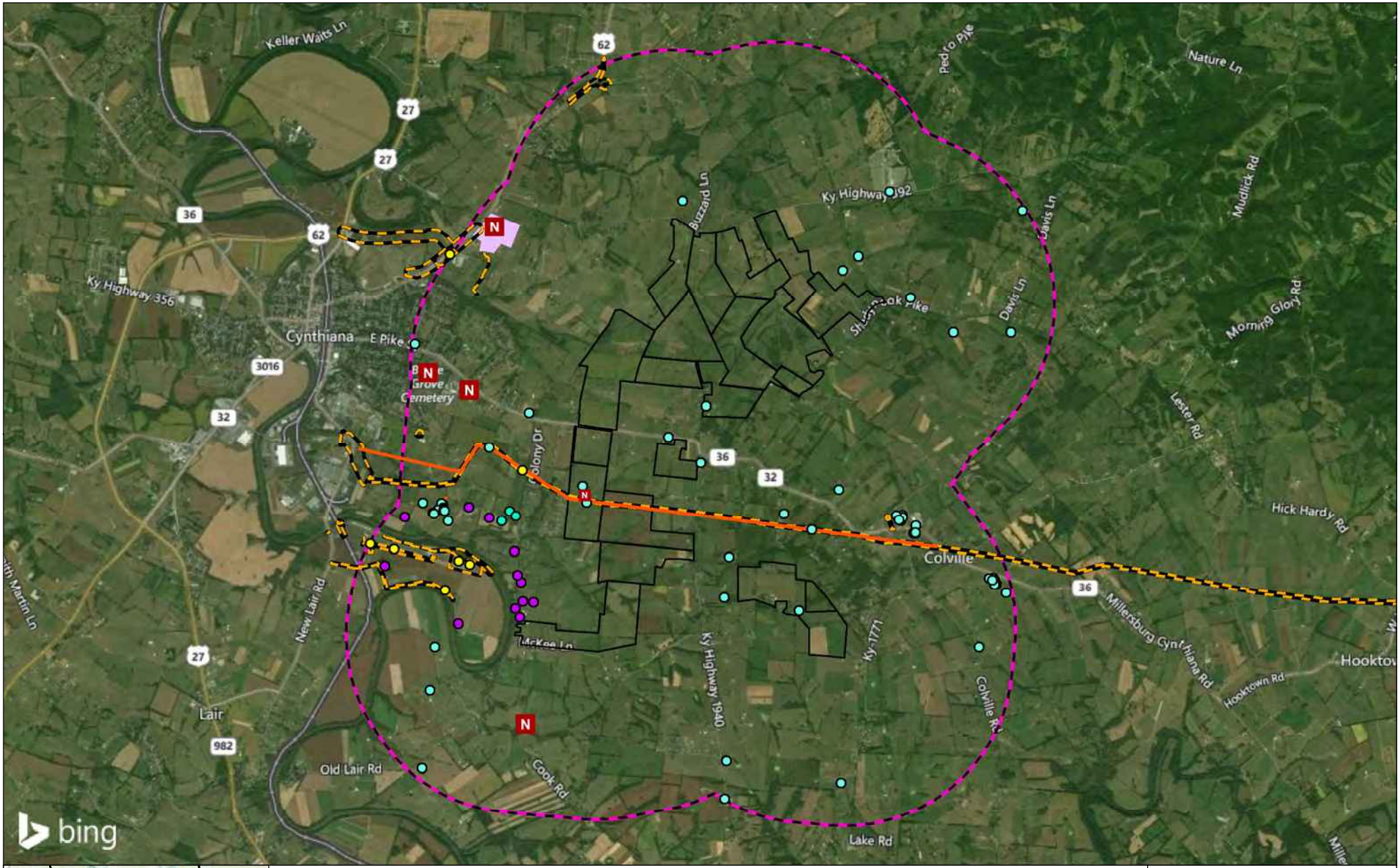
The Kentucky Heritage Council (KHC) database of historic architectural resources was also reviewed to determine if there were any previously recorded above ground structures that might represent issues for the development of the solar farm. This review identified a total of two houses or complexes located within the Project area (**Table 5-3**)

The Vernacular House (HR47) located along Steffe Lane on the Chapel Mastin property, located in the southeastern portion of the Project area has not been assessed. The John Williams House Complex (HR149) located on the Wilson farm in the southwest portion of the Project area was listed on the National Register of Historic Places (NRHP) in 1983, but the associated barn and tobacco barn were not determined eligible (**Figure 5-2**).

Three structures (HR50, HR57, and HR58) are located just outside of the Project area, are in the vicinity of the Ruddles Mill Road, Hedges Lane, and Millersburg Pike intersection. All three of these structures lie just outside of the Craycraft and Cook farms. Of the three, only HR58 has been assessed as meeting the criteria for listing on the NRHP (**Table 5-3**). An assessment based upon the solar farm's development would be necessary for each of these three houses as part of the survey.

Additional NRHP listed houses are located to the south and west of the Project area. While lying outside of the Project area, it is possible that the development of the solar farm would be considered an impact to the viewshed of some of these listed structures. An additional, 35 historic structures and a historic transmission line (Cynthiana-Headquarters 69 kV transmission line) were identified within the study area surrounding the Project area (**Figure 5-2**). The majority of these resources have not been evaluated for the NRHP.

An evaluation of the Project area would indicate that there are no known archaeological resources that would be considered a critical issue to the development of the solar farm. The identification of the Old East Broadwell Cemetery in the central portion of the Project area could represent an issue, but avoidance during the development process should suffice to mitigate any effect to the resource. The historic architectural assessment of the Project area has identified five houses, one of which is already listed on NRHP, within or in proximity to the Project area. An assessment of effects on the four houses that have not been nominated to the NRHP is probable but none would appear to be an obvious critical issue to the development of the solar farm. The NRHP-listed John Williams House though would appear to represent a critical issue to the development of the solar farm. Avoidance of the property is highly recommended, if possible. As indicated above, there is the potential for additional cultural resources to exist both in and within proximity to the solar farm Project area. The research and historic value of any of these resources is not understood at this time, and would need to be evaluated as the project develops.



Legend

- Blue Moon Project Area
- Blue Moon 1 Mile Buffer
- Archaeological Survey Areas
- Previously Recorded Achaeological Sites
- Historic Linear Resource
- Historic Resources
- National Register Property
- Preliminary Historic Resources
- National Register Area

0 1,000 2,000 4,000
Feet

Cardno
Shaping the Future

Blue Moon Energy LLC Solar Project
Critical Issues Analysis
Harrison County, Kentucky

Cultural Resources Map

Date:	Project No:	Figure No:
April 2020	E320201801	5-2

Date Created: 4/27/2020 Date Revised: 4/27/2020 File Path: S:\PROJECTS\RecurrentEnergy\E320201801 - Blue Moon Solar\GIS\5-2 Cultural.mxd
GIS Analyst: corbin.hoffmann

Data Source: Basemap: Bing Maps Aerial (2020)

Table 5-3 KHC Identified Structures within the Project Area

Site Number	Name	Register Status	Construction Date	Style
HR47*	HOUSE	UNDETERMINED	BEFORE 1800	VERNACULAR SETTLEMENT
HR50	COOK HOUSE	UNDETERMINED	1850-1874	VERNACULAR-VICTORIAN
HR57	HOUSE	UNDETERMINED	BEFORE 1800	VERNACULAR SETTLEMENT
HR58	HOUSE	MEETS N/R CRITERIA	1850-1874	GREEK REVIVAL
HR149*	JOHN WILLIAMS HOUSE	NATIONAL REGISTER	1800-1824	FEDERAL

*located within the Project area

6 Conclusion and Recommendations

Cardno reviewed current and historic mapping, as well as local, state, and federal GIS data layers as part of a desktop investigation during its natural and cultural resources assessment.

Cardno reviewed federal and state resources to determine if habitat may exist for listed species within the Project area. In total, there are ten federally listed endangered species and two federally listed threatened species with the potential to occur within or be affected by the Project. No critical habitat was identified within the Project area.

Potential habitat for federally listed bat species would be limited to forested areas within the Project area that may contain roosting trees (trees with loose bark or hollows greater than 5 inches DBH). A thorough habitat survey per USFWS guidelines would need to be conducted in order to rule out potential roosting and/or foraging habitat within all forested areas if affected by the Project. Formal habitat or presence/absence surveys are recommended should forested habitat be impacted during active bat season (mid-April through October).

Although seven federally listed freshwater mussel species are contained within the IPaC list as potentially being affected by the Project, consideration for these species is not necessary given that potential impacts as a result of Project activities would not be anticipated to reach the South Fork Licking River.

The Project area could contain habitat for the federally listed endangered running buffalo clover, Short's goldenrod, and Virginia spiraea. Presence/absence surveys during the listed species flowering seasons: running buffalo clover's (April-August), Short's goldenrod (August-October) and Virginia spiraea (June-July) are recommended.

The USFWS National Wetland Inventory (NWI) mapping service and National Hydrography Dataset (NHD) were reviewed to determine if potential WOUS that would be considered jurisdictional by the U.S. Army Corps of Engineers (USACE) exist within the Project area. In total, **28** ponded areas and **13** streams were identified within the Project area. No wetlands were identified by the NWI within the Project area. From the desktop perspective, all ponded areas appear to be isolated, and 10 streams appear to function as ephemeral drainages between ponds, that lack a significant nexus to a TNW. Only three streams, including South Fork Indian Creek and two unnamed tributaries, appear to possess a significant nexus to Indian Creek, which flows to the South Fork Licking River, a TNW.

The presence/absence of jurisdictional wetlands and streams cannot be determined through desktop analysis alone. A final determination of wetland status requires taxonomic classification of vegetation, review of hydrology, an identification of hydric soils. Field site visits are recommended to determine these criteria in potential wetland features, and to delineate the boundaries of all potential WOUS to determine potential nexus with a TNW. Identified wetland and waterbody features that are determined to possess a significant nexus to a TNW would most likely be considered jurisdictional under USACE guidance.

If any of the identified streams or wetlands are deemed jurisdictional by the USACE and may be impacted by construction, the Project may proceed under a NWP 51 and/or 12. Nationwide 51 requires a pre-construction notification to the USACE and allows for construction, expansion or modification of land-based renewable energy production facilities, including attendant features. Utility lines transferring energy to a distribution system, regional grid, or other facility are generally considered to be separate single and complete linear projects. If the only activity requiring USACE authorization is the construction of a utility line, then a NWP 12 may be used. As stated in the text of the NWPs, the discharge of dredged or fill material into wetlands and non-tidal WOUS must not cause the loss of greater than ½-acre of wetlands and non-tidal WOUS, including the loss of no more than 300 linear feet of stream bed. Permanent impacts which exceed the ½-acre threshold for NWPs will require an Individual Permit.

According to the FEMA floodplain data, approximately 25.5 acres of the Project area occur within the 100-Year Floodplain of South Indian Creek. Additional permitting from the Fleming and Mason counties Floodplain Administrators may be required if construction will take place in these areas.

Cardno performed a search for potential sinkhole areas utilizing Geographic Information Systems (GIS) data from the Kentucky Geological Survey (KGS). **One** sinkhole area comprising 0.3 acres was identified within the Project area.

Cardno's cultural resource specialists reviewed information regarding known archeological and historic sites, as well as prior cultural resources studies, available through the Kentucky Office of State Archaeology and Kentucky Heritage Council (April, 2020). Cardno also reviewed USGS topographic maps, current, and historic aerial imagery for evidence of historic use within the Project area. Desktop analysis of the Project area identified 11 cultural resource surveys and seven archaeological sites recorded within one-mile of the Project area. Five surveyed historic structures were identified within the Project area, one was determined to be a National Register of Historic Places (NRHP). The research and historic value of any of these resources is not understood at this time, and would need to be evaluated as the project develops.

7 References

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Blue Moon Solar Project
CIA Report

APPENDIX A

USFWS IPAC OFFICIAL SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
Phone: (502) 695-0468 Fax: (502) 695-1024
http://www.fws.gov/frankfort/

In Reply Refer To: April 16, 2020
Consultation Code: 04EK1000-2020-SLI-0989
Event Code: 04EK1000-2020-E-02544
Project Name: Blue Moon Solar Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

Your concern for the protection of endangered and threatened species is greatly appreciated. The purpose of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA) is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. The species list attached to this letter fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the ESA to provide information as to whether any proposed or listed species may be present in the area of a proposed action. This is not a concurrence letter; additional consultation with the Service may be required.

The Information in Your Species List:

The enclosed species list identifies federal trust species and critical habitat that may occur within the boundary that you entered into IPaC. For your species list to most accurately represent the species that may potentially be affected by the proposed project, the boundary that you input into IPaC should represent the entire “action area” of the proposed project by considering all the potential “effects of the action,” including potential direct, indirect, and cumulative effects, to federally-listed species or their critical habitat as defined in 50 CFR 402.02. This includes effects of any “interrelated actions” that are part of a larger action and depend on the larger action for their justification and “interdependent actions” that have no independent utility apart from the action under consideration (e.g.; utilities, access roads, etc.) and future actions that are reasonably certain to occur as a result of the proposed project (e.g.; development in response to a new road). If your project is likely to have significant indirect effects that extend well beyond the project footprint (e.g., long-term impacts to water quality), we highly recommend that you

coordinate with the Service early to appropriately define your action area and ensure that you are evaluating all the species that could potentially be affected.

We must advise you that our database is a compilation of collection records made available by various individuals and resource agencies available to the Service and may not be all-inclusive. This information is seldom based on comprehensive surveys of all potential habitats and, thus, does not necessarily provide conclusive evidence that species are present or absent at a specific locality. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please note that “critical habitat” refers to specific areas identified as essential for the conservation of a species that have been designated by regulation. Critical habitat usually does not include all the habitat that the species is known to occupy or all the habitat that may be important to the species. Thus, even if your project area does not include critical habitat, the species on the list may still be present.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and associated information. To re-access your project in IPaC, go to the IPaC web site (https://ecos.fws.gov/ipac/), select “Need an updated species list?”, and enter the consultation code on this letter.

ESA Obligations for Federal Projects:

Under sections 7(a)(1) and 7(a)(2) of the ESA and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

If a Federal project (a project authorized, funded, or carried out by a federal agency) may affect federally-listed species or critical habitat, the Federal agency is required to consult with the Service under section 7 of the ESA, pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). Recommended contents of a Biological Assessment are described at 50 CFR 402.12. For projects other than major construction activities, the Service suggests that a biological evaluation

similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat.

ESA Obligations for Non-federal Projects:

Proposed projects that do not have a federal nexus (non-federal projects) are not subject to the obligation to consult under section 7 of the ESA. However, section 9 of the ESA prohibits certain activities that directly or indirectly affect federally-listed species. These prohibitions apply to all individuals subject to the jurisdiction of the United States. Non-federal project proponents can request technical assistance from the Service regarding recommendations on how to avoid and/or minimize impacts to listed species. The project proponent can choose to implement avoidance, minimization, and mitigation measures in a proposed project design to avoid ESA violations.

Additional Species-specific Information:

In addition to the species list, IPaC also provides general species-specific technical assistance that may be helpful when designing a project and evaluating potential impacts to species. To access this information from the IPaC site (https://ecos.fws.gov/ipac/), click on the text “My Projects” on the left of the black bar at the top of the screen (you will need to be logged into your account to do this). Click on the project name in the list of projects; then, click on the “Project Home” button that appears. Next, click on the “See Resources” button under the “Resources” heading. A list of species will appear on the screen. Directly above this list, on the right side, is a link that will take you to pdfs of the “Species Guidelines” available for species in your list. Alternatively, these documents and a link to the “ECOS species profile” can be accessed by clicking on an individual species in the online resource list.

Next Steps:

Requests for additional technical assistance or consultation from the Kentucky Field Office should be submitted following guidance on the following page http://www.fws.gov/frankfort/PreDevelopment.html and the document retrieved by clicking the “outline” link at that page. When submitting correspondence about your project to our office, please include the Consultation Tracking Number in the header of this letter. (There is no need to provide us with a copy of the IPaC-generated letter and species list.)

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

Project Summary

Consultation Code: 04EK1000-2020-SLI-0989

Event Code: 04EK1000-2020-E-02544

Project Name: Blue Moon Solar Project

Project Type: LAND - ACQUISITION

Project Description: Potential Solar Facility

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.39068028300005N84.23985688924716W

Counties: Harrison, KY

Endangered Species Act Species

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 10 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS

Gray Bat *Myotis grisescens* — Endangered

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- The project area includes potential gray bat habitat.

Species profile: https://ecos.fws.gov/ecp/species/6329

General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/21/office/42431.pdf

Indiana Bat *Myotis sodalis* — Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.

This species only needs to be considered under the following conditions:

- The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species.

Species profile: https://ecos.fws.gov/ecp/species/5949

General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/1/office/42431.pdf

Northern Long-eared Bat *Myotis septentrionalis* — Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species.

Species profile: https://ecos.fws.gov/ecp/species/9045

General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/10043/office/42431.pdf

Clams

NAME	STATUS

Clubshell *Pleurobema clava* — Endangered

Population: Wherever found; Except where listed as Experimental Populations
No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat in the South Fork Licking River.

Species profile: https://ecos.fws.gov/ecp/species/3789
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/352/office/42431.pdf

Fanshell *Cyprogenia stegaria* — Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat in the South Fork Licking River.

Species profile: https://ecos.fws.gov/ecp/species/4822
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/368/office/42431.pdf

Northern Riffleshell *Epioblasma torulosa rangiana* — Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat in the South Fork Licking River.

Species profile: https://ecos.fws.gov/ecp/species/527
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/374/office/42431.pdf

Pink Mucket (pearlymussel) *Lampsilis abrupta* — Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat in the South Fork Licking River.

Species profile: https://ecos.fws.gov/ecp/species/7829
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/331/office/42431.pdf

Purple Cat's Paw (=purple Cat's Paw Pearlymussel) *Epioblasma obliquata obliquata* — Endangered

Population: Wherever found; Except where listed as Experimental Populations
No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat in the South Fork Licking River.

Species profile: https://ecos.fws.gov/ecp/species/5602
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/323/office/42431.pdf

Rough Pigtoe *Pleurobema plenum* — Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat in the South Fork Licking River.

NAME	STATUS

Species profile: https://ecos.fws.gov/ecp/species/6894
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/338/office/42431.pdf

Sheepnose Mussel *Plethobasus cyphyus* — Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:

- The species may potentially occur in suitable habitat in the South Fork Licking River.

Species profile: https://ecos.fws.gov/ecp/species/6903
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/7816/office/42431.pdf

Flowering Plants

NAME	STATUS

Running Buffalo Clover *Trifolium stoloniferum* — Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/2529
Species survey guidelines:
https://ecos.fws.gov/ipac/guideline/survey/population/1041/office/42431.pdf
Habitat assessment guidelines:
https://ecos.fws.gov/ipac/guideline/assessment/population/1041/office/42431.pdf

Short's Goldenrod *Solidago shortii* — Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/5367

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Request No. 2:

Provide a copy of the report from the Kentucky Heritage Counsel as soon as it is available.

Response No. 2:

Based on the absence of a federal nexus and the results of the Blue Moon Solar Project Critical Issues Analysis Report, Section 5-5, no Section 106 review is required to be provided to the Kentucky Heritage Council. See response to #1 for Critical Issues Analysis Report.

Responding Witness: Jayce Walker

Request No. 3:

Provide a copy of the Glare Study as soon as it is available.

Response No. 3:

See attached.

Responding Witness: Jayce Walker

FISHER ASSOCIATES

Transportation
Land Development
Energy

September 27, 2021

Chad Martin
Senior Principal – Environmental Planning and Permitting
Blue Moon Solar Facility

Glint and Glare Analysis
Blue Moon Solar Facility
Harrison County, Kentucky

Fisher Associates, P.E., L.S., L.A., D.P.C. is pleased to present the following analysis of the glint and glare potential at the Blue Moon Solar Site, located in Harrison County, Kentucky. Cardno has asked Fisher to perform a glint and glare study for both the public roads in the area as well as for the approach to the Cynthiana-Harrison County Airport. The following outlines the available data, analysis procedures and the resulting glint and glare potential from the project.

Executive Summary

The proposed project consists of five (5) separate solar array sites utilizing single axis tracker panels. The analysis was run from the centerline of 36/32/Millersburg Pike and 1940/Ruddles Mill Road for each array to identify any issues from each array. Analysis was also performed for the Runway 29 approach for the Cynthiana-Harrison County Airport. Note that a glint and glare analysis was not performed for any residences in the vicinity of the project, the analysis was performed solely on the public road and for the runway approach.

Glare Analysis - General

Fisher Associates utilized the ForgeSolar PV Planning and Glare Analysis tool to determine the occurrence and duration of potential glare from the proposed solar installation. The ForgeSolar software is a web-based glare assessment tool that allows input of the PV array, route information, and elevation data. The ForgeSolar provides an assessment of the time and place of where glare may occur throughout the year from solar installations, as well as identifying the potential effect glare may produce to the human eye if it occurs. The ForgeSolar analyzes the worst case scenario of full exposed sun throughout the year.

Glint and glare differ only in duration. An example of this is that a source of reflection would appear as glint to a motorist driving by, whereas it would appear as glare to a stationary observer viewing it for a longer period of time. In this report yellow glare is defined as a source with potential to cause a temporary after-image and green glare has a low potential to cause an after-image.

In addition, ForgeSolar is compliant with the Federal Aviation Administration (FAA) requirements and generates FAA-specific reports.

Glare Analysis - Roadway

Glare was evaluated along the centerline of the roads that are in the project area. The length of 36/32/Millersburg Pike is approximately 3.2 miles and the length of 1940/Ruddles Mill Road is approximately 2.25 miles. The driver viewing angle is set at 50 degrees, the height of eye of

the observer is set to 3.5 feet, and the panel height assumed is 6 feet. The panels modelled are lightly textured glass without anti-reflective coating.

While the results show multiple areas with both yellow and green glare, the modeling software does not take into consideration existing vegetation nor the topography between the roadway and the panels. Cardo provided a viewshed analysis for the project, which indicates that much of the existing roadways will not be able to see the panels and therefore would not be affected by glint and glare from the panels.

Glare Analysis - Airport

The Cythiana-Harrison County Airport has one runway (11-29) with the end of the runway being within 2 miles of a portion of the facility. Glint and glare analysis was performed for the approach of Runway 29 to determine any potential impacts to pilots on the approach.

The modeling indicates that the southern array is directly in the flight path and has the potential to produce yellow glare and all but one of the arrays could produce green glare.

Results

Copies of all the modeling analysis performed is attached to this memo as is a copy of the viewshed analysis indicating what portions of the public roadways would be able to see the panels.

Mitigation

It is not anticipated that mitigation will be necessary for the public road glint and glare. Besides much of the roadway not being visible from the public road, Recurrent Energy is planning on providing landscaping buffers along the public roadways where the arrays would be visible.

For the airport, the reported aircraft operations per day average 37 based on the 12-month period ending April 26, 2021. The airport also has 24 aircraft based at the airport, all single engine aircraft. It is recommended to consult with the airport to determine what the potential impacts are with the timing of the flights.

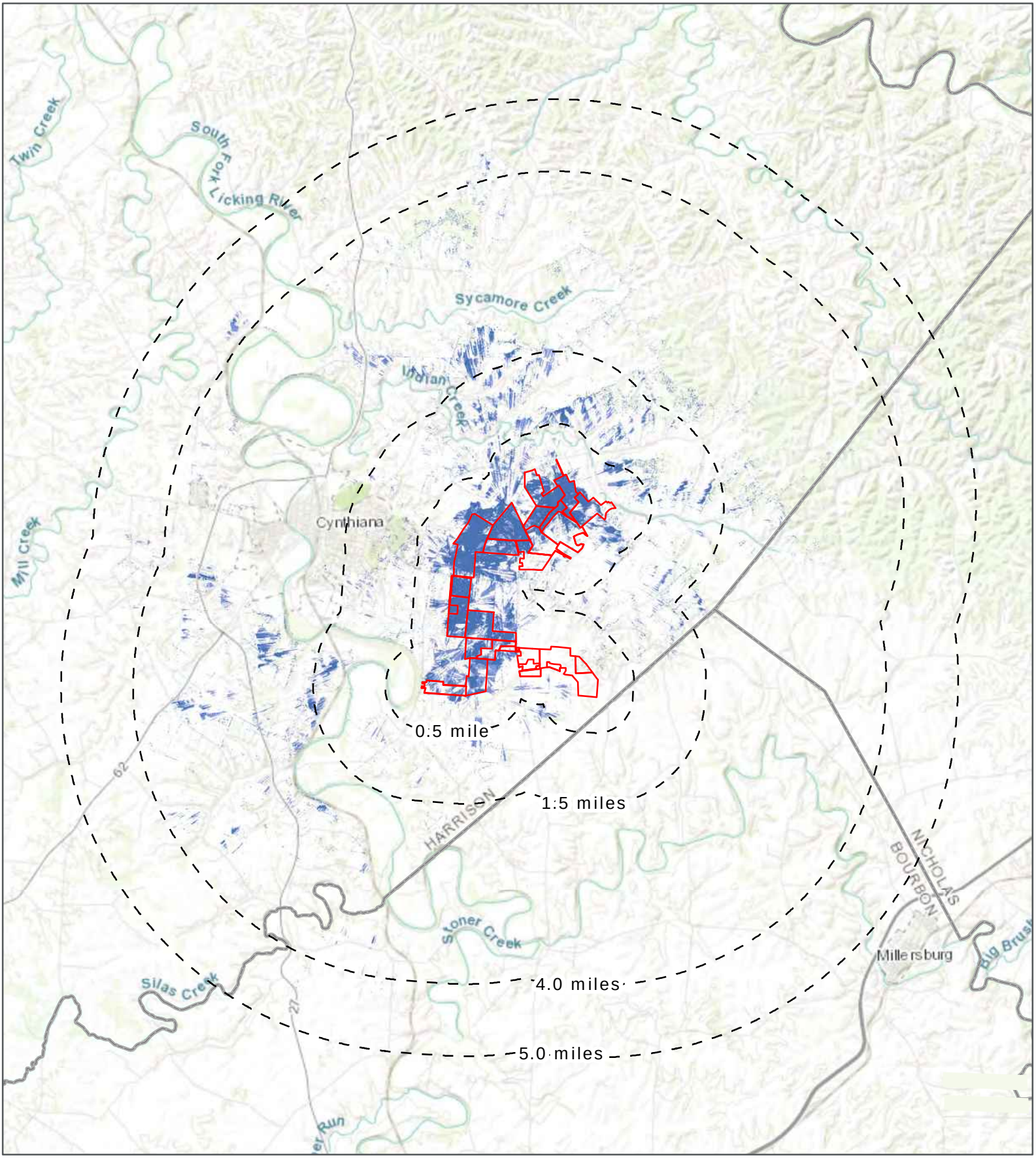
Thank you for the opportunity to assist you on this project. Please don't hesitate to contact me with questions.

Sincerely,

FISHER ASSOCIATES, P.E., L.S., L.A., D.P.C.

Lisa M. Oliver, PE
Renewables Group Manager

Enclosures



0 1 2 3 Miles

0 1 2 3 4 Kilometers

Greater Number of Panels Visible

Fewer Number of Panels Visible

Visibility Range Rings

Project Area

7.5' Quadrangles:
Cynthiana, KY (1984)
Shady Nook, KY (1984)
Shawhan, KY (1984)
Millersburg, KY (1984)

PLSS: unsectioned

Viewshed Analysis - PV Panel (5-mile radius)

Visual Resource Assessment for the Blue Moon Solar Project
Blue Moon Energy, LLC
Harrison County, Kentucky

Cardno
76 San Marcos Street
Austin, TX 78702 USA
Phone (+1) 512.745.8129
www.cardno.com

GIS Analyst: samuel.waltman

Blue Moon Solar - KY

Blue Moon route 32-temp-1

Created Aug. 24, 2021
Updated Aug. 24, 2021
Time-step 1 minute
Timezone offset UTC-5
Site ID 57834.10332

Project type Advanced
Project status: active
Category 10 MW to 100 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

Analysis Methodologies:
- Observation point: **Version 2**
- 2-Mile Flight Path: **Version 2**
- Route: **Version 2**

Summary of Results Glare with potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
PV array 1	SA tracking	SA tracking	14,497	20,855	-
PV array 2	SA tracking	SA tracking	24,008	3,873	-
PV array 3	SA tracking	SA tracking	16,155	0	-
PV array 4	SA tracking	SA tracking	39	1,506	-
PV array 5	SA tracking	SA tracking	0	0	-

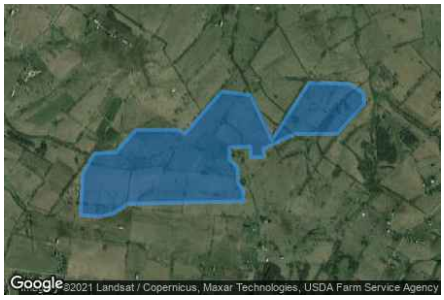
PV Array(s)

Total PV footprint area: 643.5 acres

Name: PV array 1
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 31.5 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.379043	-84.255753	869.51	6.00	875.51
2	38.379565	-84.260249	850.51	6.00	856.51
3	38.382853	-84.260045	819.72	6.00	825.72
4	38.382870	-84.258843	811.89	6.00	817.89
5	38.382769	-84.258822	815.81	6.00	821.81
6	38.381684	-84.257191	839.20	6.00	845.20
7	38.381693	-84.255786	826.71	6.00	832.71
8	38.381196	-84.255571	840.78	6.00	846.78

Name: PV array 2
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 239.0 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad



Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.383711	-84.259519	839.15	6.00	845.15
2	38.386520	-84.259348	854.92	6.00	860.92
3	38.387983	-84.258328	824.73	6.00	830.73
4	38.388067	-84.256419	823.48	6.00	829.48
5	38.389623	-84.254638	834.77	6.00	840.77
6	38.389632	-84.250958	893.58	6.00	899.58
7	38.389362	-84.250292	885.42	6.00	891.42
8	38.392280	-84.247063	857.41	6.00	863.41
9	38.392028	-84.244488	876.21	6.00	882.21
10	38.388917	-84.242621	850.21	6.00	856.21
11	38.392886	-84.239338	821.31	6.00	827.31
12	38.392819	-84.235819	814.50	6.00	820.50
13	38.392179	-84.234521	798.16	6.00	804.16
14	38.391414	-84.234446	819.44	6.00	825.44
15	38.389346	-84.236838	841.87	6.00	847.87
16	38.389329	-84.240604	811.58	6.00	817.58
17	38.388311	-84.243372	824.60	6.00	830.60
18	38.387748	-84.243297	824.20	6.00	830.20
19	38.387681	-84.244467	856.38	6.00	862.38
20	38.388471	-84.244520	835.50	6.00	841.50
21	38.388387	-84.246376	877.16	6.00	883.16
22	38.387554	-84.246344	876.87	6.00	882.87
23	38.387033	-84.245658	863.21	6.00	869.21
24	38.385973	-84.245615	842.74	6.00	848.74
25	38.385427	-84.245164	848.06	6.00	854.06
26	38.384661	-84.245089	852.13	6.00	858.13
27	38.384502	-84.255281	855.92	6.00	861.93
28	38.383812	-84.256633	826.91	6.00	832.91
29	38.383619	-84.257674	826.75	6.00	832.75

Name: PV array 3
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 66.8 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.395282	-84.231623	826.51	6.00	832.51
2	38.396577	-84.231645	827.09	6.00	833.09
3	38.396594	-84.229553	860.26	6.00	866.26
4	38.395593	-84.228984	866.07	6.00	872.07
5	38.394895	-84.227160	847.00	6.00	853.00
6	38.393390	-84.227117	844.78	6.00	850.78
7	38.392305	-84.227343	838.32	6.00	844.32
8	38.390026	-84.227364	812.02	6.00	818.03
9	38.389883	-84.228920	797.63	6.00	803.63
10	38.390649	-84.230336	794.66	6.00	800.66
11	38.392364	-84.232889	789.69	6.00	795.69
12	38.394037	-84.232932	814.09	6.00	820.09

Name: PV array 4
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 71.5 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

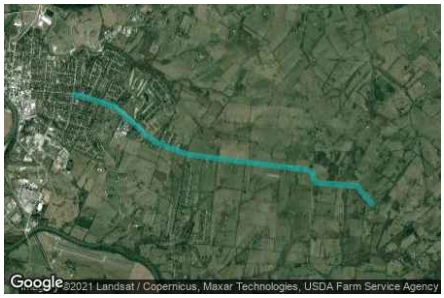
Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.378388	-84.260944	843.65	6.00	849.65
2	38.378422	-84.259935	827.87	6.00	833.87
3	38.377614	-84.259699	818.76	6.00	824.76
4	38.377547	-84.257468	833.30	6.00	839.30
5	38.378674	-84.257468	837.52	6.00	843.52
6	38.378506	-84.256287	855.62	6.00	861.62
7	38.374023	-84.257103	841.10	6.00	847.10
8	38.372013	-84.257178	829.93	6.00	835.93
9	38.372088	-84.253863	865.22	6.00	871.22
10	38.371794	-84.250934	880.90	6.00	886.90
11	38.370700	-84.250987	873.18	6.00	879.18
12	38.371533	-84.259613	813.29	6.00	819.29
13	38.373754	-84.259517	838.56	6.00	844.56
14	38.373779	-84.261073	825.51	6.00	831.51

Name: PV array 5
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 234.7 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.370419	-84.251004	870.97	6.00	876.97
2	38.371429	-84.262001	841.80	6.00	847.80
3	38.368131	-84.262355	803.17	6.00	809.17
4	38.368123	-84.261336	784.77	6.00	790.77
5	38.367349	-84.261422	784.16	6.00	790.16
6	38.367013	-84.257527	825.68	6.00	831.68
7	38.362975	-84.257774	803.95	6.00	809.95
8	38.362958	-84.256680	797.26	6.00	803.26
9	38.360325	-84.256916	819.82	6.00	825.82
10	38.359576	-84.256101	827.23	6.00	833.23
11	38.359088	-84.256176	833.21	6.00	839.21
12	38.359139	-84.256616	829.10	6.00	835.10
13	38.358794	-84.257667	820.49	6.00	826.49
14	38.355874	-84.257796	831.60	6.00	837.60
15	38.355773	-84.255038	847.40	6.00	853.40
16	38.356085	-84.253064	837.03	6.00	843.03
17	38.361021	-84.252442	831.45	6.00	837.45
18	38.362451	-84.252506	823.27	6.00	829.27
19	38.362460	-84.255199	794.94	6.00	800.94
20	38.363696	-84.255135	814.60	6.00	820.60
21	38.364714	-84.253976	824.68	6.00	830.68
22	38.364664	-84.251970	819.41	6.00	825.41
23	38.366447	-84.251012	837.74	6.00	843.74
24	38.366523	-84.246506	869.54	6.00	875.54
25	38.367709	-84.246398	849.85	6.00	855.85
26	38.368146	-84.250829	847.04	6.00	853.04

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg



Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.388266	-84.286524	820.54	4.50	825.04
2	38.388233	-84.285773	824.38	4.50	828.88
3	38.386770	-84.279507	869.72	4.50	874.22
4	38.384572	-84.276224	838.42	4.50	842.92
5	38.382654	-84.273649	854.65	4.50	859.15
6	38.381796	-84.272061	849.84	4.50	854.34
7	38.381090	-84.270152	842.89	4.50	847.39
8	38.380013	-84.266439	850.52	4.50	855.02
9	38.379424	-84.260839	852.28	4.50	856.78
10	38.378767	-84.254426	879.07	4.50	883.57
11	38.377875	-84.245714	909.46	4.50	913.96
12	38.377757	-84.244727	898.64	4.50	903.14
13	38.377337	-84.244255	886.81	4.50	891.31
14	38.376681	-84.244276	884.25	4.50	888.75
15	38.376260	-84.244019	883.62	4.50	888.12
16	38.376025	-84.243311	876.82	4.50	881.33
17	38.375587	-84.236466	892.45	4.50	896.95
18	38.373103	-84.233858	907.97	4.50	912.47

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
PV array 1	SA tracking	SA tracking	14,497	20,855	-	-
PV array 2	SA tracking	SA tracking	24,008	3,873	-	-
PV array 3	SA tracking	SA tracking	16,155	0	-	-
PV array 4	SA tracking	SA tracking	39	1,506	-	-
PV array 5	SA tracking	SA tracking	0	0	-	

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
pv-array-1 (green)	0	0	8	1422	3857	2793	3370	3006	41	0	0	0
pv-array-1 (yellow)	0	0	826	4560	3461	2259	2858	4655	2236	0	0	0
pv-array-2 (green)	0	0	0	1957	6458	5003	7249	3255	86	0	0	0
pv-array-2 (yellow)	0	0	166	1719	57	0	0	1081	850	0	0	0
pv-array-3 (green)	0	0	602	2103	3419	2737	3476	2590	1228	0	0	0
pv-array-3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
pv-array-4 (green)	0	0	0	20	0	0	0	1	18	0	0	0
pv-array-4 (yellow)	0	0	218	534	0	0	0	118	636	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

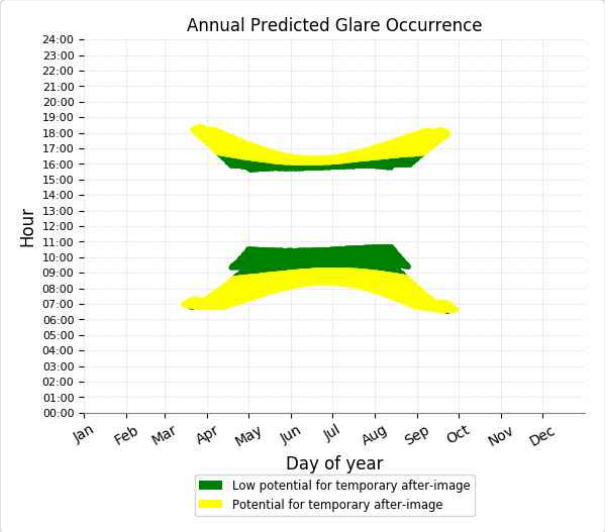
PV array 1 potential temporary after-image

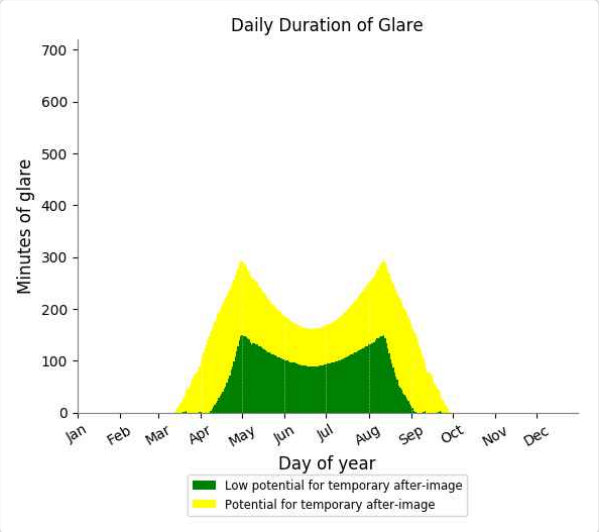
Component	Green glare (min)	Yellow glare (min)
Route: Route 1	14497	20855

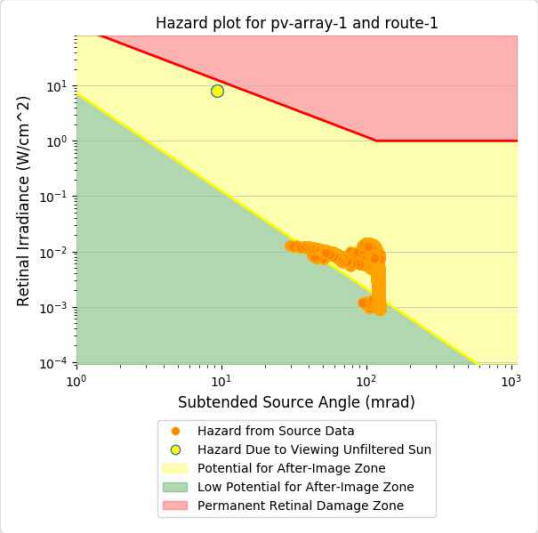
PV array 1 - Route Receptor (Route 1)

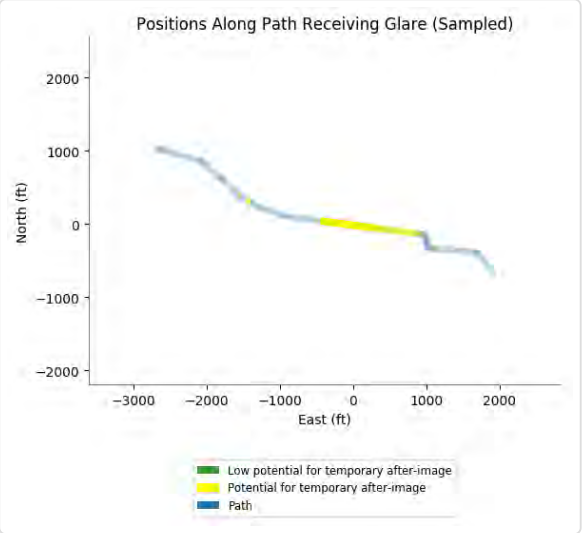
PV array is expected to produce the following glare for receptors at this location:

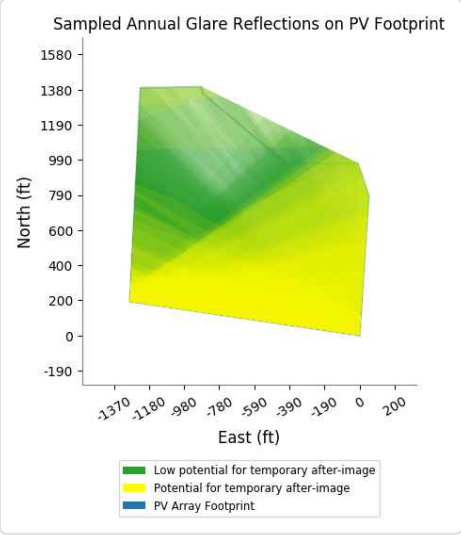
- 14,497 minutes of "green" glare with low potential to cause temporary after-image.
- 20,855 minutes of "yellow" glare with potential to cause temporary after-image.











PV array 2 potential temporary after-image

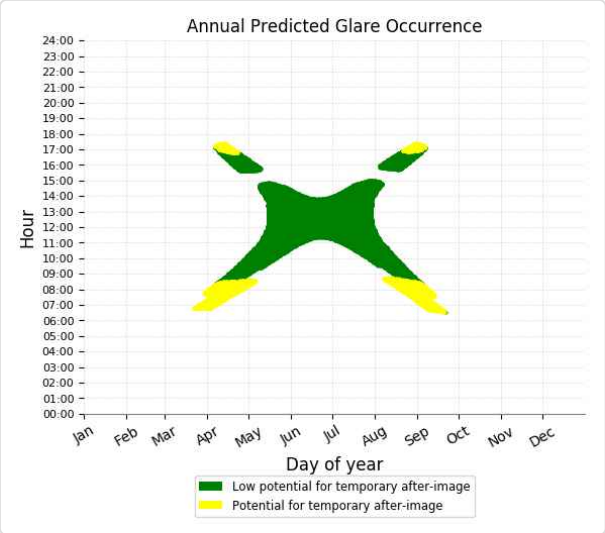
Component	Green glare (min)	Yellow glare (min)

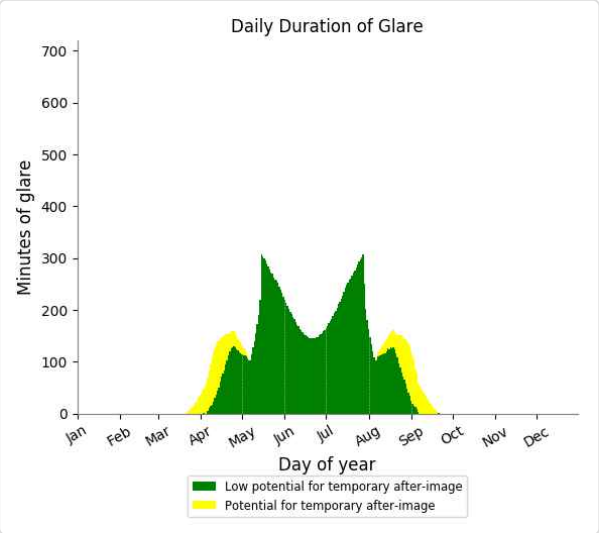
Route: Route 1	24008	3873

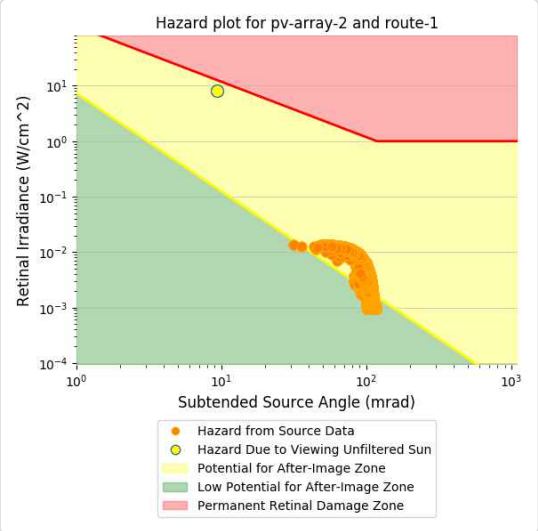
PV array 2 - Route Receptor (Route 1)

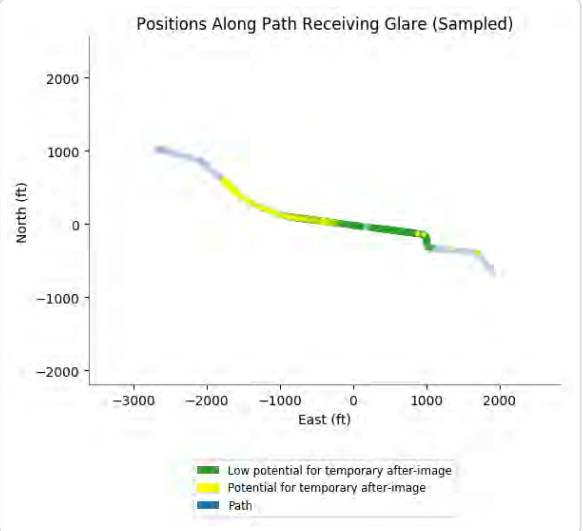
PV array is expected to produce the following glare for receptors at this location:

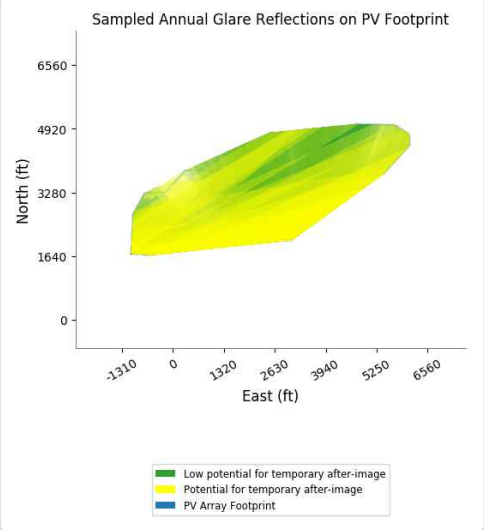
- 24,008 minutes of "green" glare with low potential to cause temporary after-image.
- 3,873 minutes of "yellow" glare with potential to cause temporary after-image.











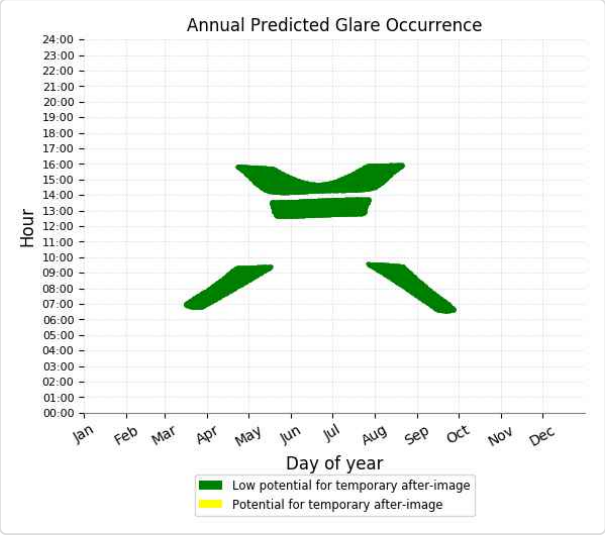
PV array 3 low potential for temporary after-image

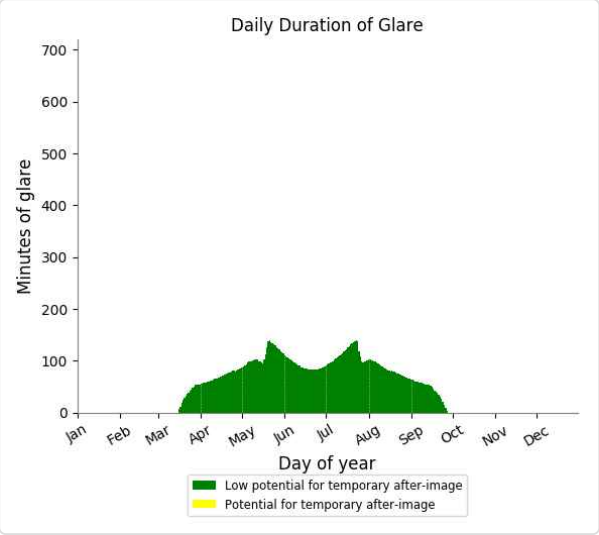
Component	Green glare (min)	Yellow glare (min)
Route: Route 1	16155	0

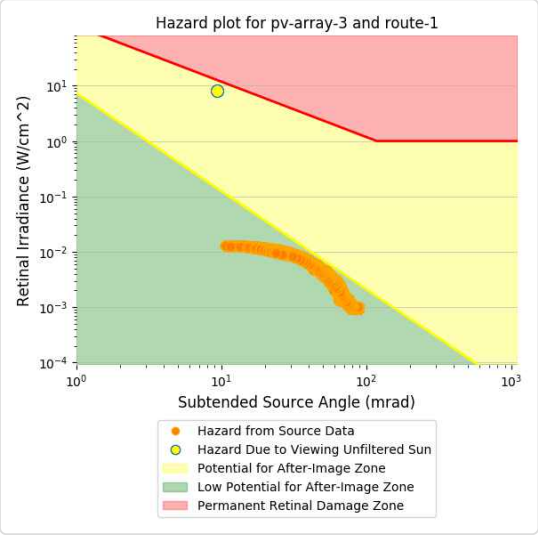
PV array 3 - Route Receptor (Route 1)

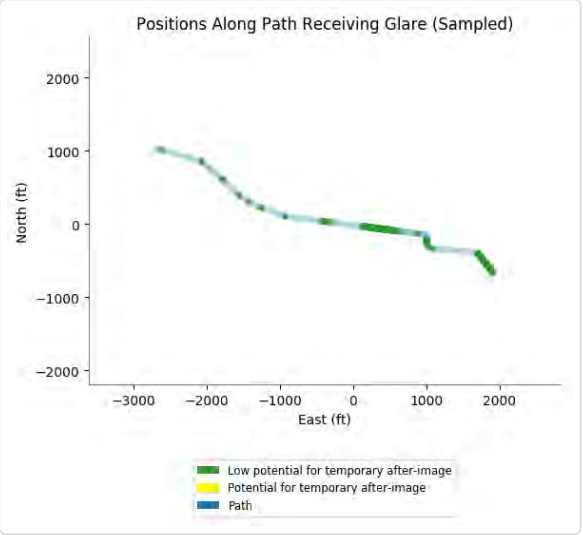
PV array is expected to produce the following glare for receptors at this location:

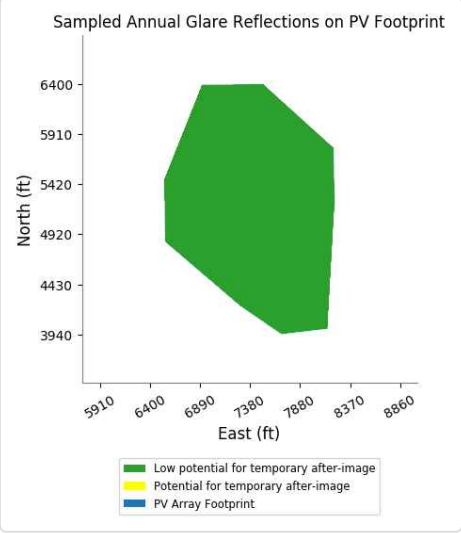
- 16,155 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











PV array 4 potential temporary after-image

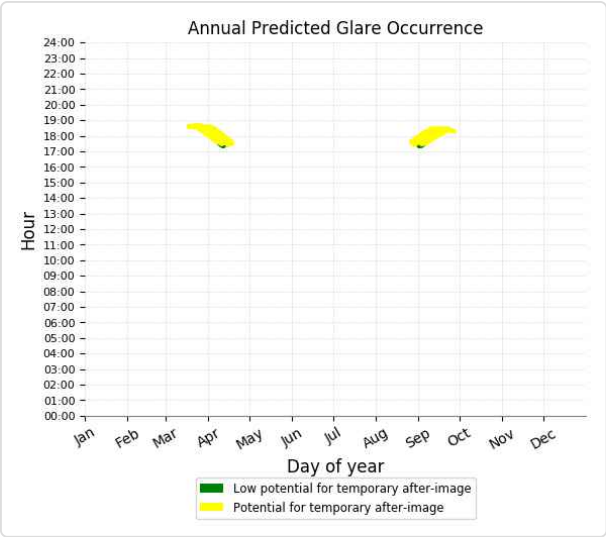
Component	Green glare (min)	Yellow glare (min)

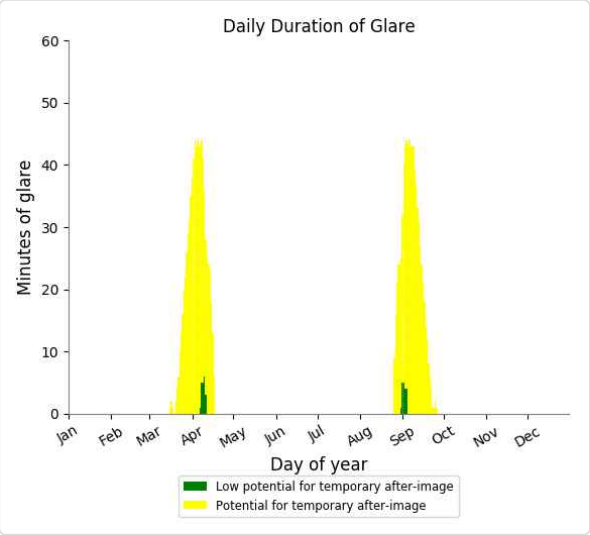
Route: Route 1	39	1506

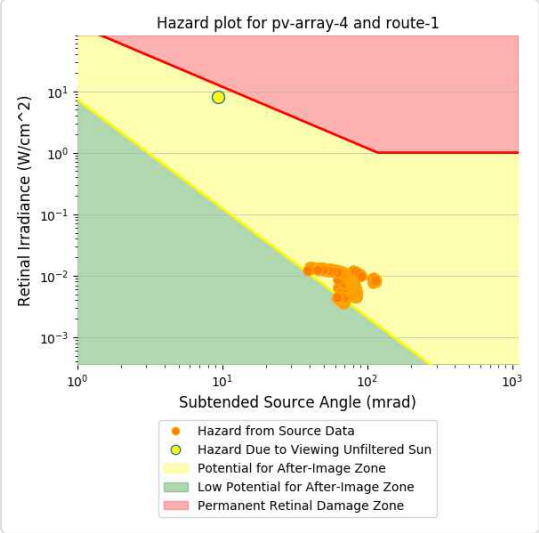
PV array 4 - Route Receptor (Route 1)

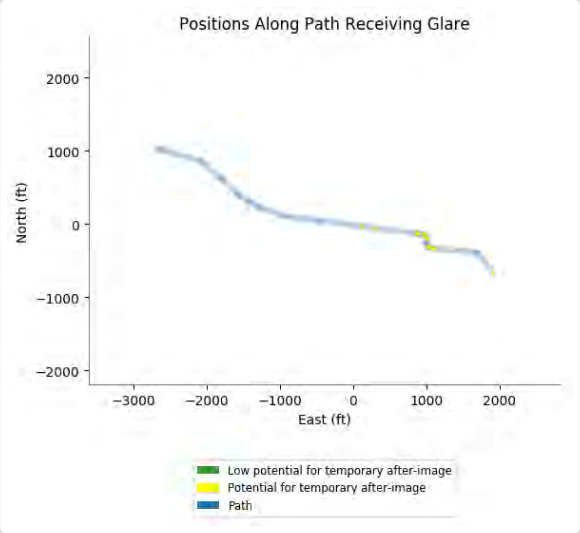
PV array is expected to produce the following glare for receptors at this location:

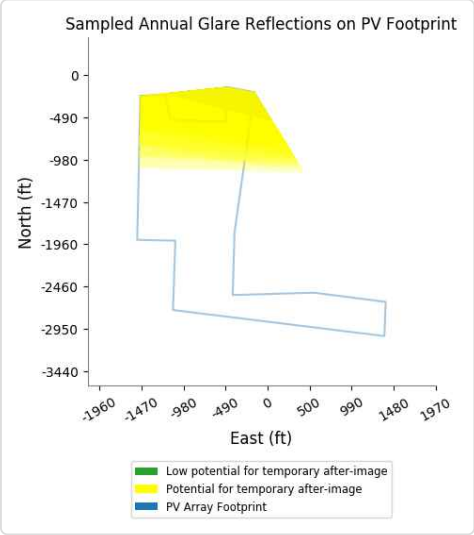
- 39 minutes of "green" glare with low potential to cause temporary after-image.
- 1,506 minutes of "yellow" glare with potential to cause temporary after-image.











PV array 5 no glare found

Component	Green glare (min)	Yellow glare (min)
Route: Route 1	0	0

No glare found

Assumptions

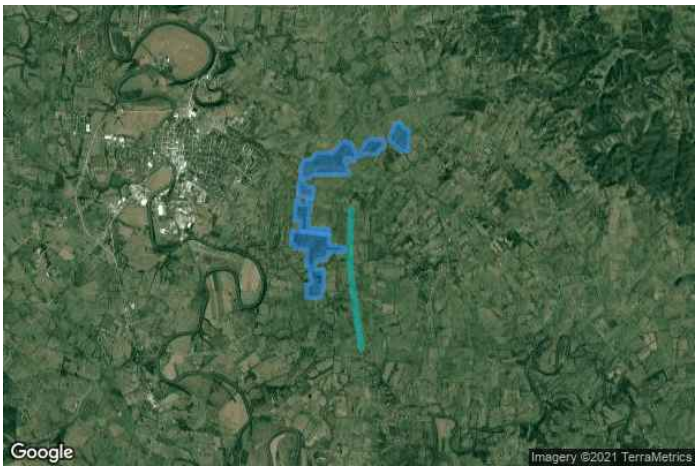
- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- 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.
- 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.
- 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.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

Blue Moon Solar - KY

Blue Moon route 1940-temp-2

Created Sept. 10, 2021
Updated Sept. 10, 2021
Time-step 1 minute
Timezone offset UTC-5
Site ID 58535.10332

Project type Advanced
Project status: active
Category 10 MW to 100 MW



Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

Analysis Methodologies:
- Observation point: **Version 2**
- 2-Mile Flight Path: **Version 2**
- Route: **Version 2**

Summary of Results Glare with potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
PV array 1	SA tracking	SA tracking	9,945	0	-
PV array 2	SA tracking	SA tracking	19,555	0	-
PV array 3	SA tracking	SA tracking	11,832	0	-
PV array 4	SA tracking	SA tracking	8,436	0	-
PV array 5	SA tracking	SA tracking	9,239	1,539	-

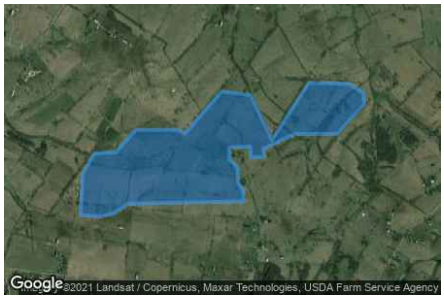
PV Array(s)

Total PV footprint area: 643.5 acres

Name: PV array 1
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 31.5 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.379043	-84.255753	869.51	6.00	875.51
2	38.379565	-84.260249	850.51	6.00	856.51
3	38.382853	-84.260045	819.72	6.00	825.72
4	38.382870	-84.258843	811.89	6.00	817.89
5	38.382769	-84.258822	815.81	6.00	821.81
6	38.381684	-84.257191	839.20	6.00	845.20
7	38.381693	-84.255786	826.71	6.00	832.71
8	38.381196	-84.255571	840.78	6.00	846.78

Name: PV array 2
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 239.0 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad



Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.383711	-84.259519	839.15	0.00	839.15
2	38.386520	-84.259348	854.92	0.00	854.92
3	38.387983	-84.258328	824.73	0.00	824.73
4	38.388067	-84.256419	823.48	0.00	823.48
5	38.389623	-84.254638	834.77	0.00	834.77
6	38.389632	-84.250958	893.58	0.00	893.58
7	38.389362	-84.250292	885.42	0.00	885.42
8	38.392280	-84.247063	857.41	0.00	857.41
9	38.392028	-84.244488	876.21	0.00	876.21
10	38.388917	-84.242621	850.21	0.00	850.21
11	38.392886	-84.239338	821.31	0.00	821.31
12	38.392819	-84.235819	814.50	0.00	814.50
13	38.392179	-84.234521	798.16	0.00	798.16
14	38.391414	-84.234446	819.44	0.00	819.44
15	38.389346	-84.236838	841.87	0.00	841.87
16	38.389329	-84.240604	811.58	0.00	811.58
17	38.388311	-84.243372	824.60	0.00	824.60
18	38.387748	-84.243297	824.20	0.00	824.20
19	38.387681	-84.244467	856.38	0.00	856.38
20	38.388471	-84.244520	835.50	0.00	835.50
21	38.388387	-84.246376	877.16	0.00	877.16
22	38.387554	-84.246344	876.87	0.00	876.87
23	38.387033	-84.245658	863.21	0.00	863.21
24	38.385973	-84.245615	842.74	0.00	842.74
25	38.385427	-84.245164	848.06	0.00	848.06
26	38.384661	-84.245089	852.13	0.00	852.13
27	38.384502	-84.255281	855.92	0.00	855.92
28	38.383812	-84.256633	826.91	0.00	826.91
29	38.383619	-84.257674	826.75	0.00	826.75

Name: PV array 3
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 66.8 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.395282	-84.231623	826.51	0.00	826.51
2	38.396577	-84.231645	827.09	0.00	827.09
3	38.396594	-84.229553	860.26	0.00	860.26
4	38.395593	-84.228984	866.07	0.00	866.07
5	38.394895	-84.227160	847.00	0.00	847.00
6	38.393390	-84.227117	844.78	0.00	844.78
7	38.392305	-84.227343	838.32	0.00	838.32
8	38.390026	-84.227364	812.02	0.00	812.02
9	38.389883	-84.228920	797.63	0.00	797.63
10	38.390649	-84.230336	794.66	0.00	794.66
11	38.392364	-84.232889	789.69	0.00	789.69
12	38.394037	-84.232932	814.09	0.00	814.09

Name: PV array 4
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 71.5 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.378388	-84.260944	843.65	0.00	843.65
2	38.378422	-84.259935	827.87	0.00	827.87
3	38.377614	-84.259699	818.76	0.00	818.76
4	38.377547	-84.257468	833.30	0.00	833.30
5	38.378674	-84.257468	837.52	0.00	837.52
6	38.378506	-84.256287	855.62	0.00	855.62
7	38.374023	-84.257103	841.10	0.00	841.10
8	38.372013	-84.257178	829.93	0.00	829.93
9	38.372088	-84.253863	865.22	0.00	865.22
10	38.371794	-84.250934	880.90	0.00	880.90
11	38.370700	-84.250987	873.18	0.00	873.18
12	38.371533	-84.259613	813.29	0.00	813.29
13	38.373754	-84.259517	838.56	0.00	838.56
14	38.373779	-84.261073	825.51	0.00	825.51

Name: PV array 5
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 234.7 acres
Rated power: -
Panel material: Light textured glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.7 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.370419	-84.251004	870.97	0.00	870.97
2	38.371429	-84.262001	841.80	0.00	841.80
3	38.368131	-84.262355	803.17	0.00	803.17
4	38.368123	-84.261336	784.77	0.00	784.77
5	38.367349	-84.261422	784.16	0.00	784.16
6	38.367013	-84.257527	825.68	0.00	825.68
7	38.362975	-84.257774	803.95	0.00	803.95
8	38.362958	-84.256680	797.26	0.00	797.26
9	38.360325	-84.256916	819.82	0.00	819.82
10	38.359576	-84.256101	827.23	0.00	827.23
11	38.359088	-84.256176	833.21	0.00	833.21
12	38.359139	-84.256616	829.10	0.00	829.10
13	38.358794	-84.257667	820.49	0.00	820.49
14	38.355874	-84.257796	831.60	0.00	831.60
15	38.355773	-84.255038	847.40	0.00	847.40
16	38.356085	-84.253064	837.03	0.00	837.03
17	38.361021	-84.252442	831.45	0.00	831.45
18	38.362451	-84.252506	823.27	0.00	823.27
19	38.362460	-84.255199	794.94	0.00	794.94
20	38.363696	-84.255135	814.60	0.00	814.60
21	38.364714	-84.253976	824.68	0.00	824.68
22	38.364664	-84.251970	819.41	0.00	819.41
23	38.366447	-84.251012	837.74	0.00	837.74
24	38.366523	-84.246506	869.54	0.00	869.54
25	38.367709	-84.246398	849.85	0.00	849.85
26	38.368146	-84.250829	847.04	0.00	847.04

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.376447	-84.244343	887.13	3.50	890.63
2	38.364755	-84.244879	859.62	3.50	863.12
3	38.356713	-84.243699	848.14	3.50	851.64
4	38.343924	-84.241381	876.64	3.50	880.14

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
PV array 1	SA tracking	SA tracking	9,945	0	-	-
PV array 2	SA tracking	SA tracking	19,555	0	-	-
PV array 3	SA tracking	SA tracking	11,832	0	-	-
PV array 4	SA tracking	SA tracking	8,436	0	-	-
PV array 5	SA tracking	SA tracking	9,239	1,539	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
pv-array-1 (green)	0	0	0	48	2799	3019	3428	651	0	0	0	0
pv-array-1 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
pv-array-2 (green)	0	0	0	360	5798	5025	6983	1389	0	0	0	0
pv-array-2 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
pv-array-3 (green)	0	0	0	150	3381	3374	3919	1008	0	0	0	0
pv-array-3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
pv-array-4 (green)	0	0	0	240	2024	2869	2454	849	0	0	0	0
pv-array-4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
pv-array-5 (green)	0	0	0	116	2028	3630	2928	537	0	0	0	0
pv-array-5 (yellow)	0	0	0	187	583	0	222	547	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

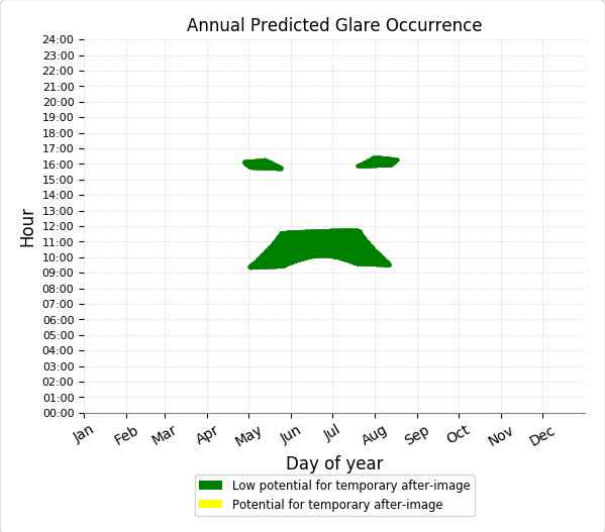
PV array 1 low potential for temporary after-image

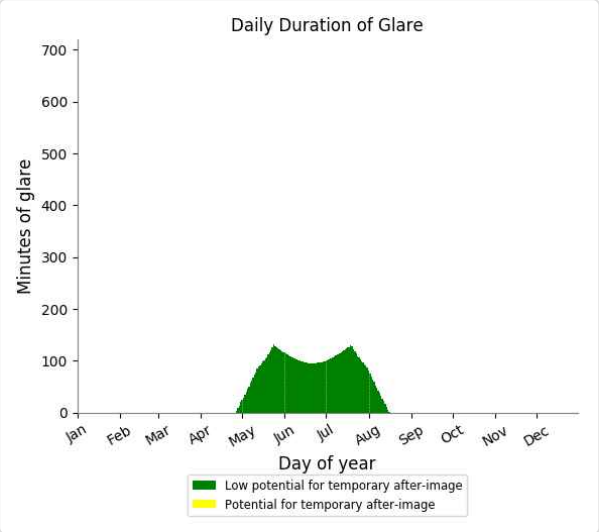
Component	Green glare (min)	Yellow glare (min)
Route: Route 1	9945	0

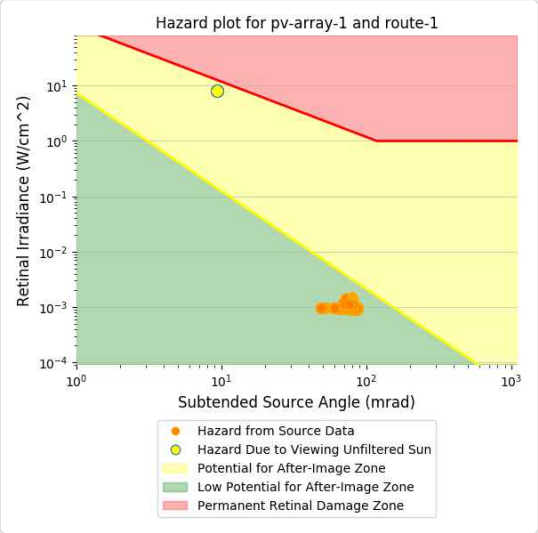
PV array 1 - Route Receptor (Route 1)

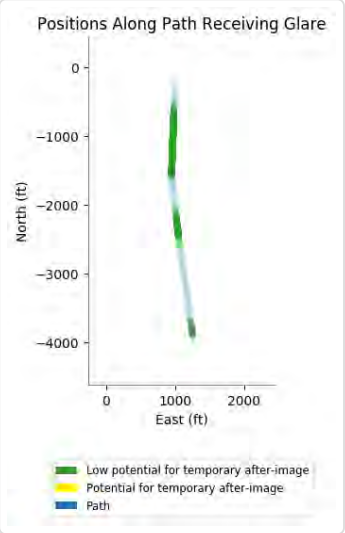
PV array is expected to produce the following glare for receptors at this location:

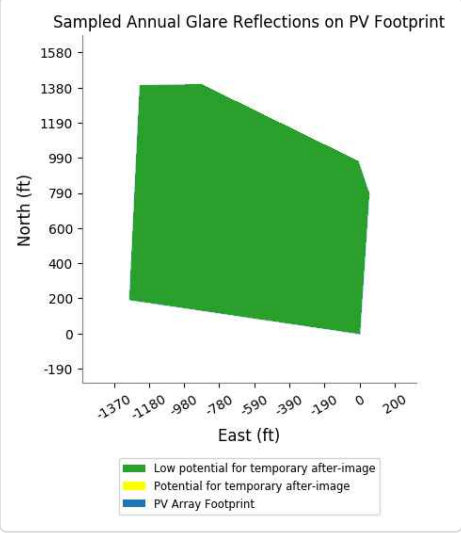
- 9,945 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











PV array 2 low potential for temporary after-image

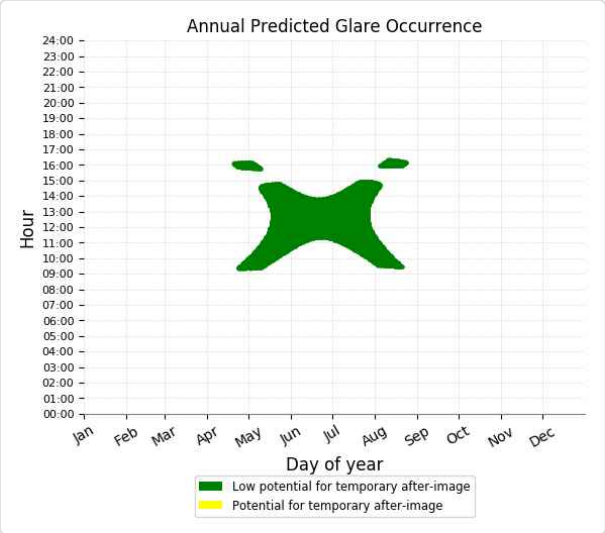
Component	Green glare (min)	Yellow glare (min)

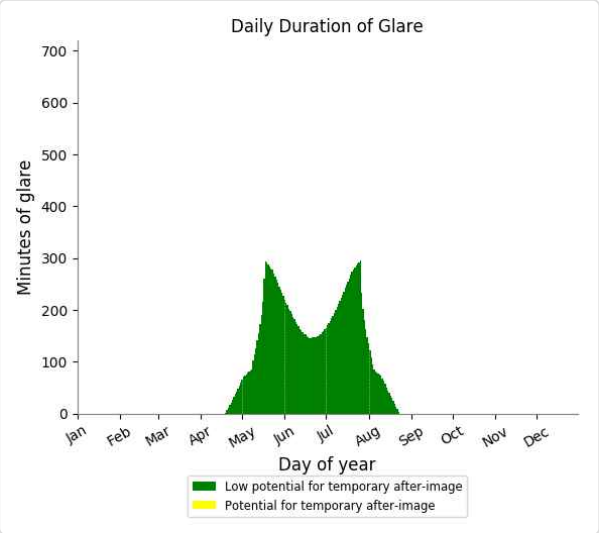
Route: Route 1	19555	0

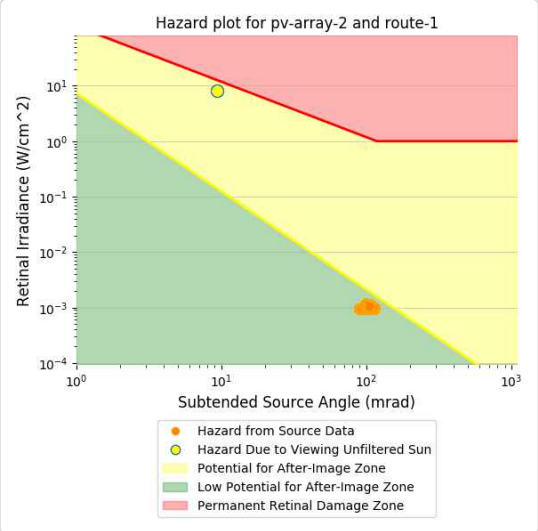
PV array 2 - Route Receptor (Route 1)

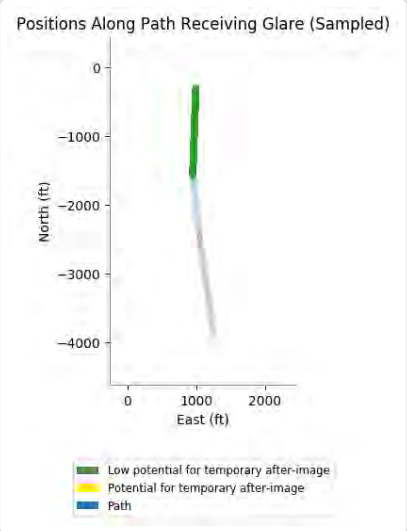
PV array is expected to produce the following glare for receptors at this location:

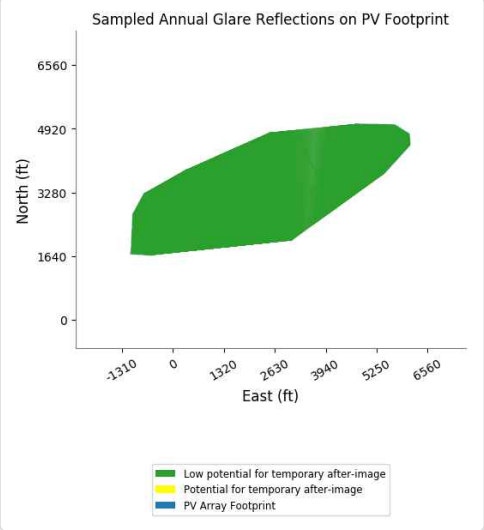
- 19,555 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











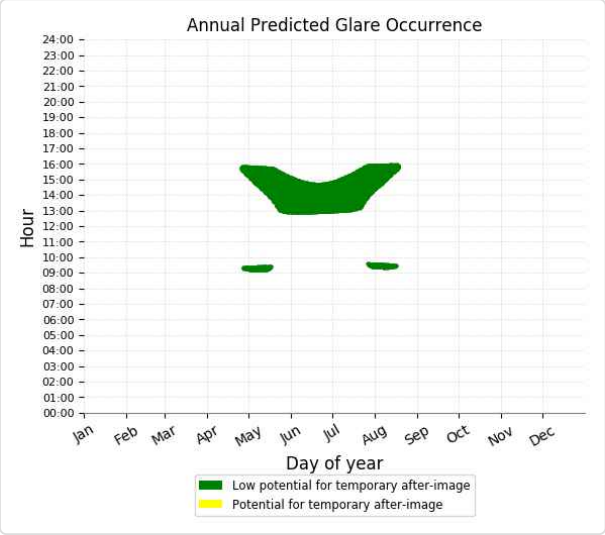
PV array 3 low potential for temporary after-image

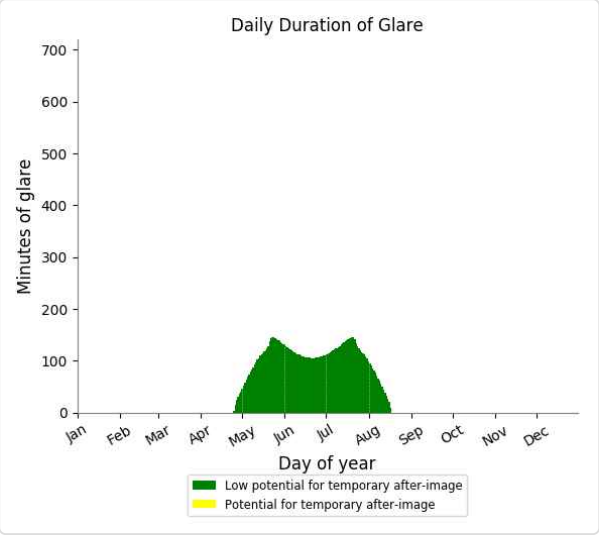
Component	Green glare (min)	Yellow glare (min)
Route: Route 1	11832	0

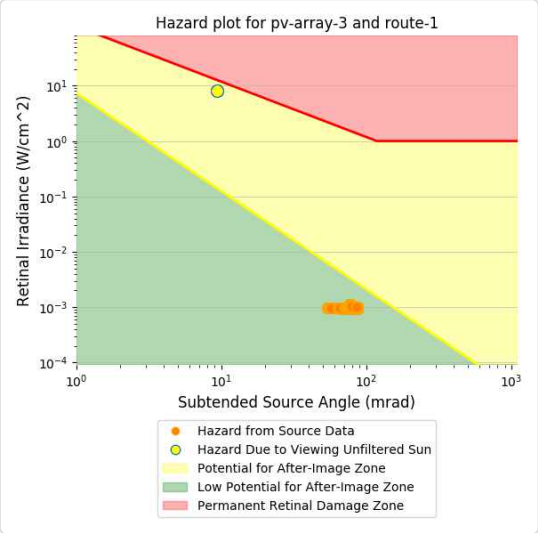
PV array 3 - Route Receptor (Route 1)

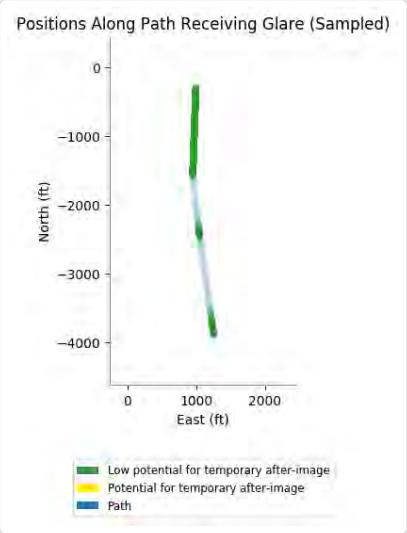
PV array is expected to produce the following glare for receptors at this location:

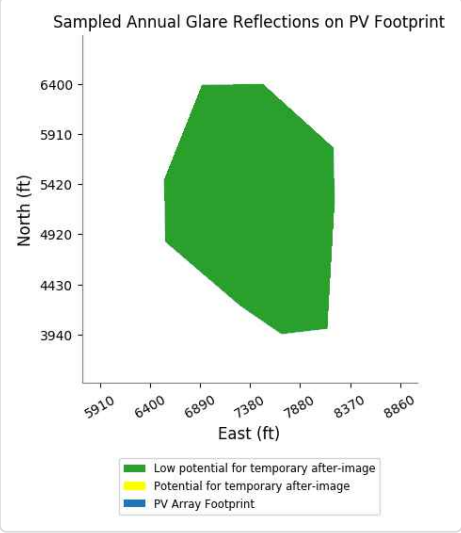
- 11,832 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











PV array 4 low potential for temporary after-image

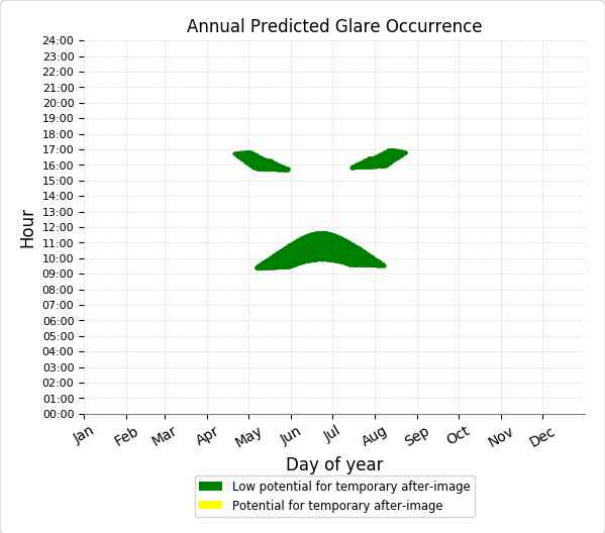
Component	Green glare (min)	Yellow glare (min)

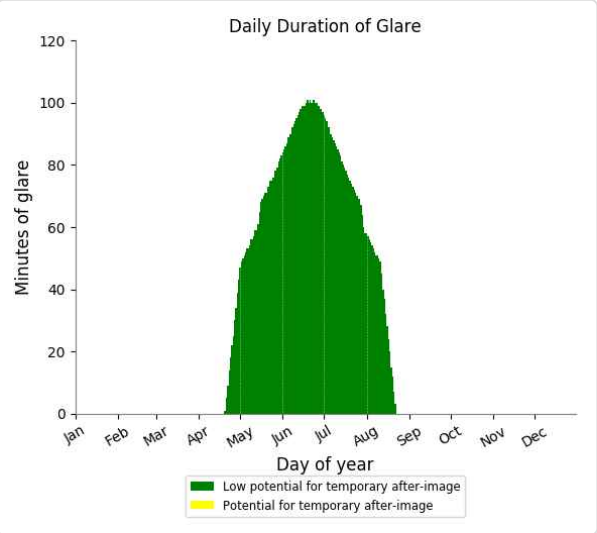
Route: Route 1	8436	0

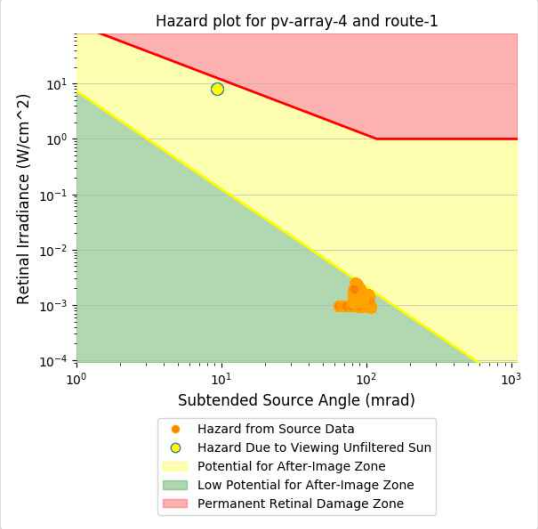
PV array 4 - Route Receptor (Route 1)

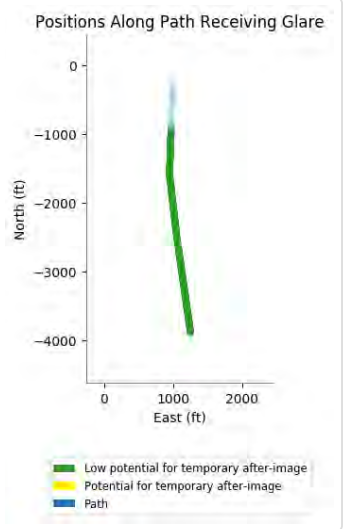
PV array is expected to produce the following glare for receptors at this location:

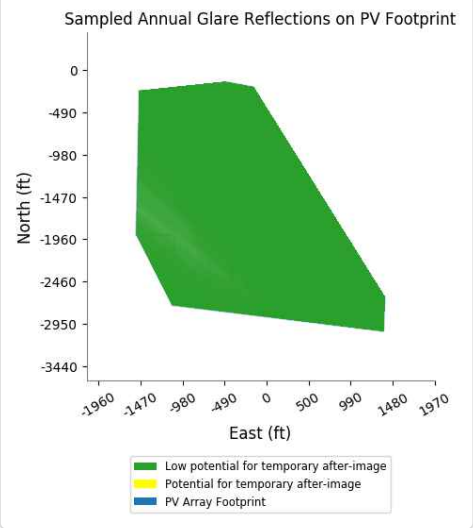
- 8,436 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











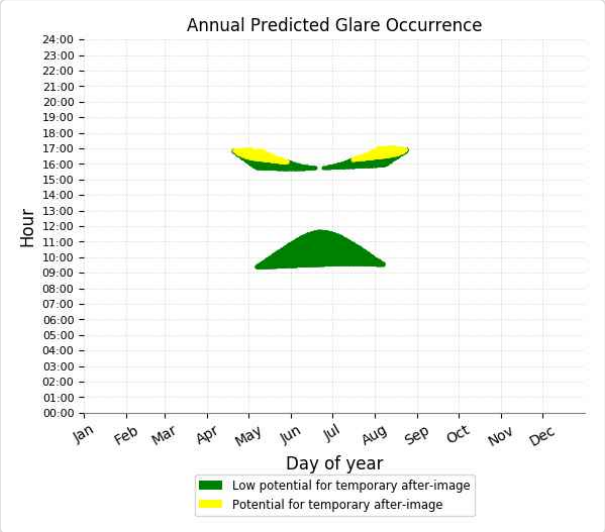
PV array 5 potential temporary after-image

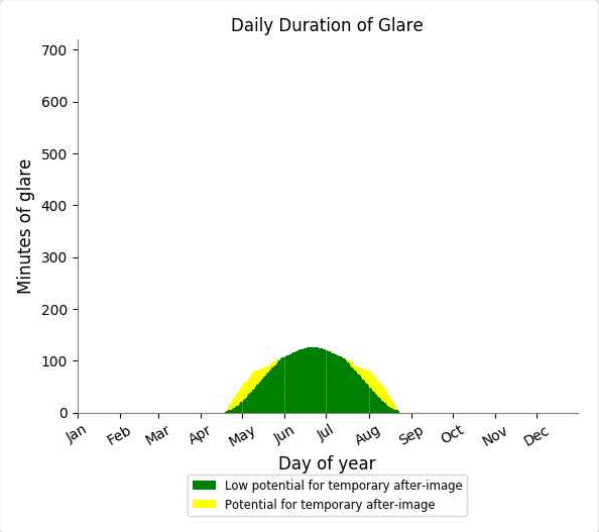
Component	Green glare (min)	Yellow glare (min)
Route: Route 1	9239	1539

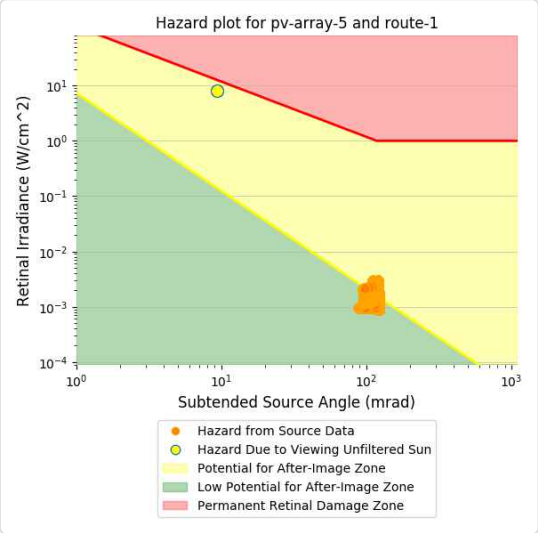
PV array 5 - Route Receptor (Route 1)

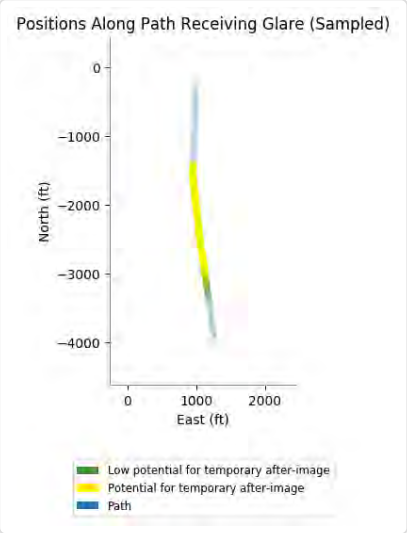
PV array is expected to produce the following glare for receptors at this location:

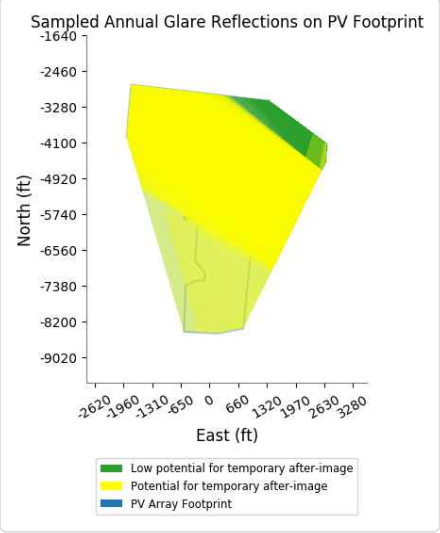
- 9,239 minutes of "green" glare with low potential to cause temporary after-image.
- 1,539 minutes of "yellow" glare with potential to cause temporary after-image.











Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- 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.
- 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.
- 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.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

FORGESOLAR GLARE ANALYSIS

Project: **Blue Moon Solar - KY**
PV project near Franklin, KY

Site configuration: **Untitled**
Analysis conducted by Steve Mellott (smellott@fisherassoc.com) at 16:46 on 24 Aug, 2021.

U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
2-mile flight path(s)	FAIL	Flight path receptor(s) receive yellow glare
ATCT(s)	N/A	No ATCT receptors designated

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

FAA Policy 78 FR 63276 can be read at https://www.federalregister.gov/d/2013-24729

SITE CONFIGURATION

Analysis Parameters

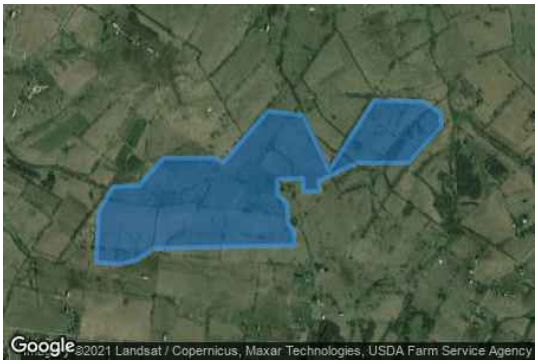
DNI: peaks at 1,000.0 W/m^2
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 57829.10332

PV Array(s)

Name: PV array 1
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0°
Tracking axis tilt: 52.0°
Tracking axis panel offset: 0.0°
Max tracking angle: 52.0°
Resting angle: 0.0°
Rated power: -
Panel material: Light textured glass without 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	38.379043	-84.255753	869.51	0.00	869.51
2	38.379565	-84.260249	850.51	0.00	850.51
3	38.382853	-84.260045	819.72	0.00	819.72
4	38.382870	-84.258843	811.89	0.00	811.89
5	38.382769	-84.258822	815.81	0.00	815.81
6	38.381684	-84.257191	839.20	0.00	839.20
7	38.381693	-84.255786	826.71	0.00	826.71
8	38.381196	-84.255571	840.78	0.00	840.78

Name: PV array 2
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0°
Tracking axis tilt: 52.0°
Tracking axis panel offset: 0.0°
Max tracking angle: 52.0°
Resting angle: 0.0°
Rated power: -
Panel material: Light textured glass without 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	38.383711	-84.259519	839.15	0.00	839.15
2	38.386520	-84.259348	854.92	0.00	854.92
3	38.387983	-84.258328	824.73	0.00	824.73
4	38.388067	-84.256419	823.48	0.00	823.48
5	38.389623	-84.254638	834.77	0.00	834.77
6	38.389632	-84.250958	893.58	0.00	893.58
7	38.389362	-84.250292	885.42	0.00	885.42
8	38.392280	-84.247063	857.41	0.00	857.41
9	38.392028	-84.244488	876.21	0.00	876.21
10	38.388917	-84.242621	850.21	0.00	850.21
11	38.392886	-84.239338	821.31	0.00	821.31
12	38.392819	-84.235819	814.50	0.00	814.50
13	38.392179	-84.234521	798.16	0.00	798.16
14	38.391414	-84.234446	819.44	0.00	819.44
15	38.389346	-84.236838	841.87	0.00	841.87
16	38.389329	-84.240604	811.58	0.00	811.58
17	38.388311	-84.243372	824.60	0.00	824.60
18	38.387748	-84.243297	824.20	0.00	824.20
19	38.387681	-84.244467	856.38	0.00	856.38
20	38.388471	-84.244520	835.50	0.00	835.50
21	38.388387	-84.246376	877.16	0.00	877.16
22	38.387554	-84.246344	876.87	0.00	876.87
23	38.387033	-84.245658	863.21	0.00	863.21
24	38.385973	-84.245615	842.74	0.00	842.74
25	38.385427	-84.245164	848.06	0.00	848.06
26	38.384661	-84.245089	852.13	0.00	852.13
27	38.384502	-84.255281	855.92	0.00	855.92
28	38.383812	-84.256633	826.91	0.00	826.91
29	38.383619	-84.257674	826.75	0.00	826.75

Name: PV array 3
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0°
Tracking axis tilt: 52.0°
Tracking axis panel offset: 0.0°
Max tracking angle: 52.0°
Resting angle: 0.0°
Rated power: -
Panel material: Light textured glass without 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	38.395282	-84.231623	826.51	0.00	826.51
2	38.396577	-84.231645	827.09	0.00	827.09
3	38.396594	-84.229553	860.26	0.00	860.26
4	38.395593	-84.228984	866.07	0.00	866.07
5	38.394895	-84.227160	847.00	0.00	847.00
6	38.393390	-84.227117	844.78	0.00	844.78
7	38.392305	-84.227343	838.32	0.00	838.32
8	38.390026	-84.227364	812.02	0.00	812.02
9	38.389883	-84.228920	797.63	0.00	797.63
10	38.390649	-84.230336	794.66	0.00	794.66
11	38.392364	-84.232889	789.69	0.00	789.69
12	38.394037	-84.232932	814.09	0.00	814.09

Name: PV array 4
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0°
Tracking axis tilt: 52.0°
Tracking axis panel offset: 0.0°
Max tracking angle: 52.0°
Resting angle: 0.0°
Rated power: -
Panel material: Light textured glass without 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	38.378388	-84.260944	843.65	0.00	843.65
2	38.378422	-84.259935	827.87	0.00	827.87
3	38.377614	-84.259699	818.76	0.00	818.76
4	38.377547	-84.257468	833.30	0.00	833.30
5	38.378674	-84.257468	837.52	0.00	837.52
6	38.378506	-84.256287	855.62	0.00	855.62
7	38.374023	-84.257103	841.10	0.00	841.10
8	38.372013	-84.257178	829.93	0.00	829.93
9	38.372088	-84.253863	865.22	0.00	865.22
10	38.371794	-84.250934	880.90	0.00	880.90
11	38.370700	-84.250987	873.18	0.00	873.18
12	38.371533	-84.259613	813.29	0.00	813.29
13	38.373754	-84.259517	838.56	0.00	838.56
14	38.373779	-84.261073	825.51	0.00	825.51

Name: PV array 5
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0°
Tracking axis tilt: 52.0°
Tracking axis panel offset: 0.0°
Max tracking angle: 52.0°
Resting angle: 0.0°
Rated power: -
Panel material: Light textured glass without 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	38.370419	-84.251004	870.97	0.00	870.97
2	38.371429	-84.262001	841.80	0.00	841.80
3	38.368131	-84.262355	803.17	0.00	803.17
4	38.368123	-84.261336	784.77	0.00	784.77
5	38.367349	-84.261422	784.16	0.00	784.16
6	38.367013	-84.257527	825.68	0.00	825.68
7	38.362975	-84.257774	803.95	0.00	803.95
8	38.362958	-84.256680	797.26	0.00	797.26
9	38.360325	-84.256916	819.82	0.00	819.82
10	38.359576	-84.256101	827.23	0.00	827.23
11	38.359088	-84.256176	833.21	0.00	833.21
12	38.359139	-84.256616	829.10	0.00	829.10
13	38.358794	-84.257667	820.49	0.00	820.49
14	38.355874	-84.257796	831.60	0.00	831.60
15	38.355773	-84.255038	847.40	0.00	847.40
16	38.356085	-84.253064	837.03	0.00	837.03
17	38.361021	-84.252442	831.45	0.00	831.45
18	38.362451	-84.252506	823.27	0.00	823.27
19	38.362460	-84.255199	794.94	0.00	794.94
20	38.363696	-84.255135	814.60	0.00	814.60
21	38.364714	-84.253976	824.68	0.00	824.68
22	38.364664	-84.251970	819.41	0.00	819.41
23	38.366447	-84.251012	837.74	0.00	837.74
24	38.366523	-84.246506	869.54	0.00	869.54
25	38.367709	-84.246398	849.85	0.00	849.85
26	38.368146	-84.250829	847.04	0.00	847.04

Blue Moon Solar - KY

12142021 analysis-temp-2

Created Dec. 14, 2021
Updated Dec. 14, 2021
Time-step 1 minute
Timezone offset UTC-5
Site ID 62647.10332

Project type Advanced
Project status: active
Category 10 MW to 100 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

Analysis Methodologies:

- Observation point: **Version 2**
- 2-Mile Flight Path: **Version 2**
- Route: **Version 2**

Summary of Results Glare with potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
PV array 1	SA tracking	SA tracking	0	0	-
PV array 2	SA tracking	SA tracking	3,737	300	-
PV array 3	SA tracking	SA tracking	24,399	2,449	-
PV array 4	SA tracking	SA tracking	18,338	0	-
PV array 5	SA tracking	SA tracking	10,661	0	-

Component Data

PV Array(s)

Total PV footprint area: 47.0 acres

Name: PV array 1
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 14.3 acres
Rated power: -
Panel material: Light textured glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.16 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.357381	-84.253402	845.64	0.00	845.64
2	38.357583	-84.257522	828.77	0.00	828.77
3	38.355968	-84.257586	825.85	0.00	825.85
4	38.355850	-84.255226	848.44	0.00	848.44
5	38.356136	-84.255205	853.22	0.00	853.22
6	38.356086	-84.253552	830.28	0.00	830.28
7	38.356641	-84.253488	838.25	0.00	838.25
8	38.356641	-84.253338	839.30	0.00	839.30

Name: PV array 2
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 14.4 acres
Rated power: -
Panel material: Light textured glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.16 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.357499	-84.253445	844.96	0.00	844.96
2	38.357718	-84.257586	826.09	0.00	826.09
3	38.358812	-84.257522	822.17	0.00	822.17
4	38.358828	-84.256707	836.06	0.00	836.06
5	38.359098	-84.256685	829.98	0.00	829.98
6	38.359047	-84.253381	828.76	0.00	828.76
7	38.358340	-84.253359	836.77	0.00	836.77
8	38.358374	-84.253188	834.78	0.00	834.78
9	38.357499	-84.253188	842.62	0.00	842.62

Name: PV array 3
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 7.7 acres
Rated power: -
Panel material: Light textured glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.16 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.359194	-84.255691	836.18	0.00	836.18
2	38.359152	-84.253942	825.83	0.00	825.83
3	38.359909	-84.253942	820.88	0.00	820.88
4	38.359959	-84.254908	829.83	0.00	829.83
5	38.360784	-84.254961	803.64	0.00	803.64
6	38.360817	-84.256174	815.13	0.00	815.13
7	38.361339	-84.256163	796.62	0.00	796.62
8	38.361347	-84.256421	799.14	0.00	799.14
9	38.361625	-84.256442	788.48	0.00	788.48
10	38.361617	-84.256689	790.18	0.00	790.18
11	38.360271	-84.256721	820.01	0.00	820.01
12	38.360254	-84.256399	825.03	0.00	825.03
13	38.359926	-84.256399	825.42	0.00	825.42
14	38.359909	-84.255938	833.32	0.00	833.32
15	38.359379	-84.255959	827.95	0.00	827.95
16	38.359362	-84.255723	834.87	0.00	834.87

Name: PV array 4
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 7.4 acres
Rated power: -
Panel material: Light textured glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.16 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.361019	-84.254575	801.36	0.00	801.36
2	38.361019	-84.252826	829.13	0.00	829.13
3	38.361810	-84.252837	834.56	0.00	834.56
4	38.361818	-84.252708	836.28	0.00	836.28
5	38.362441	-84.252730	820.04	0.00	820.04
6	38.362424	-84.255283	794.91	0.00	794.91
7	38.361810	-84.255283	808.91	0.00	808.91
8	38.361810	-84.254951	813.75	0.00	813.75
9	38.361305	-84.254961	802.51	0.00	802.51
10	38.361297	-84.254575	810.87	0.00	810.87

Name: PV array 5
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 52.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 52.0 deg
Resting angle: 0.0 deg
Footprint area: 3.2 acres
Rated power: -
Panel material: Light textured glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.16 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	38.364345	-84.257676	820.38	0.00	820.38
2	38.364353	-84.256603	831.44	0.00	831.44
3	38.363849	-84.256635	817.87	0.00	817.87
4	38.363840	-84.256807	820.16	0.00	820.16
5	38.363007	-84.256775	799.72	0.00	799.72
6	38.362990	-84.257740	805.25	0.00	805.25

2-Mile Flight Path Receptor(s)

Name: FP 1
Description:
Threshold height : 50 ft
Direction: 285.7 deg
Glide slope: 4.0 deg
Pilot view restricted? Yes
Vertical view restriction: 30.0 deg
Azimuthal view restriction: 50.0 deg

Point	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
Threshold	38.365562	-84.280557	720.04	50.00	770.04
2-mile point	38.357753	-84.245011	803.05	705.46	1508.50

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File
PV array 1	SA tracking	SA tracking	0	0	-	
PV array 2	SA tracking	SA tracking	3,737	300	-	-
PV array 3	SA tracking	SA tracking	24,399	2,449	-	-
PV array 4	SA tracking	SA tracking	18,338	0	-	-
PV array 5	SA tracking	SA tracking	10,661	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
pv-array-2 (green)	400	1015	404	0	0	0	0	0	9	1176	571	162
pv-array-2 (yellow)	0	40	109	0	0	0	0	0	0	151	0	0
pv-array-3 (green)	3710	5307	2295	0	0	0	0	0	938	5042	4442	2665
pv-array-3 (yellow)	0	716	506	0	0	0	0	0	97	1098	32	0
pv-array-4 (green)	76	3220	5629	242	0	0	0	0	3780	4809	582	0
pv-array-4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
pv-array-5 (green)	0	0	3013	2316	0	0	0	619	4684	29	0	0
pv-array-5 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

PV array 1 no glare found

Component	Green glare (min)	Yellow glare (min)
FP: FP 1	0	0

No glare found

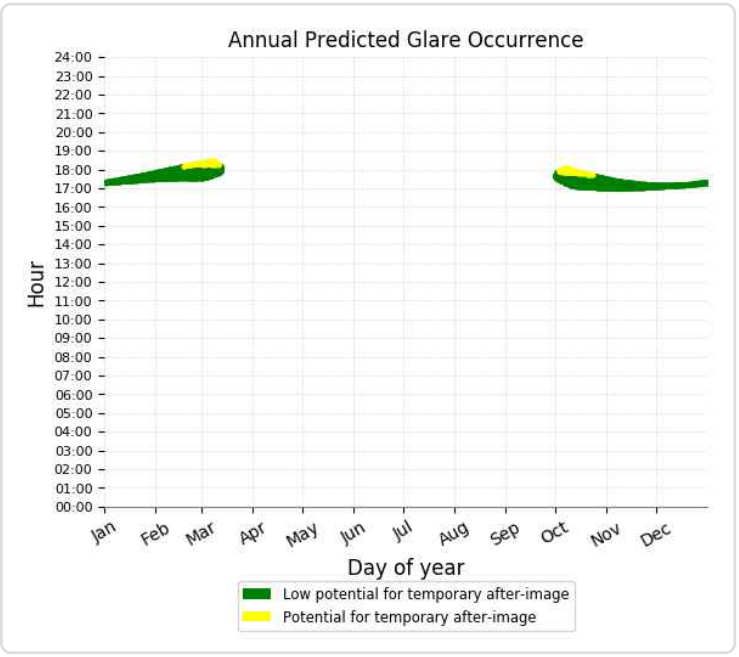
PV array 2 potential temporary after-image

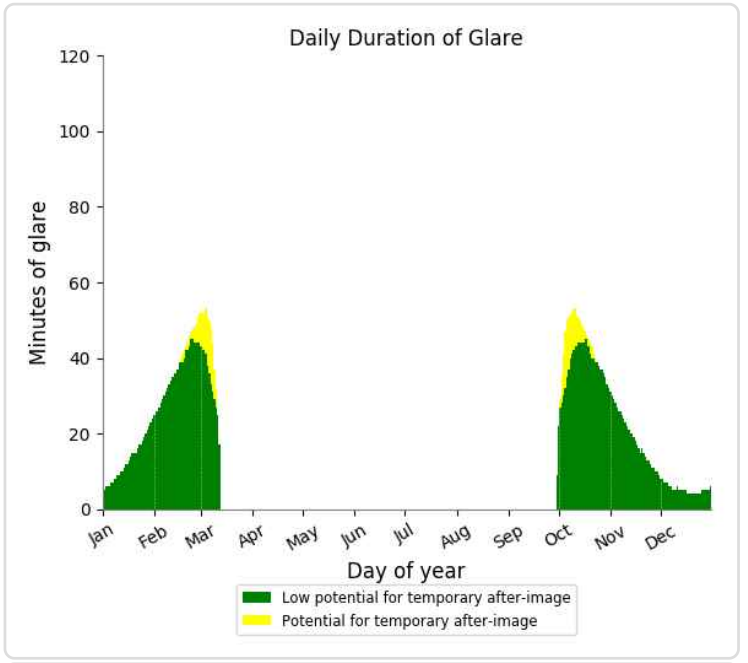
Component	Green glare (min)	Yellow glare (min)
FP: FP 1	3737	300

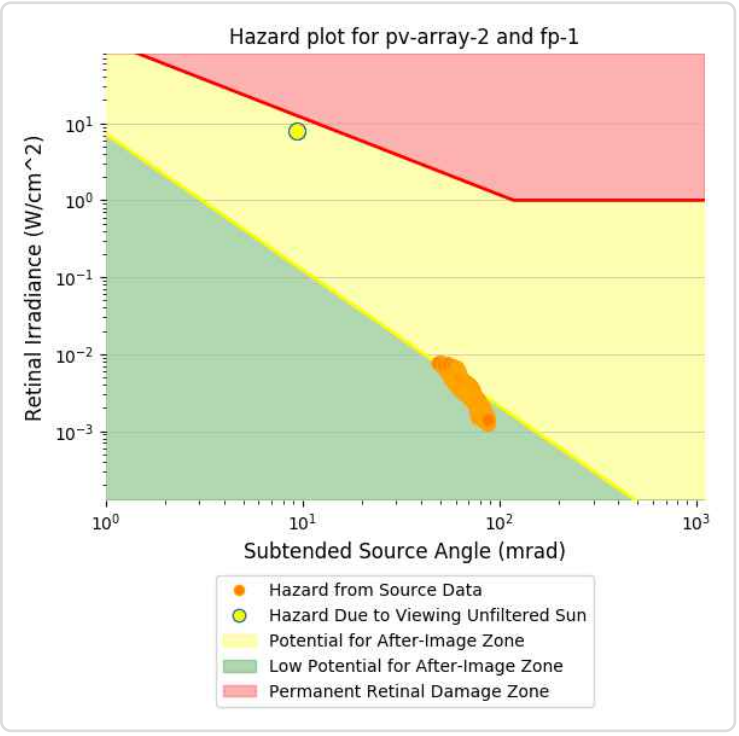
PV array 2 - Receptor (FP 1)

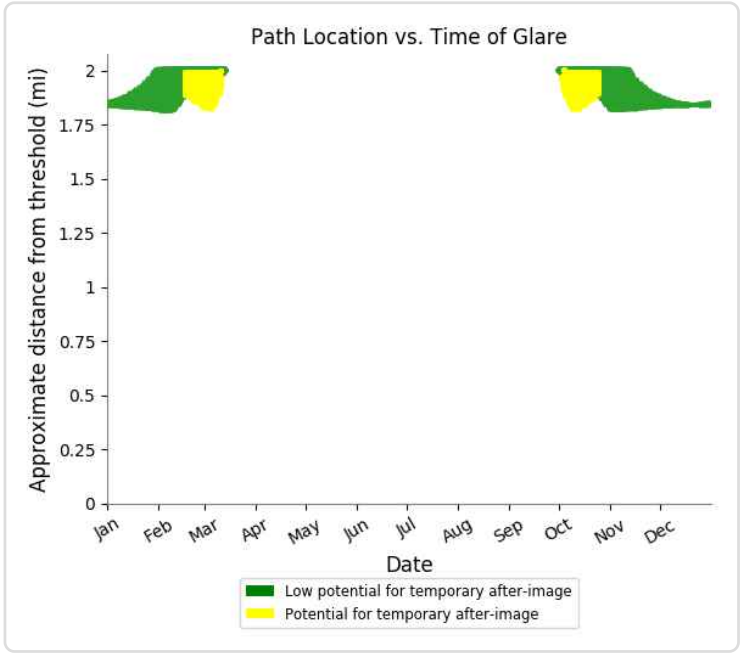
PV array is expected to produce the following glare for observers on this flight path:

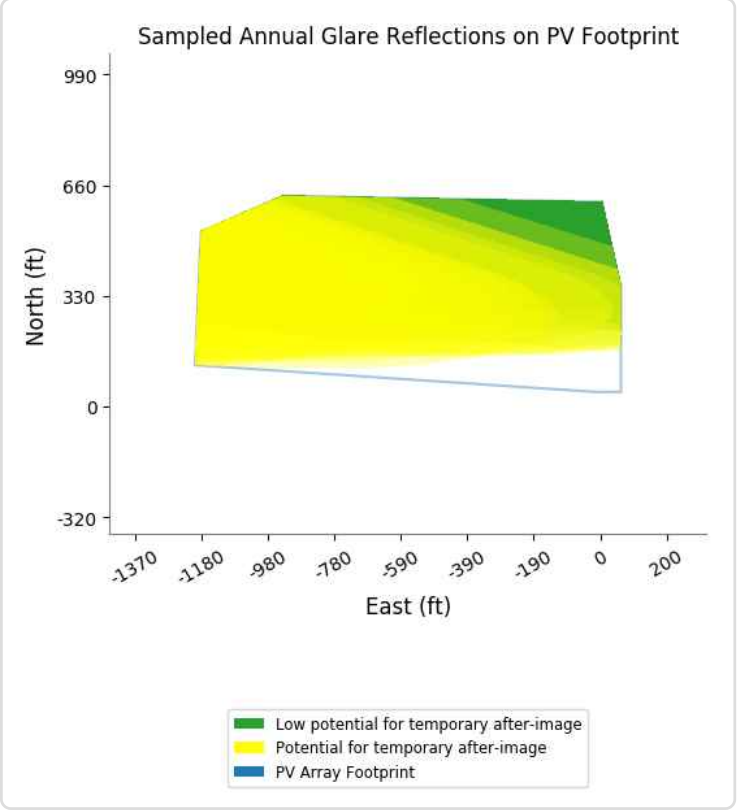
- 3,737 minutes of "green" glare with low potential to cause temporary after-image.
- 300 minutes of "yellow" glare with potential to cause temporary after-image.

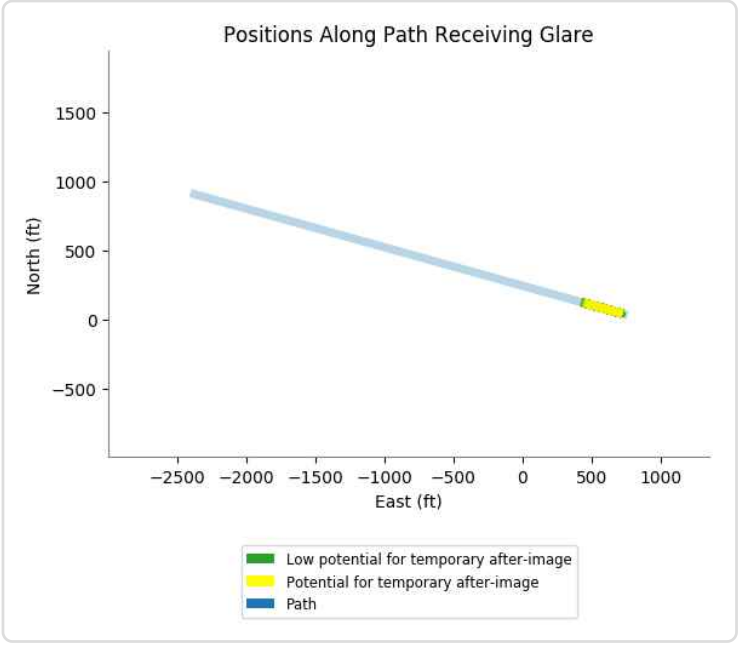












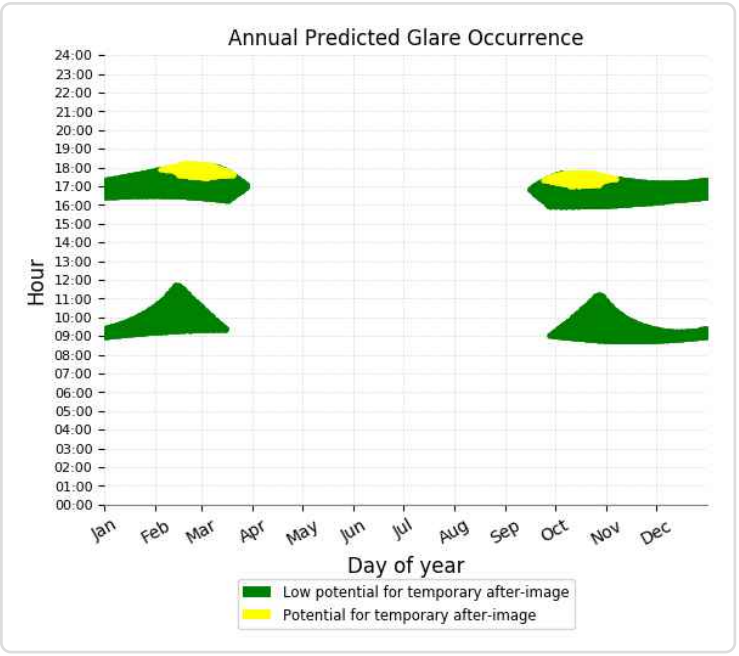
PV array 3 potential temporary after-image

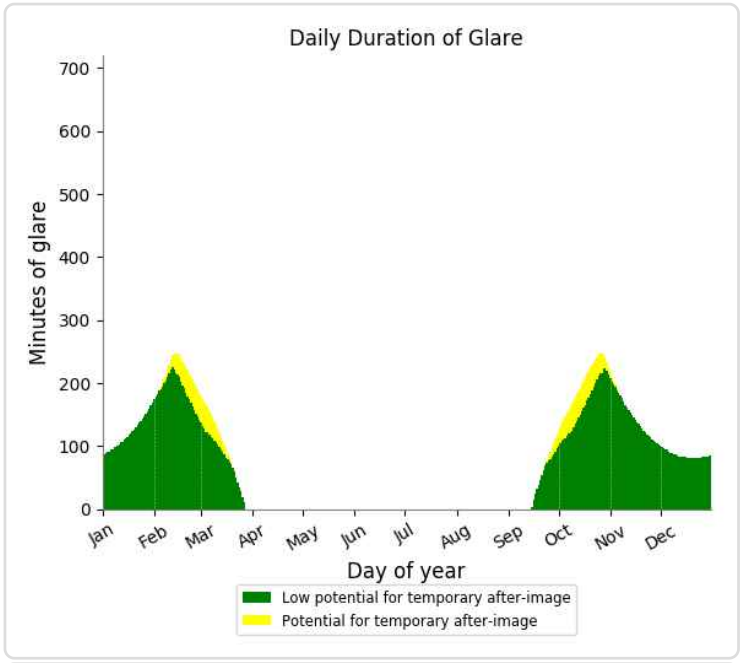
Component	Green glare (min)	Yellow glare (min)
FP: FP 1	24399	2449

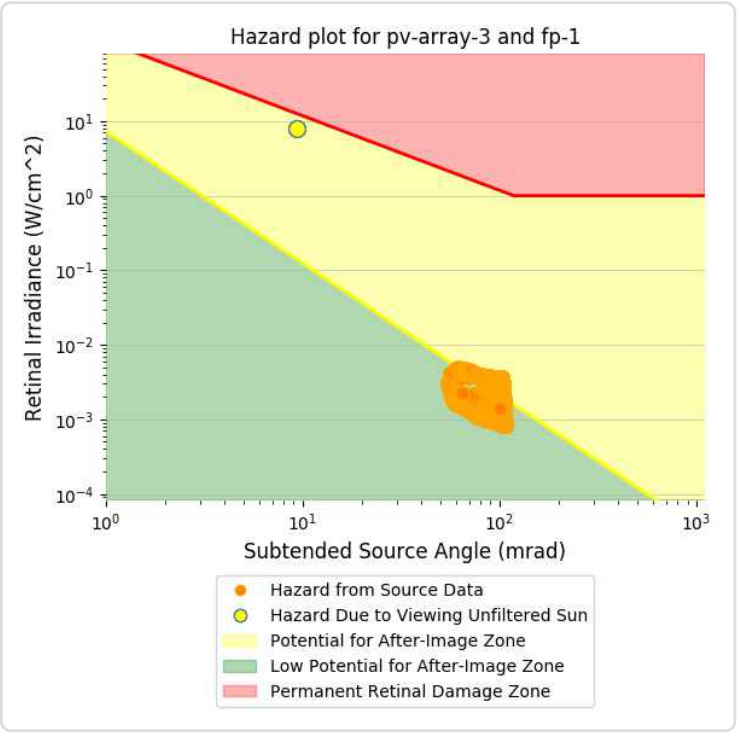
PV array 3 - Receptor (FP 1)

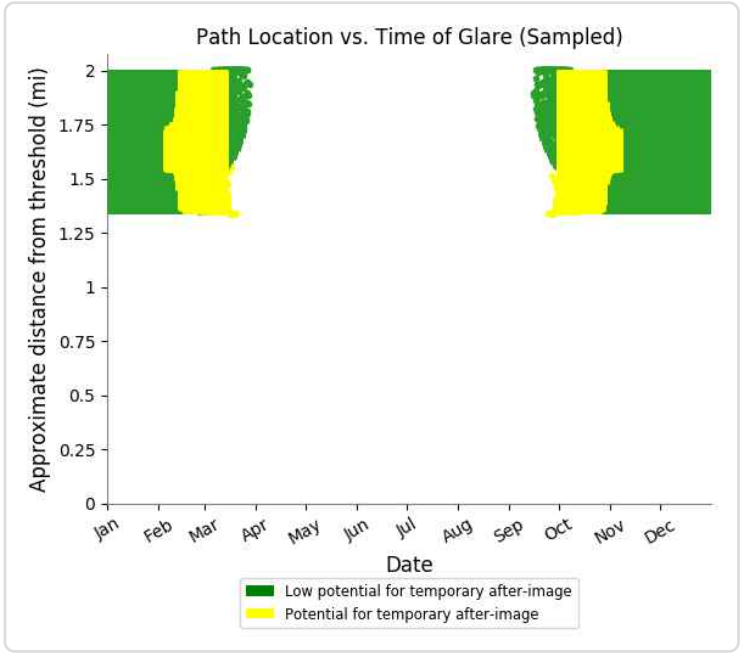
PV array is expected to produce the following glare for observers on this flight path:

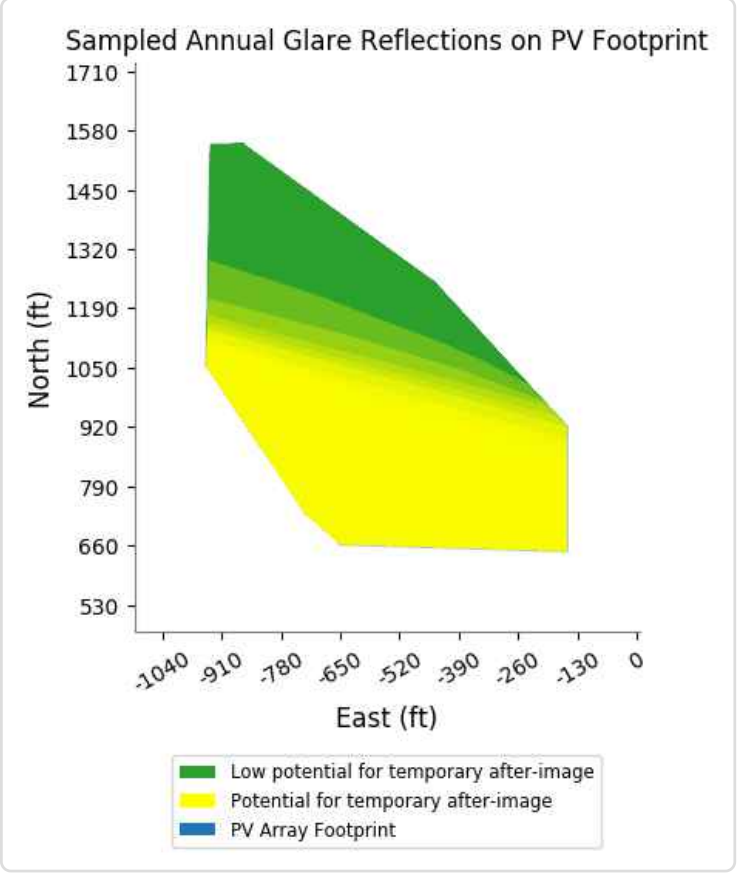
- 24,399 minutes of "green" glare with low potential to cause temporary after-image.
- 2,449 minutes of "yellow" glare with potential to cause temporary after-image.

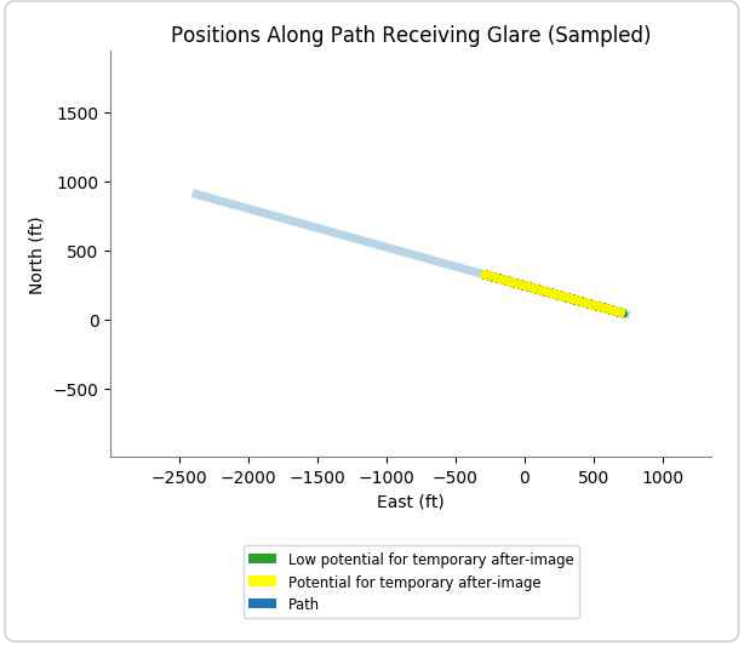












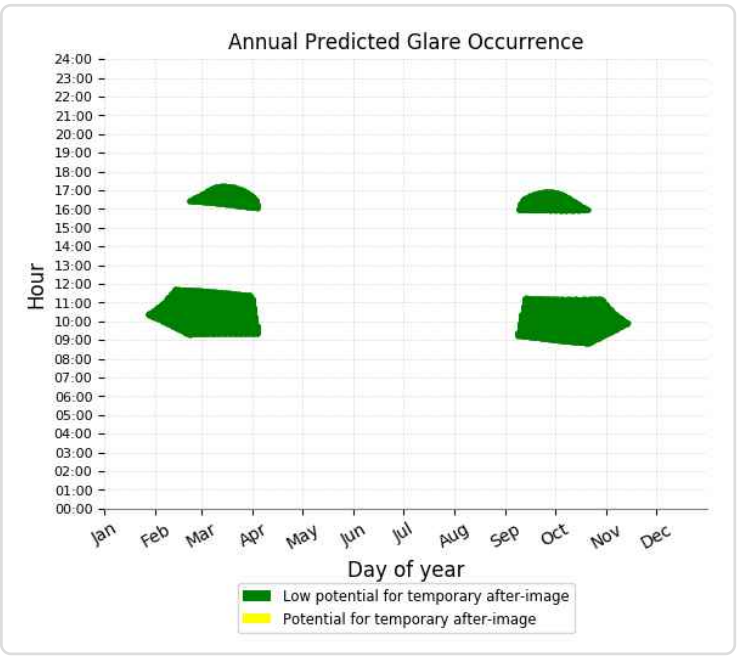
PV array 4 low potential for temporary after-image

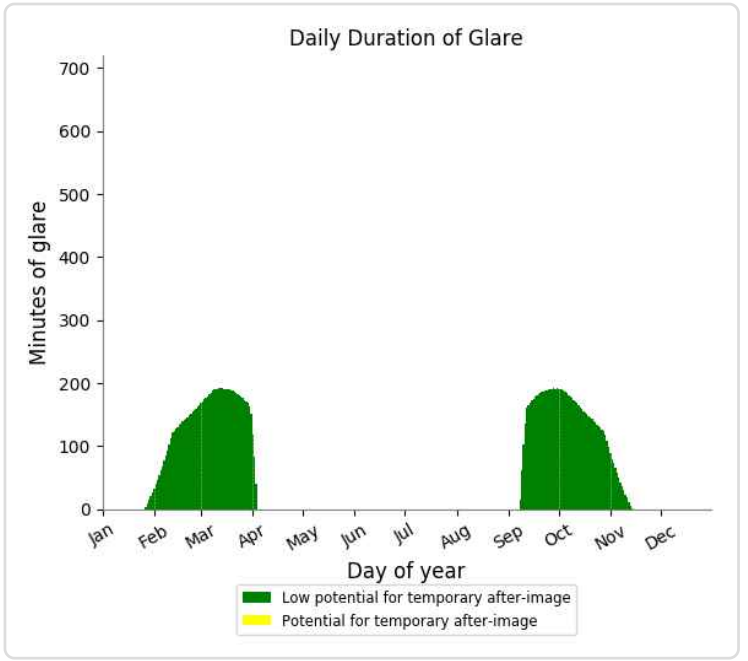
Component	Green glare (min)	Yellow glare (min)
FP: FP 1	18338	0

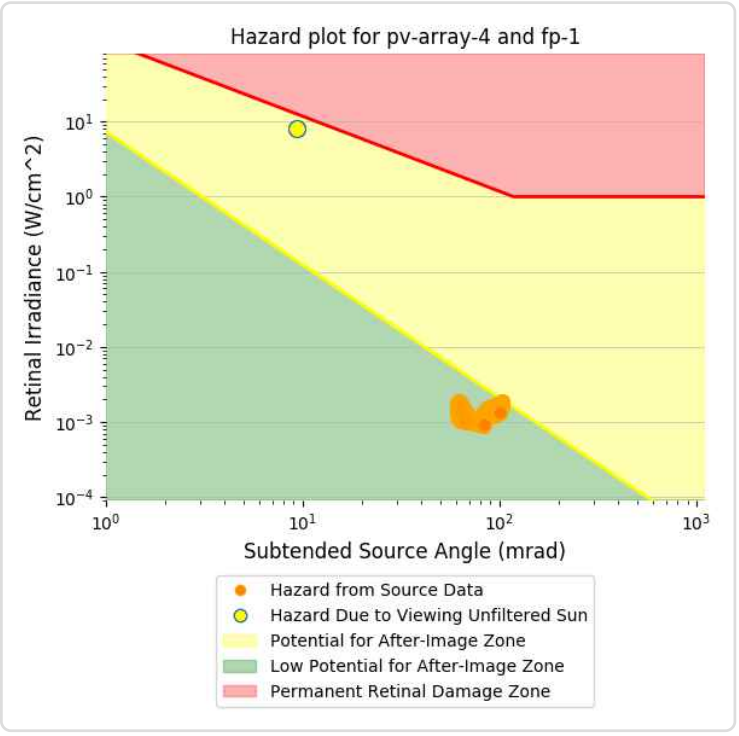
PV array 4 - Receptor (FP 1)

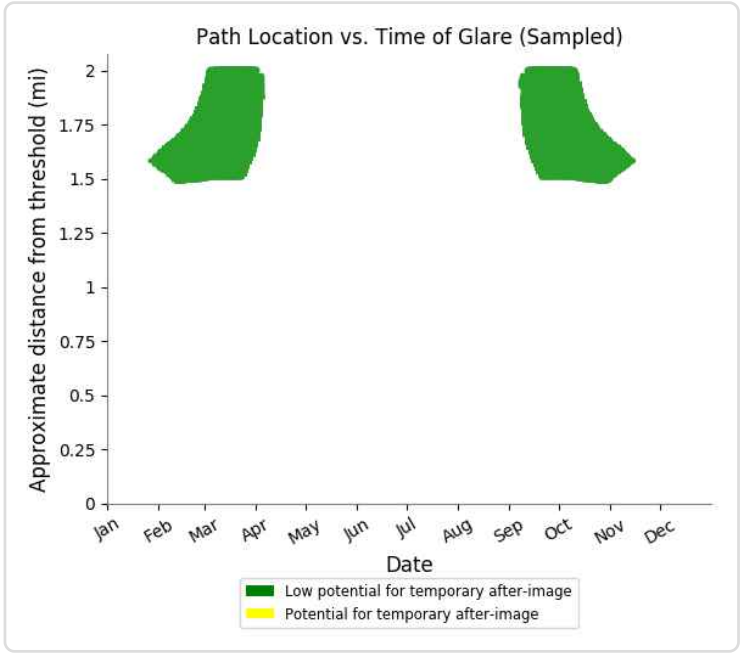
PV array is expected to produce the following glare for observers on this flight path:

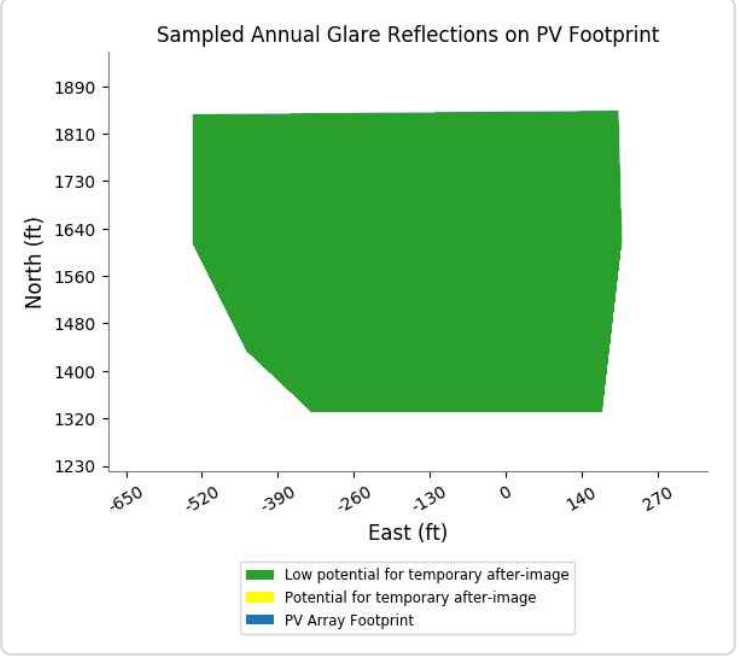
- 18,338 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.

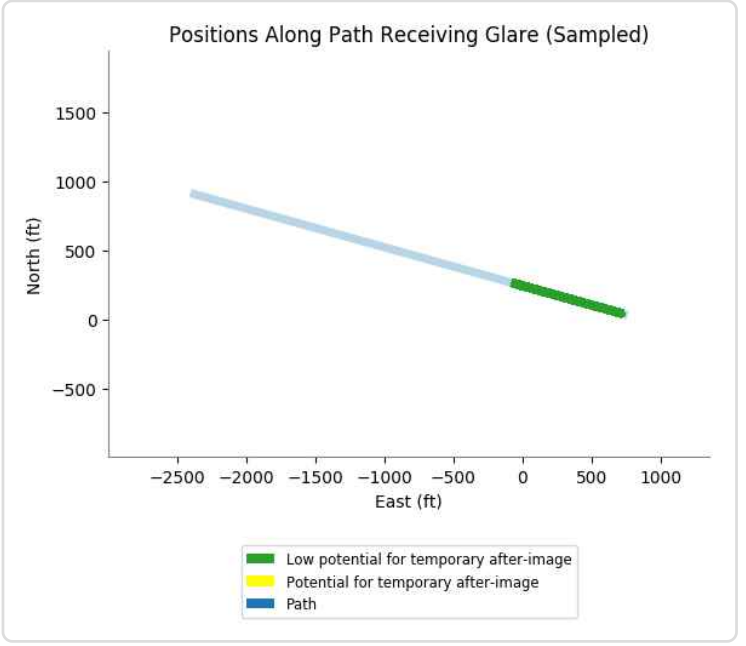












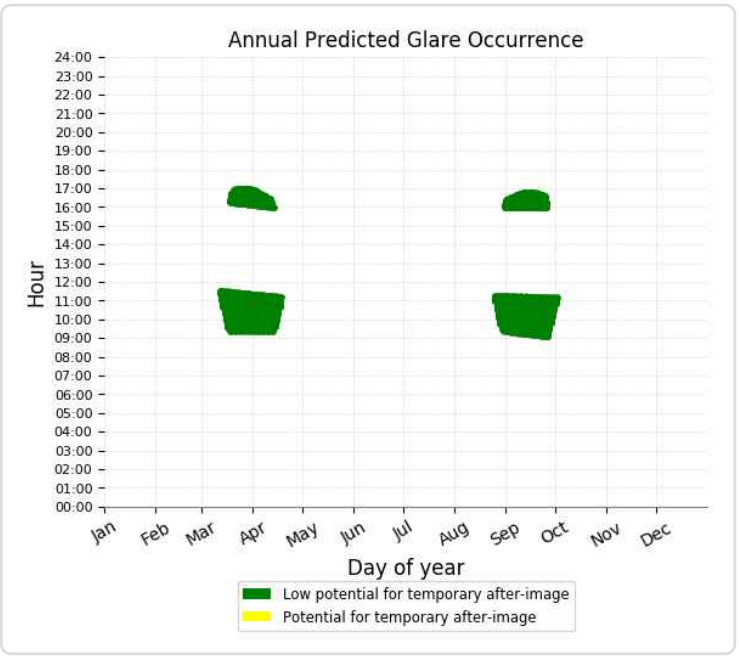
PV array 5 low potential for temporary after-image

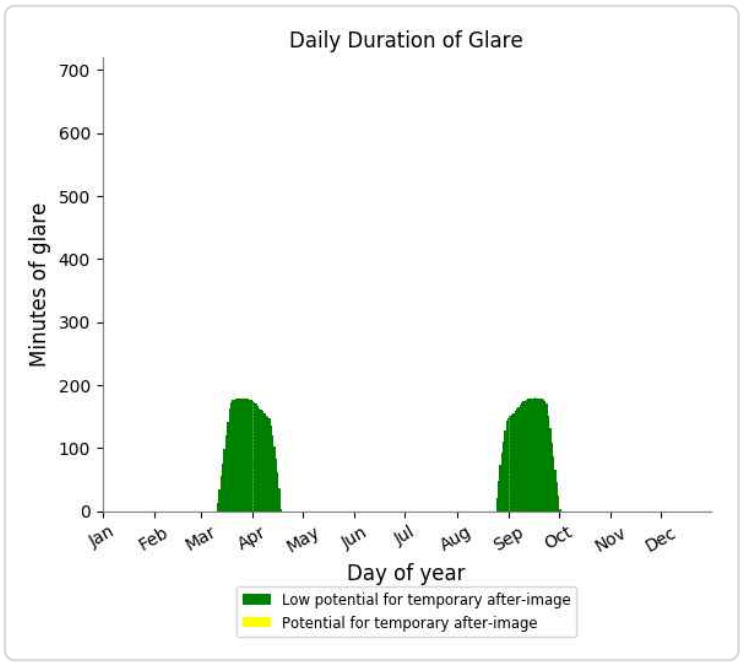
Component	Green glare (min)	Yellow glare (min)
FP: FP 1	10661	0

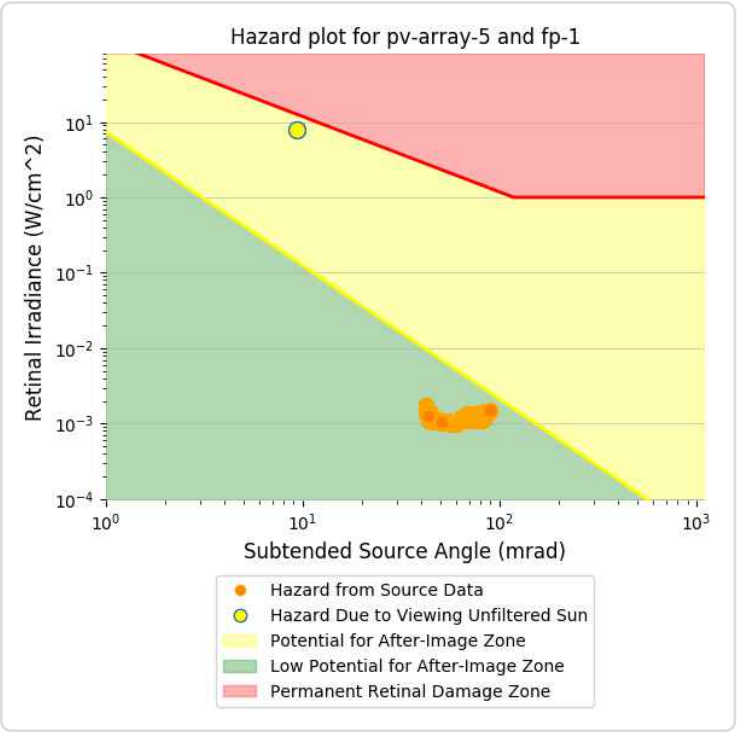
PV array 5 - Receptor (FP 1)

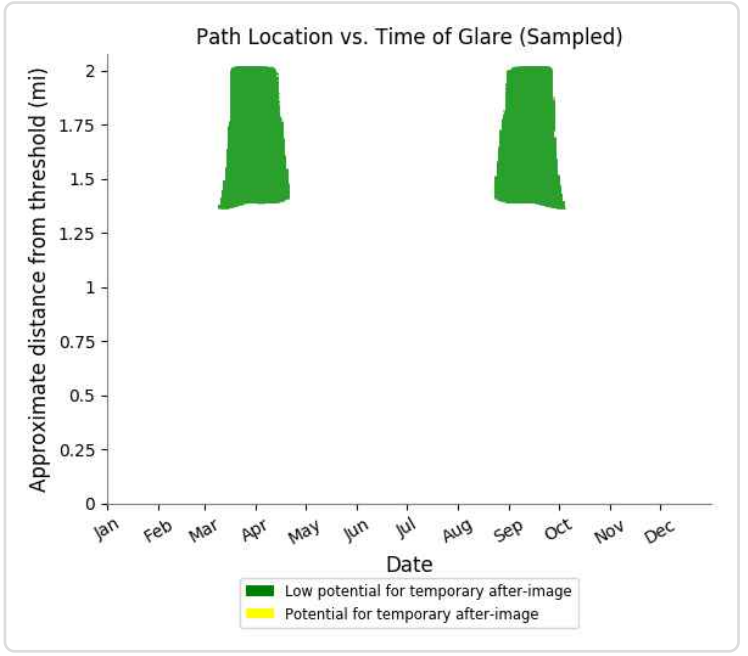
PV array is expected to produce the following glare for observers on this flight path:

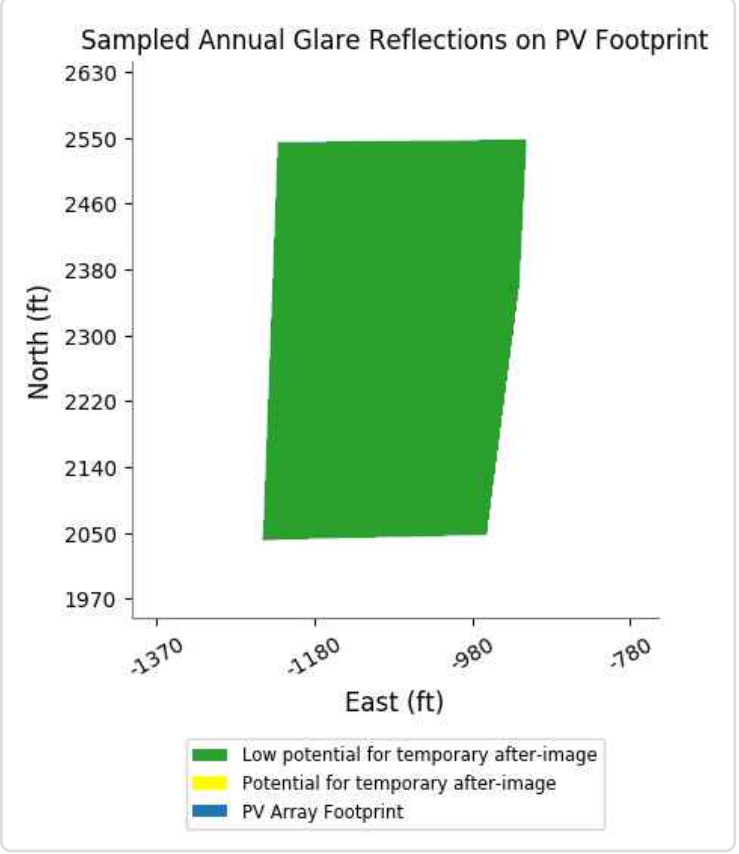
- 10,661 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.

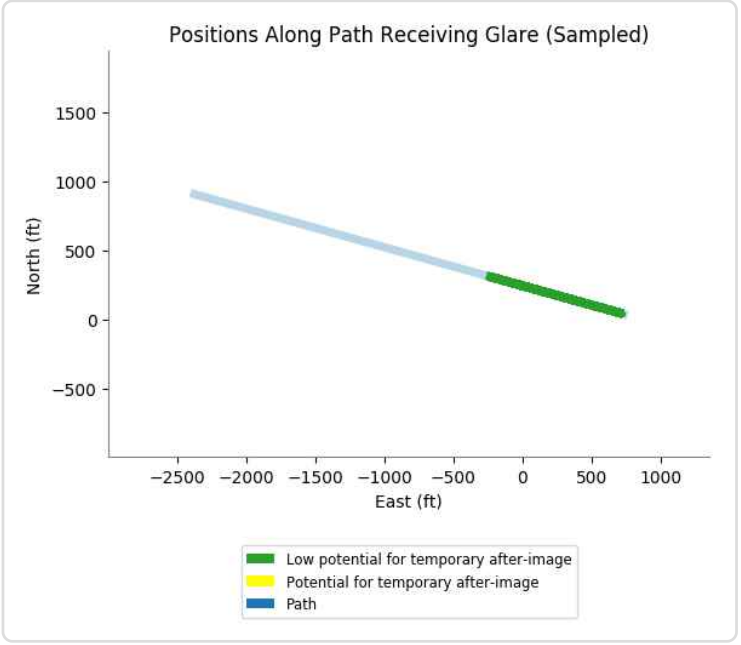












Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- 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.
- 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.
- 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.)

- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

Flight Path Receptor(s)

Name: Runway 29
Description:
Threshold height: 50 ft
Direction: 285.5°
Glide slope: 4.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	38.365560	-84.280559	720.04	50.00	770.04
Two-mile	38.357814	-84.244990	802.64	705.86	1508.50

GLARE ANALYSIS RESULTS

Summary of Glare

PV Array Name	Tilt (°)	Orient (°)	"Green" Glare min	"Yellow" Glare min	Energy kWh
PV array 1	SA tracking	SA tracking	1,621	0	-
PV array 2	SA tracking	SA tracking	1,551	0	-
PV array 3	SA tracking	SA tracking	0	0	-
PV array 4	SA tracking	SA tracking	5,513	0	-
PV array 5	SA tracking	SA tracking	36,758	12,530	-

Total annual glare received by each receptor

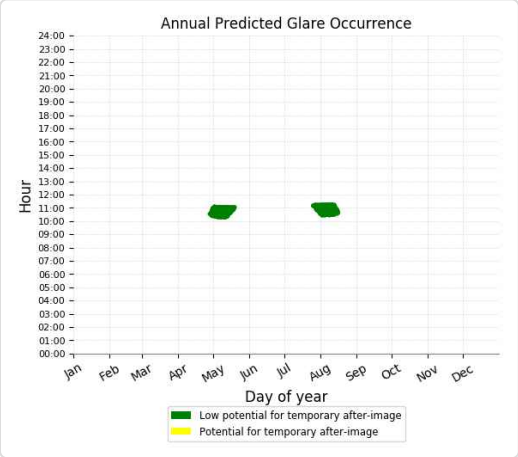
Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
Runway 29	45443	12530

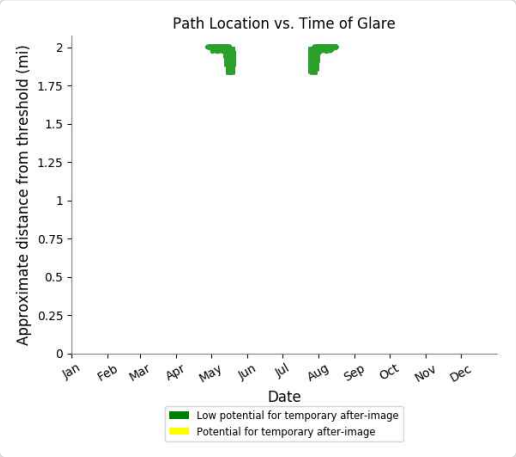
Results for: PV array 1

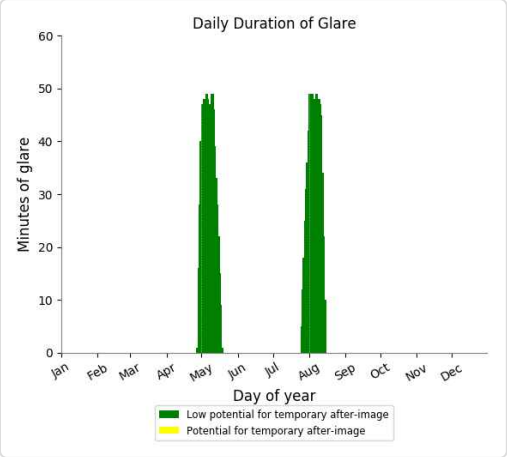
Receptor	Green Glare (min)	Yellow Glare (min)
Runway 29	1621	0

Flight Path: Runway 29

0 minutes of yellow glare
1621 minutes of green glare





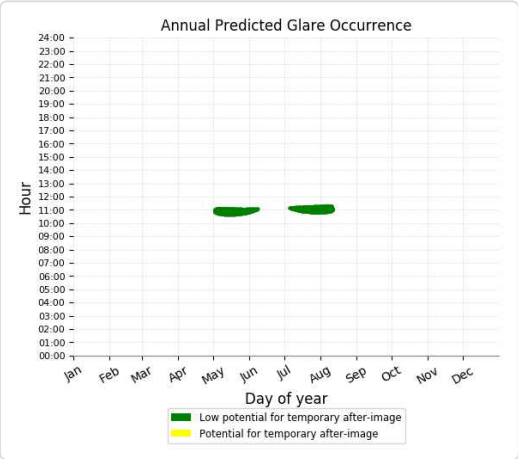


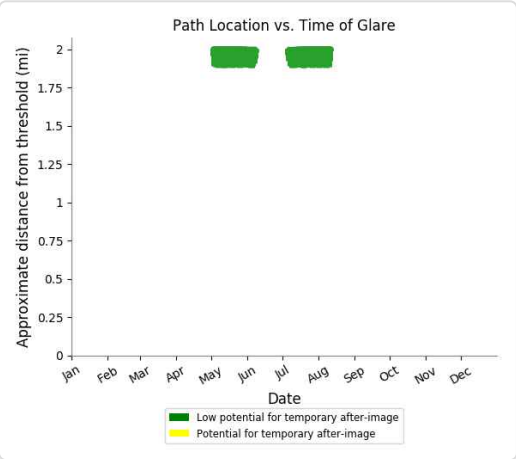
Results for: PV array 2

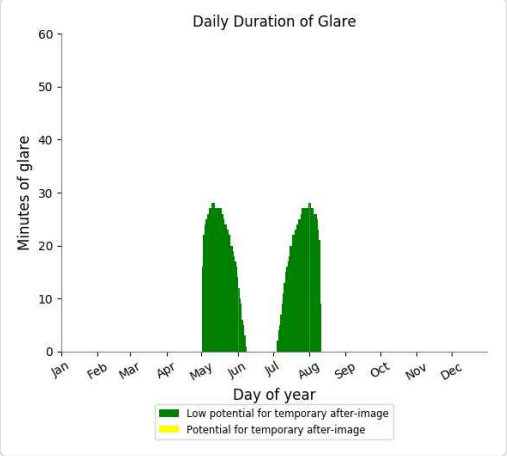
Receptor	Green Glare (min)	Yellow Glare (min)
Runway 29	1551	0

Flight Path: Runway 29

0 minutes of yellow glare
1551 minutes of green glare







Results for: PV array 3

Receptor	Green Glare (min)	Yellow Glare (min)
Runway 29	0	0

Flight Path: Runway 29

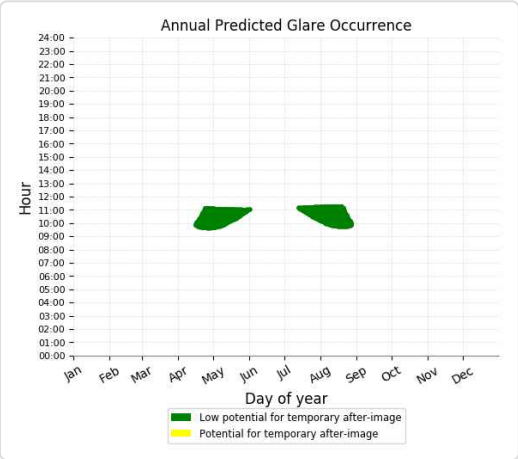
0 minutes of yellow glare
0 minutes of green glare

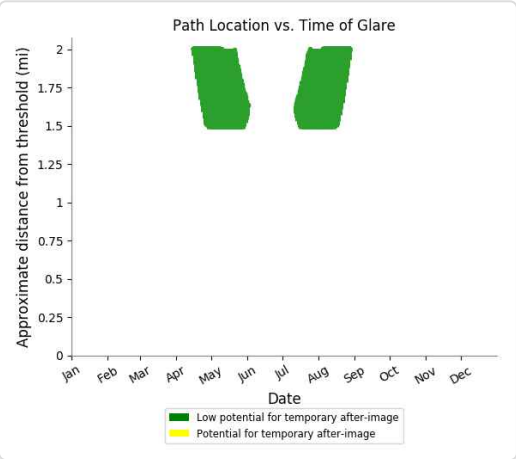
Results for: PV array 4

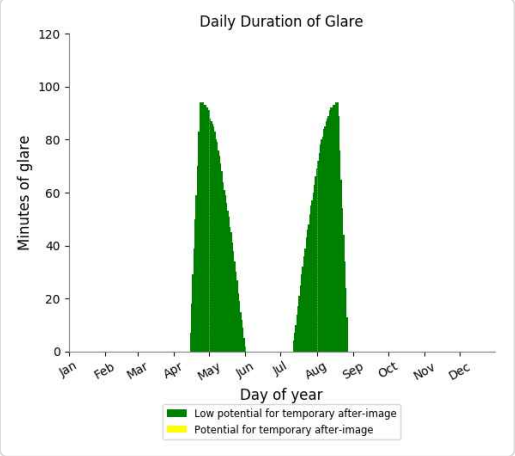
Runway 29	5513	0

Flight Path: Runway 29

0 minutes of yellow glare
5513 minutes of green glare





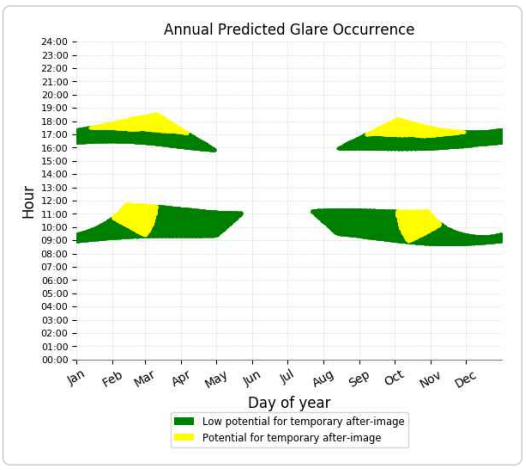


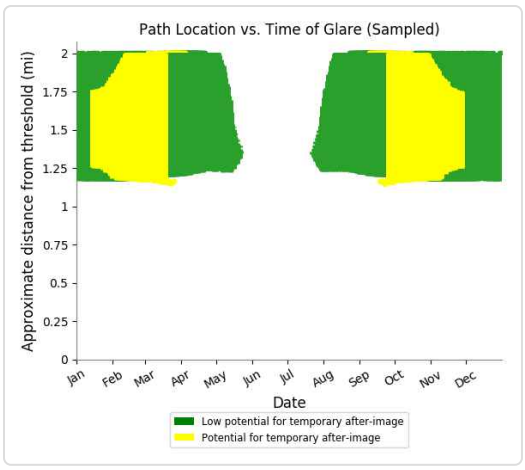
Results for: PV array 5

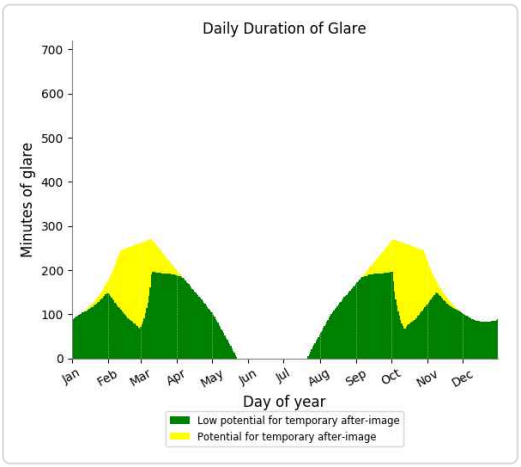
Receptor	Green Glare (min)	Yellow Glare (min)
Runway 29	36758	12530

Flight Path: Runway 29

12530 minutes of yellow glare
36758 minutes of green glare


Annual Predicted Glare Occurrence
Hour
24:00
23:00
22:00
21:00
20:00
19:00
18:00
17:00
16:00
15:00
14:00
13:00
12:00
11:00
10:00
09:00
08:00
07:00
06:00
05:00
04:00
03:00
02:00
01:00
00:00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Path Location vs. Time of Glare (Sampled)
Approximate distance from threshold (mi)
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Date
Low potential for temporary after-image
Potential for temporary after-image


Daily Duration of Glare
Minutes of glare
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image

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.
Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to V1 algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
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.)
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.
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.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Request No. 4:

Provide a copy of aeronautical study generated by the Federal Aviation Association for the project as soon as it is available.

Response No. 4:

See attached.

Responding Witness: Jayce Walker

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40914-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 64
Location:	Cynthiana, KY
Latitude:	38-21-52.04N NAD 83
Longitude:	84-13-51.96W
Heights:	888 feet site elevation (SE)
	15 feet above ground level (AGL)
	903 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40914-OE.

Signature Control No: 498615791-502295606 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40914-OE

Sectional Map for ASN 2021-ASO-40914-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40915-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 67
Location:	Cynthiana, KY
Latitude:	38-21-28.81N NAD 83
Longitude:	84-13-26.91W
Heights:	909 feet site elevation (SE)
	15 feet above ground level (AGL)
	924 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40915-OE.

Signature Control No: 498615792-502295617 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40915-OE

Sectional Map for ASN 2021-ASO-40915-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40916-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 68
Location:	Cynthiana, KY
Latitude:	38-21-16.35N NAD 83
Longitude:	84-13-28.35W
Heights:	875 feet site elevation (SE)
	15 feet above ground level (AGL)
	890 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40916-OE.

Signature Control No: 498615793-502295614 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40916-OE


1222
(423)
T217
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1309
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1050
Cynthiana
CYNTHIANA-HARRISON
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Shawhan
Ruddels
Mills
Millersburg
GEORGETOWN-SCOTT
COUNTY RGNL (27K)
AWOS-3 119.975
1369
1010
21

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40917-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 69
Location:	Cynthiana, KY
Latitude:	38-21-17.55N NAD 83
Longitude:	84-13-45.32W
Heights:	900 feet site elevation (SE) 15 feet above ground level (AGL) 915 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

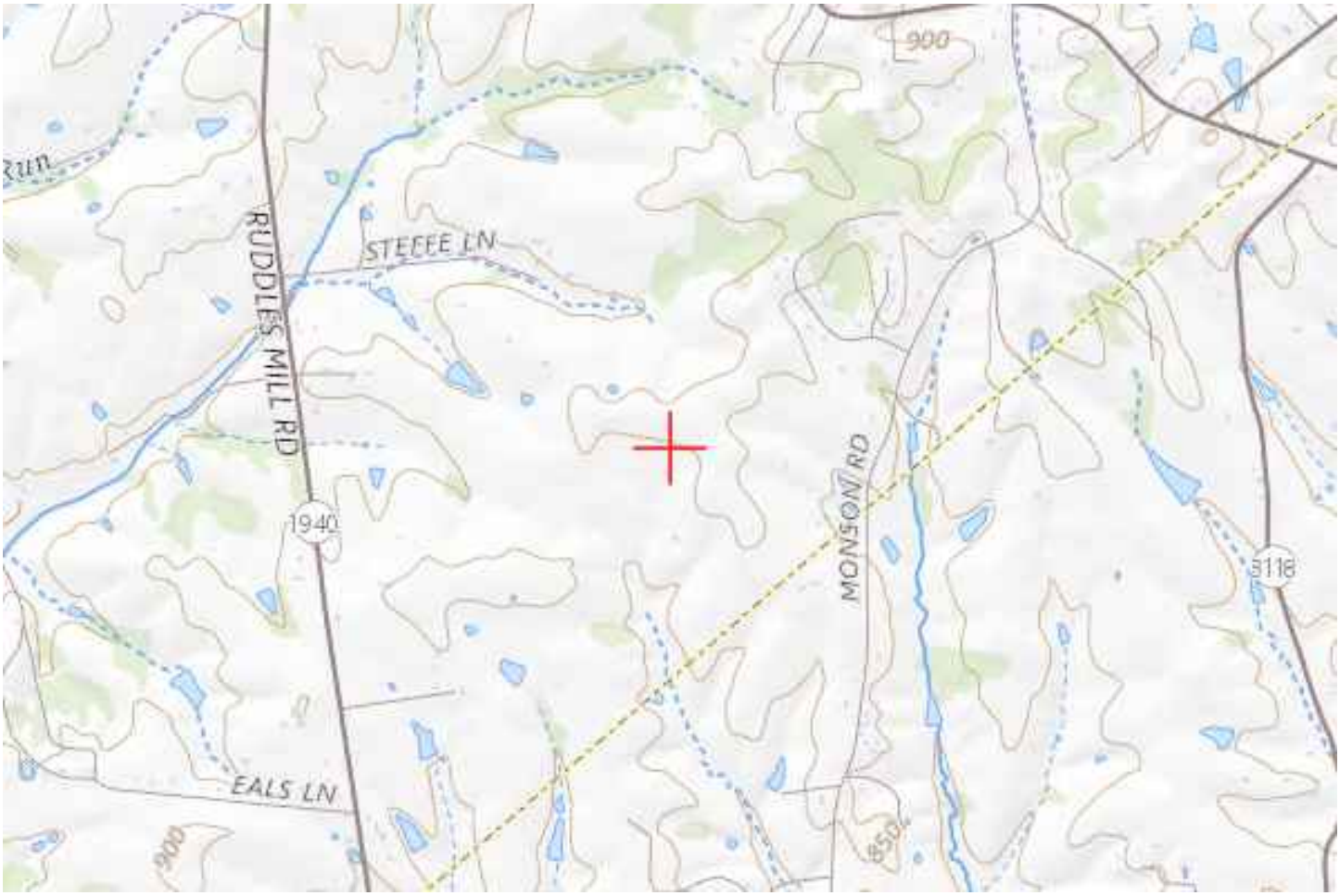
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40917-OE.

Signature Control No: 498615794-502295620 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40917-OE



Sectional Map for ASN 2021-ASO-40917-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40918-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 76
Location:	Cynthiana, KY
Latitude:	38-21-32.14N NAD 83
Longitude:	84-14-19.76W
Heights:	835 feet site elevation (SE) 15 feet above ground level (AGL) 850 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

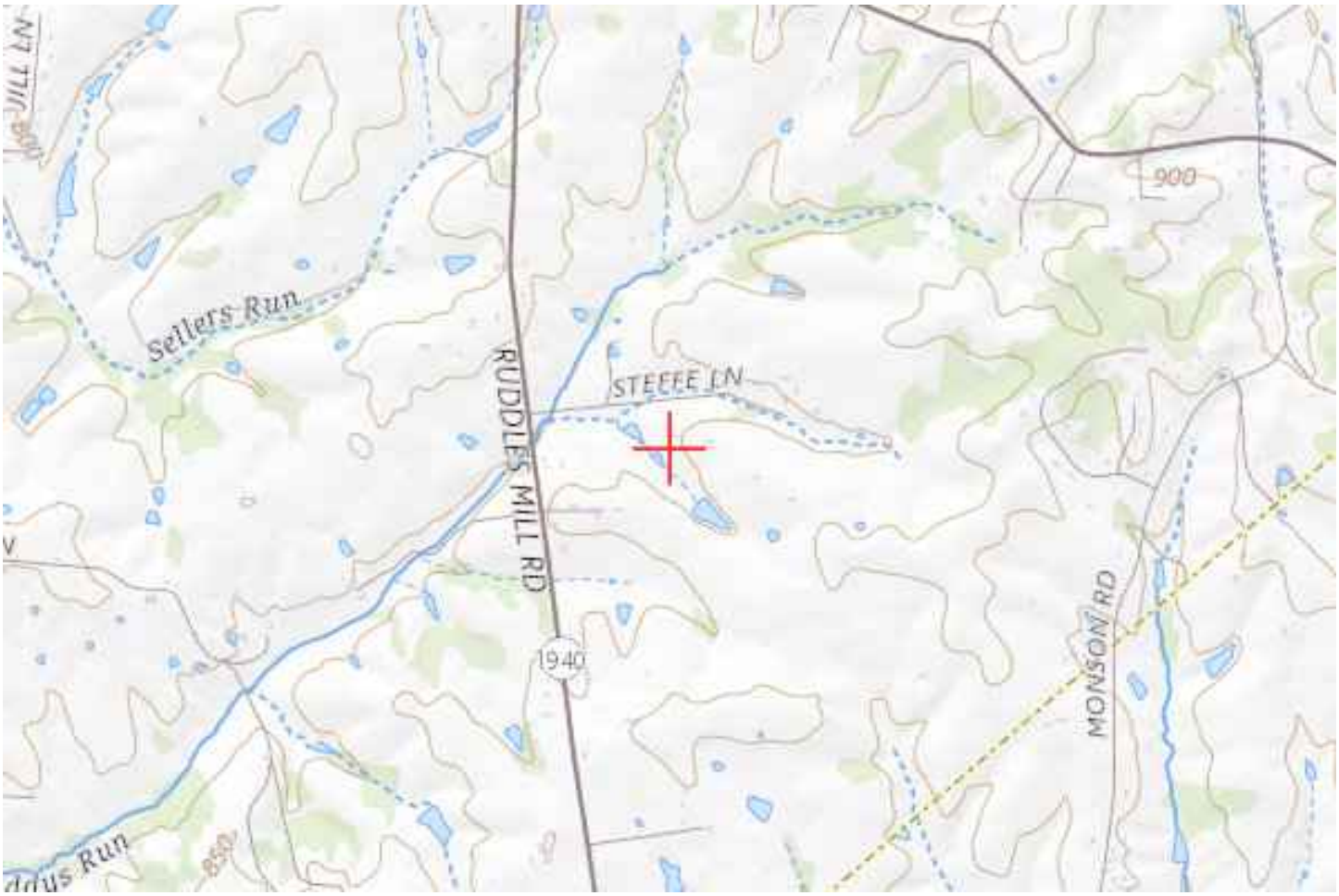
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40918-OE.

Signature Control No: 498615796-502295615 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40918-OE



Sectional Map for ASN 2021-ASO-40918-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40919-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 77
Location:	Cynthiana, KY
Latitude:	38-21-32.26N NAD 83
Longitude:	84-14-38.54W
Heights:	808 feet site elevation (SE)
	15 feet above ground level (AGL)
	823 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

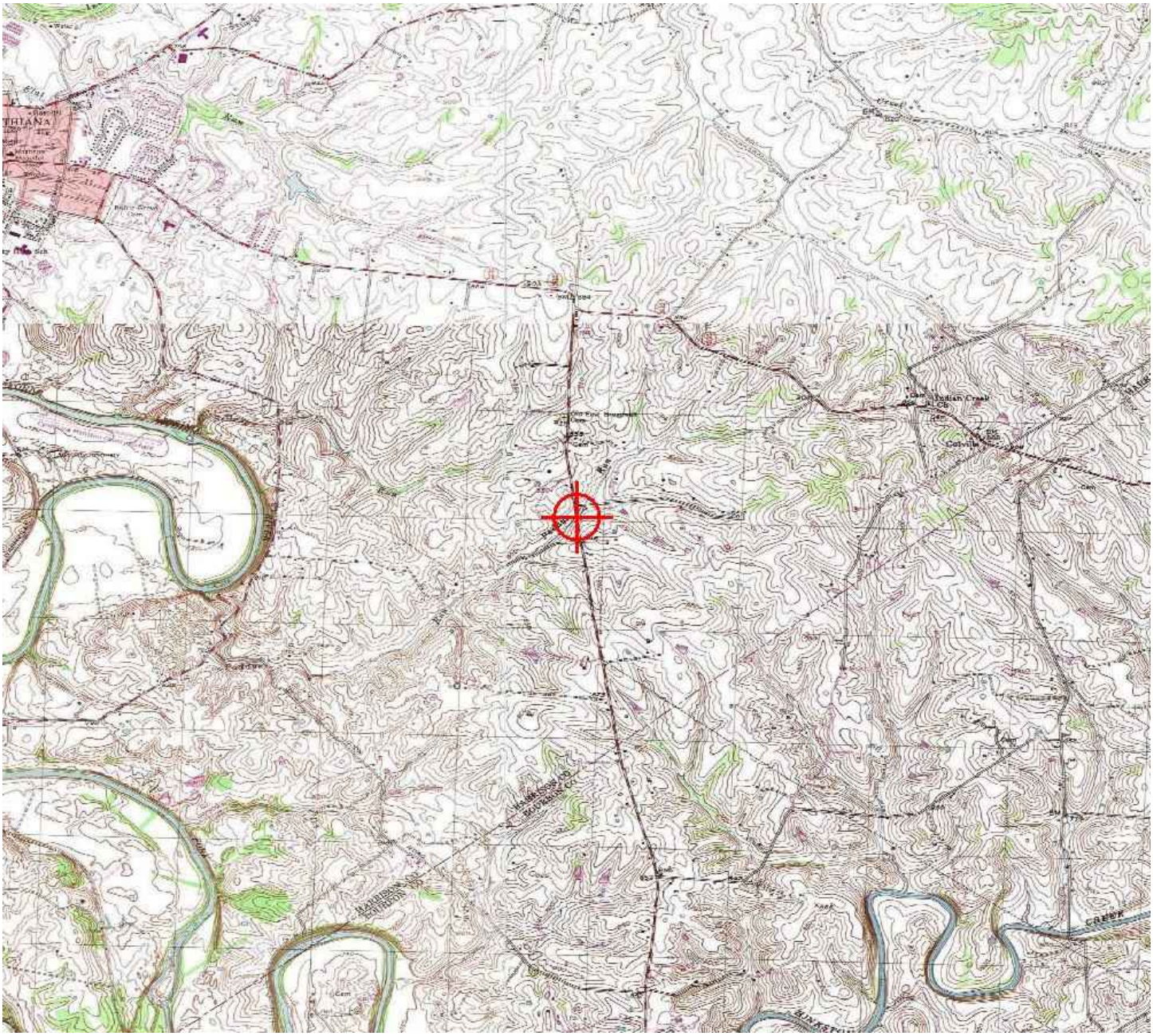
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40919-OE.

Signature Control No: 498615797-502295616 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40919-OE



Sectional Map for ASN 2021-ASO-40919-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40920-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 80
Location:	Cynthiana, KY
Latitude:	38-21-44.40N NAD 83
Longitude:	84-15-01.37W
Heights:	848 feet site elevation (SE)
	15 feet above ground level (AGL)
	863 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40920-OE.

Signature Control No: 498615799-502295604 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40920-OE

Sectional Map for ASN 2021-ASO-40920-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40921-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 82
Location:	Cynthiana, KY
Latitude:	38-21-21.62N NAD 83
Longitude:	84-15-10.37W
Heights:	838 feet site elevation (SE)
	15 feet above ground level (AGL)
	853 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

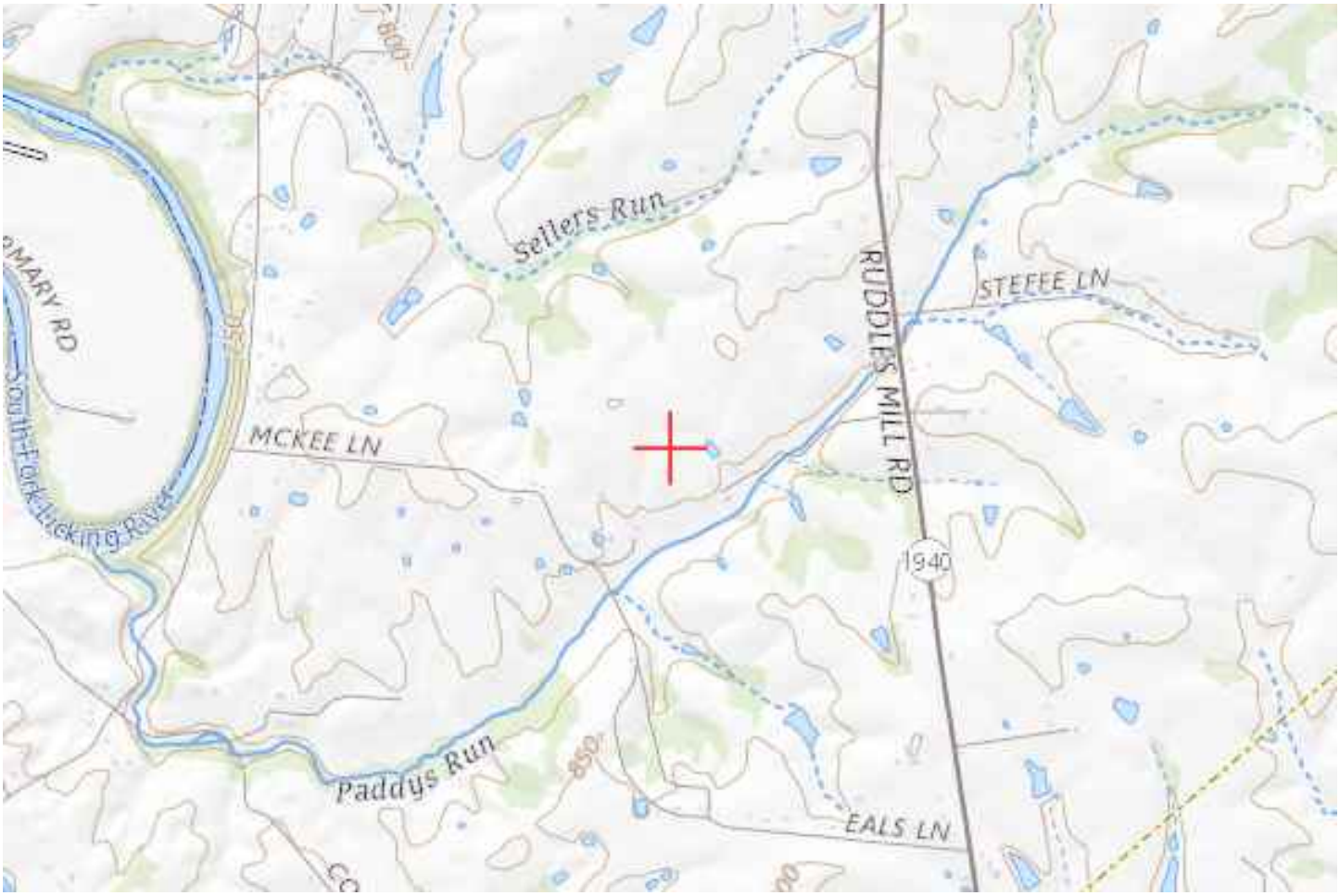
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40921-OE.

Signature Control No: 498615800-502295618 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40921-OE



Sectional Map for ASN 2021-ASO-40921-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40922-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 84
Location:	Cynthiana, KY
Latitude:	38-21-21.39N NAD 83
Longitude:	84-16-06.69W
Heights:	836 feet site elevation (SE)
	15 feet above ground level (AGL)
	851 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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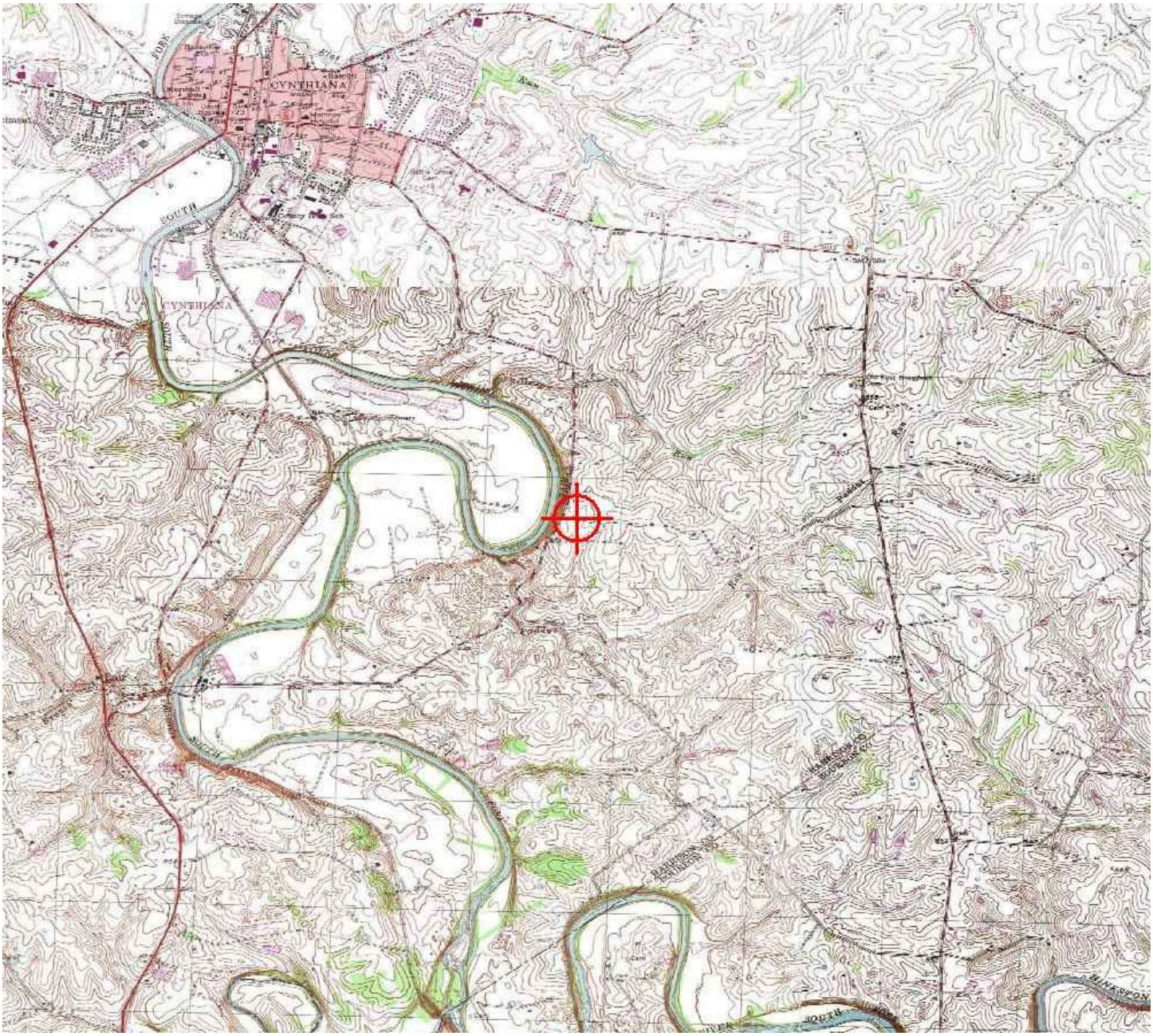
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40922-OE.

Signature Control No: 498615802-502295799 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40922-OE



Sectional Map for ASN 2021-ASO-40922-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40923-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 86
Location:	Cynthiana, KY
Latitude:	38-21-29.09N NAD 83
Longitude:	84-16-08.58W
Heights:	850 feet site elevation (SE)
	15 feet above ground level (AGL)
	865 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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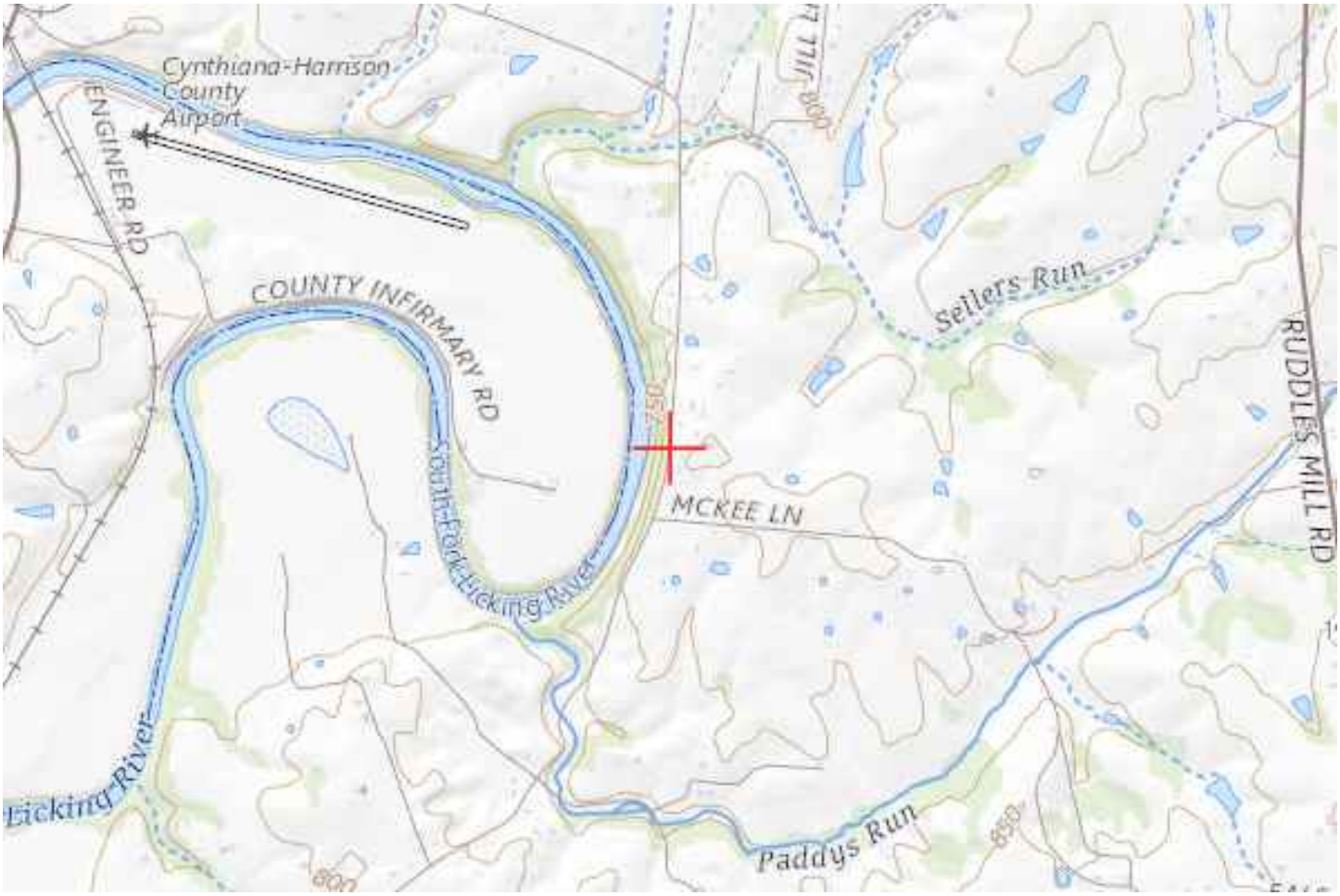
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40923-OE.

Signature Control No: 498615803-502295806 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40923-OE



Sectional Map for ASN 2021-ASO-40923-OE

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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40924-OE

Issued Date: 11/22/2021

Jayce Walker
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3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 91
Location:	Cynthiana, KY
Latitude:	38-21-33.23N NAD 83
Longitude:	84-15-27.82W
Heights:	834 feet site elevation (SE)
	15 feet above ground level (AGL)
	849 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

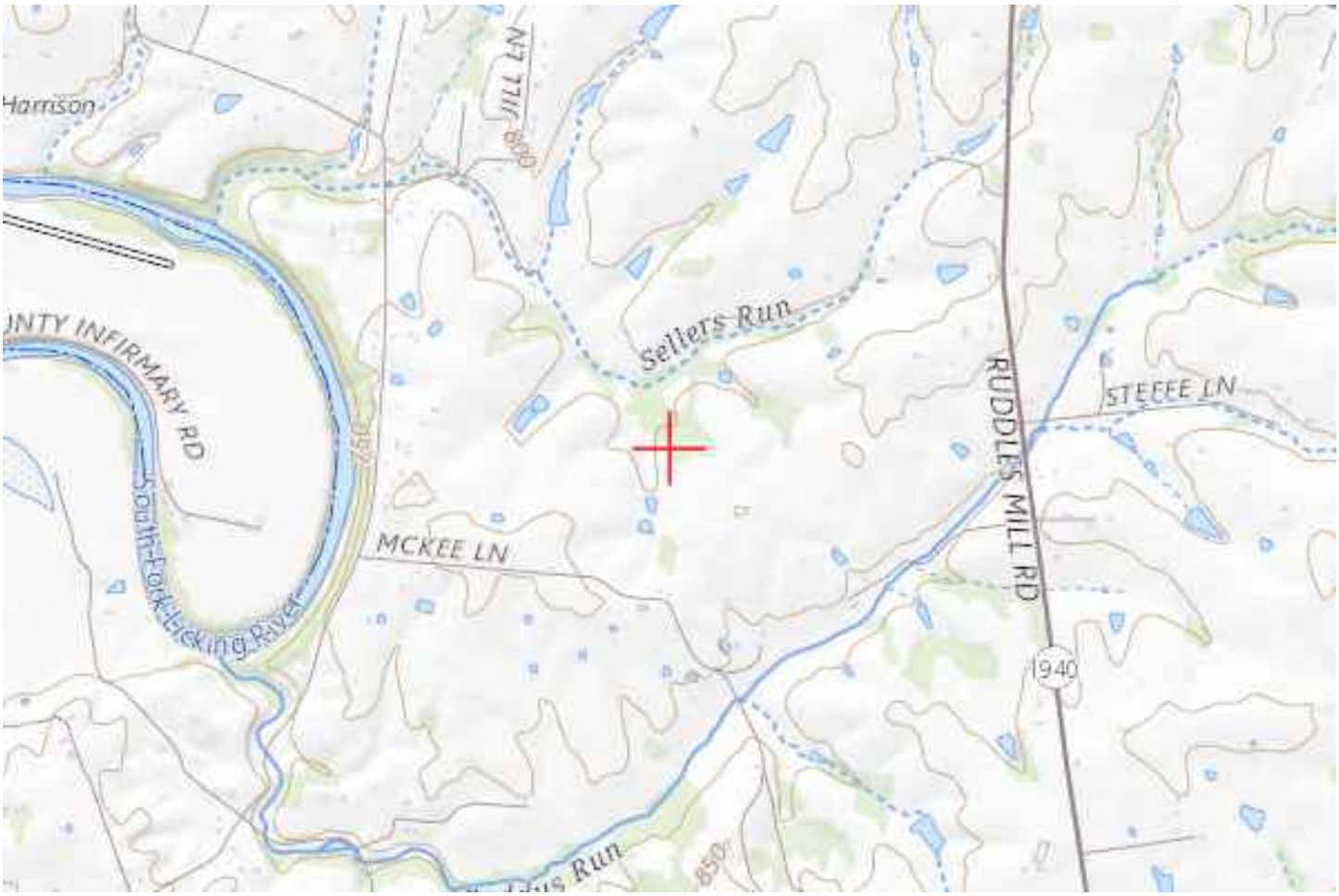
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40924-OE.

Signature Control No: 498615804-502295815 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40924-OE



Sectional Map for ASN 2021-ASO-40924-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40925-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 92
Location:	Cynthiana, KY
Latitude:	38-21-45.35N NAD 83
Longitude:	84-15-28.91W
Heights:	803 feet site elevation (SE) 15 feet above ground level (AGL) 818 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

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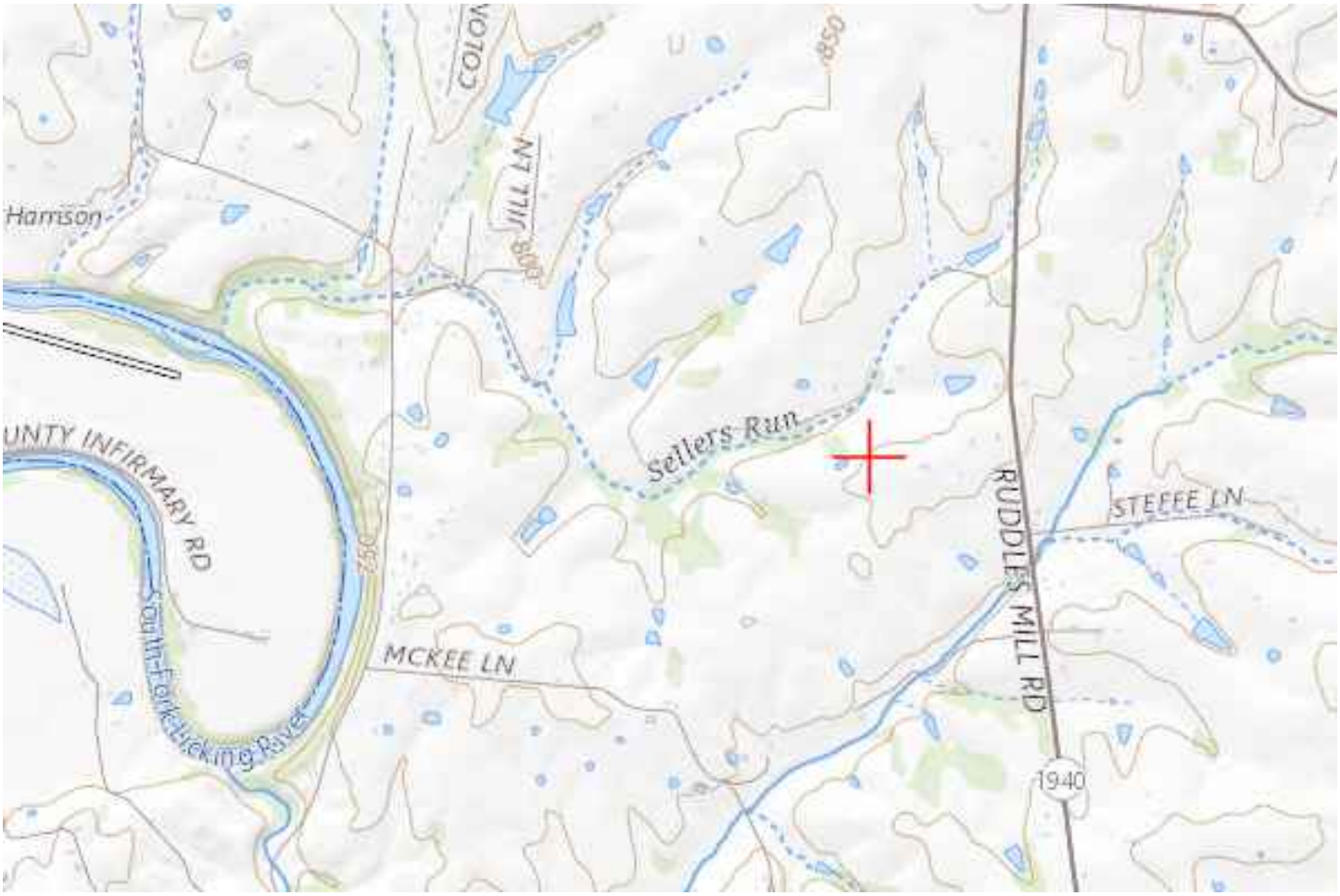
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40925-OE.

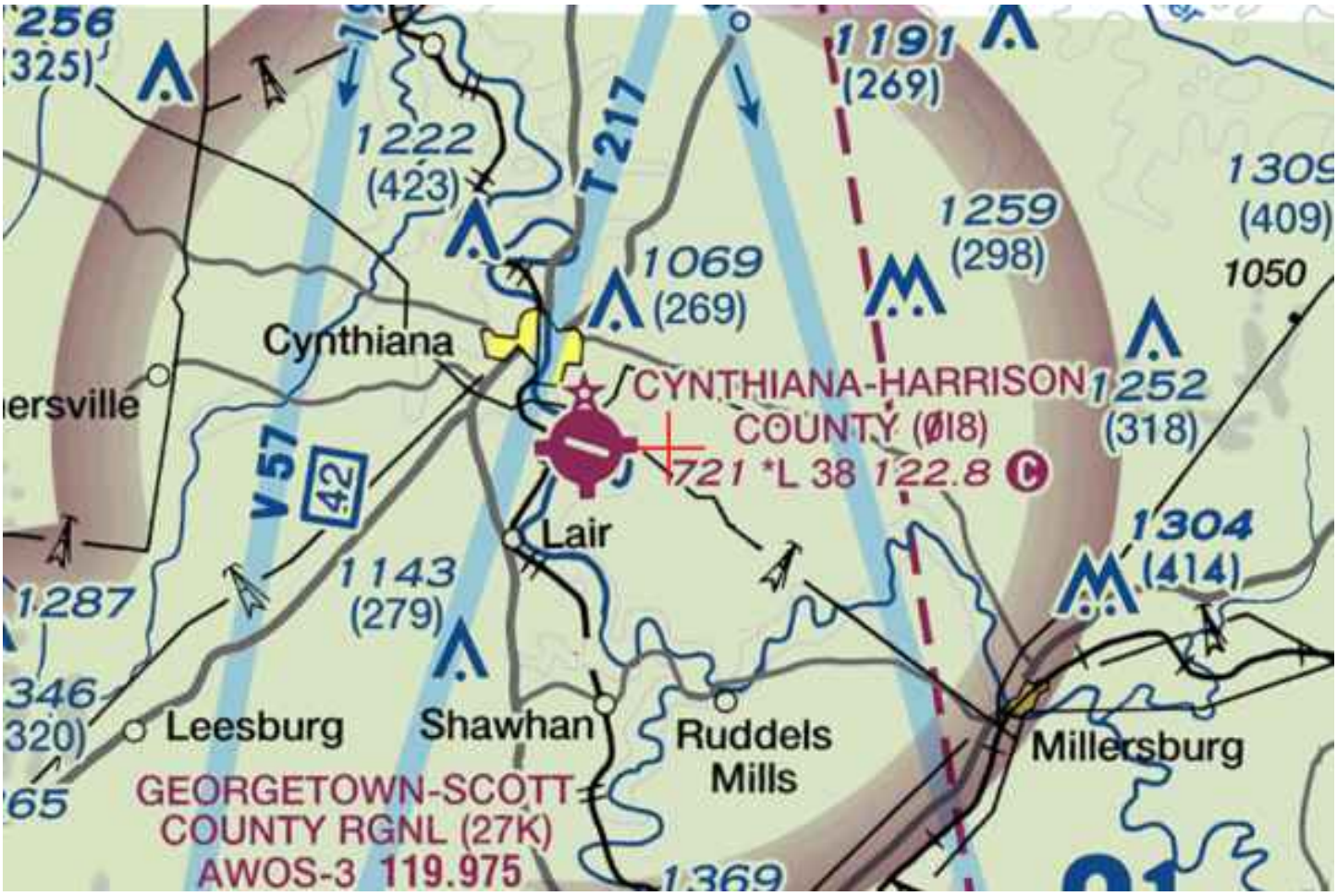
Signature Control No: 498615806-502295821 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40925-OE



Sectional Map for ASN 2021-ASO-40925-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40926-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 94
Location:	Cynthiana, KY
Latitude:	38-22-02.15N NAD 83
Longitude:	84-15-45.22W
Heights:	800 feet site elevation (SE)
	15 feet above ground level (AGL)
	815 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

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__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

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(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

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If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40926-OE.

Signature Control No: 498615807-502295823 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40926-OE

Sectional Map for ASN 2021-ASO-40926-OE

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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40927-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 95
Location:	Cynthiana, KY
Latitude:	38-22-45.71N NAD 83
Longitude:	84-15-40.09W
Heights:	856 feet site elevation (SE)
	14 feet above ground level (AGL)
	870 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

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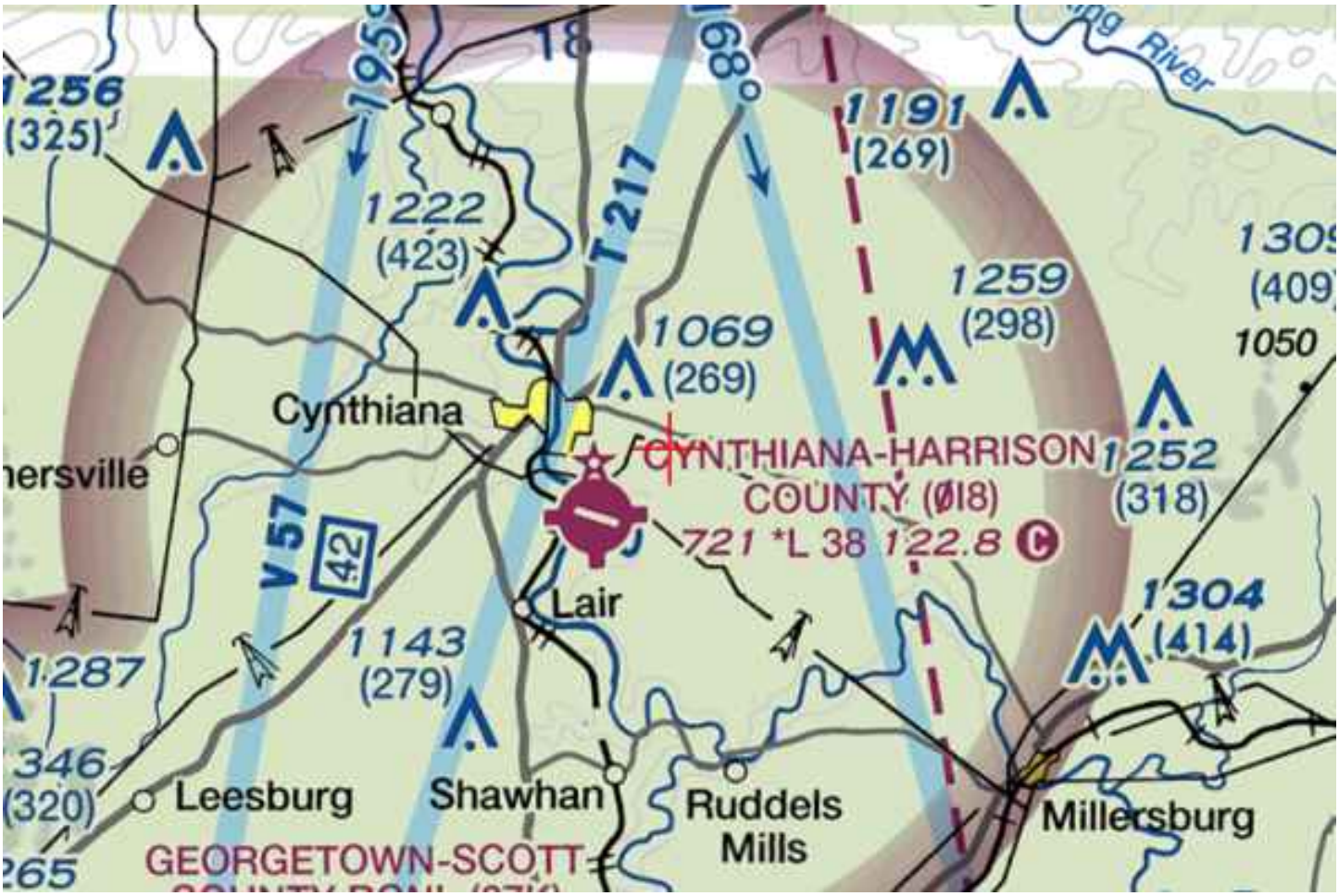
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40927-OE.

Signature Control No: 498615809-502294243 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40927-OE

Sectional Map for ASN 2021-ASO-40927-OE



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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40900-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Blue Moon Energy Project Solar Substation
Location:	Cynthiana, KY
Latitude:	38-22-18.20N NAD 83
Longitude:	84-15-27.12W
Heights:	825 feet site elevation (SE)
	45 feet above ground level (AGL)
	870 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

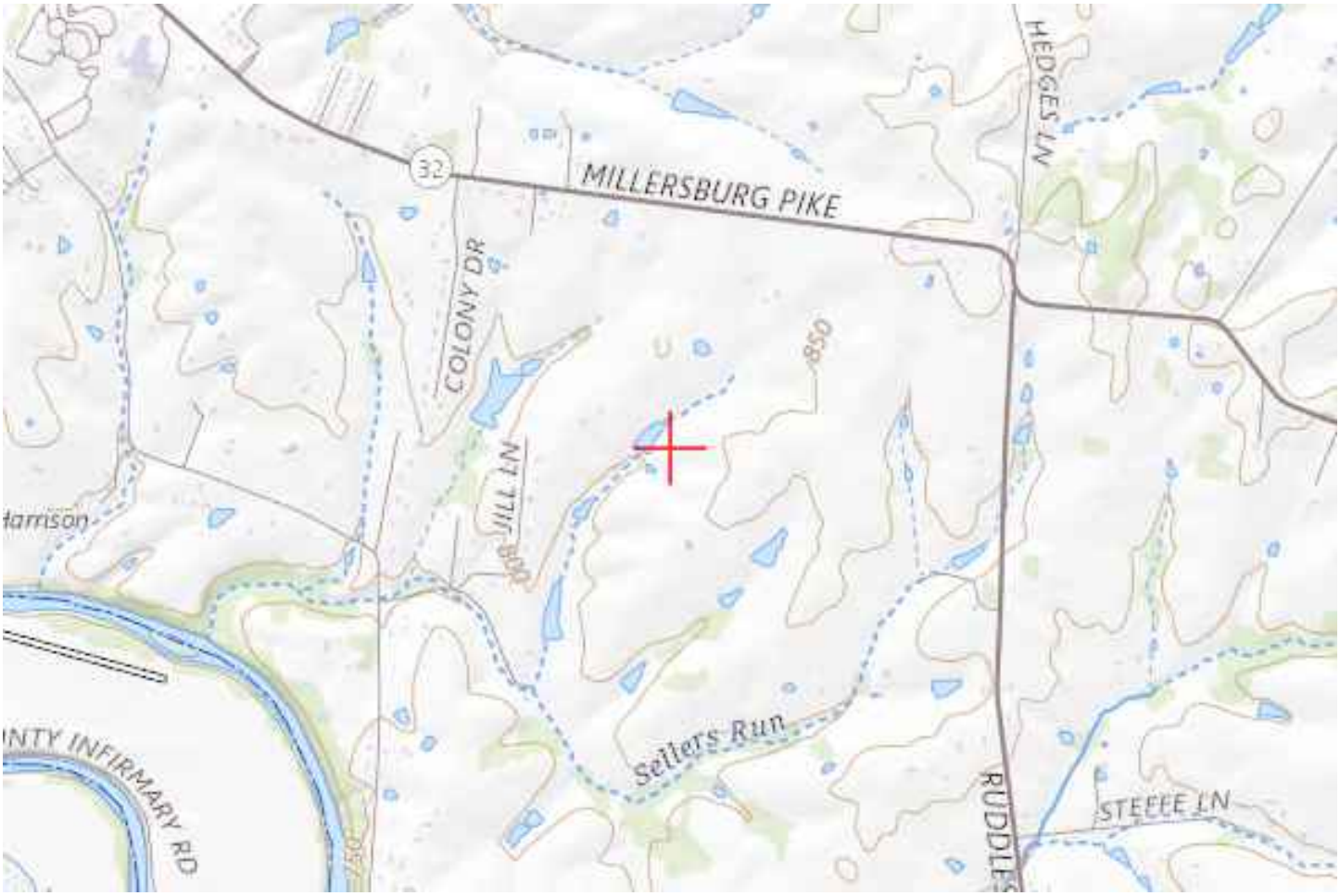
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40900-OE.

Signature Control No: 498615771-502293410 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40900-OE



Sectional Map for ASN 2021-ASO-40900-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40901-OE

Issued Date: 11/22/2021

Jayce Walker
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3000 E. Cesar Chavez St.
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Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 3
Location:	Cynthiana, KY
Latitude:	38-23-29.95N NAD 83
Longitude:	84-15-20.42W
Heights:	860 feet site elevation (SE)
	15 feet above ground level (AGL)
	875 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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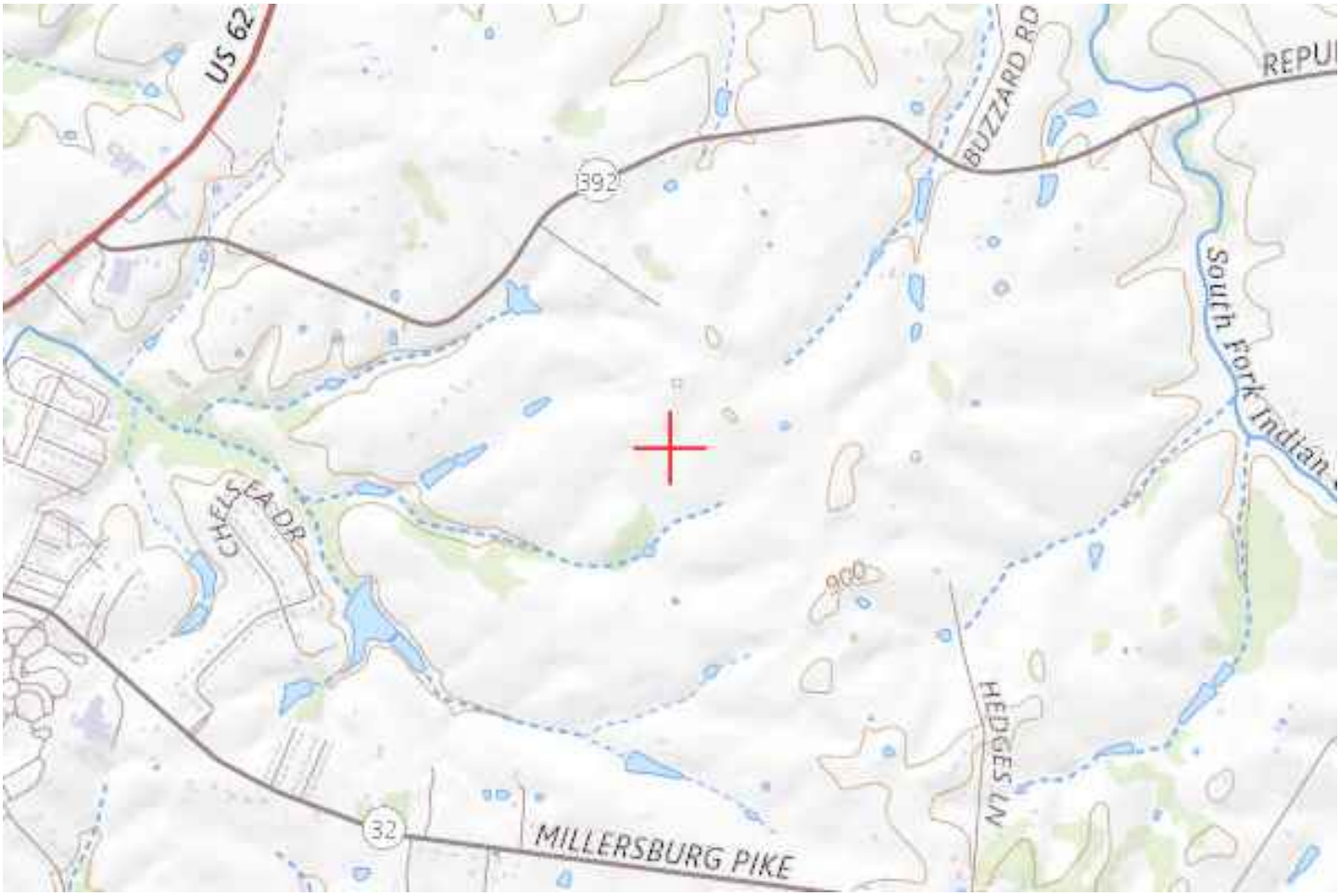
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40901-OE.

Signature Control No: 498615772-502295610 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40901-OE



Sectional Map for ASN 2021-ASO-40901-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40902-OE

Issued Date: 11/22/2021

Jayce Walker
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3000 E. Cesar Chavez St.
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Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 6
Location:	Cynthiana, KY
Latitude:	38-23-38.05N NAD 83
Longitude:	84-14-43.72W
Heights:	855 feet site elevation (SE)
	15 feet above ground level (AGL)
	870 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

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This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

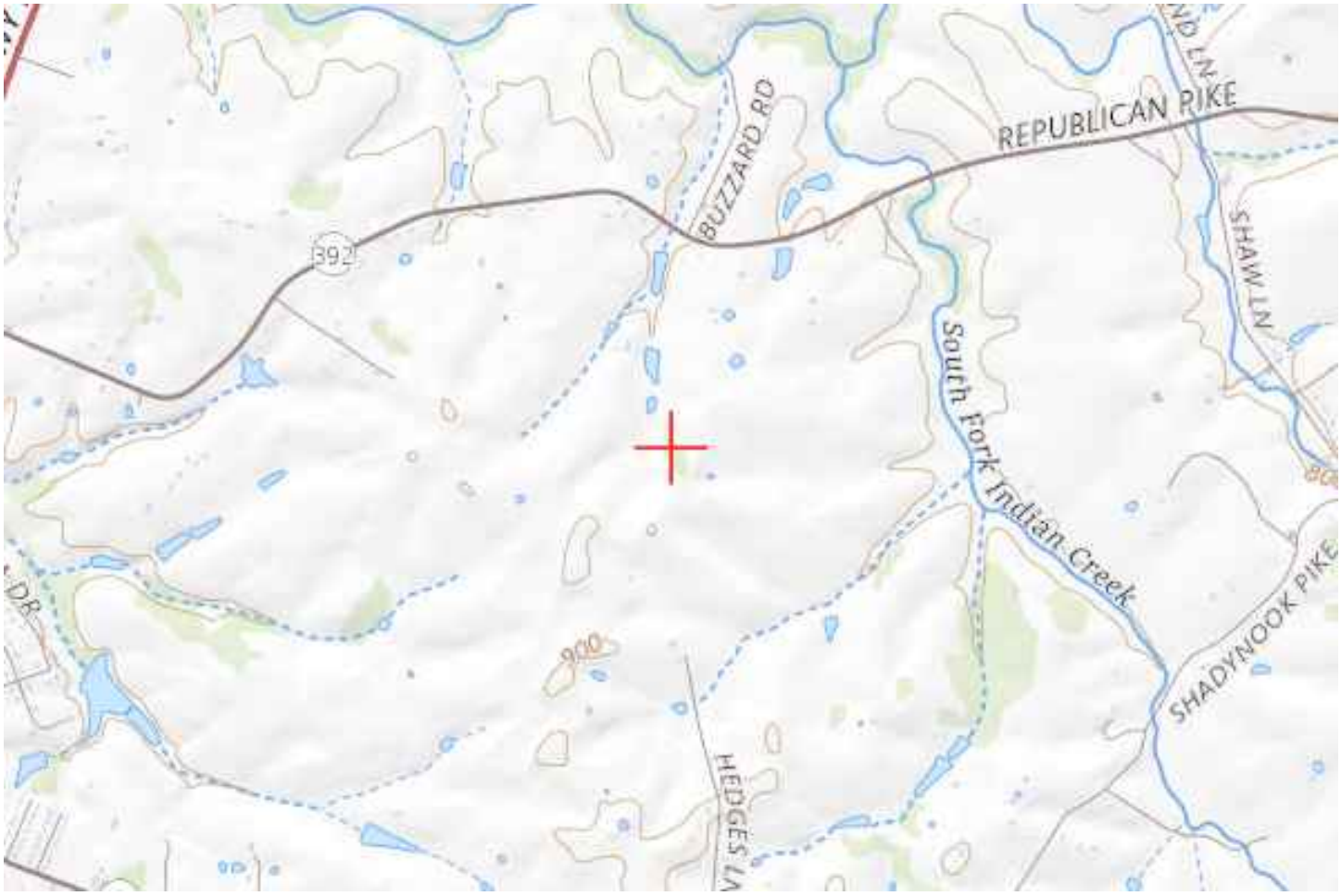
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40902-OE.

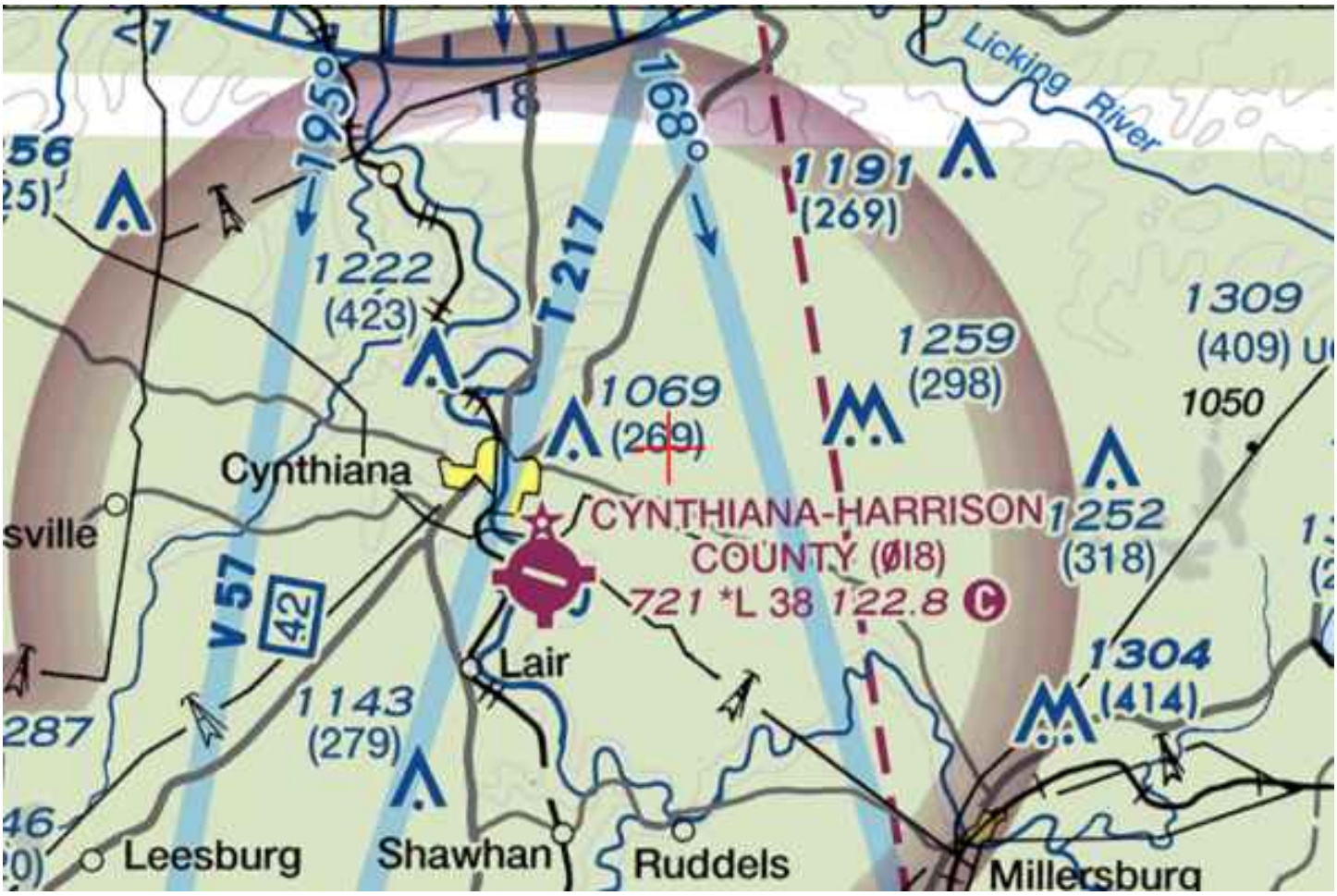
Signature Control No: 498615773-502295607 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40902-OE



Sectional Map for ASN 2021-ASO-40902-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40903-OE

Issued Date: 11/22/2021

Jayce Walker
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3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 10
Location:	Cynthiana, KY
Latitude:	38-23-59.82N NAD 83
Longitude:	84-14-31.18W
Heights:	824 feet site elevation (SE)
	15 feet above ground level (AGL)
	839 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

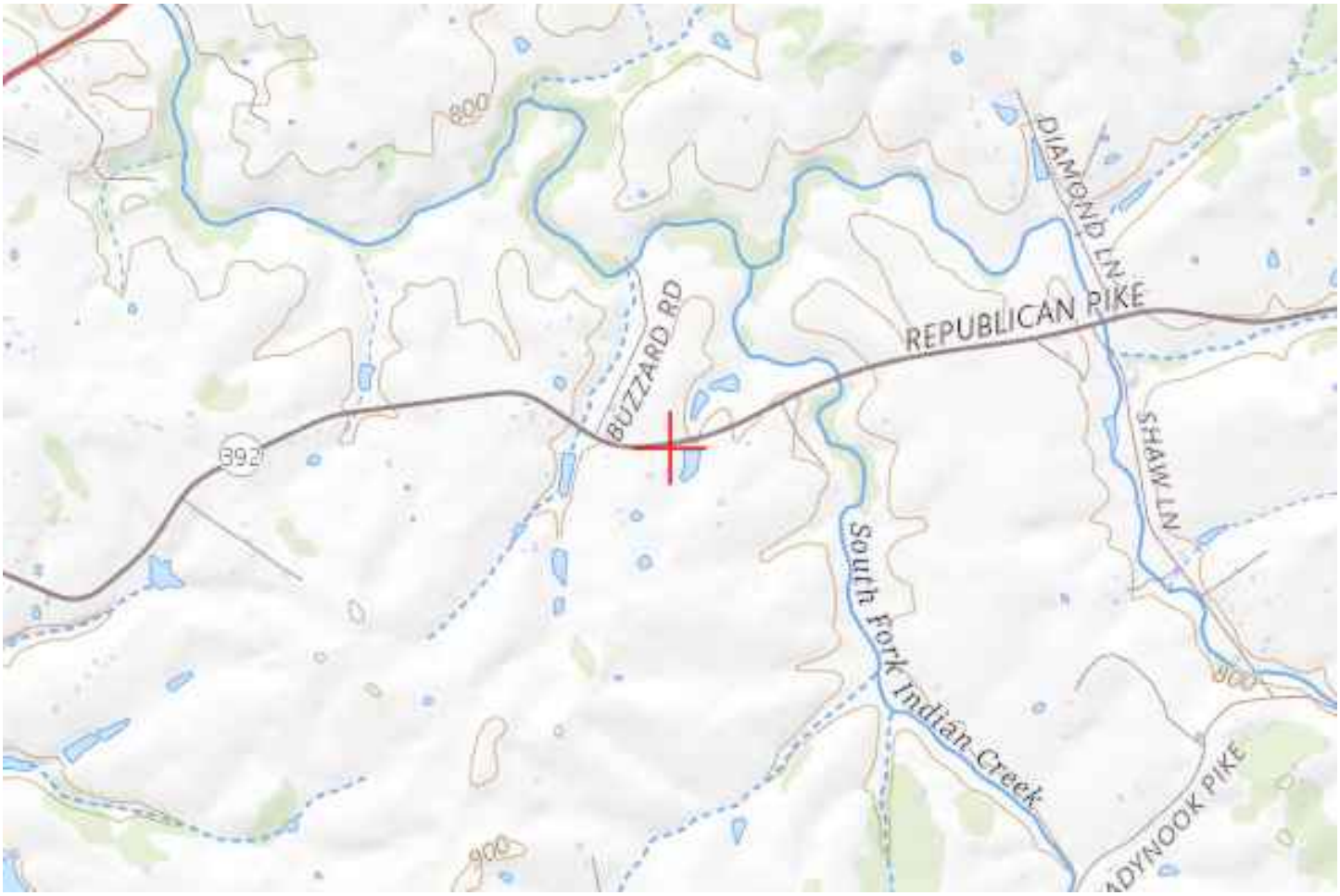
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40903-OE.

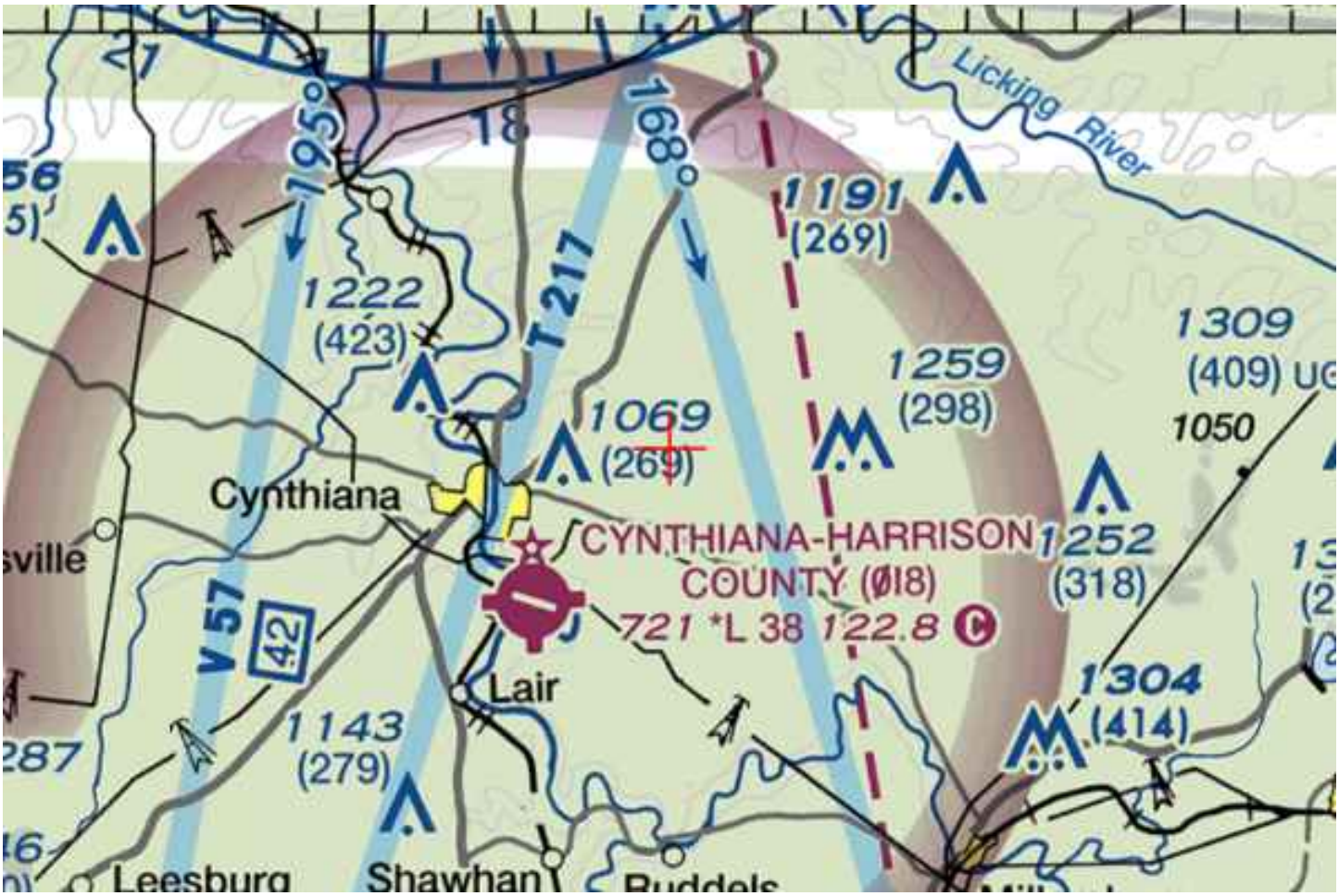
Signature Control No: 498615775-502295602 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40903-OE



Sectional Map for ASN 2021-ASO-40903-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40904-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 25
Location:	Cynthiana, KY
Latitude:	38-23-53.12N NAD 83
Longitude:	84-13-45.79W
Heights:	860 feet site elevation (SE)
	15 feet above ground level (AGL)
	875 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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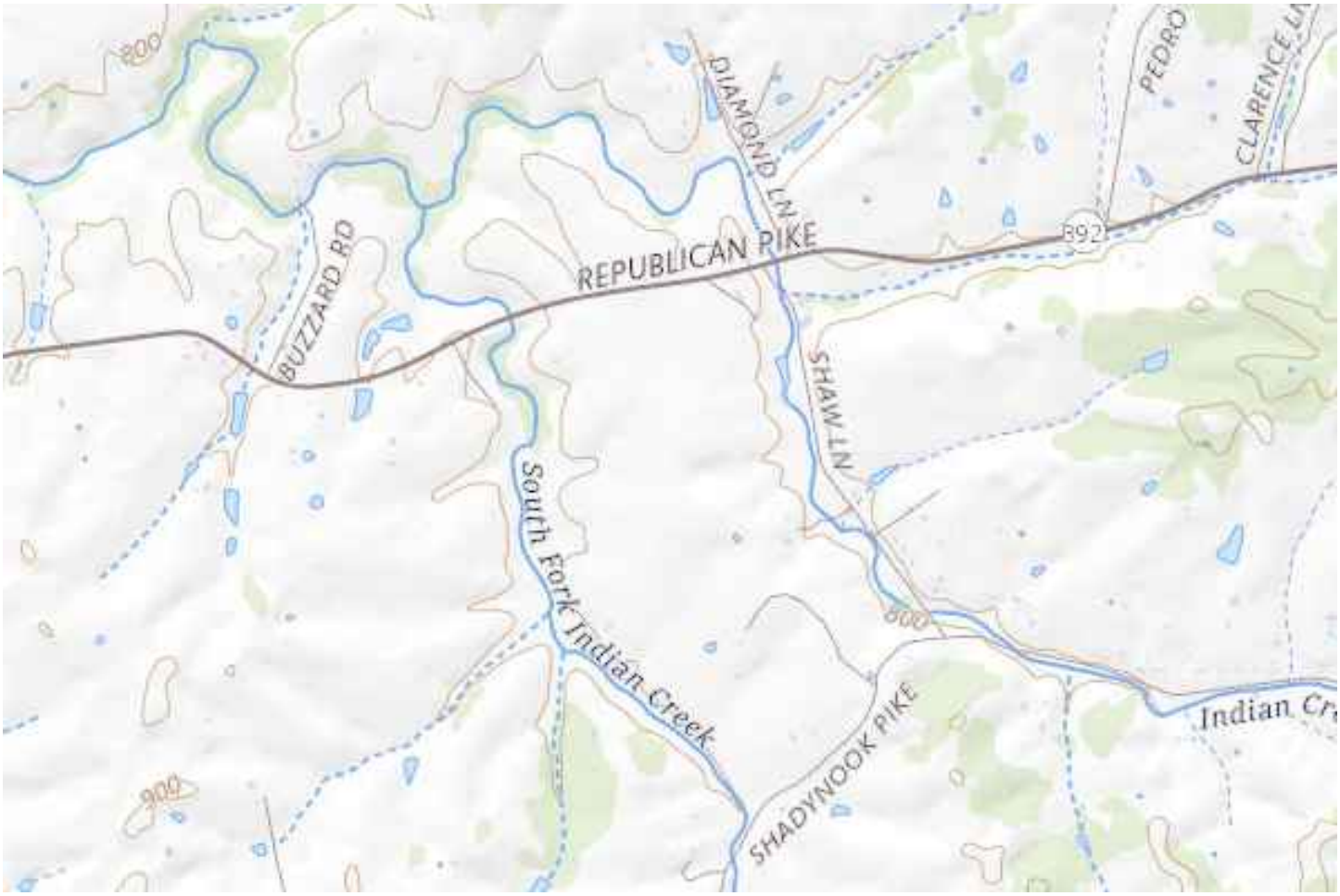
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40904-OE.

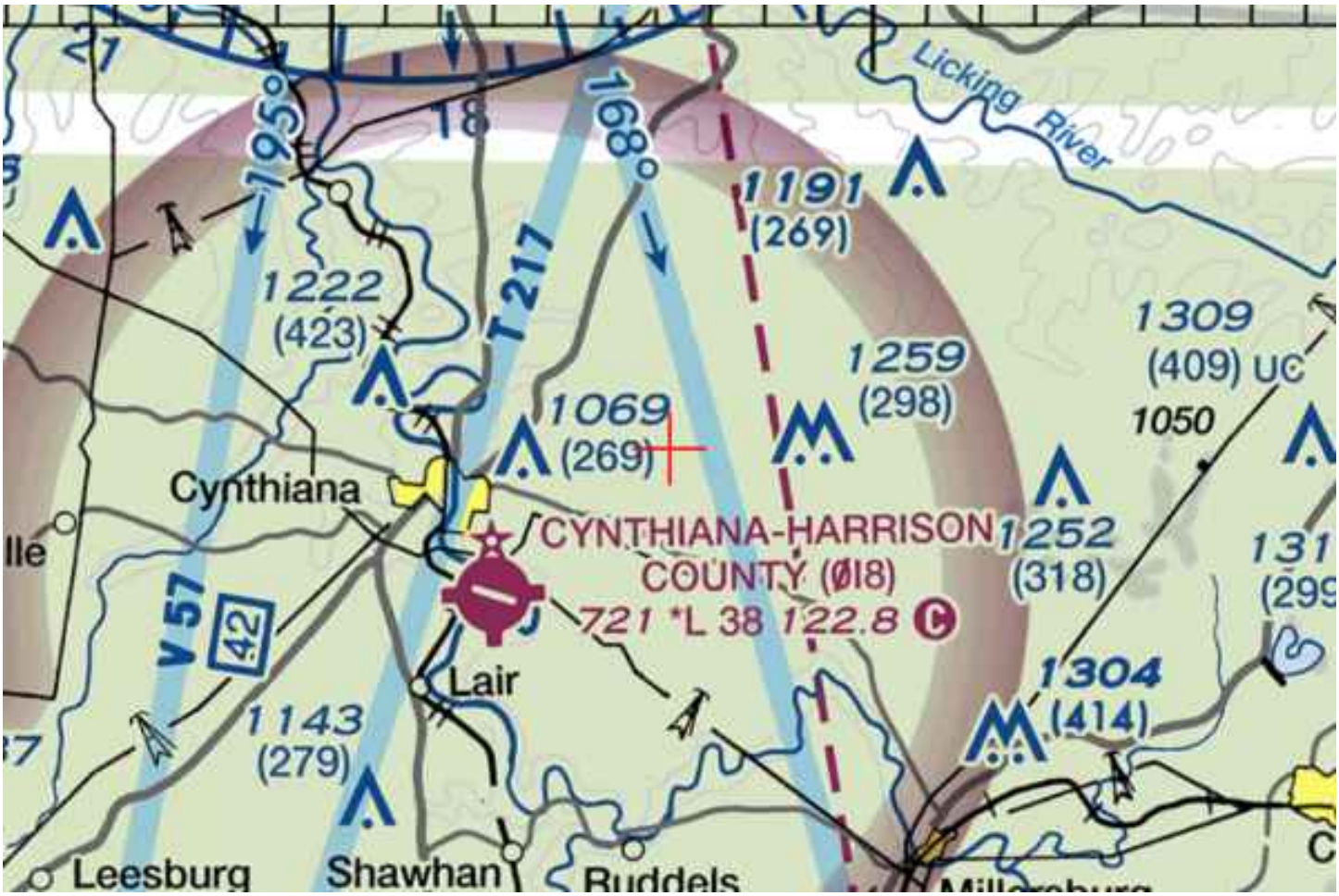
Signature Control No: 498615776-502295599 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40904-OE



Sectional Map for ASN 2021-ASO-40904-OE



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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40905-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
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Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 33
Location:	Cynthiana, KY
Latitude:	38-23-37.37N NAD 83
Longitude:	84-13-12.11W
Heights:	800 feet site elevation (SE)
	15 feet above ground level (AGL)
	815 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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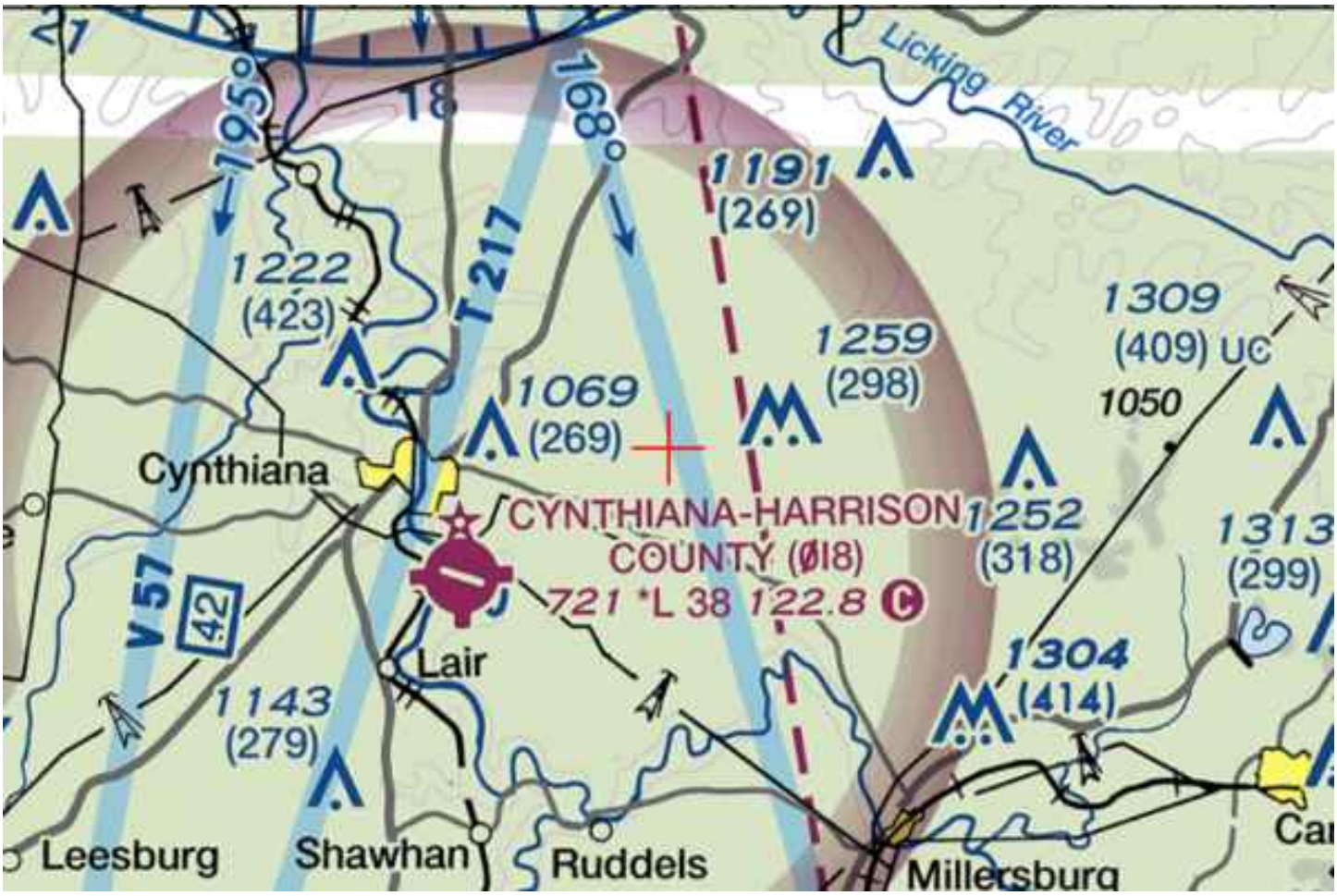
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40905-OE.

Signature Control No: 498615778-502295608 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40905-OE

Sectional Map for ASN 2021-ASO-40905-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40906-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
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Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 35
Location:	Cynthiana, KY
Latitude:	38-23-24.57N NAD 83
Longitude:	84-13-18.44W
Heights:	866 feet site elevation (SE)
	15 feet above ground level (AGL)
	881 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

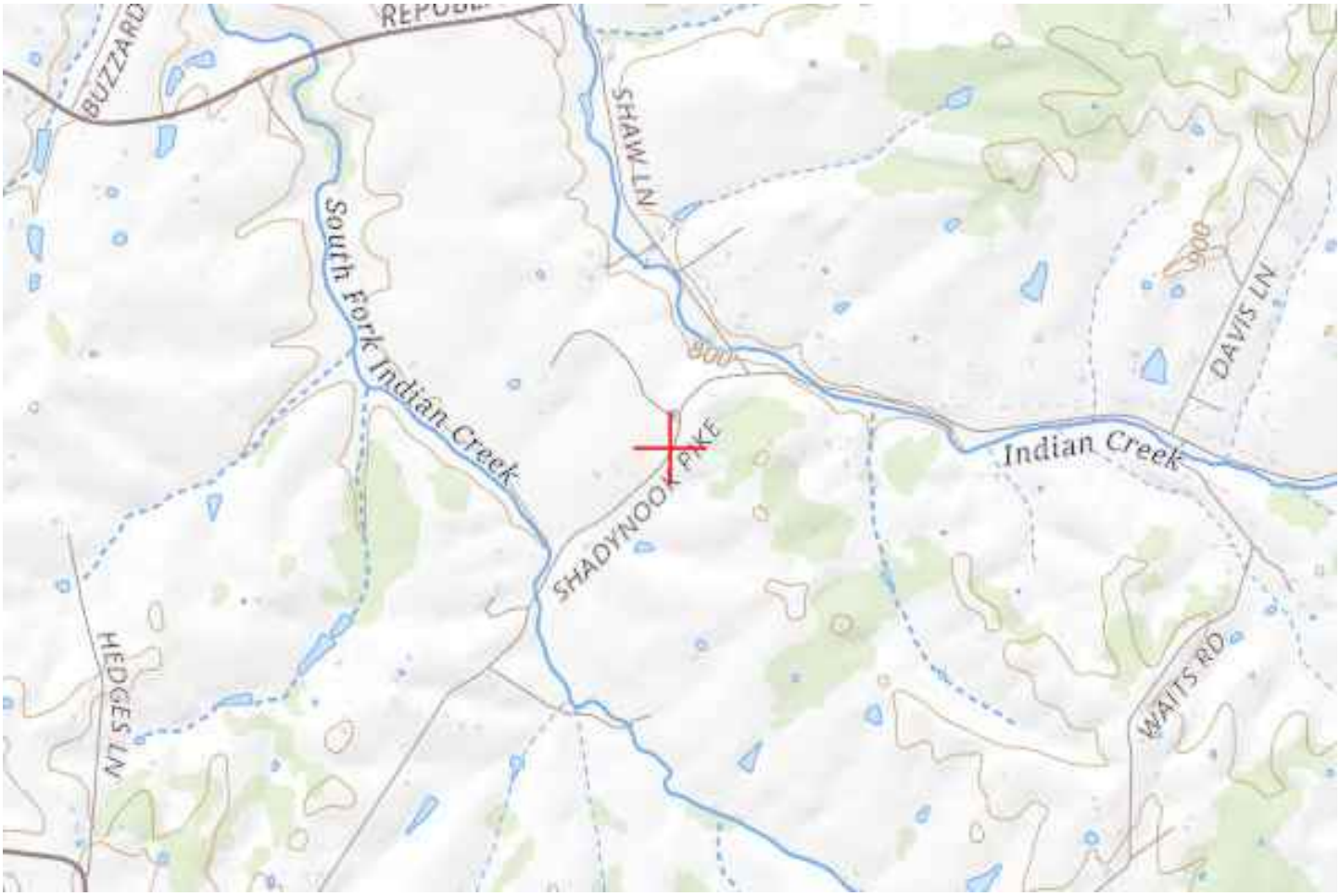
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40906-OE.

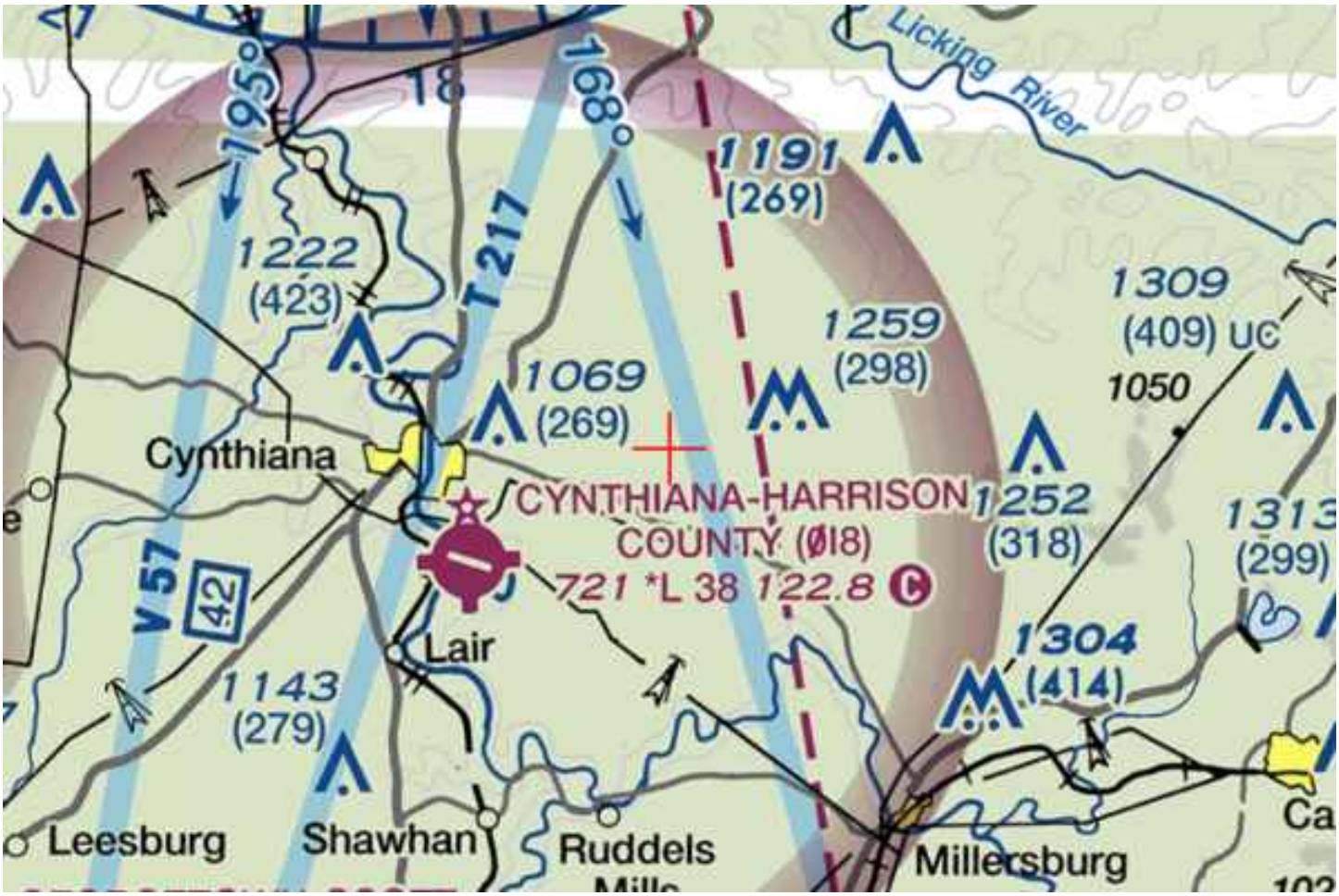
Signature Control No: 498615779-502295603 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40906-OE



Sectional Map for ASN 2021-ASO-40906-OE



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Federal Aviation Administration
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Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40907-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 38
Location:	Cynthiana, KY
Latitude:	38-23-13.11N NAD 83
Longitude:	84-13-34.37W
Heights:	803 feet site elevation (SE) 15 feet above ground level (AGL) 818 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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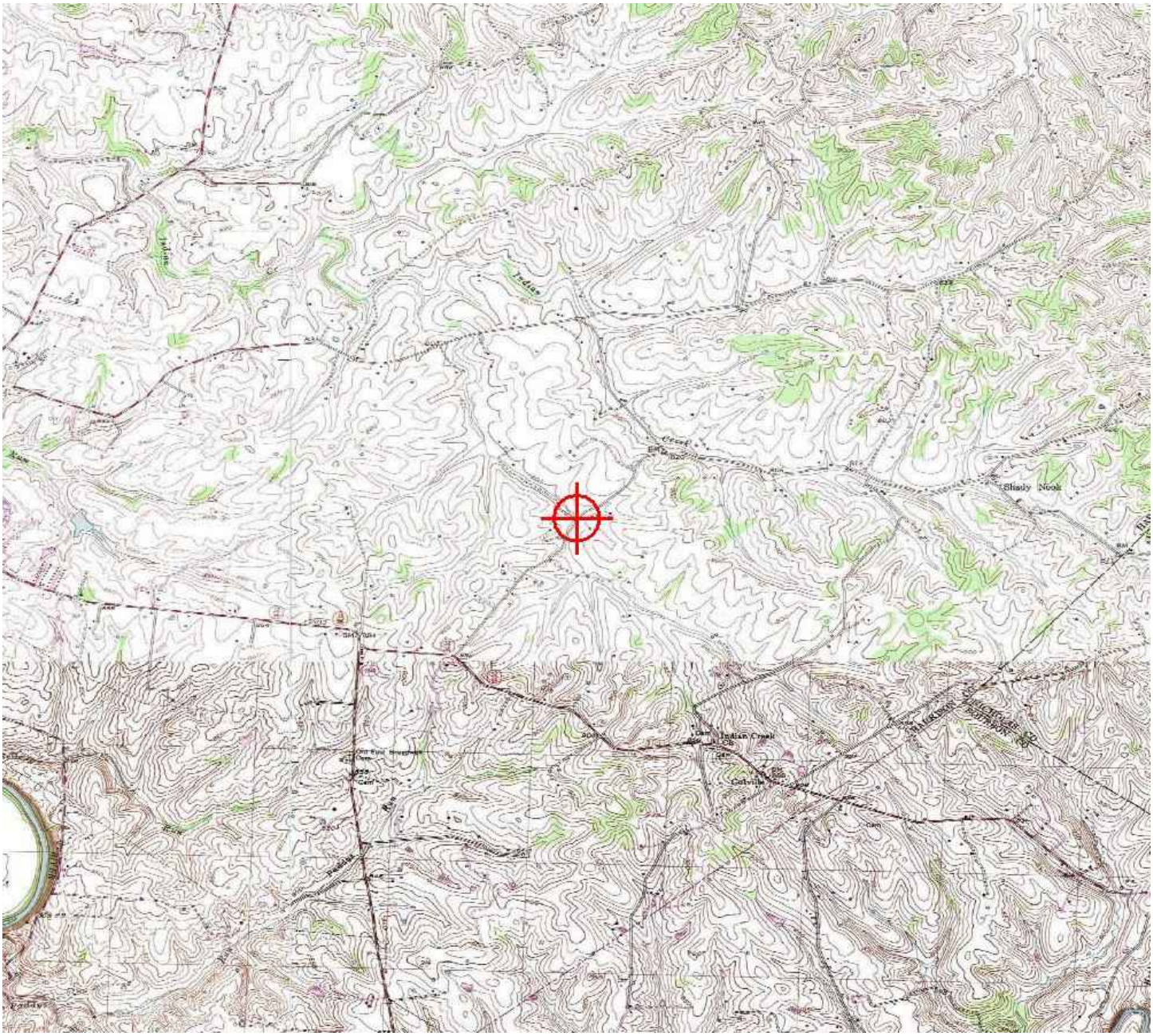
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40907-OE.

Signature Control No: 498615781-502295600 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40907-OE



Sectional Map for ASN 2021-ASO-40907-OE

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Southwest Regional Office
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10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40908-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 43
Location:	Cynthiana, KY
Latitude:	38-23-01.35N NAD 83
Longitude:	84-13-43.51W
Heights:	855 feet site elevation (SE) 15 feet above ground level (AGL) 870 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

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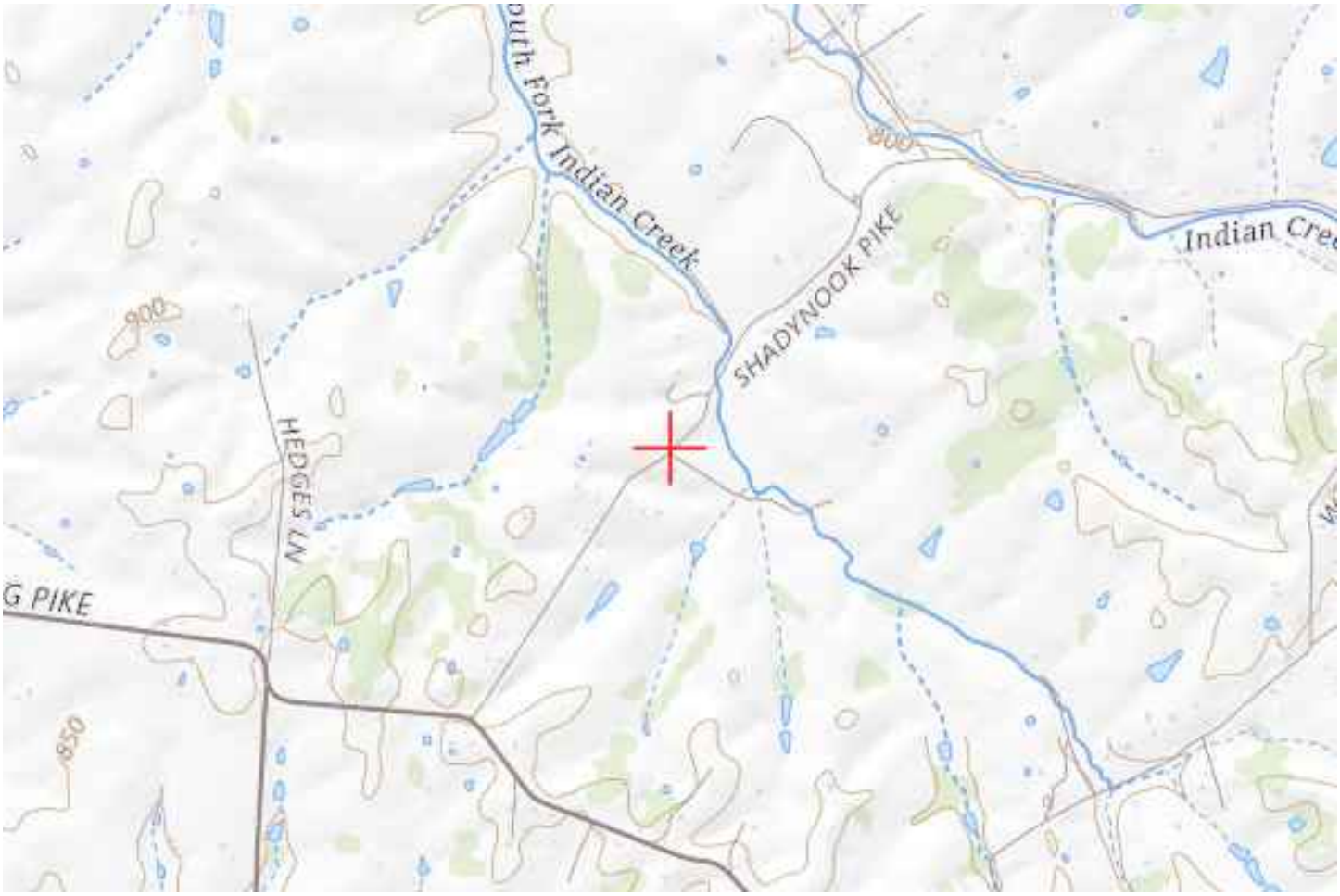
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40908-OE.

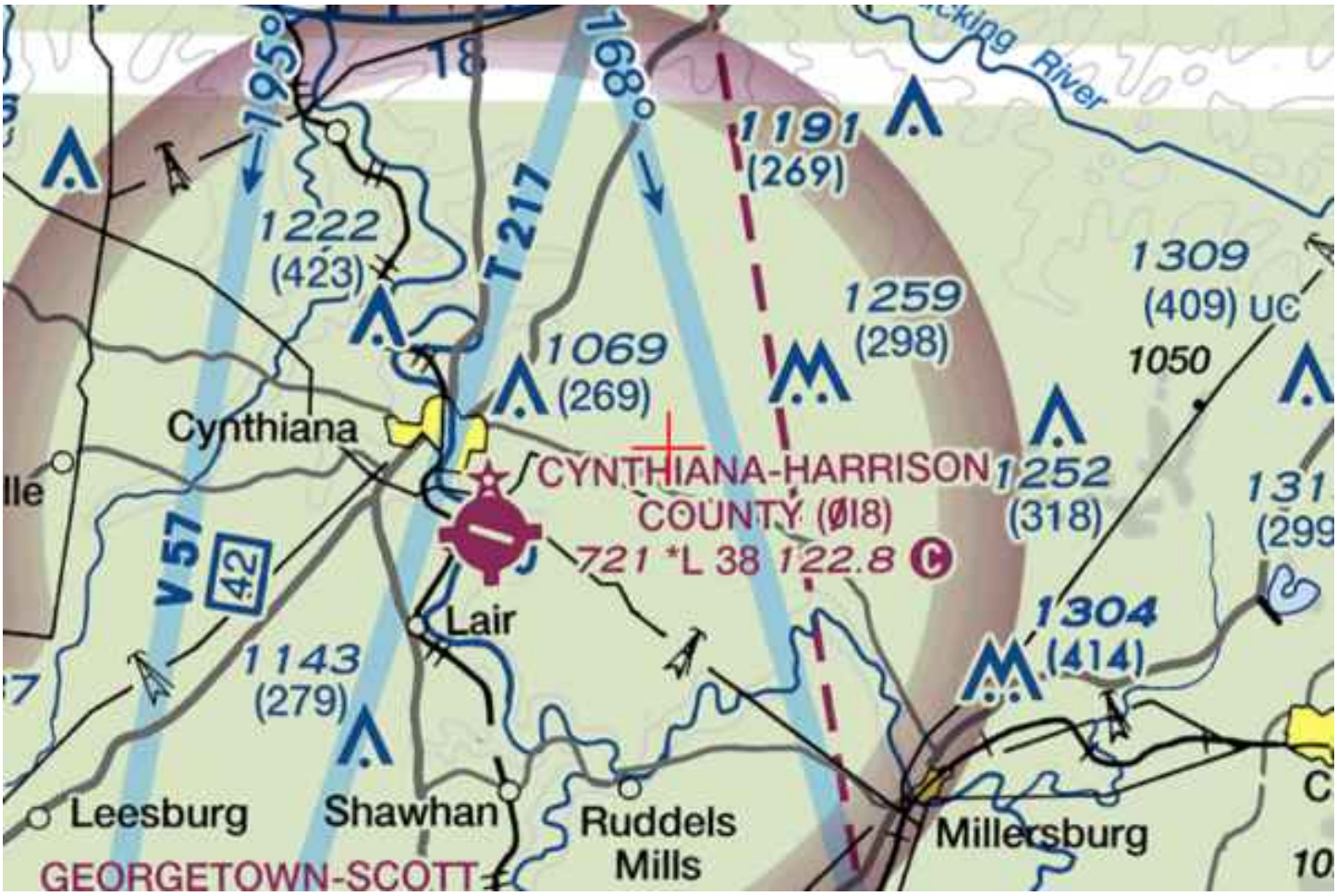
Signature Control No: 498615782-502295613 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40908-OE



Sectional Map for ASN 2021-ASO-40908-OE



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Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40909-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 50
Location:	Cynthiana, KY
Latitude:	38-22-48.88N NAD 83
Longitude:	84-14-16.40W
Heights:	872 feet site elevation (SE)
	15 feet above ground level (AGL)
	887 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

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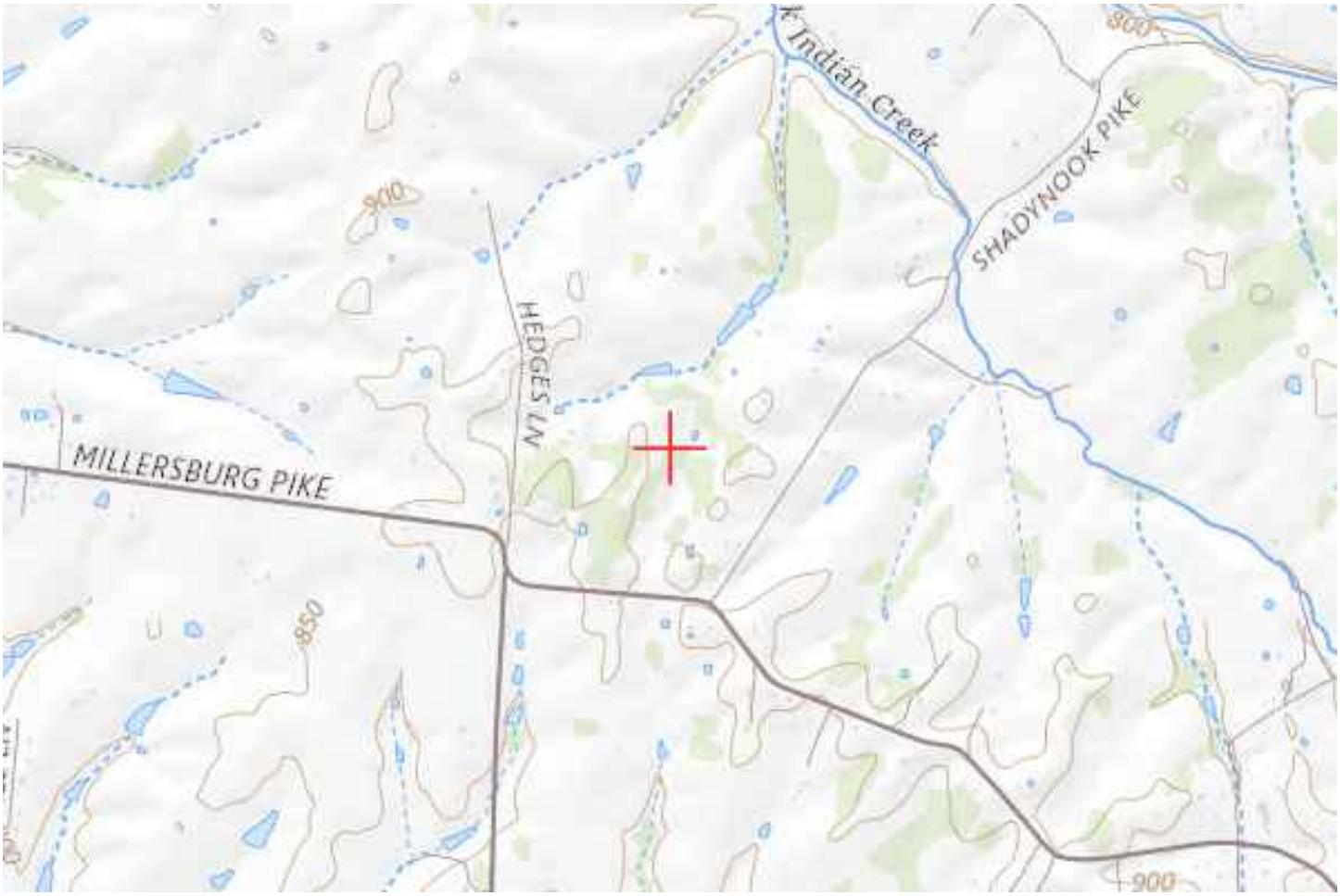
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40909-OE.

Signature Control No: 498615784-502295601 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40909-OE



Sectional Map for ASN 2021-ASO-40909-OE

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Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40910-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 51
Location:	Cynthiana, KY
Latitude:	38-22-49.52N NAD 83
Longitude:	84-14-37.71W
Heights:	882 feet site elevation (SE)
	15 feet above ground level (AGL)
	897 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

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If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40910-OE.

Signature Control No: 498615785-502295605 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40910-OE

Sectional Map for ASN 2021-ASO-40910-OE

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10101 Hillwood Parkway
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Aeronautical Study No.
2021-ASO-40911-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
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Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 54
Location:	Cynthiana, KY
Latitude:	38-23-02.91N NAD 83
Longitude:	84-15-17.81W
Heights:	840 feet site elevation (SE)
	15 feet above ground level (AGL)
	855 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

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If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40911-OE.

Signature Control No: 498615786-502295611 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40911-OE

Sectional Map for ASN 2021-ASO-40911-OE

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10101 Hillwood Parkway
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Aeronautical Study No.
2021-ASO-40912-OE

Issued Date: 11/22/2021

Jayce Walker
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3000 E. Cesar Chavez St.
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**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 57
Location:	Cynthiana, KY
Latitude:	38-22-20.83N NAD 83
Longitude:	84-15-25.61W
Heights:	823 feet site elevation (SE)
	15 feet above ground level (AGL)
	838 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

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__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

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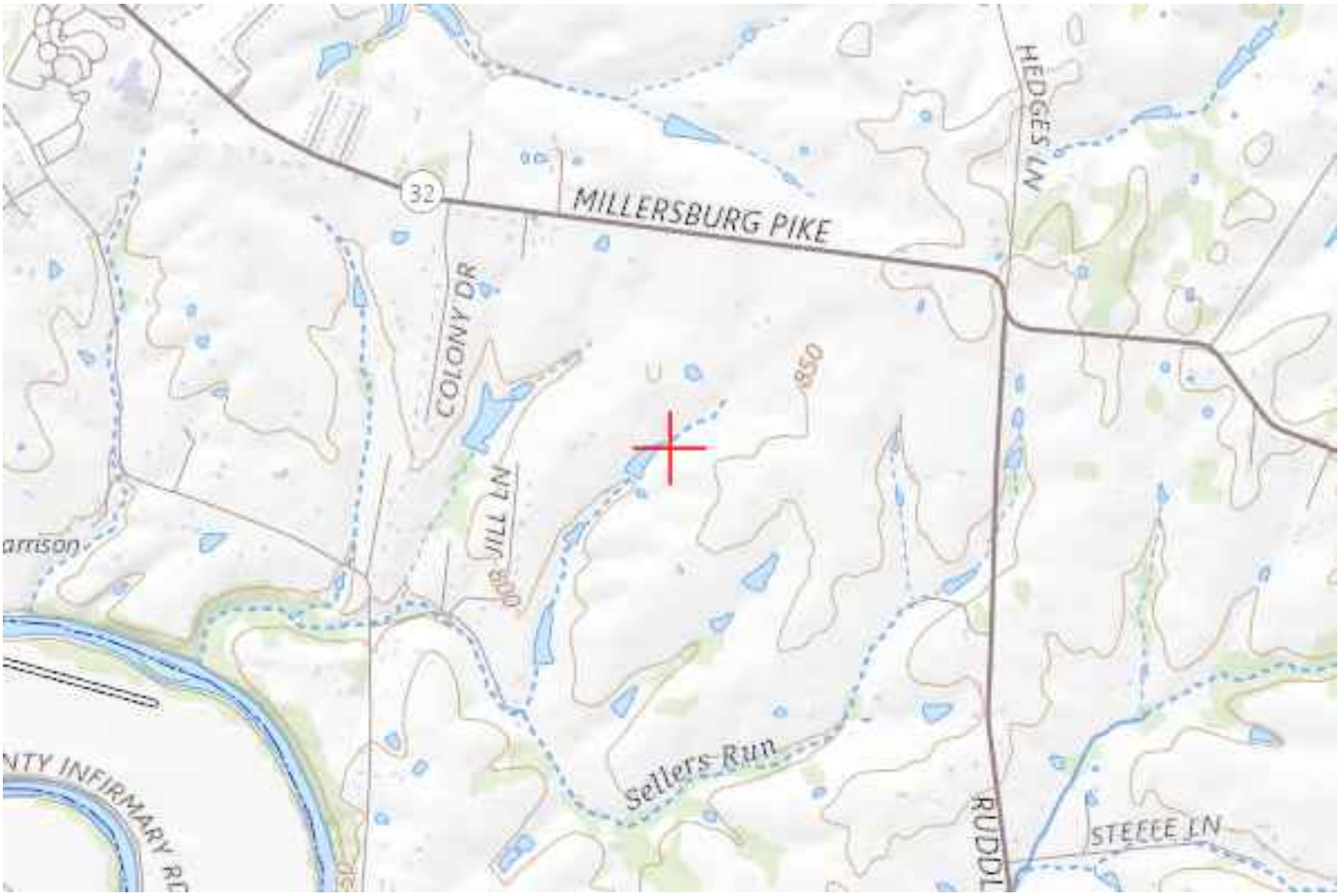
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40912-OE.

Signature Control No: 498615788-502295621 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40912-OE



Sectional Map for ASN 2021-ASO-40912-OE

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Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2021-ASO-40913-OE

Issued Date: 11/22/2021

Jayce Walker
Recurrent Energy
3000 E. Cesar Chavez St.
Ste 400
Austin, TX 78702

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Boundary Vertices 60
Location:	Cynthiana, KY
Latitude:	38-22-03.92N NAD 83
Longitude:	84-14-41.82W
Heights:	864 feet site elevation (SE)
	6 feet above ground level (AGL)
	870 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 05/22/2023 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, effective 21 Nov 2007, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

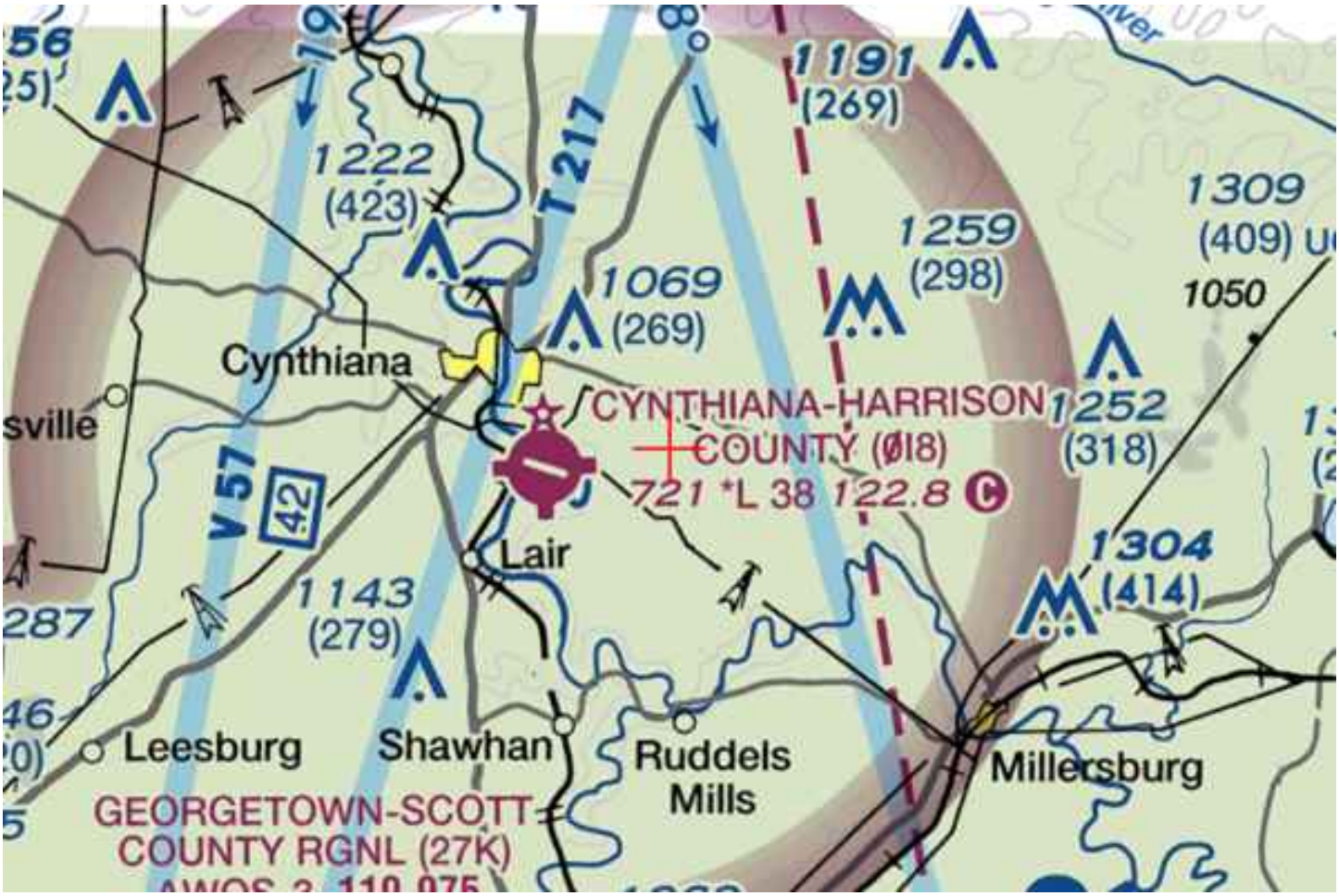
If we can be of further assistance, please contact our office at (817) 222-5928, or chris.smith@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2021-ASO-40913-OE.

Signature Control No: 498615789-502293787 (DNE)
Chris Smith
Specialist

Attachment(s)
Map(s)

TOPO Map for ASN 2021-ASO-40913-OE

Sectional Map for ASN 2021-ASO-40913-OE



Request No. 5:

Provide a copy of the permit for the project from the Kentucky Airport Zoning Commission.

Response No. 5:

See attached.

Responding Witness: Jayce Walker

KENTUCKY AIRPORT ZONING COMMISSION

ANDY BESHEAR
Governor

Office of Audits, 200 Mero Street, 4th floor
Frankfort, KY 40622
www.transportation.ky.gov
502-782-4043

JIM GRAY
Secretary

APPROVAL OF APPLICATION

December 15, 2021

APPLICANT
Blue Moon Energy
Kate Garcia
3000 E. Cesar Chavez St. Ste 400
Austin, TX 78702

SUBJECT: AS-HARRISON-0I8-2021-116

STRUCTURE: Solar Panels
LOCATION: Cynthiana, KY

POINT NO.	LATTITUDE	LONGITUDE	Ground Elevation	Structure Hight	Total Height
SUBSTATION	38° 22' 18.20'' N	84° 15' 27.12'' W	825	50	875
BOUNDARY VERTICES 3	38° 23' 29.95'' N	84° 15' 20.42'' W	860	15	875
BOUDNARY VERTICES 6	38° 23' 38.05'' N	84° 14' 43.72'' W	855	15	870
BOUNDARY VERTICES 10	38° 23' 59.82'' N	84° 14' 31.18'' W	824	15	839
BOUNDARY VERTICES 25	38° 23' 53.12'' N	84° 13' 45.79'' W	860	15	875
BOUNDARY VERTICES 33	38° 23' 37.37'' N	84° 13' 12.11'' W	800	15	815
BOUNDARY VERTICES 35	38° 23' 24.57'' N	84° 13' 18.44'' W	866	15	881
BOUNDARY VERTICES 38	38° 23' 13.11'' N	84° 13' 34.37'' W	803	15	818
BOUNDARY VERTICES 43	38° 23' 01.35'' N	84° 13' 43.51'' W	855	15	870
BOUNDARY VERTICES 50	38° 22' 48.88'' N	84° 14' 16.40'' W	872	15	887
BOUNDARY VERTICES 51	38 22' 49.52'' N	84° 14' 37.71'' W	882	15	897
BOUNDARY VERTICES 54	38° 23' 02.91'' N	84° 15' 17.81'' W	840	15	855
BOUNDARY VERTICES 57	38° 22' 20.83'' N	84° 15' 25.61'' W	823	15	838
BOUNDARY VERTICES 60	38° 22' 3.92'' N	84° 14' 41.82'' W	864	15	879
BOUNDARY VERTICES 64	38° 21' 52.04'' N	84° 13' 51.96'' W	888	15	903
BOUNDARY VERTICES 67	38° 21' 28.81'' N	84° 13' 26.91'' W	909	15	924

BOUNDARY VERTICES 68	38° 21' 16.35'' N	84° 13' 28.35'' W	875	15	890
BOUNDARY VERTICES 69	38° 21' 17.55'' N	84° 13' 45.32'' W	900	15	915
BOUNDARY VERTICES 76	38° 21' 32.14'' N	84° 14' 19.76'' W	835	15	850
BOUNDARY VERTICES 77	38° 21' 32.26'' N	84° 14' 38.54'' W	808	15	823
BOUNDARY VERTICES 80	38° 21' 44.40'' N	84° 15' 01.37'' W	848	15	863
BOUNDARY VERTICES 82	38° 21' 21.62'' N	84° 15' 10.37'' W	838	15	853
BOUNDARY VERTICES 84	38° 21' 21.39'' N	84° 16' 06.69'' W	836	15	851
BOUNDARY VERTICES 86	38° 21' 29.09'' N	84° 16' 08.58'' W	850	15	865
BOUNDARY VERTICES 91	38° 21' 33.23'' N	84° 15' 27.82'' W	834	15	849
BOUNDARY VERTICES 92	38° 21' 45.35'' N	84° 15' 28.91'' W	803	15	818
BOUNDARY VERTICES 94	38° 22' 02.15'' N	84° 15' 45.22'' W	800	15	815
BOUNDARY VERTICES 95	38° 22' 45.71'' N	84° 15' 40.09'' W	856	15	871

The Kentucky Airport Zoning Commission has approved your application for a permit to construct Solar Panels near Cynthiana, KY.

This permit is valid for a period of 18 Month(s) from its date of issuance. If construction is not completed within said 18-Month period, this permit shall lapse and be void, and no work shall be performed without the issuance of a new permit.

No hazard, no marking/lighting required. The Solar Panels cannot create ocular (i.e., glint or glare) impacts to pilots operating an aircraft or the airports traffic area. If impacts to the pilots and airport traffic area are discovered after construction, the Sponsor must mitigate those impacts at its own expense.

Randall S. Royer

Randall S. Royer, Executive Director
Office of Audits
Acting Administrator
Randall.Royer@ky.gov
Jason.Salazar-Munoz@ky.gov

Request No. 6:

Provide the distance from each noise emitting infrastructure (including inverters, and substation) to the nearest participating and nonparticipating residences.

Response No. 6:

Inverters will be located 772 feet from the nearest participating residence and 928 feet from the nearest nonparticipating residence. The substation will be located 1,381 feet from the nearest participating residence and 1,662 feet from the nearest nonparticipating residence.

Responding Witness: Jayce Walker

Request No. 7:

Provide a copy of the Industrial Revenue Bond and the Payment In Lieu of Taxes agreements.

Response No. 7:

See attached.

Responding Witness: Jayce Walker

RESOLUTION NO. _____

A RESOLUTION OF THE FISCAL COURT OF THE COUNTY OF HARRISON, KENTUCKY, GIVING PRELIMINARY APPROVAL OF AN INDUSTRIAL REVENUE BOND FINANCING FOR BLUE MOON ENERGY LLC, AND ANY AFFILIATES OR ASSIGNEES THEREOF; AUTHORIZING INITIATION OF THE ACQUISITION, CONSTRUCTION, EQUIPPING, AND INSTALLATION OF AN INDUSTRIAL PROJECT; AGREEING TO UNDERTAKE THE ISSUANCE OF ONE OR MORE SERIES OF INDUSTRIAL REVENUE BONDS AT THE APPROPRIATE TIME OR TIMES; AUTHORIZING THE EXECUTION AND DELIVERY OF A MEMORANDUM OF AGREEMENT AND PAYMENT IN LIEU OF TAXES AGREEMENT IN CONNECTION WITH THE ISSUANCE OF THE BONDS; AND TAKING OTHER PRELIMINARY ACTIONS

WHEREAS, the Fiscal Court of the County of Harrison, Kentucky (the "***Issuer***"), has determined that the Issuer may assist Blue Moon Energy LLC, a Delaware limited liability company, its affiliates and assigns (the "***Company***"), by pursuing the acquisition, construction, equipping, and installation of an industrial project of the Company consisting of the facilities and properties, including any franchise as that term is used in KRS 136.115 to 136.180 (the "***Franchise***"), described in **EXHIBIT A** attached hereto (collectively, the "***Project***") and by entering into, at the appropriate time, a lease agreement with the Company (the "***Lease Agreement***") pertaining to the Project, all pursuant to the authority of Sections 103.200 to 103.285, inclusive, of the Kentucky Revised Statutes, as amended (the "***Act***"), and in furtherance of the purposes of the Act and the ensuing public benefit to the residents of the Issuer and its environs, the Lease Agreement to be upon terms and conditions as the Act may require and as the Issuer may deem acceptable; and

WHEREAS, the Company has represented to the Issuer that the acquisition, construction, equipping, and installation of the Project, if acquired, constructed, equipped, and installed, will result in new job opportunities within the environs of the Issuer; and

WHEREAS, the Issuer is authorized by the Act to issue its industrial revenue bonds for the purpose of defraying the costs of acquiring, constructing, equipping, and installing "industrial building" facilities, which term means all real and personal properties suitable for the Project, including land, buildings, fixtures, equipment and the Franchise; discussions have occurred between representatives of the Company and the Issuer regarding the issuance of industrial revenue bonds by the Issuer to finance the Company's Project; it is the intention of the Issuer, and the Issuer has agreed and hereby agrees with the Company, to issue such industrial revenue bonds upon compliance by the Company with such reasonable conditions and obligations as the Issuer may require and documents incident to such bond issue or issues and upon the agreement of the Company to pay the reasonable costs and expenses of the Issuer related to or arising from such issuance from bond proceeds or other sources; and the Issuer has authorized the Company to proceed with the initiation of the acquisition, construction,

equipping, and installation of the Project, subject to reimbursement of the costs of such acquisition, construction, equipping, and installation from the proceeds of the industrial revenue bonds, as and when issued; and

WHEREAS, based upon the Company's present estimate of the aggregate costs of the Project together with a reasonable allowance for contingencies and incidental costs, the Issuer proposes to issue its industrial revenue bonds in an aggregate stated principal amount up to $115,000,000, for a term of up to forty (40) years, to pay the costs of the acquisition of the Project (the "***Bonds***"), including costs incident to the authorization, sale, and issuance of the Bonds and other financing costs, with the understanding that such amount may be increased by subsequent official action of the Issuer upon the Company's request; and the Bonds will be payable solely from payments to be made by the Company under the Lease Agreement and will not be payable from any funds or assets of the Issuer whatsoever; and

WHEREAS, the Issuer proposes to enter into the Lease Agreement with the Company at the appropriate time under which the Company will covenant and agree to pay amounts sufficient to provide for the payment of principal of and premium, if any, and interest on the Bonds together with all trustee, paying agent, and servicing agent's fees in connection with the Bonds and any other related charges as the same come due and payable; and

WHEREAS, to evidence the Issuer and the Company's preliminary agreement regarding these matters the parties propose to enter into a Memorandum of Agreement substantially in the form set out in **EXHIBIT B** attached hereto (the "***Memorandum of Agreement***"), and upon and in connection with the issuance of each series of the Bonds, the Payment in Lieu of Taxes Agreement substantially in the form set out in **EXHIBIT C** attached hereto (the "***County PILOT Agreement***").

NOW, THEREFORE, BE IT RESOLVED AND ORDERED BY THE FISCAL COURT OF HARRISON COUNTY, KENTUCKY, AS FOLLOWS:

Section 1. It is found, determined, and declared that (a) the recitals set forth in the preambles to this Resolution, which are incorporated in this Section 1 by reference, are true and correct; (b) the amount of money necessary to be provided by the Issuer through the issuance of the Bonds for the acquisition, construction, installation, and equipping of the Project, including the Franchise, will be an aggregate amount up to $115,000,000, the Bonds to have a term of up to forty (40) years; (c) the Company has represented it intends to have sufficient financial resources to acquire, construct, install, and equip the Project and to place it in operation and to continue to operate, maintain, and insure the Project throughout the term of the Bonds, meeting when due the obligations of the Lease Agreement; and (d) sufficient safeguards shall be provided by the Lease Agreement to insure that all money provided by the Issuer from the proceeds of the sale of the Bonds will be expended, by way of direct expenditure or reimbursement, solely and only for the purposes of the Project financed thereby; and (e) sufficient safeguards shall be provided by the Lease Agreement and other documents for the Bonds such that should the Company transfer or assign the Lease Agreement governing all or

substantially all of the Project assets to an investor owned utility that is or would be exempt from the Issuer's occupational license tax on the net profits of the Project, the Issuer may, after 30-days' notice and an opportunity to cure, declare a default, declare the Bonds due and payable, terminate the Lease Agreement, and transfer title to the Company's Project to the then existing lessee thereunder.

Section 2. It is hereby found, determined, and declared that (a) the costs of acquiring, constructing, installing, and equipping the Project, including any Franchise, will be paid out of the proceeds of the Bonds, such proceeds to be supplemented by contributions of the Company as may be necessary to complete the Company's respective Project; (b) none of the Bonds will be general obligations of the Issuer; (c) neither the Bonds nor the interest thereon shall constitute or give rise to any pecuniary liability whatsoever of the Issuer or any charge against its general credit or taxing power; (d) the Bonds and the payment of interest thereon shall be secured and payable solely by a pledge of amounts to be paid by the Company or otherwise to be available under the Lease Agreement; (e) no part of said costs will be payable out of any general funds, assets, properties, or other contributions of the Issuer; (f) the Issuer shall sell the Bonds only to the Company or an affiliated entity or assignee thereof; and (g) the Company shall pay all reasonable costs and expenses of the Issuer related to the issuance of the Bonds in an amount not to exceed $1,500.

Section 3. The acquisition, construction, installation, and equipping of the Project may be initiated and undertaken or caused to be initiated and undertaken by the Company forthwith, and the Company is authorized to formulate and develop plans and specifications for the Project and to enter into such contracts and undertakings as may be required for the acquisition, construction, installation, and equipping of the Project. Payments or reimbursements to or on behalf of the Company after the receipt of the proceeds of the sale of the Bonds by the Issuer shall be made as set out in the Lease Agreement.

Section 4. The Company is authorized and directed to take any other legal action necessary and customary in order to satisfy any prerequisites to the issuance of the Bonds. Counsel for the Issuer and its officers and officials are authorized and requested to assist the Company in any appropriate manner.

Section 5. The Memorandum of Agreement attached hereto as **EXHIBIT B** is hereby approved and the County Judge/Executive is hereby authorized to execute the Memorandum of Agreement on the Issuer's behalf. The Company may assign its rights hereunder by assigning the Memorandum of Agreement and providing notice of such assignment to the County Judge/Executive.

Section 6. It is hereby acknowledged and agreed that the form of the County PILOT Agreement attached hereto as **EXHIBIT C** describes the agreement reached between the Issuer and the Company's representatives regarding the Company's obligations to make payments in lieu of taxes while the Bonds are outstanding and that upon the issuance of the Bonds, the Issuer shall direct its County Judge/Executive or its other authorized officials to execute a

County PILOT Agreement in the form attached hereto with such changes or revisions as are necessary to reflect the date, par, designation, maturity, and interest rate or rates applicable to the Bonds.

Section 7. No funds of the Issuer shall be expended for the costs of issuance of the Bonds or for the costs of the Project, except such as are derived from Bond proceeds.

Section 8. All resolutions, municipal orders, and other official actions of the Issuer or parts thereof in conflict herewith are, to the extent of such conflict, hereby rescinded.

Section 9. This Resolution shall be in full force and effect from and after its adoption.

[*Signature Page To Follow*]

[SIGNATURE PAGE TO INDUCEMENT RESOLUTION]

ADOPTED by the Fiscal Court of the County of Harrison, Kentucky, at a meeting held on August 11, 2020.

Alex Barnett
County Judge/Executive

Attest:

Linda Barnes
County Clerk

CERTIFICATION

I, the undersigned, do hereby certify that I am the duly qualified and acting County Clerk of Harrison County, Kentucky (the "*Issuer*"), and as such I further certify that the foregoing (with the attached **EXHIBITS A**, **B**, and **C**), is a true, correct, and complete copy of a Resolution duly adopted by the Fiscal Court of the Issuer at a meeting properly held on August 11, 2020, signed by the County Judge/Executive and now in full force and effect, all as appears from the official records of the Issuer in my possession and under my control.

IN WITNESS WHEREOF, I have hereunder set my hand this 6-22 2021 ~~2020~~.

Linda Barnes
County Clerk

EXHIBIT A
TO INDUCEMENT RESOLUTION

Project Description

The Project includes all industrial building facilities to be financed by the Bonds and to be acquired, constructed, installed, and equipped by the Company in Harrison County, Kentucky for the purpose of manufacturing approximately 70 megawatts (MW) of electricity, including any Franchise and all related distribution facilities and operating equipment and machinery deemed necessary in connection therewith, but excluding the underlying land which is to be leased for the Project.

EXHIBIT B
TO INDUCEMENT RESOLUTION

Form of Memorandum of Agreement

MEMORANDUM OF AGREEMENT

This **MEMORANDUM OF AGREEMENT** (this "***Agreement***") is made as of August 11, 2020, by and between the **COUNTY OF HARRISON, KENTUCKY**, a county and political subdivision of the Commonwealth of Kentucky (the "***Issuer***") and **BLUE MOON ENERGY LLC**, a Delaware limited liability company, its affiliates and assigns (the "***Company***").

RECITALS

A. The Issuer is authorized under Sections 103.200 to 103.285, inclusive, of the Kentucky Revised Statutes (the "***Act***") to issue industrial revenue bonds to finance the costs of acquiring, constructing, installing, and equipping certain industrial projects and facilities within the meaning of the Act, in order to accomplish the public purposes of promoting economic development within the Issuer's environs; and

B. The Company has advised the Issuer that the Company desires to finance the acquisition, construction, installation, and equipping of an industrial project consisting of the facilities and properties, including the franchise as that term is used in KRS 136.115 to 136.180 (the ***"Franchise"***), described in **ATTACHMENT A** attached hereto (the "***Project***"); and

C. The Company has asked the Issuer to issue industrial revenue bonds pursuant to the Act in an aggregate principal amount not to exceed $115,000,000 for the purpose of financing the Project (the "***Bonds***"); and

D. The parties hereto have found and determined that the financing of the Project will tend to accomplish the public purposes of the Act by causing economic development within the Issuer's environs; and

E. The Issuer proposes to issue the Bonds to finance the Project and desires to authorize the Company to proceed with the financing of the Project and be reimbursed from the proceeds of the Bonds for costs incurred related thereto before the issuance of the Bonds; and

F. The Issuer proposes to enter into, at the appropriate time and in accordance with the Act, a lease agreement with the Company (the "***Lease Agreement***"), pertaining to the Project, the Lease Agreement to be upon terms and conditions as the Act may require and the Issuer may deem acceptable; and

G. In order to obtain for the Issuer's residents the benefits listed above, which the Project would create and preserve, the Issuer desires to encourage and induce the Company to proceed with the financing of the Project;

NOW, THEREFORE, in consideration of the premises and of the covenants and undertakings herein expressed, the Issuer and the Company hereby agree as follows:

Section 1. The Company may commence the acquisition, construction, installation, and equipping of the Project and may provide or cause to be provided, at its own expense, any necessary interim financing to permit such acquisition, construction, installation, and equipping to commence and continue.

Section 2. The Issuer will issue and sell the Bonds pursuant to the terms of the Act in an aggregate principal amount not to exceed $115,000,000. The Bonds shall be signed by the manual or facsimile signature of the Issuer's County Judge/Executive and attested to by the Issuer's County Clerk, and shall bear such title or designation, shall bear interest at such rate or rates, shall be in such denomination or denominations, shall be subject to such terms of redemption, shall be in registered form, shall be payable as to principal, redemption price, and interest at such place or places, and shall contain such other terms and conditions as may be fixed by or pursuant to the Issuer's ordinance authorizing the sale and delivery thereof. The proceeds from the sale of the Bonds shall be used to finance the Project pursuant to the Act.

Section 3. The Issuer will cooperate with the Company for the purpose of issuing and selling the Bonds on the best terms reasonably obtainable; and if arrangements therefor satisfactory to the Issuer and the Company can be made, the Issuer will authorize the execution and delivery of such instruments and the taking of such further actions as may be necessary or advisable for the authorization, issuance, and sale of the Bonds on a negotiated basis and the use of the proceeds thereof to finance the Project, all as shall be authorized by law and mutually satisfactory to the Issuer and the Company. The Issuer shall sell the Bonds only to the Company or any affiliated entity or assignee thereof.

Section 4. Upon the issuance of the Bonds, the Issuer shall take title to the Company's Project and the Issuer and the Company shall enter into the Lease Agreement pursuant to which the Company will covenant and agree to pay amounts sufficient to provide for the payment of principal of and interest for the Bonds, together with all trustee, paying agent, and serving agent's fees in connection with the Bonds, and any other related charges as the same come due and payable.

Section 5. The Company acknowledges and agrees that so long as the Issuer has title to the Company's franchise as that term is used in KRS 136.115 to 136.180 (the "***Franchise***") and the Company's leasehold interest in such Franchise is excluded from Issuer ad valorem taxation pursuant to KRS 139.200(7), the Company's shall either pay the Issuer's occupational license tax on the Company's net profits apportioned to the Issuer or make a payment equal thereto if the Company is exempt from the Issuer's occupational license tax.

Section 6. The Issuer will take or cause to be taken such other acts and adopt or cause to be adopted such further proceedings as may be required to implement the aforesaid undertakings or as it may deem appropriate pursuant thereto.

Section 7. Contemporaneously with the sale of the Bonds, the Company (a) will enter into the Lease Agreement with the Issuer, the terms of which shall obligate the Company to pay the Issuer the amounts described in Section 4 hereof, as and when the same shall become due and payable, all provisions required by law and such other provisions as shall be mutually acceptable to the Issuer and the Company, and (b) will take such further acts and adopt such further proceedings as may be required to implement its aforesaid undertakings or as it may deem appropriate in pursuance thereof. The terms of the Bonds and the respective Lease Agreement shall provide that the Issuer may declare an event of default, terminate the Bonds, and transfer title to the Project to the then existing lessee thereunder if the Company transfers or assigns the Lease Agreement governing all or substantially all of the Project assets to an investor-owned utility that is or would be exempt from the Issuer's occupational license tax on the net profits of the Project. Such right to terminate will be conditioned on the Issuer first providing notice to the Company or other then lessee and such person not curing the default within thirty (30) days.

Section 8. As an inducement to the Issuer to enter into this Memorandum of Agreement, each Company agrees that it will reimburse the Issuer for, or pay reasonable expenses, including fees and expenses of its counsel, which the Issuer may incur at the Company's request, or as may be necessary, arising from the execution of the Memorandum of Agreement and the performance by the Issuer of its obligations hereunder, but such expenses shall not exceed $1,500 for the Bonds, which the Issuer and the Company agree is reasonably sufficient to pay such costs and expenses.

Section 9. It is understood and agreed by and between the Issuer and the Company that the provisions hereof are not intended to, and shall not be construed or interpreted to, either (a) obligate or authorize the expenditure of any funds of the Issuer derived from any source whatsoever other than the proceeds from the issuance and sale of the Bonds as provided for herein; or (b) create any personal liability of the Issuer's present or future officers and officials serving from time to time.

Section 10. No recourse shall be had for the payment of the principal of or premium or interest on any of the Bonds or for any claim based thereon or upon any obligation, covenant, or agreement therein contained against any past, present, or future officer, member, employee, or agent of the Issuer or the Commonwealth of Kentucky or any agency or political subdivision thereof, as such, either directly or through the Issuer or the Commonwealth of Kentucky or any agency or political subdivision thereof, under any rule of law or equity, statute, or constitution, or by the enforcement of any assessment or penalty or otherwise, and all such liability of any such officer, member, employee, or agent as such shall be expressly waived and released as a condition of and consideration for the execution and delivery of this Agreement and the issuance of the Bonds.

Section 11. The Company may assign its rights under this Agreement and shall provide notice of such assignment to the County Judge/Executive of the Issuer.

Section 12. This Agreement may be signed by each party upon a separate copy or separate signature page, and any combination of separate copies signed by all parties or including signature pages so signed will constitute a single counterpart of this Agreement. This Agreement may be signed in any number of counterparts, each of which will be deemed to be an original, but all of which together will constitute one and the same agreement. It will not be necessary, in proving this Agreement in any proceeding, to produce or account for more than one counterpart of this Agreement. This Agreement will become effective when one or more counterparts have been signed by each party, and delivered to the other parties, respectively. Any party may deliver an executed copy of this Agreement (and an executed copy of any documents contemplated by this Agreement) by facsimile transmission to another party or e-mailed .pdf files of scanned copies bearing their respective signatures, and such delivery will have the same force and effect as any other delivery of a manually signed copy of this Agreement (or such other document).

[*Signature Page To Follow*]

[SIGNATURE PAGE TO MEMORANDUM OF AGREEMENT]

HARRISON COUNTY, KENTUCKY

By: _____

Alex Barnett
County Judge/Executive

Attest:

By: _____

Linda Barnes
County Clerk

BLUE MOON ENERGY LLC

By: _____

Name: Michael Arndt

Its: President

ATTACHMENT A
TO MEMORANDUM OF AGREEMENT

Project Description

The Project includes all industrial building facilities to be financed by the Bonds and to be acquired, constructed, installed, and equipped by the Company in Harrison County, Kentucky for the purpose of manufacturing approximately 70 megawatts (MW) of electricity, including any Franchise and all related distribution facilities and operating equipment and machinery deemed necessary in connection therewith, but excluding the underlying land which is to be leased for the Project.

EXHIBIT C
TO INDUCEMENT RESOLUTION

Form of Payment In Lieu of Taxes Agreement

PAYMENT IN LIEU OF TAXES AGREEMENT

This **PAYMENT IN LIEU OF TAXES AGREEMENT** (this "***Agreement***") is made as of [____], by and between the **COUNTY OF HARRISON, KENTUCKY**, a county and political subdivision of the Commonwealth of Kentucky (the "***County***") and **BLUE MOON ENERGY LLC**, a Delaware limited liability company (the "***Company***").

RECITALS

A. The Harrison County School District (the "***School District***"), by and through the Board of Education of Harrison County, Kentucky (the "***Board of Education***"), is a body politic and corporate existing under Section 160.160 of the Kentucky Revised Statutes (the "***KRS***") and has the authority under KRS 160.460 through 160.476 to levy ad valorem taxes for school purposes on all property subject to local taxation with a taxable situs in the District ("***School Property Taxes***"); and

B. The Company or an affiliate thereof is currently acquiring, constructing, installing, and equipping an industrial project consisting of the facilities and properties, including any franchise as that term is used in KRS 136.116 to 136.180 (the "***Franchise***") described in **ATTACHMENT A** attached hereto (the "***Project***"), the Project being located within the County; and

C. The Project represents new investment and is expected to generate economic development within the County; and

D. On [____], the County adopted a Bond-authorizing Ordinance (the "***Ordinance***") providing for, among other things, the issuance of taxable industrial building revenue bonds in an aggregate principal amount of up to $[_____] (the "***Bonds***") for the benefit of the Company, pursuant to KRS 103.200 through 103.285, inclusive, (the "***Act***"), to finance the Project's acquisition, construction, installation, and equipping of the Project, to acquire title to the Project, and to lease said portion back to the Company, all pursuant to the Act; and

E. The County and the Company have agreed that title to the Project will be conveyed to the County and leased back to the Company, pursuant to the Act, so long as the Bonds are outstanding; and

F. A condition of the County's agreement to enter into the documents necessary to vest title to the Project in the County and to effect the lease of the Project to the Company, the Company has agreed to make certain payments to the School District in lieu of School Property Taxes and to the and to enter into this Agreement with respect thereto;

NOW, THEREFORE, in consideration of the foregoing, the mutual agreement of the parties contained herein and other good and valuable consideration, receipt of which is hereby acknowledged, the parties hereto agree as follows:

Section 1. Recitals Incorporated. It is hereby found, determined, and declared that the recitals set forth in the preambles to this Agreement, including the definitions contained therein, are true and correct and are hereby incorporated in this Section 1 by reference.

Section 2. Project Exempt From Taxation. It is understood, acknowledged, and agreed by the parties that pursuant to KRS 103.285, the Project is exempt from taxation by the State, County, the School District, and other political subdivisions in Kentucky to the same extent as other public property used for public purposes, so long as same is owned by the County and any balance remains outstanding on the Bonds. The parties further agree that (a) the Company's leasehold interest is exempt from local taxation pursuant to KRS 132.200(7) and (b) any proportion of the value of the leasehold interest created through any private financing is taxable at applicable state and local tax rates. The parties agree that the recording of the Lease Agreement with the County Clerk of Harrison County, Kentucky shall constitute the listing of the taxable leasehold interest in real property created thereby pursuant to KRS 132.220. The Company agrees annually to list any taxable leasehold interest in real property, tangible personal property and any Franchise created by each Lease Agreement by listing such interest on and filing a Form 61A200 (Public Service Company Personal Property Tax Return) or other applicable property tax return.

Section 3. Agreement To Make PILOT Payments. In consideration of the County's agreement to issue the Bonds and take all other actions authorized by the Ordinance, the Company hereby agrees that in each calendar year during the term of this Agreement with respect to each series of the Bonds beginning on and after the first January 1st assessment date following issuance of said Bonds (each an "***Assessment Date***") that the County owns the Project or any portion thereof, the Company shall make a payment computed as indicated below for each of the thirty Assessment Dates during the term of said Bonds. The annual payment shall be determined based upon all School Property Taxes levied on the Project or the portion thereof owned by the County, excluding any Franchise, that otherwise would have been due and payable to the School District, as if the Project were owned by a tax-paying entity and subject to payment of School Property Taxes absent the application of KRS 103.285 (each, a "***PILOT Payment***" and together, the "***PILOT Payments***"), for each of the Assessment Dates following issuance of the Bonds while any portion of the Bonds remains outstanding. It is understood, acknowledged, and agreed by the parties that the Project manufactures transmission-voltage electricity and that for purposes of calculating PILOT Payments, if the Project were owned by a

tax-paying entity and subject to School Property Taxes, the Project assets actually engaged in manufacturing that product would be exempt from local property taxation pursuant to KRS 132.200(4). It is further understood and agreed that the Project assets actually engaged in manufacturing the Project's product (transmission-voltage electricity) are the assets essential to the manufacture of the electricity and the step-up of its voltage to transmission voltage (the solar panels, the brackets and supports for the panels, the inverters, step-up transformers, and associated breakers and wiring).

Section 4. Calculation Of PILOT Payments. The amount of the PILOT Payment in each calendar year that any balance remains outstanding on the Bonds shall be equal to 100% of the Abated School Property Tax on Project assets subject to School Property Taxes if the Project were owned by a tax-paying entity absent the application of KRS 103.285, excluding any Franchise (the "***Locally Taxable Assets***"). "***Abated School Property Tax***" for any calendar year equals the product of (a) the Fair Cash Value (as hereinafter defined) of the Locally Taxable Assets financed by the Bonds (excluding any Franchise), owned by the Issuer as of the January 1st of such calendar year, multiplied by (b) the ad valorem tax rate levied by the Board of Education for such calendar year under KRS 160.460 through 160.476 (the "***Tax Rate***"). If, in any calendar year during which the foregoing calculation is made, the Board of Education has levied different ad valorem tax rates on different classes of property subject to School Property Taxes, the foregoing calculation shall be made separately for each such class of property, excluding any Franchise, that is included within the portion of the Project financed by the Bonds. The amount of the PILOT Payment shall not be less than zero.

Section 5. Determination Of Fair Cash Value Of The Project. The Harrison County Property Valuation Administrator (the "***PVA***") is generally responsible for establishing the assessed value of real estate within Harrison County for the purpose of imposing real property taxes. The Department of Revenue, Kentucky Finance and Administration Cabinet (the "***Department***"), oversees the assessment of personal property within the County for the purpose of imposing personal property taxes. The "**Fair Cash Value**" of any real property portion of the Project shall be as determined annually by the PVA as if the Project were owned by a tax-paying entity subject to property tax pursuant to KRS Chapter 132. The "**Fair Cash Value**" of the personal property portion of the Project shall be annually determined using its original cost, age, and the applicable trending tables published by the Department in its Form 62A500 (Tangible Personal Property Tax Return), adjusted to take into account the scrapping, removal, or other disposition of personal property in the ordinary course of business.

Section 6. PILOT Payments. The Company shall pay six percent (6%) of each PILOT Payment to the School District and shall pay the balance of each PILOT Payment to the County. The annual payment to the School District has been determined based upon (a) the estimated School Property Taxes levied on the Project or the portion thereof owned by the County that otherwise would have been due and payable to the Board of Education but for the issuance of the Bonds, less (b) the estimated reduction in the amount of state-provided funds under the Support Education Excellence in Kentucky and Facilities Support Program of Kentucky school funding programs that otherwise would have been due and payable to the Board of Education,

as if the Project were owned by a tax-paying entity and subject to payment of School Property Taxes absent the application of KRS 103.285.

Section 7. Timing Of PILOT Payments. Any PILOT Payment payable in any calendar year hereunder shall be paid at the same time and in the same manner as School Property Taxes for such calendar year, except that the Company shall deliver the PILOT Payment as provided in Section 6 directly to the School District and the County at the address provided in Section 9 below, instead of the regular tax collector, along with supporting calculations. The PILOT Payment for each such calendar year shall be due and payable in full no later than two full months from the date the bill for the School Property Taxes is issued in accordance with KRS 134.015; provided, however, if the Company pays a PILOT Payment to the School District on or before any discount date established pursuant to KRS 134.015 for the School Property Tax, the Company may reduce the PILOT Payment by the corresponding discount percentage, and provided further that the Company pays a PILOT Payment to the School District after the due date established pursuant to KRS 134.015 for the School Property Tax, the Company shall increase the PILOT Payment by the corresponding penalty percentage.

Section 8. Termination. Notwithstanding any other provision herein and with the exception of Sections 1 and 2 hereof, this Agreement shall terminate on the day immediately following the first date that no Bonds issued by the County pursuant to the Ordinance remain issued and outstanding. If for any reason the Project or any part of the property included within the Project is legally placed on the ad valorem tax rolls, the obligation of the Company to make the PILOT Payments shall terminate with respect to that property on and after January 1st of the following calendar year, and the owner of the property shall thereafter pay ad valorem taxes on that property as required of a tax-paying entity.

Section 9. Notices. All notices, certificates, or other communications hereunder shall be sufficiently given and shall be deemed given when delivered or mailed by registered or certified mail, postage prepaid, addressed as follows:

To the County:	County of Harrison, Kentucky 111 S. Main Street, Suite 201 Cynthiana, Kentucky 41031
With a copy to:	Harrison County Attorney 201 South Main Street, Suite 3 Cynthiana, Kentucky 41031
To the School District:	Harrison County School District 308 Webster Avenue Cynthiana, Kentucky 41031
To the Company:	Blue Moon Energy LLC 3000 Oak Road Suite 300

Walnut Creek, California 94597

With a copy to:

Timothy J. Eifler
Stoll Keenon Ogden PLLC
500 West Jefferson Street
Suite 2000
Louisville, Kentucky 40202-2828

The County and the Company may by notice given hereunder designate any further or different addresses to which subsequent notices, certificates, or other communications shall be sent.

Section 10. Entire Agreement. This Agreement contains all of the agreements and conditions made between the parties hereto regarding the subject matter of this Agreement and there are no other agreements or understandings, written or oral, between the parties relating to the subject matter of this Agreement. This Agreement supersedes all prior agreements and understandings, written and oral, between the parties with respect to such subject matter. This Agreement may not be modified orally or in any other manner than by an agreement in writing signed by both parties hereto or their respect successors in interest. The invalidity, illegality, or unenforceability of any provision of this Agreement will not affect the validity, legality, or enforceability of the remaining provisions.

Section 11. Binding Effect. This Agreement shall inure to the benefit of and shall be binding upon the County, the Company, and their respective successors and assigns.

Section 12. Execution In Counterparts. This Agreement may be signed by each party upon a separate copy or separate signature page, and any combination of separate copies signed by all parties or including signature pages so signed will constitute a single counterpart of this Agreement. This Agreement may be signed in any number of counterparts, each of which will be deemed to be an original, but all of which together will constitute one and the same agreement. It will not be necessary, in proving this Agreement in any proceeding, to produce or account for more than one counterpart of this Agreement. This Agreement will become effective when one or more counterparts have been signed by each party, and delivered to the other parties, respectively. Any party may deliver an executed copy of this Agreement (and an executed copy of any documents contemplated by this Agreement) by facsimile transmission to another party or e-mailed .pdf files of scanned copies bearing their respective signatures, and such delivery will have the same force and effect as any other delivery of a manually signed copy of this Agreement (or such other document).

Section 13. Applicable Law. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Kentucky.

Section 14. Captions. The captions or headings in this Agreement are for convenience only and in no way define, limit, or describe the scope or intent of any provisions or sections of this Agreement.

[*Signature Page To Follow*]

[SIGNATURE PAGE TO PAYMENT IN LIEU OF TAXES AGREEMENT]

HARRISON COUNTY, KENTUCKY

By: _____

Alex Barnett
County Judge/Executive

Attest:

By: _____

Linda Barnes
County Clerk

BLUE MOON ENERGY LLC

By: _____

Name: Michael Arndt

Its: President

ATTACHMENT A
TO PILOT AGREEMENT

Project Description

The Project includes all industrial building facilities to be financed by the Bonds and to be acquired, constructed, installed, and equipped by the Company in Harrison County, Kentucky for the purpose of manufacturing approximately 70 megawatts (MW) of electricity, including any Franchise and all related distribution facilities and operating equipment and machinery deemed necessary in connection therewith, but excluding the underlying land which is to be leased for the Project.