Exhibit J

COMMONWEALTH OF KENTUCKY
BEFORE THE KENTUCKY STATE BOARD ON
ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

ELECTRONIC APPLICATION OF STMO BN, LLC (STARFIRE) FOR A CERTIFICATE OF CONSTRUCTION FOR AN APPROXIMATELY 210 MEGAWATT MERCHANT SOLAR ELECTRIC GENERATING FACILITY IN KNOTT, BREATHITT, AND PERRY COUNTIES, KENTUCKY PURSUANT TO KRS 278.700 AND 807 KAR 5:110	)))))))	Case No. 2024-00025

SITE ASSESSMENT REPORT

STMO Bn, LLC (the "Applicant" or "Starfire"), pursuant to KRS 278.708, files this Site Assessment Report (SAR) contemporaneously with its application requesting from the Kentucky State Board on Electric Generation and Transmission Siting (the "Siting Board") a Certificate of Construction for an approximately 210 megawatt alternating current (MW) merchant solar electric generating facility(the "Project").

As part of the SAR, the Applicant submits herewith SAR Attachments 1-7. The facts on which the SAR are based are contained in the concurrently filed SAR Attachments and other information and the statements further made by Starfire as follows:

I. Description of Proposed Project Site

1. Pursuant to KRS 278.708(3)(a), the proposed Project is situated on an approximately 1,980-acre site located within the unincorporated areas of Breathitt, Knott, and Perry Counties, Kentucky (SAR Attachment 1). The Project footprint, generally the area within the fence line where the Project infrastructure will be located, is approximately 1,385 acres. The Project is located on a former mine approximately six miles east of Wendell H. Ford Airport. The Project is north of Kentucky Route 80 with site access from Routes 476 and 1087.

2. Pursuant to KRS 278.708(3)(a)(1), a detailed description of the surrounding land uses is identified in the Property Value Impact Study conducted by Kirkland Appraisals, LLC, and attached as SAR Attachment 2. The adjoining land uses are shown as summarized below.

	Acreage
Residential	4.86%
Agricultural	95.13%
Commercial	0.00%
Recreational	0.00%

3. Pursuant to KRS 278.708(3)(a)(2), SAR Attachment 3 contains the legal description of the proposed site.

4. Pursuant to KRS 278.708(3)(a)(3), the proposed facility layout is included in SAR Attachment 1 as well as Application Exhibit C. The layout shows the proposed access to the site. A guard house will be situated at the base of the main access road leading up to the site, which will be fenced. Access to array areas will be provided via access gates. A wildlife friendly fence with wooden posts and wire mesh will enclose the solar panels and associated infrastructure. A fence meeting National Electric Safety Code (NESC) requirement, typically a six-foot fence that includes three strings of barbed wire at the top will enclose the Project's substation. The Project will comply with federal, state, and local regulations, as applicable, in determining safety signage locations around the facility.

5. Pursuant to KRS 278.708(3)(a)(4), the proposed locations of all Project infrastructure (buildings, roads, and other structures) are included in the Preliminary Site Layout in SAR Attachment 1.

6. Pursuant to KRS 278.708(3)(a)(5), proposed access points and internal roads are shown in SAR Attachment 1. No railways are located within the Project.

7. Pursuant to KRS 278.708(3)(a)(6), a limited electric service may be required to provide for the operations and maintenance building and is anticipated to be provided by Kentucky Power. Water resources will be obtained from onsite wells or trucked in from an offsite water purveyor.

8. Pursuant to KRS 278.708(3)(a)(7), Knott, Breathitt, and Perry Counties, Kentucky, have not enacted any zoning ordinances or setback requirements for the location of the Project and, therefore, no setbacks by such a planning commission exist in any of the counties. Accordingly, the Project will not be required to follow setbacks established by KRS 278.704(3) because no local zoning is present.

9. There are no residential neighborhoods, schools, hospitals, or nursing homes within two thousand (2,000) feet of the proposed structures or facilities of the Project and no request for deviation from KRS 278.704(2) setbacks is therefore necessary.

10. Pursuant to KRS 278.708(3)(a)(8), an acoustic assessment was completed for the Project and is included in SAR Attachment 4. This assessment evaluated existing noise conditions in the area as well as proposed noise from construction and operation of the Project. Existing noise in the Project area consists of those typical for rural areas, such as various wildlife noises. Proposed noise impacts for construction and operation of the Project are expected to be minimal due to the distance between project infrastructure and any noise sensitive receptors.

11. Because the Project site covers a large area, the noise levels experienced during construction at any Noise Sensitive Area (“NSA”) will vary depending on what areas of the site are under construction. However, construction site noise is a temporary activity, and there are no known noise limits or standards applicable to construction. Any temporary impacts will be

minimized by construction phasing. These impacts are shown in SAR Attachment 4, Table A-1. Average and peak impacts of construction noise at the Project boundary are also provided in SAR Attachment 4, Table 2.

12. Noise during the operational phase of the Project will be as follows. During daylight hours, panel tracking will cause intermittent noise, with inverters also creating noise impacts. At night, all inverters are inactive, and noise is restricted to the substation. The noise produced by operation of the Project is expected to be negligible due to the distance between Project infrastructure and noise-sensitive receptors. The impacts of noise during Project operation are shown in SAR Attachment 4, Table A-2 and Figure 1.

II. Compatibility with Scenic Surroundings

13. Pursuant to KRS 278.708(3)(b), the Project has been designed to be compatible with the scenic surroundings. The current area around the site consists of coal mines in various stages of reclamation and second-growth forests.

14. Starfire prepared a series of visual simulations which are attached hereto in SAR Attachment 5. These simulations demonstrate that the Project is not visible from existing residences due to intervening topography and vegetation.

15. A glare study was completed for the Project and is attached hereto as SAR Attachment 6. Based on the results of the analysis, no glare is expected to surrounding residences because of this Project. It is likely that intervening topography and vegetation from the surrounding area will negate most, if not all, glare from local roads. No red or yellow glare is predicted and the sections of Buckhorn Road where a minor amount of green glare is predicted are unlikely to affect the general public.

16. No vegetative screening is proposed because the site is not visible from any existing surrounding residences due to intervening topography and vegetation.

17. The Project will promote overall wildlife movement and habitat connectivity by utilizing wildlife-friendly fencing to maintain integrity of wildlife corridors in the area. The Project will incorporate North/South-oriented wildlife corridors between areas where panels will be installed. These are planned to be as wide as possible, up to a combined three hundred feet, but subject to the constraints of site topography and necessary fencing. The Project will also utilize existing trees and habitat as much as possible to facilitate wildlife movement.

18. Vegetative ground cover on the site will be established to the greatest extent possible, up to a total of ninety percent of the Project footprint. To the extent that it will be consistent with any agrivoltaic areas, the Project will utilize native plants and seed mixes and will not plant invasive species listed as a threat by the Kentucky Exotic Pest Plant Council. The Project will incorporate at least ten (10) acres of pollinator plantings on site, prioritizing, if possible, plantings around existing water basins and wetlands to increase site resiliency. The Project commits to reforesting at least twenty-five (25) acres onsite, with an effort to do so on contiguous acres within the final designated wildlife corridor(s) and consisting of native species, such as white and shortleaf pine. A goal of the Project will be to expand or add to these pollinator and reforestation areas over time and to ultimately encompass at least 100 acres, if proven environmentally and economically feasible.

III. Property Value Impacts

19. Pursuant to KRS 278.708(3)(c), Kirkland Appraisals, LLC prepared a report detailing potential property value impacts to owners in relative proximity to the proposed facility, which is

attached hereto as SAR Attachment 2. The conclusion of the report, Section XIV on page 116, reads as follows:

> "Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no negative impact on the value of adjoining or abutting property. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it's quiet, and there is no traffic."

IV. Anticipated Noise Levels at Property Boundary

20. Pursuant to KRS 278.708(3)(d), noise will occur intermittently and temporarily during the construction phase of the Project due to increases in vehicular traffic, construction equipment, and assembly of solar facility components. See SAR Attachment 4. Average and peak impacts of construction noise at the Project boundary are shown in SAR Attachment 4, Tables 2 and A-1. These will be temporary and minimized to the extent practicable through implementation of best management practices and noise mitigation measures. Noise from construction equipment will vary depending on multiple factors, including the number and class of equipment operating at a location at a given time. Received sound levels will also fluctuate depending on the construction activity, equipment type, and distance between noise source and noise-sensitive receptors. For example, grading and earthmoving equipment, pile drivers, and other construction equipment typically produce sounds between 76 to 90 dBA at 50 feet. Sounds associated with this equipment will primarily occur during initial site preparation activities, such as grading, access road construction, and pile driving for rack support foundations. Installation of each rack support foundation takes between thirty seconds to two minutes depending on soil conditions; this activity is anticipated to take approximately seven to nine months in total. The Project spans approximately

2.4 miles from east to west, which means that construction noise will not be isolated to any particular area for long periods of time.

21. During operation, the principal sources of noise are the cooling fans on the inverters and transformers, the electrical components of the inverter skids, and the main power transformer at the substation. The Project includes approximately 55 inverter skids and one substation transformer. Substations generate a sound generally described as a low humming. Breaker noise is a sound event of very short duration and is expected to occur only a few times throughout the year. Modeling results show that noise levels resulting from Project operations will be under the U.S. EPA sound level criterion of 55 dBA for all sensitive receptors in the vicinity of the Project.

V. Effect on Road, Railways and Fugitive Dust

22. Pursuant to KRS 278.708(3)(e), a traffic impact study was completed for the Project and is included as SAR Attachment 7. It evaluates the Project's impact on road and rail traffic, including anticipated fugitive dust and degradation of roads within vicinity of the facility.

23. The traffic study demonstrates that the Project will not produce long-term significant adverse traffic impacts during construction or operation. Any impacts to transportation will be temporary in nature as these will mostly occur during the construction phase of the Project. During the peak of construction, the Project is anticipated to generate approximately 566 vehicle trips on a typical weekday day with 242 vehicle trips occurring during the weekday morning and weekday evening commuter peak hours. There are multiple routes connecting the site to the regional roadway system, which would reduce impacts to any single roadway segment or intersection. Once construction is complete, post-construction operations and maintenance (O&M) activities at the site are not anticipated to result in a measurable increase in vehicle traffic. The Project will not utilize railways for construction or operational activities.

24. The Project will comply with the provisions of 401 KAR 63:010 applicable to controlling fugitive dust emissions. The Project will utilize Best Management Practices (BMPs), which may include activities such as vehicle cleaning stations, water trucks, and dust screens. During construction, water may be applied to the internal road system to reduce dust generation. Water used for dust control is authorized under the Kentucky Pollutant Discharge Elimination System (KPDES) as a non-stormwater discharge activity.

VI. Mitigation Measures

25. Pursuant to KRS 278.708(4), the Applicant has implemented or intends to implement the following mitigation measures for the Project:

26. Starfire’s generation facility will be compatible with the existing land uses in the area. Construction methods will be implemented to minimize potential impacts on noise, dust, and traffic. The Project's design will also incorporate avoidance and mitigation measures for areas such as wetlands and habitats for listed plant and animal species.

27. *Noise:* Construction noise mitigation measures may include keeping construction equipment well-maintained and routinely checking vehicles using internal combustion engines equipped with mufflers to ensure they are in good working order; locating noisy equipment as far from possible from sensitive areas; and implementing a noise complaint hotline with a local representative to address any noise-related issues. Potential noise from pile driving and other construction activities will be mitigated by construction phasing and limiting noise-causing construction activities to certain hours. Construction activities will be limited to the hours between 6:00 a.m. through 7:00 p.m. Monday through Saturday. Construction will not be conducted on Sundays unless necessary to make up for delays or to meet deadlines. Operational noise will be

mitigated by the placement of noise making equipment in such a way as to avoid noise levels above 55 dBA at all existing sensitive receptors.

28. *Wildlife and Natural Habitat*: The Project has been designed to avoid impacts on wildlife by allowing for animal migration through the site by including wildlife corridors and using wildlife friendly fencing. The Project will establish wildlife corridors and planting of native species to encourage wildlife movement and habitat within the Project footprint.

29. *Wetlands and Streams*: The Project has been designed to avoid impacts to wetlands and waters to the greatest extent practicable. If any impacts are identified in the future, these will be minimized to the extent practicable, and the appropriate Clean Water Act (CWA) Section 404/401 permit will be obtained from the U.S. Army Corps of Engineers (USACE) and the Kentucky Energy & Environment Cabinet — Department for Environmental Protection, Division of Water (KDOW).

30. *Viewscape*: The Project is not visible from existing residences in and around the Project area due to intervening topography and vegetation, so additional screening is not proposed.

31. *Setbacks*: No Project infrastructure will be located within two thousand (2,000) feet of any neighborhoods, residences, recreational resources, schools, hospitals, or nursing homes.

32. *Stormwater*: The Project will comply with all applicable requirements for management of erosion, sedimentation, and stormwater runoff. The Project will develop and submit a Stormwater Pollution Prevention Plan (SWPPP) and Notice of Intent for coverage by the Kentucky stormwater construction permit KYR10 to KDOW. The SWPPP will be prepared by a qualified engineer and will include an Erosion and Sediment Control Plan. The combination of these plans will help reduce potential impacts related to erosion and surface water quality during construction. BMPs may include dewatering procedures, stormwater runoff control measures, stormwater detention,

construction of silt fencing, vegetated covers and buffers strips, weep berms, and other innovative natural infrastructure approaches. The Project recognizes the importance of erosion, sedimentation and stormwater control in addition to the unique site conditions in the area, and will endeavor to implement new or other BMPs if found better suited for the region and proven to be environmentally and economically feasible, and will share learnings to advance science and best practices in the region.

Dated this 4th day of February 2025.

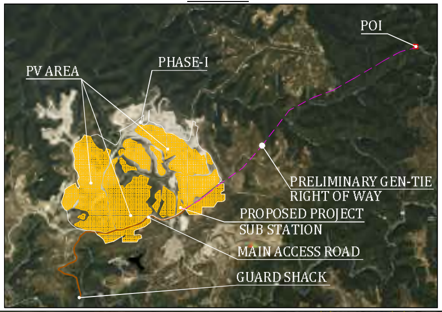
Respectfully submitted,

Gregory T. Dutton
Kathryn A. Eckert
Pierce T. Stevenson
FROST BROWN TODD LLP
400 W. Market Street, 32nd Floor
Louisville, KY 40202
(502) 589-5400
(502) 581-1087 (fax)
gdutton@fbtlaw.com
keckert@fbtlaw.com
pstevenson@fbtlaw.com
Counsel for STMO Bn, LLC

SAR Attachment 1

NOT FOR CONSTRUCTION

KEY PLAN

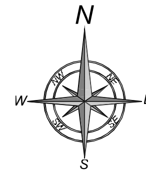


LEGEND:-

SYMBOL	DESCRIPTION
	SITE BOUNDARY (PHASE-I AREA)
	WILDLIFE FRIENDLY FENCE
	NERC COMPLIANT FENCE
	SETBACK FROM FENCE
	PRELIMINARY DRAINAGE BASINS
	GAS PIPE LINE
	TRACKER
	INVERTER SKID
	PLANT INTERNAL ROAD (16')
	MAIN ACCESS ROAD (24')

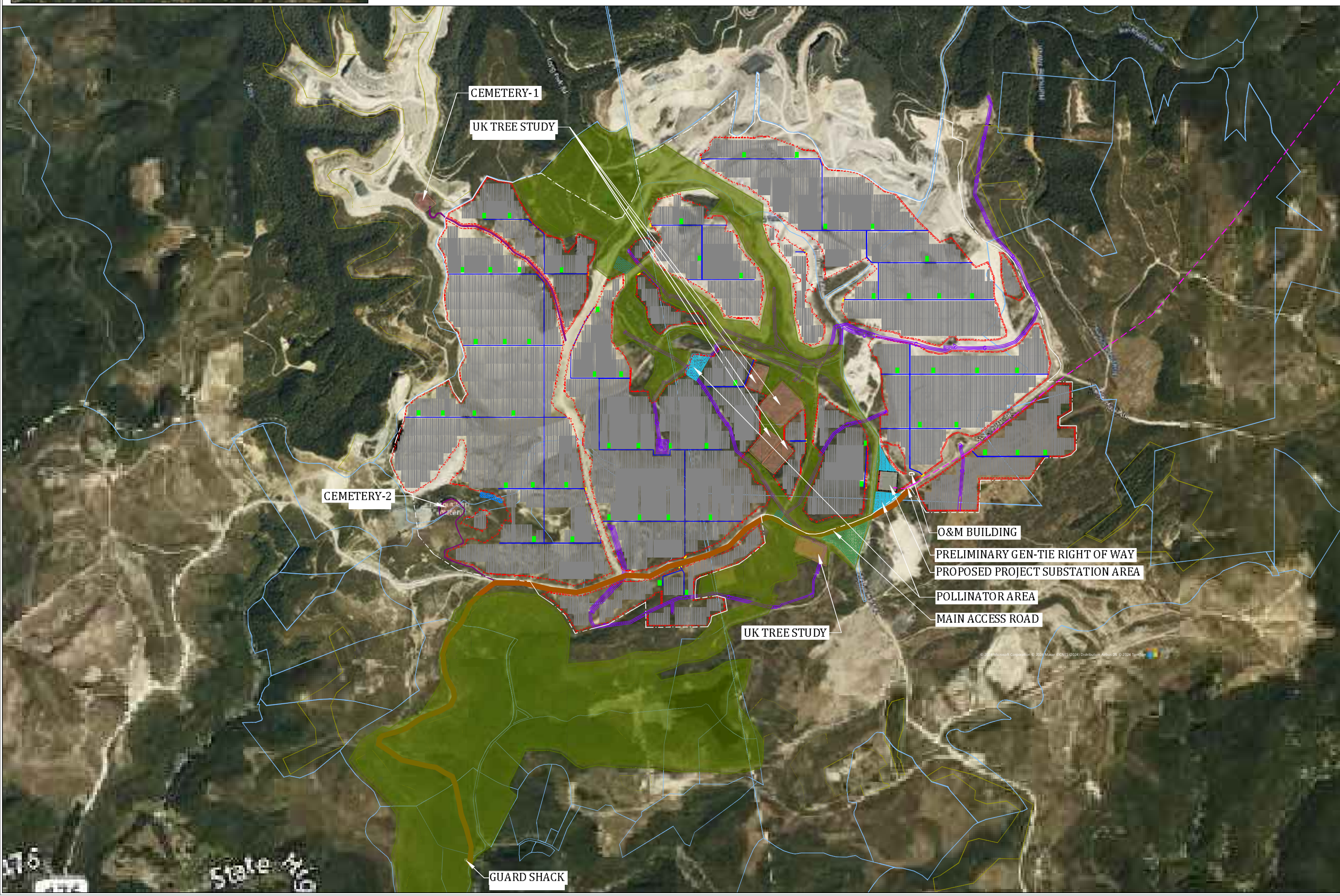
LEGEND:-

SYMBOL	DESCRIPTION
	ACCESS GATE
	CEMETERY ACCESS ROAD
	WILDLIFE CORRIDOR
	POTENTIAL REFORESTATION AREAS
	PARCEL BOUNDARY
	PRELIMINARY GEN-TIE RIGHT OF WAY
	POLLINATOR AREA
	AVOIDANCE AREAS



Project Details Phase-I

Site latitude	37°24'18.42"N
Site longitude	83° 6'42.86"W
PV DC capacity	278.966 MWp
AC capacity at POI	210 MWac
DC AC ratio at POI	1.328
Evacuation voltage	138 kV
Module wattage	590Wp
Module type	Bifacial
Module quantity	472824
Module per string	27
Total strings	17512
PV Inverter rating	4.4MWac
PV Inverter Type	Central
PV Inverter	55
Racking type	Tracker
Pitch	23.36'
Ground coverage ratio	32%
Fenced area (Buildable + Constraints)	1389 Acres



Note:-
* All Dimensions Are in Feet.
* Coordinates System :-
NAD83 Kentucky State Planes, South Zone, US Foot
* Timber & Shrub cutting considered.

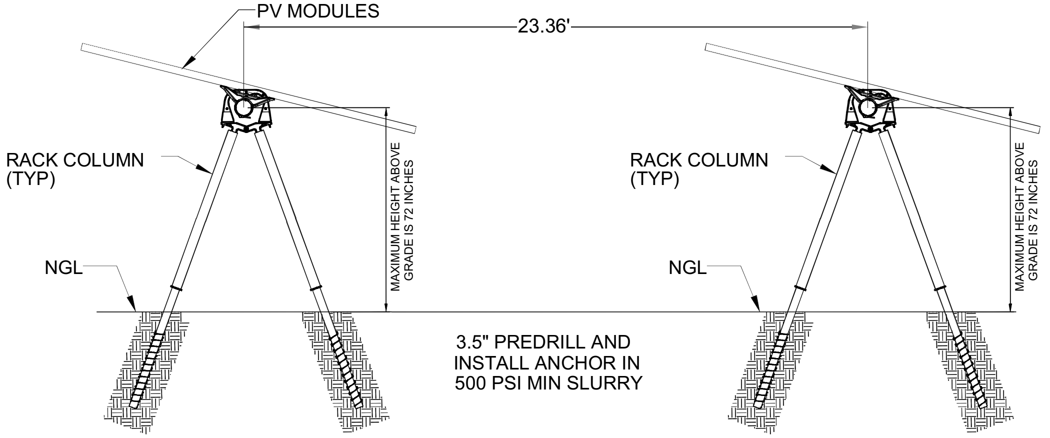
DATE	REV.	REVISION HISTORY	DRN. BY	CKD. BY	APPD. BY
2024-12-04	00	FIRST ISSUE	YS	PS	KP

BrightNight Power

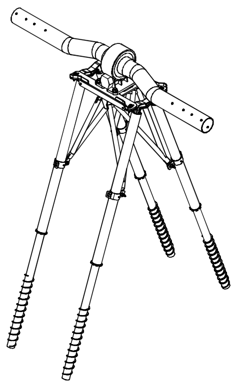
PROJECT NAME: STARFIRE

TITLE:- PLANT LAYOUT PHASE-I (PV)

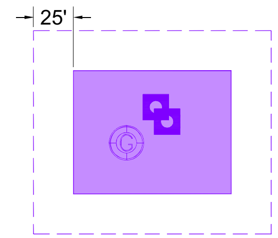
SCALE	PURPOSE CODE	DRAWING NO.	REV.	SHEET
NTS	ISSUE FOR PERMIT	36"x24"	00	1 OF 2



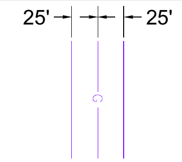
STANDARD ARRAY PIER



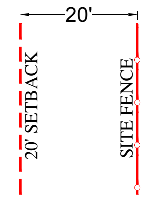
TYPICAL ISOMETRIC VIEW OF MOTOR PIERS



GAS WELL SETBACK



GAS PIPELINE SETBACK



FENCE LINE SETBACK DETAIL

Setback details	
Setback description	Setback value
Gas & Well Line Setback	25'
Plant fence and array setback	20'

Note:-
* All Dimensions Are in Feet.

DATE	REV.	REVISION HISTORY	DRN. BY	CKD. BY	APPD. BY
2024-12-03	00	FIRST ISSUE	YS	PS	KP

BRIGHTNIGHT	BrightNight Power
PROJECT NAME	STARFIRE
TITLE:-	PLANT LAYOUT PHASE-I (PV)

SCALE	PURPOSE CODE	DRAWING NO.	REV.	SHEET
NTS	ISSUE FOR PERMIT	36"x24"	00	2 OF 2

SAR Attachment 2

Kirkland Appraisals, LLC

Richard C. Kirkland, Jr., MAI
9408 Northfield Court
Raleigh, North Carolina 27603
Phone (919) 414-8142
rkirkland2@gmail.com
www.kirklandappraisals.com

January 31, 2025

Robert Roy
BrightNight Power
STMO Bn, LLC
515 N Flagler Drive, Suite 250
West Palm Beach, FL 33401

RE: Starfire Solar, Breathitt, Knott, Perry Counties, KY

Mr. Roy

At your request, I have considered the impact of a solar farm proposed to be constructed on a portion of 1,980.08-acre assemblage of land located near Bulan and Dwarf with acreage in Breathitt, Knott, and Perry Counties, Kentucky. Specifically, I have been asked to give my professional opinion on the proposed solar farm will have any impact on adjoining property value and whether "the location and character of the use, if developed according to the plan as submitted and approved, will be in harmony with the area in which it is to be located."

To form an opinion on these issues, I have researched and visited existing and proposed solar farms in Kentucky as well as other states, researched articles through the Appraisal Institute and other studies, and discussed the likely impact with other real estate professionals. I have not been asked to assign any value to any specific property.

This letter is a limited report of a real property appraisal consulting assignment. My client is STMO Bn, LLC, represented to me by Mr. Robert Roy with BrightNight Power. My findings support the Kentucky Siting Board Application. The effective date of this consultation is January 31, 2025.

While based in NC, I am also a Kentucky State Certified General Appraiser #5522.

Conclusion

The adjoining properties are well set back from the proposed solar panels. The closest non-participating home will be 4,293.70 feet from the nearest panel. This is a former mine site with topography and existing vegetation providing substantial barriers to visibility of the site.

The matched pair analysis shows no impact on home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land where the solar farm is properly screened and buffered. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all indicate that a solar farm is a compatible use for rural/residential transition areas and that it would function in a harmonious manner with this area.

Data from the university studies, broker commentary, and other appraisal studies support a finding of no impact on property value adjoining a solar farm with proper setbacks and landscaped buffers.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial negative effect to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved with adjoining agricultural uses, schools, churches, and residential developments.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting properties and that the proposed use is in harmony with the area in which it is located. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it is quiet, and there is minimal traffic.

If you have any questions please contact me.

Sincerely,

Richard C. Kirkland, Jr., MAI
NC Certified General Appraiser A4359
KY Certified General Appraiser #5522

Table of Contents

I. Proposed Project and Adjoining Uses

Proposed Use Description

This solar farm is proposed to be constructed on a portion of a 1,980.08-acre assemblage of land located near Bulan and Dwarf with acreage in Breathitt, Knott, and Perry Counties, Kentucky.

Adjoining Properties

I have considered adjoining uses and included a map to identify each parcel's location. Based on the current site plan the closest adjoining home will be 4,293.70 feet from the nearest panel.

Adjoining land is primarily a mix of residential and agricultural uses, which is very typical of solar farm sites.

The breakdown of those uses by acreage and number of parcels is summarized below.

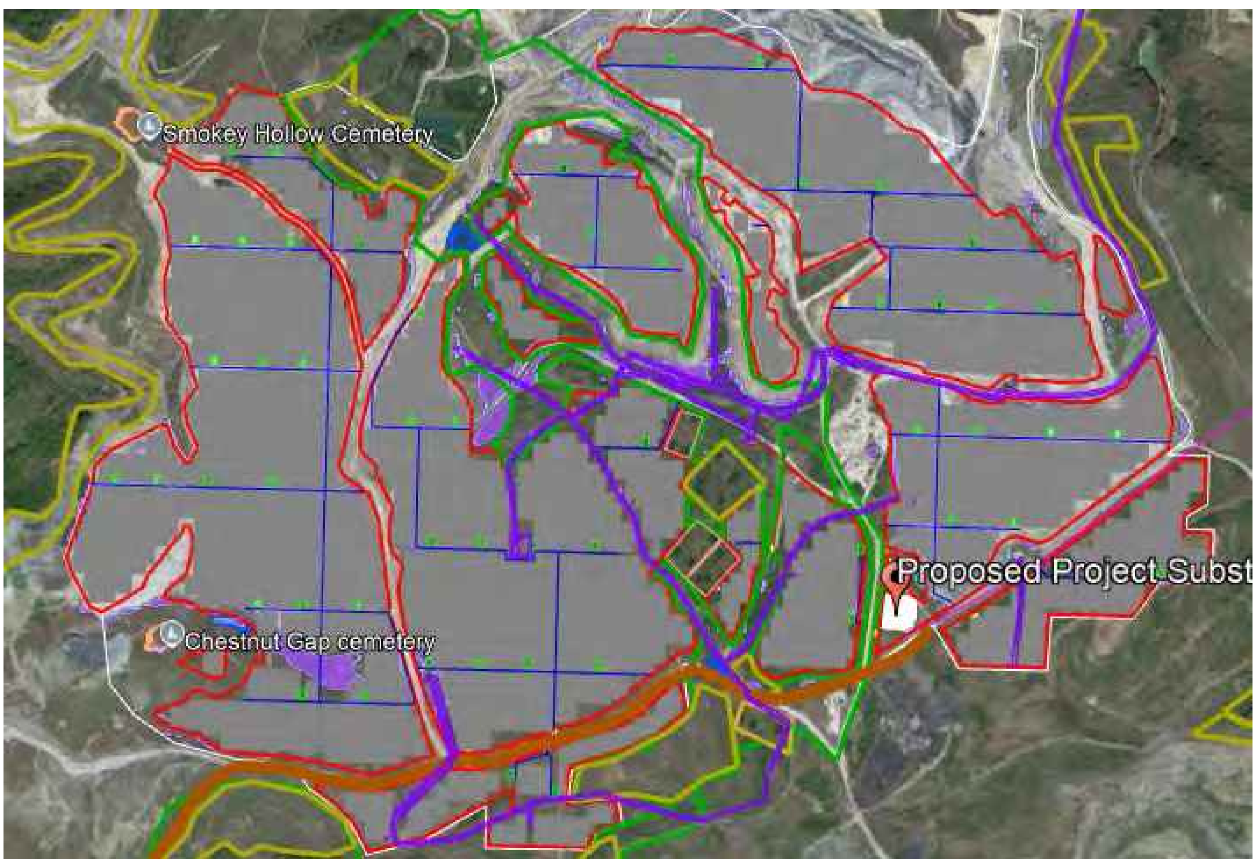
Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	4.86%	54.17%
Agricultural	95.13%	45.83%
Commercial	0.00%	0.00%
Recreational	0.00%	0.00%
Total	**100.00%**	**100.00%**

GoogleEarth Map of Overall Project

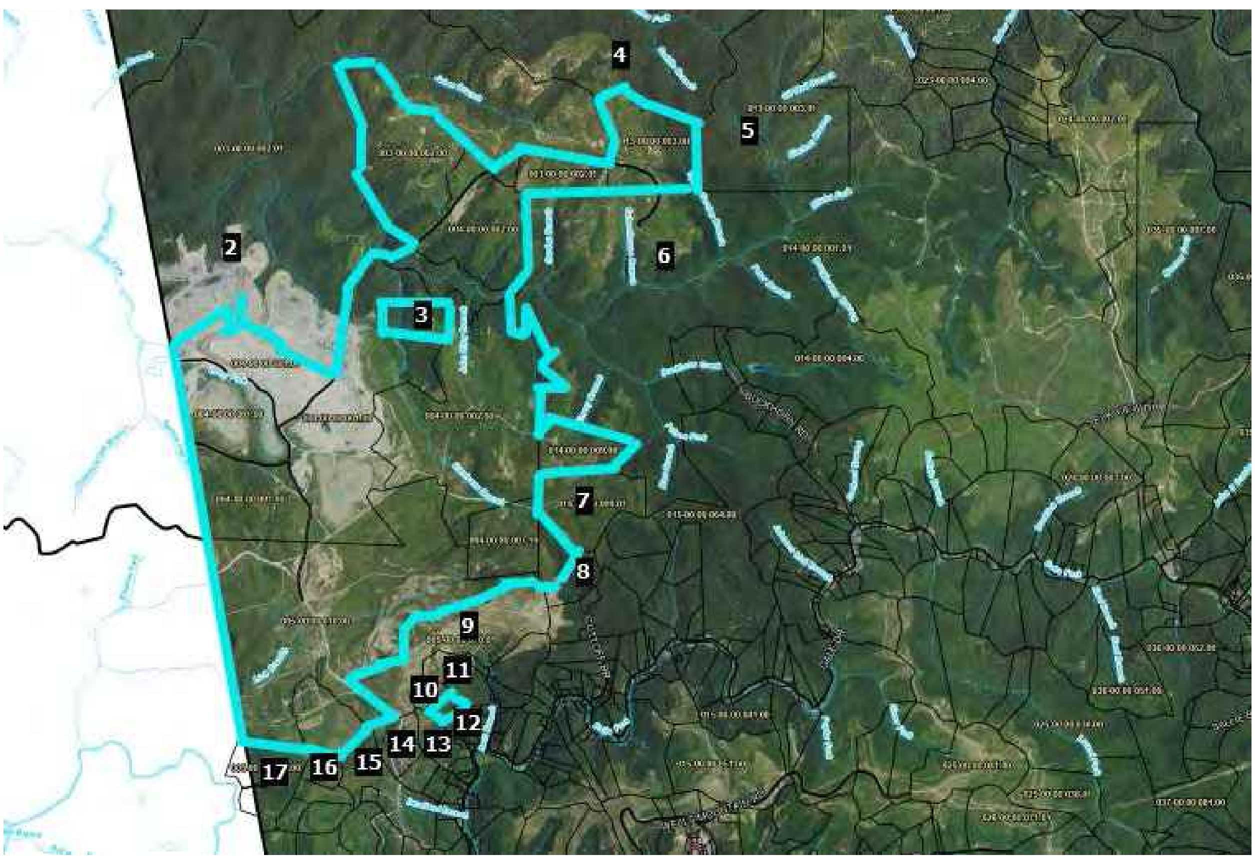
Numbers on this map correlate to the following maps from County GIS showing adjoining parcels – The 2nd Map shows the proposed project area in the bright green line within the larger assemblage of land.

GoogleEarth Map of Specific Area of Proposed Solar Project

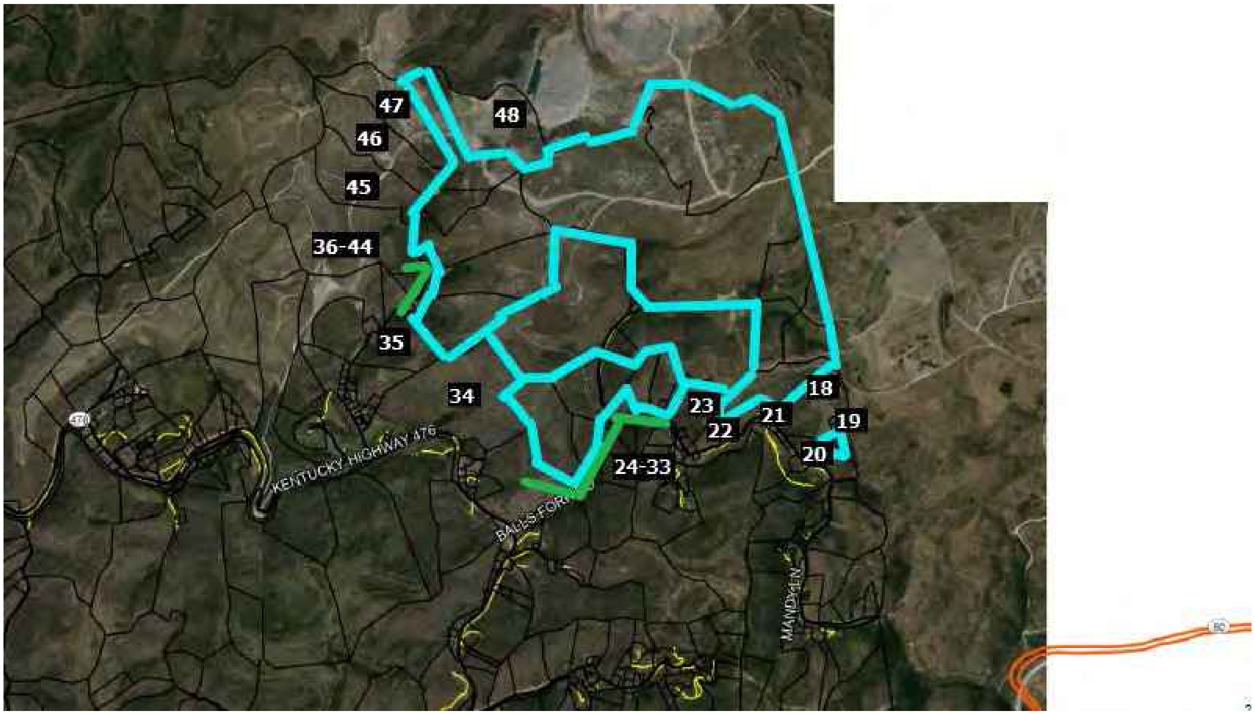


Map 1 – Breathitt County GIS

Map 2 – Knott County GIS



Map 3 – Perry County GIS



Surrounding Uses

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels
1	205-00-00-011.00	ICG	3341.00	Agricultural	30.71%	2.08%
2	003-00 00 002.01	ICG	2265.81	Agricultural	20.83%	2.08%
3	004-00 00 003.00	University	60.00	Agricultural	0.55%	2.08%
4	013-00 00 001.00	University	1558.10	Agricultural	14.32%	2.08%
5	013-00 00 003.01	ICG	351.52	Agricultural	3.23%	2.08%
6	014-00 00 001.01	ICG	1672.00	Agricultural	15.37%	2.08%
7	014-00 00 009.01	Mountain	50.00	Agricultural	0.46%	2.08%
8	015-00 00 061.00	Mountain	35.00	Agricultural	0.32%	2.08%
9	005-00 00 010.01	ICG	314.49	Agricultural	2.89%	2.08%
10	005-00 00 009.00	Mountain	20.00	Residential	0.18%	2.08%
11	005-00 00 005.00	Mountain	50.00	Agri/Res	0.46%	2.08%
12	005-00 00 008.00	Mountain	30.00	Agricultural	0.28%	2.08%
13	005-20 00 005.00	Ritchie	42.75	Agri/Res	0.39%	2.08%
14	005-20 00 003.00	Core	45.00	Agricultural	0.41%	2.08%
15	005-20 00 002.00	Core	120.00	Agricultural	1.10%	2.08%

Surrounding Uses

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels
16	005-00 00 019.02	Core	20.00	Residential	0.18%	2.08%
17	005-00 00 018.00	Fugate	75.00	Agricultural	0.69%	2.08%
18	131-00 00 027.03	Dalton	43.81	Agri/Res	0.40%	2.08%
19	131-00 00 027.02	Glover	1.45	Residential	0.01%	2.08%
20	131-00 00 029.00	ICG	17.60	Agricultural	0.16%	2.08%
21	131-00 00 025.00	Moore	0.65	Residential	0.01%	2.08%
22	131-00 00 024.00	Smith	20.45	Agricultural	0.19%	2.08%
23	131-00 00 016.00	Appalachia	27.95	Agricultural	0.26%	2.08%
24	131-00 00 014.01	Crawford	1.15	Residential	0.01%	2.08%
25	131-00 00 012.00	Kentucky	6.20	Residential	0.06%	2.08%
26	131-00 00 011.00	Stacy	7.50	Residential	0.07%	2.08%
27	131-00 00 006.00	Napier	2.20	Residential	0.02%	2.08%
28	131-00 00 007.00	Bartoe	3.70	Residential	0.03%	2.08%
29	131-00 00 008.00	Little	1.55	Residential	0.01%	2.08%
30	131-00 00 009.00	Embry	1.40	Residential	0.01%	2.08%
31	132-00 00 001.00	Stacy	1.40	Residential	0.01%	2.08%
32	132-00 00 002.00	Little	37.80	Agricultural	0.35%	2.08%
33	113-00 00 002.00	Chaneys	60.20	Agricultural	0.55%	2.08%
34	112-00 00 047.0	Spurlock	136.00	Agri/Res	1.25%	2.08%
35	112-00 00 021.00	Stacy	38.00	Agri/Res	0.35%	2.08%
36	112-00 00 019.00	Ritchie	1.00	Residential	0.01%	2.08%
37	112-00 00 017.00	Davis	0.50	Residential	0.00%	2.08%
38	112-00 00 016.00	Calhoun	1.35	Residential	0.01%	2.08%
39	112-00 00 009.00	Slover	6.20	Residential	0.06%	2.08%
40	112-00 00 009.02	Holland	0.65	Residential	0.01%	2.08%
41	112-00 00 009.01	Slover	0.30	Residential	0.00%	2.08%
42	112-00 00 010.00	Campbell	0.25	Residential	0.00%	2.08%
43	112-00 00 005.00	ICG	140.00	Agri/Res	1.29%	2.08%
44	112-00 00 007.00	ICG	1.40	Residential	0.01%	2.08%
45	112-00 00 001.00	ICG	63.00	Agricultural	0.58%	2.08%
46	111-00 00 001.00	ICG	70.00	Agricultural	0.64%	2.08%
47	111-00 00 002.00	ICG	55.00	Agricultural	0.51%	2.08%
48	111-00 00 004.00	ICG	80.00	Agricultural	0.74%	2.08%
		Total	**10879.330**		**100.00%**	**100.00%**

II. Demographics

I have pulled the following demographics for a 1-mile, 3-mile and 5-mile radius around the proposed solar farm project.

I note that there is a projected a decline in population projected in all three of these rings.

Housing Profile

42053 2
42053, Kevil, Kentucky
Ring: 1 mile radius

Prepared by Esri
Latitude: 37.12216
Longitude: -88.85959

Population		Households	
2020 Total Population	53	2024 Median Household Income	$57,497
2024 Total Population	57	2029 Median Household Income	$64,160
2029 Total Population	56	2024-2029 Annual Rate	2.22%
2024-2029 Annual Rate	-0.35%		

	Census 2020		2024		2029	
Housing Units by Occupancy Status and Tenure	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Housing Units	25	100.0%	25	100.0%	25	100.0%
Occupied	25	100.0%	25	100.0%	25	100.0%
Owner	22	88.0%	22	88.0%	22	88.0%
Renter	3	12.0%	3	12.0%	3	12.0%
Vacant	3	12.0%	0	0.0%	0	0.0%

	2024		2029	
Owner Occupied Housing Units by Value	**Number**	**Percent**	**Number**	**Percent**
Total	21	100.0%	22	100.0%
<$50,000	0	0.0%	0	0.0%
$50,000-$99,999	0	0.0%	0	0.0%
$100,000-$149,999	9	42.9%	8	36.4%
$150,000-$199,999	1	4.8%	1	4.5%
$200,000-$249,999	1	4.8%	2	9.1%
$250,000-$299,999	0	0.0%	1	4.5%
$300,000-$399,999	0	0.0%	1	4.5%
$400,000-$499,999	0	0.0%	1	4.5%
$500,000-$749,999	10	47.6%	8	36.4%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	0	0.0%	0	0.0%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$225,000		$250,000	
Average Value	$370,238		$350,000	

Census 2020 Housing Units	**Number**	**Percent**
Total	25	100.0%
Housing Units In Urbanized Areas	0	0.0%
Rural Housing Units	25	100.0%

Census 2020 Owner Occupied Housing Units by Mortgage Status	**Number**	**Percent**
Total	21	100.0%
Owned with a Mortgage/Loan	13	61.9%
Owned Free and Clear	8	38.1%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2024 and 2029. U.S. Census Bureau 2020 decennial Census data.

July 02, 2024

THE SCIENCE OF WHERE®

Housing Profile

42053 2
42053, Kevil, Kentucky
Ring: 3 mile radius

Prepared by Esri
Latitude: 37.12216
Longitude: -88.85959

Population		Households	
2020 Total Population	1,673	2024 Median Household Income	$61,065
2024 Total Population	1,655	2029 Median Household Income	$68,339
2029 Total Population	1,637	2024-2029 Annual Rate	2.28%
2024-2029 Annual Rate	-0.22%		

	Census 2020		2024		2029	
Housing Units by Occupancy Status and Tenure	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Housing Units	751	100.0%	749	100.0%	749	100.0%
Occupied	670	89.2%	657	87.7%	651	86.9%
Owner	558	74.3%	558	74.5%	556	74.2%
Renter	112	14.9%	99	13.2%	95	12.7%
Vacant	82	10.9%	92	12.3%	98	13.1%

	2024		2029	
Owner Occupied Housing Units by Value	**Number**	**Percent**	**Number**	**Percent**
Total	558	100.0%	555	100.0%
<$50,000	41	7.3%	35	6.3%
$50,000-$99,999	39	7.0%	34	6.1%
$100,000-$149,999	138	24.7%	112	20.2%
$150,000-$199,999	61	10.9%	53	9.5%
$200,000-$249,999	41	7.3%	61	11.0%
$250,000-$299,999	46	8.2%	57	10.3%
$300,000-$399,999	41	7.3%	61	11.0%
$400,000-$499,999	15	2.7%	27	4.9%
$500,000-$749,999	134	24.0%	114	20.5%
$750,000-$999,999	1	0.2%	1	0.2%
$1,000,000-$1,499,999	1	0.2%	0	0.0%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$200,000		$235,656	
Average Value	$288,038		$291,396	

Census 2020 Housing Units	Number	Percent
Total	751	100.0%
Housing Units In Urbanized Areas	0	0.0%
Rural Housing Units	751	100.0%

Census 2020 Owner Occupied Housing Units by Mortgage Status	Number	Percent
Total	558	100.0%
Owned with a Mortgage/Loan	329	59.0%
Owned Free and Clear	229	41.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2024 and 2029. U.S. Census Bureau 2020 decennial Census data.

July 02, 2024

esri
THE SCIENCE OF WHERE

Housing Profile

42053 2
42053, Kevil, Kentucky
Ring: 5 mile radius

Prepared by Esri
Latitude: 37.12216
Longitude: -88.85959

Population		Households	
2020 Total Population	4,494	2024 Median Household Income	$64,240
2024 Total Population	4,450	2029 Median Household Income	$74,350
2029 Total Population	4,402	2024-2029 Annual Rate	2.97%
2024-2029 Annual Rate	-0.22%		

	Census 2020		2024		2029	
Housing Units by Occupancy Status and Tenure	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Housing Units	2,091	100.0%	2,084	100.0%	2,084	100.0%
Occupied	1,892	90.5%	1,870	89.7%	1,852	88.9%
Owner	1,556	74.4%	1,572	75.4%	1,565	75.1%
Renter	336	16.1%	298	14.3%	287	13.8%
Vacant	210	10.0%	214	10.3%	231	11.1%

	2024		2029	
Owner Occupied Housing Units by Value	**Number**	**Percent**	**Number**	**Percent**
Total	1,573	100.0%	1,566	100.0%
<$50,000	149	9.5%	127	8.1%
$50,000-$99,999	152	9.7%	130	8.3%
$100,000-$149,999	282	17.9%	235	15.0%
$150,000-$199,999	240	15.3%	217	13.9%
$200,000-$249,999	124	7.9%	154	9.8%
$250,000-$299,999	186	11.8%	206	13.2%
$300,000-$399,999	171	10.9%	225	14.4%
$400,000-$499,999	55	3.5%	78	5.0%
$500,000-$749,999	206	13.1%	187	11.9%
$750,000-$999,999	4	0.3%	4	0.3%
$1,000,000-$1,499,999	4	0.3%	3	0.2%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$192,396		$224,026	
Average Value	$250,016		$261,526	

Census 2020 Housing Units	Number	Percent
Total	2,091	100.0%
Housing Units In Urbanized Areas	0	0.0%
Rural Housing Units	2,091	100.0%

Census 2020 Owner Occupied Housing Units by Mortgage Status	Number	Percent
Total	1,557	100.0%
Owned with a Mortgage/Loan	887	57.0%
Owned Free and Clear	670	43.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2024 and 2029. U.S. Census Bureau 2020 decennial Census data.

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III. Methodology and Discussion of Issues

Standards and Methodology

I conducted this analysis using the standards and practices established by the Appraisal Institute and that conform to the Uniform Standards of Professional Appraisal Practice. The analyses and methodologies contained in this report are accepted by all major lending institutions, and they are used in Kentucky and across the country as the industry standard by certified appraisers conducting appraisals, market analyses, or impact studies and are considered adequate to form an opinion of the impact of a land use on neighboring properties. These standards and practices have also been accepted by the courts at the trial and appellate levels and by federal courts throughout the country as adequate to reach conclusions about the likely impact a use will have on adjoining or abutting properties.

The aforementioned standards compare property uses in the same market and generally within the same calendar year so that fluctuating markets do not alter study results. Although these standards do not require a linear study that examines adjoining property values before and after a new use (e.g. a solar farm) is developed, some of these studies do in fact employ this type of analysis. Comparative studies, as used in this report, are considered an industry standard.

The type of analysis employed is a Matched Pair Analysis or Paired Sales Analysis. This methodology is outlined in **The Appraisal of Real Estate**, Twelfth Edition by the Appraisal Institute pages 438-439. It is further detailed in **Real Estate Damages**, Third Edition, pages 33-36 by Randall Bell PhD, MAI. Paired sales analysis is used to support adjustments in appraisal work for factors ranging from the impact of having a garage, golf course view, or additional bedrooms. It is an appropriate methodology for addressing the question of impact of an adjoining solar farm. The paired sales analysis is based on the theory that when two properties are in all other respects equivalent, a single difference can be measured to indicate the difference in price between them. Dr. Bell describes it as comparing a test area to control areas. In the example provided by Dr. Bell he shows five paired sales in the test area compared to 1 to 3 sales in the control areas to determine a difference. I have used 3 sales in the control areas in my analysis for each sale developed into a matched pair.

Determining what is an External Obsolescence

An external obsolescence is a use of property that, because of its characteristics, might have a negative impact on the value of adjacent or nearby properties because of identifiable impacts. Determining whether a use would be considered an external obsolescence requires a study that isolates that use, eliminates any other causing factors, and then studies the sales of nearby versus distant comparable properties. The presence of one or a combination of key factors does not mean the use will be an external obsolescence, but a combination of these factors tend to be present when market data reflects that a use is an external obsolescence.

External obsolescence is evaluated by appraisers based on several factors. These factors include but are not limited to:

1) Traffic. Solar Farms are not traffic generators.

2) Odor. Solar farms do not produce odor.

3) Noise. Solar farms generate no noise concerns. A wide range of noise studies that have been completed have found them consistent with agricultural and residential areas. The noise is even less at night.

4) Environmental. Solar farms do not produce toxic or hazardous waste. Grass is maintained underneath the panels so there is minimal impervious surface area.

5) Appearance/Viewshed. This is the one area that potentially applies to solar farms. However, solar farms are generally required to provide significant setbacks and landscaping buffers to address that concern. Furthermore, any consideration of appearance of viewshed impacts has to be considered in comparison with currently allowed uses on that site. For example if a residential subdivision is already an allowed use, the question becomes in what way does the appearance impact adjoining property owners above and beyond the appearance of that allowed subdivision or other similar allowed uses.

6) Other factors. I have observed and studied many solar farms and have never observed any characteristic about such facilities that prevents or impedes neighbors from fully using their homes or farms or businesses for the use intended.

Market Imperfection

Throughout this analysis, I have specifically considered the influence of market imperfection on data analysis. Market imperfection is the term that refers to the fact that unlike a can of soup at the supermarket or in your online shopping cart, real estate cannot be comparison shopped for the best price and purchased at the best price for that same identical product. Real estate products are always similar and never identical. Even two adjacent lots that are identical in almost every way, have a slight difference in location. Once those lots are developed with homes, the number of differences begin to multiply, whether it is size of the home, landscaping, layout, age of interior upfit, quality of interior upfit, quality of maintenance and so on.

Neoclassical economics indicates a perfectly competitive market as having the following: A large number of buyers and sellers (no one person dominates the market), no barriers or transaction costs, homogeneous product, and perfect information about the product and pricing. Real estate is clearly not homogeneous. The number of buyers and sellers for a particular product in a particular location is limited by geography, financing, and the limited time period within a property is listed. There are significant barriers that limit the liquidity in terms of time, costs and financing. Finally, information on real estate is often incomplete or partial – especially at the time that offers are made and prices set, which is prior to appraisals and home inspections. So real estate is very imperfect based on this definition and the impact of this are readily apparent in the real estate market.

What appear to be near-identical homes that are in the same subdivision will often sell with slight variations in price. When multiple appraisers approach the same property, there is often a slight variation among all of those conclusions of value, due to differences in comparables used or analysis of those comparables. This is common and happens all of the time. In fact, within each appraisal, after making adjustments to the comparables, the appraiser will typically have a range of values that are supported that often vary more than +/-5% from the median or average adjusted value.

Based on this understanding of market imperfection, it is important to note that very minor differences in value within an impact study do not necessarily indicate either a negative or positive impact. When the impacts measured fall within that +/-5%, I consider this to be within typical market variation/imperfection. Therefore it may be that there is a negative or positive impact identified if the impact is within that range, but given that it is indistinguishable from what amounts to the background noise or static within the real estate data, I do not consider indications of +/-5% to support a finding of a negative or positive impact.

Impacts greater than that range are however, considered to be strong indications of impacts that fall outside of typical market imperfection. I have used this as a guideline while considering the impacts identified within this report.

Relative Solar Farm Sizes

Solar farms have been increasing in size in recent years. Much of the data collected is from existing, older solar farms of smaller size, but there are numerous examples of sales adjoining 75 to 80 MW facilities that show a similar trend as the smaller solar farms. This is understandable given that the primary concern relative to a solar farm is the appearance or view of the solar farm, which is typically addressed through setbacks and landscaping buffers. The relevance of data from smaller solar farms to larger solar farms is due to the primary question being one of appearance. If the solar farm is properly screened, then little of the solar farm would be seen from adjoining property regardless of how many acres are involved.

Larger solar farms are often set up in sections where any adjoining owner would only be able to see a small section of the project even if there were no landscaping screen. Once a landscaping screen is in place, the primary view is effectively the same whether you are adjoining a 5 MW, 20 MW or 100 MW facility.

I have split out the data for the matched pairs adjoining larger solar farms only to illustrate the similarities later in this report. I note that I have matched pairs adjoining solar farms up to 500 MWs in size showing no impact on property value.

Steps Involved in the Analysis

The paired sales analysis employed in this report follows the following process:

1. Identify sales of property adjoining existing solar farms.
2. Compare those sales to similar property that does not adjoin an existing solar farm.
3. Confirmation of sales are noted in the analysis write ups.
4. Distances from the homes to panels are included as a measure of the setbacks.
5. Topographic differences across the solar farms themselves are likewise noted along with demographic data for comparing similar areas.

There are a number of Sale/Resale comparables included in the write ups, but most of the data shown is for sales of homes after a solar farm has been announced (where noted) or after a solar farm has been constructed.

IV. Research on Solar Farms

A. Appraisal Market Studies

I have also considered a number of impact studies completed by other appraisers as detailed below.

CohnReznick – Property Value Impact Study: Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Facilities

Patricia McGarr, MAI, CRE, FRICS, CRA and Andrew R. Lines, MAI with CohnReznick completed an impact study for a proposed solar farm in Cheboygan County, Michigan completed on June 10, 2020. I am familiar with this study as well as a number of similar such studies completed by CohnReznick. I have not included all of these studies but I submit this one as representative of those studies.

This study addresses impacts on value from eight different solar farms in Michigan, Minnesota, Indiana, Illinois, Virginia and North Carolina. These solar farms are 19.6 MW, 100 MW, 11.9 MW, 23 MW, 71 MW, 61 MW, 40 MW, and 19 MW for a range from 11.9 MW to 100 MW with an average of 31 MW and a median of 31.5 MW. They analyzed a total of 24 adjoining property sales in the Test Area and 81 comparable sales in the Control Area over a five-year period.

The conclusion of this study is that there is no evidence of any negative impact on adjoining property values based on sales prices, conditions of sales, overall marketability, potential for new development or rate of appreciation.

Christian P. Kaila & Associates – Property Impact Analysis – Proposed Solar Power Plant Guthrie Road, Stuarts Draft, Augusta County, Virginia

Christian P. Kaila, MAI, SRA and George J. Finley, MAI developed an impact study as referenced above dated June 16, 2020. This was for a proposed 83 MW facility on 886 acres.

Mr. Kaila interviewed appraisers who had conducted studies and reviewed university studies and discussed the comparable impacts of other development that was allowed in the area for a comparative analysis of other impacts that could impact viewshed based on existing allowed uses for the site. He also discussed in detail the various other impacts that could cause a negative impact and how solar farms do not have such characteristics.

Mr. Kaila also interviewed County Planners and Real Estate Assessor's in eight different Virginia counties with none of the assessor's identifying any negative impacts observed for existing solar projects.

Mr. Kaila concludes on a finding of no impact on property values adjoining the indicated solar farm.

Fred Beck, MAI, CCIM – Impact Analysis in Lincoln County, North Carolina, 2013

Mr. Fred Beck, MAI, CCIM completed an impact analysis in 2013 for a proposed solar farm that concluded on a negative impact on value. That report relied on a single cancelled contract for an adjoining parcel where the contracted buyers indicated that the solar farm was the reason for the cancellation. It also relied on the activities of an assessment impact that was applied in a nearby county.

Mr. Beck was interviewed as part of the Christian Kalia study noted above. From that I quote "Mr. Beck concluded on no effect on moderate priced homes, and only a 5% change in his limited research of higher priced homes. His one sale that fell through is hardly a reliable sample."

Also noted in the Christian Kalia interview notes is a response from Mr. Beck indicating that in his opinion "the homes were higher priced homes and had full view of the solar farm." Mr. Beck indicated in the interview if landscaping screens were employed he would not see any drop in value.

NorthStar Appraisal Company – Impact Analysis for Nichomus Run Solar, Pilesgrove, New Jersey, 2020

Mr. William J. Sapio, MAI with NorthStar Appraisal Company considered a matched pair analysis for the potential impact on adjoining property values to this proposed 150 MW solar farm. Mr. Sapio considered sales activity in a subdivision known as Point of Woods in South Brunswick Township and identified two recent new homes that were constructed and sold adjoining a 13 MW solar farm and compared them to similar homes in that subdivision that did not adjoin the solar farm. These homes sold in the $1,290,450 to $1,336,613 price range and these homes were roughly 200 feet from the closest solar panel.

Based on this analysis, he concluded that the adjoining solar farm had no impact on adjoining property value.

MR Valuation Consulting, LLC – The Kuhl Farm Solar Development and The Fischer Farm Solar Development – New Jersey, 2012

Mr. Mark Pomykacaz, MAI MRICS with MR Valuation Consulting, LLC considered a matched pair analysis for sales near these solar farms. The sales data presented supported a finding of no impact on property value for nearby and adjoining homes and concludes that there is no impact on marketing time and no additional risk involved with owning, building, or selling properties next to the solar farms.

Mary McClinton Clay, MAI – McCracken County Solar Project Value Impact Report, Kentucky, 2021

Ms. Mary Clay, MAI reviewed a report by Kirkland Appraisals in this case and also provided a differing opinion of impact. Having testified opposite Ms. Clay, she has stated that she does not confirm her data and does not use an appropriate method for time adjustments.

The comments throughout this study are heavy in adjectives, avoids stating facts contrary to the conclusion and shows a strong selection bias.

Kevin T. Meeks, MAI – Corcoran Solar Impact Study, Minnesota, 2017

Mr. Kevin Meeks, MAI reviewed a report by Kirkland Appraisals in this case and also provided additional research on the topic with additional paired sales. The sales he considered are well presented and show that they were confirmed by third parties and all of the broker commentary is aligned with the conclusion that the adjoining solar farms considered had no impact on the adjoining home values.

Mr. Meeks also researched a 100 MW project in Chisago County, known as North Star Solar Garden in MN. He interviewed local appraisers and a broker who was actively marketing homes adjoining that solar farm to likewise support a finding of no impact on property value.

John Keefe, Chisago County Assessor, Chisago County Minnesota Assessor's Office, 2017

This study was completed by the Chisago County Minnesota Assessor's Office on property prices adjacent to and in close vicinity of a 1,000-acre North Star solar farm in Minnesota. The study concluded that the North Star solar farm had "no adverse impact" on property values. Mr. Keefe further stated that, "It seems conclusive that valuation has not suffered."

Tim Connelly, MAI – Solar Impact Study of Proposed Solar Facility, New Mexico, 2023

This study is a detailed review of an Impact Study completed by Kirkland Appraisals, LLC for Rancho Viejo Solar. It goes through all of the analysis and confirms the applicability and reliability of the methods and conclusions. Mr. Connelly, MAI concurs that "the proposed solar project will not have a negative impact on market value, marketability, or enjoyment of property in the immediate vicinity of the proposed project."

Donald Fisher, ARA, 2021

Donald Fisher has completed a number of studies on solar farms and was quoted in February 15, 2021 stating, "Most of the locations were in either suburban or rural areas, and all of those studies found either a neutral impact or, ironically, a positive impact, where values on properties after the installation of solar farms went up higher than time trends."

Jennifer N. Pitts, MAI - Study of Residential Market Trends Surrounding Six Utility-Scale Solar Projects in Texas, 2023

This study was completed by Real Property Analytics with Ms. Pitts along with Erin M. Kiella, PhD, and Chris Yost-Bremm, PhD. This analysis considered these solar farms through different stages of the market from announcement of the project, during construction, and after construction. They found no indication of a negative impact on sales price, the ratio of sales price to listing price, or the number of Days on Market. They also researched individual sales and interviewed local brokers who confirmed that market participants were knowledgeable of the solar projects and did not result in a negative impact on sales price or marketing time.

Michael S. MaRous, MAI, CRE – Market Impact Analysis Langdon Mills Solar, Columbia County, Wisconsin, 2023

This study was completed by MaRous & Company and singed by Machael S. MaRous. This analysis included consideration of solar projects in 13 states and including 7 solar projects in Wisconsin. This includes 22 matched pairs with a conclusion on Page 70 that states "there does not appear to have been any measurable negative impact on surrounding residential property values due to the proximity of a solar farm."

This analysis was further supported by Assessor Surveys including assessors in Wisconsin which found no instance of an assessor in Wisconsin identifying any negative impacts from solar farms on adjoining property values.

Conclusion of Impact Studies

Of the 11 studies noted 9 included actual sales data to derive an opinion of no impact on value. The two studies to conclude on a negative impact includes the Fred Beck study based on no actual sales data, and he has since indicated that with landscaping screens he would not conclude on a negative impact. The other study by Mary Clay shows improper adjustments for time, a lack of confirmation of sales comparables, and exclusion of data that does not support her initial position.

I have relied on these studies as additional support for the findings in this impact analysis.

B. Articles

I have also considered a number of articles on this subject as well as conclusions and analysis as noted below.

Farm Journal Guest Editor, March 22, 2021 – Solar's Impact on Rural Property Values

Andy Ames, ASFMRA (American Society of Farm Managers and Rural Appraisers) published this article that includes a discussion of his survey of appraisers and studies on the question of property value related to solar farms. He discusses the university studies that I have cited as well as Patricia McGarr, MAI.

He also discusses the findings of Donald A. Fisher, ARA, who served six years at the Chair of the ASFMRA's National Appraisal Review Committee. He is also the Executive Vice President of the CNY Pomeroy Appraiser and has conducted several market studies on solar farms and property impact. He is quoted in the article as saying, "Most of the locations were in either suburban or rural areas, and all of those studies found either a neutral impact, or ironically, a positive impact, where values on properties after installation of solar farms went up higher than time trends."

Howard Halderman, AFM, President and CEO of Halderman Real Estate and Farm Management attended the ASFMRA solar talk hosted by the Indiana Chapter of the ASFMRA and he concludes that other rural properties would likely see no impact and farmers and landowners shown even consider possible benefits. "In some cases, farmers who rent land to a solar company will insure the viability of their farming operation for a longer time period. This makes them better long-term tenants or land buyers so one can argue that higher rents and land values will follow due to the positive impact the solar leases offer."

More recently in August 2022, Donald Fisher, ARA, MAI and myself led a webinar on this topic for the ASFMRA discussing the issues, the university studies and specific examples of solar farms having no impact on adjoining property values.

National Renewable Energy Laboratory – Top Five Large-Scale Solar Myths, February 3, 2016

Megan Day reports form NREL regarding a number of concerns neighbors often express. Myth #4 regarding property value impacts addresses specifically the numerous studies on wind farms that show no impact on property value and that solar farms have a significantly reduced visual impact from wind farms. She highlights that the appearance can be addressed through mitigation measures to reduce visual impacts of solar farms through vegetative screening. Such mitigations are not available to wind farms given the height of the windmills and again, those studies show no impact on value adjoining wind farms.

North Carolina State University: NC Clean Energy Technology Center White Paper: Balancing Agricultural Productivity with Ground-Based Solar Photovoltaic (PV) Development (Version 2), May 2019

Tommy Cleveland and David Sarkisian wrote a white paper for NCSU NC Clean Energy Technology Center regarding the potential impacts to agricultural productivity from a solar farm use. I have interviewed Tommy Cleveland on numerous occasions and I have also heard him speak on these issues at length as well. He addresses many of the common questions regarding how solar farms work and a detailed explanation of how solar farms do not cause significant impacts on the soils, erosion and other such concerns. This is a heavily researched paper with the references included.

North Carolina State University: NC Clean Energy Technology Center White Paper: Health and Safety Impacts of Solar Photovoltaics, May 2017

Tommy Cleveland wrote a white paper for NCSU NC Clean Energy Technology Center regarding the health and safety impacts to address common questions and concerns related to solar farms. This is a heavily researched white paper addressing questions ranging from EMFs, fire safety, as well as vegetation control and the breakdown of how a solar farm works.

C. Broker Commentary

In the process of working up the matched pairs used later in this report, I have collected comments from brokers who have actually sold homes adjoining solar farms indicating that the solar farm had no impact on the marketing, timing, or sales price for the adjoining homes. I have comments from brokers noted within the solar farm write ups of this report including brokers from Kentucky, Virginia, Tennessee, and North Carolina. I have additional commentary from other states including New Jersey and Michigan that provide the same conclusion.

V. University Studies

I have also considered the following studies completed by four different universities related to solar farms and impacts on property values.

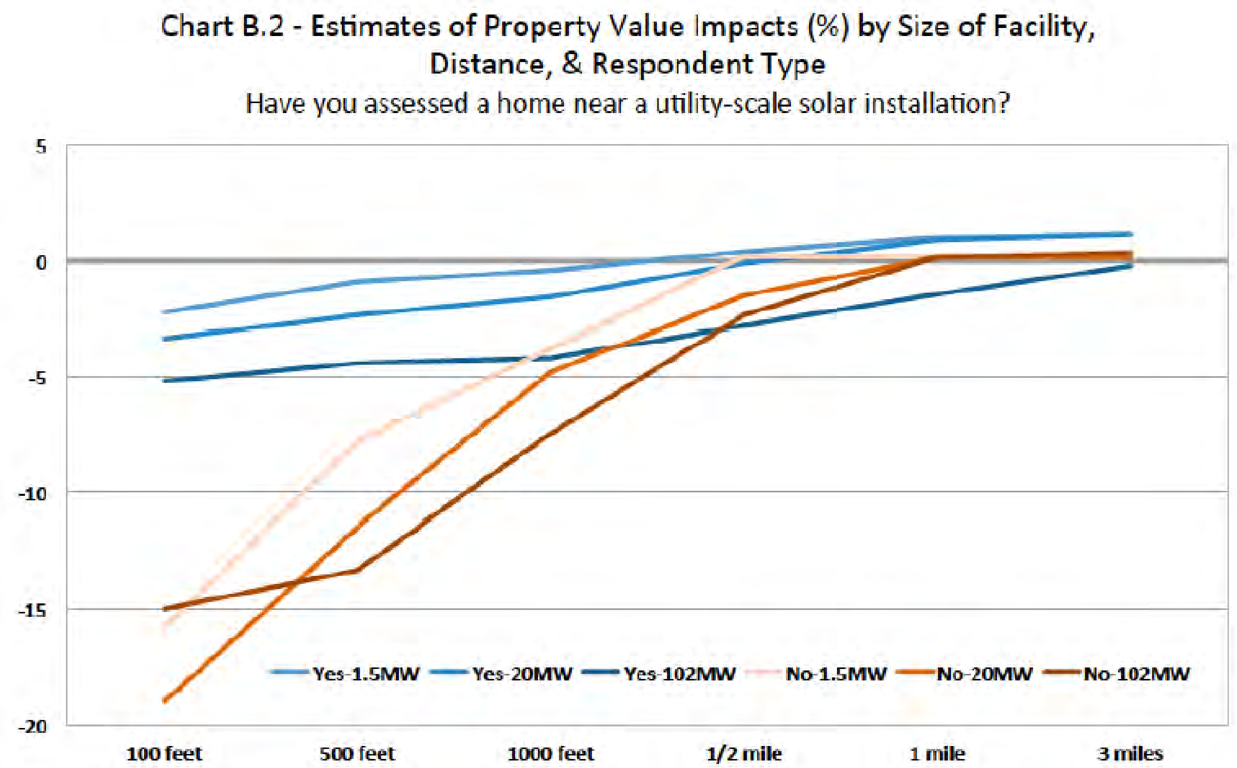
A. University of Texas at Austin, May 2018

An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations

This study considers solar farms from two angles. First it looks at where solar farms are being located and concludes that they are being located primarily in low density residential areas where there are fewer homes than in urban or suburban areas.

The second part is more applicable in that they conducted a survey of appraisers/assessors on their opinions of the possible impacts of proximity to a solar farm. They consider the question in terms of size of the adjoining solar farm and how close the adjoining home is to the solar farm. I am very familiar with this part of the study as I was interviewed by the researchers multiple times as they were developing this. One very important question that they ask within the survey is very illustrative. They asked if the appraiser being surveyed had ever appraised a property next to a solar farm. There is a very noticeable divide in the answers provided by appraisers who have experience appraising property next to a solar farm versus appraisers who self-identify as having no experience or knowledge related to that use.

On Page 16 of that study they have a chart showing the responses from appraisers related to proximity to a facility and size of the facility, but they separate the answers as shown below with appraisers with experience in appraising properties next to a solar farm shown in blue and those inexperienced shown in brown. Even within 100 feet of a 102 MW facility the response from experienced appraisers were -5% at most on impact. While inexperienced appraisers came up with significantly higher impacts. This chart clearly shows that an uninformed response widely diverges from the sales data available on this subject.



Furthermore, the question cited above does not consider any mitigating factors such as landscaping buffers or screens which would presumably reduce the minor impacts noted by experienced appraisers on this subject.

The conclusion of the researchers is shown on Page 23 indicated that "Results from our survey of residential home assessors show that the majority of respondents believe that proximity to a solar installation has either no impact or a positive impact on home values."

This analysis supports the conclusion of this report that the data supports no impact on adjoining property values. The only impact suggested by this study is -5% if a home was within 100 feet of a 100 MW solar farm with little to no landscaping screening. The proposed project has a landscaping screening, is much further setback than 100 feet from adjoining homes, and is less than 100 MW.

B. University of Rhode Island, September 2020

Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island

The University of Rhode Island published a study entitled **Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island** on September 29, 2020 with lead researchers being Vasundhara Gaur and Corey Lang. I have read that study and interviewed Mr. Corey Lang related to that study. This study is often cited by opponents of solar farms but the findings of that study have some very specific caveats according to the report itself as well as Mr. Lang from the interview.

While that study does state in the Abstract that they found depreciation of homes within 1-mile of a solar farm, that impact is limited to non-rural locations. On Pages 16-18 of that study under Section 5.3 Heterogeneity in treatment effect they indicate that the impact that they found was limited to non-rural locations with the impact in rural locations effectively being zero. For the study they defined "rural" as a municipality/township with less than 850 population per square mile.

They further tested the robustness of that finding and even in areas up to 2,000 population per square mile they found no statistically significant data to suggest a negative impact. They have not specifically defined a point at which they found negative impacts to begin, as the sensitivity study stopped checking at the 2,000-population per square mile.

Where they did find negative impacts was in high population density areas that was largely a factor of running the study in Massachusetts and Rhode Island which the study specifically cites as being the 2nd and 3rd most population dense states in the USA. Mr. Lang in conversation as well as in recorded presentations has indicated that the impact in these heavily populated areas may reflect a loss in value due to the scarce greenery in those areas and not specifically related to the solar farm itself. In other words, any development of that site might have a similar impact on property value.

Based on this study I have checked the population for the Grahamville-Heath Division of McCracken County, which has a population of 6,307 population for 2023 based on HomeTownLocator using Census Data and a total area of 84.09 square miles. This indicates a population density of 75 people per square mile which puts this well below the threshold indicated by the Rhode Island Study.

I therefore conclude that the Rhode Island Study supports the indication of no impact on adjoining properties for the proposed solar farm project.

Grahamville-Heath Division Data & Demographics (As of July 1, 2023)

POPULATION	
Total Population	6,307 (100%)
Population in Households	6,229 (98.8%)
Population in Families	5,296 (84.0%)
Population in Group Quarters[1]	78 (1.2%)
Population Density	75
Diversity Index[2]	23

HOUSING	
Total HU (Housing Units)	2,778 (100%)
Owner Occupied HU	1,892 (68.1%)
Renter Occupied HU	626 (22.5%)
Vacant Housing Units	260 (9.4%)
Median Home Value	$252,149
Average Home Value	$265,275
Housing Affordability Index[3]	125

INCOME	
Median Household Income	$74,933
Average Household Income	$91,962
% of Income for Mortgage[4]	20%
Per Capita Income	$36,726
Wealth Index[5]	72

HOUSEHOLDS	
Total Households	2,518
Average Household Size	2.47000000000
Family Households	1,807
Average Family Size	3

C. Georgia Institute of Technology, October 2020

Utility-Scale Solar Farms and Agricultural Land Values

This study was completed by Nino Abashidze as Post-Doctoral Research Associate of Health Economics and Analytics Labe (HEAL), School of Economics, Georgia Institute of Technology. This research was started at North Carolina State University and analyzes properties near 451 utility-scale ground-mount solar installations in NC that generate at least 1 MW of electric power. A total of 1,676 land sales within 5-miles of solar farms were considered in the analysis.

This analysis concludes on Page 21 of the study "Although there are no direct effects of solar farms on nearby agricultural land values, we do find evidence that suggests construction of a solar farm may create a small, positive, option -value for land owners that is capitalized into land prices. Specifically, after construction of a nearby solar farm, we find that agricultural land that is also located near transmission infrastructure may increase modestly in value."

This study supports a finding of no impact on adjoining agricultural property values and in some cases could support a modest increase in value.

D. Master's Thesis: ECU by Zachary Dickerson July 2018

A Solar Farm in *My* Backyard? Resident Perspectives of Utility-Scale Solar in Eastern North Carolina

This study was completed as part of a Master of Science in Geography Master's Thesis by Zachary Dickerson in July 2018. This study sets out to address three questions:

1. Are there different aspects that affect resident satisfaction regarding solar farms?
2. Are there variations in satisfaction for residents among different geographic settings, e.g. neighborhoods adjacent to the solar farms or distances from the solar farms?
3. How can insight from both the utility and planning sectors, combined with knowledge gained from residents, fill gaps in communication and policy writing in regard to solar farms?

This was done through survey and interview with adjacent and nearby neighbors of existing solar farms. The positive to neutral comments regarding the solar farms were significantly higher than negative. The researcher specifically indicates on Page 46 "The results show that respondents generally do not believe the solar farms pose a threat to their property values."

The most negative comments regarding the solar farms were about the lack of information about the approval process and the solar farm project prior to construction.

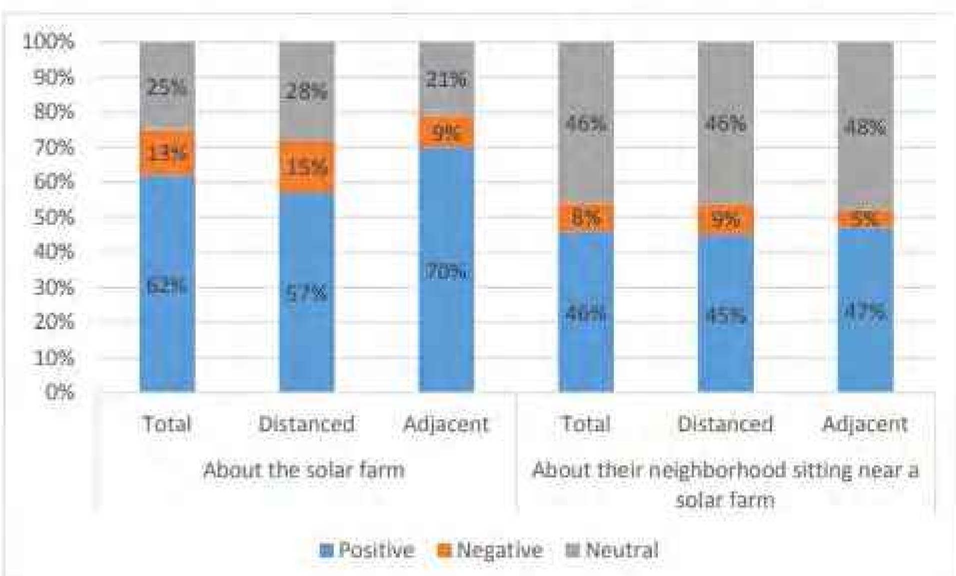
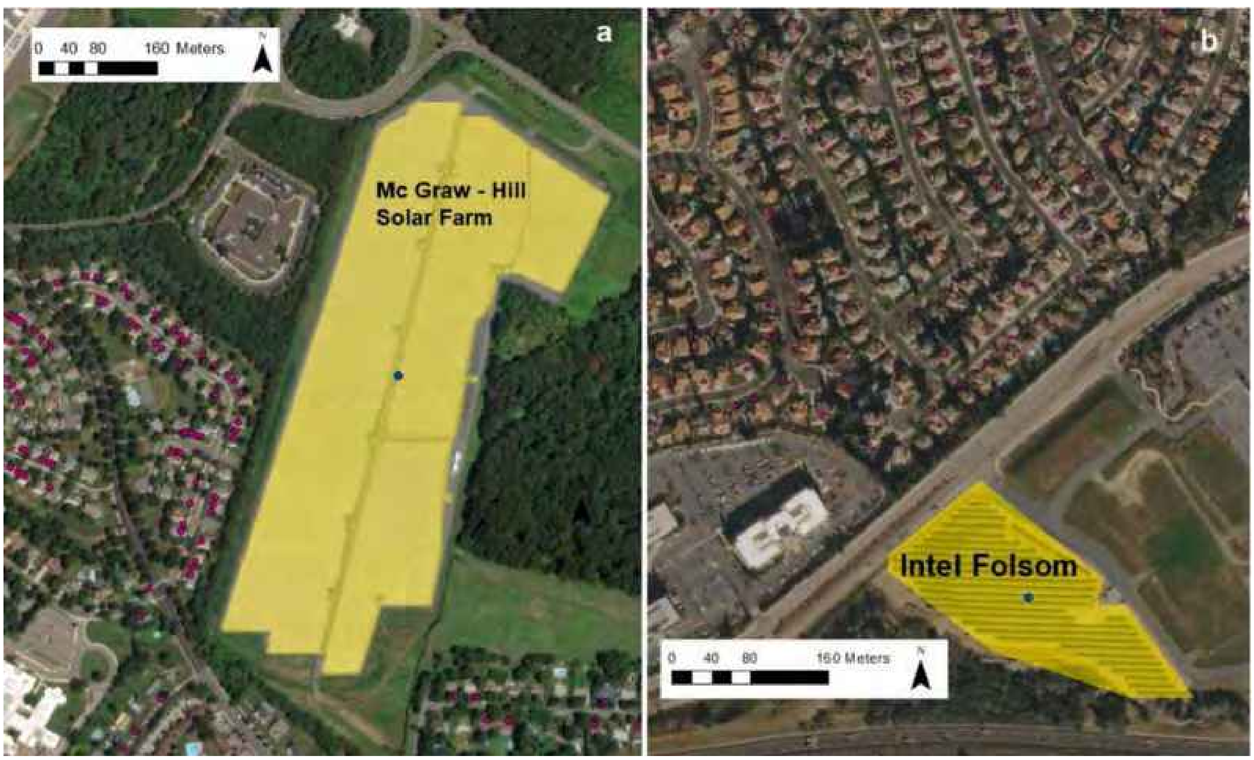


Figure 11: Residents' positive/negative word choices by geographic setting for both questions

E. Lawrence Berkeley National Lab, March 2023

Shedding light on large-scale solar impacts: An analysis of property values and proximity to photovoltaics across six U.S. states

This study was completed by researchers including Salma Elmallah, Ben Hoen, K. Sydny Fujita, Dana Robson, and Eric Brunner. This analysis considers home sales before and after solar farms were installed within a 1-mile radius and compared them to home sales before and after the solar farms at a 2-4-mile radius. The conclusion found a 1.5% impact within 0.5 mile of a solar farm as compared to homes 2-4 miles from solar farms. This is the largest study of this kind on solar and addresses a number of issues, but also does not address a number of items that could potentially skew these results. First of all, the study found no impact in the three states with the most solar farm activity and only found impacts in smaller sets of data. The data does not in any way discuss actual visibility of solar farms or address existing vegetation screens. This lack of addressing this is highlighted by the fact that they suggest in the abstract that vegetative shading may be needed to address possible impacts. Another notable issue is the fact that they do not address other possible impacts within the radii being considered. This lack of consideration is well illustrated within the study on Figure A.1 where they show satellite images of McGraw Hill Solar Farm in NJ and Intel Folsom in CA. The Folsom image clearly shows large highways separating the solar farm from nearby housing, but with tower office buildings located closer to the housing being considered. In no place do they address the presence of these towers that essentially block those homes from the solar farm in some places. An excerpt of Fig. A.1. is shown below.



For each of these locations, I have panned out a little further on Google Earth to show the areas illustrated to more accurately reflect the general area. For the McGraw Hill Solar Farm you can see there is a large distribution warehouse to the west along with a large offices and other industrial uses. Further to the west is a large/older apartment complex (Princeton Arms). To the east there are more large industrial buildings. However, it is even more notable that 1.67 miles away to the west is Cranbury Golf Club. Given how this analysis was set up, these homes around the industrial buildings are being compared to homes within this country club to help establish impacts from the solar farm. Even considering the idea that each set is compared to itself before and after the solar farm, it is not a reasonable supposition that homes in each area would appreciate at the same rates even if no solar farm was included. Furthermore the site where the solar farm is located an all of the surrounding uses not improved with residential housing to the south is zoned Research Office (RO) which allows for: manufacturing, preparation, processing or fabrication of products, with all activities and product storage taking place within a completely enclosed building, scientific or research laboratories, warehousing, computer centers, pharmaceutical operations, office buildings, industrial office parks among others. Homes adjoining such a district would likely have impacts and influences not seen in areas zoned and surrounded by zoning strictly for residential uses.


Bounce U West Windsor Kids Birthdays and More
Windsor Corporate Park
Healthy Kids Pediatric Group
East Windsor Township
Muslim Center of Greater Princeton
PenFed Credit Union
133
Windsor Center Dr
EAG Laboratories
The Orchards
Krauszer's Food Store
Oak Creek Estates Association
Patel Brothers
Princeton Hightstown Rd
571
Devonshire Dr
Pebble Rd
Oak Creek Rd
Princeton Arms
Yorkshire Dr
Arias Constructions NJ
Kent Ln
Melvin H. Kreps Middle School
Wilmor Dr
Scott Rd
Wickham Dr
Wiltshire Dr
Wickham Ln
Heathwood Dr
Oak Creek Rd
Dutch Neck Dental
Windsor Derma
Cherry Brook Ln
Dutch Neck Rd
Taft Ct
1 Mile Rd Ext
Beth El Synagogue
Wiltshire Park
Maple Stream Rd
Google


COVENTRY AT NATOMA STATION
Center
Natoma Station Elementary School
NATOMA STATION
Waterford Place
Deer Rabbit Mini Park
Petite Scholars
Redfin | Sacramento Real Estate Agents
PBK Architects
Black Diamond Dr
Iron Point Rd
El Dorado Fwy
50
Alder Creek
Mylapore South Indian Vegetaria
Safeway
Prairie City Rd
Intel Corporation
Intel - FM7
Intel - FM5
R RUN
tory House

On the Intel Folsom map I have shown the images of two of the Intel Campus buildings, but there are roughly 8 such buildings on that site with additional solar panels installed in the parking lot as shown in that image. I included two photos that show the nearby housing having clear and close views of adjoining office parking lots. This illustrates that the homes in that 0.5-mile radius are significantly more impacted by the adjoining office buildings than a solar farm located distantly that are not within the viewshed of those homes. Also, this solar farm is located on land adjoining the Intel Campus on a tract that is zoned M-1 PD, which is a Light Industrial/Manufacturing zoning. Nearby homes. Furthermore, the street view at the solar farm shows not only the divided four-lane highway that separates the office buildings and homes from the solar farm, but also shows that there is no landscaping buffer at this location. All of these factors are ignored by this study. Below is another image of the Folsom Solar at the corner of Iron Point Road and Intel West Driveway which shows just how close and how unscreened this project is.

Compare that image from the McGraw Hill Street view facing south from County Rte 571. There is a distant view and much of the project is hidden by a mix of berms and landscaping. The analysis makes no distinction between these projects.

The third issue with this study is that it identifies impacts following development in areas where they note that "more adverse home price impacts might be found where LSPVPS (large-scale photovoltaic project) displace green space (consistent with results that show higher property values near green space." The problem with this statement is that it assumes that the greenspace is somehow guaranteed in these areas, when in fact, they could just as readily be developed as a residential subdivision and have the same impacts. They have made no effort to differentiate loss of greenspace through other development purposes such as schools, subdivisions, or other uses versus the impact of solar farms. In other words, they may have simply identified the impact of all forms of development on property value. This would in fact be consistent with the comments in the Rhode Island study where the researchers noted that the loss of greenspace in the highly urban areas was likely due to the loss of greenspace in particular and not due to the addition of solar panels.

Despite these three shortcomings in the analysis – the lack of differentiating landscape screening, the lack of consideration of other uses within the area that could be impacting property values, and the lack of consideration of alternative development impacts – the study still only found impacts between 0 and 5% with a conclusion of 1.5% within a 0.5-mile radius. As discussed later in this report, real estate is an imperfect market and real estate transactions typically sell for much wider variability than 5% even where there are no external factors operating on property value.

I therefore conclude that the minor impacts noted in this study support a finding of no impact on property value. Most appraisals show a variation between the highest and lowest comparable sale that is substantially greater than 1.5% and this measured impact for all its flaws would just be lost in the static of normal real estate transactions.

VI. Assessor Surveys

I have completed a survey of assessors in Kentucky, I have excluded responses from assessors with no existing and no pending solar farms in those counties. The breakdown is shown below.

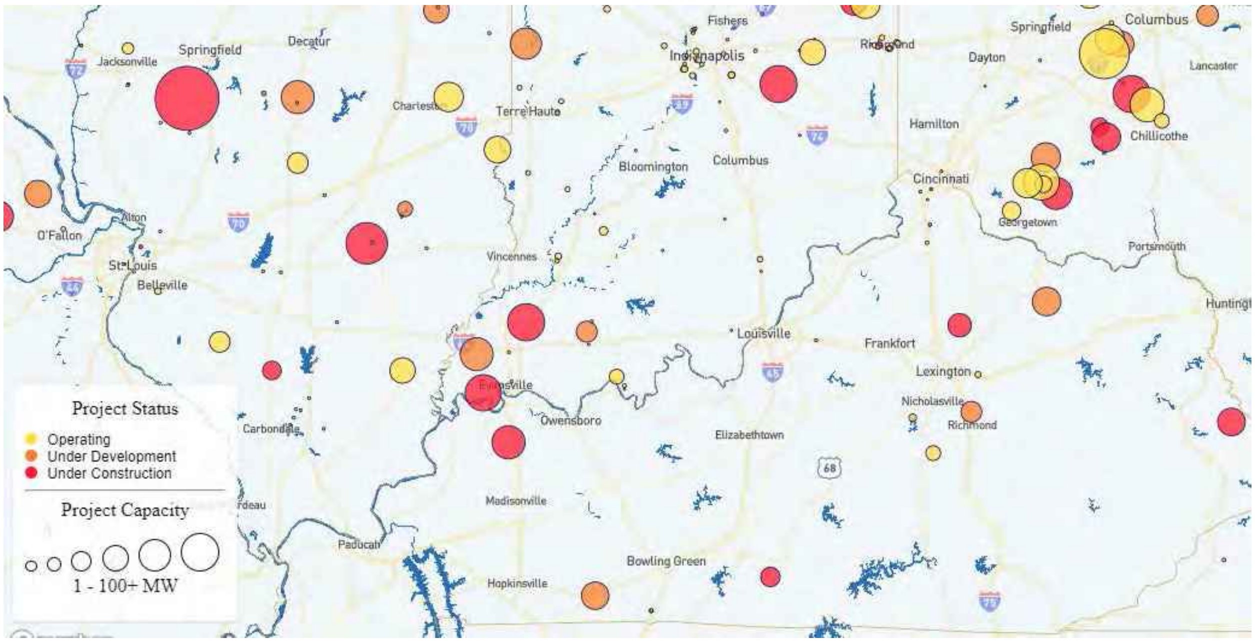
Kentucky Property Valuation Administrator				
		Existing	Proposed	
County	Assessor	Solar	Solar	Impact on Adjacent?
Breckinridge	Dana Bland	0	2	No
Caldwell	Ronald Wood	0	2	No
Christian	Angie Strader	4	n/a	No
Clark	Jada Brady	1	n/a	No response
Green	Sean Curry	0	2	No
Martin	Bobby Hale, Jr.	0	1	No response/hasn't come up yet
Mercer	Jessica Elliott	1	0	No
Russell	Tim Popplewell	0	1	No response/depends on sales after built
Webster	Jeffrey Kelley	0	1	No response/depends on sales after built
Whitley	Ronnie Moses	0	1	No
	Total Responses	10		
	No Impact Responses	6		
	No Response on Impact	4		

I have completed similar surveys in a number of states and I have shown the breakdown of those responses below. I have not had any assessor indicate a negative adjustment due to adjacency to a solar farm in any state. These responses total 188 with 170 definitively indicating no negative adjustments are made to adjoining property values, 18 providing no response to the question, and 0 indicating that they do address a negative impact on adjoining property value.

Summary of Assessor Surveys				
State	**Responses**	**No Impact**	**Yes Impact**	**No Comment**
North Carolina	39	39		
Virginia	16	16		
Indiana	31	31		
Colorado	15	7		8
Georgia	33	33		
Kentucky	10	6		4
Mississippi	4	2		2
New Mexico	5	5		
Ohio	24	20		4
South Carolina	11	11		
Totals	188	170		18

VII. Summary of Solar Projects in Kentucky

I have researched the solar projects in Kentucky. I identified the solar farms through the Solar Energy Industries Association (SEIA) Major Projects List and then excluded the roof mounted facilities. This leaves only six solar farms in Kentucky for analysis at this time. Below is a map pulled from SEIA on Major Projects and it shows projects under development in orange and under construction in red, with yellow dots representing existing solar farms. It was from this map that I have identified a list of existing and under construction solar farms researched in Kentucky.



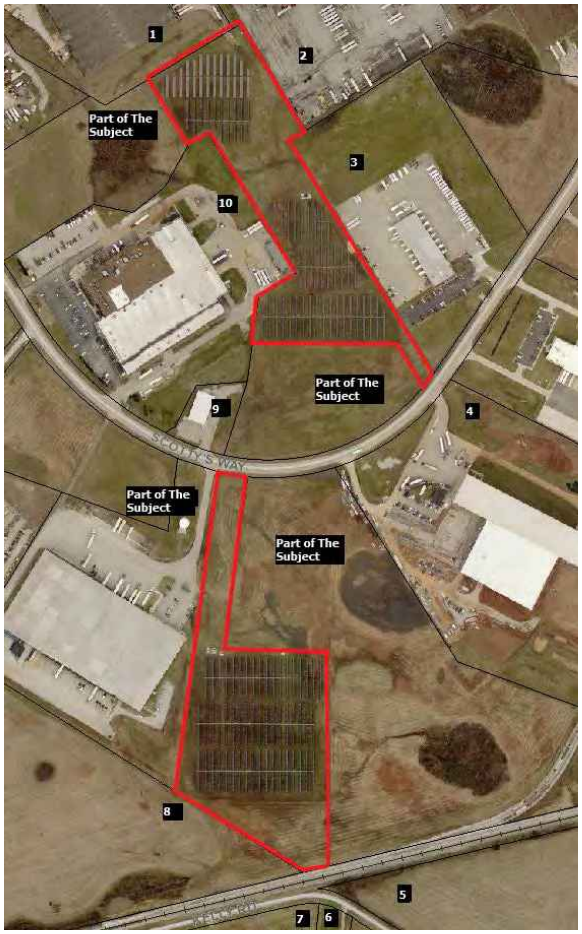
I have provided a summary of projects below and additional detailed information on the projects on the following pages. I specifically note the similarity in most of the sites in Kentucky in terms of mix of adjoining uses, topography, and distances to adjoining homes to each other as well as to the data identified throughout the southeast.

The number of solar farms currently in Kentucky is low compared to a number of other states and North Carolina in particular. I have looked at solar farms in Kentucky for sales activity, but the small number of sites coupled with the relatively short period of time these solar farms have been in place has not provided as many examples of sales adjoining a solar farm as I am able to pull from other places. I have therefore also considered sales in other states, but I have shown in the summary how the demographics around the solar farms in other locations relate to the demographics around the proposed solar farm to show that generally similar locations are being considered. The similarity of the sites in terms of adjoining uses and surrounding demographics makes it reasonable to compare the lack of significant impacts in other areas would translate into a similar lack of significant impacts at the subject site.

Solar #	Name	County	City	Output (MW)	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre: Res	Agri	Agri/Res	Com
610	Bowling Green	Warren	Bowling Green	2	17.36	17.36	720	720	1%	64%	0%	36%
611	Cooperative Solar I	Clarky	Winchester	8.5	181.47	63	2,110	2,040	0%	96%	3%	0%
612	Walton 2	Kenton	Walton	2	58.03	58.03	891	120	21%	0%	60%	19%
613	Crittenden	Grant	Crittenden	2.7	181.7	34.1	1,035	345	22%	27%	51%	0%
617	Glover Creek	Metcalfe	Summer Shade	55	968.2	322.44	1,731	175	6%	25%	69%	0%
618	Turkey Creek	Garrard	Lancaster	50	752.8	297.05	976	240	8%	36%	51%	5%
656	Mount Olive Creek	Russell	Russell Springs	60	526.02	420.82	759	150	24%	28%	47%	0%
657	Horseshoe Bend	Greene	Greensburg	60	585.65	395	1,140	285	8%	51%	41%	0%
658	Flat Run	Taylor	Campbellsville	55	518.94	518.94	540	220	11%	70%	18%	0%
659	Cooperative Shelby	Shelby	Simpsonville	4	35	35	N/A	N/A	6%	11%	32%	52%
660	E.W. Brown	Mercer	Harrodsburg	10	50	50	1,026	565	3%	44%	29%	25%
696	Fleming	Fleming	Elizaville	188	2350	2350	1,036	175	12%	37%	50%	0%
700	Ashwood	Lyon	Fredonia	86	1537.7	1537.7	785	170	4%	46%	23%	27%
720	Fleming 1	Fleming	Flemingburgs	98	764.5	598.6	585	150	3%	48%	49%	0%
722	Henderson KY	Henderson	Henderson	50	1113	725.13	1,395	180	14%	57%	28%	1%
770	Bluebird KY	Harrison	Cynthia	90	1943.2	1345	2,056	350	3%	21%	76%	0%
771	Martin	Martin	Threeforks	100	4122		4,029	1,450	5%	94%	2%	0%
794	Russelville	Logan	Russelville	208	1612	1612	1,058	250	4%	51%	45%	0%
				18								
			Average	62.7	962.1	610.6	1287	446	9%	45%	37%	9%
			Median	55.0	669.2	395.0	1035	240	6%	45%	43%	0%
			High	208.0	4122.0	2350.0	4029	2040	24%	96%	76%	52%
			Low	2.0	17.4	17.4	540	120	0%	0%	0%	0%

I have a larger list of projects that includes a number of recently proposed projects that bring this total up to 46 potential/existing solar projects in Kentucky that I have researched, but most of those additional projects are proposed and not far along in the queue towards development.

610: Bowling Green Solar, Bowling Green, KY



This project was built in 2011 and located on 17.36 acres for a 2 MW project on Scotty's Way with the adjoining uses being primarily industrial. The closest dwelling is 720 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	0.58%	10.00%
Agricultural	63.89%	30.00%
Industrial	35.53%	60.00%
Total	**100.00%**	**100.00%**

611: Cooperative Solar I, Winchester, KY

This project was built in 2017 on 63 acres of a 181.47-acre parent tract for an 8.5 MW project with the closest home at 2,040 feet from the closest solar panel.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	0.15%	11.11%
Agricultural	96.46%	77.78%
Agri/Res	3.38%	11.11%
Total	**100.00%**	**100.00%**

612: Walton 2 Solar, Walton, KY

This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	20.84%	47.06%
Agri/Res	59.92%	17.65%
Commercial	19.25%	35.29%
Total	**100.00%**	**100.00%**

613: Crittenden Solar, Crittenden, KY

This project was built in late 2017 on 34.10 acres out of a 181.70-acre tract for a 2.7 MW project where the closest home is 345 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	1.65%	32.08%
Agricultural	73.39%	39.62%
Agri/Res	23.05%	11.32%
Commercial	0.64%	9.43%
Industrial	0.19%	3.77%
Airport	0.93%	1.89%
Substation	0.15%	1.89%
Total	**100.00%**	**100.00%**

617: Glover Creek Solar, Summer Shade, Metcalfe County, KY

This project under construction in 2023 and 2024 on 322.44 acres out of a 968.20-acre parent tract assemblage for a 55 MW project where the closest home is 175 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	5.78%	37.50%
Agricultural	19.81%	12.50%
Agri/Res	74.41%	50.00%
Total	**100.00%**	**100.00%**

I identified a sale of 194 acres adjoining this solar farm on January 22, 2021 for $430,000, or $2,216 per acre. This land was improved with a dwelling from the early 1900s and while 74 acres were in timber, the timber was reserved. Given the reserved timber and the fact that this sold prior to the construction of the solar farm, it is difficult to analyze this sale for impact.

618: Turkey Creek Solar, Lancaster, Garrard County, KY

This project was built in 2022 on 297.05 acres out of a 752.80-acre parent tract assemblage for a 50 MW project where the closest home is 240 feet from the closest panel. This project was announced in 2019 with approvals in 2020.

I identified a sale at 166 Long Branch Drive, Lancaster that sold on November 25, 2020 after the solar farm was announced for $180,000. The prior sale of the property on February 28, 2019 was for $160,000. Adjusting the earlier sale by the FHFA Home Price Index, the anticipated increase in value was $181,000. This is a difference of 1% which is within typical market deviation and supports a finding of no impact on property value due to the announcement of the solar farm. This home is approximately 250 feet from the nearest solar panel.

I also identified 209 Ashlock Drive that sold on June 14, 2022 near the time construction was to be begin at this solar project. This home sold for $500,000 for a 3,968 s.f. home with 4 BR, 4.5 BA built in 1985 on 3.06 acres. This is a unique home and it is over 1,000 feet to the nearest solar panel. It was purchase out of a larger tract that now includes 5 additional lots and this home adjoins an industrial use to the northwest. All of these factors make it difficult to analyze this sale. I have therefore not attempted to do so as any result would be non-credible given these other factors.

I also identified 1439 Stanford Road that sold on June 27, 2023 for $1,300,000 for this 3,400 s.f. historic home on 206 acres. The home is over 1,500 feet from the panels and the site includes acreage zoned for commercial use according to the listing. There are too many unique features to this for a valid paired sales analysis. I have not attempted one for this sale.

656: Mount Olive Creek Solar, Russell Springs, Russell County, KY

This project is proposed to be built by 2025 on 420.82 acres out of a parent tract assemblage of 526.02 acres for this 60 MW project.

The closest adjoining home is 150 feet from the nearest panel.

I identified a home sale at 2985 KY-1729 that sold on December 2, 2022 for $150,000. This home is around 1,250 feet from the nearest panel which is located to the northeast and through the intersection of Sano Road and Sulpher Creek Road (Highway 1729). It fronts on the highway and adjoins a church. Given these various issues, it would be difficult to complete a paired sales analysis on this home. However, this home did sell on September 18, 2018 for $110,000 prior to the solar farm construction. Adjusting this purchase price upward by the FHFA Home Price Index for the area, this home would have been expected to appreciate to $158,000. This was within 5% of the anticipated sales price and supports a finding of no impact on property value. Still given the distance to the solar farm and the other factors, I will not rely heavily on this indicator.

657: Horseshoe Bend Solar, Greensburg, Green County, KY

This project is proposed to be built in 2025 on 395 acres out of a parent tract assemblage of 585.65 acres for this 60 MW project.

A home located at 2814 Highway 218, Greensburg sold on March 17, 2023 for $199,500 for a 3BR, 3 bathroom brick range on 3.75 acres located across the Highway and 1,275 feet from the nearest panel. The home is very well screened by trees and very distant and across a highway from the project. It is not a great candidate for testing for solar farm values. Furthermore it was updated since it was purchased in 2018, which minimizes the potential for a Sale/Resale analysis. All I can say is that the home was purchased in 2018 for $127,000 and sold 5 years later at a significantly higher price, though I don't know how much of that is attributable to the updates.

658: Flat Run Solar, Campbellsville, Taylor County, KY

This project is currently proposed to begin commercial operation in 2025 and to be located on 518.94 acres for this 55 MW project. The closest dwelling was proposed to be 220 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	11.11%	55.56%
Agricultural	70.45%	37.04%
Agri/Res	18.44%	7.41%
Total	**100.00%**	**100.00%**

659: Cooperative Shelby Solar, Simpsonville, KY

This project was built in 2020 on 35 acres for a 0.5 MW project that is approved for expansion up to 4 MW.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	6.04%	44.44%
Agricultural	10.64%	11.11%
Agri/Res	31.69%	33.33%
Institutional	51.62%	11.11%
Total	**100.00%**	**100.00%**

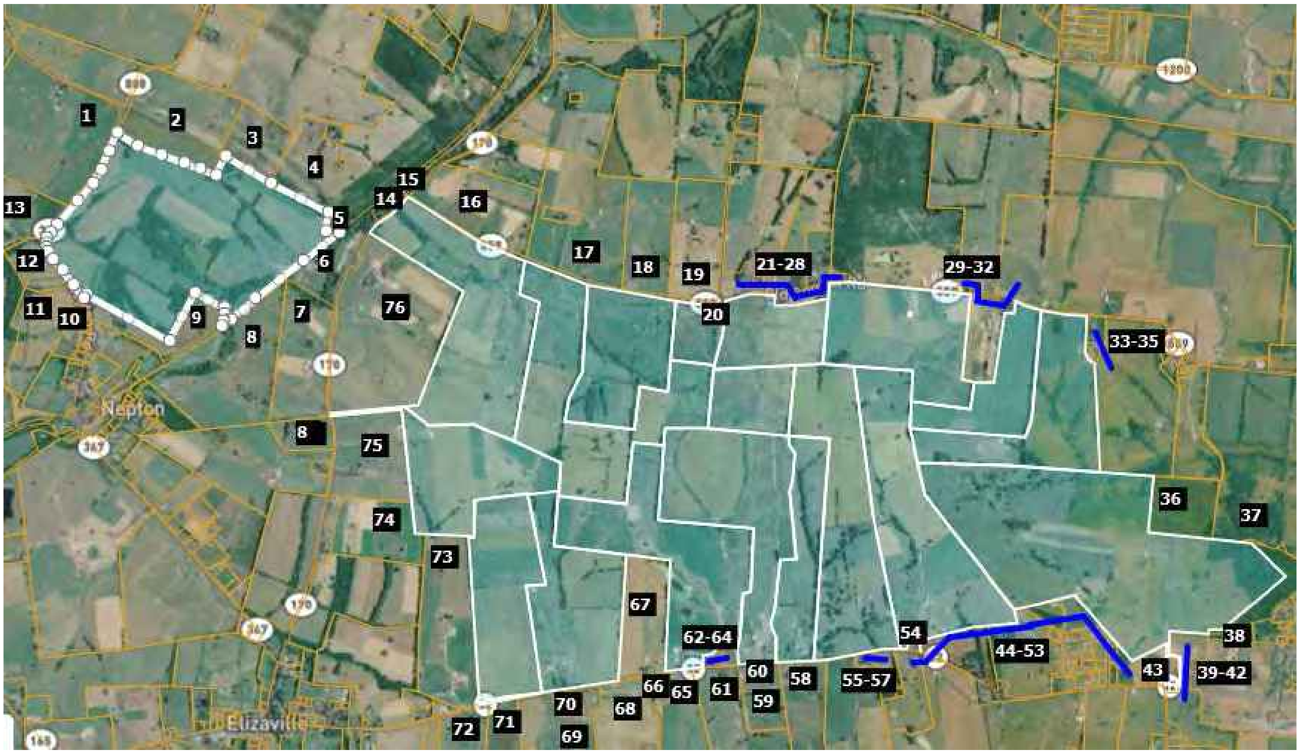
660: E.W. Brown Solar, Harrodsburg, KY

This project was built in 2016 on 50 acres for a 10 MW project. This solar facility adjoins three coal-fired units, which makes analysis of these nearby home sales problematic as it is impossible to extract the impact of the coal plant on the nearby homes especially given the lake frontage of the homes shown.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	2.77%	77.27%
Agricultural	43.92%	9.09%
Agri/Res	28.56%	9.09%
Industrial	24.75%	4.55%
Total	**100.00%**	**100.00%**

696: AEUG Fleming Solar, Elizaville, Fleming County, KY



This project is proposed to be developed in 2026 for a 188 MW project on a parent tract of 2,350 acres. The closest adjoining home is to be 175 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	11.80%	48.68%
Agricultural	37.47%	18.42%
Agri/Res	50.22%	30.26%
Religious	0.20%	1.32%
Commercial	0.30%	1.32%
Total	**100.00%**	**100.00%**

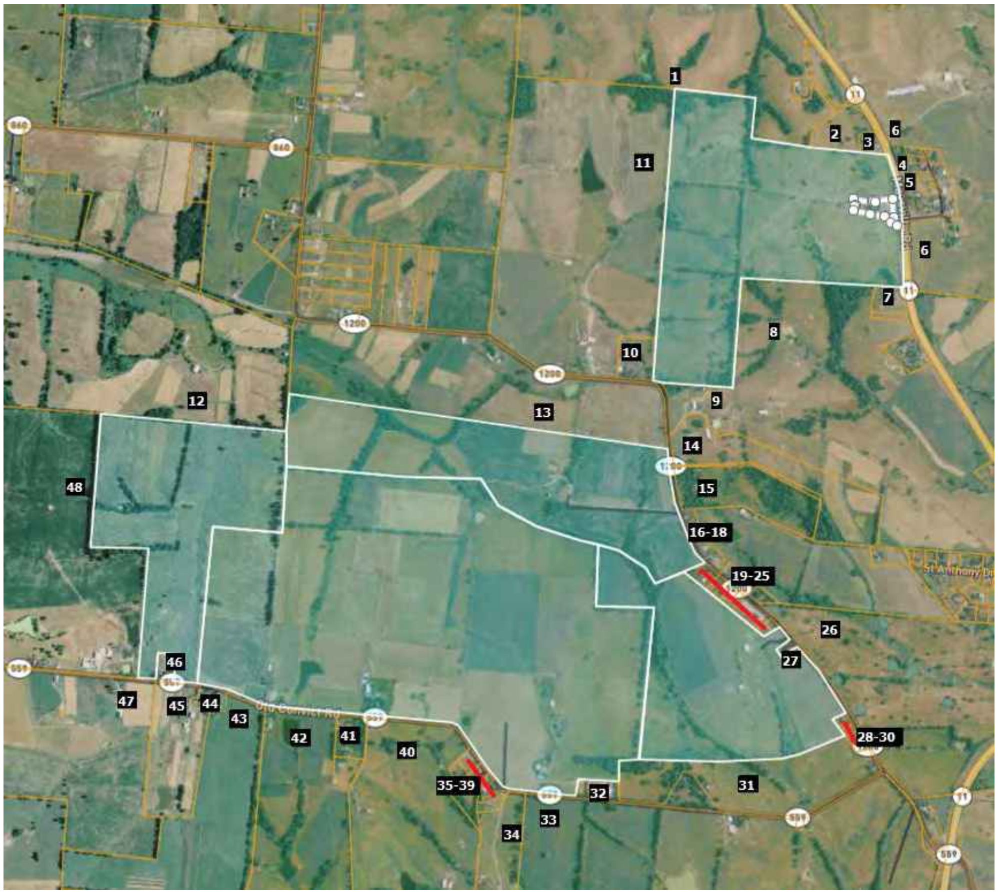
700: Ashwood Solar, Fredonia, Lyon County, KY

This project broke ground in 2023 and expected to be complete in 2024 according to RWE's website. It is located on 1,537.70 acres for an 86 MW project on Coleman Doles Road near Fredonia. The closest dwelling was proposed to be 170 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	3.70%	54.05%
Agricultural	46.11%	24.32%
Agri/Res	22.99%	18.92%
Correctional	27.20%	2.70%
Total	**100.00%**	**100.00%**

720: Fleming 2 Solar, Flemingsburg, Fleming County, KY

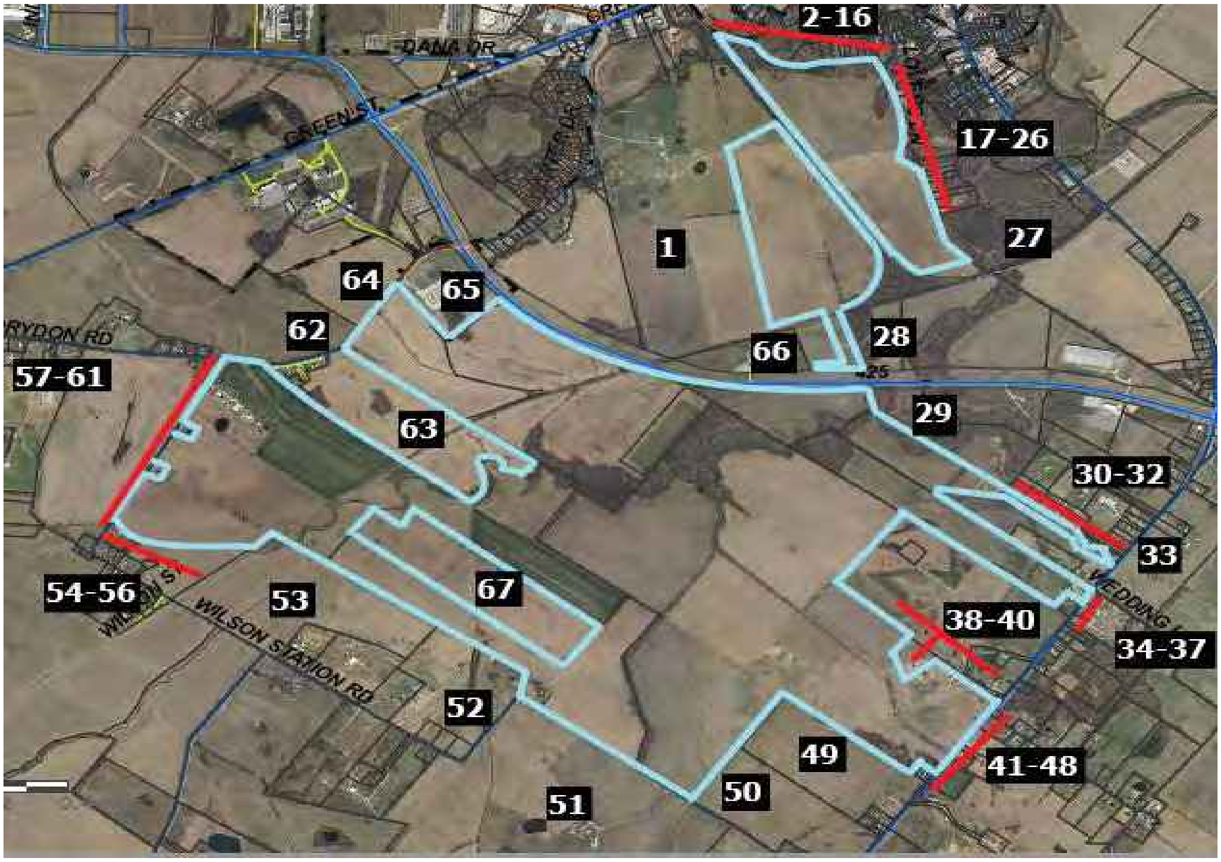


This project is currently proposed to be completed in 2024 according to RWEs website and is located on 598.60 acres out of a 764.50-acre assemblage for a 98 MW project on Old Convict Road. The closest dwelling was proposed to be 150 feet from the nearest panel. This is part of the same project as the AEUG Fleming Solar located just north and east of the earlier reported section, but being developed first.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	2.93%	56.25%
Agricultural	47.56%	20.83%
Agri/Res	49.27%	18.75%
Religious	0.12%	2.08%
Warehouse	0.12%	2.08%
Total	**100.00%**	**100.00%**

722: Henderson County Solar, Henderson, Henderson County, KY

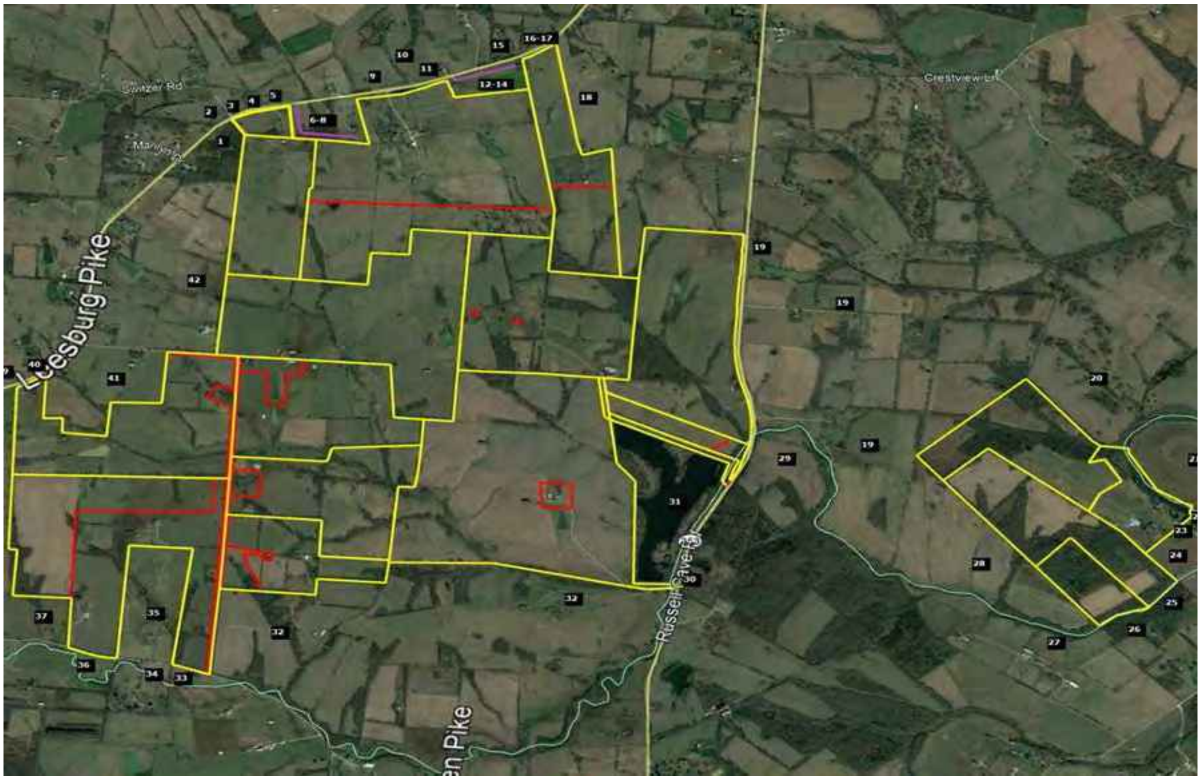


This project was originally proposed to be completed in 2023 and is located on 725.13 acres out of a 1,113.03-acre assemblage for a 50 MW project on Wilson Station Road. The original company Community Energy was acquired by AES in 2021 and this project was taken over by Stellar Renewable Power which projects to begin operations in December 2026. The closest dwelling was proposed to be 180 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	12.77%	71.64%
Agricultural	56.98%	14.93%
Agri/Res	27.96%	7.46%
Religious	0.03%	1.49%
School	1.45%	1.49%
Substation	0.45%	1.49%
Cell Tower	0.35%	1.49%
Total	**100.00%**	**100.00%**

770: Bluebird Solar, Cynthia, Harrison County, KY

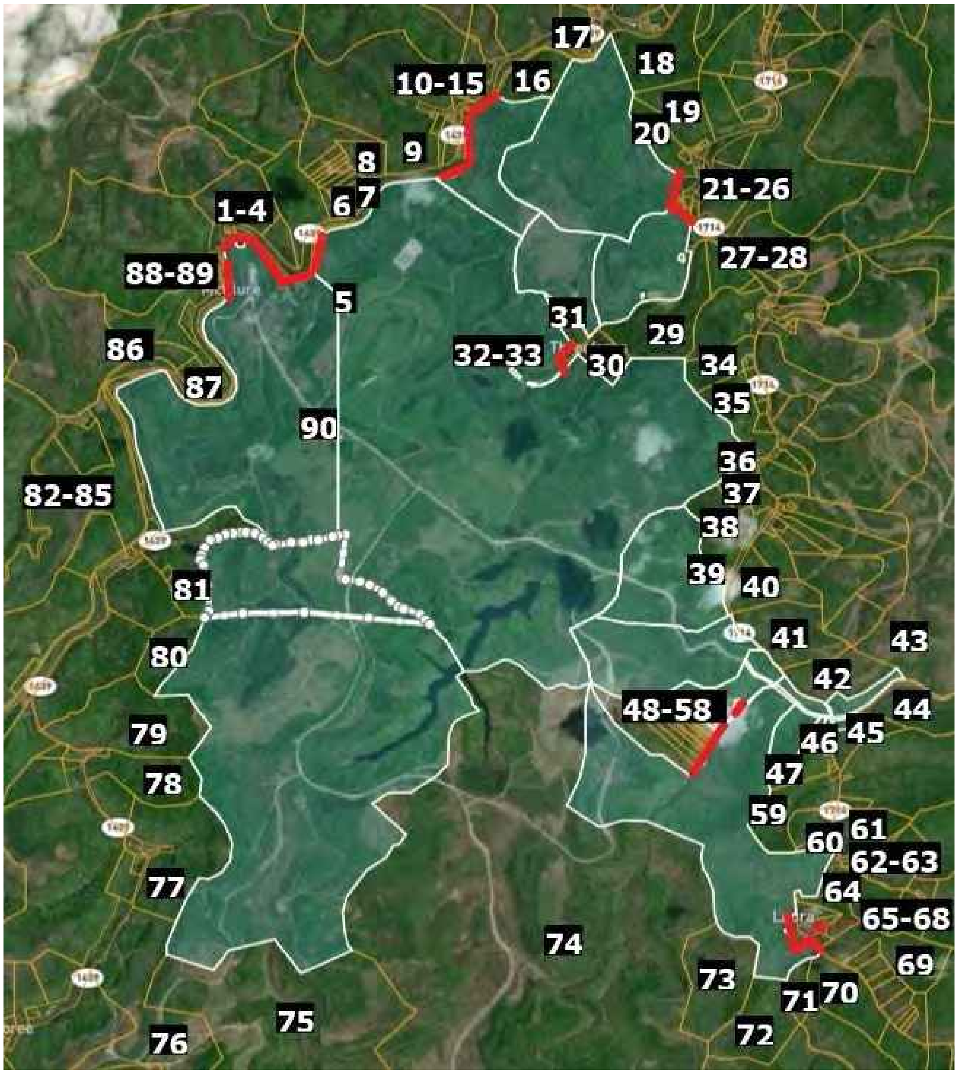


This project is currently proposed to be completed in 2024 and is located on 1,345 acres out of a 1,943.24-acre assemblage for a 90 MW project on Hwy 32 W near Cynthia. The closest dwelling was proposed to be 350 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	3.47%	47.62%
Agricultural	20.51%	26.19%
Agri/Res	76.01%	26.19%
Total	**100.00%**	**100.00%**

771: Martin County Solar, Threeforks, Martin County, KY

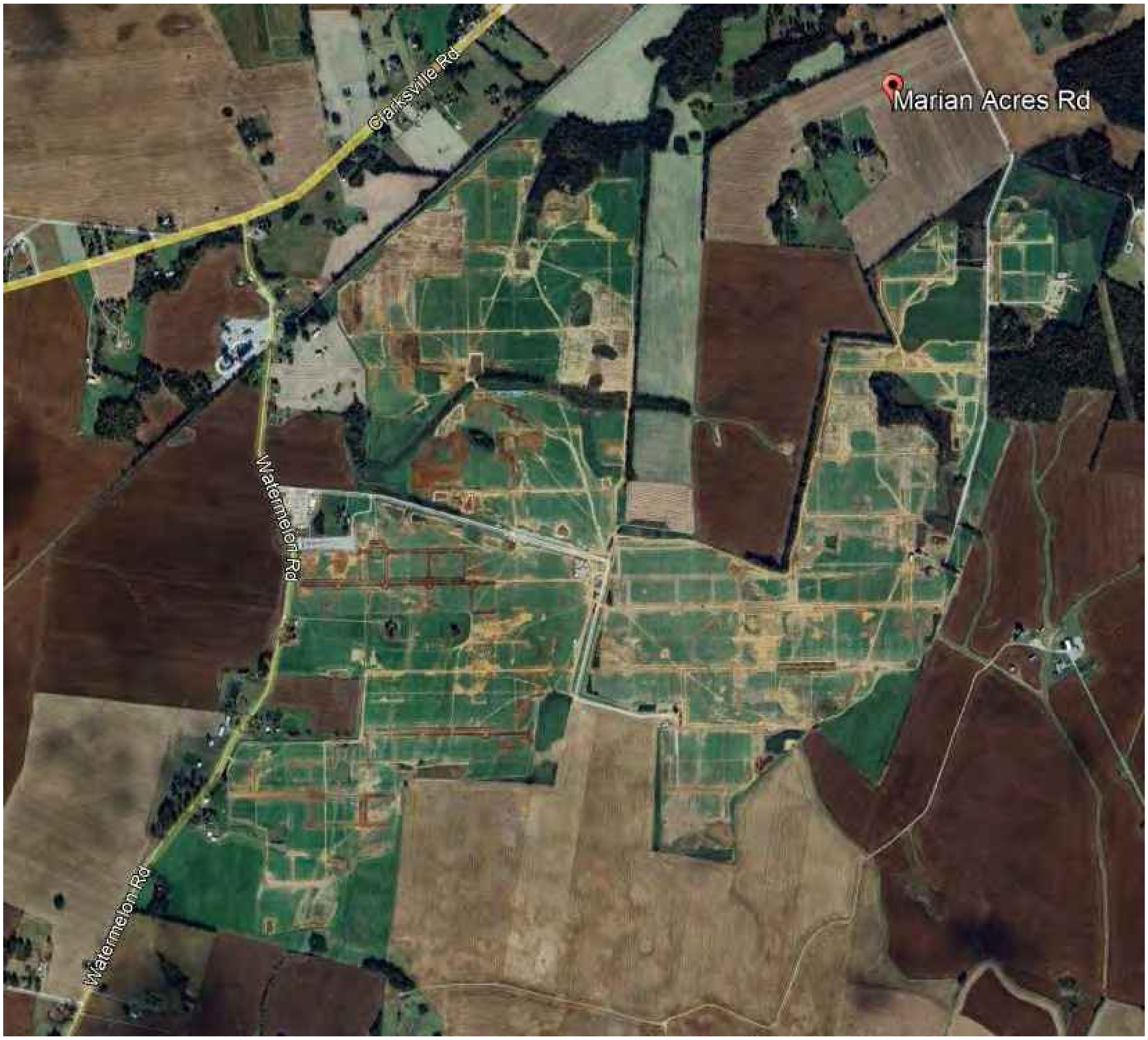


This project began construction in 2023 with a proposed completion date of 2024 on a 900-acre portion of a 2,500-acre assemblage for a 111 MW project. This was the former Martiki Coal Mine land. The closest dwelling was proposed to be 1,450 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	4.65%	60.44%
Agricultural	93.60%	31.87%
Agri/Res	1.69%	2.20%
Cemetery	0.06%	5.49%
Total	**100.00%**	**100.00%**

794: Logan County Solar, Russelville, Logan County, KY



This project began construction in 2023 and proposed to be complete in 2024. It is located on 1,100 acres for a 173 MW project. The closest dwelling was proposed to be 225 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	3.54%	45.71%
Agricultural	51.29%	37.14%
Agri/Res	45.05%	14.29%
Religious	0.12%	2.86%
Total	**100.00%**	**100.00%**

I identified a May 17, 2022 sale of 528 Watermelon Road for $275,000 for a home on 1.29 acres with 2,370 s.f. with 3 BR and 2 BR built in 1940 with 2 carport spaces. This homes is 1,460 feet from the nearest panel through an existing wooded patch. The distance and age makes it difficult to compare this home in this area to similar properties for a paired sale analysis. This home last sold on September 12, 2016 for $149,000. Using the FHFA Home Price Index the anticipated appreciated value as of the date of the most recent sale was expected to be $234,000. This Sale/Resale analysis suggests a 17.5% increase in value due to the solar farm.

I also identified 557 J Montgomery Road that sold on December 8, 2021 for $185,000 for a 4 BR, 2 BA with 2,200 s.f. of living space on 1 acre that was built in 1980. This home has a pool that is noted as needing work, but was otherwise in average condition. I spoke with Dewayne Whittaker the listing agent who indicated that the proposed nearby solar farm had no impact on the sales price or marketing of the home. This home previously sold on May 5, 2016 for $114,000 and also on June 17, 2008 for $125,000. The 2008 sales price was higher than the 2016 due to the crash in the housing market in 2008. Adjusting each of these former sales to a December 2021 value expectation based on the FHFA Home Price Index, I derive expectations of $174,000 from the 2016 sale and $210,000 from the 2008 sale. The Sale/Resale difference from the 2008 sale is considered more reliable as it covers a shorter period of time. It shows a 6% increase in value over the expected value and supports a mild increase in value due to the adjacency to the solar farm. This home is over 1,900 feet to the nearest panel through existing woods. Given the distance involved this is not a strong indicator for properties closer to solar panels.

Similarly, 263 Donald Lane sold on October 3, 2022 for $263,400 for a brick ranch with 4 BR, 2.5 BA with 1,704 s.f. of living area on 5 acres. This home is about 1400 feet from the nearest panel through existing woods. This home previously sold in May 2010 for $141,000. Adjusting this for time using the FHFA HPI, I derive an expected value of $262,000. This is within 1% of the actual closed price and strongly supports a finding of no impact at this distance. It is not a strong indicator for properties closer to panels.

VIII. Market Analysis of the Impact on Value from Solar Farms

I have researched hundreds of solar farms in numerous states to determine the impact of these facilities on the value of adjoining properties. This research has primarily been in North Carolina, but I have also conducted market impact analyses in Virginia, South Carolina, Tennessee, Texas, Oregon, Mississippi, Maryland, New York, California, Missouri, Florida, Montana, Georgia, Kentucky, and New Jersey.

I have derived a breakdown of the adjoining uses to show where solar farms are located. A summary showing the results of compiling that data over hundreds of solar farms is shown later in the Scope of Research section of this report.

I also consider whether the properties adjoining a solar farm in one location have characteristics similar to the properties abutting or adjoining the proposed site so that I can make an assessment of market impact on each proposed site. Notably, in most cases solar farms are placed in areas very similar to the site in question, which is surrounded by low density residential and agricultural uses. In my over 700 studies, I have found a striking repetition of that same typical adjoining property use mix in over 90% of the solar farms I have looked at. Matched pair results in multiple states are strikingly similar, and all indicate that solar farms – which generate very little traffic, and do not generate noise, dust or have other harmful effects – do not negatively impact the value of adjoining or abutting properties.

I have previously been asked by the Kentucky Siting Board about how the solar farms and the matched pair sets were chosen. This is the total of all the usable home sales adjoining the 900+ solar farms that I have looked at over the last 15 years. Most of the solar farms that I have looked at are only a few years old and have not been in place long enough for home or land sales to occur next to them for me to analyze. There is nothing unusual about this given the relatively rural locations of most of the solar farms where home and land sales occur much less frequently than they do in urban and suburban areas and the number of adjoining homes is relatively small.

I review the solar farms that I have looked at periodically to see if there are any new sales. If there is a sale I have to be sure it is not an inhouse sale or to a related family member. A great many of the rural sales that I find are from one family member to another, which makes analysis impossible given that these are not "arm's length" transactions. There are also numerous examples of sales that are "arm's length" but are still not usable due to other factors such as adjoining significant negative factors such as a coal fired plant or at a landfill or prison. I have looked at homes that require a driveway crossing a railroad spur, homes in close proximity to large industrial uses, as well as homes adjoining large state parks, or homes that are over 100 years old with multiple renovations. Such sales are not usable as they have multiple factors impacting the value that are tangled together. You can't isolate the impact of the coal fired plant, the industrial building, or the railroad unless you are comparing that sale to a similar property with similar impacts. Matched pair analysis requires that you isolate properties that only have one differential to test for, which is why the type of sales noted above is not appropriate for analysis.

After my review of all sales and elimination of the family transactions and those sales with multiple differentials, I am left with the matched pairs shown in this report to analyze. I do have additional matched pair data in other areas of the United States that were not included in this report due to being states less comparable to Kentucky than those shown. The only other sales that I have eliminated from the analysis are home sales under $100,000, which there haven't been many such examples, but at that price range it is difficult to identify any impacts through matched pair analysis. I have not cherry picked the data to include just the sales that support one direction in value, but I have included all of them both positive and negative with a preponderance of the evidence supporting no impact to mild positive impacts.

A. Kentucky and Adjoining States Data

1. Matched Pair – Crittenden Solar, Crittenden, Grant County, KY

This solar farm was built in December 2017 on a 181.70-acre tract but utilizing only 34.10 acres. This is a 2.7 MW facility with residential subdivisions to the north and south.

I have identified five home sales to the north of this solar farm on Clairborne Drive and one home sale to the south on Eagle Ridge Drive since the completion of this solar farm. The home sale on Eagle Drive is for a $75,000 home and all of the homes along that street are similar in size and price range. According to local broker Steve Glacken with Cutler Real Estate these are the lowest price range/style home in the market. I have not analyzed that sale as it would unlikely provide significant data to other homes in the area.

Mr. Glacken has been selling lots at the west end of Clairborne for new home construction. He indicated in 2020 that the solar farm near the entrance of the development has been a complete non-factor and none of the home sales are showing any concern over the solar farm. Most of the homes are in the $250,000 to $280,000 price range. The vacant residential lots are being marketed for $28,000 to $29,000. The landscaping buffer is considered light, but the rolling terrain allows for distant views of the panels from the adjoining homes along Clairborne Drive.

The first home considered is a bit of an anomaly for this subdivision in that it is the only manufactured home that was allowed in the community. It sold on January 3, 2019. I compared that sale to three other manufactured home sales in the area making minor adjustments as shown on the next page to account for the differences. After all other factors are considered the adjustments show a -1% to +13% impact due to the adjacency of the solar farm. The best indicator is 1250 Cason, which shows a 3% impact. A 3% impact is within the normal static of real estate transactions and therefore not considered indicative of a positive impact on the property, but it strongly supports an indication of no negative impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	250 Claiborne	0.96	1/3/2019	$120,000	2000	2,016	$59.52	3/2	Drive	Manuf	
	Not	1250 Cason	1.40	4/18/2018	$95,000	1994	1,500	$63.33	3/2	2-Det	Manuf	Carport
	Not	410 Reeves	1.02	11/27/2018	$80,000	2000	1,456	$54.95	3/2	Drive	Manuf	
	Not	315 N Fork	1.09	5/4/2019	$107,000	1992	1,792	$59.71	3/2	Drive	Manuf	

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne								$120,000			373
Not	1250 Cason	$2,081		$2,850	$26,144		-$5,000	-$5,000	$116,075	3%		
Not	410 Reeves	$249		$0	$24,615				$104,865	13%		
Not	315 N Fork	-$1,091		$4,280	$10,700				$120,889	-1%		
											5%	

I also looked at three other home sales on this street as shown below. These are stick-built homes and show a higher price range.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	300 Claiborne	1.08	9/20/2018	$212,720	2003	1,568	$135.66	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	Ranch	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne								$213,000			488
Not	460 Claiborne	-$2,026		-$4,580	$15,457	$5,000			$242,850	-14%		
Not	2160 Sherman	-$5,672		-$2,650	-$20,406				$236,272	-11%		
Not	215 Lexington	$1,072		$3,468	-$2,559	-$5,000			$228,180	-7%		
											-11%	

This set of matched pairs shows a minor negative impact for this property. I was unable to confirm the sales price or conditions of this sale. The best indication of value is based on 215 Lexington, which required the least adjusting and supports a -7% impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	350 Claiborne	1.00	7/20/2018	$245,000	2002	1,688	$145.14	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	350 Claiborne								$245,000			720
Not	460 Claiborne	-$3,223		-$5,725	$30,660	$5,000			$255,712	-4%		
Not	2160 Sherman	-$7,057		-$3,975	-$5,743				$248,225	-1%		
Not	215 Lexington	-$136		$2,312	$11,400	-$5,000			$239,776	2%		
											-1%	

The following photograph shows the light landscaping buffer and the distant view of panels that was included as part of the marketing package for this property. The panels are visible somewhat on the left and somewhat through the trees in the center of the photograph. The first photograph is from the home, with the second photograph showing the view near the rear of the lot.

This set of matched pairs shows a no negative impact for this property. The range of adjusted impacts is -4% to +2%. The best indication is -1%, which as described above is within the typical market static and supports no impact on adjoining property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	
	Adjoins	370 Claiborne	1.06	8/22/2019	$273,000	2005	1,570	$173.89	4/3	2-Car	
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	F
	Not	2290 Dry	1.53	5/2/2019	$239,400	1988	1,400	$171.00	3/2.5	2-Car	F
	Not	125 Lexington	1.20	4/17/2018	$240,000	2001	1,569	$152.96	3/3	2-Car	

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	%
Adjoins	370 Claiborne								$273,000		
Not	2160 Sherman	$1,831		$0	-$20,161				$246,670	10%	
Not	2290 Dry	$2,260		$20,349	$23,256	$2,500			$287,765	-5%	
Not	125 Lexington	$9,951		$4,800					$254,751	7%	

This set of matched pairs shows a general positive impact for this property. The rang impacts is -5% to +10%. The best indication is +7%. I typically consider measurement be within the typical variation in real estate transactions. This indication is higher t suggests a positive relationship.

The photograph from the listing shows panels visible between the home and the tram in the picture.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	330 Claiborne	1.00	12/10/2019	$282,500	2003	1,768	$159.79	3/3	2-Car	Ranch	Brick/pool
Not	895 Osborne	1.70	9/16/2019	$249,900	2002	1,705	$146.57	3/2	2-Car	Ranch	Brick/pool
Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	330 Claiborne								$282,500			665
Not	895 Osborne	$1,790		$1,250	$7,387	$5,000		$0	$265,327	6%		
Not	2160 Sherman	$4,288		-$2,650	$4,032			$20,000	$290,670	-3%		
Not	215 Lexington	$9,761		$3,468	$20,706	-$5,000		$20,000	$280,135	1%		
											1%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -3% to +6%. The best indication is +6%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship. The landscaping buffer on these is considered light with a fair visibility of the panels from most of these comparables and only thin landscaping buffers separating the homes from the solar panels.

I also looked at four sales that were during a rapid increase in home values around 2021, which required significant time adjustments based on the FHFA Housing Price Index. Sales in this time frame are less reliable for impact considerations as the peak buyer demand allowed for homes to sell with less worry over typical issues such as repairs.

The home at 250 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Lisa Ann Lay with Keller Williams Realty Service. As noted earlier, this is the only manufactured home in the community and is a bit of an anomaly. There was an impact on this sale due to an appraisal that came in low likely related to the manufactured nature of the home. Ms. Lay indicated that there was significant back and forth between both brokers and the appraiser to address the low appraisal, but ultimately, the buyers had to pay $20,000 out of pocket to cover the difference in appraised value and the purchase price. The low appraisal was not attributed to the solar farm, but the difficulty in finding comparable sales and likely the manufactured housing.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	250 Claiborne	1.05	1/5/2022	$210,000	2002	1,592	$131.91	4/2	Drive	Ranch	Manuf
Not	255 Spillman	0.64	3/4/2022	$166,000	1991	1,196	$138.80	3/1	Drive	Ranch	Remodel
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B
Not	240 Shawnee	1.18	6/7/2021	$180,000	1977	1,352	$133.14	3/2	Gar	Ranch	N/A

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne							$210,000			365
Not	255 Spillman	-$379	$9,130	$43,971	$10,000		-$20,000	$208,722	1%		
Not	546 Waterworks	$1,772	-$4,488	$74,958			-$67,313	$184,429	12%		
Not	240 Shawnee	$1,501	$22,500	$25,562		-$10,000		$219,563	-5%		
										3%	

The photograph of the rear view from the listing is shown below.

The home at 260 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Jim Dalton with Ashcraft Real Estate Services. He noted that there was significant wood rot and a heavy smoker smell about the house, but even that had no impact on the price due to high demand in the market.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	260 Claiborne	1.00	10/13/2021	$175,000	2001	1,456	$120.19	3/2	Drive	Ranch	N/A
Not	355 Oakwood	0.58	10/27/2020	$186,000	2002	1,088	$170.96	3/2	Gar	Ranch	3/4 Fin B
Not	30 Ellen Kay	0.50	1/30/2020	$183,000	1988	1,950	$93.85	3/2	Gar	2-Story	N/A
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	260 Claiborne							$175,000			390
Not	355 Oakwood	$18,339	-$930	$50,329		-$10,000	-$69,750	$173,988	1%		
Not	30 Ellen Kay	$31,974	$11,895	-$37,088		-$10,000		$179,781	-3%		
Not	546 Waterworks	$8,420	-$5,385	$56,287			-$67,313	$171,510	2%		
										0%	

The photograph of the rear view from the listing is shown below.

These next two were brick and with unfinished basements which made them easier to compare and therefore more reliable. For 300 Claiborne I considered the sale of a home across the street that did not back up to the solar farm and it adjusted to well below the range of the other comparables. I have included it, but would not rely on that which means this next comparable strongly supports a range of 0 to +3% and not up to +19%.

djoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	300 Claiborne	0.89	12/18/2021	$290,000	2002	1,568	$184.95	3/3	2-Car	Br Rnch	Bsmt
Not	405 Claiborne	0.41	2/1/2022	$267,750	2004	1,787	$149.83	3/2	2-Car	Br Rnch	Bsmt
Not	39 Pinhook	0.68	3/31/2022	$299,000	1992	1,680	$177.98	3/2	2-Car	Br Rnch	Bsmt
Not	5 Pinhook	0.70	4/7/2022	$309,900	1992	1,680	$184.46	3/2	2-Car	Br Rnch	Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne							$290,000			570
Not	405 Claiborne	-$3,384	-$2,678	-$26,251				$235,437	19%		
Not	39 Pinhook	-$8,651	$14,950	-$15,947				$289,352	0%		
Not	5 Pinhook	-$9,576	$15,495	-$16,528				$299,291	-3%		
										5%	

The photograph of the rear view from the listing is shown below.

This same home, 300 Claiborne sold again on October 14, 2022 for $332,000, or $42,000 higher or 15% higher than it had just 10 months earlier. The FHFA Home Price Index indicates an 8.3% increase over that time for the overall market, suggesting that this home is actually increasing in value faster than other properties in the area. An updated photo from the 2022 listing is shown below.

The home at 410 Claiborne included an inground pool with significant landscaping around it that was a challenge. Furthermore, two of the comparables had finished basements. I made no adjustment for the pool on those two comparables and considered the two factors to cancel out

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	410 Claiborne	0.31	2/10/2021	$275,000	2006	1,595	$172.41	3/2	2-Car	Br Rnch	Bsmt/Pool
Not	114 Austin	1.40	12/23/2020	$248,000	1994	1,650	$150.30	3/2	2-Car	Br Rnch	Bsmt
Not	125 Liza	0.29	6/25/2021	$315,000	2005	1,913	$164.66	4/3	2-Car	Br Rnch	Ktchn Bsmt
Not	130 Hannahs	0.42	2/9/2021	$295,000	2007	1,918	$153.81	3/3	2-Car	Br Rnch	Fin Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	410 Claiborne							$275,000			1080
Not	114 Austin	$3,413	$14,880	-$6,613			$20,000	$279,680	-2%		
Not	125 Liza	-$11,945	$1,575	-$41,890	-$10,000			$252,740	8%		
Not	130 Hannahs	$83	-$1,475	-$39,743	-$10,000			$243,864	11%		
										6%	

The nine matched pairs considered in this analysis includes five that show no impact on value, one that shows a negative impact on value, and three that show a positive impact. The negative indication supported by one matched pair is -7% and the positive impacts are +6% and +7%. The two neutral indications show impacts of -5% to +5%. The average indicated impact is +2% when all nine of these indicators are blended.

Furthermore, the comments of the local real estate brokers strongly support the data that shows no negative impact on value due to the proximity to the solar farm.

2. Matched Pair – Walton 2, Walton, Kenton County, KY

This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

The home located on Parcel 1 (783 Jones Road, Walton, KY) in the map above sold on May 4, 2022 for $346,000. This home is 410 feet from the nearest solar panel. I have considered a Sale/Resale analysis of this home as it previously sold on May 7, 2012 for $174,900. This analysis compares that 2012 purchase price and uses the FHFA House Price Index Calculator to identify what real estate values in the area have been appreciating at to determine where it was expected to appreciate to. I have then compared that to the actual sales price to determine if there is any impact attributable to the addition of the solar farm.

As can be seen on the calculator form, the expected value for $174,900 home sold in 2nd quarter 2012 would be $353,000 for 2nd quarter 2022. This is within 2% of the actual sales price and supports a finding of no impact on property value.

I have not attempted a paired sales analysis with other sales, as this property also has the nearby recycling and car lot that would be a potential factor in comparing to other sales. But based on aerial imagery, these same car lots were present in 2012 and therefore has no additional impact when comparing this home sale to itself.

Purchase Quarter
2012 Quarter 2
Purchase Value
$174,900
Valuation Quarter
2022 Quarter 2
Estimated Value for MSA
$353,000
Percentage Change
101.8%
X
Kentucky
Cincinnati, OH-KY-IN
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
2012 Q2
2022 Q2
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

3. Matched Pair – Turkey Creek, Lancaster, Garrard County, KY

This project was built in 2022 on 297.05 acres out of a 752.80-acre parent tract assemblage for a 50 MW project where the closest home is 240 feet from the closest panel. This project was announced in 2019 with approvals in 2020.

I identified a sale at 166 Long Branch Drive, Lancaster that sold on November 25, 2020 after the solar farm was announced for $180,000. The prior sale of the property on February 28, 2019 was for $160,000. Adjusting the earlier sale by the FHFA Home Price Index, the anticipated increase in value was $181,000. This is a difference of 1% which is within typical market deviation and supports a finding of no impact on property value due to the announcement of the solar farm. This home is approximately 250 feet from the nearest solar panel.

I also identified 209 Ashlock Drive that sold on June 14, 2022 near the time construction was to be begin at this solar project. This home sold for $500,000 for a 3,968 s.f. home with 4 BR, 4.5 BA built in 1985 on 3.06 acres. This is a unique home and it is over 1,000 feet to the nearest solar panel. It was purchase out of a larger tract that now includes 5 additional lots and this home adjoins an industrial use to the northwest. All of these factors make it difficult to analyze this sale. I have therefore not attempted to do so as any result would be non-credible given these other factors.

I also identified 1439 Stanford Road that sold on June 27, 2023 for $1,300,000 for this 3,400 s.f. historic home on 206 acres. The home is over 1,500 feet from the panels and the site includes acreage zoned for commercial use according to the listing. There are too many unique features to this for a valid paired sales analysis. I have not attempted one for this sale.

Merriwood Development, LLC purchased 15 lots along Elmwood Court on May 18, 2023 for $750,000, or $50,000 per lot. These lots were developed in 2022/2023 by Wimbledon Holdings and WRH Investments following the purchase of the raw land on March 25, 2022. The raw land was purchased for development after the solar farm was approved and the subdivision infrastructure was developed during the construction of the solar farm. The developer clearly foresaw no negative impact on the property from the solar farm or they would not have invested in the development. The sales price is not a good indication of market value as Wimbledon and Merriwood are noted as related entities.

I searched for recent lot sales in the area and found 1 to 3 acre lots to the northeast selling for $15,000 to $30,000 each. The lots at Merriwood are in close proximity to Garrard County High School off Industry Road.

Lot 96 sold to Robert and Avonda Noe on January 24, 2023 for $44,900 and was subsequently developed with a single family home. This lot directly adjoins the solar farm with the nearest panel 625 feet away. The panels appear to be visible in the background of the tax card photo.

Lot 97 sold to Michael and Jill Stevens on July 28, 2023 for $60,800. This lot directly adjoins the solar farm with a likely home site 820 feet from the nearest panel.

Lot 98 was sold to Walter and Hannah Hulett for $1 as an entity related to Wimbledon Holdings. This is the home visible in the map just underneath the word Elmwood Court. The Huletts are WRH Investments, LLC that developed the site with Wimbledon Holdings, LLC.

Lot 100 sold on July 28, 2023 to Jimmie McCulley for $39,900. This lot does not directly adjoin the solar farm.

Lot 101 sold on November 22, 2023 to Willie and Tiffany Skeens for $50,000. This lot directly adjoins the solar farm with a likely home site 450 feet from the nearest panel.

Additional lots were transferred to Elmwood Builders, LLC that is noted as affiliated with Merriwood Development, LLC for $1 each.

The various lot prices range from $39,900 to $60,800 with the low end of the range being a lot non-adjacent to the solar farm and the high end being adjacent to the solar farm. The sales data on the lots do not support any finding of a negative impact on property value. Comparing the most common lot value of $50,000 per lot suggests an impact range of -10% for Lot 96 that sold for $44,900 to +22% for Lot 97 that sold for $60,800. Those two lots are adjacent to each other. Blending the two impacts suggests a 12% enhancement for adjoining the solar farm. But given the wide ranges of lot values in this development, I consider this to simply support a finding of no impact on property value.

4. Matched Pair – Mulberry, Selmer, McNairy County, TN

This 16 MW solar farm was built in 2014 on 208.89 acres with the closest home being 480 feet.

This solar farm adjoins two subdivisions with Central Hills having a mix of existing and new construction homes. Lots in this development have been marketed for $15,000 each with discounts offered for multiple lots being used for a single home site. I spoke with the agent with Rhonda Wheeler and Becky Hearnsberger with United County Farm & Home Realty who noted that they have seen no impact on lot or home sales due to the solar farm in this community.

I have included a map below as well as data on recent sales activity on lots that adjoin the solar farm or are near the solar farm in this subdivision both before and after the announced plan for this solar farm facility. I note that using the same method I used to breakdown the adjoining uses at the subject property I show that the predominant adjoining uses are residential and agricultural, which is consistent with the location of most solar farms.

Adjoining Use Breakdown

	Acreage	Parcels
Commercial	3.40%	0.034
Residential	12.84%	79.31%
Agri/Res	10.39%	3.45%
Agricultural	73.37%	13.79%
Total	**100.00%**	**100.00%**

I have run a number of direct matched comparisons on the sales adjoining this solar farm as shown below. These direct matched pairs include some of those shown above as well as additional more recent sales in this community. In each of these I have compared the one sale adjoining the solar farm to multiple similar homes nearby that do not adjoin a solar farm to look for any potential impact from the solar farm.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
3	Adjoins	491 Dusty	6.86	10/28/2016	$176,000	2009	1,801	$97.72	3/2	2-Gar	Ranch	
	Not	820 Lake Trail	1.00	6/8/2018	$168,000	2013	1,869	$89.89	4/2	2-Gar	Ranch	
	Not	262 Country	1.00	1/17/2018	$145,000	2000	1,860	$77.96	3/2	2-Gar	Ranch	
	Not	35 April	1.15	8/16/2016	$185,000	2016	1,980	$93.43	3/2	2-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
3	Adjoins	491 Dusty							$176,000		480
	Not	820 Lake Trail	-$8,324	$12,000	-$3,360	-$4,890			$163,426	7%	
	Not	262 Country	-$5,450	$12,000	$6,525	-$3,680			$154,396	12%	
	Not	35 April	$1,138	$12,000	-$6,475	-$13,380			$178,283	-1%	
									Average	6%	

The best matched pair is 35 April Loop, which required the least adjustment and indicates a -1% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
12	Adjoins	57 Cooper	1.20	2/26/2019	$163,000	2011	1,586	$102.77	3/2	2-Gar	1.5 Story	Pool
	Not	191 Amelia	1.00	8/3/2018	$132,000	2005	1,534	$86.05	3/2	Drive	Ranch	
	Not	75 April	0.85	3/17/2017	$134,000	2012	1,588	$84.38	3/2	2-Crprt	Ranch	
	Not	345 Woodland	1.15	12/29/2016	$131,000	2002	1,410	$92.91	3/2	1-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
12	Adjoins	57 Cooper	$163,000							$163,000		685
	Not	191 Amelia	$132,000	$2,303		$3,960	$2,685	$10,000	$5,000	$155,947	4%	
	Not	75 April	$134,000	$8,029	$4,000	-$670	-$135	$5,000	$5,000	$155,224	5%	
	Not	345 Woodland	$131,000	$8,710		$5,895	$9,811		$5,000	$160,416	2%	
										Average	4%	

The best matched pair is 191 Amelia, which was most similar in time frame of sale and indicates a +4% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
15	Adjoins	297 Country	1.00	9/30/2016	$150,000	2002	1,596	$93.98	3/2	4-Gar	Ranch	
	Not	185 Dusty	1.85	8/17/2015	$126,040	2009	1,463	$86.15	3/2	2-Gar	Ranch	
	Not	53 Glen	1.13	3/9/2017	$126,000	1999	1,475	$85.42	3/2	2-Gar	Ranch	Brick

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
15	Adjoins	297 Country	$150,000							$150,000		650
	Not	185 Dusty	$126,040	$4,355		-$4,411	$9,167	$10,000		$145,150	3%	
	Not	53 Glen	$126,000	-$1,699		$1,890	$8,269	$10,000		$144,460	4%	
										Average	3%	

The best matched pair is 53 Glen, which was most similar in time frame of sale and required less adjustment. It indicates a +4% increase in value due to the solar farm adjacency.

The average indicated impact from these three sets of matched pairs is +4%, which suggests a mild positive relationship due to adjacency to the solar farm. The landscaping buffer for this project is mostly natural tree growth that was retained as part of the development but much of the trees separating the panels from homes are actually on the lots for the homes themselves. I therefore consider the landscaping buffer to be thin to moderate for these adjoining homes.

I have also looked at several lot sales in this subdivision as shown below.

These are all lots within the same community and the highest prices paid are for lots one parcel off from the existing solar farm. These prices are fairly inconsistent, though they do suggest about a $3,000 loss in the lots adjoining the solar farm. This is an atypical finding and additional details suggest there is more going on in these sales than the data crunching shows. First of all Parcel 4 was purchased by the owner of the adjoining home and therefore an atypical buyer seeking to expand a lot and the site is not being purchased for home development. Moreover, using the SiteToDoBusiness demographic tools, I found that the 1-mile radius around this development is expecting a total population increase over the next 5 years of 3 people. This lack of growing demand for lots is largely explained in that context. Furthermore, the fact that finished home sales as shown above are showing no sign of a negative impact on property value makes this data unreliable and inconsistent with the data shown in sales to an end user. I therefore place little weight on this outlier data.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	4/18/2019 Adj for Time	$/AC	4/18/2019 Adj for Time
4	Adjoins	Shelter	2.05	10/25/2017	$16,000	$16,728	$7,805	$8,160
10	Adjoins	Carter	1.70	8/2/2018	$14,000	$14,306	$8,235	$8,415
11	Adjoins	Cooper	1.28	9/17/2018	$12,000	$12,215	$9,375	$9,543
	Not	75 Dusty	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976
	Not	Lake Trl	1.47	11/7/2018	$13,000	$13,177	$8,844	$8,964
	Not	Lake Trl	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976

	Adjoins	Per Acre	Not Adjoins	Per Acre	% DIF/Lot	% DIF/AC
Average	$14,416	$8,706	$17,726	$10,972	19%	21%
Median	$14,306	$8,415	$20,000	$11,976	28%	30%
High	$16,728	$9,543	$20,000	$11,976	16%	20%
Low	$12,215	$8,160	$13,177	$8,964	7%	9%

5. Matched Pair – Grand Ridge Solar, Streator, LaSalle County, IL

This solar farm has a 20 MW output and is located on a 160-acre tract. The project was built in 2012.

I have considered the recent sale of Parcel 13 shown above, which sold in October 2016 after the solar farm was built. I have compared that sale to a number of nearby residential sales not in proximity to the solar farm as shown below. Parcel 13 is 480 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
13	34-21-237-000	2	Oct-16	$186,000	1997	2,328	$79.90

Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
712 Columbus Rd	32-39-134-005	1.26	Jun-16	$166,000	1950	2,100	$79.05
504 N 2782 Rd	18-13-115-000	2.68	Oct-12	$154,000	1980	2,800	$55.00
7720 S Dwight Rd	11-09-300-004	1.14	Nov-16	$191,000	1919	2,772	$68.90
701 N 2050th Rd	26-20-105-000	1.97	Aug-13	$200,000	2000	2,200	$90.91
9955 E 1600th St	04-13-200-007	1.98	May-13	$181,858	1991	2,600	$69.95

		Adjustments		
TAX ID	**Date Sold**	**Time**	**Total**	**$/Sf**
34-21-237-000	Oct-16		$186,000	$79.90
32-39-134-005	Jun-16		$166,000	$79.05
18-13-115-000	Oct-12	$12,320	$166,320	$59.40
11-09-300-004	Nov-16		$191,000	$68.90
26-20-105-000	Aug-13	$12,000	$212,000	$96.36
04-13-200-007	May-13	$10,911	$192,769	$74.14

	Adjoins Solar Farm		**Not Adjoin Solar Farm**	
	Average	**Median**	**Average**	**Median**
Sales Price/SF	$79.90	$79.90	$75.57	$74.14
GBA	2,328	2,328	2,494	2,600

Based on the matched pairs I find no indication of negative impact due to proximity to the solar farm.

The most similar comparable is the home on Columbus that sold for $79.05 per square foot. This is higher than the median rate for all of the comparables. Applying that price per square foot to the subject property square footage indicates a value of $184,000.

There is minimal landscaping separating this solar farm from nearby properties and is therefore considered light.

6. Matched Pair – Portage Solar, Portage, Porter County, IN

This solar farm has a 2 MW output and is located on a portion of a 56-acre tract. The project was built in 2012. As can be seen by the more recent map, Lennar Homes is now developing a new subdivision on the vacant land just west of this solar farm.

I have considered the recent sale of Parcels 5 and 12. Parcel 5 is an undeveloped tract, while Parcel 12 is a residential home. I have compared each to a set of comparable sales to determine if there was any impact due to the adjoining solar farm. This home is 1,320 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
12	64-06-19-326-007.000-015	1.00	Sep-13	$149,800	1964	1,776	$84.35

Nearby Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2501 Architect Dr	64-04-32-202-004.000-021	1.31	Nov-15	$191,500	1959	2,064	$92.78
336 E 1050 N	64-07-09-326-003.000-005	1.07	Jan-13	$155,000	1980	1,908	$81.24
2572 Pryor Rd	64-05-14-204-006.000-016	1.00	Jan-16	$216,000	1960	2,348	$91.99

Adjoining Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
5	64-06-19-200-003.000-015	18.70	Feb-14	$149,600	$8,000

Nearby Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
	64-07-22-401-001.000-005	74.35	Jun-17	$520,450	$7,000
	64-15-08-200-010.000-001	15.02	Jan-17	$115,000	$7,658

Residential Sale Adjustment Chart

		Adjustments		
TAX ID	Date Sold	Time	Total	$/Sf
64-06-19-326-007.000-015	Sep-13	$8,988	$158,788	$89.41
64-04-32-202-004.000-021	Nov-15	$3,830	$195,330	$94.64
64-07-09-326-003.000-005	Jan-13	$9,300	$164,300	$86.11
64-05-14-204-006.000-016	Jan-16		$216,000	$91.99

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$89.41	$89.41	$90.91	$91.99
GBA	1,776	1,776	2,107	2,064

After adjusting the price per square foot is 2.88% less for the home adjoining the solar farm versus those not adjoining the solar farm. This is within the typical range of variation to be anticipated in any real estate transaction and indicates no impact on property value.

Applying the price per square foot for the 336 E 1050 N sale, which is the most similar to the Parcel 12 sale, the adjusted price at $81.24 per square foot applied to the Parcel 12 square footage yields a value of $144,282.

The landscaping separating this solar farm from the homes is considered light.

Land Sale Adjustment Chart

		Adjustments		
TAX ID	**Date Sold**	**Time**	**Total**	**$/Acre**
64-06-19-200-003.000-015	Feb-14	$8,976	$158,576	$8,480
64-07-22-401-001.000-005	Jun-17		$520,450	$7,000
64-15-08-200-010.000-001	Jan-17		$115,000	$7,658

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	**Median**	**Average**	**Median**
Sales Price/Ac	$8,480	$8,480	$7,329	$7,329
Acres	18.70	18.70	44.68	44.68

After adjusting the price per acre is higher for the property adjoining the solar farm, but the average and median size considered is higher which suggests a slight discount. This set of matched pair supports no indication of negative impact due to the adjoining solar farm.

Alternatively, adjusting the 2017 sales back to 2014 I derive an indicated price per acre for the comparables at $6,580 per acre to $7,198 per acre, which I compare to the unadjusted subject property sale at $8,000 per acre.

7. Matched Pair – Dominion Indy III, Indianapolis, Marion County, IN

This solar farm has an 8.6 MW output and is located on a portion of a 134-acre tract. The project was built in 2013.

There are a number of homes on small lots located along the northern boundary and I have considered several sales of these homes. I have compared those homes to a set of nearby not adjoining home sales as shown below. The adjoining homes that sold range from 380 to 420 feet from the nearest solar panel, with an average of 400 feet. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2	2013249	0.38	12/9/2015	$140,000	2006	2,412	$58.04
4	2013251	0.23	9/6/2017	$160,000	2006	2,412	$66.33
5	2013252	0.23	5/10/2017	$147,000	2009	2,028	$72.49
11	2013258	0.23	12/9/2015	$131,750	2011	2,190	$60.16
13	2013260	0.23	3/4/2015	$127,000	2005	2,080	$61.06
14	2013261	0.23	2/3/2014	$120,000	2010	2,136	$56.18

Nearby Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
5836 Sable Dr	2013277	0.14	Jun-16	$141,000	2005	2,280	$61.84
5928 Mosaic Pl	2013845	0.17	Sep-15	$145,000	2007	2,280	$63.60
5904 Minden Dr	2012912	0.16	May-16	$130,000	2004	2,252	$57.73
5910 Mosaic Pl	2000178	0.15	Aug-16	$146,000	2009	2,360	$61.86
5723 Minden Dr	2012866	0.26	Nov-16	$139,900	2005	2,492	$56.14

		Adjustments		
TAX ID	**Date Sold**	**Time**	**Total**	**$/Sf**
2013249	12/9/2015	$5,600	$145,600	$60.36
2013251	9/6/2017		$160,000	$66.33
2013252	5/10/2017		$147,000	$72.49
2013258	12/9/2015	$5,270	$137,020	$62.57
2013260	3/4/2015	$5,080	$132,080	$63.50
2013261	2/3/2014	$7,200	$127,200	$59.55
2013277	6/1/2016	$2,820	$143,820	$63.08
2013845	9/1/2015	$5,800	$150,800	$66.14
2012912	5/1/2016	$2,600	$132,600	$58.88
2000178	8/1/2016	$2,920	$148,920	$63.10
2012866	11/1/2016	$2,798	$142,698	$57.26

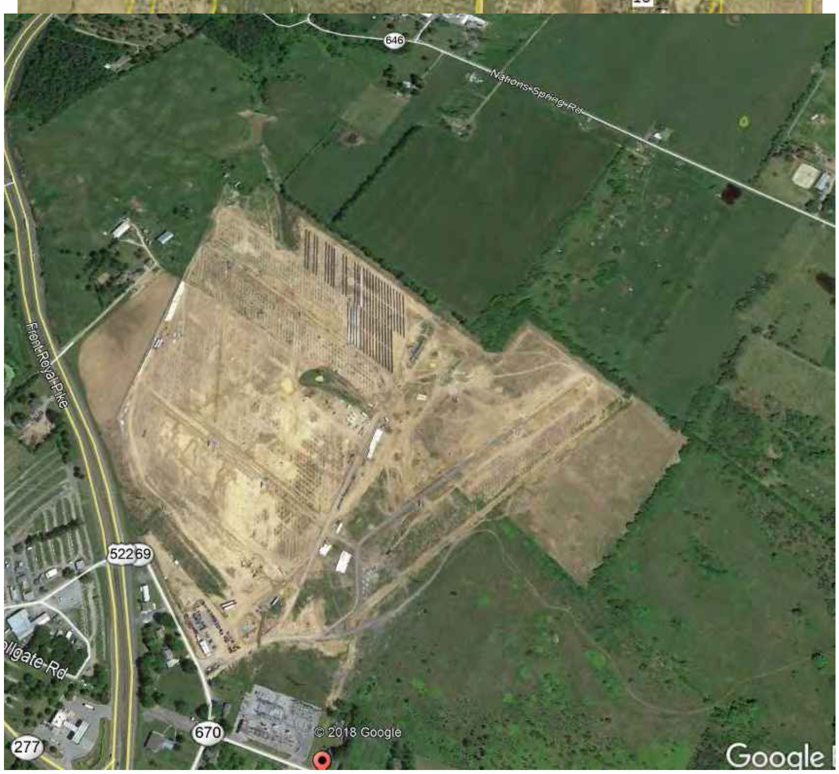
2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	**Median**	**Average**	**Median**
Sales Price/SF	$64.13	$63.03	$61.69	$63.08
GBA	2,210	2,163	2,333	2,280

This set of homes provides very strong indication of no impact due to the adjacency to the solar farm and includes a large selection of homes both adjoining and not adjoining in the analysis.

The landscaping screen is considered light in relation to the homes considered above.

8. Matched Pair – Clarke County Solar, Double Tollgate Road, White Post, Clarke County, VA



This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered a recent sale or Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction.

I've compared this home sale to a number of similar rural homes on similar parcels as shown below. I have used multiple sales that bracket the subject property in terms of sale date, year built, gross living area, bedrooms and bathrooms. Bracketing the parameters insures that all factors are well balanced out in the adjustments. The trend for these sales shows a positive value for the adjacency to the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	Unfin bsmt
Not	85 Ashby	5.09	9/11/2017	$315,000	1982	2,333	$135.02	3/2	2 Gar	Ranch	
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	1986	3,157	$117.20	4/4	2 Gar	2 story	
Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	3 Gar	2 story	
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Drive	Ranch	

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Time**	**Acres**	**YB**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000								$295,000	
Not	85 Ashby	5.09	9/11/2017	$315,000	-$6,300		-$6,615	-$38,116		-$7,000	$15,000	$271,969	8%
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	-$18,500		-$18,130	-$62,057		-$7,000	$15,000	$279,313	5%
Not	4174 Rockland	5.06	1/2/2017	$300,000			-$23,100	-$15,782		-$12,000	$15,000	$264,118	10%
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	-$9,000	$43,000	$5,040	$20,571	$10,000	$3,000	$15,000	$267,611	9%
												Average	8%

The landscaping screen is primarily a newly planted buffer with a row of existing trees being maintained near the northern boundary and considered light.

<u>9. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, New Kent County, VA</u>

This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A limited buffering remains along the road with natural growth being encouraged, but currently the panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
									Average Diff	0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property as it was such a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

10. Matched Pair – Sappony Solar, Stony Creek, Sussex County, VA

This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

I have considered the 2018 sale of Parcel 17 as shown below. From Parcel 17 the retained trees and setbacks are a light to medium landscaped buffer.

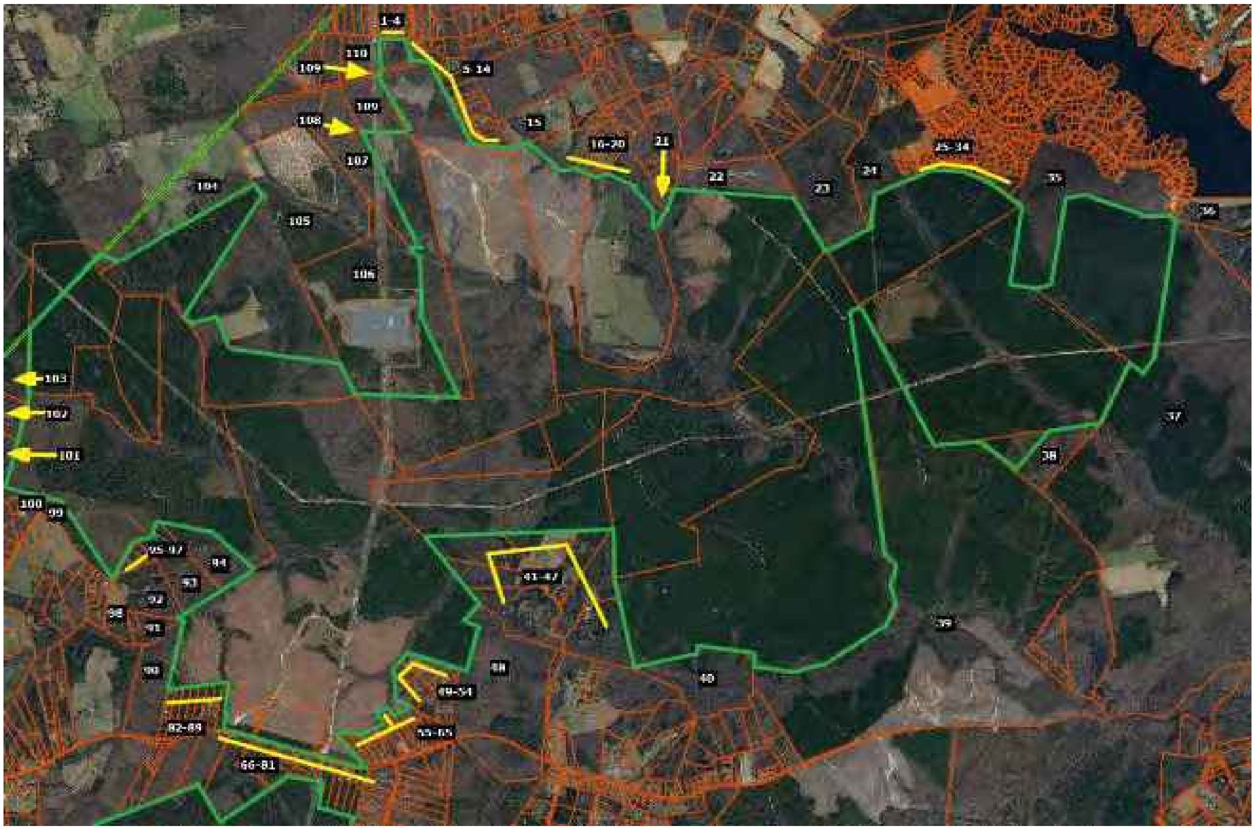
Adjoining Residential Sales After Solar Farm Approved

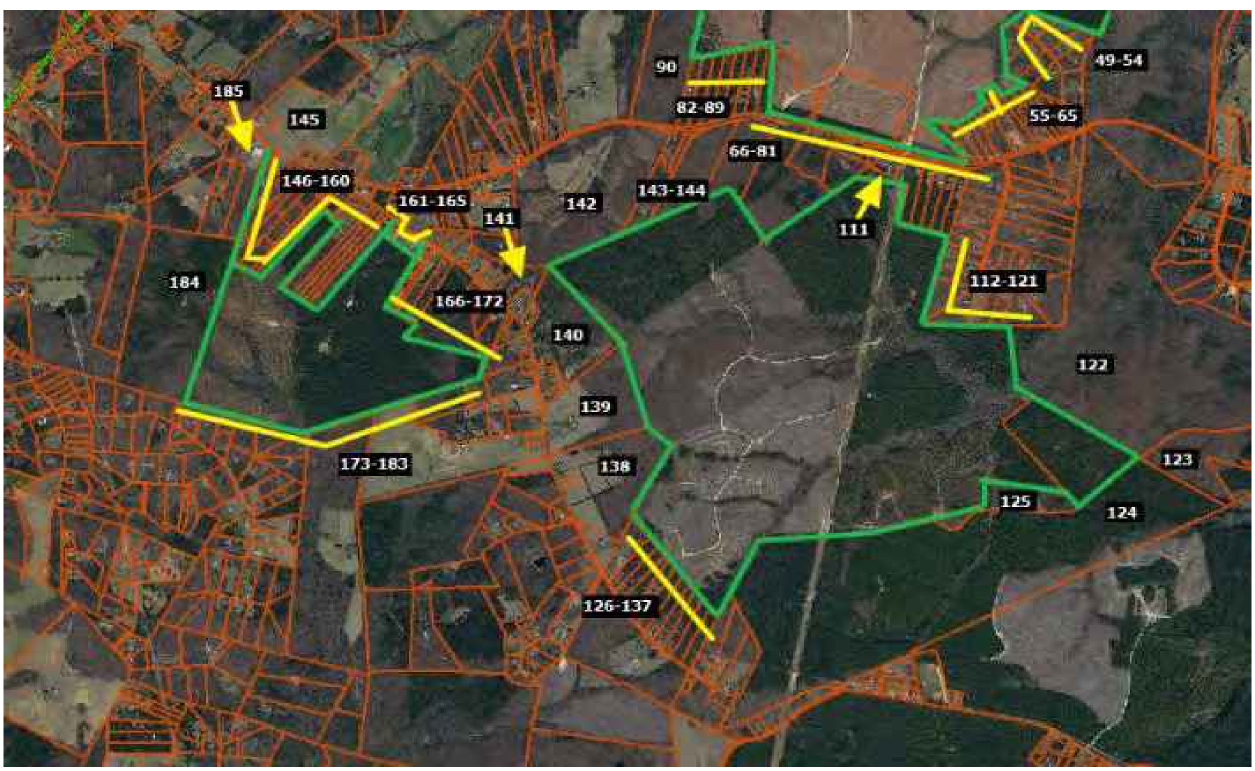
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

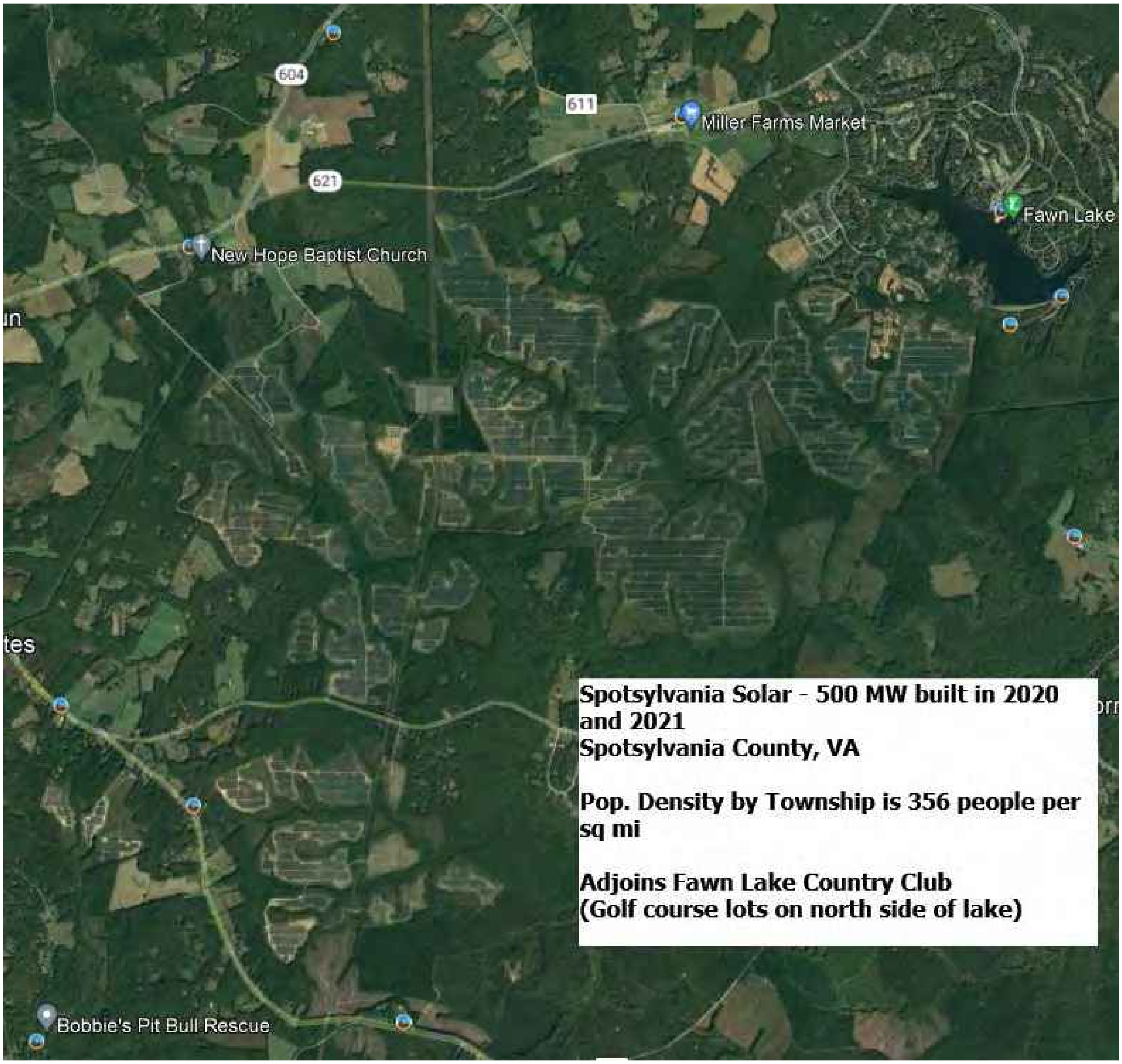
Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

11. Matched Pair – Spotsylvania Solar, Paytes, Spotsylvania County, VA







This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
							Average Diff		4%	

I contacted Keith Snider to confirm this sale. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
							Average Diff		2%	

I contacted Annette Roberts with ReMax about this transaction. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
							Average Diff		-4%	

I contacted Joy Pearson with CTI Real Estate about this transaction. This is considered to have a heavy landscaping screen.

All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three show no indication of any impact on property value.

There are a couple of recent lot sales located along Southview Court that have sold since the solar farm was approved. The most recent lot sales include 11700 Southview Court that sold on December 29, 2021 for $140,000 for a 0.76-acre lot. This property was on the market for less than 2 months before closing within 6% of the asking price. This lot sold earlier in September 2019 for $55,000 based on a liquidation sale from NTS to an investor.

A similar 0.68-acre lot at 11507 Stonewood Court within the same subdivision located away from the solar farm sold on March 9, 2021 for $109,000. This lot sold for 18% over the asking price within 1 month of listing suggesting that this was priced too low. Adjusting this lot value upward by 12% for very strong growth in the market over 2021, the adjusted indicated value is $122,080 for this lot. This is still showing a 15% premium for the lot backing up to the solar farm.

The lot at 11009 Southview Court sold on August 5, 2019 for $65,000, which is significantly lower than the more recent sales. This lot was sold by NTS the original developer of this subdivision, who was in the process of liquidating lots in this subdivision with multiple lot sales in this time period throughout the subdivision being sold at discounted prices. The home was later improved by the buyer with a home built in 2020 with 2,430 square feet ranch, 3.5 bathrooms, with a full basement, and a current assessed value of $492,300.

I spoke with Chris Kalia, MAI, Mark Doherty, local real estate investor, and Alex Doherty, broker, who are all three familiar with this subdivision and activity in this neighborhood. All three indicated that there was a deep sell off of lots in the neighborhood by NTS at discounted prices under $100,000 each. Those lots since that time are being sold for up to $140,000. The prices paid for the lots below $100,000 were liquidation values and not indicative of market value. Homes are being built in the neighborhood on those lots with home prices ranging from $600,000 to $800,000 with no sign of impact on pricing due to the solar farm according to all three sources.

Fawn Lake Lot Sales

Parcel		Solar?	Address	Acres	Sale Date	Sale Price	Ad. For Time	% Diff
A		Adjoins	11700 Southview Ct	0.76	12/29/2021	$140,000		
	1	1 parcel away	11603 Southview Ct	0.44	3/31/2022	$140,000	$141,960	-1.4%
	2	Not adjoin	11507 Stonewood Ct	0.68	3/9/2021	$109,000	$118,374	15.4%
	3	Not adjoin	11312 Westgate Wy	0.83	10/15/2020	$125,000	$142,000	-1.4%
	4	Not adjoin	11409 Darkstone Pl	0.589	9/23/2021	$118,000	$118,000	15.7%

Average	7.1%
Median	7.0%
Least Adjusted	15.7%
2nd Least Adjusted	-1.4%
(Parcel 1 off solar farm)	

Time Adjustments are based on the FHFA Housing Price Index

I have identified additional home sales after construction was complete. I looked at 11710 Southview Court that sold on May 5, 2022. I have compared that to three similar homes built and sold in the same time frame in the same community but not near the solar farm. The first two comparables are in close proximity to Fawn Lake and may have some mild enhancement from that proximity, but I made no adjustment for that factor.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	11710 Soutview	0.89	5/5/2022	$767,945	2022	3,740	$205.33	5/4.5	2Gar	2-Story	UnBsmt
Not	11305 Hidden	0.57	2/18/2022	$789,905	2022	3,750	$210.64	4/3.5	2Gar	2-Story	PrtFinBsmt
Not	10501 Ridge Cv	0.57	12/30/2021	$737,119	2021	3,535	$208.52	6/4	2Gar	2-Story	UnBsmt
Not	10919 Grn Lf	0.39	6/16/2022	$739,990	2022	3,768	$196.39	4/4.5	2Gar	2-Story	UnBsmt

	Adjoining Sales Adjusted									
Address	**Time**	**Ac/Loc**	**YB**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**	**Dist**
11710 Soutview								$767,945		435
11305 Hidden	$18,092		$0	-$843	$15,000		-$20,000	$802,155	-4%	
10501 Ridge Cv	$27,990		$0	$17,099	$10,000			$792,208	-3%	
10919 Grn Lf	-$9,366		$0	-$2,200				$728,424	5%	
								Average Diff	-1%	

I identified a sale at 11708 Southview Court that sold on September 1, 2021 for $623,345. The first comparable required a significant adjustment for the unfinished basement, but otherwise required the least adjusting. In this time of rapid home value increase, I consider the sale closest in time to be the best indicator for this paired sale.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	11606 Aprils	0.73	9/7/2023	$711,400	2023	2,745	$259.16	4/3	2Gar	2-Story	UnBsmt
Not	11701 Quail Rn	0.44	7/26/2023	$650,000	2020	2,588	$251.16	3/2.5	2Gar	2-Story	
Not	11809 Pheasant	0.36	10/3/2022	$629,510	2022	2,612	$241.01	3/2	2Gar	2-Story	UnBsmt
Not	10908 Grn Lf	0.43	2/16/2023	$774,760	2023	2,927	$264.69	5/4	2Gar	2-Story	UnBsmt

	Adjoining Sales Adjusted									
Address	**Time**	**Ac/Loc**	**YB**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**	**Dist**
11606 Aprils								$711,400		410
11701 Quail Rn	$5,360		$9,750	$15,773	$10,000		$32,500	$723,383	-2%	
11809 Pheasant	$40,927		$0	$12,822	$15,000			$698,258	2%	
10908 Grn Lf	$30,163		$0	-$19,270	-$15,000			$770,653	-8%	
								Average Diff	-3%	

12. Matched Pair – Whitehorn Solar, Gretna, Pittsylvania County, VA

This project was built in 2021 for a solar project with 50 MW. Adjoining uses are residential and agricultural. There was a sale located at 1120 Taylors Mill Road that sold on December 20, 2021, which is about the time the solar farm was completed. This sold for $224,000 for 2.02 acres with a 2,079 s.f. mobile home on it that was built in 2010. The property was listed for $224,000 and sold for that same price within two months (went under contract almost exactly 30 days from listing). This sales price works out to $108 per square foot. This home is 255 feet from the nearest panel.

I have compared this sale to an August 20, 2020 sale at 1000 Long Branch Drive that included 5.10 acres with a 1,980 s.f. mobile home that was built in 1993 and sold for $162,000, or $81.82 per square foot. Adjusting this upward for significant growth between this sale date and December 2021 relied on data provided by the FHFA House Pricing Index, which indicates that for homes in the Roanoke, VA MSA would be expected to appreciate from $162,000 to $191,000 over that period of time. Using $191,000 as the effective value as of the date of comparison, the indicated value of this sale works out to $96.46 per square foot. Adjusting this upward by 17% for the difference in year built, but downward by 5% for the much larger lot size at this comparable, I derive an adjusted indication of value of $213,920, or $108 per square foot.

This indicates no impact on value attributable to the new solar farm located across from the home on Taylors Mill Road.

13. Matched Pair – Altavista Solar, Altavista, Campbell County, VA

This project was mostly built in 2021 with final construction finished in 2022. This is an 80 MW facility on 720 acres just north of Roanoke River and west of Altavista. Adjoining uses are residential and agricultural.

I have done a Sale/Resale analysis of 3211 Leesville Road which is approximately 540 feet from the nearest solar panel. There was an existing row of trees between this home and the panels that was supplemented with additional screening for a narrow landscaped buffer between the home and the solar panels.

This home sold in December 2018 for $72,500 for this 1,451 s.f. home built in 1940 with a number of additional outbuildings on 3.35 acres. This was before any announcement of a solar farm. This home sold again on March 28, 2022 for $124,048 after the solar farm was constructed. This shows a 71% increase in value on this property since 2018. There was significant growth in the market between these dates and to accurately reflect that I have considered the FHFA House Price Index that is specific for the Lynchburg area of Virginia (the closest regional category), which shows an expected increase in home values over that same time period of 33.8%, which would suggest a normal growth in value up to $97,000. The home sold for significantly more than this which certainly does not support a finding of a negative impact and in fact suggests a significant positive impact. However, I was not able to discuss this sale with the broker and it is possible that the home also was renovated between 2018 and 2022, which may account for that additional increase in value. Still given that the home increased in value so significantly over the initial amount there is no sign of any negative impact due to the solar farm adjacency, but I have not included this datapoint in the charts as it shows a substantial outlier enhancement due to adjoining a solar project which is likely attributable to renovations and not an actual enhancement.

Similarly, I looked at 3026 Bishop Creek Road that is approximately 600 feet from the nearest solar panel. This home sold on July 16, 2019 for $120,000, which was before construction of the solar farm. This home sold again on February 23, 2022 for $150,000. This shows a 25% increase in value over that time period. Using the same FHFA House Price Index Calculator, the expected increase in value was 29.2% for an indicated expected value of $155,000. This is within 3% of the actual closed price, which supports a finding of no impact from the solar farm. This home has a dense wooded area between it and the adjoining solar farm.

I also considered 2049 Bishop Creek Road that sold on July 3, 2023. This home included a pool and in the analysis I made no consideration positive or negative for the pool among the comparables. The comparable at 3270 Wards has a partially finished basement instead of a fully finished basement, but I was unable to determine how much that partial indicated. I will focus on the other two paired sales which range from -5% to +4% impacts and support a finding of no impact on property value.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Nearby	2049 Bishop Crk	3.72	7/3/2023	$375,000	1970	3,966	$94.55	3/3	2Gar	Br Rnch	FinBsmt/Pool
Not	56 Whisper. Pn	1.02	2/29/2024	$375,000	1988	3,548	$105.69	5/3	2Gar	Br Rnch	FinBsmt
Not	1900 Woodhaven	1.90	8/31/2022	$355,000	1969	3,643	$97.45	3/2/2	2Gar	Br Rnch	FinBsmt
Not	3270 Wards	3.60	9/21/2023	$325,000	1960	3,564	$91.19	3/2.5	2Gar	Br Rnch	PrtFn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
2049 Bishop Crk								$375,000		745
56 Whisper. Pn	-$17,332	$20,000	-$33,750	$17,672				$361,590	4%	
1900 Woodhaven	$20,833	$10,000	$1,775	$12,590	-$5,000			$395,198	-5%	
3270 Wards	-$4,986		$16,250	$14,663	$10,000			$360,927	4%	
							Average Diff		1%	

14. Matched Pair – DG Amp Piqua, Piqua, Miami County, OH

This project is located on the southeast corner of Manier Street and N Washington Road, Piqua, OH. There are a number of nearby homes to the north, south and west of this solar farm.

I considered one adjoining sale and one nearby sale (one parcel off) that happened since the project was built in 2019. I did not consider the sale of a home located at Parcel 20 that happened in that time period as that property was marketed with damaged floors in the kitchen and bathroom, rusted baseboard heaters and generally was sold in an As-Is condition that makes it difficult to compare to move-in ready homes. I also did not consider some sales to the north that sold for prices significantly under $100,000. The homes in that community includes a wide range of smaller, older homes that have been selling for prices ranging from $25,000 to $80,000. I have not been tracking home sales under $100,000 as homes in that price range are less susceptible to external factors.

The adjoining sale at 6060 N Washington is a brick range fronting on a main road. I did not adjust the comparables for that factor despite the subdivision exposure on those comparables was superior. I considered the difference in lot size to be balancing factors. If I adjusted further for that main road frontage, then it would actually show a positive impact for adjoining the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
22	Adjoins	6060 N Washington	0.80	10/30/2019	$119,500	1961	1,404	$85.11	3/1	2 Gar	Br Rnch	Updates
	Not	1523 Amesbury	0.25	5/7/2020	$119,900	1973	1,316	$91.11	3/2	Gar	Br Rnch	Updates
	Not	1609 Haverhill	0.17	10/17/2019	$114,900	1974	1,531	$75.05	3/1	Gar	Br Rnch	Updates
	Not	1511 Sweetbriar	0.17	8/6/2020	$123,000	1972	1,373	$89.58	4/2	Gar	Br Rnch	Updates

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$119,500			155
-$1,920		-$7,194	$6,414	-$5,000	$7,500	$0	$119,700	0%		
$126		-$7,469	-$7,625		$7,500	$0	$107,432	10%		
-$2,913		-$6,765	$2,222	-$5,000	$7,500	$0	$118,044	1%		
									4%	

I also considered a home fronting on Plymouth Avenue which is one lot to the west of the solar farm with a rear view towards the solar farm. After adjustments this set of matched pairs shows no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Nearby	1011 Plymouth	0.21	2/24/2020	$113,000	1973	1,373	$82.30	4/2	Gar	1.5 Stry	Fnce/Shd
	Not	1630 Haverhill	0.32	8/18/2019	$94,900	1973	1,373	$69.12	4/2	Gar	1.5 Stry	N/A
	Not	1720 Williams	0.17	12/4/2019	$119,900	1968	1,682	$71.28	4/1	2Gar	1.5 Br	Fnce/Shd
	Not	1710 Cambridge	0.17	1/22/2018	$116,000	1968	1,648	$70.39	4/2	Det 2	1.5 Br	Fnce/Shd

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$113,000			585
$1,519		$0	$0			$10,000	$106,419	6%		
$829		$2,998	-$17,621	$5,000			$111,105	2%		
$7,459		$2,900	-$15,485				$110,873	2%		
									3%	

I considered a home located at 6010 N Washington that sold on August 3, 2021. This property was sold with significant upgrades that made it more challenging to compare, but I focused on similar older brick ranches with updates in the analysis. The comparables suggest an enhancement to this property due to proximity from the solar farm, but it is more likely that the upgrades at the subject were superior. Still this strongly supports a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
24	Adjoins	6010 N Washington	0.80	8/3/2021	$176,900	1961	1,448	$122.17	4/2	2 Gar	Br Ranch	Updates
	Not	1244 Severs	0.19	10/29/2021	$149,900	1962	1,392	$107.69	3/2	Gar	Br Ranch	Updates
	Not	1515 Amesbury	0.19	5/5/2022	$156,500	1973	1,275	$122.75	3/2	2 Gar	Br Ranch	Updates
	Not	1834 Wilshire	0.21	12/3/2021	$168,900	1979	1,265	$133.52	3/2	2 Gar	Br Ranch	Updates

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$176,900			155
-$1,099		-$750	$4,221		$7,000		$159,273	10%		
-$3,627		-$9,390	$16,988				$160,471	9%		
-$1,736		-$14,357	$19,547				$172,354	3%		
									7%	

I considered a home located at 6240 N Washington that sold on October 15, 2021. The paired sale located at 532 Wilson included a sunroom that I did not adjust for. The -4% impact from that sale is related to that property having a superior sunroom and not related to proximity to the solar farm. The other two comparables strongly support that assertion as well as a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	6240 N Washington	1.40	10/15/2021	$155,000	1962	1,582	$97.98	2/1	Det 3	Ranch	
	Not	1408 Brooks	0.13	8/20/2021	$105,000	1957	1,344	$78.13	3/1	Drive	Ranch	
	Not	532 Wilson	0.14	7/29/2021	$159,900	1948	1,710	$93.51	3/2	Det Gar	Ranch	Sunroom
	Not	424 Pinewood	0.17	5/20/2022	$151,000	1960	1,548	$97.55	4/2	Gar	Ranch	

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$155,000			160
$496		$2,625	$13,016		$15,000		$136,136	12%		
$1,051		$11,193	-$9,575	-$10,000	$8,000		$160,569	-4%		
-$2,761		-$2,265	$2,653	-$10,000	$7,000		$145,627	6%		
									5%	

Based on these four matched pairs, the data at this solar farm supports a finding of no impact on property value due to the proximity of the solar farm for homes as close as 155 feet.

I also identified three new construction home sales on Arrowhead Drive that sold in 2022. I have reached out to the builder regarding those homes, but these homes sold between $250,000 and $275,000 each and were located within 350 feet of the solar farm. These sales show that the presence of the solar farm is not inhibiting new home construction in proximity to the solar farm.

15. Matched Pair – Solidago Solar, Windsor, Isle of Wight County, VA

This 20 MW solar farm was completed in March 2024. The closest adjoining home is 350 feet away.

The home located just north of this solar farm at 17479 Courthouse Highway, Windsor on December 28, 2023 for $555,000 for this 4 BR, 2.5 BA with 2,775 s.f. built in 2001 on 3.62 acres with a 2-car garage. This also includes a 4 bay barn and large metal storage building, which complicates using this home for paired sales analysis. The purchase price works out to $200 per s.f. The tax card allocates $23,000 to the two outbuildings (assessed value), which I will use in adjusting the comparables. This home is 610 feet from the nearest solar panel.

I have compared this to 15414 Trump Town Road, Windsor that sold on September 22, 2023 for $463,000 for a 4 BR, 2.5 BA home with 2,583 s.f. built in 1998 on 1.88 acres with a 2-car garage. The purchase price works out to $179.25 per s.f. Adjusting the price upward by $18,000 for the additional acreage and $23,000 for the outbuildings, the indicated price becomes $514,000, or $198.99 per s.f. I made no adjustment for the difference in frontage but Courthouse Highway is a busier road than Trump Town Road, which is inferior. If I adjusted for that road frontage difference, the Trump Town Road sales price would go even lower. The adjusted sales price is 1% less than the price of the home next to the solar farm sold for and supports a finding of no impact on property value. Applying that per s.f. rate to the home size at Courthouse Highway indicates an adjusted value of $552,197, which is also just 1% less than the sales price of the home adjoining the solar farm.

I also considered 11497 Dews Plantation Road, Ivor, which the broker Anna Boyer suggested was a good comparable. This home sold on October 19, 2023 for $640,000 for a 3 BR, 2.5 BA with 2,684 s.f., built in 2003 with a 2-car garage on 15.20 acres. This home includes a powered horse barn with 4 stalls and a tack room, an additional 2-car detached garage with a finished room over it and fenced pasture. Adjusting the price downward by $58,000 for the much larger acreage and $41,000 for the outbuildings (difference in assessed value of relative outbuildings) the adjusted sales price is $541,000, or $201.56 per s.f. This is 1% more than the home at Courthouse Highway without making any adjustment for the difference in frontage, which supports a finding of no impact on property value. Applying that per s.f. rate to the home size at Courthouse Highway indicates an adjusted value of $559,329, which is also just 1% more than the sales price of the home adjoining the solar farm. I consider both of these reasonable comparisons, but the Trump Town Road comparable is closer and required less adjusting, which makes it a more reliable comparable.

I reached out to Anna Boyer with Howard Hanna Smithfield as the listing broker for this home. She indicated that she believed that the solar farm was a big issue for a number of folks who came to look at this home and it could have impacted the sales price. However, she also indicated that while she initially listed the property for $625,000, her internal analysis suggested a value of $550,000 and she only listed it at the higher price due to the owner's insistence. She noted that $550,000 was her opinion assuming no impact from the solar farm. When they later dropped the asking price to $559,000, they received an offer quickly and the property appraised and sold for $555,000. She noted that the appraiser indicated that the solar farm would not impact the value and assigned no impact on the appraisal. The closing price was slightly above the broker's opinion of value and supported by the appraisal with no impact from the adjoining solar farm.

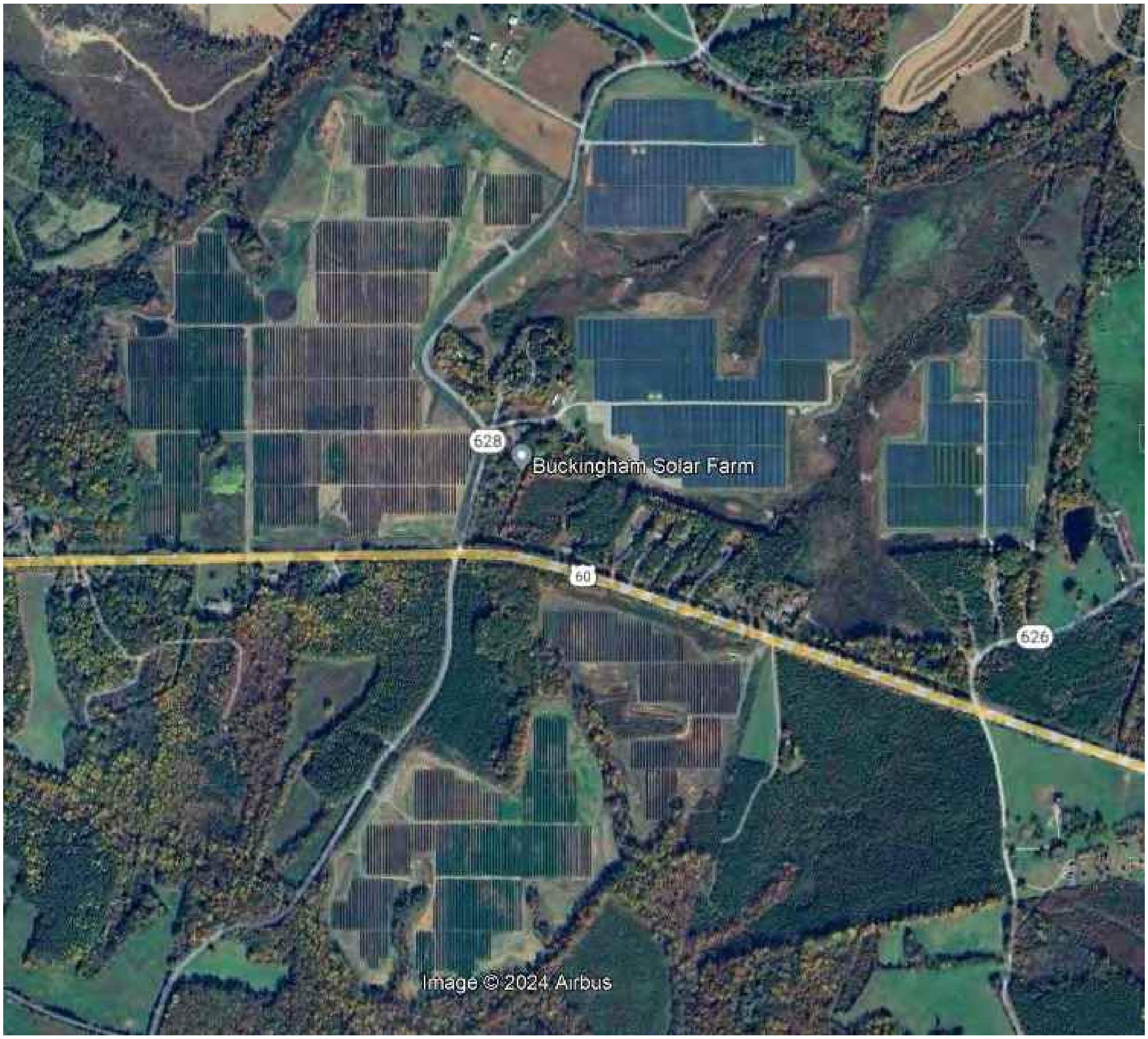
Ms. Boyer indicated that she currently has a listing at 6568 Beechland Road, Elberon that is asking $585,000 for a 4 BR, 3.5 BA with 2,800 s.f. built in 2000 on 9.33 acres with a 2-car garage and a detached garage with a workshop. This has been on the market for 55 days so far and she has had a number of potential buyers express concern over the adjoining solar farm. This illustrates that for some buyers the solar farm will be a deterrent, but she also noted that some potential buyers have indicated that the solar farm is protection from future development nearby.

The home located at 12256 Redhouse Road sold on February 8, 2024 for $671,650 for this 2,640 s.f. home with 3 BR, 2 full BA and 2 half BA built in 2002 on 21 acres, or $254.41 per s.f. Given that this home includes an updated kitchen, bar/entertainment room, 4-stall barn with feed and wash stalls and stable room with electrical fencing for pastures, riding ring and other horse features this becomes a difficult home to use for a paired sales analysis. I reached out to Anna Hansen with Surry Side Realty about this sale. She said that while she expected a certain amount of pushback from the solar farm she did not have any negative comments or impacts from the solar farm and it therefore did not impact the sales price or marketing of this home. This home is 640 feet from the nearest panel.

While it is challenging to find a good comparable, I considered 11497 Dews Plantation Road, Ivor, which has similar pasture and a horse features. This home sold on October 19, 2023 for $640,000 for a 3 BR, 2.5 BA with 2,684 s.f., built in 2003 with a 2-car garage on 15.20 acres. This home includes a powered horse barn with 4 stalls and a tack room, an additional 2-car detached garage with a finished room over it and fenced pasture. Adjusting the price upward by $25,000 for the smaller acreage and assuming that the horse features balance out, the adjusted sales price is $665,000, or $247.76 per s.f. This is 3% less than the home at Redhouse Road, which supports a finding of no impact on property value.

Interestingly, Ms. Anna Boyer indicated that she did bring a prospective buyer to view 12256 Redhouse Road. That buyer visited the site 3 times before deciding that the solar farm would be the reason she did not want to purchase that home. So while there clearly are purchasers in the market that would not purchase a home next to a solar farm, there are enough other buyers that do not see it as a negative to keep the prices stable as illustrated by the paired sales above.

16. Matched Pair – Buckingham Solar, Cumberland, Buckingham County, VA



Buckingham Solar is a 19.8 MW project east of 628 shown above, while Energix Buckingham is a 20 MW project west of 628 shown above.

The closest adjoining home is 125 feet from the nearest panel.

1 - I identified 24081 E James Anderson Highway sold on June 2, 2023 for $160,000 for a 3 BR, 2BA, 1,248 s.f. manufactured home built in 1999 on 1 acre. This home is 380 feet from the solar panels south of US 60 and 760 feet from the solar panels to the north. The sales price works out to $128.21 per s.f.

I compared that to 755 High School Road that sold on September 8, 2023 for $190,000 for a 3 BR, 2BA, 1,296 s.f. manufactured home built in 2007 on 2.04 acres and including a detached workshop with power. Adjusting this sale downward by $5,000 for the difference in lot size, $7,600 for difference in building age (based on 0.5% per year difference in age), and $15,000 for the detached workshop for an adjusted indication of value of $162,400, or $125.31 per s.f. This supports a finding of no impact on property value for the home at 24081 E James Anderson Highway due to the solar farm proximity.

2 - I also identified 23225 E James Anderson Highway that sold on June 30, 2023 for $180,000 for a 2 BR, 1 BA, 1,076 s.f. home built in 1958 on 1.50 acres with a 2-car garage and a full unfinished basement. This home is 560 feet from the nearest solar panel.

I compared that to 17534 E James Anderson Highway that sold on January 24, 2024 for $205,000 for a 3 BR, 2 BA, 1,218 s.f. home built in 1968 on 2 acres with a carport and detached 2 car garage and a full unfinished basement. Adjusting this sale downward by $10,000 for the extra bathroom and $9,560 for the larger size of this home (based on 40% of the per s.f. value for the difference in s.f.), the adjusted indication of value is $185,440, which is within 3% of the property next to the solar farm. This difference is more likely attributable to the extra 0.50 acres at this site that I did not adjust for, but either way is within typical market imperfection and supports a finding of no impact on property value.

Conclusion

The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in far more urban areas. The median income for the population within 1 mile of a solar farm among this subset of matched pairs is $60,657 with a median housing unit value of $204,423. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in other states over $1,600,000 in price adjoining large solar farms. The predominate adjoining uses are residential and agricultural. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Kentucky and adjoining states as well as the proposed subject property.

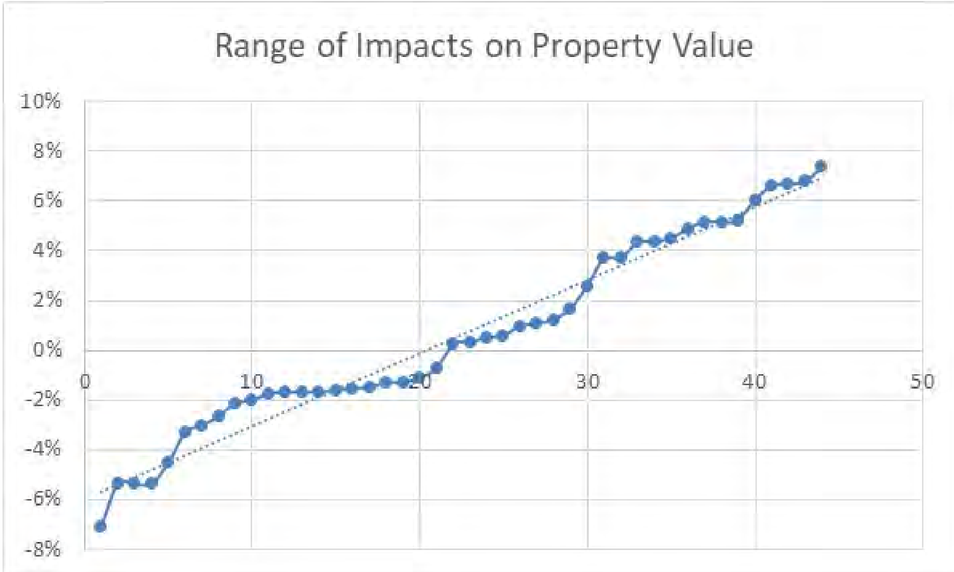
Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

Matched Pair Summary							Adj. Uses By Acreage				1 mile Radius (2010-2023 Data)		
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit
1	Crittenden	Crittenden	KY	34	2.70	40	22%	51%	27%	0%	1,419	$60,198	$178,643
2	Walton 2	Walton	KY	58	2.00	90	21%	0%	60%	19%	880	$81,709	$277,717
3	Turkey Crk	Lancaster	KY	753	50.00	120	7%	36%	51%	6%	257	$52,892	$221,809
4	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746
5	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
6	Portage	Portage	IN	56	2.00	0	19%	81%	0%	0%	6,642	$65,695	$186,463
7	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515
8	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
9	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
10	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
11	Spotyslvania	Paytes	VA	3,500	615.00	160	37%	52%	11%	0%	74	$120,861	$483,333
12	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
13	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
14	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555
15	Solidago	Isle of Wight	VA	193	20.00	N/A	N/A	N/A	N/A	N/A	62	$88,375	$312,500
16	Buckingham	Cumberland	VA	240	39.80	50	4%	6%	90%	0%	120	$59,445	$251,562
	Average			476	60.48	56	14%	54%	29%	2%	1,347	$65,418	$243,440
	Median			193	20.00	50	13%	52%	20%	0%	230	$60,657	$204,423
	High			3,500	615.00	160	37%	98%	90%	19%	6,735	$120,861	$483,333
	Low			34	2.00	0	2%	0%	0%	0%	7	$38,919	$96,555

These are very similar to the demographics shown around these comparable solar farms.

On the following page is a summary of the 44 matched pairs for all of the solar farms noted above. They show a pattern of results from -7% to +7% with a median of 0% and an average of +1%.

As can be seen in the chart of those results below, most of the data points are between -5% and +5%. This variability is common with real estate and consistent with market imperfection. I therefore conclude that these results strongly support an indication of no impact on property value due to the adjacent solar farm.


Range of Impacts on Property Value
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
0
10
20
30
40
50

Residential Dwelling Matched Pairs Adjoining Solar Farms

Pair	Solar Farm	City	State	Area	MW	Approx Distance	Tax ID/Address	Sale Date	Sale Price	Adj. Price	% Diff
1	Portage	Portage	IN	Rural	2	1320	836 N 450 W	Sep-13	$149,800		
							336 E 1050 N	Jan-13	$155,000	$144,282	4%
2	Dominion	Indianapolis	IN	Rural	8.6	400	2013249 (Tax ID)	Dec-15	$140,000		
							5723 Minden	Nov-16	$139,900	$132,700	5%
3	Dominion	Indianapolis	IN	Rural	8.6	400	2013251 (Tax ID)	Sep-17	$160,000		
							5910 Mosaic	Aug-16	$146,000	$152,190	5%
4	Dominion	Indianapolis	IN	Rural	8.6	400	2013252 (Tax ID)	May-17	$147,000		
							5836 Sable	Jun-16	$141,000	$136,165	7%
5	Dominion	Indianapolis	IN	Rural	8.6	400	2013258 (Tax ID)	Dec-15	$131,750		
							5904 Minden	May-16	$130,000	$134,068	-2%
6	Dominion	Indianapolis	IN	Rural	8.6	400	2013260 (Tax ID)	Mar-15	$127,000		
							5904 Minden	May-16	$130,000	$128,957	-2%
7	Dominion	Indianapolis	IN	Rural	8.6	400	2013261 (Tax ID)	Feb-14	$120,000		
							5904 Minden	May-16	$130,000	$121,930	-2%
8	DG Amp	Piqua	OH	Suburban	12.6	155	6060 N Washington	Oct-19	$119,500		
							1511 Sweetbriar	Aug-20	$123,000	$118,044	1%
9	DG Amp	Piqua	OH	Suburban	12.6	585	1011 Plymouth	Feb-20	$113,000		
							1720 Williams	Dec-19	$119,900	$111,105	2%
10	DG Amp	Piqua	OH	Suburban	12.6	155	6010 N Washington	Aug-21	$176,900		
							1834 Wilshire	Dec-21	$168,900	$172,354	3%
11	DG Amp	Piqua	OH	Suburban	12.6	160	6240 N Washington	Oct-21	$155,000		
							424 Pinewood	May-22	$151,000	$145,627	6%
12	Spotsylvania	Paytes	VA	Rural	617	1270	12901 Orange Plnk	Aug-20	$319,900		
							12717 Flintlock	Dec-20	$290,000	$326,767	-2%
13	Spotsylvania	Paytes	VA	Rural	617	1950	9641 Nottoway	May-20	$449,900		
							11626 Forest	Aug-20	$489,900	$430,246	4%
14	Spotsylvania	Paytes	VA	Rural	617	1171	13353 Post Oak	Sep-20	$300,000		
							12810 Catharpin	Jan-20	$280,000	$299,008	0%
15	Walker	Barhamsville	VA	Rural	20	250	5241 Barham	Oct-18	$264,000		
							9252 Ordinary	Jun-19	$277,000	$246,581	7%
16	Clarke Cnty	White Post	VA	Rural	20	1230	833 Nations Spr	Aug-19	$385,000		
							2393 Old Chapel	Aug-20	$330,000	$389,286	-1%
17	Sappony	Stony Creek	VA	Rural	20	1425	12511 Palestine	Jul-18	$128,400		
							6494 Rocky Branch	Nov-18	$100,000	$131,842	-3%
18	Crittenden	Crittenden	KY	Suburban	2.7	373	250 Claiborne	Jan-19	$120,000		
							315 N Fork	May-19	$107,000	$120,889	-1%
19	Crittenden	Crittenden	KY	Suburban	2.7	488	300 Claiborne	Sep-18	$213,000		
							1795 Bay Valley	Dec-17	$231,200	$228,180	-7%
20	Crittenden	Crittenden	KY	Suburban	2.7	720	350 Claiborne	Jul-18	$245,000		
							2160 Sherman	Jun-19	$265,000	$248,225	-1%
21	Crittenden	Crittenden	KY	Suburban	2.7	930	370 Claiborne	Aug-19	$273,000		
							125 Lexington	Apr-18	$240,000	$254,751	7%
22	Crittenden	Crittenden	KY	Suburban	2.7	365	250 Claiborne	Jan-22	$210,000		
							240 Shawnee	Jun-21	$166,000	$219,563	-5%
23	Crittenden	Crittenden	KY	Suburban	2.7	390	260 Claiborne	Oct-21	$175,000		
							355 Oakwood	Oct-20	$186,000	$173,988	1%
24	Crittenden	Crittenden	KY	Suburban	2.7	570	300 Claiborne	Dec-21	$290,000		
							39 Pinhook	Mar-22	$299,000	$289,352	0%
25	Crittenden	Crittenden	KY	Suburban	2.7	1080	410 Claiborne	Feb-21	$275,000		
							114 Austin	Dec-20	$248,000	$279,680	-2%
26	Mulberry	Selmer	TN	Rural	5	400	0900A011	Jul-14	$130,000		
							099CA043	Feb-15	$148,900	$136,988	-5%
27	Mulberry	Selmer	TN	Rural	5	400	099CA002	Jul-15	$130,000		
							0990NA040	Mar-15	$120,000	$121,200	7%
28	Mulberry	Selmer	TN	Rural	5	480	491 Dusty	Oct-16	$176,000		
							35 April	Aug-16	$185,000	$178,283	-1%
29	Mulberry	Selmer	TN	Rural	5	650	297 Country	Sep-16	$150,000		
							53 Glen	Mar-17	$126,000	$144,460	4%
30	Mulberry	Selmer	TN	Rural	5	685	57 Cooper	Feb-19	$163,000		
							191 Amelia	Aug-18	$132,000	$155,947	4%

Pair	Solar Farm	City	State	Area	MW	Approx Distance	Tax ID/Address	Sale Date	Sale Price	Adj. Price	% Diff
31	Grand Ridge	Streator	IL	Rural	20	480	1497 E 21st	Oct-16	$186,000		
							712 Columbus	Jun-16	$166,000	$184,000	1%
32	Walton 2	Walton	KY	Suburban	2	410	783 Jones	May-22	$346,000		
							783 Jones	May-12	$174,900	$353,000	-2%
33	Whitehorn	Gretna	VA	Rural	50	255	1120 Taylors Mill	Dec-21	$224,000		
							100 Long Branch	Aug-20	$162,000	$213,920	5%
34	Altavista	Altavista	VA	Rural	80	600	3026 Bishop Crk	Feb-22	$150,000		
							3026 Bishop Crk	Jul-19	$120,000	$155,000	-3%
35	Spotsylvania	Spotsylvania	VA	Rural	617	435	11710 Southview	May-22	$767,945		
							10919 Green Leaf	Jun-22	$739,990	$728,424	5%
36	Spotsylvania	Spotsylvania	VA	Rural	617	410	11606 Aprils	Sep-23	$711,400		
							11701 Quail Run	Jul-23	$650,000	$723,383	-2%
37	Altavista	Altavista	VA	Rural	80	745	2049 Bishop Crk	Jul-23	$375,000		
							1900 Woodhaven	Aug-22	$355,000	$395,198	-5%
38	Solidago	Windsor	VA	Rural	20	610	17479 Courthouse	Dec-23	$555,000		
							15414 Trump Town	Sep-23	$463,000	$552,197	1%
39	Solidago	Windsor	VA	Rural	20	630	6568 Beechland	Feb-24	$671,500		
							11497 Dews Plant.	Oct-23	$640,000	$665,000	1%
40	Spotsylvania	Spotsylvania	VA	Rural	617	435	11710 Southview	May-22	$767,945		
							10919 Green Leaf	Jun-22	$739,990	$728,424	5%
41	Spotsylvania	Spotsylvania	VA	Rural	617	410	11606 Aprils	Sep-23	$711,400		
							11701 Quail Run	Jul-23	$650,000	$723,383	-2%
42	Altavista	Altavista	VA	Rural	80	745	2049 Bishop Crk	Jul-23	$375,000		
							1900 Woodhaven	Aug-22	$355,000	$395,198	-5%
43	Buckingham	Cumberland	VA	Rural	40	380	24081 E James And	Jun-23	$160,000		
							755 High Sch	Sep-23	$190,000	$162,400	-2%
44	Buckingham	Cumberland	VA	Rural	40	560	23225 E James And	Jun-23	$180,000		
							17534 E James And	Jan-24	$205,000	$185,440	-3%

	MW	Avg. Distance
Average	112.76	607
Median	12.60	458
High	617.00	1,950
Low	2.00	155

	% Dif
Average	1%
Median	0%
High	7%
Low	-7%

B. Southeastern USA Data – Over 5 MW

Conclusion – SouthEast Over 5 MW

Southeast USA Over 5 MW
Matched Pair Summary

							Adj. Uses By Acreage				1 mile Radius (2010-2022 Data		
						Topo						Med.	Avg. Housing
	Name	City	State	Acres	MW	Shift	Res	Ag	Ag/Res	Com/Ind	Pop.	Income	Unit
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
9	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884
10	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
11	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171
12	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
13	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
14	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
15	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138
16	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
17	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288
18	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
19	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939
20	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
21	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
22	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333
23	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
24	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
25	Hattiesburg	Hattiesburg	MS	400	50.00	N/A	10%	85%	5%	0%	1,065	$28,545	$129,921
26	Solidago	Isle of Wight	VA	193	20.00	N/A	N/A	N/A	N/A	N/A	62	$88,375	$312,500
27	Buckingham	Cumberland	VA	240	39.80	50	4%	6%	90%	0%	120	$59,445	$251,562
	Average			480	56.36	37	23%	47%	24%	6%	831	$61,643	$237,095
	Median			237	20.00	20	17%	56%	11%	0%	448	$58,688	$231,408
	High			3,500	617.00	160	76%	98%	94%	44%	4,689	$120,861	$483,333
	Low			35	5.00	0	2%	0%	0%	0%	7	$28,545	$99,219

The solar farm matched pairs pulled from the solar farms shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in more urban areas. The median income for the population within 1 mile of a solar farm is $55,049 with a median housing unit value of $230,848. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in multiple states over $1,600,000 adjoining solar farms. The adjoining uses show that residential and agricultural uses are the predominant adjoining uses. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Virginia and adjoining states as well as the proposed subject property.

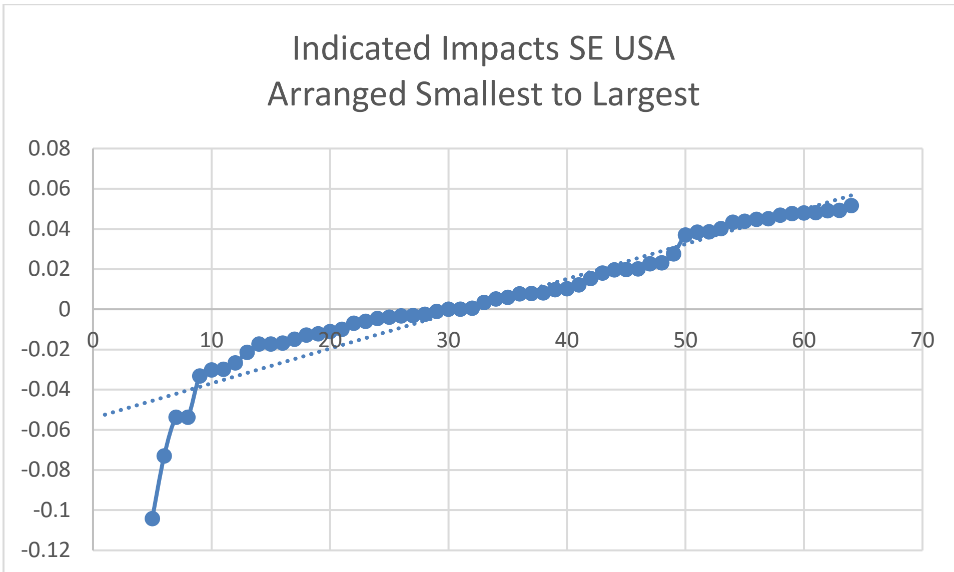
Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

I have pulled 64 matched pairs from the above referenced solar farms to provide the following summary of home sale matched pairs and land sales next to solar farms. The summary shows that the range of differences is from -10% to +10% with an average of +1% and median of +1%.

While the range is seemingly wide, the graph below clearly shows that the vast majority of the data falls between -5% and +5% and most of those are clearly in the 0 to +5% range. As noted earlier in this report, real estate is an imperfect market and this 5% variability is typical in real estate. This data strongly supports an indication of no impact on adjoining residential uses to a solar farm.

Only 2 of the data points supports a negative impact on property value, while 5 support a positive impact. So out of 62 out of 64 data points support a finding of no impact to a positive impact on property value.

I therefore conclude that these matched pairs support a finding of no impact on value at the subject property for the proposed project, which as proposed will include a landscaped buffer to screen adjoining residential properties.



C. Summary of National Data on Solar Farms

I have worked in over 25 states related to solar farms and I have been tracking matched pairs in most of those states. On the following pages I provide a brief summary of those findings showing 38 solar farms over 5 MW studied with each one providing matched pair data supporting the findings of this report.

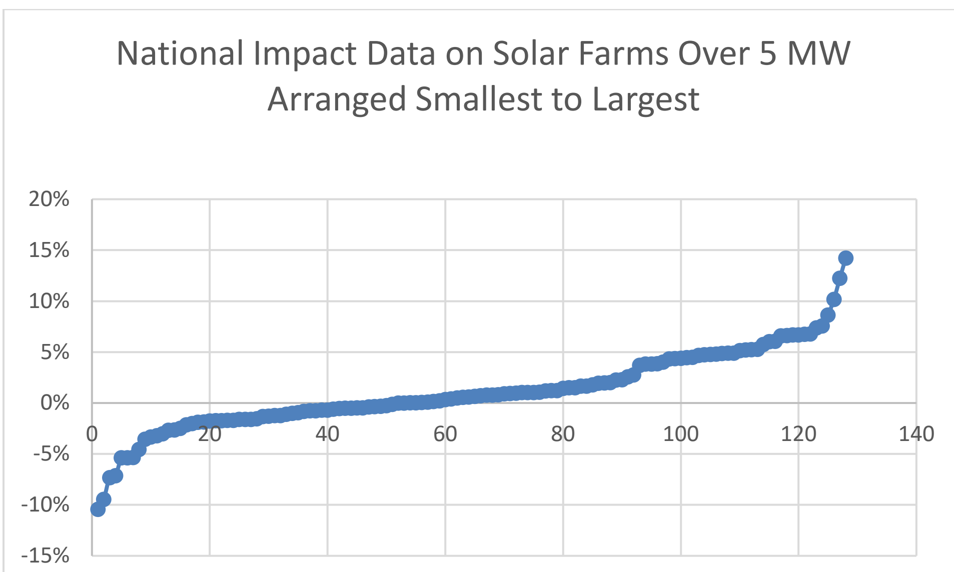
The solar farms summary is shown below with a summary of the matched pair data shown on the following page.

Matched Pair Summary							**Adj. Uses By Acreage**				**1 mile Radius (2020 Data)**		
	Name	**City**	**State**	**Acres**	**MW**	**Topo Shift**	**Res**	**Ag**	**Ag/Res**	**Com/Ind**	**Population**	**Med. Income**	**Avg. Housing Unit**
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
9	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
10	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515
11	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884
12	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
13	Flemington	Flemington	NJ	120	9.36	N/A	13%	50%	28%	8%	3,477	$105,714	$444,696
14	Frenchtown	Frenchtown	NJ	139	7.90	N/A	37%	35%	29%	0%	457	$111,562	$515,399
15	McGraw	East Windsor	NJ	95	14.00	N/A	27%	44%	0%	29%	7,684	$78,417	$362,428
16	Tinton Falls	Tinton Falls	NJ	100	16.00	N/A	98%	0%	0%	2%	4,667	$92,346	$343,492
17	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922
18	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171
19	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
20	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
21	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
22	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214
23	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361
24	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138
25	Picture Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172
26	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308
27	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
28	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288
29	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
30	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939
31	Eddy II	Eddy	TX	93	10.00	N/A	15%	25%	58%	2%	551	$59,627	$139,088
32	Somerset	Somerset	TX	128	10.60	N/A	5%	95%	0%	0%	1,293	$41,574	$135,490
33	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555
34	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
35	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
36	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
37	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
38	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
39	Hattiesburg	Hattiesburg	MS	400	50.00	N/A	10%	85%	5%	0%	1,065	$28,545	$129,921
40	Bremen	Bremen	IN	37	6.80	15	40%	60%	0%	0%	388	$62,855	$232,857
41	North Rock	Fulton	WI	472	50.00	N/A	3%	40%	57%	0%	236	$86,238	$370,062
42	Wood County	Saratoga	WI	1,200	150.00	N/A	N/A	N/A	N/A	N/A	187	$74,110	$204,545
43	Solidago	Isle of Wight	VA	193	20.00	N/A	N/A	N/A	N/A	N/A	62	$88,375	$312,500
	Average			382	41.95	32	24%	52%	20%	6%	1,318	$65,577	$243,934
	Median			160	20.00	13	15%	59%	6%	0%	467	$62,855	$231,408
	High			3,500	500.00	160	98%	98%	94%	44%	7,684	$120,861	$515,399
	Low			35	5.00	0	1%	0%	0%	0%	7	$28,545	$96,555

From these 43 solar farms, I have derived 96 matched pairs. The matched pairs show no negative impact at distances as close as 105 feet between a solar panel and the nearest point on a home. The range of impacts is -10% to +14% with an average and median of +1%. Two of the recent data points I have included from WI shows significant positive impacts, but both of those are from distances of 1,530 feet to 2,000 feet. This goes to a question I have had on a couple of occasions about the possibility of positive impacts once the buffers are extended out to a certain distance. With a reasonable expectation of a protected buffer of significant size, there is a reasonable expectation of enhancement in some cases. Excluding those two data points at further distances the range of impacts is -10% to +10% with the same +1% average and median.

	MW	Avg. Distance		% Dif
Average	47.89	590	**Average**	1%
Median	20.00	403	**Median**	1%
High	617.00	2,020	**High**	14%
Low	5.00	145	**Low**	-10%

While the range is broad, the two charts below show the data points in range from lowest to highest. There are only 4 data points out of 104 that show a negative impact. The rest support either a finding of no impact or 15 of the data points suggest a positive impact due to adjacency to a solar farm. As discussed earlier in this report, I consider this data to strongly support a finding of no impact on value as most of the findings are within typical market variation and even within that, most are mildly positive findings.



D. Larger Solar Farms

I have also considered larger solar farms to address impacts related to larger projects. Projects have been increasing in size and most of the projects between 100 and 1000 MW are newer with little time for adjoining sales. I have included a breakdown of solar farms with 20 MW to 80 MW facilities with one over 500 MW facility.

Matched Pair Summary - @20 MW And Larger							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
						Topo						Med.	Avg. Housing
	Name	**City**	**State**	**Acres**	**MW**	**Shift**	**Res**	**Ag**	**Ag/Res**	**Com/Ind**	**Population**	**Income**	**Unit**
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
5	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
6	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922
7	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
8	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
9	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
10	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214
11	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361
12	Picure Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172
13	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308
14	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
15	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
16	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
17	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
18	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333
19	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
20	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
21	Solidago	Isle of Wight	VA	193	20.00	N/A	N/A	N/A	N/A	N/A	62	$88,375	$312,500
22	Hattiesburg	Hattiesburg	MS	400	50.00	N/A	10%	85%	5%	0%	1,065	$28,545	$129,921
23	North Rock	Fulton	WI	472	50.00	N/A	3%	40%	57%	0%	236	$86,238	$370,062
24	Wood County	Saratoga	WI	1,200	150.00	N/A	N/A	N/A	N/A	N/A	187	$74,110	$204,545
25	Buckingham	Cumberland	VA	240	39.80	50	4%	6%	90%	0%	120	$59,445	$251,562
	Average			614	72.33		17%	61%	22%	4%	593	$67,237	$260,275
	Median			374	50.00		10%	68%	5%	0%	203	$70,158	$269,922
	High			3,500	617.00		75%	98%	94%	25%	2,446	$120,861	$483,333
	Low			121	19.60		1%	0%	0%	0%	7	$28,545	$110,361

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

I have included a breakdown of solar farms with 50 MW to 617 MW facilities adjoining.

Matched Pair Summary							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
						Topo						Med.	Avg. Housing
	Name	**City**	**State**	**Acres**	**MW**	**Shift**	**Res**	**Ag**	**Ag/Res**	**Com/Ind**	**Population**	**Income**	**Unit**
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
5	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
6	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
7	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
8	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333
9	Hattiesburg	Hattiesburg	MS	400	50.00	N/A	10%	85%	5%	0%	1,065	$28,545	$129,921
10	North Rock	Fulton	WI	472	50.00	N/A	3%	40%	57%	0%	236	$86,238	$370,062
11	Wood County	Saratoga	WI	1,200	150.00	N/A	N/A	N/A	N/A	N/A	187	$74,110	$204,545
	Average			1,019	127	41	16%	59%	25%	1%	707	$70,356	$274,931
	Median			532	75	2	12%	67%	3%	0%	382	$74,110	$276,347
	High			3,500	617	160	41%	97%	94%	3%	2,446	$120,861	$483,333
	Low			347	50	0	2%	0%	0%	0%	48	$28,545	$129,921

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

The data for these larger solar farms is shown in the SE USA and the National data breakdowns with similar landscaping, setbacks and range of impacts that fall mostly in the +/-5% range as can be seen earlier in this report.

On the following page I show a summary of 248 projects ranging in size from 50 MW up to 1,000 MW with an average size of 119.7 MW and a median of 80 MW. The average closest distance for an adjoining home is 365 feet, while the median distance is 220 feet. The closest distance is 50 feet. The mix of adjoining uses is similar with most of the adjoining uses remaining residential or agricultural in nature. This is the list of solar farms that I have researched for possible matched pairs and not a complete list of larger solar farms in those states.

Total Number of Solar Farms Researched Over 50 MW 238

						Adjoining Use by Acre			
	Output (MW)	**Total Acres**	**Used Acres**	**Avg. Dist to home**	**Closest Home**	**Res**	**Agri**	**Agri/Res**	**Com**
Average	119.7	1521.4	1223.3	1092	365	10%	68%	18%	4%
Median	80.0	987.3	805.5	845	220	7%	72%	12%	0%
High	1000.0	19000.0	9735.4	6835	6810	98%	100%	100%	70%
Low	50.0	3.0	3.0	241	50	0%	0%	0%	0%

IX. Distance Between Homes and Panels

I have measured distances at matched pairs as close as 105 feet between panel and home to show no impact on value. This measurement goes from the closest point on the home to the closest solar panel. This is a strong indication that at this distance there is no impact on adjoining homes.

However, in tracking other approved solar farms across Kentucky, North Carolina and other states, I have found that it is common for there to be homes within 100 to 150 feet of solar panels. Given the visual barriers in the form of privacy fencing or landscaping, there is no sign of negative impact.

I have also tracked a number of locations where solar panels are between 50 and 100 feet of single-family homes. In these cases the landscaping is typically a double row of more mature evergreens at time of planting. There are many examples of solar farms with one or two homes closer than 100-feet, but most of the adjoining homes are further than that distance.

X. Topography

As shown on the summary charts for the solar farms, I have been identifying the topographic shifts across the solar farms considered. Differences in topography can impact visibility of the panels, though typically this results in distant views of panels as opposed to up close views. The topography noted for solar farms showing no impact on adjoining home values range from as much as 160-foot shifts across the project. Given that appearance is the only factor of concern and that distance plus landscape buffering typically addresses up close views, this leaves a number of potentially distant views of panels. I specifically note that in Crittenden in KY there are distant views of panels from the adjoining homes that showed no impact on value.

General rolling terrain with some distant solar panel views are showing no impact on adjoining property value.

XI. Potential Impacts During Construction

I have previously been asked by the Kentucky Siting Board about potential impacts during construction. This is not a typical question I get as any development of a site will have a certain amount of construction, whether it is for a commercial agricultural use such as large-scale poultry operations or a new residential subdivision. Construction will be temporary and consistent with other development uses of the land and in fact dust from the construction will likely be less than most other construction projects given the minimal grading. I would not anticipate any impacts on property value due to construction on the site.

I note that in the matched pairs that I have included there have been a number of home sales that happened after a solar farm was approved but before the solar farm was built showing no impact on property value. Therefore the anticipated construction had no impact as shown by that data.

XII. Scope of Research

I have researched over 1,000 solar farms and sites on which solar farms are existing and proposed in Kentucky, Illinois, Tennessee, North Carolina, Virginia as well as other states to determine what uses are typically found in proximity with a solar farm. The data I have collected and provide in this report strongly supports the assertion that solar farms are having no negative consequences on adjoining agricultural and residential values.

Beyond these references, I have quantified the adjoining uses for a number of solar farm comparables to derive a breakdown of the adjoining uses for each solar farm. The chart below shows the breakdown of adjoining or abutting uses by total acreage.

Percentage By Adjoining Acreage	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	19%	53%	20%	2%	6%	887	344	91%	8%
Median	11%	56%	11%	0%	0%	708	218	100%	0%
High	100%	100%	100%	93%	98%	5,210	4,670	100%	98%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

I have also included a breakdown of each solar farm by number of adjoining parcels to the solar farm rather than based on adjoining acreage. Using both factors provides a more complete picture of the neighboring properties.

Percentage By Number of Parcels Adjoining	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	61%	24%	9%	2%	4%	887	344	93%	6%
Median	65%	19%	5%	0%	0%	708	218	100%	0%
High	100%	100%	100%	60%	78%	5,210	4,670	105%	78%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

Both of the above charts show a marked residential and agricultural adjoining use for most solar farms. Every single solar farm considered included an adjoining residential or residential/agricultural use.

XIII. Specific Factors Related To Impacts on Value

I have completed a number of Impact Studies related to a variety of uses and I have found that the most common areas for impact on adjoining values typically follow a hierarchy with descending levels of potential impact. I will discuss each of these categories and how they relate to a solar farm.

1. Hazardous material
2. Odor
3. Noise
4. Traffic
5. Stigma
6. Appearance

1. Hazardous material

A solar farm presents no potential hazardous waste byproduct as part of normal operation. Any fertilizer, weed control, vehicular traffic, or construction will be significantly less than typically applied in a residential development and especially most agricultural uses.

The various solar farms that I have inspected and identified in the addenda have no known environmental impacts associated with the development and operation.

2. Odor

The various solar farms that I have inspected produced no odor.

3. Noise

Whether discussing passive fixed solar panels, or single-axis trackers, there is no negative impact associated with noise from a solar farm. The transformer has a hum similar to an HVAC that can only be heard in close proximity and the buffers on the property are sufficient to make emitted sounds effectively inaudible from the adjoining properties. A wide variety of noise studies have been conducted on solar farms to illustrate compatibility between solar properties and nearby residential uses. The noise factor is even less at night.

The various solar farms that I have inspected were inaudible from the roadways.

4. Traffic

The solar farm will have no onsite employee's or staff. The site requires only minimal maintenance. Relative to other potential uses of the site (such as a residential subdivision), the additional traffic generated by a solar farm use on this site is insignificant.

5. Stigma

There is no stigma associated with solar farms and solar farms and people generally respond favorably towards such a use. While an individual may express concerns about proximity to a solar farm, there is no specific stigma associated with a solar farm. Stigma generally refers to things such as adult establishments, prisons, rehabilitation facilities, and so forth.

Solar panels have no associated stigma and in smaller collections are found in yards and roofs in many residential communities. Solar farms are adjoining elementary, middle and high schools as well as churches and subdivisions. I note that one of the solar farms in this report not only adjoins a church, but is actually located on land owned by the church. Solar panels on a roof are often cited as an enhancement to the property in marketing brochures.

I see no basis for an impact from stigma due to a solar farm.

6. Appearance

I note that larger solar farms using fixed or tracking panels are a passive use of the land that is in keeping with a rural/residential area. As shown below, solar farms are comparable to larger greenhouses. This is not surprising given that a greenhouse is essentially another method for collecting passive solar energy. The greenhouse use is well received in residential/rural areas and has a similar visual impact as a solar farm.




The solar panels are all less than 15 feet high, which means that the visual impact of the solar panels will be similar in height to a typical greenhouse and lower than a single-story residential dwelling. Were the subject property developed with single family housing, that development would have a much greater visual impact on the surrounding area given that a two-story home with attic could be three to four times as high as these proposed panels.

Whenever you consider the impact of a proposed project on viewshed or what the adjoining owners may see from their property it is important to distinguish whether or not they have a protected viewshed or not. Enhancements for scenic vistas are often measured when considering properties that adjoin preserved open space and parks. However, adjoining land with a preferred view today conveys no guarantee that the property will continue in the current use. Any consideration of the impact of the appearance requires a consideration of the wide variety of other uses a property already has the right to be put to, which for solar farms often includes subdivision development, agricultural business buildings such as poultry, or large greenhouses and the like.

Dr. Randall Bell, MAI, PhD, and author of the book **Real Estate Damages**, Third Edition, on Page 146 "Views of bodies of water, city lights, natural settings, parks, golf courses, and other amenities are considered desirable features, particularly for residential properties." Dr. Bell continues on Page

147 that "View amenities may or may not be protected by law or regulation. It is sometimes argued that views have value only if they are protected by a view easement, a zoning ordinance, or covenants, conditions, and restrictions (CC&Rs), although such protections are relatively uncommon as a practical matter. The market often assigns significant value to desirable views irrespective of whether or not such views are protected by law."

Dr. Bell concludes that a view enhances adjacent property, even if the adjacent property has no legal right to that view. He then discusses a "borrowed" view where a home may enjoy a good view of vacant land or property beyond with a reasonable expectation that the view might be partly or completely obstructed upon development of the adjoining land. He follows that with "This same concept applies to potentially undesirable views of a new development when the development conforms to applicable zoning and other regulations. Arguing value diminution in such cases is difficult, since the possible development of the offending property should have been known." In other words, if there is an allowable development on the site then arguing value diminution with such a development would be difficult. This further extends to developing the site with alternative uses that are less impactful on the view than currently allowed uses.

This gets back to the point that if a property has development rights and could currently be developed in such a way that removes the viewshed such as a residential subdivision, then a less intrusive use such as a solar farm that is easily screened by landscaping would not have a greater impact on the viewshed of any perceived value adjoining properties claim for viewshed. Essentially, if there are more impactful uses currently allowed, then how can you claim damages for a less impactful use.

7. Conclusion

On the basis of the factors described above, it is my professional opinion that the proposed solar farm will not negatively impact adjoining property values. The only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers. The matched pair data supports that conclusion.

XIV. Conclusion

The matched pair analysis shows no negative impact in home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land. The proposed setbacks are further than those measured showing no impact for similar price ranges of homes and for areas with similar demographics to the subject area. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all support a finding of no impact on property value. Similar paired sales showed no impact from adjoining battery storage facilities.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial injury to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved adjoining agricultural uses, schools, churches, and residential developments.

I have found no difference in the mix of adjoining uses or proximity to adjoining homes based on the size of a solar farm and I have found no significant difference in the matched pair data adjoining larger solar farms versus smaller solar farms. The data in the Southeast is consistent with the larger set of data that I have nationally, as is the more specific data located in and around Kentucky.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no negative impact on the value of adjoining or abutting property. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it’s quiet, and there is no traffic.

XV. Certification

I certify that, to the best of my knowledge and belief:

1. The statements of fact contained in this report are true and correct;

2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions;

3. I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved;

4. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;

5. My engagement in this assignment was not contingent upon developing or reporting predetermined results;

6. My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of the appraisal;

7. The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute;

8. My analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

9. The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives;

10. I have not made a personal inspection of the property that is the subject of this report, and;

11. No one provided significant real property appraisal assistance to the person signing this certification.

12. As of the date of this report I have completed the continuing education program for Designated Members of the Appraisal Institute;

13. I have not performed services, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.

Disclosure of the contents of this appraisal report is governed by the bylaws and regulations of the Appraisal Institute and the National Association of Realtors.

Neither all nor any part of the contents of this appraisal report shall be disseminated to the public through advertising media, public relations media, news media, or any other public means of communications without the prior written consent and approval of the undersigned.

Richard C. Kirkland, Jr., MAI
State Certified General Appraiser

Kirkland Appraisals, LLC

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Raleigh, North Carolina 27603
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www.kirklandappraisals.com

PROFESSIONAL EXPERIENCE

Kirkland Appraisals, LLC, Raleigh, N.C.	2003 – Present
Commercial appraiser	
Hester & Company, Raleigh, N.C.	
Commercial appraiser	1996 – 2003

PROFESSIONAL AFFILIATIONS

MAI (Member, Appraisal Institute) designation #11796	2001
NC State Certified General Appraiser # A4359	1999
VA State Certified General Appraiser # 4001017291	
SC State Certified General Appraiser # 6209	
KY State Certified General Appraiser # 5522	
TN State Certified General Appraiser # 6240	
FL State Certified General Appraiser # RZ3950	
GA State Certified General Appraiser # 321885	
MI State Certified General Appraiser # 1201076620	
PA State Certified General Appraiser # GA004598	
OH State Certified General Appraiser # 2021008689	
IN State Certified General Appraiser # CG42100052	
IL State Certified General Appraiser # 553.002633	
LA State Certified General Appraiser # APR.05049-CGA	
TX State Certified General Appraiser # 1380528 G	

EDUCATION

Bachelor of Arts in English, University of North Carolina, Chapel Hill	1993

CONTINUING EDUCATION

Uniform Standards of Professional Appraisal Practice Update	2024
ASFMRA Integrated Approaches to Value (A360)	2024
ASFMRA Best in Business Ethics	2023
Appraising Natural Resources Series – Oil, Gas & Minerals	2023
Appraisal of Industrial and Flex Buildings	2023
Commercial Land Valuation	2023
Fair Housing, Bias and Discrimination	2023
Pennsylvania State Mandated Law for Appraisers	2023
What NOT to Do (NCDOT Course)	2023
The Income Approach – A Scope of Work Decision	2023
Valuation of Residential Solar	2022
Residential Property Measurement and ANSI	2022
Business Practices and Ethics	2022
Uniform Standards of Professional Appraisal Practice Update	2022

Sexual Harassment Prevention Training	2021
Appraisal of Land Subject to Ground Leases	2021
Michigan Appraisal Law	2020
Uniform Standards of Professional Appraisal Practice Update	2020
Uniform Appraisal Standards for Federal Land Acquisitions (Yellow Book)	2019
The Cost Approach	2019
Income Approach Case Studies for Commercial Appraisers	2018
Introduction to Expert Witness Testimony for Appraisers	2018
Appraising Small Apartment Properties	2018
Florida Appraisal Laws and Regulations	2018
Uniform Standards of Professional Appraisal Practice Update	2018
Appraisal of REO and Foreclosure Properties	2017
Appraisal of Self Storage Facilities	2017
Land and Site Valuation	2017
NCDOT Appraisal Principles and Procedures	2017
Uniform Standards of Professional Appraisal Practice Update	2016
Forecasting Revenue	2015
Wind Turbine Effect on Value	2015
Supervisor/Trainee Class	2015
Business Practices and Ethics	2014
Subdivision Valuation	2014
Uniform Standards of Professional Appraisal Practice Update	2014
Introduction to Vineyard and Winery Valuation	2013
Appraising Rural Residential Properties	2012
Uniform Standards of Professional Appraisal Practice Update	2012
Supervisors/Trainees	2011
Rates and Ratios: Making sense of GIMs, OARs, and DCFs	2011
Advanced Internet Search Strategies	2011
Analyzing Distressed Real Estate	2011
Uniform Standards of Professional Appraisal Practice Update	2011
Business Practices and Ethics	2011
Appraisal Curriculum Overview (2 Days – General)	2009
Appraisal Review - General	2009
Uniform Standards of Professional Appraisal Practice Update	2008
Subdivision Valuation: A Comprehensive Guide	2008
Office Building Valuation: A Contemporary Perspective	2008
Valuation of Detrimental Conditions in Real Estate	2007
The Appraisal of Small Subdivisions	2007
Uniform Standards of Professional Appraisal Practice Update	2006
Evaluating Commercial Construction	2005
Conservation Easements	2005
Uniform Standards of Professional Appraisal Practice Update	2004
Condemnation Appraising	2004
Land Valuation Adjustment Procedures	2004
Supporting Capitalization Rates	2004
Uniform Standards of Professional Appraisal Practice, C	2002
Wells and Septic Systems and Wastewater Irrigation Systems	2002
Appraisals 2002	2002
Analyzing Commercial Lease Clauses	2002
Conservation Easements	2000
Preparation for Litigation	2000
Appraisal of Nonconforming Uses	2000
Advanced Applications	2000
Highest and Best Use and Market Analysis	1999
Advanced Sales Comparison and Cost Approaches	1999
Advanced Income Capitalization	1998

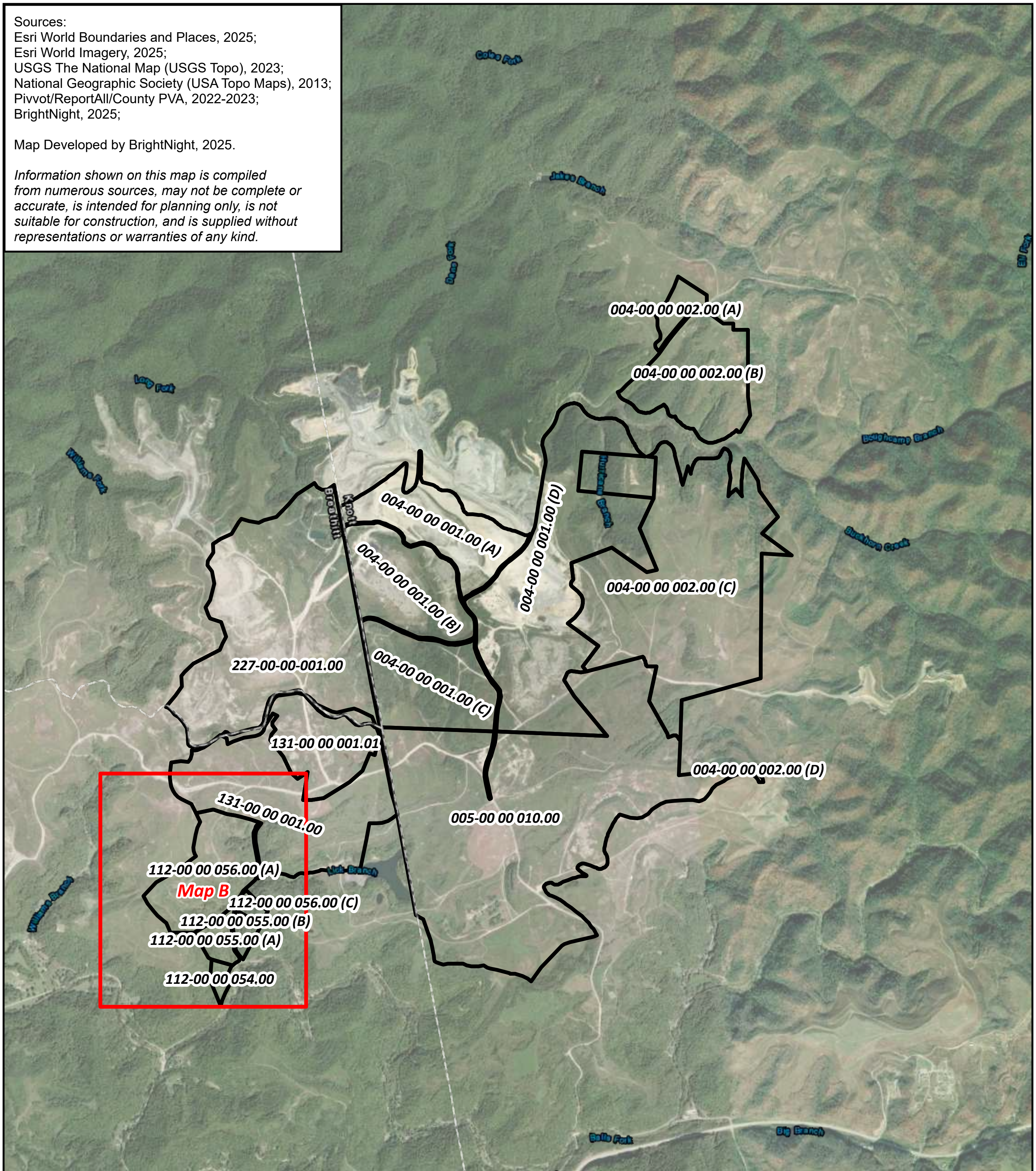
Valuation of Detrimental Conditions in Real Estate	1999
Report Writing and Valuation Analysis	1999
Property Tax Values and Appeals	1997
Uniform Standards of Professional Appraisal Practice, A & B	1997
Basic Income Capitalization	1996

SAR Attachment 3

Sources:
Esri World Boundaries and Places, 2025;
Esri World Imagery, 2025;
USGS The National Map (USGS Topo), 2023;
National Geographic Society (USA Topo Maps), 2013;
Pivvot/ReportAll/County PVA, 2022-2023;
BrightNight, 2025;

Map Developed by BrightNight, 2025.

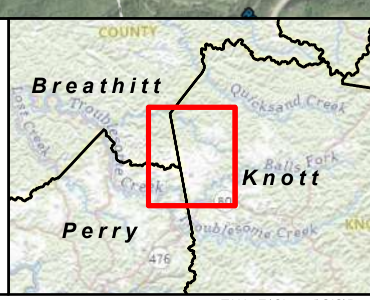
Information shown on this map is compiled from numerous sources, may not be complete or accurate, is intended for planning only, is not suitable for construction, and is supplied without representations or warranties of any kind.



Parcel Boundary

1 inch = 4,000 feet

0 1,000 2,000 4,000 6,000 Feet



Parcel Map A

STARFIRE MOUNTAIN (STMO)

Breathitt, Perry, and Knott Co., KY

Project:	Date:
STMO	1/29/2025

BRIGHTNIGHT

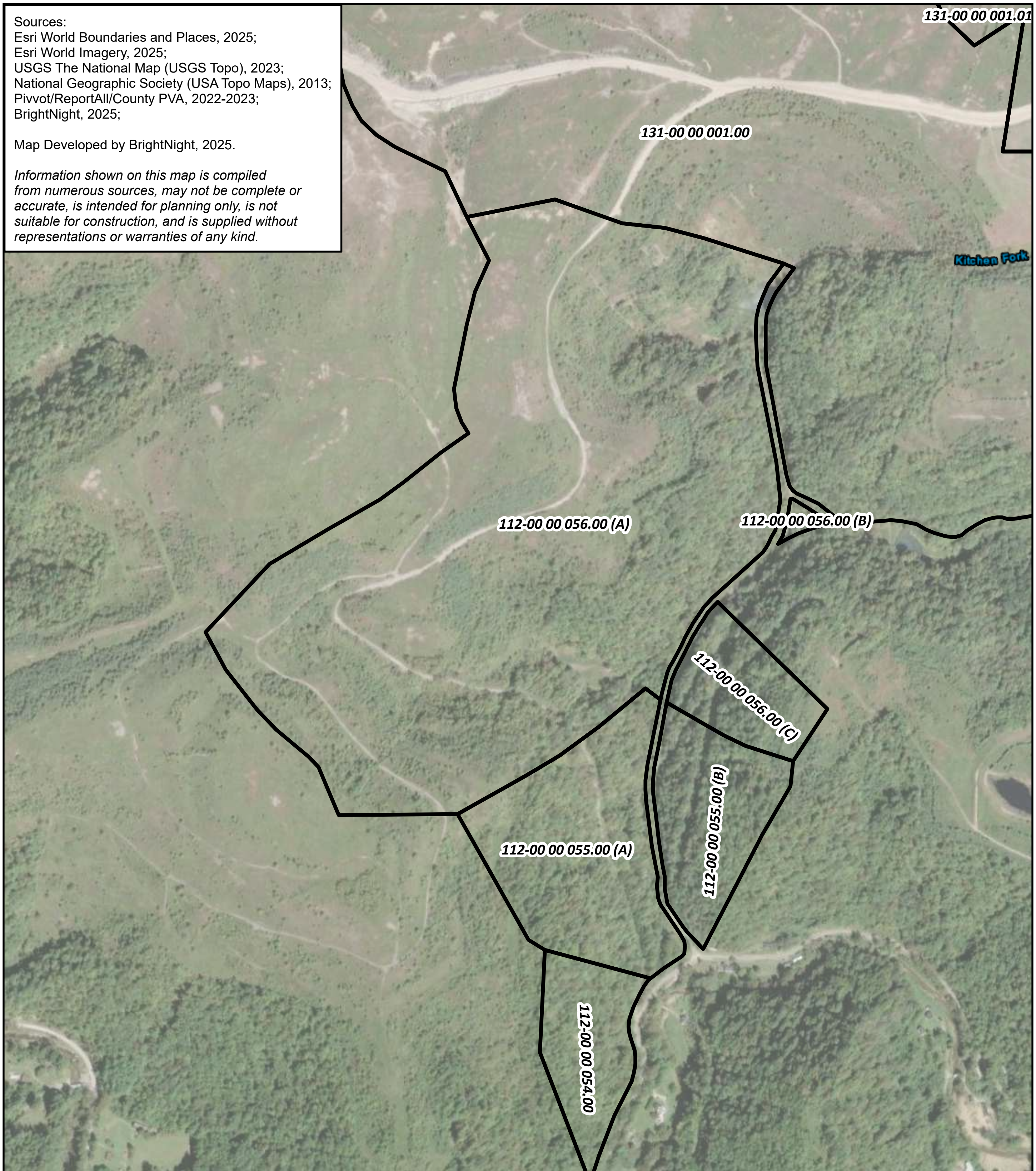
Figure: N/A

TAH Z:\Shared\GIS\Dev\Projects\America_North\US\STMO\Pro\FigureX-STMO-KYSB-FBT-Parcels-v04-8x11-P.aprx

Sources:
Esri World Boundaries and Places, 2025;
Esri World Imagery, 2025;
USGS The National Map (USGS Topo), 2023;
National Geographic Society (USA Topo Maps), 2013;
Pivvot/ReportAll/County PVA, 2022-2023;
BrightNight, 2025;

Map Developed by BrightNight, 2025.

Information shown on this map is compiled from numerous sources, may not be complete or accurate, is intended for planning only, is not suitable for construction, and is supplied without representations or warranties of any kind.



Parcel Boundary

1 inch = 800 feet

0 200 400 800 1,200 Feet

Parcel Map B

STARFIRE MOUNTAIN (STMO)

Breathitt, Perry, and Knott Co., KY

Project:	Date:
STMO	1/29/2025

BRIGHTNIGHT

Figure: N/A

TAH Z:\Shared\GIS\Dev\Projects\America_North\US\STMO\Pro\FigureX-STMO-KYSB-FBT-BallsForkRd-Parcels-v03-8x11-P.aprx

LEGAL BOUNDARY DESCRIPTIONS

<u>Perry County, Kentucky</u>

<u>Parcel 1</u>:

Tax ID No: 112-00 00 056.00 (A)

The following land bound by the following according to the Perry County, Kentucky PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 001.00

On the East by Lost Mountain Road and by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 001.00

On the South by the lands of Liberty Land, LLC, Tax ID No. 112-00 00 055.00, Liberty Land, LLC, Tax ID No. 112-00 00 053.00 and Victor Spurlock, Tax ID No. 112-00 00 047.00

On the West by the lands of Liberty Land, LLC, Tax ID No. 112-00 00 018.00 and Liberty Land, LLC, Tax ID No. 112-00 00 013.00

Being the same property conveyed to Carl Salyer Combs by Will Book 31, Page 88 of the Perry County, Kentucky Clerk's Office.

<u>Parcel 2</u>:

Tax ID No: 112-00 00 056.00 (B)

The following land bound by the following according to the Perry County, Kentucky PVA:

On the North by Lost Mountain Road and by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 001.00

On the East by Lost Mountain Road and by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 001.00

On the South by Lost Mountain Road and by the lands of Carl Combs, Tax ID No. 131-00 00 005.00

On the West by Lost Mountain Road and by the lands of Carl Combs, Tax ID No. 112-00 00 056.00

Being the same property conveyed to Carl Salyer Combs by Will Book 31, Page 88 of the Perry County, Kentucky Clerk's Office.

<u>Parcel 3</u>:

Tax ID No: 112-00 00 056.00 (C)

The following land bound by the following according to the Perry County, Kentucky PVA:

On the North by Lost Mountain Road and by the lands of Carl Combs, Tax ID No. 131-00 00 005.00

On the East by Carl Combs, Tax ID No. 131-00 00 005.00 and by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 013.00

On the South by the lands of Liberty Land, LLC, Tax ID No. 112-00 00 055.00

On the West by Lost Mountain Road and by the lands of Carl Combs, Tax ID No. 112-00 00 056.00

Being the same property conveyed to Carl Salyer Combs by Will Book 31, Page 88 of the Perry County, Kentucky Clerk's Office.

<u>Parcel 4</u>:

Tax ID No: 112-00 00 055.00 (A)

The following land bounded by the following according to the Perry County PVA:

On the North by the lands of Carl Combs, Tax ID No. 112-00 00 056.00

On the East by Lost Mountain Road and by the lands of Liberty Land, LLC, Tax ID No. 112-00 00 055.00

On the South by Lost Mountain Road and by the lands of Liberty Land, LLC, Tax ID No. 112-00 00 054.00

On the West by lands of Liberty Land, LLC, Tax ID No. 112-00 00 053.00 and by the lands of Carl Combs, Tax ID No. 112-00 00 056.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 413, Page 648 of the Perry County, Kentucky Clerk's Office.

<u>Parcel 5</u>:

Tax ID No: 112-00 00 055.00 (B)

The following land bounded by the following according to the Perry County PVA:

On the North by the lands of Carl Combs, Tax ID No. 112-00 00 056.00

On the East by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 013.00

On the South by Lost Mountain Road and by the lands of Paula Napier, Tax ID No. 131-00 00 006.00

On the West by Lost Mountain Road and by the lands of Liberty Land, LLC, Tax ID No. 112-00 00 055.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 413, Page 648 of the Perry County, Kentucky Clerk's Office.

<u>Parcel 6</u>:

Tax ID No: 112-00 00 054.00

The following land bounded by the following according to the Perry County PVA:

On the North by lands of Liberty Land, LLC, Tax ID No. 112-00 00 055.00

On the East by Balls Fork Road, by the lands of Gary Bartoe, Tax ID No. 131-00 00 007.00, by the lands of Perry County Fiscal Court, Tax ID No. 131-00 00 008.00 and by the lands of Timothy Embry, Tax ID No. 131-00 00 009.00

On the South by Balls Fork Road and by the lands of Liberty Land, LLC, Tax ID No. 112-00 00 053.00

On the West by lands of Liberty Land, LLC, Tax ID No. 112-00 00 053.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 413, Page 648 of the Perry County, Kentucky Clerk's Office.

<u>Parcel 7</u>:

Tax ID No: 131-00 00 001.00

The following land bounded by the following according to the Perry County PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 001.01

On the East by the Knott County line

On the South by Lost Mountain Road and by the lands of Carl Combs, Tax ID No. 131-00 00 005.00

On the West by Lost Mountain Road, by the the lands of Liberty Land, LLC, Tax ID No. 112-00 00 005.01 and by the lands of Carl Combs, Tax ID No. 112-00 00 056.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 413, Page 648 of the Perry County, Kentucky Clerk's Office.

<u>Parcel 8</u>:

Tax ID No: 131-00 00 001.01

The following land bounded by the following according to the Perry County PVA:

On the North by the Breathitt County line

On the East by the Knott County line

On the South by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 001.00

On the West by the Breathitt County line and by the lands of Liberty Land, LLC, Tax ID No. 131-00 00 001.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 413, Page 648 of the Perry County, Kentucky Clerk's Office.

Breathitt County, Kentucky

Parcel 9:

Tax ID No: 227-00-00-001.00

The following land bounded by the following according to the Breathitt County PVA:

On the North by the lands of ICG Natural Resources, LLC, Tax ID No. 205-00-00-011.00

On the East by the Knott County line

On the South by the Perry County line

On the West by the lands of ICG Natural Resources, LLC, Tax ID No. 205-00-00-011.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 262, Page 793 of the Breathitt County, Kentucky Clerk's Office.

Knott County, Kentucky

Parcel 10:

Tax ID No: 005-00 00 010.00

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00 and Liberty Land, LLC, Tax ID No. 004-00 00 002.00

On the East by the lands of John Stacy, Tax ID No. 005-00 00 007.01

On the South by the lands of ICG Natural Resources, LLC, Tax ID No. 005-00 00 010.01, by the lands of Core Capital, LLC, Tax ID No. 005-20 00 002.00, by the lands of Core Capital, LLC, Tax ID No. 005-20 00 019.02 and by the lands of Sam Fugate, Tax ID No. 005-00 00 018.00

On the West by the Breathitt County line

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

Parcel 11:

Tax ID No: 004-00 00 001.00 (A)

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of ICG Natural Resources, LLC, Tax ID No. 003-00 00 002.01

On the East by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 002.00

On the South by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00

On the West by the Perry County line

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

<u>Parcel 12</u>:

Tax ID No: 004-00 00 001.00 (B)

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00

On the East by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00

On the South by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00

On the West by the Perry County line

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

<u>Parcel 13</u>:

Tax ID No: 004-00 00 001.00 (C)

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00

On the East by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00

On the South by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.00

On the West by the Perry County line

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

<u>Parcel 14</u>:

Tax ID No: 004-00 00 001.00 (D)

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.00

On the East by the lands of the University of Kentucky, Tax ID No. 004-00 00 003.00 and by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 002.00

On the South by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.00

On the West by the lands of ICG Natural Resources, LLC, Tax ID No. 003-00 00 002.01 and by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

<u>Parcel 15</u>:

Tax ID No: 004-00 00 002.00 (A)

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 003-00 00 002.00 and ICG Natural Resources, LLC, Tax ID No. 003-00 00 002.01

On the East by a road and by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 002.00

On the South by a road and by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 002.00

On the West by the lands of Liberty Land, LLC, Tax ID No. 003-00 00 002.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

<u>Parcel 16</u>:

Tax ID No: 004-00 00 002.00 (B)

The following land bounded by the following according to the Knott County PVA:

On the North by a road and by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 002.00 and ICG Natural Resources, LLC, Tax ID No. 003-00 00 002.01

On the East by the lands of ICG Natural Resources, LLC, Tax ID No. 014-00 00 001.01

On the South by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.00

On the West by a road and by the lands of Liberty Land, LLC, Tax ID No. 003-00 00 002.00 and by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 002.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

<u>Parcel 17</u>:

Tax ID No: 004-00 00 002.00 (C)

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.000 and ICG Natural Resources, LLC, Tax ID No. 014-00 00 001.01

On the East by the lands of ICG Natural Resources, LLC, Tax ID No. 014-00 00 001.01, by the lands of Liberty Land, LLC, Tax ID No. 014-00 00 009.00 and by the lands of Mountain Properties, Inc., Tax ID No. 014-00 00 0009.01

On the South by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.00 and by the lands of John Stacy, Tax ID No. 005-00 00 007.01

On the West by the lands of Liberty Land, LLC, Tax ID No. 004-00 00 001.00 and by the lands of the University of Kentucky LLC, Tax ID No. 004-00 00 003.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

<u>Parcel 18</u>:

Tax ID No: 004-00 00 002.00 (D)

The following land bounded by the following according to the Knott County PVA:

On the North by the lands of John Stacy, Tax ID No. 005-00 00 007.01

On the East by the lands of Liberty Land, LLC, Tax ID No. 015-00 00 062.00

On the South by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.00

On the West by the lands of Liberty Land, LLC, Tax ID No. 005-00 00 010.00

Being the same property conveyed to Liberty Land, LLC by Deed Book 294, Page 138 of the Knott County, Kentucky Clerk's Office.

SAR Attachment 4

Acoustic Assessment Report for the Starfire Solar Project

Perry, Knott, and Breathitt Counties, Kentucky

January 2025

Prepared for:

STMO Bn, LLC
515 N Flagler Dr. Suite 250,
West Palm Beach, FL, 33401

Prepared by:

Tetra Tech, Inc.
4101 Cox Road, Suite 100
Glen Allen, VA 23060

TETRA TECH

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
%	percent
µPa	microPascal
dB	decibel
dBA	A-weighted decibel
dBL	decibel (unweighted)
ft	feet
hp	horsepower
Hz	Hertz
ISO	International Organization for Standardization
L_{10}	the sound level exceeded 10% of the time
L_{90}	the sound level exceeded 90% of the time
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
L_{max}	maximum sound level
L_P	sound pressure level
L_W	sound power level
m	meter
MVA	megavolt ampere
MW	megawatt
MWh	megawatt-hour
NSA	noise sensitive area
Project	Starfire Solar Project
pW	picowatt
Tetra Tech	Tetra Tech, Inc.
USGS	United States Geological Survey
W	watt

1.0 INTRODUCTION

STMO Bn, LLC (STMO) proposes to construct and operate the Starfire Solar Project (Project), a solar photovoltaic power generation facility which will consist of an up to 210-megawatt AC (MWac) ground-mounted solar photovoltaic system, a substation, and related interconnection and ancillary facilities located within the counties of Breathitt, Knot, and Perry, Kentucky.

The proposed Project is a 1,980-acre site located on a former mine site east of Wendell H. Ford Airport in the counties of Breathitt, Knott, and Perry, Kentucky. The Project footprint, generally the area within the fence line where the Project infrastructure will be located, includes approximately 1,385 acres within the larger Project site after site constraints. The Project is north of Kentucky Route 80 with site access from Routes 476 and 1087. Noise-sensitive areas (NSAs) relative to the Project include multiple residential land uses and two cemetery locations. For the purposes of this noise assessment, two sets of distances were used for characterizing noise impacts. The distance between NSAs and the closest Project infrastructure is presented for the purpose of operational noise impacts, and the distance between NSAs and the closest Project boundary was used for calculating the construction noise impacts. The closest residential noise-sensitive area (NSA-6) is located approximately 4,211 feet from the closest Project infrastructure, and approximately 3,828 feet from the closest Project boundary.

On behalf of STMO, Tetra Tech, Inc. (Tetra Tech) prepared an acoustic assessment for the Project, evaluating the sound contribution of the Project. An acoustic modeling analysis was conducted simulating sound produced during both construction and operation. Operational sound sources consisted primarily of the inverter skids and the main transformer at the onsite collector substation. The overall objectives of this assessment were to: 1) identify Project sound sources and estimate sound propagation characteristics; 2) computer-simulate sound levels using internationally accepted calculation standards; and 3) determine whether the Project will operate in compliance with the applicable noise regulations.

2.0 ACOUSTIC METRICS AND TERMINOLOGY

This section outlines some of the relevant concepts in acoustics to help non-specialist readers better understand the acoustic modeling assessment and results as presented in this report.

Sound is described as a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave. Sound energy is characterized by the properties of sound waves, which include frequency, wavelength, period, amplitude, and velocity. A sound source is defined by a sound power level (L_W), which is independent of any external factors. Sound power is the rate at which acoustical energy is radiated outward and is expressed in units of watts (W). Sound energy propagates through a medium where it is sensed and then interpreted by a receiver. A sound pressure level (L_P) is a measure of this fluctuation at a given receiver location and can be obtained using a microphone or calculated from information about the source L_W and the surrounding environment. Sound power, however, cannot be measured directly. It is calculated from measurements of sound intensity or sound pressure at a given distance from the source.

While the concept of sound is defined by the laws of physics, the term ‘noise’ has further qualities, such as being excessive or loud. The perception of sound as noise is influenced by several technical factors as intensity, sound quality, tonality, duration, and the existing background levels. Sound levels are presented on a logarithmic scale to account for the large range of acoustic pressures that the human ear is exposed to and is expressed in units of decibels (dB). A dB is defined as the ratio between a measured value and a reference value, usually corresponding to the lower threshold of human hearing defined as 20 microPascals (µPa). Conversely, sound power is referenced to 1 picowatt (pW).

Broadband sound includes sound energy summed across the frequency spectrum. In addition to broadband sound pressure, analysis of the various frequency components of the sound spectrum is completed to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves; the frequency analysis typically examines 11 octave bands ranging from 16 Hz (low) to 16,000 Hz (high), encompassing the entire human audible frequency range. Since the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter. The A-weighted filter is applied to compensate for the frequency response of the human auditory system and sound exposure in acoustic assessments is designated in A-weighted decibels (dBA). Unweighted sound levels are referred to as linear. Linear decibels (dBL) are used to determine a sound’s tonality and to engineer solutions to reduce or control noise as techniques are different for low- and high-frequency noise.

Sound can be measured, modeled, and presented in various formats, with the most common metric being the equivalent sound level (L_{eq}). The L_{eq} value is the energy-averaged sound level over a given measurement period. Levels of many sounds change from moment to moment. Some impulses last 1 second or less, while others rise and fall over much longer periods of time. The equivalent sound level has been shown to provide both an effective and uniform method for comparing time-varying sound levels. Another commonly used sound metric is maximum sound level (L_{max}), which can be used to quantify the maximum instantaneous sound pressure level. The day-night sound level (L_{dn}) is used to describe sound levels over the course of a 24-hour period, with a 10-dB correction to reflect the increased noise-sensitivity of nighttime (10:00 pm to 7:00 am). Sound levels can also be described using statistical levels (L_n). This descriptor identifies the sound level that is exceeded “n” percent of the time over a measurement period (e.g., L_{90} = sound level exceeded 90 percent of the time). The sound level exceeded for a small percent of the time, L_{10}, closely corresponds to short-term, higher-level, intrusive noises (such as vehicle pass-by noise near a roadway). The sound level exceeded for a large percent of the time, L_{90}, closely corresponds to continuous, lower-level background noise (such as continuous noise from a distant industrial facility). L_{50}

is the level exceeded 50 percent of the time and is typically referred to the median sound level over a given period. Typical sound levels associated with various activities and environments are presented in Table 1.

Table 1. Sound Pressure Levels of Typical Noise Sources and Acoustic Environments

Noise Source or Activity	Sound Level (dBA)	Subjective Impression
Jet aircraft takeoff from carrier (50 feet [ft])	140	Threshold of pain
50-horsepower (hp) siren (100 ft)	130	
Loud rock concert near stage Jet takeoff (200 ft)	120	Uncomfortably loud
Crop dusting plane takeoff (100 ft)	110	
Jet takeoff (2,000 ft)	100	Very loud
Heavy truck or motorcycle (25 ft)	90	
Garbage disposal Food blender (2 ft) Pneumatic drill (50 ft)	80	Loud
Vacuum cleaner (10 ft)	70	Moderate
Passenger car at 65 miles per hour (25 ft)	65	
Large store air-conditioning unit (20 ft)	60	
Large office household refrigerator	55	Quiet
Light auto traffic (100 ft)	50	
Quiet rural residential area with no activity	45	
Bedroom or quiet living room, bird calls	40	Faint
Typical wilderness area	35	
Quiet library, soft whisper (15 ft)	30	Very quiet
Wilderness with no wind or animal activity	25	Extremely quiet
High-quality recording studio	20	
Acoustic test chamber	10	Just audible
	0	Threshold of human hearing

3.0 NOISE REGULATIONS

A review was conducted of noise regulations applicable to the Project at the federal, state, county, and local levels. There are no federal, state, county, or local environmental noise requirements specific to this Project.

While the U.S. EPA has no regulation governing environmental noise, the agency has conducted several extensive studies to identify the effects of sound level on public health and welfare. In 1974 the U.S. EPA published "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin on Safety". In this publication, the U.S. EPA evaluated the effects of environmental noise with respect to health and safety and determined an L_{dn} of 55 dBA (equivalent to an L_{eq} (1-hour) of 48.6 dBA assuming continuous 24-hour operation) to be the maximum sound level that will not adversely affect public health and welfare by interfering with speech or other activities in outdoor areas.

In the absence of relevant environmental noise requirements, received sound levels at the closest NSA were calculated and compared to the U.S. EPA level of 55 dBA L_{dn}. Sound levels resulting from the Project at all identified NSAs located in the vicinity of the Project are absolute and independent of the existing acoustic environment; therefore, a baseline sound survey is not required to demonstrate conformance.

4.0 PROJECT CONSTRUCTION

Construction of the Project is expected to be typical of other solar power generating facilities in terms of schedule, equipment, and activities.

4.1 NOISE CALCULATION METHODOLOGY

Acoustic emission levels for activities associated with Project construction were based upon typical ranges of energy equivalent noise levels at construction sites, as documented by the U.S. EPA (1971) and the U.S. EPA's "Construction Noise Control Technology Initiatives" (U.S. EPA 1980), as well as equivalent noise levels for construction equipment provided by STMO. The U.S. EPA methodology distinguishes between type of construction and construction stage. Using those energy equivalent noise levels as input to a basic propagation model, construction noise levels were calculated at a series of set reference distances using the formula:

$$L_2 = L_1 - |20 * \log(r_1/r_2)|,$$

Where $L_1 = L_{max}$ at distance r_1

$L_2 = L_{max}$ at distance r_2.

The basic model assumed spherical wave divergence from a point source located at the closest point of the Project site boundary. Furthermore, the model conservatively assumed that all pieces of construction equipment associated with an activity will operate simultaneously for the duration of that activity at their L_{max}. An additional level of conservatism was built into the construction noise model by excluding potential shielding effects due to intervening structures and buildings along the propagation path from the site to receiver locations.

In addition to the L_{max} calculation described above, the average noise level (L_{eq}) was also calculated by applying the utilization percentage for each piece of construction equipment. This is the percentage of time an individual piece of construction equipment will operate over an hour period. The following formula was used to calculate this:

$$L = L_{max} + |10 * \log(UR/100)|,$$

Where $L = L_{eq}$

UR = Utilization Rate (%)

4.2 PROJECTED NOISE LEVELS DURING CONSTRUCTION

Table 2 summarizes the projected noise levels due to Project construction, organized into the following work stages:

(1) Site Preparation and Grading,

(2) Trenching and Road Construction,

(3) Equipment Installation, and

(4) Commissioning. Work associated with these phases may overlap.

Equipment used for construction includes heavy equipment (e.g., bulldozers, loaders, dump trucks), which involve diesel engines that produce mechanical and exhaust noise with the latter typically the predominant sound source. Periodically, sound levels may be higher or lower than those presented in Table 2; however, the overall sound levels should generally be lower due to excess attenuation and the trend toward quieter construction equipment in the intervening decades since the USEPA data were developed. Since there are no NSAs within 2,000 feet of the Project, the noise impacts from all construction phases were calculated at all NSAs within 1-mile of the site, with the closest residential NSA being approximately 3,828 feet from the Project site boundary and 4,211 feet to the closest project infrastructure (NSA-6). Table A-1 in Appendix A shows the received construction noise levels at the remaining NSAs within 1-mile of the site.

Noise from construction equipment will vary depending on a variety of factors including the number and class of equipment operating at a location at a given time. Received sound levels will also fluctuate, depending on the construction activity, equipment type, and distance between noise source and noise-sensitive receptors. Construction hours of operation are assumed to generally be between 7:00 a.m. and 7:00 p.m. five days per week (Monday through Friday) with noise-producing activities typically from 9:00 a.m. to 5:00PM.

Due to the infrequent nature of loud construction activities at the site, the limited hours of construction and the implementation of noise mitigation measures, the temporary increase in noise due to construction is considered to be a less than significant impact.

Table 2. Projected Construction Noise Levels by Phase (dBA L_{max}, L_{eq})

Construction Phase	Construction Equipment	Individual Equipment Noise Level at 50 feet (dBA, L_{max})	Usage Factor (%)	Composite Equipment Noise Level at NSA-6, 3,828 feet from Project Boundary	
				Peak, (dBA, L_{max})	Average, (dBA, L_{eq})
Site Preparation and Grading	(1) Grader (174 horsepower [hp]) (1) Rubber Tired Loader (164 hp) (1) Scraper (313 hp) (1) Water Truck (189 hp) (1) Generator Set	85 80 85 85 82	40 40 40 50 50	53	50
Trenching and Road Construction	(2) Excavator (168 hp) (1) Bar Trencher (600 hp) (1) Grader (174 hp) (1) Water Truck (189 hp) (1) Trencher (63 hp) (1) Rubber Tired Loader (164 hp) (1) Generator Set	85 82 85 85 82 80 82	40 50 40 50 50 40 50	55	51
Equipment Installation	(1) Crane (399 hp) (1) Crane (165 hp) (2) Forklift (145 hp) (2) Pile Driver (6) Pickup Truck/All-Terrain Vehicle (2) Water Truck (189 hp) (2) Generator Set	85 85 55 95 55 85 82	16 16 40 20 40 50 50	61	55
Commissioning	(2) Pickup Trucks/ATVs	55	40	20	16

4.3 CONSTRUCTION NOISE MITIGATION

Construction noise will be temporary in nature and, as such, no long term or significant noise impacts due to construction are anticipated. Regardless, reasonable efforts may be made to minimize the impact of noise resulting from construction activities. Following is a list of recommended best management practices and noise mitigation measures:

- Construction equipment should be well-maintained and vehicles using internal combustion engines equipped with mufflers will be routinely checked to ensure they are in good working order;
- Noisy equipment will be located as far from possible from sensitive areas; and
- A noise complaint hotline and local representative will be made available to address any noise-related issues.

Implementing the listed measures will aid in reducing offsite construction noise impacts. Due to the temporary nature of construction noise, no long-term impacts are anticipated.

5.0 OPERATIONAL NOISE

This section describes the model and input assumptions used to calculate noise levels due to the Project's normal operation, and the results of the noise impact analysis.

5.1 OPERATIONAL NOISE PROPAGATION MODEL

The acoustic modeling for the Project operation was conducted with the Cadna-A® sound model from DataKustik GmbH (2024). The outdoor noise propagation model is based on Organization for International Standardization (ISO) 9613, Part 1: "Calculation of the absorption of sound by the atmosphere," (1993) and Part 2: "General method of calculation," (1996). It is used by acoustic engineers to accurately describe sound emission and propagation from complex facilities and in most cases yields conservative results of operational sound levels in the surrounding community. Model predictions are accurate to within 1 dB of calculations based on the ISO 9613 standard.

ISO 9613 was used to calculate propagation and attenuation of sound energy with distance, surface and building reflection, and shielding effects by equipment, buildings, and ground topography. Offsite topography was determined using Unites States Geological Survey (USGS) digital elevation data. The sound model propagation calculation parameters are summarized in Table 3.

Table 3. Acoustic Model Setup Parameters

Model Input	Parameter Value
Standards	ISO 9613-2, Acoustics – Attenuation of sound during propagation outdoors.[1]
Reflection Loss	2 dB – indicates reduction in acoustic energy due to reflection
Grid Spacing	30 m
Terrain Description	USGS topography
Ground Absorption	0.5 (semi-reflective)
Receiver Characteristics	1.52 m (5 ft) above ground level
Meteorological Factors	Omnidirectional downwind propagation / mild to moderate atmospheric temperature inversion
Temperature	70°F
Relative Humidity	70%
Search radius	1 mile

[1] Propagation calculations under the ISO 9613 standard incorporate the effects of downwind propagation from facility to receptor) with wind speeds of 1 to 5 m per second (3.6 to 18 kilometers per hour) measured at a height of 3 to 11 m above the ground.

The Project's general arrangement was directly imported into the acoustic model so that onsite equipment could be easily identified, structures could be added, and sound emissions ratings could be assigned to sources as appropriate. Cadna-A® allows for three basic types of sound sources to be introduced into the model: point, line, and area sources. Each noise-radiating element was modeled based on its noise emission pattern. Larger dimensional sources, such as the transformer walls, were modeled as area sources. Transformers and inverter skids were modeled as solid structures because diffracted paths around and over structures tend to reduce noise levels in certain directions. The interaction between sound sources and structures was also considered with reflection loss. The reflective characteristic of the structure is quantified by its reflection loss, which is typically defined as smooth façade from which the reflected sound energy is 2 dB less than the incident sound energy.

Ground absorption rates are described by a numerical coefficient. For pavement and water bodies, the absorption coefficient is defined as G = 0 to account for reduced sound attenuation and higher reflectivity. In contrast, ground covered in vegetation, including suburban lawns, are acoustically absorptive and aid in sound attenuation, i.e., G = 1.0. For the acoustic modeling analysis, a conservative semi-reflective value of G = 0.5 was used to represent the Project area. The portions of the Project area containing solar panels were represented with a reflective value of G = 0.0.

5.2 OPERATIONAL SOUND SOURCE INFORMATION

The Project site layout was directly imported into the acoustic model and includes 55 inverter skids and one 225 MVA substation transformer. The principal sources of noise are the cooling fans on the inverters and transformers, the electrical components of the inverter skids, and the main power transformer at the substation. Please note that trackers are not commonly modeled when evaluating solar facility noise impacts since they are considered such a low-level sound source.

Substations have switching, protection, and control equipment, as well as a main power transformer, which generate the sound generally described as a low humming. There are three chief noise sources associated with a transformer: core noise, load noise, and noise generated by the operation of the cooling equipment. The core is the principal noise source and does not vary significantly with electrical load. The load noise is primarily caused by the load current in the transformer's conducting coils (or windings) and consequently the main frequency of this sound is twice the supply frequency: 120 Hz for 60 Hz transformers. The cooling equipment (fans and pumps) may also be an important noise component, depending on fan design. During air forced cooling method, cooling fan noise is produced in addition to the core noise. The resulting audible sound is a combination of the humming and the broadband fan noise. Breaker noise is a sound event of very short duration, expected to occur only a few times throughout the year. Just as horsepower ratings designate the power capacity of an electric motor, a transformer's megavolt amperes rating indicates its maximum power output capacity.

Table 4 summarizes the equipment L_W data used as inputs to the modeling analysis. Sound power level values of operational equipment were calculated based on typical equipment of similar type. It is assumed that installed equipment will have similar sound power profiles as those used in the acoustic modeling analysis; however, it is possible that the final manufacturer warranty values may vary.

Table 4. Modeled Octave-Band Sound Power Levels for Project Equipment

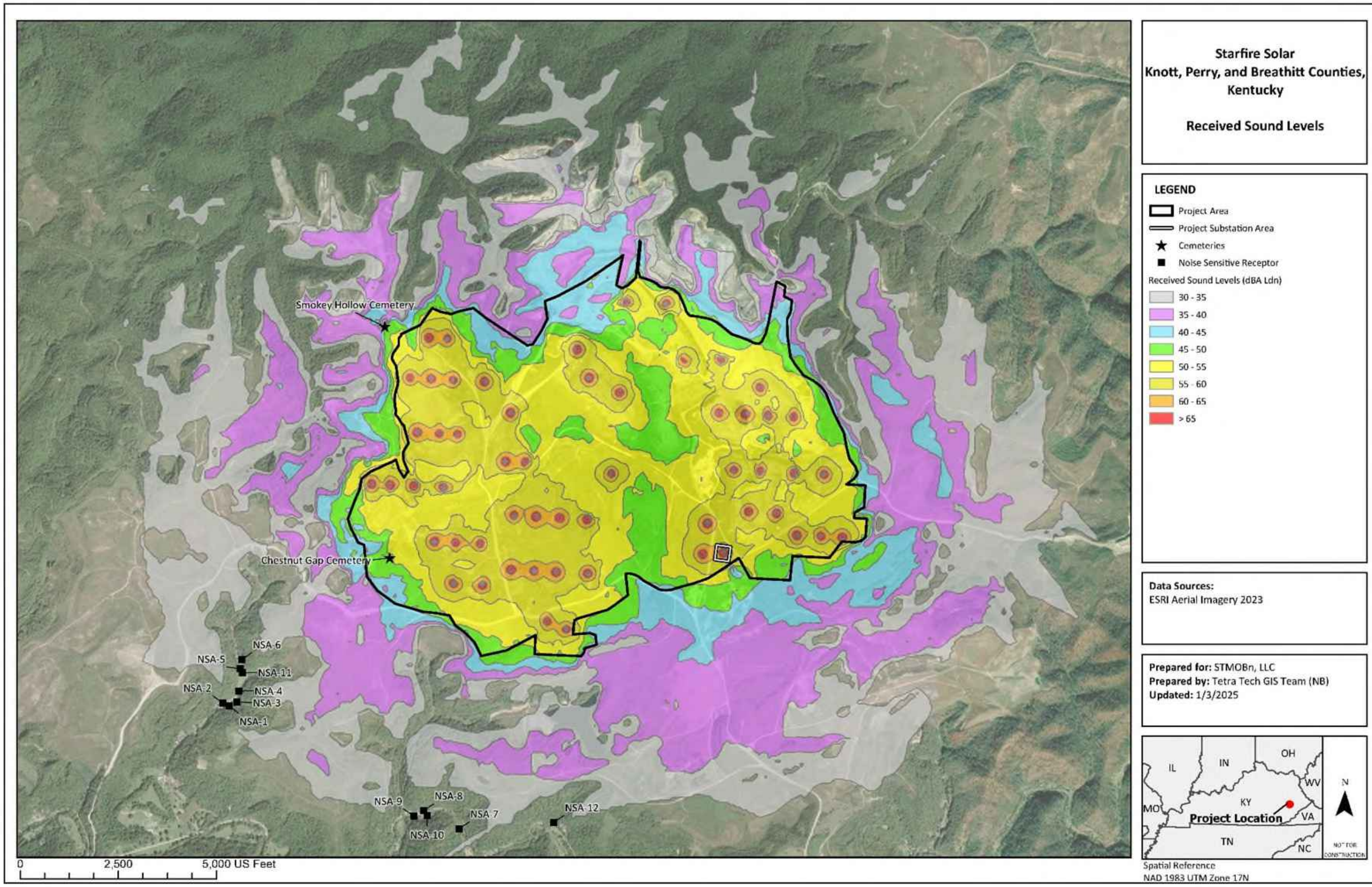
Operational Sound Sources	Sound Power Level (L_w) by Octave Band Frequency, (dBA)									Broadband L_w, dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Inverter	56	67	79	91	90	92	90	87	83	104
Substation Transformer	63	82	94	97	102	88	96	90	81	106

5.3 PROJECTED SOUND LEVELS DURING OPERATION

Broadband (dBA) sound pressure levels were calculated for expected normal Project operation assuming that all components identified previously are operating continuously and concurrently at the representative manufacturer-rated sound levels. The sound energy was then summed and weighted to determine the L_{eq} and L_{dn} at a point of reception. A sound contour plot displaying broadband (dBA) sound levels (L_{dn}) presented as color-coded isopleths is provided in Figure 1. The sound contours are graphical representations of the cumulative noise associated with full operation of the equipment and show how operational noise will be distributed over the surrounding area. Results from acoustic modeling are projected 5-dBA increments on scaled Project aerial. Results are independent of the existing acoustic environment, representative of Project-generated sound levels only. The sound contour isopleths are plotted at a height of 1.52 m above ground level, about the height of the ears of a standing person. The contour isopleths are analogous to elevation contours on a topographic map, i.e., the noise contours are continuous lines of equal noise level around some source, or sources, of noise.

Modeling results can be seen in Table A-2 in Appendix A and shows that the highest noise levels resulting from Project operations at a residential location will be 18 dBA L_{eq} and 25 dBA L_{dn} at NSA-1, and at a non-residential location will be 40 dBA L_{eq} and 47 dBA L_{dn} at Chestnut Gap Cemetery, and thus under the U.S. EPA sound level criterion of 55 dBA L_{dn} at all NSAs. In addition, the highest sound level experienced at the Project's Property Boundary will be 59 dBA, with an average L_{dn} of 65 dBA. This Property Boundary location is located at the eastern portion of the Project site and approximately 10,243 feet from the nearest NSA, which is NSA-12. Overall, sound emissions associated with the Project are expected to remain at a low level, consistent with other solar energy facilities of similar size and design sited in Kentucky.

Figure 1. Operational Sound Levels (L_{dn})



6.0 CONCLUSIONS

Tetra Tech completed a detailed acoustic assessment of the proposed STMO Project, located in the counties of Breathitt, Knot, and Perry, Kentucky. The assessment included an evaluation of Project sound contribution to the surrounding area during construction and operation phases.

The construction noise assessment indicated that construction noise will be periodically audible at offsite locations; however, that noise will be temporary and minimized to the extent practicable through implementation of best management practices and noise mitigation measures as identified in section 4.3. Additionally, the closest residential NSA (NSA-6) is 4,211 feet from the nearest Project infrastructure so noise will be kept to a minimum. Traffic noise generated during construction on and offsite will also add to overall sound levels but will be intermittent and short-term.

Operational sound levels were modeled and evaluated at the closest NSAs to the Project area. Anticipated Project sound sources consist of the collector substation main power transformer and inverter skids. Modeling results show that noise levels resulting from Project operations will be under the U.S. EPA sound level criterion of 55 dBA L_{dn}. Overall, sound emissions associated with the Project are expected to remain at a low level, consistent with other solar energy facilities of similar size and design sited in the State of Kentucky.

7.0 REFERENCES

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APPENDIX A. DETAILED ACOUSTIC MODELING RESULTS

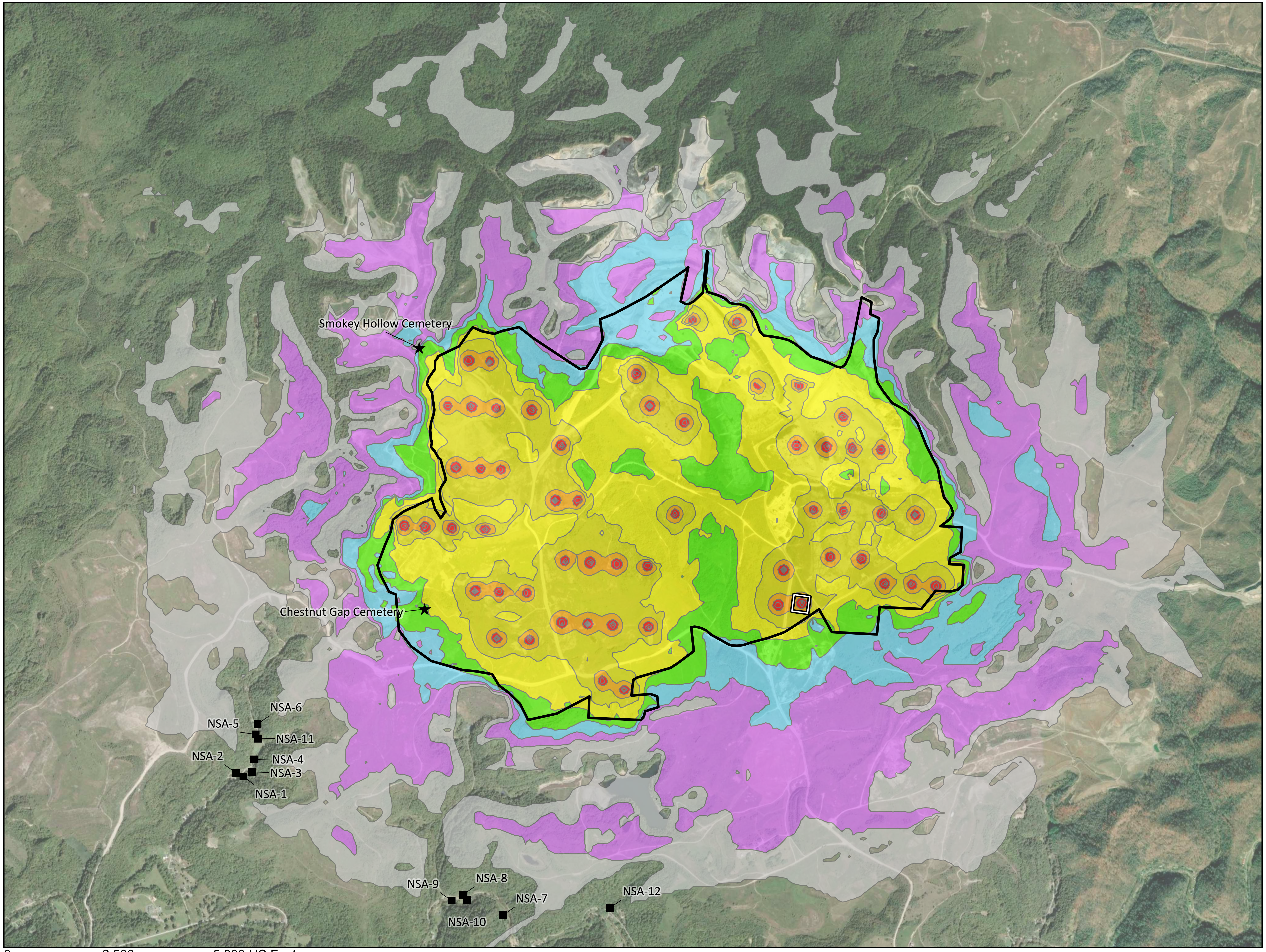
Table A-1. Detailed Construction Acoustic Modeling Results

NSA ID	UTM Coordinates (meters)		Distance to Project Boundary (feet)	Site Preparation and Grading		Trenching and Road Construction		Equipment Installation		Commissioning	
	Easting	Northing		Peak (dBA, L_{max})	Average (dBA, L_{eq})	Peak (dBA, L_{max})	Average (dBA, L_{eq})	Peak (dBA, L_{max})	Average (dBA, L_{eq})	Peak (dBA, L_{max})	Average (dBA, L_{eq})
1	309258	4140751	4,788	51	48	53	49	59	53	18	14
2	309208	4140777	4,868	51	47	53	49	59	53	18	14
3	309319	4140783	4,567	52	48	53	50	60	53	19	15
4	309332	4140868	4,363	52	48	54	50	60	54	19	15
5	309344	4141040	3,994	54	49	54	51	61	55	20	16
6	309356	4141112	3,828	53	50	55	51	61	55	20	16
7	311044	4139797	4,440	52	48	54	50	60	54	19	15
8	310768	4139938	4,210	52	49	54	51	60	54	20	16
9	310691	4139898	4,425	52	48	54	50	60	54	19	15
10	310796	4139902	4,289	52	49	54	50	60	54	19	15
11	309359	4141011	4,011	53	49	55	51	61	55	20	16
12	311779	4139847	4,264	52	49	54	50	60	54	19	15

Smokey Hollow Cemetery	310468	4143698	455	72	68	73	70	80	73	39	35
Chestnut Gap Cemetery	310505	4141902	385	73	70	75	71	81	75	40	36

Table A-2. Detailed Operational Acoustic Modeling Results

NSA ID	UTM Coordinates (meters)		Distance to Nearest Project Infrastructure (feet)	Received L_{dn} (dBA)	Received L_{eq} (dBA)
	Easting	Northing			
1	309258	4140751	5054	25	18
2	309208	4140777	5147	23	16
3	309319	4140783	4831	21	15
4	309332	4140868	4644	22	16
5	309344	4141040	4342	17	11
6	309356	4141112	4211	16	10
7	311044	4139797	4597	18	12
8	310768	4139938	4355	18	11
9	310691	4139898	4568	16	9
10	310796	4139902	4436	18	12
11	309359	4141011	4338	19	13
12	311779	4139847	4310	19	12
Smokey Hollow Cemetery	310468	4143698	585	43	37
Chestnut Gap Cemetery	310505	4141902	544	47	41



Starfire Solar
Knott, Perry, and Breathitt Counties, Kentucky

Received Sound Levels

LEGEND

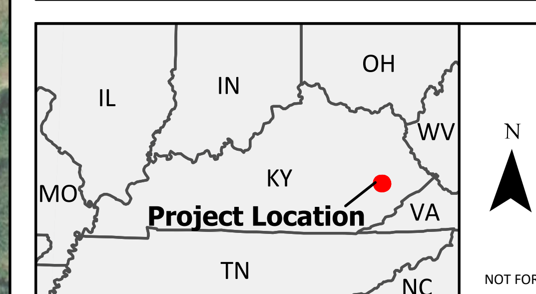
- Project Area
- Project Substation Area
- Cemeteries
- Noise Sensitive Receptor

Received Sound Levels (dBA Ldn)

- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- > 65

Data Sources:
ESRI Aerial Imagery 2023

Prepared for: STMOBn, LLC
Prepared by: Tetra Tech GIS Team (NB)
Updated: 1/3/2025



Spatial Reference
NAD 1983 UTM Zone 17N

SAR Attachment 5

STARFIRE SOLAR PROJECT

VISUAL SIMULATION

January 2025

EXISTING CONDITION

VISUAL SIMULATION

FIRE TOWER

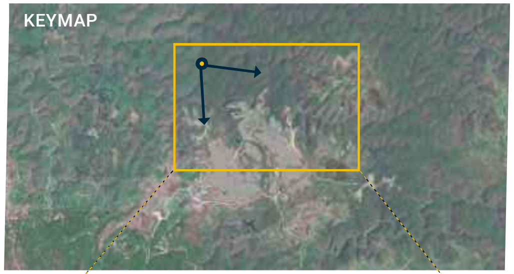
PHOTOGRAPH INFORMATION

Location
View from the fire tower in Robinson Forest, North of the project (5,180 feet above mean sea level)

Date and Time
May 15, 2024, 1:49PM

Geolocation
Latitude: 37.467028°
Longitude: -83.157667°

Distance from viewpoint to the closest infrastructure
3.33 miles to closest solar arrays

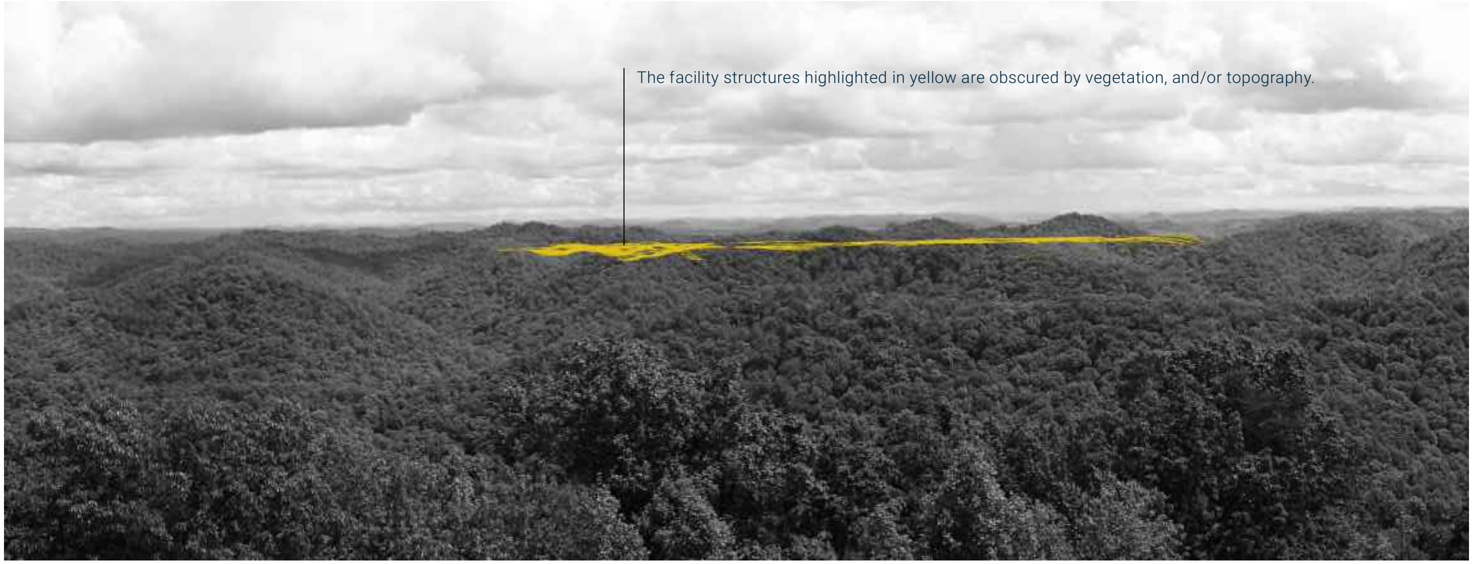


Visual Simulations were based on preliminary design and are subject to change based on final design

EXISTING CONDITION

VISUAL SIMULATION

XRAY VIEW : EXHIBIT OF OBSCURED INFRASTRUCTURE FROM THIS VIEWPOINT



FIRE TOWER

PHOTOGRAPH INFORMATION

Location
View from the fire tower in Robinson Forest, North of the project (5,180 feet above mean sea level)

Date and Time
May 15, 2024, 1:49PM

Geolocation
Latitude: 37.467028°
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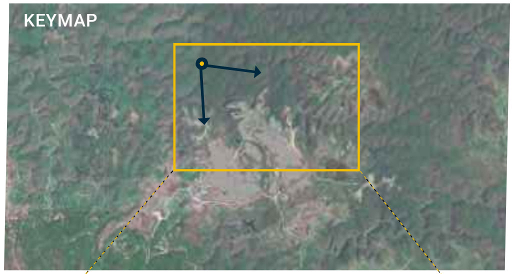
Distance from viewpoint to the closest infrastructure
3.33 miles to closest solar arrays



Visual Simulations were based on preliminary design and are subject to change based on final design

EXISTING CONDITION

VISUAL SIMULATION

OLIVE BRANCH

PHOTOGRAPH INFORMATION

Location
View from a former mining access road within proposed Olive Branch Development

Date and Time
May 21, 2024, 5:48PM

Geolocation
Latitude: 37.381389°
Longitude: -83.113056°

Distance from viewpoint to the closest infrastructure
1.35 miles to closest solar arrays

Visual Simulations were based on preliminary design and are subject to change based on final design

EXISTING CONDITION

VISUAL SIMULATION

XRAY VIEW : EXHIBIT OF OBSCURED INFRASTRUCTURE FROM THIS VIEWPOINT

OLIVE BRANCH

PHOTOGRAPH INFORMATION

Location
View from a former mining access road within proposed Olive Branch Development

Date and Time
May 21, 2024, 5:48PM

Geolocation
Latitude: 37.381389°
Longitude: -83.113056°

Distance from viewpoint to the closest infrastructure
1.35 miles to closest solar arrays

Visual Simulations were based on preliminary design and are subject to change based on final design

SAR Attachment 6

Glare Analysis Report for the Starfire Solar Project

Perry, Knott, and Breathitt Counties, Kentucky

January 2025

Prepared for:

STMO Bn, LLC
515 N Flagler Dr. Suite 250,
West Palm Beach, FL, 33401

Prepared by:

TETRA TECH

Tetra Tech, Inc.
4101 Cox Road, Suite 100
Glen Allen, VA 23060

TABLE OF CONTENTS

TABLES

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
Federal Aviation Administration	FAA
Solar Glare Hazard Analysis Tool	SGHAT
Observation Point	OP
Wendell H Ford Airport	CPF
Runway	RWY

1.0 INTRODUCTION

At the request STMO Bn, LLC (STMO) Tetra Tech, Inc. (Tetra Tech) conducted a glare analysis for the proposed Starfire Project (Project) located in a former coal mine spread across Breathitt, Knott, and Perry counties, Kentucky. This memorandum summarizes analysis of the glare that may result from operation of the proposed 210-megawatt (MW) photovoltaic solar energy generation facility, which is located on approximately 1,980 acres of a former coal mine in various reclamation stages (Project Area). The Project Area sits in an area of topographic relief and is surrounded by rolling, forested hills and scattered rural residences. Included with this memo are figures showing the Project location and glare receptors considered in the analysis (Attachment A), the Federal Aviation Administration (FAA) Notice Criteria Tool Report (Attachment B), and the glare modeling analysis reports (Attachment C).

2.0 GLARE ANALYSIS METHOD

With growing numbers of solar energy systems being proposed and installed throughout the United States, the potential impact of glint (a momentary flash of bright light) and glare (a continuous source of bright light) from solar photovoltaic modules has come under scrutiny by aviation authorities. The FAA issued an Interim Policy (78 FR 63276) on October 23, 2013, describing methods for obtaining FAA review and approval of proposed solar arrays on airport property. These methods involve the use of the Sandia Laboratories Solar Glare Hazard Analysis Tool (SGHAT), a modeling/compliance analysis tool licensed for public use within the ForgeSolar GlareGauge cloud software application. Although not required for a proposed solar installation located offsite of an airport property (and for which notice is filed with FAA pursuant to 14 CFR Part 77.9), analysis of potential glare hazard using SGHAT is generally considered to be an industry best practice for solar facilities.

Sandia Laboratories describes the SGHAT technology as follows:

Sandia developed SGHAT v. 3.0, a web-based tool and methodology to evaluate potential glint/glare associated with solar energy installations. The validated tool provides a quantified assessment of when and where glare will occur, as well as information about potential ocular impacts. The calculations and methods are based on analyses, test data, a database of different photovoltaic module surfaces (e.g., anti-reflective coating, texturing), and models developed over several years at Sandia. The results are presented in a simple easy-to-interpret plot that specifies when glare will occur throughout the year, with color indicating the potential ocular hazard (Sandia Laboratories, 2016).

Tetra Tech, Inc. (Tetra Tech) completed a glare analysis using the SGHAT software, developed by Sandia Laboratories, now hosted by ForgeSolar (as discussed further below). The SGHAT software is considered an industry-best practice and conservative model that effectively models the potential for glare at defined receptors from defined solar energy generating facilities. The model is conservative in that it does not account for potential screening such as existing or proposed vegetation, topography outside of the defined areas, buildings, walls, or fences, nor does it account for varying weather conditions throughout the year.

Based on the predicted retinal irradiance (intensity) and subtended angle (size/distance) of the glare source to receptor, SGHAT categorizes potential glare where it is predicted to occur by the model in accordance with three tiers of severity (ocular hazards) represented by different colors in the model output:

- “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 when observed prior to a typical blink response time.
- “Red” glare is glare with potential to cause permanent eye damage (retinal burn).

These categories of glare are calculated using a typical observer’s blink response time, ocular transmission coefficient (the amount of radiation absorbed in the eye prior to reaching the retina), pupil diameter, and eye focal length (the distance between where rays intersect in the eye and the retina). As a point of comparison, direct viewing of the sun without a filter is considered to be on the border between yellow glare and red glare, while typical camera flashes are considered to be lower tier yellow glare (approximately three orders of magnitude less than direct viewing of the sun). Upon exposure to yellow glare, the observer may experience a temporary spot in their vision temporarily lasting after the exposure. Upon exposure to green glare, the observer may experience a bright reflection but typically no spot lasting after exposure.

Tetra Tech used SGHAT to conduct three separate glare analyses to evaluate the potential for glint and glare from the Project, as follows: (1) 25 observation points (OP) at nearby locations selected to represent lines of sight from neighboring properties; (2) proximal segments of nearby roads (Buckhorn Road, KY-478, KY-80, and Starfire Hand Road); and 3) the final approach paths for the Wendell H Ford Airport (CPF). Analysis 1 and 2 differ in the heights assumed for the OP and vehicular routes; Analysis 1 represents the point of view from an average first floor residential/commercial structure and typical commuter car, while Analysis 2 represents the point of view from an average second floor residential/commercial structure and typical semi-tractor-trailer truck. Analysis 3 modeled the four two-mile final approach flight paths associated with CPF airport. For all three analyses, the Project area was defined as 10 separate solar photovoltaic arrays, which are segmented polygons generally representative of the proposed Project layout. The modeled solar photovoltaic arrays are shown in Figure 1, the OPs, roadway segments and final approach runways are shown in Figure 2 (Attachment A).

The FAA NCT determines whether a proposed structure is in proximity to a jurisdictional air navigation facility and if formal submission under 14 CFR Part 77.9 (Safe, Efficient Use, and Preservation of the Navigable Airspace) is needed. The NCT was utilized to determine whether notice must be filed and if there are any airports or federally obligated two-mile final approach paths within the vicinity of the Project. The NCT identified the CPF airport and based on the results the Project does not exceed notice criteria; therefore, it is not required for the Project to be formally filed with the FAA Obstruction Evaluation Group. Although the NCT shows that the Project would not need to be filed with FAA, the CPF Airport is within proximity of the Project with flight paths noted on the NCT Report. Due to this the 2-mile flight paths were included in the analysis report (Analysis 3). The FAA Notice Criteria Tool Report is included as Attachment B.

The panel orientation, location, and specifications used in the analysis were based on the Project design as provided by STMO. The solar photovoltaic arrays consist of a single-axis tracker system with a maximum tracking angle tilt of ±60 degrees (including backtracking with a resting angle of 5 degrees) and a panel height of 5 feet above ground surface (centroid height) with applicable panel specifications. The panels to be used are smooth glass surface material with an anti-reflection coating (ARC), which is noted in the glare analysis. The input features used in the analyses are summarized in Table 1 and Table 2.

Table 1. Glare Analyses Input Features

Analysis No.	Racking Type	Module Orientation[1]	Tracking Maximum[2] (degrees)	Resting Angle[3] (degrees)	Module Height[4] (feet)	OP Height[5] (feet)	Route Height[6] (feet)	Flight Paths
1	Tracking	East-facing	±60	5	5	6	5	-
2	Tracking	East-facing	±60	5	5	16	9	-
3	Tracking	East-facing	±60	5	5	-	-	4

1. PV Array Areas modeled as single axis tracking modules from east-facing in the morning hours to west-facing in the evening hours.
2. The module tilt varies through the day as they track the sun, the maximum tracking angle tilt is ±60 degrees east/west.
3. Angle of rotation of panels when sun is outside tracking range. Used to model backtracking. Panels will revert to the position described by this rotation angle at all times when the sun is outside the rotation range defined by the tracking maximum.
4. Average module centroid height above ground surface.
5. Height of observation point receptor: 6 feet represents an average first floor residential/commercial point of view and 16 feet represents an average second floor residential/commercial point of view.
6. Height of vehicular route receptor: 5 feet represents typical commuter car height and 9 feet represents typical semi-tractor-trailer truck views.

Table 2. Analysis 3 Input Features

Flight Path/ ATCT Name	Associated Airport	True Direction (degrees)	Threshold Crossing Height (feet)	Glide Path[1] (degrees)
CPF RWY 06	Wendell H Ford Airport	59	50	3
CPF RWY 14	Wendell H Ford Airport	139	31	3
CPF RWY 24	Wendell H Ford Airport	239	50	3
CPF RWY 32	Wendell H Ford Airport	319	38	4

1. Angle of descent along final approach flight path.

3.0 GLARE ANALYSIS RESULTS

Analyses 1 – 1st Story Receptors

Analysis 1 analyzed 10 PV Array Areas for 25 first-story receptors (OP-1 through OP-25) and six proximal route receptors along segments of Buckhorn Road (1 and 2), Starfire Hand Road, KY-478 (1 and 2), and KY-80 from the height of a driver in a standard commuter vehicle. The SGHAT GlareGauge modeled the results for the Project. The simulation predicted minor amounts of green glare for a specific section of Buckhorn Road (2) and OP-9 from PV Array 6. Predicted glare for the segment of Buckhorn Road occurs in December through early January with a duration of less than 10 minutes between the hours of 4:00 and 5:00 PM. Predicted glare for OP-9 occurs in December through early January with a duration of less than 15 minutes between the hours of 4:00 and 5:00 PM.

Analyses 2 – 2nd Story Receptors

Analysis 2 analyzed 10 PV Array Areas for 25 second-story receptors and six proximal route receptors along segments of Buckhorn Road (1 and 2), Starfire Hand Road, KY-478 (1 and 2), and KY-80 from the height of a driver in a typical tractor trailer. The SGHAT GlareGauge modeled the results for the Project. The simulation predicted minor amounts of green glare for a specific section of Buckhorn Road (2) and OP-9 from PV Array 6. Predicted glare for the segment of Buckhorn Road occurs in December through early January with a duration of less than 10 minutes between the hours of 4:00 and 5:00 PM. Predicted glare for OP-9 occurs in December through early January with a duration of less than 15 minutes between the hours of 4:00 and 5:00 PM.

Analyses 3 – FAA Receptors

Analysis 3 analyzed 10 PV Array Areas for the four 2-mile final approach paths for the CPF Airport. Specifications for the runways were taken from the FAA's Aeronautical Data resource database. A typical 30-degree maximum downward viewing angle and 50-degree maximum azimuthal viewing angle from the aircraft cockpit were included. SGHAT GlareGauge modeled the results for the Project. The simulation predicted that no glare would occur to the modeled receptors.

No instances of red glare are predicted for any OP or route segments. For Analysis 1 the total amount of annual green glare predicted is 538 minutes (9.0 annual hours), and for Analysis 2 the total amount of annual green glare predicted is 593 minutes (9.9 annual hours). This is considered a minor amount. A summary of the amount of predicted glare in Analysis 1 and 2 is presented in Table 3 and Table 4, showing only the receptors that have the potential to receive glare.

Table 3. Summary of Predicted Glare

	Receptor	Annual Green Glare	
		minutes	hours
Analysis 1	OP 9	301	5.0
	Buckhorn Road -2	237	4.0
Analysis 2	OP 9	356	5.9
	Buckhorn Road -2	237	4.0
No instances of yellow or red glare is predicted for any OP or route segment.			

Table 4. Detailed Glare Summary

Receptor	Type of Glare	Minutes per Day	Time of Day	Time of Year
OP 9	Green	Less than 15 minutes	4:00 – 5:00 PM	December through early January
Buckhorn Road	Green	Less than 10 minutes	4:00 – 5:00 PM	December through early January

4.0 SUMMARY

The proposed solar photovoltaic facility for the Starfire Project was modeled using SGHAT to evaluate the extent of predicted glint and glare that may be experienced at nearby observation points, vehicle routes, and the CPF airport. Three analyses were performed which represented the point of view from an average first floor residential/commercial structure and typical commuter car (six feet and five feet respectively), an average second floor residential/commercial structure and typical semi-tractor-trailer truck (sixteen feet and nine feet respectively), and the 2-mile final approach paths for the nearby airport. No red or yellow glare is predicted. Minor amount of green glare was predicted for a section of Buckhorn Road and OP-9 in Analyses 1 and 2. Based on these results, it is predicted that vehicles along a section of Buckhorn Road and viewers at OP-9 would experience green glare for less than 15 minutes per day between the hours of 4:00 PM and 5:00 PM during December to early January. This glare was predicted solely from PV Array 6. Based on the results of the analysis, no glare is expected to surrounding residences because of this Project. Additionally, the sections of Buckhorn Road where glare is predicted is not a through road and is unlikely to impact the general public. OP-9 is located on undeveloped mining land and any glare is unlikely to impact the public.

The GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing topography not located within the defined array layouts, or existing vegetation or structures (including fences or walls) unless defined through the Obstruction tool. As such, the predicted results are considered to be conservative with actual glare from the Project being lower. The section of Buckhorn Road that received glare and OP-9 are located adjacent to each other and based on aerial imagery appear to be located within a valley and potentially have obstructed views to the Project from existing topography and vegetation. It is likely that intervening topography and vegetation from the surrounding area will negate most if not all glare from local roads.

Lastly, based on the results of the FAA Notice Criteria Tool, the Project does not exceed notice criteria; therefore, it is not required for the Project to be formally filed with the FAA Obstruction Evaluation Group.

5.0 REFERENCES

Sandia Solar Glare Hazard Analysis Tool, GlareGauge hosted by ForgeSolar. Accessed online https://www.forgesolar.com/.

Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports. 78 FR 63276. October 23, 2013.

Federal Aviation Administration. CFR Title 14 Part 77.9 Notice of Proposed Construction or Alteration Requiring Notice. 2010.

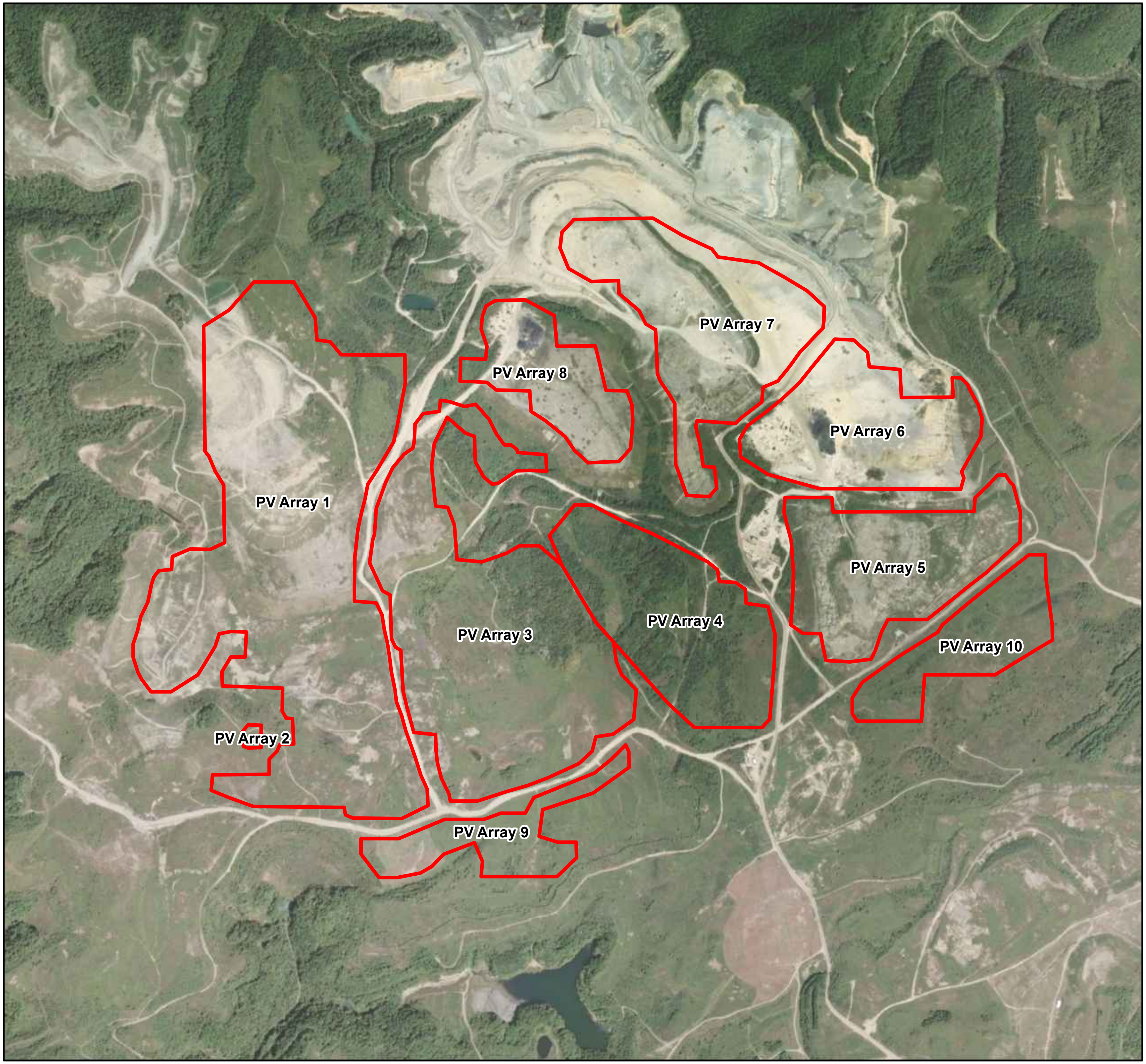
Federal Aviation Administration. Technical Guidance for Evaluating Selected Solar Technologies on Airports. 2010.

ATTACHMENT A. FIGURES

ATTACHMENT B. FAA NOTICE CRITERIA TOOL

ATTACHMENT C. GLARE MODELING ANALYSIS REPORTS

ATTACHMENT A. FIGURES



Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors

Legend

Project Layout (PV Array Area)

N

Approximate Scale:

0 0.125 0.25 0.5 Miles

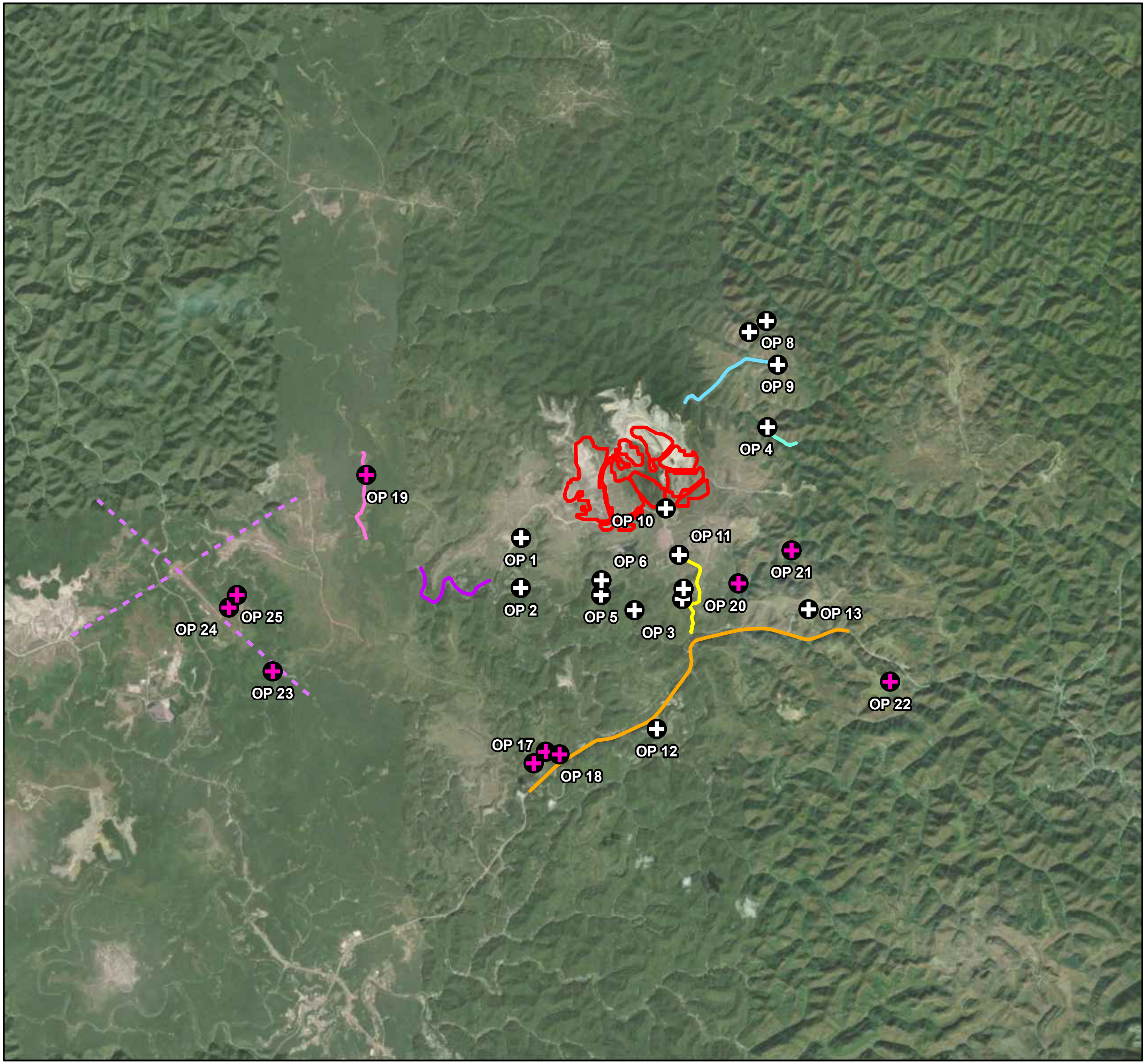
TETRA TECH

Date:

12/13/2024

Figure 1
PV Array Areas

Starfire Project
Breathitt, Knott,
and Perry Counties, Kentucky



Legend

Project Layout (PV Array

Observation Points (OPs)

Residential Homes

Neighboring Views

Buckhorn Road -1

Buckhorn Road -2

KY-478 -1

KY-478 -2

KY-80

Starfire Hand Road

Wendell H Ford Airport 2-mile Final Approach Paths

Approximate Scale:

0 0.75 1.5 3 Miles

TETRA TECH

Date:

12/13/2024

Figure 2
Glare Analysis Receptors

Starfire Project
Breathitt, Knott,
and Perry Counties, Kentucky

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors

ATTACHMENT B. FAA NOTICE CRITERIA TOOL

Federal Aviation Administration

The FAA is currently experiencing delays in processing off-airport aeronautical studies. These delays are currently resulting in an approximate 15 additional days in processing time. The FAA will continue to work aeronautical studies on a first come, first served basis. Please take this possible delay into consideration when determining when to submit your case. If your submitted aeronautical study requires priority and 60 days has elapsed since submission, please contact the OEG Specialist for your state with the rationale for your request and it will be reviewed for escalation. The issue causing these delays is actively being mitigated and is expected to be resolved around August.

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2018.2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:
- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

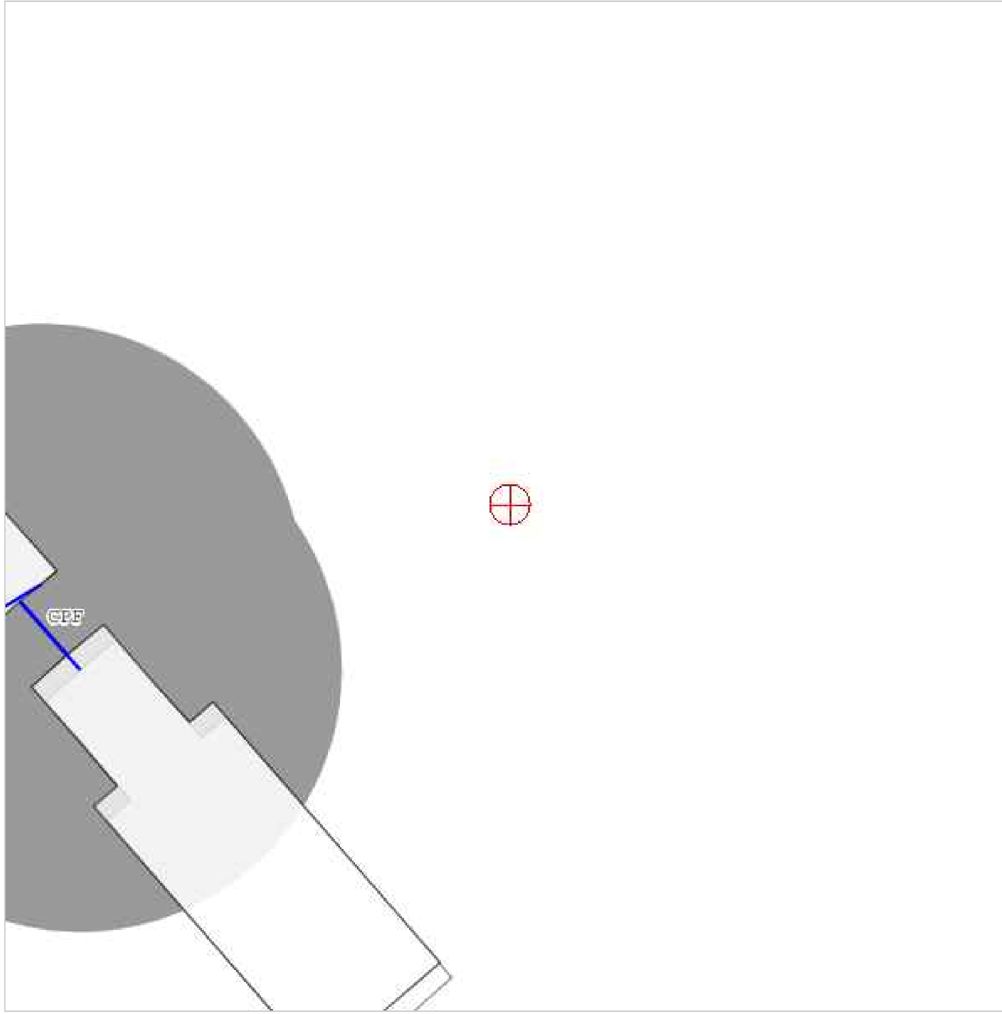
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

*** Structure Type:**	SOLAR | Solar Panel Please select structure type and complete location point information.
Latitude:	37 Deg 24 M 38.41 S N
Longitude:	83 Deg 8 M 12.02 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	1294 (nearest foot)
Structure Height :	12 (nearest foot)
Is structure on airport:	(selected) No Yes

Results

You do not exceed Notice Criteria.


CPF

Federal Aviation Administration

The FAA is currently experiencing delays in processing off-airport aeronautical studies. These delays are currently resulting in an approximate 15 additional days in processing time. The FAA will continue to work aeronautical studies on a first come, first served basis. Please take this possible delay into consideration when determining when to submit your case. If your submitted aeronautical study requires priority and 60 days has elapsed since submission, please contact the OEG Specialist for your state with the rationale for your request and it will be reviewed for escalation. The issue causing these delays is actively being mitigated and is expected to be resolved around August.

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- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

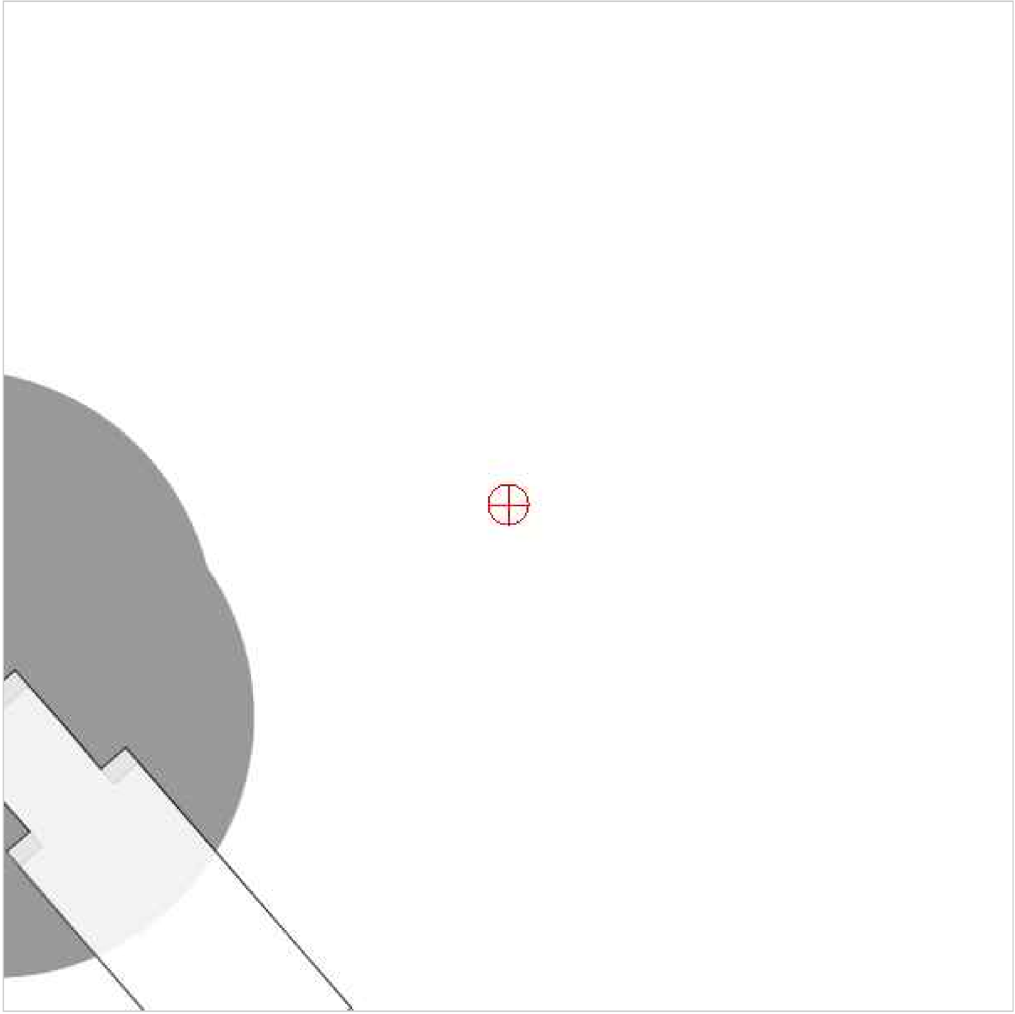
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

*** Structure Type:**	SOLAR | Solar Panel Please select structure type and complete location point information.
Latitude:	37 Deg 25 M 13.40 S N
Longitude:	83 Deg 6 M 50.04 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	1350 (nearest foot)
Structure Height :	12 (nearest foot)
Is structure on airport:	(•) No ( ) Yes

Results

You do not exceed Notice Criteria.



ATTACHMENT C. GLARE MODELING ANALYSIS REPORTS

FORGESOLAR GLARE ANALYSIS

Project: **Starfire Solar**
Site configuration: **Analysis 1 - 1st Story Receptors 12042024**

Created 13 Dec, 2024
Updated 13 Dec, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 1 MW to 5 MW
Site ID 136811.21171

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with low potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	538	9.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

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

Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	237	4.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	301	5.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.421702	-83.138117	1395.55	5.00	1400.55
2	37.421719	-83.136390	1402.04	5.00	1407.04
3	37.420228	-83.135317	1389.02	5.00	1394.02
4	37.419342	-83.135306	1380.05	5.00	1385.05
5	37.419333	-83.134501	1386.18	5.00	1391.18
6	37.418677	-83.133096	1356.71	5.00	1361.71
7	37.418660	-83.130886	1306.12	5.00	1311.12
8	37.417492	-83.130918	1305.98	5.00	1310.98
9	37.415831	-83.131315	1344.14	5.00	1349.14
10	37.415294	-83.131433	1330.53	5.00	1335.53
11	37.414706	-83.131969	1345.15	5.00	1350.15
12	37.414075	-83.132527	1342.08	5.00	1347.08
13	37.412610	-83.133053	1352.08	5.00	1357.08
14	37.411169	-83.133536	1357.16	5.00	1362.16
15	37.409678	-83.133729	1293.55	5.00	1298.55
16	37.408962	-83.133729	1292.67	5.00	1297.67
17	37.409005	-83.132656	1291.84	5.00	1296.84
18	37.408613	-83.132420	1285.09	5.00	1290.09
19	37.407837	-83.132281	1283.51	5.00	1288.51
20	37.406525	-83.132055	1279.77	5.00	1284.77
21	37.405758	-83.131948	1284.17	5.00	1289.17
22	37.405110	-83.131862	1277.47	5.00	1282.47
23	37.404667	-83.131690	1276.14	5.00	1281.14
24	37.404126	-83.131472	1272.77	5.00	1277.77
25	37.403295	-83.131126	1272.18	5.00	1277.18
26	37.402425	-83.130783	1281.25	5.00	1286.25
27	37.401616	-83.130461	1281.91	5.00	1286.91
28	37.401419	-83.130386	1281.88	5.00	1286.88
29	37.401002	-83.130364	1282.08	5.00	1287.08
30	37.400448	-83.131566	1282.65	5.00	1287.65
31	37.400559	-83.133980	1292.02	5.00	1297.02
32	37.400742	-83.134430	1292.06	5.00	1297.06
33	37.400742	-83.134430	1292.06	5.00	1297.06
34	37.400742	-83.134430	1292.06	5.00	1297.06
35	37.400742	-83.134430	1292.06	5.00	1297.06
36	37.400742	-83.134430	1292.06	5.00	1297.06
37	37.400742	-83.134430	1292.06	5.00	1297.06
38	37.401040	-83.134463	1292.49	5.00	1297.49
39	37.401300	-83.139012	1272.33	5.00	1277.33
40	37.401607	-83.140165	1255.58	5.00	1260.58
41	37.401858	-83.140889	1248.17	5.00	1253.17
42	37.402427	-83.140830	1268.09	5.00	1273.09
43	37.402334	-83.138046	1300.57	5.00	1305.57
44	37.403026	-83.138038	1306.94	5.00	1311.94
45	37.403557	-83.137510	1319.70	5.00	1324.70
46	37.403531	-83.136750	1294.95	5.00	1299.95
47	37.404647	-83.136635	1250.60	5.00	1255.60
48	37.404675	-83.137142	1256.92	5.00	1261.92
49	37.404903	-83.137295	1257.86	5.00	1262.86
50	37.405841	-83.137206	1275.06	5.00	1280.06
51	37.405949	-83.140202	1283.63	5.00	1288.63
52	37.406480	-83.140146	1285.44	5.00	1290.44
53	37.407004	-83.139728	1286.61	5.00	1291.61
54	37.407285	-83.140793	1367.45	5.00	1372.45
55	37.406486	-83.141506	1381.97	5.00	1386.97
56	37.405982	-83.142189	1334.71	5.00	1339.71
57	37.406021	-83.143979	1314.52	5.00	1319.52
58	37.406549	-83.144356	1283.36	5.00	1288.36
59	37.407123	-83.144537	1224.05	5.00	1229.05

Name: PV array 10
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.404765	-83.109382	1345.27	5.00	1350.27
2	37.405362	-83.108867	1355.93	5.00	1360.93
3	37.406244	-83.107236	1353.98	5.00	1358.98
4	37.406527	-83.106670	1353.29	5.00	1358.29
5	37.408409	-83.103446	1347.48	5.00	1352.48
6	37.409004	-83.102489	1345.43	5.00	1350.43
7	37.410176	-83.100491	1338.59	5.00	1343.59
8	37.410161	-83.099669	1328.06	5.00	1333.06
9	37.409239	-83.099691	1327.72	5.00	1332.72
10	37.407395	-83.099426	1350.02	5.00	1355.02
11	37.406807	-83.099445	1351.64	5.00	1356.64
12	37.406505	-83.100123	1352.39	5.00	1357.39
13	37.405529	-83.102341	1364.79	5.00	1369.79
14	37.405584	-83.105949	1357.68	5.00	1362.68
15	37.403778	-83.106013	1304.21	5.00	1309.21
16	37.403846	-83.109146	1343.40	5.00	1348.40
17	37.404148	-83.109412	1330.91	5.00	1335.91

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.404122	-83.139221	1352.58	5.00	1357.58
2	37.404332	-83.139005	1355.31	5.00	1360.31
3	37.404298	-83.138431	1349.69	5.00	1354.69
4	37.403465	-83.138482	1350.18	5.00	1355.18
5	37.403498	-83.139014	1352.46	5.00	1357.46
6	37.403570	-83.139262	1348.74	5.00	1353.74

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.413646	-83.126416	1280.40	5.00	1285.40
2	37.413859	-83.125998	1278.88	5.00	1283.88
3	37.413986	-83.125569	1280.39	5.00	1285.39
4	37.414038	-83.125172	1285.39	5.00	1290.39
5	37.413977	-83.124165	1302.83	5.00	1307.83
6	37.414556	-83.124122	1321.14	5.00	1326.14
7	37.414970	-83.125887	1331.87	5.00	1336.87
8	37.416031	-83.126815	1330.66	5.00	1335.66
9	37.416533	-83.127475	1328.18	5.00	1333.18
10	37.416563	-83.127990	1326.02	5.00	1331.02
11	37.416804	-83.128811	1328.97	5.00	1333.97
12	37.416823	-83.129187	1323.13	5.00	1328.13
13	37.416331	-83.130090	1323.21	5.00	1328.21
14	37.415802	-83.130441	1330.21	5.00	1335.21
15	37.414184	-83.131545	1340.03	5.00	1345.03
16	37.413665	-83.132005	1345.82	5.00	1350.82
17	37.413163	-83.132243	1349.25	5.00	1354.25
18	37.412575	-83.132487	1352.19	5.00	1357.19
19	37.411450	-83.132697	1356.09	5.00	1361.09
20	37.410610	-83.132729	1356.11	5.00	1361.11
21	37.409457	-83.132262	1291.22	5.00	1296.22
22	37.408430	-83.131872	1284.07	5.00	1289.07
23	37.407582	-83.131840	1282.63	5.00	1287.63
24	37.404984	-83.131279	1276.23	5.00	1281.23
25	37.403893	-83.130840	1275.55	5.00	1280.55
26	37.401522	-83.129228	1282.65	5.00	1287.65
27	37.401470	-83.126393	1284.01	5.00	1289.01
28	37.402509	-83.122933	1281.78	5.00	1286.78
29	37.404166	-83.120068	1298.37	5.00	1303.37
30	37.405289	-83.120041	1334.59	5.00	1339.59
31	37.406363	-83.120954	1326.78	5.00	1331.78
32	37.407241	-83.121065	1322.85	5.00	1327.85
33	37.408055	-83.121906	1326.14	5.00	1331.14
34	37.408055	-83.121906	1326.14	5.00	1331.14
35	37.408055	-83.121906	1326.14	5.00	1331.14
36	37.408055	-83.121906	1326.14	5.00	1331.14
37	37.408055	-83.121906	1326.14	5.00	1331.14
38	37.408572	-83.122004	1328.07	5.00	1333.07
39	37.408572	-83.122004	1328.07	5.00	1333.07
40	37.408572	-83.122004	1328.07	5.00	1333.07
41	37.408572	-83.122004	1328.07	5.00	1333.07
42	37.408572	-83.122004	1328.07	5.00	1333.07
43	37.409360	-83.122756	1323.04	5.00	1328.04
44	37.409360	-83.122756	1323.04	5.00	1328.04
45	37.409360	-83.122756	1323.04	5.00	1328.04
46	37.409360	-83.122756	1323.04	5.00	1328.04
47	37.409360	-83.122756	1323.04	5.00	1328.04
48	37.410840	-83.123835	1319.90	5.00	1324.90
49	37.410840	-83.123835	1319.90	5.00	1324.90
50	37.410840	-83.123835	1319.90	5.00	1324.90
51	37.410840	-83.123835	1319.90	5.00	1324.90
52	37.410840	-83.123835	1319.90	5.00	1324.90
53	37.411118	-83.124367	1319.53	5.00	1324.53
54	37.411157	-83.125461	1330.98	5.00	1335.98
55	37.410853	-83.126212	1329.42	5.00	1334.42
56	37.410471	-83.127535	1313.54	5.00	1318.54
57	37.410527	-83.128710	1295.29	5.00	1300.29
58	37.411315	-83.128691	1279.35	5.00	1284.35
59	37.411999	-83.128793	1270.94	5.00	1275.94

Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412539	-83.122675	1306.04	5.00	1311.04
2	37.412501	-83.121827	1312.13	5.00	1317.13
3	37.411304	-83.118957	1333.48	5.00	1338.48
4	37.409902	-83.115862	1355.56	5.00	1360.56
5	37.408317	-83.113411	1365.87	5.00	1370.87
6	37.407209	-83.113159	1371.04	5.00	1376.04
7	37.406141	-83.113201	1362.86	5.00	1367.86
8	37.405617	-83.113266	1361.99	5.00	1366.99
9	37.404015	-83.113475	1350.03	5.00	1355.03
10	37.403693	-83.113797	1344.17	5.00	1349.17
11	37.403693	-83.113797	1344.17	5.00	1349.17
12	37.403693	-83.113797	1344.17	5.00	1349.17
13	37.403693	-83.113797	1344.17	5.00	1349.17
14	37.403793	-83.117171	1347.05	5.00	1352.05
15	37.404748	-83.118512	1313.17	5.00	1318.17
16	37.405067	-83.118721	1316.53	5.00	1321.53
17	37.407249	-83.121066	1322.64	5.00	1327.64
18	37.408067	-83.121897	1326.18	5.00	1331.18
19	37.408063	-83.121903	1326.18	5.00	1331.18
20	37.408063	-83.121903	1326.18	5.00	1331.18
21	37.408063	-83.121903	1326.18	5.00	1331.18
22	37.408063	-83.121903	1326.18	5.00	1331.18
23	37.408063	-83.121903	1326.18	5.00	1331.18
24	37.408578	-83.122004	1328.14	5.00	1333.14
25	37.409103	-83.122509	1321.05	5.00	1326.05
26	37.409362	-83.122755	1323.04	5.00	1328.04
27	37.410850	-83.123828	1319.99	5.00	1324.99
28	37.411455	-83.123828	1316.83	5.00	1321.83
29	37.411987	-83.123490	1317.65	5.00	1322.65

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412573	-83.112361	1360.70	5.00	1365.70
2	37.412522	-83.110162	1359.75	5.00	1364.75
3	37.412023	-83.110167	1352.59	5.00	1357.59
4	37.411859	-83.103066	1335.80	5.00	1340.80
5	37.412401	-83.103060	1331.47	5.00	1336.47
6	37.412920	-83.102401	1339.15	5.00	1344.15
7	37.413290	-83.101968	1329.68	5.00	1334.68
8	37.413290	-83.101968	1329.68	5.00	1334.68
9	37.413290	-83.101968	1329.68	5.00	1334.68
10	37.413279	-83.101510	1330.21	5.00	1335.21
11	37.413279	-83.101510	1330.21	5.00	1335.21
12	37.413279	-83.101510	1330.21	5.00	1335.21
13	37.412918	-83.101267	1336.86	5.00	1341.86
14	37.411795	-83.100997	1336.86	5.00	1341.86
15	37.410748	-83.100938	1338.94	5.00	1343.94
16	37.410062	-83.101832	1343.60	5.00	1348.60
17	37.407831	-83.105642	1347.26	5.00	1352.26
18	37.407620	-83.107672	1333.22	5.00	1338.22
19	37.406241	-83.108399	1352.12	5.00	1357.12
20	37.406307	-83.109396	1325.08	5.00	1330.08
21	37.406287	-83.110638	1361.65	5.00	1366.65
22	37.407464	-83.111596	1362.78	5.00	1367.78
23	37.407745	-83.112207	1366.81	5.00	1371.81
24	37.408525	-83.112183	1365.68	5.00	1370.68
25	37.410790	-83.111909	1365.73	5.00	1370.73
26	37.411691	-83.112370	1366.72	5.00	1371.72

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.414350	-83.114433	1351.23	5.00	1356.23
2	37.414908	-83.114398	1353.10	5.00	1358.10
3	37.415435	-83.114073	1359.34	5.00	1364.34
4	37.416470	-83.112377	1365.82	5.00	1370.82
5	37.418726	-83.109660	1335.88	5.00	1340.88
6	37.418713	-83.108889	1274.05	5.00	1279.05
7	37.418140	-83.107174	1296.99	5.00	1301.99
8	37.417573	-83.106584	1321.61	5.00	1326.61
9	37.416346	-83.106619	1259.84	5.00	1264.84
10	37.416274	-83.103864	1332.66	5.00	1337.66
11	37.417094	-83.103863	1338.46	5.00	1343.46
12	37.417091	-83.103682	1338.58	5.00	1343.58
13	37.416554	-83.103169	1333.60	5.00	1338.60
14	37.415451	-83.102672	1327.21	5.00	1332.21
15	37.414913	-83.102707	1325.48	5.00	1330.48
16	37.412892	-83.103863	1306.96	5.00	1311.96
17	37.413037	-83.110634	1377.40	5.00	1382.40
18	37.413640	-83.113113	1355.11	5.00	1360.11

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412842	-83.117184	1327.25	5.00	1332.25
2	37.412815	-83.116090	1326.77	5.00	1331.77
3	37.413077	-83.115856	1329.87	5.00	1334.87
4	37.413889	-83.115788	1345.57	5.00	1350.57
5	37.414740	-83.116543	1351.65	5.00	1356.65
6	37.415539	-83.116768	1337.29	5.00	1342.29
7	37.415674	-83.114858	1357.80	5.00	1362.80
8	37.416502	-83.113387	1362.92	5.00	1367.92
9	37.419238	-83.110405	1413.45	5.00	1418.45
10	37.419518	-83.110326	1425.53	5.00	1430.53
11	37.420074	-83.110306	1421.25	5.00	1426.25
12	37.421773	-83.113424	1382.02	5.00	1387.02
13	37.423641	-83.118495	1368.49	5.00	1373.49
14	37.423726	-83.122302	1168.93	5.00	1173.93
15	37.423093	-83.123031	1152.67	5.00	1157.67
16	37.422662	-83.122932	1136.09	5.00	1141.09
17	37.421971	-83.122654	1200.81	5.00	1205.81
18	37.421410	-83.121628	1244.04	5.00	1249.04
19	37.420821	-83.120136	1217.79	5.00	1222.79
20	37.419704	-83.118884	1328.81	5.00	1333.81
21	37.418291	-83.119155	1302.20	5.00	1307.20
22	37.418172	-83.118436	1304.47	5.00	1309.47
23	37.417611	-83.118453	1303.83	5.00	1308.83
24	37.416360	-83.117509	1352.30	5.00	1357.30
25	37.413945	-83.117589	1316.31	5.00	1321.31

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.418411	-83.128059	1330.42	5.00	1335.42
2	37.420065	-83.126906	1314.72	5.00	1319.72
3	37.420635	-83.126393	1315.22	5.00	1320.22
4	37.420587	-83.124870	1314.35	5.00	1319.35
5	37.420308	-83.123882	1325.57	5.00	1330.57
6	37.420038	-83.123583	1336.45	5.00	1341.45
7	37.419340	-83.123466	1337.40	5.00	1342.40
8	37.418821	-83.123488	1329.89	5.00	1334.89
9	37.418775	-83.121528	1329.69	5.00	1334.69
10	37.418225	-83.121368	1327.42	5.00	1332.42
11	37.417677	-83.121252	1322.87	5.00	1327.87
12	37.416966	-83.120155	1328.91	5.00	1333.91
13	37.416700	-83.119931	1333.01	5.00	1338.01
14	37.416428	-83.119786	1330.84	5.00	1335.84
15	37.415879	-83.119803	1323.19	5.00	1328.19
16	37.414791	-83.120063	1333.51	5.00	1338.51
17	37.414245	-83.120474	1319.67	5.00	1324.67
18	37.414271	-83.122027	1321.26	5.00	1326.26
19	37.414848	-83.122604	1337.59	5.00	1342.59
20	37.415404	-83.123034	1327.68	5.00	1332.68
21	37.416256	-83.124663	1320.06	5.00	1325.06
22	37.417256	-83.126658	1331.59	5.00	1336.59
23	37.417602	-83.128055	1329.23	5.00	1334.23

Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.399790	-83.133693	1286.30	5.00	1291.30
2	37.399766	-83.131783	1286.35	5.00	1291.35
3	37.400471	-83.129546	1285.45	5.00	1290.45
4	37.400429	-83.127580	1279.50	5.00	1284.50
5	37.400636	-83.126765	1279.12	5.00	1284.12
6	37.401224	-83.125142	1277.03	5.00	1282.03
7	37.401330	-83.124807	1277.15	5.00	1282.15
8	37.402095	-83.122143	1286.19	5.00	1291.19
9	37.402624	-83.121309	1294.94	5.00	1299.94
10	37.403175	-83.120550	1305.28	5.00	1310.28
11	37.402907	-83.120376	1315.75	5.00	1320.75
12	37.402291	-83.120405	1323.29	5.00	1328.29
13	37.401524	-83.121440	1295.00	5.00	1300.00
14	37.400657	-83.124825	1281.15	5.00	1286.15
15	37.399672	-83.124890	1278.88	5.00	1283.88
16	37.399453	-83.124002	1310.15	5.00	1315.15
17	37.399442	-83.123114	1307.70	5.00	1312.70
18	37.398801	-83.123103	1291.19	5.00	1296.19
19	37.398103	-83.124100	1297.40	5.00	1302.40
20	37.398154	-83.127833	1317.78	5.00	1322.78
21	37.398798	-83.127822	1318.50	5.00	1323.50
22	37.399509	-83.128083	1274.07	5.00	1279.07
23	37.398359	-83.130773	1285.23	5.00	1290.23
24	37.398237	-83.131921	1281.66	5.00	1286.66
25	37.398235	-83.132822	1282.56	5.00	1287.56
26	37.399187	-83.133694	1283.36	5.00	1288.36

Route Receptors

Name: Buckhorn Road -1
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.418781	-83.071481	1056.72	5.00	1061.72
2	37.418463	-83.072677	1054.76	5.00	1059.76
3	37.418271	-83.073249	1045.26	5.00	1050.26
4	37.418286	-83.073581	1039.28	5.00	1044.28
5	37.418401	-83.073994	1042.52	5.00	1047.52
6	37.418768	-83.075030	1080.16	5.00	1085.16
7	37.419185	-83.075579	1023.90	5.00	1028.90
8	37.419462	-83.075979	1028.23	5.00	1033.23
9	37.419780	-83.076695	1037.14	5.00	1042.14
10	37.419978	-83.077100	1024.68	5.00	1029.68
11	37.420048	-83.077355	1034.72	5.00	1039.72
12	37.420189	-83.077723	1025.59	5.00	1030.59
13	37.420382	-83.078130	1019.76	5.00	1024.76
14	37.420627	-83.078294	1012.28	5.00	1017.28
15	37.420823	-83.078643	1017.74	5.00	1022.74
16	37.420913	-83.078809	1027.85	5.00	1032.85
17	37.420998	-83.079085	1026.29	5.00	1031.29
18	37.421092	-83.079238	1026.15	5.00	1031.15
19	37.421599	-83.079635	1022.50	5.00	1027.50
20	37.421982	-83.079833	1022.48	5.00	1027.48
21	37.422165	-83.079975	1010.69	5.00	1015.69
22	37.422316	-83.080115	1004.61	5.00	1009.61
23	37.422756	-83.080192	992.04	5.00	997.04
24	37.423063	-83.080272	980.97	5.00	985.97

Name: Buckhorn Road-2
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.429705	-83.105979	1094.39	5.00	1099.39
2	37.430620	-83.105410	1057.19	5.00	1062.19
3	37.431042	-83.104788	1033.75	5.00	1038.75
4	37.431366	-83.103999	1015.20	5.00	1020.20
5	37.431413	-83.103603	1005.28	5.00	1010.28
6	37.431063	-83.103104	1043.69	5.00	1048.69
7	37.430459	-83.102422	1046.36	5.00	1051.36
8	37.430284	-83.101934	1045.05	5.00	1050.05
9	37.430375	-83.101537	1055.09	5.00	1060.09
10	37.430766	-83.101028	1088.83	5.00	1093.83
11	37.431282	-83.100341	1115.87	5.00	1120.87
12	37.431635	-83.099649	1126.95	5.00	1131.95
13	37.432094	-83.098860	1139.87	5.00	1144.87
14	37.432529	-83.098260	1161.55	5.00	1166.55
15	37.432827	-83.097686	1177.08	5.00	1182.08
16	37.434322	-83.095556	1236.68	5.00	1241.68
17	37.435184	-83.094773	1243.79	5.00	1248.79
18	37.437477	-83.092293	1254.85	5.00	1259.85
19	37.437824	-83.091752	1257.98	5.00	1262.98
20	37.438163	-83.090893	1261.00	5.00	1266.00
21	37.438355	-83.090258	1263.81	5.00	1268.81
22	37.438841	-83.089375	1261.55	5.00	1266.55
23	37.439276	-83.088101	1262.33	5.00	1267.33
24	37.439864	-83.087270	1267.95	5.00	1272.95
25	37.440187	-83.086594	1268.40	5.00	1273.40
26	37.440213	-83.086111	1269.27	5.00	1274.27
27	37.439720	-83.083160	1268.10	5.00	1273.10
28	37.439396	-83.081330	1275.78	5.00	1280.78
29	37.439294	-83.080075	1285.95	5.00	1290.95
30	37.438987	-83.078455	1295.62	5.00	1300.62

Name: KY-478 -1
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.397935	-83.207382	819.72	5.00	824.72
2	37.399218	-83.207785	814.50	5.00	819.50
3	37.400475	-83.208182	832.46	5.00	837.46
4	37.401084	-83.208600	829.32	5.00	834.32
5	37.402742	-83.210006	819.92	5.00	824.92
6	37.403113	-83.210156	819.38	5.00	824.38
7	37.403415	-83.210118	824.25	5.00	829.25
8	37.403816	-83.209657	836.98	5.00	841.98
9	37.404206	-83.208806	853.38	5.00	858.38
10	37.404474	-83.208538	852.47	5.00	857.47
11	37.405160	-83.208190	859.70	5.00	864.70
12	37.406618	-83.207498	865.77	5.00	870.77
13	37.407078	-83.207476	856.81	5.00	861.81
14	37.409098	-83.207675	830.65	5.00	835.65
15	37.409652	-83.207626	829.24	5.00	834.24
16	37.411796	-83.207294	862.51	5.00	867.51
17	37.412350	-83.206941	849.60	5.00	854.60
18	37.413070	-83.206206	831.72	5.00	836.72
19	37.413547	-83.205227	848.68	5.00	853.68
20	37.413833	-83.205001	847.27	5.00	852.27
21	37.414293	-83.205055	808.71	5.00	813.71
22	37.414821	-83.205414	802.98	5.00	807.98
23	37.415337	-83.206305	803.48	5.00	808.48
24	37.415890	-83.207270	803.07	5.00	808.07
25	37.416385	-83.207667	805.89	5.00	810.89
26	37.417098	-83.207921	817.54	5.00	822.54
27	37.417686	-83.207760	821.32	5.00	826.32
28	37.418753	-83.207111	811.90	5.00	816.90
29	37.419183	-83.207218	810.11	5.00	815.11
30	37.419383	-83.207604	808.81	5.00	813.81

Name: KY-478 -2
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.390123	-83.190416	795.93	5.00	800.93
2	37.388887	-83.189815	845.33	5.00	850.33
3	37.388163	-83.189461	881.42	5.00	886.42
4	37.387046	-83.189268	877.45	5.00	882.45
5	37.386283	-83.189230	865.28	5.00	870.28
6	37.385712	-83.189412	825.59	5.00	830.59
7	37.384092	-83.190442	850.38	5.00	855.38
8	37.383692	-83.190539	852.98	5.00	857.98
9	37.383257	-83.190356	841.75	5.00	846.75
10	37.382916	-83.189873	869.26	5.00	874.26
11	37.381552	-83.187095	851.53	5.00	856.53
12	37.381484	-83.186397	848.38	5.00	853.38
13	37.381816	-83.185475	838.41	5.00	843.41
14	37.383025	-83.184380	854.91	5.00	859.91
15	37.384432	-83.183747	871.64	5.00	876.64
16	37.386256	-83.183447	853.58	5.00	858.58
17	37.386776	-83.183168	849.74	5.00	854.74
18	37.387330	-83.182191	838.36	5.00	843.36
19	37.387458	-83.181494	829.59	5.00	834.59
20	37.387143	-83.181001	823.43	5.00	828.43
21	37.386137	-83.180453	836.79	5.00	841.79
22	37.385012	-83.179381	848.29	5.00	853.29
23	37.384014	-83.178190	842.42	5.00	847.42
24	37.383629	-83.177514	853.50	5.00	858.50
25	37.383151	-83.175228	842.13	5.00	847.13
26	37.383203	-83.174531	838.71	5.00	843.71
27	37.383757	-83.173919	845.13	5.00	850.13
28	37.385044	-83.172793	842.53	5.00	847.53
29	37.385485	-83.171899	837.57	5.00	842.57
30	37.386465	-83.169110	861.06	5.00	866.06

Name: KY-80
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.333597	-83.158090	1296.56	5.00	1301.56
2	37.339704	-83.149550	1188.07	5.00	1193.07
3	37.345150	-83.138150	975.16	5.00	980.16
4	37.345863	-83.136121	954.13	5.00	959.13
5	37.346059	-83.132527	922.81	5.00	927.81
6	37.346503	-83.130564	920.39	5.00	925.39
7	37.349553	-83.121551	1055.47	5.00	1060.47
8	37.350433	-83.119748	1091.09	5.00	1096.09
9	37.351781	-83.117602	1135.54	5.00	1140.54
10	37.362034	-83.107457	1140.91	5.00	1145.91
11	37.363154	-83.106698	1108.26	5.00	1113.26
12	37.364450	-83.106301	1083.83	5.00	1088.83
13	37.365380	-83.106301	1067.12	5.00	1072.12
14	37.367623	-83.106623	1051.60	5.00	1056.60
15	37.368622	-83.106344	1063.65	5.00	1068.65
16	37.369756	-83.105293	1070.01	5.00	1075.01
17	37.370336	-83.103748	1061.57	5.00	1066.57
18	37.371694	-83.094811	1024.38	5.00	1029.38
19	37.372481	-83.089610	973.43	5.00	978.43
20	37.372617	-83.086262	997.45	5.00	1002.45
21	37.372532	-83.083132	999.75	5.00	1004.75
22	37.372140	-83.080214	1009.56	5.00	1014.56
23	37.370516	-83.074084	1042.68	5.00	1047.68
24	37.369808	-83.071670	1053.97	5.00	1058.97
25	37.369553	-83.070243	1064.52	5.00	1069.52
26	37.369612	-83.068430	1074.26	5.00	1079.26
27	37.369927	-83.066788	1097.49	5.00	1102.49
28	37.371717	-83.061027	1119.45	5.00	1124.45
29	37.371802	-83.059063	1101.92	5.00	1106.92
30	37.371325	-83.056864	1097.91	5.00	1102.91

Name: Starfire Hand Road
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.372057	-83.106101	914.29	5.00	919.29
2	37.372351	-83.106219	938.16	5.00	943.16
3	37.372645	-83.106112	947.81	5.00	952.81
4	37.373059	-83.105796	969.63	5.00	974.63
5	37.373468	-83.105817	1002.16	5.00	1007.16
6	37.374035	-83.105554	1035.26	5.00	1040.26
7	37.374674	-83.105554	1086.73	5.00	1091.73
8	37.375727	-83.105801	1136.37	5.00	1141.37
9	37.376218	-83.105704	1167.71	5.00	1172.71
10	37.376853	-83.105184	1208.45	5.00	1213.45
11	37.377144	-83.105157	1217.40	5.00	1222.40
12	37.378521	-83.106327	1268.20	5.00	1273.20
13	37.378845	-83.106338	1274.30	5.00	1279.30
14	37.379165	-83.105758	1298.55	5.00	1303.55
15	37.379301	-83.105222	1312.48	5.00	1317.48
16	37.379353	-83.104465	1329.52	5.00	1334.52
17	37.379570	-83.103763	1354.93	5.00	1359.93
18	37.379864	-83.103339	1366.54	5.00	1371.54
19	37.380225	-83.103280	1368.46	5.00	1373.46
20	37.382434	-83.103130	1378.50	5.00	1383.50
21	37.384020	-83.103832	1388.29	5.00	1393.29
22	37.384617	-83.103940	1388.26	5.00	1393.26
23	37.385569	-83.103607	1381.24	5.00	1386.24
24	37.387458	-83.102749	1375.99	5.00	1380.99
25	37.388199	-83.102690	1377.87	5.00	1382.87
26	37.388651	-83.103119	1380.97	5.00	1385.97
27	37.390375	-83.107341	1366.66	5.00	1371.66
28	37.392374	-83.110495	1362.73	5.00	1367.73
29	37.392937	-83.111026	1358.90	5.00	1363.90
30	37.394267	-83.110865	1316.39	5.00	1321.39

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	37.396945	-83.158588	1314.30	6.00
OP 2	2	37.384459	-83.159212	838.23	6.00
OP 3	3	37.378051	-83.123629	955.03	6.00
OP 4	4	37.423000	-83.080331	983.85	6.00
OP 5	5	37.382129	-83.134098	940.17	6.00
OP 6	6	37.385780	-83.133747	880.04	6.00
OP 7	7	37.449522	-83.079678	1435.28	6.00
OP 8	8	37.446937	-83.085180	1418.91	6.00
OP 9	9	37.438576	-83.076553	1332.34	6.00
OP 10	10	37.403367	-83.112991	1344.66	6.00
OP 11	11	37.391575	-83.109213	1361.97	6.00
OP 12	12	37.348179	-83.117745	1320.89	6.00
OP 13	13	37.377018	-83.069076	1399.62	6.00
OP 14	14	37.380511	-83.108659	1357.01	6.00
OP 15	15	37.383060	-83.108026	1401.80	6.00
OP 16	16	37.340402	-83.156733	1381.46	6.00
OP 17	17	37.343232	-83.152797	1393.32	6.00
OP 18	18	37.342542	-83.148530	1144.02	6.00
OP 19	19	37.413754	-83.206763	866.49	6.00
OP 20	20	37.384042	-83.090774	945.06	6.00
OP 21	21	37.391949	-83.073849	975.29	6.00
OP 22	22	37.358322	-83.044081	1497.44	6.00
OP 23	23	37.365303	-83.237832	925.00	6.00
OP 24	24	37.381557	-83.250911	1271.44	6.00
OP 25	25	37.384616	-83.248354	1236.98	6.00

Glare Analysis Results

Summary of Results

Glare with low potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	538	9.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

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

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	237	4.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	301	5.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV: PV array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 1 and Route: Buckhorn Road -1

No glare found

PV array 1 and Route: Buckhorn Road-2

No glare found

PV array 1 and Route: KY-478 -1

No glare found

PV array 1 and Route: KY-478 -2

No glare found

PV array 1 and Route: KY-80

No glare found

PV array 1 and Route: Starfire Hand Road

No glare found

PV array 1 and OP 1

No glare found

PV array 1 and OP 2

No glare found

PV array 1 and OP 3

No glare found

PV array 1 and OP 4

No glare found

PV array 1 and OP 5

No glare found

PV array 1 and OP 6

No glare found

PV array 1 and OP 7

No glare found

PV array 1 and OP 8

No glare found

PV array 1 and OP 9

No glare found

PV array 1 and OP 10

No glare found

PV array 1 and OP 11

No glare found

PV array 1 and OP 12

No glare found

PV array 1 and OP 13

No glare found

PV array 1 and OP 14

No glare found

PV array 1 and OP 15

No glare found

PV array 1 and OP 16

No glare found

PV array 1 and OP 17

No glare found

PV array 1 and OP 18

No glare found

PV array 1 and OP 19

No glare found

PV array 1 and OP 20

No glare found

PV array 1 and OP 21

No glare found

PV array 1 and OP 22

No glare found

PV array 1 and OP 23

No glare found

PV array 1 and OP 24

No glare found

PV array 1 and OP 25

No glare found

PV: PV array 10 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 10 and Route: Buckhorn Road -1

No glare found

PV array 10 and Route: Buckhorn Road-2

No glare found

PV array 10 and Route: KY-478 -1

No glare found

PV array 10 and Route: KY-478 -2

No glare found

PV array 10 and Route: KY-80

No glare found

PV array 10 and Route: Starfire Hand Road

No glare found

PV array 10 and OP 1

No glare found

PV array 10 and OP 2

No glare found

PV array 10 and OP 3

No glare found

PV array 10 and OP 4

No glare found

PV array 10 and OP 5

No glare found

PV array 10 and OP 6

No glare found

PV array 10 and OP 7

No glare found

PV array 10 and OP 8

No glare found

PV array 10 and OP 9

No glare found

PV array 10 and OP 10

No glare found

PV array 10 and OP 11

No glare found

PV array 10 and OP 12

No glare found

PV array 10 and OP 13

No glare found

PV array 10 and OP 14

No glare found

PV array 10 and OP 15

No glare found

PV array 10 and OP 16

No glare found

PV array 10 and OP 17

No glare found

PV array 10 and OP 18

No glare found

PV array 10 and OP 19

No glare found

PV array 10 and OP 20

No glare found

PV array 10 and OP 21

No glare found

PV array 10 and OP 22

No glare found

PV array 10 and OP 23

No glare found

PV array 10 and OP 24

No glare found

PV array 10 and OP 25

No glare found

PV: PV array 2 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 2 and Route: Buckhorn Road -1

No glare found

PV array 2 and Route: Buckhorn Road-2

No glare found

PV array 2 and Route: KY-478 -1

No glare found

PV array 2 and Route: KY-478 -2

No glare found

PV array 2 and Route: KY-80

No glare found

PV array 2 and Route: Starfire Hand Road

No glare found

PV array 2 and OP 1

No glare found

PV array 2 and OP 2

No glare found

PV array 2 and OP 3

No glare found

PV array 2 and OP 4

No glare found

PV array 2 and OP 5

No glare found

PV array 2 and OP 6

No glare found

PV array 2 and OP 7

No glare found

PV array 2 and OP 8

No glare found

PV array 2 and OP 9

No glare found

PV array 2 and OP 10

No glare found

PV array 2 and OP 11

No glare found

PV array 2 and OP 12

No glare found

PV array 2 and OP 13

No glare found

PV array 2 and OP 14

No glare found

PV array 2 and OP 15

No glare found

PV array 2 and OP 16

No glare found

PV array 2 and OP 17

No glare found

PV array 2 and OP 18

No glare found

PV array 2 and OP 19

No glare found

PV array 2 and OP 20

No glare found

PV array 2 and OP 21

No glare found

PV array 2 and OP 22

No glare found

PV array 2 and OP 23

No glare found

PV array 2 and OP 24

No glare found

PV array 2 and OP 25

No glare found

PV: PV array 3 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 3 and Route: Buckhorn Road -1

No glare found

PV array 3 and Route: Buckhorn Road-2

No glare found

PV array 3 and Route: KY-478 -1

No glare found

PV array 3 and Route: KY-478 -2

No glare found

PV array 3 and Route: KY-80

No glare found

PV array 3 and Route: Starfire Hand Road

No glare found

PV array 3 and OP 1

No glare found

PV array 3 and OP 2

No glare found

PV array 3 and OP 3

No glare found

PV array 3 and OP 4

No glare found

PV array 3 and OP 5

No glare found

PV array 3 and OP 6

No glare found

PV array 3 and OP 7

No glare found

PV array 3 and OP 8

No glare found

PV array 3 and OP 9

No glare found

PV array 3 and OP 10

No glare found

PV array 3 and OP 11

No glare found

PV array 3 and OP 12

No glare found

PV array 3 and OP 13

No glare found

PV array 3 and OP 14

No glare found

PV array 3 and OP 15

No glare found

PV array 3 and OP 16

No glare found

PV array 3 and OP 17

No glare found

PV array 3 and OP 18

No glare found

PV array 3 and OP 19

No glare found

PV array 3 and OP 20

No glare found

PV array 3 and OP 21

No glare found

PV array 3 and OP 22

No glare found

PV array 3 and OP 23

No glare found

PV array 3 and OP 24

No glare found

PV array 3 and OP 25

No glare found

PV: PV array 4 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 4 and Route: Buckhorn Road -1

No glare found

PV array 4 and Route: Buckhorn Road-2

No glare found

PV array 4 and Route: KY-478 -1

No glare found

PV array 4 and Route: KY-478 -2

No glare found

PV array 4 and Route: KY-80

No glare found

PV array 4 and Route: Starfire Hand Road

No glare found

PV array 4 and OP 1

No glare found

PV array 4 and OP 2

No glare found

PV array 4 and OP 3

No glare found

PV array 4 and OP 4

No glare found

PV array 4 and OP 5

No glare found

PV array 4 and OP 6

No glare found

PV array 4 and OP 7

No glare found

PV array 4 and OP 8

No glare found

PV array 4 and OP 9

No glare found

PV array 4 and OP 10

No glare found

PV array 4 and OP 11

No glare found

PV array 4 and OP 12

No glare found

PV array 4 and OP 13

No glare found

PV array 4 and OP 14

No glare found

PV array 4 and OP 15

No glare found

PV array 4 and OP 16

No glare found

PV array 4 and OP 17

No glare found

PV array 4 and OP 18

No glare found

PV array 4 and OP 19

No glare found

PV array 4 and OP 20

No glare found

PV array 4 and OP 21

No glare found

PV array 4 and OP 22

No glare found

PV array 4 and OP 23

No glare found

PV array 4 and OP 24

No glare found

PV array 4 and OP 25

No glare found

PV: PV array 5 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 5 and Route: Buckhorn Road -1

No glare found

PV array 5 and Route: Buckhorn Road-2

No glare found

PV array 5 and Route: KY-478 -1

No glare found

PV array 5 and Route: KY-478 -2

No glare found

PV array 5 and Route: KY-80

No glare found

PV array 5 and Route: Starfire Hand Road

No glare found

PV array 5 and OP 1

No glare found

PV array 5 and OP 2

No glare found

PV array 5 and OP 3

No glare found

PV array 5 and OP 4

No glare found

PV array 5 and OP 5

No glare found

PV array 5 and OP 6

No glare found

PV array 5 and OP 7

No glare found

PV array 5 and OP 8

No glare found

PV array 5 and OP 9

No glare found

PV array 5 and OP 10

No glare found

PV array 5 and OP 11

No glare found

PV array 5 and OP 12

No glare found

PV array 5 and OP 13

No glare found

PV array 5 and OP 14

No glare found

PV array 5 and OP 15

No glare found

PV array 5 and OP 16

No glare found

PV array 5 and OP 17

No glare found

PV array 5 and OP 18

No glare found

PV array 5 and OP 19

No glare found

PV array 5 and OP 20

No glare found

PV array 5 and OP 21

No glare found

PV array 5 and OP 22

No glare found

PV array 5 and OP 23

No glare found

PV array 5 and OP 24

No glare found

PV array 5 and OP 25

No glare found

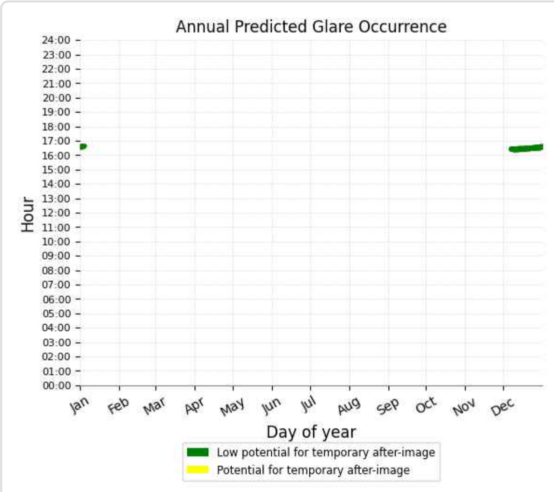
PV: PV array 6 low potential for temporary after-image

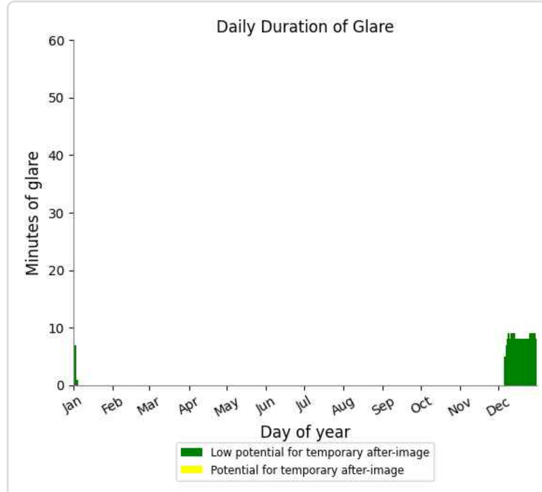
Receptor results ordered by category of glare

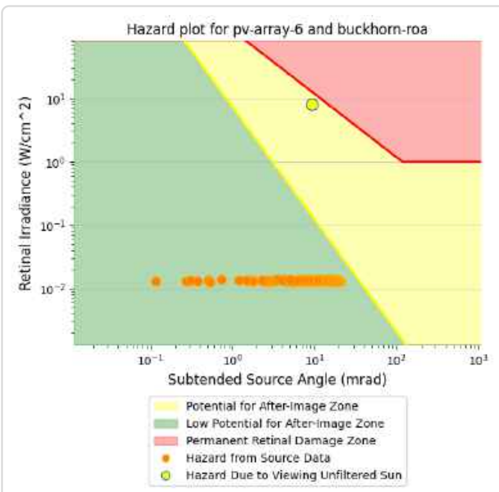
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road-2	237	4.0	0	0.0
Buckhorn Road -1	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 9	301	5.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

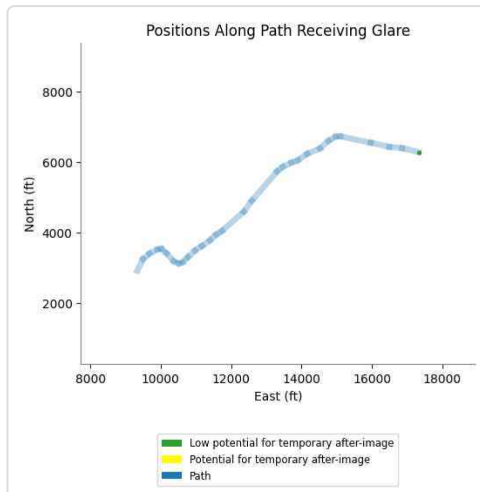
PV array 6 and Route: Buckhorn Road-2

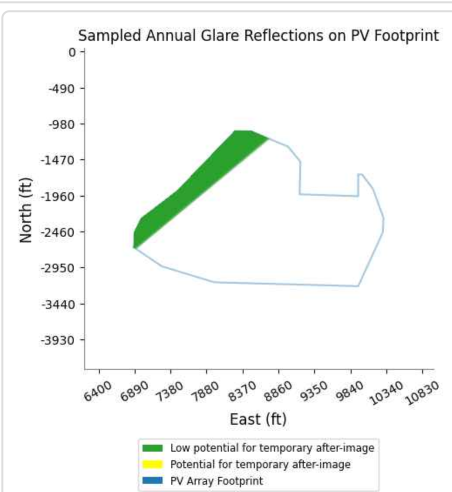
Yellow glare: none
Green glare: 237 min.











PV array 6 and Route: Buckhorn Road -1

No glare found

PV array 6 and Route: KY-478 -1

No glare found

PV array 6 and Route: KY-478 -2

No glare found

PV array 6 and Route: KY-80

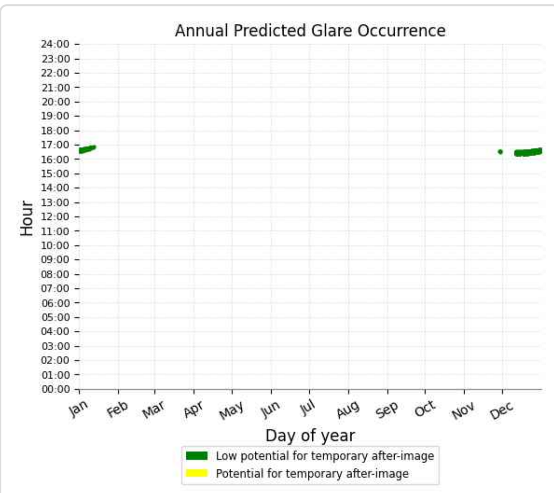
No glare found

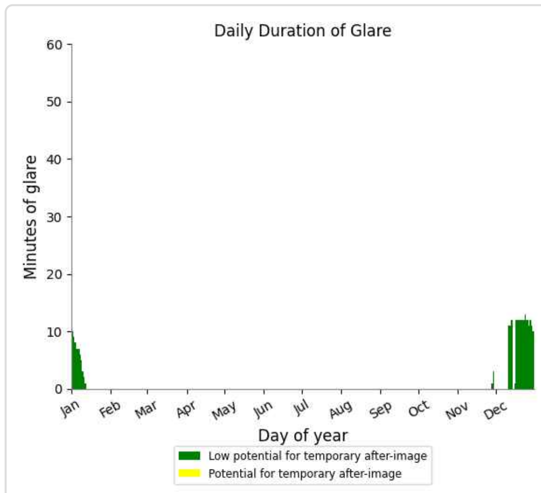
PV array 6 and Route: Starfire Hand Road

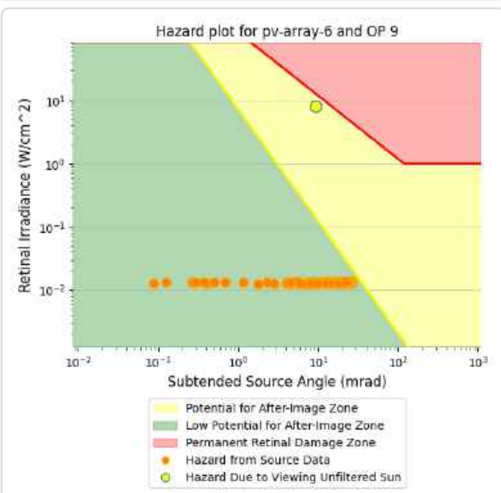
No glare found

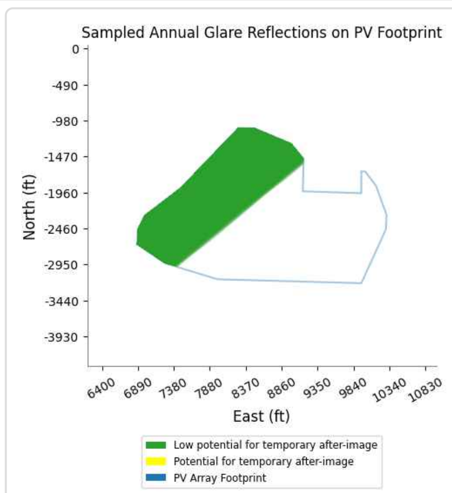
PV array 6 and OP 9

Yellow glare: none
Green glare: 301 min.









PV array 6 and OP 1

No glare found

PV array 6 and OP 2

No glare found

PV array 6 and OP 3

No glare found

PV array 6 and OP 4

No glare found

PV array 6 and OP 5

No glare found

PV array 6 and OP 6

No glare found

PV array 6 and OP 7

No glare found

PV array 6 and OP 8

No glare found

PV array 6 and OP 10

No glare found

PV array 6 and OP 11

No glare found

PV array 6 and OP 12

No glare found

PV array 6 and OP 13

No glare found

PV array 6 and OP 14

No glare found

PV array 6 and OP 15

No glare found

PV array 6 and OP 16

No glare found

PV array 6 and OP 17

No glare found

PV array 6 and OP 18

No glare found

PV array 6 and OP 19

No glare found

PV array 6 and OP 20

No glare found

PV array 6 and OP 21

No glare found

PV array 6 and OP 22

No glare found

PV array 6 and OP 23

No glare found

PV array 6 and OP 24

No glare found

PV array 6 and OP 25

No glare found

PV: PV array 7 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 7 and Route: Buckhorn Road -1

No glare found

PV array 7 and Route: Buckhorn Road-2

No glare found

PV array 7 and Route: KY-478 -1

No glare found

PV array 7 and Route: KY-478 -2

No glare found

PV array 7 and Route: KY-80

No glare found

PV array 7 and Route: Starfire Hand Road

No glare found

PV array 7 and OP 1

No glare found

PV array 7 and OP 2

No glare found

PV array 7 and OP 3

No glare found

PV array 7 and OP 4

No glare found

PV array 7 and OP 5

No glare found

PV array 7 and OP 6

No glare found

PV array 7 and OP 7

No glare found

PV array 7 and OP 8

No glare found

PV array 7 and OP 9

No glare found

PV array 7 and OP 10

No glare found

PV array 7 and OP 11

No glare found

PV array 7 and OP 12

No glare found

PV array 7 and OP 13

No glare found

PV array 7 and OP 14

No glare found

PV array 7 and OP 15

No glare found

PV array 7 and OP 16

No glare found

PV array 7 and OP 17

No glare found

PV array 7 and OP 18

No glare found

PV array 7 and OP 19

No glare found

PV array 7 and OP 20

No glare found

PV array 7 and OP 21

No glare found

PV array 7 and OP 22

No glare found

PV array 7 and OP 23

No glare found

PV array 7 and OP 24

No glare found

PV array 7 and OP 25

No glare found

PV: PV array 8 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 8 and Route: Buckhorn Road -1

No glare found

PV array 8 and Route: Buckhorn Road-2

No glare found

PV array 8 and Route: KY-478 -1

No glare found

PV array 8 and Route: KY-478 -2

No glare found

PV array 8 and Route: KY-80

No glare found

PV array 8 and Route: Starfire Hand Road

No glare found

PV array 8 and OP 1

No glare found

PV array 8 and OP 2

No glare found

PV array 8 and OP 3

No glare found

PV array 8 and OP 4

No glare found

PV array 8 and OP 5

No glare found

PV array 8 and OP 6

No glare found

PV array 8 and OP 7

No glare found

PV array 8 and OP 8

No glare found

PV array 8 and OP 9

No glare found

PV array 8 and OP 10

No glare found

PV array 8 and OP 11

No glare found

PV array 8 and OP 12

No glare found

PV array 8 and OP 13

No glare found

PV array 8 and OP 14

No glare found

PV array 8 and OP 15

No glare found

PV array 8 and OP 16

No glare found

PV array 8 and OP 17

No glare found

PV array 8 and OP 18

No glare found

PV array 8 and OP 19

No glare found

PV array 8 and OP 20

No glare found

PV array 8 and OP 21

No glare found

PV array 8 and OP 22

No glare found

PV array 8 and OP 23

No glare found

PV array 8 and OP 24

No glare found

PV array 8 and OP 25

No glare found

PV: PV array 9 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 9 and Route: Buckhorn Road -1

No glare found

PV array 9 and Route: Buckhorn Road-2

No glare found

PV array 9 and Route: KY-478 -1

No glare found

PV array 9 and Route: KY-478 -2

No glare found

PV array 9 and Route: KY-80

No glare found

PV array 9 and Route: Starfire Hand Road

No glare found

PV array 9 and OP 1

No glare found

PV array 9 and OP 2

No glare found

PV array 9 and OP 3

No glare found

PV array 9 and OP 4

No glare found

PV array 9 and OP 5

No glare found

PV array 9 and OP 6

No glare found

PV array 9 and OP 7

No glare found

PV array 9 and OP 8

No glare found

PV array 9 and OP 9

No glare found

PV array 9 and OP 10

No glare found

PV array 9 and OP 11

No glare found

PV array 9 and OP 12

No glare found

PV array 9 and OP 13

No glare found

PV array 9 and OP 14

No glare found

PV array 9 and OP 15

No glare found

PV array 9 and OP 16

No glare found

PV array 9 and OP 17

No glare found

PV array 9 and OP 18

No glare found

PV array 9 and OP 19

No glare found

PV array 9 and OP 20

No glare found

PV array 9 and OP 21

No glare found

PV array 9 and OP 22

No glare found

PV array 9 and OP 23

No glare found

PV array 9 and OP 24

No glare found

PV array 9 and OP 25

No glare found

Assumptions

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

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

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

FORGESOLAR GLARE ANALYSIS

Project: **Starfire Solar**
Site configuration: **Analysis 2 - 2nd Story Receptors 12042024**

Created 13 Dec, 2024
Updated 13 Dec, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 1 MW to 5 MW
Site ID 136812.21171

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with low potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	593	9.9	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

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

Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	237	4.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	356	5.9	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.421702	-83.138117	1395.55	5.00	1400.55
2	37.421719	-83.136390	1402.04	5.00	1407.04
3	37.420228	-83.135317	1389.02	5.00	1394.02
4	37.419342	-83.135306	1380.05	5.00	1385.05
5	37.419333	-83.134501	1386.18	5.00	1391.18
6	37.418677	-83.133096	1356.71	5.00	1361.71
7	37.418660	-83.130886	1306.12	5.00	1311.12
8	37.417492	-83.130918	1305.98	5.00	1310.98
9	37.415831	-83.131315	1344.14	5.00	1349.14
10	37.415294	-83.131433	1330.53	5.00	1335.53
11	37.414706	-83.131969	1345.15	5.00	1350.15
12	37.414075	-83.132527	1342.08	5.00	1347.08
13	37.412610	-83.133053	1352.08	5.00	1357.08
14	37.411169	-83.133536	1357.16	5.00	1362.16
15	37.409678	-83.133729	1293.55	5.00	1298.55
16	37.408962	-83.133729	1292.67	5.00	1297.67
17	37.409005	-83.132656	1291.84	5.00	1296.84
18	37.408613	-83.132420	1285.09	5.00	1290.09
19	37.407837	-83.132281	1283.51	5.00	1288.51
20	37.406525	-83.132055	1279.77	5.00	1284.77
21	37.405758	-83.131948	1284.17	5.00	1289.17
22	37.405110	-83.131862	1277.47	5.00	1282.47
23	37.404667	-83.131690	1276.14	5.00	1281.14
24	37.404126	-83.131472	1272.77	5.00	1277.77
25	37.403295	-83.131126	1272.18	5.00	1277.18
26	37.402425	-83.130783	1281.25	5.00	1286.25
27	37.401616	-83.130461	1281.91	5.00	1286.91
28	37.401419	-83.130386	1281.88	5.00	1286.88
29	37.401002	-83.130364	1282.08	5.00	1287.08
30	37.400448	-83.131566	1282.65	5.00	1287.65
31	37.400559	-83.133980	1292.02	5.00	1297.02
32	37.400742	-83.134430	1292.06	5.00	1297.06
33	37.401040	-83.134463	1292.49	5.00	1297.49
34	37.401300	-83.139012	1272.33	5.00	1277.33
35	37.401607	-83.140165	1255.58	5.00	1260.58
36	37.401858	-83.140889	1248.17	5.00	1253.17
37	37.402427	-83.140830	1268.09	5.00	1273.09
38	37.402334	-83.138046	1300.57	5.00	1305.57
39	37.403026	-83.138038	1306.94	5.00	1311.94
40	37.403557	-83.137510	1319.70	5.00	1324.70
41	37.403531	-83.136750	1294.95	5.00	1299.95
42	37.404647	-83.136635	1250.60	5.00	1255.60
43	37.404675	-83.137142	1256.92	5.00	1261.92
44	37.404903	-83.137295	1257.86	5.00	1262.86
45	37.405841	-83.137206	1275.06	5.00	1280.06
46	37.405949	-83.140202	1283.63	5.00	1288.63
47	37.406480	-83.140146	1285.44	5.00	1290.44
48	37.407004	-83.139728	1286.61	5.00	1291.61
49	37.407285	-83.140793	1367.45	5.00	1372.45
50	37.406486	-83.141506	1381.97	5.00	1386.97
51	37.405982	-83.142189	1334.71	5.00	1339.71
52	37.406021	-83.143979	1314.52	5.00	1319.52
53	37.406549	-83.144356	1283.36	5.00	1288.36
54	37.407123	-83.144537	1224.05	5.00	1229.05
55	37.407662	-83.144499	1195.73	5.00	1200.73
56	37.408734	-83.144108	1204.37	5.00	1209.37
57	37.409505	-83.143249	1216.32	5.00	1221.32
58	37.409959	-83.143547	1253.60	5.00	1258.60
59	37.410234	-83.143464	1265.32	5.00	1270.32

Name: PV array 10
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.404765	-83.109382	1345.27	5.00	1350.27
2	37.405362	-83.108867	1355.93	5.00	1360.93
3	37.406244	-83.107236	1353.98	5.00	1358.98
4	37.406527	-83.106670	1353.29	5.00	1358.29
5	37.408409	-83.103446	1347.48	5.00	1352.48
6	37.409004	-83.102489	1345.43	5.00	1350.43
7	37.410176	-83.100491	1338.59	5.00	1343.59
8	37.410161	-83.099669	1328.06	5.00	1333.06
9	37.409239	-83.099691	1327.72	5.00	1332.72
10	37.407395	-83.099426	1350.02	5.00	1355.02
11	37.406807	-83.099445	1351.64	5.00	1356.64
12	37.406505	-83.100123	1352.39	5.00	1357.39
13	37.405529	-83.102341	1364.79	5.00	1369.79
14	37.405584	-83.105949	1357.68	5.00	1362.68
15	37.403778	-83.106013	1304.21	5.00	1309.21
16	37.403846	-83.109146	1343.40	5.00	1348.40
17	37.404148	-83.109412	1330.91	5.00	1335.91

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.404122	-83.139221	1352.58	5.00	1357.58
2	37.404332	-83.139005	1355.31	5.00	1360.31
3	37.404298	-83.138431	1349.69	5.00	1354.69
4	37.403465	-83.138482	1350.18	5.00	1355.18
5	37.403498	-83.139014	1352.46	5.00	1357.46
6	37.403570	-83.139262	1348.74	5.00	1353.74

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.413646	-83.126416	1280.40	5.00	1285.40
2	37.413859	-83.125998	1278.88	5.00	1283.88
3	37.413986	-83.125569	1280.39	5.00	1285.39
4	37.414038	-83.125172	1285.39	5.00	1290.39
5	37.413977	-83.124165	1302.83	5.00	1307.83
6	37.414556	-83.124122	1321.14	5.00	1326.14
7	37.414970	-83.125887	1331.87	5.00	1336.87
8	37.416031	-83.126815	1330.66	5.00	1335.66
9	37.416533	-83.127475	1328.18	5.00	1333.18
10	37.416563	-83.127990	1326.02	5.00	1331.02
11	37.416804	-83.128811	1328.97	5.00	1333.97
12	37.416823	-83.129187	1323.13	5.00	1328.13
13	37.416331	-83.130090	1323.21	5.00	1328.21
14	37.415802	-83.130441	1330.21	5.00	1335.21
15	37.414184	-83.131545	1340.03	5.00	1345.03
16	37.413665	-83.132005	1345.82	5.00	1350.82
17	37.413163	-83.132243	1349.25	5.00	1354.25
18	37.412575	-83.132487	1352.19	5.00	1357.19
19	37.411450	-83.132697	1356.09	5.00	1361.09
20	37.410610	-83.132729	1356.11	5.00	1361.11
21	37.409457	-83.132262	1291.22	5.00	1296.22
22	37.408430	-83.131872	1284.07	5.00	1289.07
23	37.407582	-83.131840	1282.63	5.00	1287.63
24	37.404984	-83.131279	1276.23	5.00	1281.23
25	37.403893	-83.130840	1275.55	5.00	1280.55
26	37.401522	-83.129228	1282.65	5.00	1287.65
27	37.401470	-83.126393	1284.01	5.00	1289.01
28	37.402509	-83.122933	1281.78	5.00	1286.78
29	37.404166	-83.120068	1298.37	5.00	1303.37
30	37.405289	-83.120041	1334.59	5.00	1339.59
31	37.406363	-83.120954	1326.78	5.00	1331.78
32	37.407241	-83.121065	1322.85	5.00	1327.85
33	37.408055	-83.121906	1326.14	5.00	1331.14
34	37.408572	-83.122004	1328.07	5.00	1333.07
35	37.409360	-83.122756	1323.04	5.00	1328.04
36	37.410840	-83.123835	1319.90	5.00	1324.90
37	37.411118	-83.124367	1319.53	5.00	1324.53
38	37.411157	-83.125461	1330.98	5.00	1335.98
39	37.410853	-83.126212	1329.42	5.00	1334.42
40	37.410471	-83.127535	1313.54	5.00	1318.54
41	37.410527	-83.128710	1295.29	5.00	1300.29
42	37.411315	-83.128691	1279.35	5.00	1284.35
43	37.411999	-83.128793	1270.94	5.00	1275.94
44	37.412555	-83.129120	1295.75	5.00	1300.75
45	37.414226	-83.129859	1305.67	5.00	1310.67
46	37.415204	-83.129673	1326.01	5.00	1331.01
47	37.415456	-83.127943	1322.06	5.00	1327.06
48	37.414374	-83.127427	1327.35	5.00	1332.35
49	37.413515	-83.126753	1288.76	5.00	1293.76
50	37.413445	-83.126579	1281.50	5.00	1286.50

Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412539	-83.122675	1306.04	5.00	1311.04
2	37.412501	-83.121827	1312.13	5.00	1317.13
3	37.411304	-83.118957	1333.48	5.00	1338.48
4	37.409902	-83.115862	1355.56	5.00	1360.56
5	37.408317	-83.113411	1365.87	5.00	1370.87
6	37.407209	-83.113159	1371.04	5.00	1376.04
7	37.406141	-83.113201	1362.86	5.00	1367.86
8	37.405617	-83.113266	1361.99	5.00	1366.99
9	37.404015	-83.113475	1350.03	5.00	1355.03
10	37.403693	-83.113797	1344.17	5.00	1349.17
11	37.403793	-83.117171	1347.05	5.00	1352.05
12	37.404748	-83.118512	1313.17	5.00	1318.17
13	37.405067	-83.118721	1316.53	5.00	1321.53
14	37.407249	-83.121066	1322.64	5.00	1327.64
15	37.408067	-83.121897	1326.18	5.00	1331.18
16	37.408063	-83.121903	1326.18	5.00	1331.18
17	37.408578	-83.122004	1328.14	5.00	1333.14
18	37.409103	-83.122509	1321.05	5.00	1326.05
19	37.409362	-83.122755	1323.04	5.00	1328.04
20	37.410850	-83.123828	1319.99	5.00	1324.99
21	37.411455	-83.123828	1316.83	5.00	1321.83
22	37.411987	-83.123490	1317.65	5.00	1322.65

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412573	-83.112361	1360.70	5.00	1365.70
2	37.412522	-83.110162	1359.75	5.00	1364.75
3	37.412023	-83.110167	1352.59	5.00	1357.59
4	37.411859	-83.103066	1335.80	5.00	1340.80
5	37.412401	-83.103060	1331.47	5.00	1336.47
6	37.412920	-83.102401	1339.15	5.00	1344.15
7	37.413290	-83.101968	1329.68	5.00	1334.68
8	37.413279	-83.101510	1330.21	5.00	1335.21
9	37.412918	-83.101267	1336.86	5.00	1341.86
10	37.411795	-83.100997	1336.86	5.00	1341.86
11	37.410748	-83.100938	1338.94	5.00	1343.94
12	37.410062	-83.101832	1343.60	5.00	1348.60
13	37.407831	-83.105642	1347.26	5.00	1352.26
14	37.407620	-83.107672	1333.22	5.00	1338.22
15	37.406241	-83.108399	1352.12	5.00	1357.12
16	37.406307	-83.109396	1325.08	5.00	1330.08
17	37.406287	-83.110638	1361.65	5.00	1366.65
18	37.407464	-83.111596	1362.78	5.00	1367.78
19	37.407745	-83.112207	1366.81	5.00	1371.81
20	37.408525	-83.112183	1365.68	5.00	1370.68
21	37.410790	-83.111909	1365.73	5.00	1370.73
22	37.411691	-83.112370	1366.72	5.00	1371.72

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.414350	-83.114433	1351.23	5.00	1356.23
2	37.414908	-83.114398	1353.10	5.00	1358.10
3	37.415435	-83.114073	1359.34	5.00	1364.34
4	37.416470	-83.112377	1365.82	5.00	1370.82
5	37.418726	-83.109660	1335.88	5.00	1340.88
6	37.418713	-83.108889	1274.05	5.00	1279.05
7	37.418140	-83.107174	1296.99	5.00	1301.99
8	37.417573	-83.106584	1321.61	5.00	1326.61
9	37.416346	-83.106619	1259.84	5.00	1264.84
10	37.416274	-83.103864	1332.66	5.00	1337.66
11	37.417094	-83.103863	1338.46	5.00	1343.46
12	37.417091	-83.103682	1338.58	5.00	1343.58
13	37.416554	-83.103169	1333.60	5.00	1338.60
14	37.415451	-83.102672	1327.21	5.00	1332.21
15	37.414913	-83.102707	1325.48	5.00	1330.48
16	37.412892	-83.103863	1306.96	5.00	1311.96
17	37.413037	-83.110634	1377.40	5.00	1382.40
18	37.413640	-83.113113	1355.11	5.00	1360.11

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412842	-83.117184	1327.25	5.00	1332.25
2	37.412815	-83.116090	1326.77	5.00	1331.77
3	37.413077	-83.115856	1329.87	5.00	1334.87
4	37.413889	-83.115788	1345.57	5.00	1350.57
5	37.414740	-83.116543	1351.65	5.00	1356.65
6	37.415539	-83.116768	1337.29	5.00	1342.29
7	37.415674	-83.114858	1357.80	5.00	1362.80
8	37.416502	-83.113387	1362.92	5.00	1367.92
9	37.419238	-83.110405	1413.45	5.00	1418.45
10	37.419518	-83.110326	1425.53	5.00	1430.53
11	37.420074	-83.110306	1421.25	5.00	1426.25
12	37.421773	-83.113424	1382.02	5.00	1387.02
13	37.423641	-83.118495	1368.49	5.00	1373.49
14	37.423726	-83.122302	1168.93	5.00	1173.93
15	37.423093	-83.123031	1152.67	5.00	1157.67
16	37.422662	-83.122932	1136.09	5.00	1141.09
17	37.421971	-83.122654	1200.81	5.00	1205.81
18	37.421410	-83.121628	1244.04	5.00	1249.04
19	37.420821	-83.120136	1217.79	5.00	1222.79
20	37.419704	-83.118884	1328.81	5.00	1333.81
21	37.418291	-83.119155	1302.20	5.00	1307.20
22	37.418172	-83.118436	1304.47	5.00	1309.47
23	37.417611	-83.118453	1303.83	5.00	1308.83
24	37.416360	-83.117509	1352.30	5.00	1357.30
25	37.413945	-83.117589	1316.31	5.00	1321.31

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.418411	-83.128059	1330.42	5.00	1335.42
2	37.420065	-83.126906	1314.72	5.00	1319.72
3	37.420635	-83.126393	1315.22	5.00	1320.22
4	37.420587	-83.124870	1314.35	5.00	1319.35
5	37.420308	-83.123882	1325.57	5.00	1330.57
6	37.420038	-83.123583	1336.45	5.00	1341.45
7	37.419340	-83.123466	1337.40	5.00	1342.40
8	37.418821	-83.123488	1329.89	5.00	1334.89
9	37.418775	-83.121528	1329.69	5.00	1334.69
10	37.418225	-83.121368	1327.42	5.00	1332.42
11	37.417677	-83.121252	1322.87	5.00	1327.87
12	37.416966	-83.120155	1328.91	5.00	1333.91
13	37.416700	-83.119931	1333.01	5.00	1338.01
14	37.416428	-83.119786	1330.84	5.00	1335.84
15	37.415879	-83.119803	1323.19	5.00	1328.19
16	37.414791	-83.120063	1333.51	5.00	1338.51
17	37.414245	-83.120474	1319.67	5.00	1324.67
18	37.414271	-83.122027	1321.26	5.00	1326.26
19	37.414848	-83.122604	1337.59	5.00	1342.59
20	37.415404	-83.123034	1327.68	5.00	1332.68
21	37.416256	-83.124663	1320.06	5.00	1325.06
22	37.417256	-83.126658	1331.59	5.00	1336.59
23	37.417602	-83.128055	1329.23	5.00	1334.23

Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.399790	-83.133693	1286.30	5.00	1291.30
2	37.399766	-83.131783	1286.35	5.00	1291.35
3	37.400471	-83.129546	1285.45	5.00	1290.45
4	37.400429	-83.127580	1279.50	5.00	1284.50
5	37.400636	-83.126765	1279.12	5.00	1284.12
6	37.401224	-83.125142	1277.03	5.00	1282.03
7	37.401330	-83.124807	1277.15	5.00	1282.15
8	37.402095	-83.122143	1286.19	5.00	1291.19
9	37.402624	-83.121309	1294.94	5.00	1299.94
10	37.403175	-83.120550	1305.28	5.00	1310.28
11	37.402907	-83.120376	1315.75	5.00	1320.75
12	37.402291	-83.120405	1323.29	5.00	1328.29
13	37.401524	-83.121440	1295.00	5.00	1300.00
14	37.400657	-83.124825	1281.15	5.00	1286.15
15	37.399672	-83.124890	1278.88	5.00	1283.88
16	37.399453	-83.124002	1310.15	5.00	1315.15
17	37.399442	-83.123114	1307.70	5.00	1312.70
18	37.398801	-83.123103	1291.19	5.00	1296.19
19	37.398103	-83.124100	1297.40	5.00	1302.40
20	37.398154	-83.127833	1317.78	5.00	1322.78
21	37.398798	-83.127822	1318.50	5.00	1323.50
22	37.399509	-83.128083	1274.07	5.00	1279.07
23	37.398359	-83.130773	1285.23	5.00	1290.23
24	37.398237	-83.131921	1281.66	5.00	1286.66
25	37.398235	-83.132822	1282.56	5.00	1287.56
26	37.399187	-83.133694	1283.36	5.00	1288.36

Route Receptors

Name: Buckhorn Road -1
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.418781	-83.071481	1056.72	9.00	1065.72
2	37.418463	-83.072677	1054.76	9.00	1063.76
3	37.418271	-83.073249	1045.26	9.00	1054.26
4	37.418286	-83.073581	1039.28	9.00	1048.28
5	37.418401	-83.073994	1042.52	9.00	1051.52
6	37.418768	-83.075030	1080.16	9.00	1089.16
7	37.419185	-83.075579	1023.90	9.00	1032.90
8	37.419462	-83.075979	1028.23	9.00	1037.23
9	37.419780	-83.076695	1037.14	9.00	1046.14
10	37.419978	-83.077100	1024.68	9.00	1033.68
11	37.420048	-83.077355	1034.72	9.00	1043.72
12	37.420189	-83.077723	1025.59	9.00	1034.59
13	37.420382	-83.078130	1019.76	9.00	1028.76
14	37.420627	-83.078294	1012.28	9.00	1021.28
15	37.420823	-83.078643	1017.74	9.00	1026.74
16	37.420913	-83.078809	1027.85	9.00	1036.85
17	37.420998	-83.079085	1026.29	9.00	1035.29
18	37.421092	-83.079238	1026.15	9.00	1035.15
19	37.421599	-83.079635	1022.50	9.00	1031.50
20	37.421982	-83.079833	1022.48	9.00	1031.48
21	37.422165	-83.079975	1010.69	9.00	1019.69
22	37.422316	-83.080115	1004.61	9.00	1013.61
23	37.422756	-83.080192	992.04	9.00	1001.04
24	37.423063	-83.080272	980.97	9.00	989.97

Name: Buckhorn Road-2
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.429705	-83.105979	1094.39	9.00	1103.39
2	37.430620	-83.105410	1057.19	9.00	1066.19
3	37.431042	-83.104788	1033.75	9.00	1042.75
4	37.431366	-83.103999	1015.20	9.00	1024.20
5	37.431413	-83.103603	1005.28	9.00	1014.28
6	37.431063	-83.103104	1043.69	9.00	1052.69
7	37.430459	-83.102422	1046.36	9.00	1055.36
8	37.430284	-83.101934	1045.05	9.00	1054.05
9	37.430375	-83.101537	1055.09	9.00	1064.09
10	37.430766	-83.101028	1088.83	9.00	1097.83
11	37.431282	-83.100341	1115.87	9.00	1124.87
12	37.431635	-83.099649	1126.95	9.00	1135.95
13	37.432094	-83.098860	1139.87	9.00	1148.87
14	37.432529	-83.098260	1161.55	9.00	1170.55
15	37.432827	-83.097686	1177.08	9.00	1186.08
16	37.434322	-83.095556	1236.68	9.00	1245.68
17	37.435184	-83.094773	1243.79	9.00	1252.79
18	37.437477	-83.092293	1254.85	9.00	1263.85
19	37.437824	-83.091752	1257.98	9.00	1266.98
20	37.438163	-83.090893	1261.00	9.00	1270.00
21	37.438355	-83.090258	1263.81	9.00	1272.81
22	37.438841	-83.089375	1261.55	9.00	1270.55
23	37.439276	-83.088101	1262.33	9.00	1271.33
24	37.439864	-83.087270	1267.95	9.00	1276.95
25	37.440187	-83.086594	1268.40	9.00	1277.40
26	37.440213	-83.086111	1269.27	9.00	1278.27
27	37.439720	-83.083160	1268.10	9.00	1277.10
28	37.439396	-83.081330	1275.78	9.00	1284.78
29	37.439294	-83.080075	1285.95	9.00	1294.95
30	37.438987	-83.078455	1295.62	9.00	1304.62

Name: KY-478 -1
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.397935	-83.207382	819.72	9.00	828.72
2	37.399218	-83.207785	814.50	9.00	823.50
3	37.400475	-83.208182	832.46	9.00	841.46
4	37.401084	-83.208600	829.32	9.00	838.32
5	37.402742	-83.210006	819.92	9.00	828.92
6	37.403113	-83.210156	819.38	9.00	828.38
7	37.403415	-83.210118	824.25	9.00	833.25
8	37.403816	-83.209657	836.98	9.00	845.98
9	37.404206	-83.208806	853.38	9.00	862.38
10	37.404474	-83.208538	852.47	9.00	861.47
11	37.405160	-83.208190	859.70	9.00	868.70
12	37.406618	-83.207498	865.77	9.00	874.77
13	37.407078	-83.207476	856.81	9.00	865.81
14	37.409098	-83.207675	830.65	9.00	839.65
15	37.409652	-83.207626	829.24	9.00	838.24
16	37.411796	-83.207294	862.51	9.00	871.51
17	37.412350	-83.206941	849.60	9.00	858.60
18	37.413070	-83.206206	831.72	9.00	840.72
19	37.413547	-83.205227	848.68	9.00	857.68
20	37.413833	-83.205001	847.27	9.00	856.27
21	37.414293	-83.205055	808.71	9.00	817.71
22	37.414821	-83.205414	802.98	9.00	811.98
23	37.415337	-83.206305	803.48	9.00	812.48
24	37.415890	-83.207270	803.07	9.00	812.07
25	37.416385	-83.207667	805.89	9.00	814.89
26	37.417098	-83.207921	817.54	9.00	826.54
27	37.417686	-83.207760	821.32	9.00	830.32
28	37.418753	-83.207111	811.90	9.00	820.90
29	37.419183	-83.207218	810.11	9.00	819.11
30	37.419383	-83.207604	808.81	9.00	817.81

Name: KY-478 -2
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.390123	-83.190416	795.93	9.00	804.93
2	37.388887	-83.189815	845.33	9.00	854.33
3	37.388163	-83.189461	881.42	9.00	890.42
4	37.387046	-83.189268	877.45	9.00	886.45
5	37.386283	-83.189230	865.28	9.00	874.28
6	37.385712	-83.189412	825.59	9.00	834.59
7	37.384092	-83.190442	850.38	9.00	859.38
8	37.383692	-83.190539	852.98	9.00	861.98
9	37.383257	-83.190356	841.75	9.00	850.75
10	37.382916	-83.189873	869.26	9.00	878.26
11	37.381552	-83.187095	851.53	9.00	860.53
12	37.381484	-83.186397	848.38	9.00	857.38
13	37.381816	-83.185475	838.41	9.00	847.41
14	37.383025	-83.184380	854.91	9.00	863.91
15	37.384432	-83.183747	871.64	9.00	880.64
16	37.386256	-83.183447	853.58	9.00	862.58
17	37.386776	-83.183168	849.74	9.00	858.74
18	37.387330	-83.182191	838.36	9.00	847.36
19	37.387458	-83.181494	829.59	9.00	838.59
20	37.387143	-83.181001	823.43	9.00	832.43
21	37.386137	-83.180453	836.79	9.00	845.79
22	37.385012	-83.179381	848.29	9.00	857.29
23	37.384014	-83.178190	842.42	9.00	851.42
24	37.383629	-83.177514	853.50	9.00	862.50
25	37.383151	-83.175228	842.13	9.00	851.13
26	37.383203	-83.174531	838.71	9.00	847.71
27	37.383757	-83.173919	845.13	9.00	854.13
28	37.385044	-83.172793	842.53	9.00	851.53
29	37.385485	-83.171899	837.57	9.00	846.57
30	37.386465	-83.169110	861.06	9.00	870.06

Name: KY-80
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.333597	-83.158090	1296.56	9.00	1305.56
2	37.339704	-83.149550	1188.07	9.00	1197.07
3	37.345150	-83.138150	975.16	9.00	984.16
4	37.345863	-83.136121	954.13	9.00	963.13
5	37.346059	-83.132527	922.81	9.00	931.81
6	37.346503	-83.130564	920.39	9.00	929.39
7	37.349553	-83.121551	1055.47	9.00	1064.47
8	37.350433	-83.119748	1091.09	9.00	1100.09
9	37.351781	-83.117602	1135.54	9.00	1144.54
10	37.362034	-83.107457	1140.91	9.00	1149.91
11	37.363154	-83.106698	1108.26	9.00	1117.26
12	37.364450	-83.106301	1083.83	9.00	1092.83
13	37.365380	-83.106301	1067.12	9.00	1076.12
14	37.367623	-83.106623	1051.60	9.00	1060.60
15	37.368622	-83.106344	1063.65	9.00	1072.65
16	37.369756	-83.105293	1070.01	9.00	1079.01
17	37.370336	-83.103748	1061.57	9.00	1070.57
18	37.371694	-83.094811	1024.38	9.00	1033.38
19	37.372481	-83.089610	973.43	9.00	982.43
20	37.372617	-83.086262	997.45	9.00	1006.45
21	37.372532	-83.083132	999.75	9.00	1008.75
22	37.372140	-83.080214	1009.56	9.00	1018.56
23	37.370516	-83.074084	1042.68	9.00	1051.68
24	37.369808	-83.071670	1053.97	9.00	1062.97
25	37.369553	-83.070243	1064.52	9.00	1073.52
26	37.369612	-83.068430	1074.26	9.00	1083.26
27	37.369927	-83.066788	1097.49	9.00	1106.49
28	37.371717	-83.061027	1119.45	9.00	1128.45
29	37.371802	-83.059063	1101.92	9.00	1110.92
30	37.371325	-83.056864	1097.91	9.00	1106.91

Name: Starfire Hand Road
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.372057	-83.106101	914.29	9.00	923.29
2	37.372351	-83.106219	938.16	9.00	947.16
3	37.372645	-83.106112	947.81	9.00	956.81
4	37.373059	-83.105796	969.63	9.00	978.63
5	37.373468	-83.105817	1002.16	9.00	1011.16
6	37.374035	-83.105554	1035.26	9.00	1044.26
7	37.374674	-83.105554	1086.73	9.00	1095.73
8	37.375727	-83.105801	1136.37	9.00	1145.37
9	37.376218	-83.105704	1167.71	9.00	1176.71
10	37.376853	-83.105184	1208.45	9.00	1217.45
11	37.377144	-83.105157	1217.40	9.00	1226.40
12	37.378521	-83.106327	1268.20	9.00	1277.20
13	37.378845	-83.106338	1274.30	9.00	1283.30
14	37.379165	-83.105758	1298.55	9.00	1307.55
15	37.379301	-83.105222	1312.48	9.00	1321.48
16	37.379353	-83.104465	1329.52	9.00	1338.52
17	37.379570	-83.103763	1354.93	9.00	1363.93
18	37.379864	-83.103339	1366.54	9.00	1375.54
19	37.380225	-83.103280	1368.46	9.00	1377.46
20	37.382434	-83.103130	1378.50	9.00	1387.50
21	37.384020	-83.103832	1388.29	9.00	1397.29
22	37.384617	-83.103940	1388.26	9.00	1397.26
23	37.385569	-83.103607	1381.24	9.00	1390.24
24	37.387458	-83.102749	1375.99	9.00	1384.99
25	37.388199	-83.102690	1377.87	9.00	1386.87
26	37.388651	-83.103119	1380.97	9.00	1389.97
27	37.390375	-83.107341	1366.66	9.00	1375.66
28	37.392374	-83.110495	1362.73	9.00	1371.73
29	37.392937	-83.111026	1358.90	9.00	1367.90
30	37.394267	-83.110865	1316.39	9.00	1325.39

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	37.396945	-83.158588	1314.30	16.00
OP 2	2	37.384459	-83.159212	838.23	16.00
OP 3	3	37.378051	-83.123629	955.03	16.00
OP 4	4	37.423000	-83.080331	983.85	16.00
OP 5	5	37.382129	-83.134098	940.17	16.00
OP 6	6	37.385780	-83.133747	880.04	16.00
OP 7	7	37.449522	-83.079678	1435.28	16.00
OP 8	8	37.446937	-83.085180	1418.91	16.00
OP 9	9	37.438576	-83.076553	1332.34	16.00
OP 10	10	37.403367	-83.112991	1344.66	16.00
OP 11	11	37.391575	-83.109213	1361.97	16.00
OP 12	12	37.348179	-83.117745	1320.89	16.00
OP 13	13	37.377018	-83.069076	1399.62	16.00
OP 14	14	37.380511	-83.108659	1357.01	16.00
OP 15	15	37.383060	-83.108026	1401.80	16.00
OP 16	16	37.340402	-83.156733	1381.46	16.00
OP 17	17	37.343232	-83.152797	1393.32	16.00
OP 18	18	37.342542	-83.148530	1144.02	16.00
OP 19	19	37.413754	-83.206763	866.49	16.00
OP 20	20	37.384042	-83.090774	945.06	16.00
OP 21	21	37.391949	-83.073849	975.29	16.00
OP 22	22	37.358322	-83.044081	1497.44	16.00
OP 23	23	37.365303	-83.237832	925.00	16.00
OP 24	24	37.381557	-83.250911	1271.44	16.00
OP 25	25	37.384616	-83.248354	1236.98	16.00

Glare Analysis Results

Summary of Results

Glare with low potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	593	9.9	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

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

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	237	4.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	356	5.9	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV: PV array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 1 and Route: Buckhorn Road -1

No glare found

PV array 1 and Route: Buckhorn Road-2

No glare found

PV array 1 and Route: KY-478 -1

No glare found

PV array 1 and Route: KY-478 -2

No glare found

PV array 1 and Route: KY-80

No glare found

PV array 1 and Route: Starfire Hand Road

No glare found

PV array 1 and OP 1

No glare found

PV array 1 and OP 2

No glare found

PV array 1 and OP 3

No glare found

PV array 1 and OP 4

No glare found

PV array 1 and OP 5

No glare found

PV array 1 and OP 6

No glare found

PV array 1 and OP 7

No glare found

PV array 1 and OP 8

No glare found

PV array 1 and OP 9

No glare found

PV array 1 and OP 10

No glare found

PV array 1 and OP 11

No glare found

PV array 1 and OP 12

No glare found

PV array 1 and OP 13

No glare found

PV array 1 and OP 14

No glare found

PV array 1 and OP 15

No glare found

PV array 1 and OP 16

No glare found

PV array 1 and OP 17

No glare found

PV array 1 and OP 18

No glare found

PV array 1 and OP 19

No glare found

PV array 1 and OP 20

No glare found

PV array 1 and OP 21

No glare found

PV array 1 and OP 22

No glare found

PV array 1 and OP 23

No glare found

PV array 1 and OP 24

No glare found

PV array 1 and OP 25

No glare found

PV: PV array 10 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 10 and Route: Buckhorn Road -1

No glare found

PV array 10 and Route: Buckhorn Road-2

No glare found

PV array 10 and Route: KY-478 -1

No glare found

PV array 10 and Route: KY-478 -2

No glare found

PV array 10 and Route: KY-80

No glare found

PV array 10 and Route: Starfire Hand Road

No glare found

PV array 10 and OP 1

No glare found

PV array 10 and OP 2

No glare found

PV array 10 and OP 3

No glare found

PV array 10 and OP 4

No glare found

PV array 10 and OP 5

No glare found

PV array 10 and OP 6

No glare found

PV array 10 and OP 7

No glare found

PV array 10 and OP 8

No glare found

PV array 10 and OP 9

No glare found

PV array 10 and OP 10

No glare found

PV array 10 and OP 11

No glare found

PV array 10 and OP 12

No glare found

PV array 10 and OP 13

No glare found

PV array 10 and OP 14

No glare found

PV array 10 and OP 15

No glare found

PV array 10 and OP 16

No glare found

PV array 10 and OP 17

No glare found

PV array 10 and OP 18

No glare found

PV array 10 and OP 19

No glare found

PV array 10 and OP 20

No glare found

PV array 10 and OP 21

No glare found

PV array 10 and OP 22

No glare found

PV array 10 and OP 23

No glare found

PV array 10 and OP 24

No glare found

PV array 10 and OP 25

No glare found

PV: PV array 2 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 2 and Route: Buckhorn Road -1

No glare found

PV array 2 and Route: Buckhorn Road-2

No glare found

PV array 2 and Route: KY-478 -1

No glare found

PV array 2 and Route: KY-478 -2

No glare found

PV array 2 and Route: KY-80

No glare found

PV array 2 and Route: Starfire Hand Road

No glare found

PV array 2 and OP 1

No glare found

PV array 2 and OP 2

No glare found

PV array 2 and OP 3

No glare found

PV array 2 and OP 4

No glare found

PV array 2 and OP 5

No glare found

PV array 2 and OP 6

No glare found

PV array 2 and OP 7

No glare found

PV array 2 and OP 8

No glare found

PV array 2 and OP 9

No glare found

PV array 2 and OP 10

No glare found

PV array 2 and OP 11

No glare found

PV array 2 and OP 12

No glare found

PV array 2 and OP 13

No glare found

PV array 2 and OP 14

No glare found

PV array 2 and OP 15

No glare found

PV array 2 and OP 16

No glare found

PV array 2 and OP 17

No glare found

PV array 2 and OP 18

No glare found

PV array 2 and OP 19

No glare found

PV array 2 and OP 20

No glare found

PV array 2 and OP 21

No glare found

PV array 2 and OP 22

No glare found

PV array 2 and OP 23

No glare found

PV array 2 and OP 24

No glare found

PV array 2 and OP 25

No glare found

PV: PV array 3 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 3 and Route: Buckhorn Road -1

No glare found

PV array 3 and Route: Buckhorn Road-2

No glare found

PV array 3 and Route: KY-478 -1

No glare found

PV array 3 and Route: KY-478 -2

No glare found

PV array 3 and Route: KY-80

No glare found

PV array 3 and Route: Starfire Hand Road

No glare found

PV array 3 and OP 1

No glare found

PV array 3 and OP 2

No glare found

PV array 3 and OP 3

No glare found

PV array 3 and OP 4

No glare found

PV array 3 and OP 5

No glare found

PV array 3 and OP 6

No glare found

PV array 3 and OP 7

No glare found

PV array 3 and OP 8

No glare found

PV array 3 and OP 9

No glare found

PV array 3 and OP 10
No glare found

PV array 3 and OP 11
No glare found

PV array 3 and OP 12
No glare found

PV array 3 and OP 13
No glare found

PV array 3 and OP 14
No glare found

PV array 3 and OP 15
No glare found

PV array 3 and OP 16
No glare found

PV array 3 and OP 17
No glare found

PV array 3 and OP 18
No glare found

PV array 3 and OP 19
No glare found

PV array 3 and OP 20
No glare found

PV array 3 and OP 21
No glare found

PV array 3 and OP 22
No glare found

PV array 3 and OP 23
No glare found

PV array 3 and OP 24

No glare found

PV array 3 and OP 25

No glare found

PV: PV array 4 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 4 and Route: Buckhorn Road -1

No glare found

PV array 4 and Route: Buckhorn Road-2

No glare found

PV array 4 and Route: KY-478 -1

No glare found

PV array 4 and Route: KY-478 -2

No glare found

PV array 4 and Route: KY-80

No glare found

PV array 4 and Route: Starfire Hand Road

No glare found

PV array 4 and OP 1

No glare found

PV array 4 and OP 2

No glare found

PV array 4 and OP 3

No glare found

PV array 4 and OP 4

No glare found

PV array 4 and OP 5

No glare found

PV array 4 and OP 6

No glare found

PV array 4 and OP 7

No glare found

PV array 4 and OP 8

No glare found

PV array 4 and OP 9

No glare found

PV array 4 and OP 10

No glare found

PV array 4 and OP 11

No glare found

PV array 4 and OP 12

No glare found

PV array 4 and OP 13

No glare found

PV array 4 and OP 14

No glare found

PV array 4 and OP 15

No glare found

PV array 4 and OP 16

No glare found

PV array 4 and OP 17

No glare found

PV array 4 and OP 18

No glare found

PV array 4 and OP 19

No glare found

PV array 4 and OP 20

No glare found

PV array 4 and OP 21

No glare found

PV array 4 and OP 22

No glare found

PV array 4 and OP 23

No glare found

PV array 4 and OP 24

No glare found

PV array 4 and OP 25

No glare found

PV: PV array 5 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 5 and Route: Buckhorn Road -1

No glare found

PV array 5 and Route: Buckhorn Road-2

No glare found

PV array 5 and Route: KY-478 -1

No glare found

PV array 5 and Route: KY-478 -2

No glare found

PV array 5 and Route: KY-80

No glare found

PV array 5 and Route: Starfire Hand Road

No glare found

PV array 5 and OP 1

No glare found

PV array 5 and OP 2

No glare found

PV array 5 and OP 3

No glare found

PV array 5 and OP 4

No glare found

PV array 5 and OP 5

No glare found

PV array 5 and OP 6

No glare found

PV array 5 and OP 7

No glare found

PV array 5 and OP 8

No glare found

PV array 5 and OP 9

No glare found

PV array 5 and OP 10

No glare found

PV array 5 and OP 11

No glare found

PV array 5 and OP 12

No glare found

PV array 5 and OP 13

No glare found

PV array 5 and OP 14

No glare found

PV array 5 and OP 15

No glare found

PV array 5 and OP 16

No glare found

PV array 5 and OP 17

No glare found

PV array 5 and OP 18

No glare found

PV array 5 and OP 19

No glare found

PV array 5 and OP 20

No glare found

PV array 5 and OP 21

No glare found

PV array 5 and OP 22

No glare found

PV array 5 and OP 23

No glare found

PV array 5 and OP 24

No glare found

PV array 5 and OP 25

No glare found

PV: PV array 6 low potential for temporary after-image

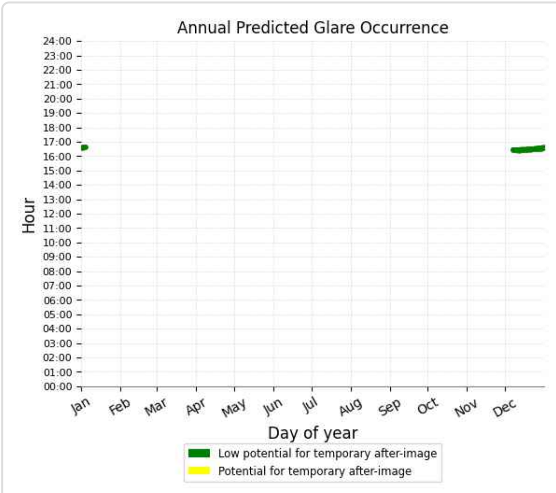
Receptor results ordered by category of glare

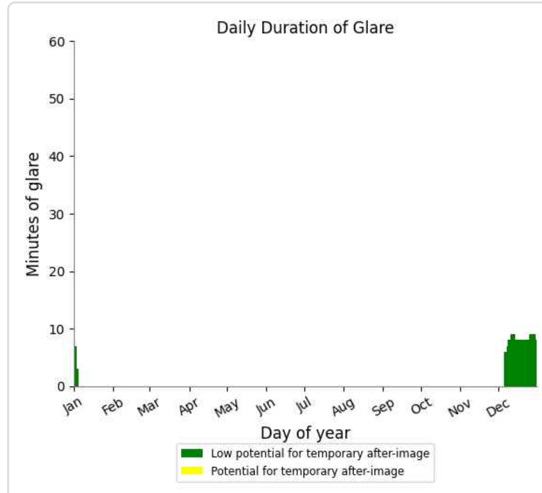
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road-2	237	4.0	0	0.0
Buckhorn Road -1	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 9	356	5.9	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

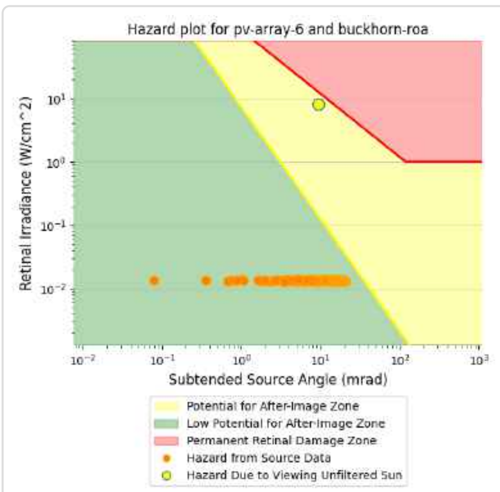
PV array 6 and Route: Buckhorn Road-2

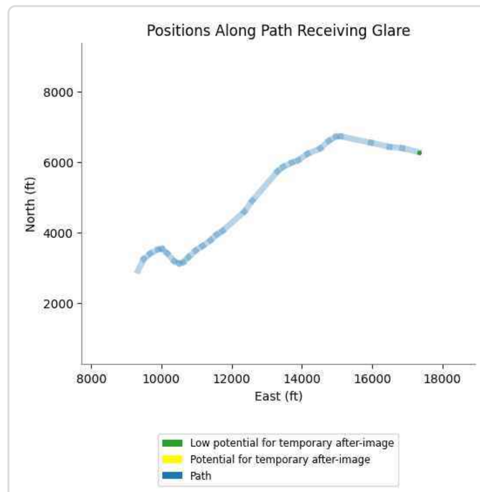
Yellow glare: none

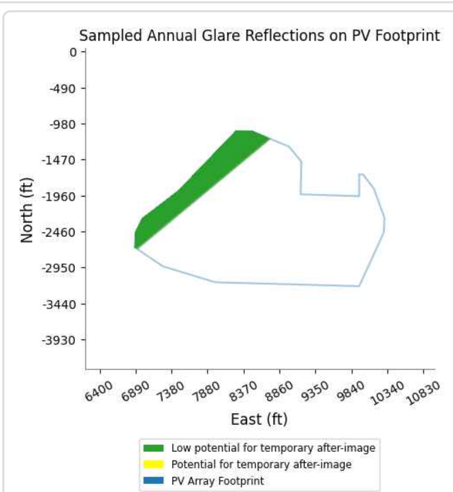
Green glare: 237 min.











PV array 6 and Route: Buckhorn Road -1

No glare found

PV array 6 and Route: KY-478 -1

No glare found

PV array 6 and Route: KY-478 -2

No glare found

PV array 6 and Route: KY-80

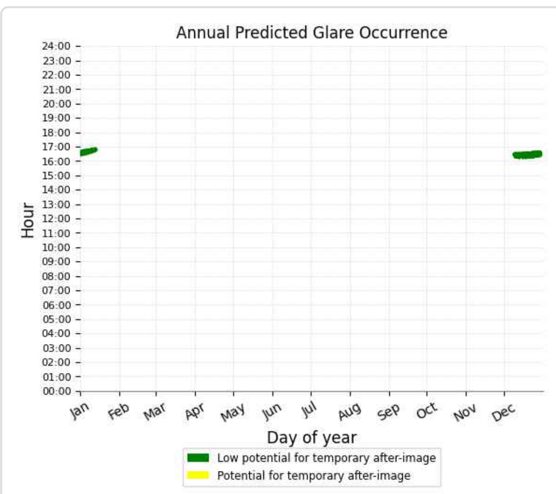
No glare found

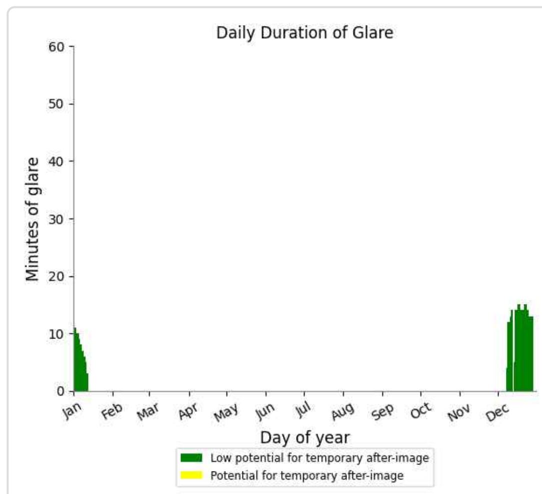
PV array 6 and Route: Starfire Hand Road

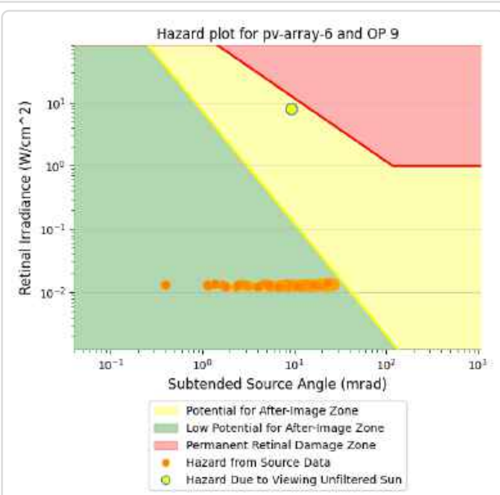
No glare found

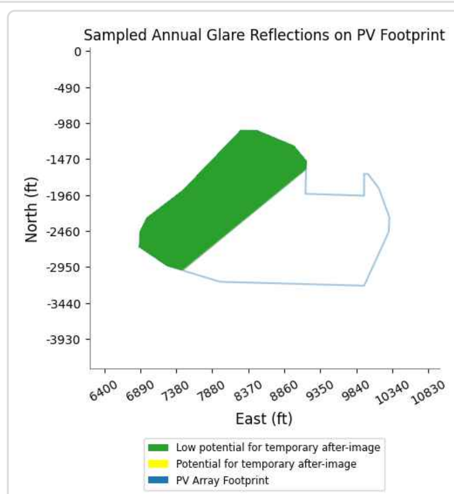
PV array 6 and OP 9

Yellow glare: none
Green glare: 356 min.









PV array 6 and OP 1

No glare found

PV array 6 and OP 2

No glare found

PV array 6 and OP 3

No glare found

PV array 6 and OP 4

No glare found

PV array 6 and OP 5

No glare found

PV array 6 and OP 6

No glare found

PV array 6 and OP 7

No glare found

PV array 6 and OP 8

No glare found

PV array 6 and OP 10

No glare found

PV array 6 and OP 11

No glare found

PV array 6 and OP 12

No glare found

PV array 6 and OP 13

No glare found

PV array 6 and OP 14

No glare found

PV array 6 and OP 15

No glare found

PV array 6 and OP 16

No glare found

PV array 6 and OP 17

No glare found

PV array 6 and OP 18

No glare found

PV array 6 and OP 19

No glare found

PV array 6 and OP 20

No glare found

PV array 6 and OP 21

No glare found

PV array 6 and OP 22

No glare found

PV array 6 and OP 23

No glare found

PV array 6 and OP 24

No glare found

PV array 6 and OP 25

No glare found

PV: PV array 7 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 7 and Route: Buckhorn Road -1

No glare found

PV array 7 and Route: Buckhorn Road-2

No glare found

PV array 7 and Route: KY-478 -1

No glare found

PV array 7 and Route: KY-478 -2

No glare found

PV array 7 and Route: KY-80

No glare found

PV array 7 and Route: Starfire Hand Road

No glare found

PV array 7 and OP 1

No glare found

PV array 7 and OP 2

No glare found

PV array 7 and OP 3

No glare found

PV array 7 and OP 4

No glare found

PV array 7 and OP 5

No glare found

PV array 7 and OP 6

No glare found

PV array 7 and OP 7

No glare found

PV array 7 and OP 8

No glare found

PV array 7 and OP 9

No glare found

PV array 7 and OP 10

No glare found

PV array 7 and OP 11

No glare found

PV array 7 and OP 12

No glare found

PV array 7 and OP 13

No glare found

PV array 7 and OP 14

No glare found

PV array 7 and OP 15

No glare found

PV array 7 and OP 16

No glare found

PV array 7 and OP 17

No glare found

PV array 7 and OP 18

No glare found

PV array 7 and OP 19

No glare found

PV array 7 and OP 20

No glare found

PV array 7 and OP 21

No glare found

PV array 7 and OP 22

No glare found

PV array 7 and OP 23

No glare found

PV array 7 and OP 24

No glare found

PV array 7 and OP 25

No glare found

PV: PV array 8 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 8 and Route: Buckhorn Road -1

No glare found

PV array 8 and Route: Buckhorn Road-2

No glare found

PV array 8 and Route: KY-478 -1

No glare found

PV array 8 and Route: KY-478 -2

No glare found

PV array 8 and Route: KY-80

No glare found

PV array 8 and Route: Starfire Hand Road

No glare found

PV array 8 and OP 1

No glare found

PV array 8 and OP 2

No glare found

PV array 8 and OP 3

No glare found

PV array 8 and OP 4

No glare found

PV array 8 and OP 5

No glare found

PV array 8 and OP 6

No glare found

PV array 8 and OP 7

No glare found

PV array 8 and OP 8

No glare found

PV array 8 and OP 9

No glare found

PV array 8 and OP 10

No glare found

PV array 8 and OP 11

No glare found

PV array 8 and OP 12

No glare found

PV array 8 and OP 13

No glare found

PV array 8 and OP 14

No glare found

PV array 8 and OP 15

No glare found

PV array 8 and OP 16

No glare found

PV array 8 and OP 17

No glare found

PV array 8 and OP 18

No glare found

PV array 8 and OP 19

No glare found

PV array 8 and OP 20

No glare found

PV array 8 and OP 21

No glare found

PV array 8 and OP 22

No glare found

PV array 8 and OP 23

No glare found

PV array 8 and OP 24

No glare found

PV array 8 and OP 25

No glare found

PV: PV array 9 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Buckhorn Road -1	0	0.0	0	0.0
Buckhorn Road-2	0	0.0	0	0.0
KY-478 -1	0	0.0	0	0.0
KY-478 -2	0	0.0	0	0.0
KY-80	0	0.0	0	0.0
Starfire Hand Road	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0

PV array 9 and Route: Buckhorn Road -1

No glare found

PV array 9 and Route: Buckhorn Road-2

No glare found

PV array 9 and Route: KY-478 -1

No glare found

PV array 9 and Route: KY-478 -2

No glare found

PV array 9 and Route: KY-80

No glare found

PV array 9 and Route: Starfire Hand Road

No glare found

PV array 9 and OP 1

No glare found

PV array 9 and OP 2

No glare found

PV array 9 and OP 3

No glare found

PV array 9 and OP 4

No glare found

PV array 9 and OP 5

No glare found

PV array 9 and OP 6

No glare found

PV array 9 and OP 7

No glare found

PV array 9 and OP 8

No glare found

PV array 9 and OP 9

No glare found

PV array 9 and OP 10

No glare found

PV array 9 and OP 11

No glare found

PV array 9 and OP 12

No glare found

PV array 9 and OP 13

No glare found

PV array 9 and OP 14

No glare found

PV array 9 and OP 15

No glare found

PV array 9 and OP 16

No glare found

PV array 9 and OP 17

No glare found

PV array 9 and OP 18

No glare found

PV array 9 and OP 19

No glare found

PV array 9 and OP 20

No glare found

PV array 9 and OP 21

No glare found

PV array 9 and OP 22

No glare found

PV array 9 and OP 23

No glare found

PV array 9 and OP 24

No glare found

PV array 9 and OP 25

No glare found

Assumptions

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

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

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

FORGESOLAR GLARE ANALYSIS

Project: **Starfire Solar**
Site configuration: **Analysis 3 - FAA Receptors 12042024**

Created 13 Dec, 2024
Updated 13 Dec, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 1 MW to 5 MW
Site ID 136813.21171

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

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

CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.421702	-83.138117	1395.55	5.00	1400.55
2	37.421719	-83.136390	1402.04	5.00	1407.04
3	37.420228	-83.135317	1389.02	5.00	1394.02
4	37.419342	-83.135306	1380.05	5.00	1385.05
5	37.419333	-83.134501	1386.18	5.00	1391.18
6	37.418677	-83.133096	1356.71	5.00	1361.71
7	37.418660	-83.130886	1306.12	5.00	1311.12
8	37.417492	-83.130918	1305.98	5.00	1310.98
9	37.415831	-83.131315	1344.14	5.00	1349.14
10	37.415294	-83.131433	1330.53	5.00	1335.53
11	37.414706	-83.131969	1345.15	5.00	1350.15
12	37.414075	-83.132527	1342.08	5.00	1347.08
13	37.412610	-83.133053	1352.08	5.00	1357.08
14	37.411169	-83.133536	1357.16	5.00	1362.16
15	37.409678	-83.133729	1293.55	5.00	1298.55
16	37.408962	-83.133729	1292.67	5.00	1297.67
17	37.409005	-83.132656	1291.84	5.00	1296.84
18	37.408613	-83.132420	1285.09	5.00	1290.09
19	37.407837	-83.132281	1283.51	5.00	1288.51
20	37.406525	-83.132055	1279.77	5.00	1284.77
21	37.405758	-83.131948	1284.17	5.00	1289.17
22	37.405110	-83.131862	1277.47	5.00	1282.47
23	37.404667	-83.131690	1276.14	5.00	1281.14
24	37.404126	-83.131472	1272.77	5.00	1277.77
25	37.403295	-83.131126	1272.18	5.00	1277.18
26	37.402425	-83.130783	1281.25	5.00	1286.25
27	37.401616	-83.130461	1281.91	5.00	1286.91
28	37.401419	-83.130386	1281.88	5.00	1286.88
29	37.401002	-83.130364	1282.08	5.00	1287.08
30	37.400448	-83.131566	1282.65	5.00	1287.65
31	37.400559	-83.133980	1292.02	5.00	1297.02
32	37.400742	-83.134430	1292.06	5.00	1297.06
33	37.401040	-83.134463	1292.49	5.00	1297.49
34	37.401300	-83.139012	1272.33	5.00	1277.33
35	37.401607	-83.140165	1255.58	5.00	1260.58
36	37.401858	-83.140889	1248.17	5.00	1253.17
37	37.402427	-83.140830	1268.09	5.00	1273.09
38	37.402334	-83.138046	1300.57	5.00	1305.57
39	37.403026	-83.138038	1306.94	5.00	1311.94
40	37.403557	-83.137510	1319.70	5.00	1324.70
41	37.403531	-83.136750	1294.95	5.00	1299.95
42	37.404647	-83.136635	1250.60	5.00	1255.60
43	37.404675	-83.137142	1256.92	5.00	1261.92
44	37.404903	-83.137295	1257.86	5.00	1262.86
45	37.405841	-83.137206	1275.06	5.00	1280.06
46	37.405949	-83.140202	1283.63	5.00	1288.63
47	37.406480	-83.140146	1285.44	5.00	1290.44
48	37.407004	-83.139728	1286.61	5.00	1291.61
49	37.407285	-83.140793	1367.45	5.00	1372.45
50	37.406486	-83.141506	1381.97	5.00	1386.97
51	37.405982	-83.142189	1334.71	5.00	1339.71
52	37.406021	-83.143979	1314.52	5.00	1319.52
53	37.406549	-83.144356	1283.36	5.00	1288.36
54	37.407123	-83.144537	1224.05	5.00	1229.05
55	37.407662	-83.144499	1195.73	5.00	1200.73
56	37.408734	-83.144108	1204.37	5.00	1209.37
57	37.409505	-83.143249	1216.32	5.00	1221.32
58	37.409959	-83.143547	1253.60	5.00	1258.60
59	37.410234	-83.143464	1265.32	5.00	1270.32

Name: PV array 10
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.404765	-83.109382	1345.27	5.00	1350.27
2	37.405362	-83.108867	1355.93	5.00	1360.93
3	37.406244	-83.107236	1353.98	5.00	1358.98
4	37.406527	-83.106670	1353.29	5.00	1358.29
5	37.408409	-83.103446	1347.48	5.00	1352.48
6	37.409004	-83.102489	1345.43	5.00	1350.43
7	37.410176	-83.100491	1338.59	5.00	1343.59
8	37.410161	-83.099669	1328.06	5.00	1333.06
9	37.409239	-83.099691	1327.72	5.00	1332.72
10	37.407395	-83.099426	1350.02	5.00	1355.02
11	37.406807	-83.099445	1351.64	5.00	1356.64
12	37.406505	-83.100123	1352.39	5.00	1357.39
13	37.405529	-83.102341	1364.79	5.00	1369.79
14	37.405584	-83.105949	1357.68	5.00	1362.68
15	37.403778	-83.106013	1304.21	5.00	1309.21
16	37.403846	-83.109146	1343.40	5.00	1348.40
17	37.404148	-83.109412	1330.91	5.00	1335.91

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.404122	-83.139221	1352.58	5.00	1357.58
2	37.404332	-83.139005	1355.31	5.00	1360.31
3	37.404298	-83.138431	1349.69	5.00	1354.69
4	37.403465	-83.138482	1350.18	5.00	1355.18
5	37.403498	-83.139014	1352.46	5.00	1357.46
6	37.403570	-83.139262	1348.74	5.00	1353.74

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.413646	-83.126416	1280.40	5.00	1285.40
2	37.413859	-83.125998	1278.88	5.00	1283.88
3	37.413986	-83.125569	1280.39	5.00	1285.39
4	37.414038	-83.125172	1285.39	5.00	1290.39
5	37.413977	-83.124165	1302.83	5.00	1307.83
6	37.414556	-83.124122	1321.14	5.00	1326.14
7	37.414970	-83.125887	1331.87	5.00	1336.87
8	37.416031	-83.126815	1330.66	5.00	1335.66
9	37.416533	-83.127475	1328.18	5.00	1333.18
10	37.416563	-83.127990	1326.02	5.00	1331.02
11	37.416804	-83.128811	1328.97	5.00	1333.97
12	37.416823	-83.129187	1323.13	5.00	1328.13
13	37.416331	-83.130090	1323.21	5.00	1328.21
14	37.415802	-83.130441	1330.21	5.00	1335.21
15	37.414184	-83.131545	1340.03	5.00	1345.03
16	37.413665	-83.132005	1345.82	5.00	1350.82
17	37.413163	-83.132243	1349.25	5.00	1354.25
18	37.412575	-83.132487	1352.19	5.00	1357.19
19	37.411450	-83.132697	1356.09	5.00	1361.09
20	37.410610	-83.132729	1356.11	5.00	1361.11
21	37.409457	-83.132262	1291.22	5.00	1296.22
22	37.408430	-83.131872	1284.07	5.00	1289.07
23	37.407582	-83.131840	1282.63	5.00	1287.63
24	37.404984	-83.131279	1276.23	5.00	1281.23
25	37.403893	-83.130840	1275.55	5.00	1280.55
26	37.401522	-83.129228	1282.65	5.00	1287.65
27	37.401470	-83.126393	1284.01	5.00	1289.01
28	37.402509	-83.122933	1281.78	5.00	1286.78
29	37.404166	-83.120068	1298.37	5.00	1303.37
30	37.405289	-83.120041	1334.59	5.00	1339.59
31	37.406363	-83.120954	1326.78	5.00	1331.78
32	37.407241	-83.121065	1322.85	5.00	1327.85
33	37.408055	-83.121906	1326.14	5.00	1331.14
34	37.408572	-83.122004	1328.07	5.00	1333.07
35	37.409360	-83.122756	1323.04	5.00	1328.04
36	37.410840	-83.123835	1319.90	5.00	1324.90
37	37.411118	-83.124367	1319.53	5.00	1324.53
38	37.411157	-83.125461	1330.98	5.00	1335.98
39	37.410853	-83.126212	1329.42	5.00	1334.42
40	37.410471	-83.127535	1313.54	5.00	1318.54
41	37.410527	-83.128710	1295.29	5.00	1300.29
42	37.411315	-83.128691	1279.35	5.00	1284.35
43	37.411999	-83.128793	1270.94	5.00	1275.94
44	37.412555	-83.129120	1295.75	5.00	1300.75
45	37.414226	-83.129859	1305.67	5.00	1310.67
46	37.415204	-83.129673	1326.01	5.00	1331.01
47	37.415456	-83.127943	1322.06	5.00	1327.06
48	37.414374	-83.127427	1327.35	5.00	1332.35
49	37.413515	-83.126753	1288.76	5.00	1293.76
50	37.413445	-83.126579	1281.50	5.00	1286.50

Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412539	-83.122675	1306.04	5.00	1311.04
2	37.412501	-83.121827	1312.13	5.00	1317.13
3	37.411304	-83.118957	1333.48	5.00	1338.48
4	37.409902	-83.115862	1355.56	5.00	1360.56
5	37.408317	-83.113411	1365.87	5.00	1370.87
6	37.407209	-83.113159	1371.04	5.00	1376.04
7	37.406141	-83.113201	1362.86	5.00	1367.86
8	37.405617	-83.113266	1361.99	5.00	1366.99
9	37.404015	-83.113475	1350.03	5.00	1355.03
10	37.403693	-83.113797	1344.17	5.00	1349.17
11	37.403793	-83.117171	1347.05	5.00	1352.05
12	37.404748	-83.118512	1313.17	5.00	1318.17
13	37.405067	-83.118721	1316.53	5.00	1321.53
14	37.407249	-83.121066	1322.64	5.00	1327.64
15	37.408067	-83.121897	1326.18	5.00	1331.18
16	37.408063	-83.121903	1326.18	5.00	1331.18
17	37.408578	-83.122004	1328.14	5.00	1333.14
18	37.409103	-83.122509	1321.05	5.00	1326.05
19	37.409362	-83.122755	1323.04	5.00	1328.04
20	37.410850	-83.123828	1319.99	5.00	1324.99
21	37.411455	-83.123828	1316.83	5.00	1321.83
22	37.411987	-83.123490	1317.65	5.00	1322.65

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412573	-83.112361	1360.70	5.00	1365.70
2	37.412522	-83.110162	1359.75	5.00	1364.75
3	37.412023	-83.110167	1352.59	5.00	1357.59
4	37.411859	-83.103066	1335.80	5.00	1340.80
5	37.412401	-83.103060	1331.47	5.00	1336.47
6	37.412920	-83.102401	1339.15	5.00	1344.15
7	37.413290	-83.101968	1329.68	5.00	1334.68
8	37.413279	-83.101510	1330.21	5.00	1335.21
9	37.412918	-83.101267	1336.86	5.00	1341.86
10	37.411795	-83.100997	1336.86	5.00	1341.86
11	37.410748	-83.100938	1338.94	5.00	1343.94
12	37.410062	-83.101832	1343.60	5.00	1348.60
13	37.407831	-83.105642	1347.26	5.00	1352.26
14	37.407620	-83.107672	1333.22	5.00	1338.22
15	37.406241	-83.108399	1352.12	5.00	1357.12
16	37.406307	-83.109396	1325.08	5.00	1330.08
17	37.406287	-83.110638	1361.65	5.00	1366.65
18	37.407464	-83.111596	1362.78	5.00	1367.78
19	37.407745	-83.112207	1366.81	5.00	1371.81
20	37.408525	-83.112183	1365.68	5.00	1370.68
21	37.410790	-83.111909	1365.73	5.00	1370.73
22	37.411691	-83.112370	1366.72	5.00	1371.72

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.414350	-83.114433	1351.23	5.00	1356.23
2	37.414908	-83.114398	1353.10	5.00	1358.10
3	37.415435	-83.114073	1359.34	5.00	1364.34
4	37.416470	-83.112377	1365.82	5.00	1370.82
5	37.418726	-83.109660	1335.88	5.00	1340.88
6	37.418713	-83.108889	1274.05	5.00	1279.05
7	37.418140	-83.107174	1296.99	5.00	1301.99
8	37.417573	-83.106584	1321.61	5.00	1326.61
9	37.416346	-83.106619	1259.84	5.00	1264.84
10	37.416274	-83.103864	1332.66	5.00	1337.66
11	37.417094	-83.103863	1338.46	5.00	1343.46
12	37.417091	-83.103682	1338.58	5.00	1343.58
13	37.416554	-83.103169	1333.60	5.00	1338.60
14	37.415451	-83.102672	1327.21	5.00	1332.21
15	37.414913	-83.102707	1325.48	5.00	1330.48
16	37.412892	-83.103863	1306.96	5.00	1311.96
17	37.413037	-83.110634	1377.40	5.00	1382.40
18	37.413640	-83.113113	1355.11	5.00	1360.11

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.412842	-83.117184	1327.25	5.00	1332.25
2	37.412815	-83.116090	1326.77	5.00	1331.77
3	37.413077	-83.115856	1329.87	5.00	1334.87
4	37.413889	-83.115788	1345.57	5.00	1350.57
5	37.414740	-83.116543	1351.65	5.00	1356.65
6	37.415539	-83.116768	1337.29	5.00	1342.29
7	37.415674	-83.114858	1357.80	5.00	1362.80
8	37.416502	-83.113387	1362.92	5.00	1367.92
9	37.419238	-83.110405	1413.45	5.00	1418.45
10	37.419518	-83.110326	1425.53	5.00	1430.53
11	37.420074	-83.110306	1421.25	5.00	1426.25
12	37.421773	-83.113424	1382.02	5.00	1387.02
13	37.423641	-83.118495	1368.49	5.00	1373.49
14	37.423726	-83.122302	1168.93	5.00	1173.93
15	37.423093	-83.123031	1152.67	5.00	1157.67
16	37.422662	-83.122932	1136.09	5.00	1141.09
17	37.421971	-83.122654	1200.81	5.00	1205.81
18	37.421410	-83.121628	1244.04	5.00	1249.04
19	37.420821	-83.120136	1217.79	5.00	1222.79
20	37.419704	-83.118884	1328.81	5.00	1333.81
21	37.418291	-83.119155	1302.20	5.00	1307.20
22	37.418172	-83.118436	1304.47	5.00	1309.47
23	37.417611	-83.118453	1303.83	5.00	1308.83
24	37.416360	-83.117509	1352.30	5.00	1357.30
25	37.413945	-83.117589	1316.31	5.00	1321.31

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.418411	-83.128059	1330.42	5.00	1335.42
2	37.420065	-83.126906	1314.72	5.00	1319.72
3	37.420635	-83.126393	1315.22	5.00	1320.22
4	37.420587	-83.124870	1314.35	5.00	1319.35
5	37.420308	-83.123882	1325.57	5.00	1330.57
6	37.420038	-83.123583	1336.45	5.00	1341.45
7	37.419340	-83.123466	1337.40	5.00	1342.40
8	37.418821	-83.123488	1329.89	5.00	1334.89
9	37.418775	-83.121528	1329.69	5.00	1334.69
10	37.418225	-83.121368	1327.42	5.00	1332.42
11	37.417677	-83.121252	1322.87	5.00	1327.87
12	37.416966	-83.120155	1328.91	5.00	1333.91
13	37.416700	-83.119931	1333.01	5.00	1338.01
14	37.416428	-83.119786	1330.84	5.00	1335.84
15	37.415879	-83.119803	1323.19	5.00	1328.19
16	37.414791	-83.120063	1333.51	5.00	1338.51
17	37.414245	-83.120474	1319.67	5.00	1324.67
18	37.414271	-83.122027	1321.26	5.00	1326.26
19	37.414848	-83.122604	1337.59	5.00	1342.59
20	37.415404	-83.123034	1327.68	5.00	1332.68
21	37.416256	-83.124663	1320.06	5.00	1325.06
22	37.417256	-83.126658	1331.59	5.00	1336.59
23	37.417602	-83.128055	1329.23	5.00	1334.23

Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	37.399790	-83.133693	1286.30	5.00	1291.30
2	37.399766	-83.131783	1286.35	5.00	1291.35
3	37.400471	-83.129546	1285.45	5.00	1290.45
4	37.400429	-83.127580	1279.50	5.00	1284.50
5	37.400636	-83.126765	1279.12	5.00	1284.12
6	37.401224	-83.125142	1277.03	5.00	1282.03
7	37.401330	-83.124807	1277.15	5.00	1282.15
8	37.402095	-83.122143	1286.19	5.00	1291.19
9	37.402624	-83.121309	1294.94	5.00	1299.94
10	37.403175	-83.120550	1305.28	5.00	1310.28
11	37.402907	-83.120376	1315.75	5.00	1320.75
12	37.402291	-83.120405	1323.29	5.00	1328.29
13	37.401524	-83.121440	1295.00	5.00	1300.00
14	37.400657	-83.124825	1281.15	5.00	1286.15
15	37.399672	-83.124890	1278.88	5.00	1283.88
16	37.399453	-83.124002	1310.15	5.00	1315.15
17	37.399442	-83.123114	1307.70	5.00	1312.70
18	37.398801	-83.123103	1291.19	5.00	1296.19
19	37.398103	-83.124100	1297.40	5.00	1302.40
20	37.398154	-83.127833	1317.78	5.00	1322.78
21	37.398798	-83.127822	1318.50	5.00	1323.50
22	37.399509	-83.128083	1274.07	5.00	1279.07
23	37.398359	-83.130773	1285.23	5.00	1290.23
24	37.398237	-83.131921	1281.66	5.00	1286.66
25	37.398235	-83.132822	1282.56	5.00	1287.56
26	37.399187	-83.133694	1283.36	5.00	1288.36

Flight Path Receptors

Name: CPF RWY 06
Description:
Threshold height: 50 ft
Direction: 59.0°
Glide slope: 3.0°
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	37.389764	-83.269137	1244.52	50.00	1294.52
Two-mile	37.374873	-83.300366	1312.58	535.37	1847.95

Name: CPF RWY 14
Description:
Threshold height: 31 ft
Direction: 139.0°
Glide slope: 3.0°
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	37.390141	-83.265409	1243.15	31.00	1274.15
Two-mile	37.411962	-83.289311	886.83	940.75	1827.58

Name: CPF RWY 24
Description:
Threshold height: 50 ft
Direction: 239.0°
Glide slope: 3.0°
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	37.393624	-83.260982	1240.65	50.00	1290.65
Two-mile	37.408515	-83.229752	1139.90	704.18	1844.08

Name: CPF RWY 32
Description:
Threshold height: 38 ft
Direction: 319.0°
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	37.379487	-83.253748	1250.82	38.00	1288.82
Two-mile	37.357666	-83.229849	1359.30	667.95	2027.25

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

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

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV: PV array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 1 and FP: CPF RWY 06

No glare found

PV array 1 and FP: CPF RWY 14

No glare found

PV array 1 and FP: CPF RWY 24

No glare found

PV array 1 and FP: CPF RWY 32

No glare found

PV: PV array 10 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 10 and FP: CPF RWY 06

No glare found

PV array 10 and FP: CPF RWY 14

No glare found

PV array 10 and FP: CPF RWY 24

No glare found

PV array 10 and FP: CPF RWY 32

No glare found

PV: PV array 2 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 2 and FP: CPF RWY 06

No glare found

PV array 2 and FP: CPF RWY 14

No glare found

PV array 2 and FP: CPF RWY 24

No glare found

PV array 2 and FP: CPF RWY 32

No glare found

PV: PV array 3 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 3 and FP: CPF RWY 06

No glare found

PV array 3 and FP: CPF RWY 14

No glare found

PV array 3 and FP: CPF RWY 24

No glare found

PV array 3 and FP: CPF RWY 32

No glare found

PV: PV array 4 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 4 and FP: CPF RWY 06

No glare found

PV array 4 and FP: CPF RWY 14

No glare found

PV array 4 and FP: CPF RWY 24

No glare found

PV array 4 and FP: CPF RWY 32

No glare found

PV: PV array 5 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 5 and FP: CPF RWY 06

No glare found

PV array 5 and FP: CPF RWY 14

No glare found

PV array 5 and FP: CPF RWY 24

No glare found

PV array 5 and FP: CPF RWY 32

No glare found

PV: PV array 6 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 6 and FP: CPF RWY 06

No glare found

PV array 6 and FP: CPF RWY 14

No glare found

PV array 6 and FP: CPF RWY 24

No glare found

PV array 6 and FP: CPF RWY 32

No glare found

PV: PV array 7 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 7 and FP: CPF RWY 06

No glare found

PV array 7 and FP: CPF RWY 14

No glare found

PV array 7 and FP: CPF RWY 24

No glare found

PV array 7 and FP: CPF RWY 32

No glare found

PV: PV array 8 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 8 and FP: CPF RWY 06

No glare found

PV array 8 and FP: CPF RWY 14

No glare found

PV array 8 and FP: CPF RWY 24

No glare found

PV array 8 and FP: CPF RWY 32

No glare found

PV: PV array 9 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
CPF RWY 06	0	0.0	0	0.0
CPF RWY 14	0	0.0	0	0.0
CPF RWY 24	0	0.0	0	0.0
CPF RWY 32	0	0.0	0	0.0

PV array 9 and FP: CPF RWY 06

No glare found

PV array 9 and FP: CPF RWY 14

No glare found

PV array 9 and FP: CPF RWY 24

No glare found

PV array 9 and FP: CPF RWY 32

No glare found

Assumptions

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

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

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

SAR Attachment 7

Transportation Assessment Report for the Starfire Solar Project (Phase I)

Perry, Knott, and Breathitt Counties, Kentucky

January 2025

Prepared for:

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TETRA TECH

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ACRONYMS AND ABBREVIATIONS

	Definition
ADT	Average Daily Traffic
HCM	Highway Capacity Manual, 7th Edition
HCS2024	Highway Capacity Software version 2024
KYTC	Kentucky Transportation Cabinet
MW	Megawatts
O&M	Operations and Maintenance
Project Area	The 2,084± acres of privately-owned land where the proposed Project is located
Project	Starfire Solar Project (Phase I)
vpd	vehicles per day
vph	vehicles per hour

1.0 INTRODUCTION

STMO Bn, LLC proposes to construct and operate Phase I of the Starfire Solar Project (Project), a solar photovoltaic power generation facility which will consist of up to 210-megawatt (MW) ground-mounted solar photovoltaic system, a substation and related interconnection to the energy grid located in Breathitt, Knott and Perry Counties, Kentucky.

Tetra Tech, Inc has prepared the following transportation assessment for the Project. The Project site is comprised of approximately 1,980± acres of land at the site of the former Starfire coal mine. Access to the site is provided by several existing gravel access roads on Routes 476 and 1087. As part of the Project, it is anticipated that one of the site's existing gravel driveways as shown on Figure 1 will be used to provide temporary construction access and permanent Operations and Maintenance (O&M) access to the site. Regionally, it is anticipated that the construction workforce will primarily use Route 80 to access the site.

As part of this assessment, Tetra Tech developed vehicle trip generation estimates associated with the Project's anticipated peak construction workforce levels and reviewed them against existing traffic volumes and public transportation in the vicinity of the Project. An evaluation of roadway capacity was conducted for the primary roadways serving the site (Routes 80, 476 and 1087).

During the peak of construction, the Project is anticipated to generate approximately 566 vehicle trips on a typical weekday day with 242 vehicle trips occurring during the weekday morning peak hour and 242 vehicle trips occurring during the weekday evening peak hour. These estimates conservatively assume that all construction workers would arrive within the same hour in the morning and depart within the same hour in the evening.

Peak construction activities are currently anticipated to occur for a period of approximately seven to nine months. The construction workforce levels will be less during the remaining six to eight months of construction. The adjacent roadways are anticipated to have ample capacity to accommodate the temporary increase in daily and peak hour traffic during the peak construction activities and, by extension, the duration of construction of the Project. The Project will use vehicle cleaning stations, water trucks, and dust screens to control dust and ensure that sediment is not tracked from the Project site onto the road network. Additionally, routine post-construction O&M activities at the site are not anticipated to result in a noticeable increase in vehicle traffic and, therefore, are not anticipated to impact the public roadway system.

2.0 TRAFFIC DATA

2.1 EXISTING TRAFFIC VOLUMES

Tetra Tech reviewed available Kentucky Transportation Cabinet (KYTC) traffic volume data[1] to establish historical daily traffic volumes in the vicinity of the Project. The principal roadways serving the site are State-maintained and include Route 80, Route 476 and Route 1087. Route 80 is classified by KYTC as a rural other principal arterial roadway, Route 476 is classified as a rural major collector roadway and Route 1087 is classified as a rural minor collector roadway.

Based on the most recent publicly available data from the KYTC Traffic Reporting System, the estimated Annual Average Daily Traffic (AADT) volume on the roadways serving the site expressed in vehicles per day (vpd) are listed below. Traffic volume data that was used to support this assessment is provided in the Appendix A.

- Route 80 at CR 1390 interchange – 5,305 vpd (2020)
- Route 476 west of site driveway – 246 vpd (2022)
- Route 1087 east of site driveway – 319 vpd (2022)

2.2 VEHICLE TRIP GENERATION

The Project will consist of three phases: construction, O&M, and decommissioning. The highest volume of site-related trips will occur during the peak construction phase of the Project. Therefore, the trip generation for the peak construction workforce levels were estimated for this assessment, along with an assessment of post-construction conditions. The Project is not anticipated to use rail for delivery transport; therefore, the trip generation estimates include roadway vehicles only.

Vehicle trip generation estimates were developed based on anticipated construction operations for the Project. Construction of the proposed solar facility is expected to include site grading, equipment deliveries, panel installation and inspections. It is anticipated that, at peak operations, the site could experience construction workforce levels of up to 250 construction workers at one time. Peak construction activities are currently anticipated to occur for a period of approximately eight to ten months. Construction hours of operation are assumed to generally be between 7:00 AM and 7:00 PM Monday through Friday.

The peak hours of the existing adjacent street traffic are expected to occur during the typical weekday commuting peak periods (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM). It is expected that the majority of construction workers would arrive and depart the site outside of the typical weekday morning and weekday evening commuter peak hours of the adjacent street. However, to present a conservative assessment of potential traffic increases associated with the Project, it is assumed that all construction workers would arrive during the weekday morning peak hour and depart during the weekday evening peak hour. The supporting trip generation calculations and assumptions for the proposed Project's peak construction workforce levels are provided in Appendix B.

While on demand public transportation service is currently provided in Breathitt County by the Middle Kentucky Transportation and in Knott and Perry Counties by LKLP Community Action Council, fixed route services are not

[1] Kentucky Transportation Cabinet Traffic Count Database, https://maps.kytc.ky.gov/trafficcounts/ (September 2024)

provided. Therefore, use of public transportation services by the Project's construction workforce is not anticipated. Public transportation information is provided in Appendix C. It is anticipated, however, that some construction workers would arrive and depart the site together (carpooling). For purposes of this assessment, it was assumed that 10 percent of the construction workers will carpool to travel to/from the site with two workers per vehicle. Table 1 presents a summary of the trip generation estimates for the proposed Project's peak construction workforce activities.

Table 1. Trip Generation Summary – Peak Construction Period

Time Period/ Direction	Project Trips			
	Workforce Trips[1]	Non-Heavy Vehicle Deliveries[2]	Heavy Vehicles[3]	Total
Weekday AM Peak Hour				
Enter	238	1	1	240
Exit	0	1	1	2
Total	**238**	**2**	**2**	**242**
Weekday PM Peak Hour				
Enter	0	1	1	2
Exit	238	1	1	240
Total	**238**	**2**	**2**	**242**
Weekday Daily				
Enter	263	10	10	283
Exit	263	10	10	283
Total	**526**	**20**	**20**	**566**

1/ Assumed 250 construction workers per day. Conservatively assumed construction workforce commuter trips overlap with adjacent street peaks.
2/ Assumed 10 deliveries per day distributed evenly throughout day.
3/ Assumed 10 deliveries per day distributed evenly throughout day.

As shown in Table 1, the peak construction activity for the proposed solar facility is expected to generate 566 new vehicle trips (283 entering and 283 exiting) on a typical weekday, with approximately 242 new vehicle trips (240 entering and 2 exiting) during the weekday morning peak hour and 242 new vehicle trips (2 entering and 240 exiting) during the weekday evening peak hour. The adjacent roadways are anticipated to have ample capacity to accommodate the temporary increase in daily and peak hour traffic. Additionally, there are multiple routes connecting the site to the regional roadway system thereby reducing potential traffic increases on any single roadway segment or intersection.

Post-Construction Conditions. Routine post-construction O&M activities at the site are not anticipated to result in a noticeable increase in vehicle traffic on the surrounding area roadways. The number of maintenance workers traveling to the site is anticipated to be low and impacts to local traffic is not expected. The proposed solar facility will be unmanned during normal operations and would only be inspected periodically. Therefore, the site is not expected to result in a noticeable increase to existing traffic under typical conditions. Impacts resulting from decommissioning of the Project are expected to be similar to or less than those experienced during construction.

3.0 ROADWAY CAPACITY

Tetra Tech conducted a capacity analysis of the primary roadways serving the site (Routes 80, 476 and 1087). The analysis was conducted using Highway Capacity Software (HCS2024) for two lane highways which is based on the Highway Capacity Manual (HCM) 7th Edition methodology. The peak hour analyses provide a level of service (LOS) designation based on the calculated follower density (followers/mile/lane) for the roadway segment analyzed. LOS results are given in letter grade designations from LOS A through LOS F. An LOS of D or better is typically considered acceptable. LOS E and LOS F indicate that a roadway segment may experience significant delays and congestion.

Based on KYTC traffic volume data, the critical roadways serving the area of the Project experience weekday peak hour flows ranging from 16 to 289 vehicles per hour (vph) in the dominant travel directions. Traffic volumes in the vicinity of site have generally experienced negligible growth over the most recent 10 years of data available. Therefore, it was assumed that Routes 80, 476 and 1087 would experience negligible growth from existing conditions through the Project's construction period. The Applicant will coordinate with KYTC on any overlapping roadway improvements planned for the area of the Project.

While the Project area can be accessed by multiple roadways, each study roadway was assumed to experience all peak hour traffic volumes to present a conservative analysis. Only the peak construction period was analyzed as it is the Project phase that is anticipated to have the highest trip generation activity. However, the peak construction phase is only anticipated to occur over a seven-to-nine-month period, with the remaining construction activity anticipated to experience fewer vehicle trips.

Two analysis conditions were evaluated during the critical weekday morning and weekday evening peak commuter hours: the 2024 Existing (Without Project) and the 2024 Build (With Peak Project Construction) conditions. The HCS two-lane highway analysis results show that the three critical roadways are expected to operate with minimal delay at LOS B or better operations during the critical weekday peak hours with Project peak construction traffic. This indicates that Routes 80, 476 and 1087 in the site vicinity have ample capacity to support the peak construction activity associated with the proposed Project (typically, LOS D or better operations are considered acceptable). Additionally, given that the construction vehicles will likely be dispersed among numerous travel routes (rather than being concentrated on a single travel route), it is expected that actual roadway operations will be better than those reported in this assessment. The HCS analysis worksheets are provided in Appendix D.

Throughout Project construction, the applicant and its general contractor will coordinate with representatives from the counties and KYTC to respond to traffic concerns that arise during construction and to determine the appropriate traffic management measures such as signage and potential time-of-day restrictions.

Minor improvements to local county roads may be needed prior to construction to prepare the road surface for a greater number of heavy truck trips. The applicant or its general contractor will coordinate with Breathitt, Knott, and Perry Counties to prepare road surfaces as needed and to contribute to road repairs at the completion of construction if any road surface damage is attributable to construction traffic. The applicant or its general contractor will plan delivery routes to avoid bridges or road surfaces insufficient to sustain truck loads.

4.0 FUGITIVE DUST

Activities that disturb land during the construction of the Project may temporarily add airborne materials. To reduce the contribution of airborne materials, application of water and covering of spoils may occur. The use of water for dust control as required for the Project is authorized under the Kentucky Pollutant Discharge Elimination System as a non-stormwater discharge activity. The Project will use vehicle cleaning stations, water trucks, and dust screens to control dust and ensure that sediment is not tracked from the Project site onto the road network.

5.0 CONCLUSIONS

The peak construction workforce levels for the proposed 210 MWac solar photovoltaic power generation facility are expected to generate approximately 242 trips during the weekday morning peak hour and 242 trips during the weekday evening peak hour during peak construction. Peak construction activities are currently anticipated to occur for a period of approximately seven to nine months. The remainder of the construction period is anticipated to generate fewer vehicle trips. These trip generation estimates are conservative as the majority of peak hour trips are likely to occur outside of the typical weekday commuter peak hours of the adjacent street traffic. Capacity analyses of the critical roadways serving the site (Routes 80, 476 and 1087) indicate ample capacity to support the Project’s temporary peak construction operations. The Project will use vehicle cleaning stations, water trucks, and dust screens to control dust and ensure that sediment is not tracked from the Project site onto the road network. Furthermore, the Project will generate even less traffic post construction with only occasional routine inspection and maintenance of the solar panels and supporting equipment.

6.0 REFERENCES

KYTC. 2024. Kentucky Transportation Cabinet Traffic Count Database. Available at: https://maps.kytc.ky.gov/trafficcounts/

FIGURES

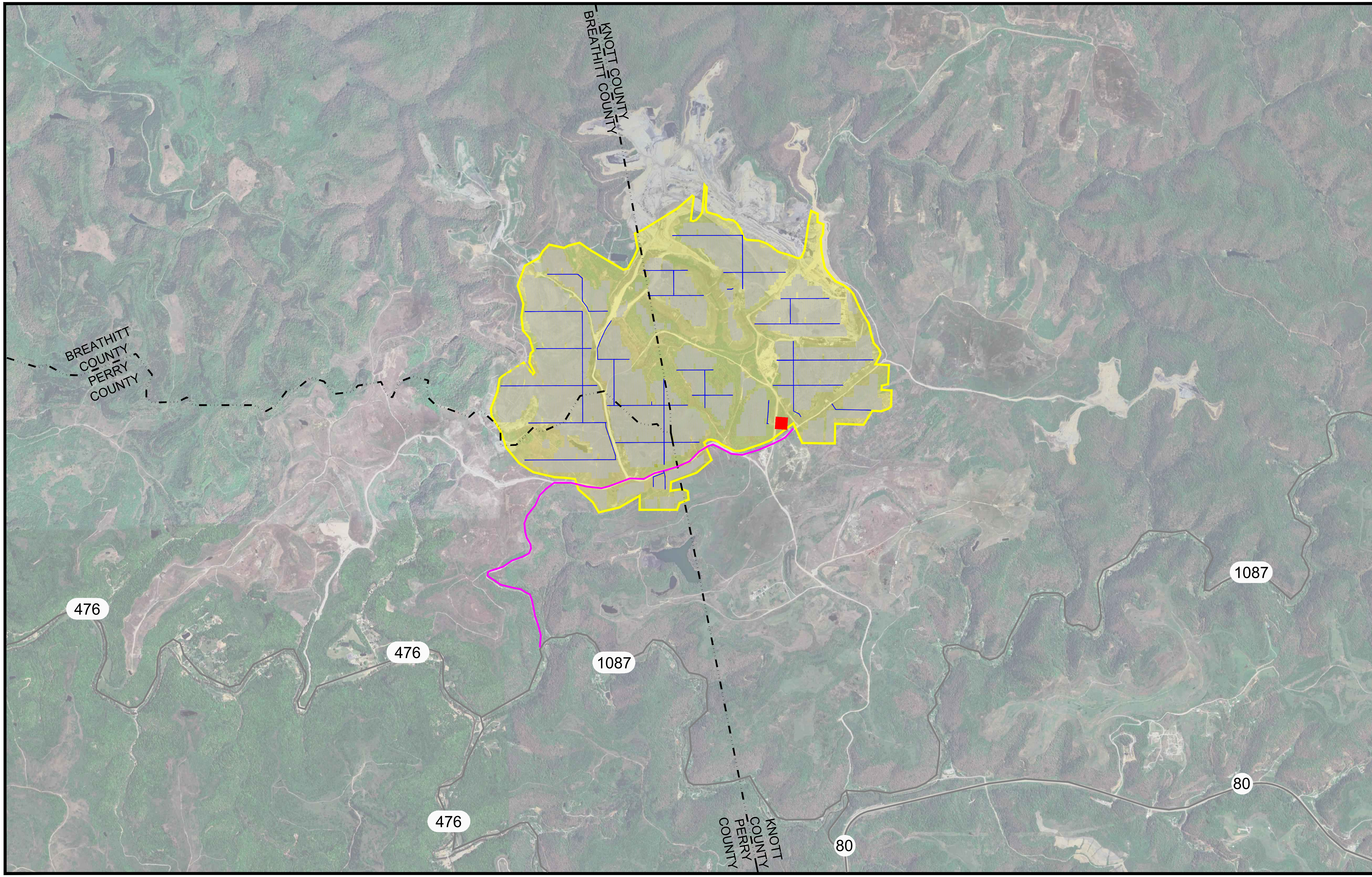
APPENDIX A. KYTC TRAFFIC VOLUME DATA

APPENDIX B. TRIP GENERATION CALCULATIONS

APPENDIX C. PUBLIC TRANSPORTATION INFORMATION

APPENDIX D. HCS WORKSHEETS

FIGURES



ROADWAYS
PROJECT BOUNDARY
INTERNAL DRIVEWAYS
SOLAR PANELS
SUBSTATION
MAIN ACCESS ROAD

TETRA TECH

Starfire Solar Phase I
Breathitt/Knott/Perry Counties, KY

SITE LOCUS

FIGURE
1

APPENDIX A. KYTC TRAFFIC VOLUME DATA

Historical Traffic Volume Summary

Station Details:

Sta ID:	060775
Sta Type:	In Adjacent County
Map:	MapIt
District:	10
County:	Perry
Route:	097-KY-0080 -000
Route Desc:	KY-80 E

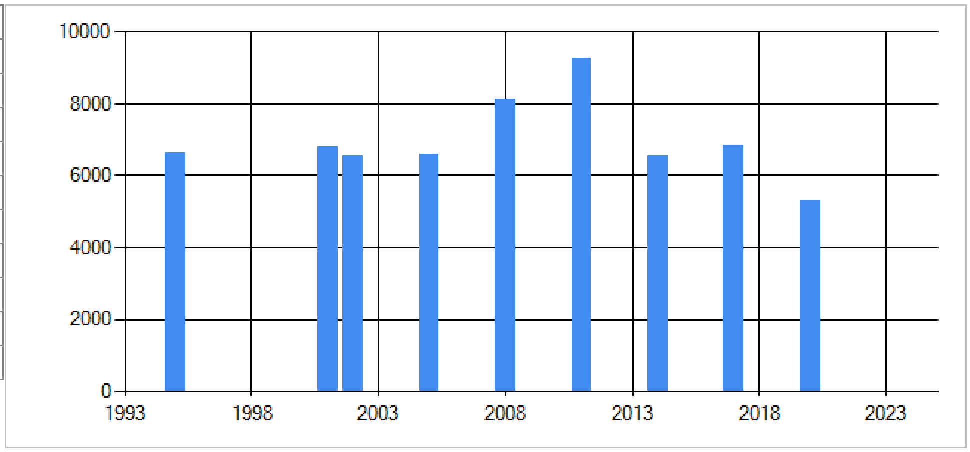
Begin MP:	14.6120
Begin Desc:	PERRY COUNTY LINE
End Mp:	15.8240
End Desc:	KNOTT COUNTY LINE
Impact Year:	
Year Added:	

Newest Count:

AADT:	5305
Year:	2020
% Single:	4.1960
% Combo:	4.8010
K Factor:	9.40
D Factor:	58

Definitions:
Sta. ID - Three digit county number + station number
MP - milepoint
Impact Year – year of significant change to traffic pattern within station segment
AADT – Annual Average Daily Traffic – the annualized average 24-hour volume of vehicles on a segment of roadway
% Single – single unit truck volume as a percentage of the AADT
% Combo – combination truck volume as a percentage of the AADT
K Factor – peak hour volume as a percentage of the AADT
D Factor – percentage of peak hour volume flowing in the peak direction

Year	AADT	Year	AADT	Year	AADT
2024		2014	6536	2004	
2023		2013		2003	
2022		2012		2002	6570
2021		2011	9260	2001	6800
2020	5305	2010		2000	
2019		2009		1999	
2018		2008	8120	1998	
2017	6856	2007		1997	
2016		2006		1996	
2015		2005	6610	1995	6640



Historical Traffic Volume Summary
Station Details:

Sta ID:	097002
Sta Type:	Classification
Map:	MapIt
District:	10
County:	Perry
Route:	097-KY-0476 -000
Route Desc:	KY-476

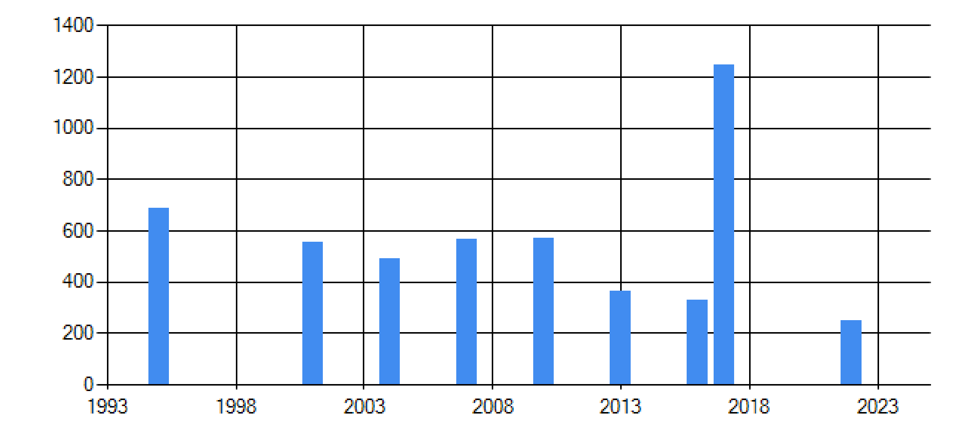
Begin MP:	13.39
Begin Desc:	WILLIAMS BRANCH DRIVE
End Mp:	18.4050
End Desc:	KY 267
Impact Year:	
Year Added:	

Newest Count:

AADT:	246
Year:	2022
% Single:	3.6520
% Combo:	1.1340
K Factor:	10.60
D Factor:	62

Definitions:
Sta. ID - Three digit county number + station number
MP - milepoint
Impact Year – year of significant change to traffic pattern within station segment
AADT – Annual Average Daily Traffic – the annualized average 24-hour volume of vehicles on a segment of roadway
% Single – single unit truck volume as a percentage of the AADT
% Combo – combination truck volume as a percentage of the AADT
K Factor – peak hour volume as a percentage of the AADT
D Factor – percentage of peak hour volume flowing in the peak direction

Year	AADT	Year	AADT	Year	AADT
2024		2014		2004	491
2023		2013	364	2003	
2022	246	2012		2002	
2021		2011		2001	556
2020		2010	569	2000	
2019		2009		1999	
2018		2008		1998	
2017	1247	2007	565	1997	
2016	328	2006		1996	
2015		2005		1995	686



Historical Traffic Volume Summary

Station Details:

Sta ID:	060757
Sta Type:	Full Coverage
Map:	MapIt
District:	12
County:	Knott
Route:	060-KY-1087 -000
Route Desc:	VEST TALCUM RD

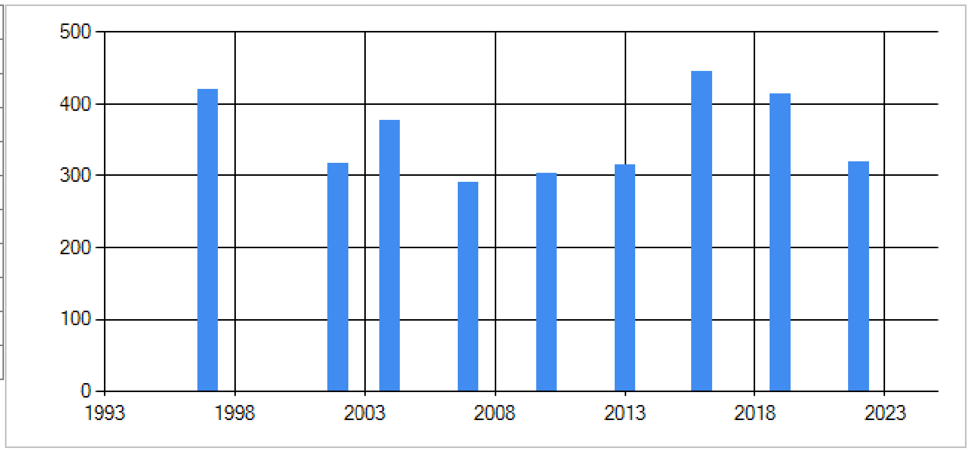
Begin MP:	0
Begin Desc:	PERRY COUNTY LINE
End Mp:	1.3960
End Desc:	KY 3209
Impact Year:	
Year Added:	

Newest Count:

AADT:	319
Year:	2022
% Single:	
% Combo:	
K Factor:	15.70
D Factor:	58

Definitions:
Sta. ID - Three digit county number + station number
MP - milepoint
Impact Year – year of significant change to traffic pattern within station segment
AADT – Annual Average Daily Traffic – the annualized average 24-hour volume of vehicles on a segment of roadway
% Single – single unit truck volume as a percentage of the AADT
% Combo – combination truck volume as a percentage of the AADT
K Factor – peak hour volume as a percentage of the AADT
D Factor – percentage of peak hour volume flowing in the peak direction

Year	AADT	Year	AADT	Year	AADT
2024		2014		2004	378
2023		2013	316	2003	
2022	319	2012		2002	317
2021		2011		2001	
2020		2010	304	2000	
2019	415	2009		1999	
2018		2008		1998	
2017		2007	291	1997	421
2016	445	2006		1996	
2015		2005		1995	



APPENDIX B. TRIP GENERATION CALCULATIONS

Peak Construction Workforce Trip Generation Calculations and Assumptions

Proposed Starfire Solar (Phase I) Facility - Breathitt/Knott/Perry Counties, KY

Construction Site Driveway Trips	Workforce Trips	Mid-Size Vehicle Deliveries	Semi Tractor Trailer Deliveries	Total	CALCULATIONS
AM Peak Hour:					
Enter	238	1	1	240	(250 workers x 100% arrive x (100% - 10% carpool x 1 vehicle/2 carpool workers)) + (2 Delivery Vehicles arrive) = 240
Exit	0	1	1	2	(250 workers x 0% depart) + (2 Delivery Vehicles depart) = 2
Total	238	2	2	242	
PM Peak Hour:					
Enter	0	1	1	2	(250 workers x 0% arrive) + (2 Delivery Vehicles arrive) = 2
Exit	238	1	1	240	(250 workers x 100% depart x (100% - 10% carpool x 1 vehicle/2 carpool workers)) + (2 Delivery Vehicles depart) = 240
Total	238	2	2	242	
Weekday Daily:					
Enter	263	10	10	283	(250 workers x 100% arrive in AM x (100% - 10% carpool x 1 vehicle/2 carpool workers)) + (250 workers x 10% return from lunch/errands midday) + (20 Delivery Vehicles arrive) = 283
Exit	263	10	10	283	(250 workers x 100% depart in PM x (100% - 10% carpool x 1 vehicle/2 carpool workers)) + (250 workers x 10% leave for lunch/errands midday) + (20 Delivery Vehicles depart) = 283
Total	526	20	20	566	

Construction Assumption	AM Peak Hour	PM Peak Hour	Off-Peak Hours	Notes
# of Peak Workers On-Site at One Time:	250	250	250	Assume 250 workers
% Workers Arriving:	100%	0%	10%	Assumed hours of operation generally between 6am-7pm. Peak Hours of adjacent street traffic assumed to occur between is 7am-9am and 4pm-6pm. Therefore, the majority of construction worker traffic is likely to occur outside of the peak commuting hours of the adjacent street. However, as a conservative measure, assumed 100 percent of workers arrive and depart during the peak hours of the adjacent street traffic. As a conservative measure, assumed half of workforce depart and return once during off-peak times. Assumed none of the workers get picked up/dropped off.
% Workers Departing:	0%	100%	10%	Assumed hours of operation generally between 6am-7pm. Peak Hours of adjacent street traffic assumed to occur between is 7am-9am and 4pm-6pm. Therefore, the majority of construction worker traffic is likely to occur outside of the peak commuting hours of the adjacent street. However, as a conservative measure, assumed 100 percent of workers arrive and depart during the peak hours of the adjacent street traffic. As a conservative measure, assumed half of workforce depart and return once during off-peak times. Assumed none of the workers get picked up/dropped off.
% Carpool[1]:	10.0%	10.0%	0.0%	Assumed 10% carpooling during commuting
Carpool VOR[2]:	2.00	2.00	1.00	Assumed two workers per car during commuting
# Shuttle Trips:	0	0	0	Assumed all workers and deliveries will occur via the construction driveway; no laydown site is proposed
# Semi Truck Deliveries:	1	1	8	Assumed worker hours of operation between 6am and 7pm and assumed 10 deliveries per day and distributed evenly throughout the day.
# Mid-Size Truck Deliveries:	1	1	8	Assumed worker hours of operation between 6am and 7pm and assumed 10 deliveries per day and distributed evenly throughout the day.

[1]Enter % per population - formulas above account for VOR

[2]VOR for carpoolers only

NOTE: Assumed a 183 MW AC facility with 15 months of construction and 3 to 4 months of ramp-up/ramp-down construction activity. Peak construction activity assumed to occur over an 7 to 9 month period.

Source: Tetra Tech

APPENDIX C. PUBLIC TRANSPORTATION INFORMATION

Public Transportation

Ride With Us

Residents with transportation needs originating in Leslie, Knott, Letcher or Perry County may schedule a trip through our dispatch center. Public Transportation is based on available seating and requires extra time to prepare driver schedules. Therefore, reservations can be made up to 72 hours in advance, but no later than 3 p.m. the day prior to the trip. Public Transportation services are available to anyone that does not have a Medicaid card, or those that have a Medicaid card, but do not meet eligibility requirements for our Non-Emergency Medical Transportation service.

To Schedule Public Transportation:
Call Toll Free 1-866-813-0072
Monday-Friday between 8 am – 4:30 pm

How to Schedule a Trip

When calling our toll-free number 1-866-813-0072, please be prepared to provide our reservationist with the following information:

- Name as it appears on your Social Security card (no nicknames), or if you are a Medicaid recipient, the name that is on your medical card
- Date of travel
- Address of your pick-up and destination locations. Be specific, including suite and/or building numbers, doctor's name, etc.
- Desired arrival time
- Return time to your place of origin or arrival time to your next appointment/or destination
- If needed, reserve a seat for a Personal Care Attendant (PCA), child or guest accompanying you
- If needed, specific details of specialized transportation needed, such as a lift van, etc.

Companions, such as a friend or family member with the same ride origin and destination, are allowed to ride with you. However, a reservation must be made for your companion to ensure space is available. Without advance notice, the companion may not be allowed to go due to the lack of available space. Your companion must have the same origin and destination and cannot have a separate appointment.

LKLP is committed to serving persons with disabilities. We back that commitment by providing services that make public transportation both easy and pleasant for those that may need reasonable modifications. Please find our Accessibility Notice and Reasonable Request Form at the links below.

Accessibility Notice
Reasonable Accommodation Request Form

Transportation

Public Transportation

Public Transportation is available to the general public. A public transportation trip can be for shopping, medical appointments, job interviews, social visits, etc. We have wheelchair service, door to door and curb to curb service. Public trips must be scheduled 24 hours in advance. In some instances, the trip can be provided that day. We provide public transportation service in Breathitt County.

Public Transportation Fare

· $1.00 per mile

Program Hours

· 8:00 a.m. to 4:30 p.m. this service is provided Monday through Friday.

To schedule a Public Transportation trip call

· (606) 666-7204

Intercity Bus Service:

The Intercity Bus Service provides transportation to the general public in Breathitt County. This service meets the intercity travel needs of residents and makes a connection between non-urbanized and larger regional public transportation operations. Middle Kentucky provides access to greyhound bus terminals as requested.

Intercity Public Transportation
· $1.00 per mile

Program Hours:
· 8:00 a.m. to 4:30 p.m. this service is provided Monday through Friday.
To schedule a Public Transportation trip call:
· (606) 666-7204

Scheduled Trip

Jackson, KY to Greyhound Terminals in Lexington, KY – The average trip is 85 miles, fare $1.00 per mile X 85 miles = $85.00. This service is available Monday, Wednesday and Friday. Must be at Hardees restaurant in Jackson, KY between 5:45 a.m. – 6:00 a.m. for pickup. Please, call in advance.

Human Service Transportation Delivery (HSTD)

Middle Kentucky provides non-emergency medical transportation to Medicaid, Department for the Blind and Vocational Rehabilitation clients in Breathitt County.

You must call Middle Kentucky's broker LKLP at 1-800-245-2826 for approval and to schedule a ride.

APPENDIX D. HCS WORKSHEETS

HCS Multilane Highway Report

Project Information			
Analyst	James Vorosmarti	Date	7/11/2024
Agency	Tetra Tech	Analysis Year	2024
Jurisdiction	KYTC	Time Analyzed	
Project Description	Route 80 - Existing Conditions	Units	U.S. Customary
Direction 1 Geometric Data			
Direction 1			
Number of Lanes (N), ln	2	Terrain Type	Specific Grade
Measured or Base Free-Flow Speed	Base	Percent Grade, %	5.00
Base Free-Flow Speed (BFFS), mi/h	60.0	Grade Length, mi	0.50
Lane Width, ft	12	Access Point Density, pts/mi	2.0
Median Type	Divided	Left-Side Lateral Clearance (LC_R), ft	6
Free-Flow Speed (FFS), mi/h	59.5	Total Lateral Clearance (TLC), ft	12
Direction 1 Adjustment Factors			
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		
Direction 1 Demand and Capacity			
Volume (V) veh/h	289	Heavy Vehicle Adjustment Factor (f_{HV})	0.822
Peak Hour Factor	0.92	Flow Rate (V_p), pc/h/ln	191
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2190
Single-Unit Trucks (SUT), %	30	Adjusted Capacity (c_{adj}), pc/h/ln	2190
Tractor-Trailers (TT), %	70	Volume-to-Capacity Ratio (v/c)	0.09
Direction 1 Speed and Density			
Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	59.5
Total Lateral Clearance Adj. (f_{LLC})	0.0	Density (D), pc/mi/ln	3.2
Median Type Adjustment (f_M)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.5		

HCS Multilane Highway Report

Project Information			
Analyst	James Vorosmarti	Date	7/11/2024
Agency	Tetra Tech	Analysis Year	2024
Jurisdiction	KYTC	Time Analyzed	
Project Description	Route 80 - Build Conditions	Units	U.S. Customary
Direction 1 Geometric Data			
Direction 1			
Number of Lanes (N), ln	2	Terrain Type	Specific Grade
Measured or Base Free-Flow Speed	Base	Percent Grade, %	5.00
Base Free-Flow Speed (BFFS), mi/h	60.0	Grade Length, mi	0.50
Lane Width, ft	12	Access Point Density, pts/mi	2.0
Median Type	Divided	Left-Side Lateral Clearance (LC_R), ft	6
Free-Flow Speed (FFS), mi/h	59.5	Total Lateral Clearance (TLC), ft	12
Direction 1 Adjustment Factors			
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		
Direction 1 Demand and Capacity			
Volume (V) veh/h	529	Heavy Vehicle Adjustment Factor (f_{HV})	0.822
Peak Hour Factor	0.92	Flow Rate (V_p), pc/h/ln	350
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2190
Single-Unit Trucks (SUT), %	30	Adjusted Capacity (c_{adj}), pc/h/ln	2190
Tractor-Trailers (TT), %	70	Volume-to-Capacity Ratio (v/c)	0.16
Direction 1 Speed and Density			
Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	59.5
Total Lateral Clearance Adj. (f_{LLC})	0.0	Density (D), pc/mi/ln	5.9
Median Type Adjustment (f_M)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.5		

HCS Two-Lane Highway Report

Project Information

Analyst	James Vorosmarti	Date	7/11/2024
Agency	Tetra Tech	Analysis Year	2024
Jurisdiction	KYTC	Time Analyzed	
Project Description	Route 476 - Existing Conditions	Units	U.S. Customary

Segment 1

Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	1
Speed Limit, mi/h	55	Access Point Density, pts/mi	2.0

Demand and Capacity

Directional Demand Flow Rate, veh/h	17	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.92	Total Trucks, %	5.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.01

Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	57.3
Speed Slope Coefficient (m)	3.66765	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.31865	PF Power Coefficient (p)	0.75412
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	0.0
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	57.3

Vehicle Results

Average Speed, mi/h	57.3	Percent Followers, %	6.0
Segment Travel Time, minutes	1.05	Adj. Follower Density, followers/mi/ln	0.0
Vehicle LOS	A		

Facility Results

T	VMT veh-mi/AP	VHD veh-h/p	Follower Density, followers/mi/ln	LOS
1	4	0.00	0.0	A

HCS Two-Lane Highway Report

Project Information

Analyst	James Vorosmarti	Date	7/11/2024
Agency	Tetra Tech	Analysis Year	2024
Jurisdiction	KYTC	Time Analyzed	
Project Description	Route 476 - Build Conditions	Units	U.S. Customary

Segment 1

Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	1
Speed Limit, mi/h	55	Access Point Density, pts/mi	2.0

Demand and Capacity

Directional Demand Flow Rate, veh/h	278	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.92	Total Trucks, %	5.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.16

Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	57.3
Speed Slope Coefficient (m)	3.66765	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.31865	PF Power Coefficient (p)	0.75412
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	2.0
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	55.5

Vehicle Results

Average Speed, mi/h	55.5	Percent Followers, %	39.5
Segment Travel Time, minutes	1.08	Adj. Follower Density, followers/mi/ln	2.0
Vehicle LOS	A		

Facility Results

T	VMT veh-mi/AP	VHD veh-h/p	Follower Density, followers/mi/ln	LOS
1	64	0.04	2.0	A

HCS Two-Lane Highway Report

Project Information

Analyst	James Vorosmarti	Date	7/11/2024
Agency	Tetra Tech	Analysis Year	2024
Jurisdiction	KYTC	Time Analyzed	
Project Description	Route 1087 - Existing Conditions	Units	U.S. Customary

Segment 1

Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	0
Speed Limit, mi/h	55	Access Point Density, pts/mi	10.0

Demand and Capacity

Directional Demand Flow Rate, veh/h	32	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.92	Total Trucks, %	0.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.02

Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	54.8
Speed Slope Coefficient (m)	3.53033	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.33796	PF Power Coefficient (p)	0.74648
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	0.1
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	54.8

Vehicle Results

Average Speed, mi/h	54.8	Percent Followers, %	9.6
Segment Travel Time, minutes	1.09	Adj. Follower Density, followers/mi/ln	0.1
Vehicle LOS	A		

Facility Results

T	VMT veh-mi/AP	VHD veh-h/p	Follower Density, followers/mi/ln	LOS
1	7	0.00	0.1	A

HCS Two-Lane Highway Report

Project Information

Analyst	James Vorosmarti	Date	7/11/2024
Agency	Tetra Tech	Analysis Year	2024
Jurisdiction	KYTC	Time Analyzed	
Project Description	Route 1087 - Build Conditions	Units	U.S. Customary

Segment 1

Vehicle Inputs

Segment Type	Passing Constrained	Length, ft	5280
Lane Width, ft	10	Shoulder Width, ft	0
Speed Limit, mi/h	55	Access Point Density, pts/mi	10.0

Demand and Capacity

Directional Demand Flow Rate, veh/h	292	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.92	Total Trucks, %	0.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.17

Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, mi/h	54.8
Speed Slope Coefficient (m)	3.53033	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.33796	PF Power Coefficient (p)	0.74648
In Passing Lane Effective Length?	No	Follower Density, followers/mi/ln	2.3
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, ft	Radius, ft	Superelevation, %	Average Speed, mi/h
1	Tangent	5280	-	-	53.0

Vehicle Results

Average Speed, mi/h	53.0	Percent Followers, %	41.4
Segment Travel Time, minutes	1.13	Adj. Follower Density, followers/mi/ln	2.3
Vehicle LOS	B		

Facility Results

T	VMT veh-mi/AP	VHD veh-h/p	Follower Density, followers/mi/ln	LOS
1	67	0.04	2.3	B