COMMONWEALTH OF KENTUCKY

BEFORE THE KENTUCKY STATE BOARD ON ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

Electronic Application of Caldwell Solar, LLC for Certificate of Construction for an up to 200 Megawatt Merchant Electric Solar Generating Facility in Caldwell County, Kentucky	))))	Case No. 2020-00244

Response to Siting Board Staff's Second Request for Information

Applicant**,** Caldwell Solar, LLC herewith submits its Response to the Siting Board Staff's Second Request for Information. A signed certification of this Response on behalf of Caldwell Solar, LLC appears on the following page.

Respectfully submitted,

/s/ Kathryn A. Eckert

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Certification of Response to Information Requests

This is to certify that I have supervised the preparation of the response to the Siting Board Staff's Second Request for Information to Caldwell Solar, LLC on behalf of the corporate respondent and that the responses are true and accurate to the best of my knowledge, information and belief after reasonable inquiry.

DATE: 1/7/2022

Courtney Pelissero

Courtney Pelissero, Permitting Specialist

Request

1. Refer to Caldwell Solar's response to Siting Board Staff's First Request for Information (Staff's First Request), Item 23. Provide a copy of the geologist consultant's report.

Response

Caldwell Solar had two karst surveys and reports completed, one for the original project boundary (Phase I) and one for the expanded project boundary (Phase II). These are contained in Figure 2 ESB 01 Caldwell Karst Report Phase I and Figure 2 ESB 01 Caldwell Karst Report Phase II, which have been provided entirely under seal with a concurrently-filed Petition for Confidential Treatment.

Request

2. Refer to Amended Exhibit J, which does not include karst features in the legend. Describe the different types of karst features that have been located and the location on the site plan

Response

Figure 2 ESB 01 Caldwell Karst Report Phase I and Figure 2 ESB 01 Caldwell Karst Report Phase II[1] contains detailed descriptions and locations of karst features. The Caldwell Solar Site Plan Karst Feature Overlay[2] contains the site plan from Amended Exhibit J and shows karst feature locations.

[1] These Reports have been filed entirely under seal with a concurrently-filed Petition for Confidential Treatment.
[2] The Caldwell Solar Site Plan Karst Feature Overlay has been provided entirely under seal with a concurrently-filed Petition for Confidential Treatment.

Request

3. Refer to Amended Exhibit J, which has a designation for floodplain in the legend. Describe the setback for the floodplain.

Response

In the preliminary design, generation equipment is setback at least 25 feet from the floodplains.

Request

4. Refer to Caldwell Solar's response to Staff's First Request, Item 6. Confirm that Figure A refers to the document Caldwell_Amended_Ex_I_Fig_2.pdf.

Response

Yes, that is correct.

Request

5. Refer to Caldwell Solar's response to Staff's First Request, Item 28(a). Confirm that construction is expected to occur over a 16-month period.

Response

Caldwell Solar assumed a 16-month construction period in ESB 01 28(a), but construction may last up to 18 months.

Request

6. Refer to Caldwell Solar's response to Staff's First Request, Items 28(b) and (c).
   a. Describe the flow of construction activities across the Project site.
   b. Explain whether separate construction activities, such as pile driving, will flow like a wave across the site.
   c. If construction activities flow like a wave, explain whether construction would start on the south end of the Project site and move northward. For example, that site preparation/grading would begin on the south end and move north.

Response

a. Construction will typically start with buildout of the laydown yards for equipment and material storage. Grading activities will take place to prepare the land for installation of underground cable, construction of access roads, piles, and foundations. Installation of inverters, racking and solar panels will follow pile driving activities. Substation and Operations and Maintenance Building construction can occur any time after grading and foundation work is completed for those locations.

b. Pile driving activities and any activities that require pile driving as a precursor will flow like a wave, sequentially, across individual blocks. This may not be true across the entire site but will be true at individual blocks.

c. Caldwell Solar has not yet determined the starting point of construction activities.

Request

7. Refer to Caldwell Solar's response to Staff's First Request, Items 28(f) and (h). Confirm that, over the entire construction period, the average number of workers on-site is expected to be approximately 120 people, ranging from a minimum of 60 to a maximum of 225.

Response

Yes, that is correct.

Request

8. Refer to Caldwell Solar's response to Staff's First Request, Items 29(a). State whether the O&M Building will be located near the substation/switchyard or if not, state where the O&M Building will be located.

Response

Caldwell Solar has not yet finalized the location of the O&M building. O&M buildings are often located near the substation/switchyard, but due to the secluded nature of the proposed substation/switchyard location, Caldwell Solar may elect to locate the O&M building in a more accessible location. The O&M building location will be selected at final design.

Request

9. Refer to Caldwell Solar's response to Staff's First Request, Item 31.
   a. Confirm that Structures ID 02C and ID 02D are associated with the Lafarge Quarry.
   b. Describe the type of business associated with Structure ID 12A.
   c. Describe the type of business associated with Structure ID 69A.
   d. Confirm that the term "Outbuilding" refers to barns, warehouses and other ancillary structures.

Response

a. To the best of Caldwell Solar's knowledge, Structure ID 02C and ID 02D are associated with the Lafarge Quarry.

b. To the best of Caldwell Solar's knowledge, Structure ID 12A is associated with a welding business.

c. Caldwell Solar is not aware of the exact type of business associated with Structure ID 69A. The structure appears to be within or near the Lafarge Quarry, so it may be associated with that business.

d. Yes, that is correct. Outbuilding refers to barns, warehouses and other ancillary structures.

Request

10. Refer to Caldwell Solar's response to Staff's First Request, Item 50(b). Confirm that large truck deliveries will use local county roads in addition to US 641 and KY 91.

Response

Yes, that is correct. US 641 and KY 91 do not provide direct access to the Project site;

therefore, local roads will need to be used for large truck deliveries.

Request

11. Refer to Caldwell Solar's response to Staff's First Request, Items 50(d), (e), and (h).
    a. Explain whether construction vehicles will all be concentrated in a single part of the project or spread out across the full project area at a given time during the construction period.
    b. If construction traffic will be spread out across the site during any given construction period, please describe how construction vehicles would be distributed across individual local roads on an average day. For example, if a total of 82 vehicles were to access different areas of the Project site on an average day, explain how many vehicles are assumed to use each local County road
    c. If construction traffic will be spread out across the site during any given construction period, please describe how construction vehicles would be distributed across individual local roads on a peak day. For example, if a total of 267 vehicles were to access different areas of the Project site on a peak day, explain how many vehicles are assumed to use each local County road.
    d. Describe the traffic management strategies to be implemented on Old Quarry Road specifically to reduce construction phase impacts to local residents and businesses along that road. For example, avoiding construction activity in that area during the plant sale season to protect that local business.
    e. Explain how Caldwell Solar will coordinate its traffic with that of the Lafarge Quarry on Fredonia Quarry Road.

Response

a. Construction vehicles will be spread out across the full project.

b. Construction passenger vehicles (such as pickup trucks) will be spread out through the site on any given day, and as a result, it will vary how many will be on a certain road during a typical day. A Contractor has not been selected yet for this project, and the Contractor's advice and direction based on his or her experience in similar projects will be required to determine how best to instruct construction passenger vehicles and deliveries to arrive at the site and leave the site. Typically, delivery vehicles will be

localized to individual blocks or to the laydown yards. Caldwell Solar will work with the Contractor to minimize road impacts and determine efficient routing.

c. Caldwell Solar has not yet determined the exact distribution of such vehicles, and therefore cannot determine use of each county road at this time. See response to 2 ESB 11 (b).

d. Caldwell Solar will give local residents and businesses right of way on Old Quarry Road when possible. In the event a road closure is required to support a large delivery, a minimum of 24 hour notice will be supplied to the local road authority and impacted businesses and residents.

e. Caldwell Solar will give vehicle traffic exiting the Lafarge Quarry right of way or work directly with the Quarry to coordinate traffic as needed. Lafarge Quarry is not anticipated to be heavily impacted due to only a small portion of the project requiring access on one shared road. Lafarge Quarry also has an additional access road to the Quarry from KY-91 that will remain unimpacted.

Request

12. Refer to Caldwell Solar's response to Staff's First Request, Item 54(b). According to the Kentucky Transportation Cabinet's Bridge Data Miner map, it appears that as many as 12 bridges in the area could be used in order to access the Project site.
    a. Provide a list of all the bridges in the Project area (by numerical identification number and location) that could potentially be used by Project construction or operational vehicles.
    b. Provide the bridge weight limit for each of the bridges listed.
    c. Explain whether overweight vehicles will access the Project site using any of the bridges listed.
    d. Describe the plans to avoid or improve or mitigate damage to any of the bridges listed to accommodate overweight vehicles.

Response

a. Caldwell Solar has not finalized the construction or operation transportation routes at this time and cannot confirm what bridges will be utilized by the Project. For the purposes of this data request, Caldwell Solar has included a list and map of bridges near the Project site that fall within the triangle created by the three main highways surrounding the Project site (KY-91, US 641, I-69). See Figure 2 ESB 12- Bridge Data attached hereto.

b. See Figure 2 ESB 12- Bridge Data.

c. Overweight vehicles may need to access the Project site using some of the identified bridges. If overweight vehicles need to cross a bridge, Caldwell Solar will obtain and be in compliance with all necessary permits from the applicable road authority.

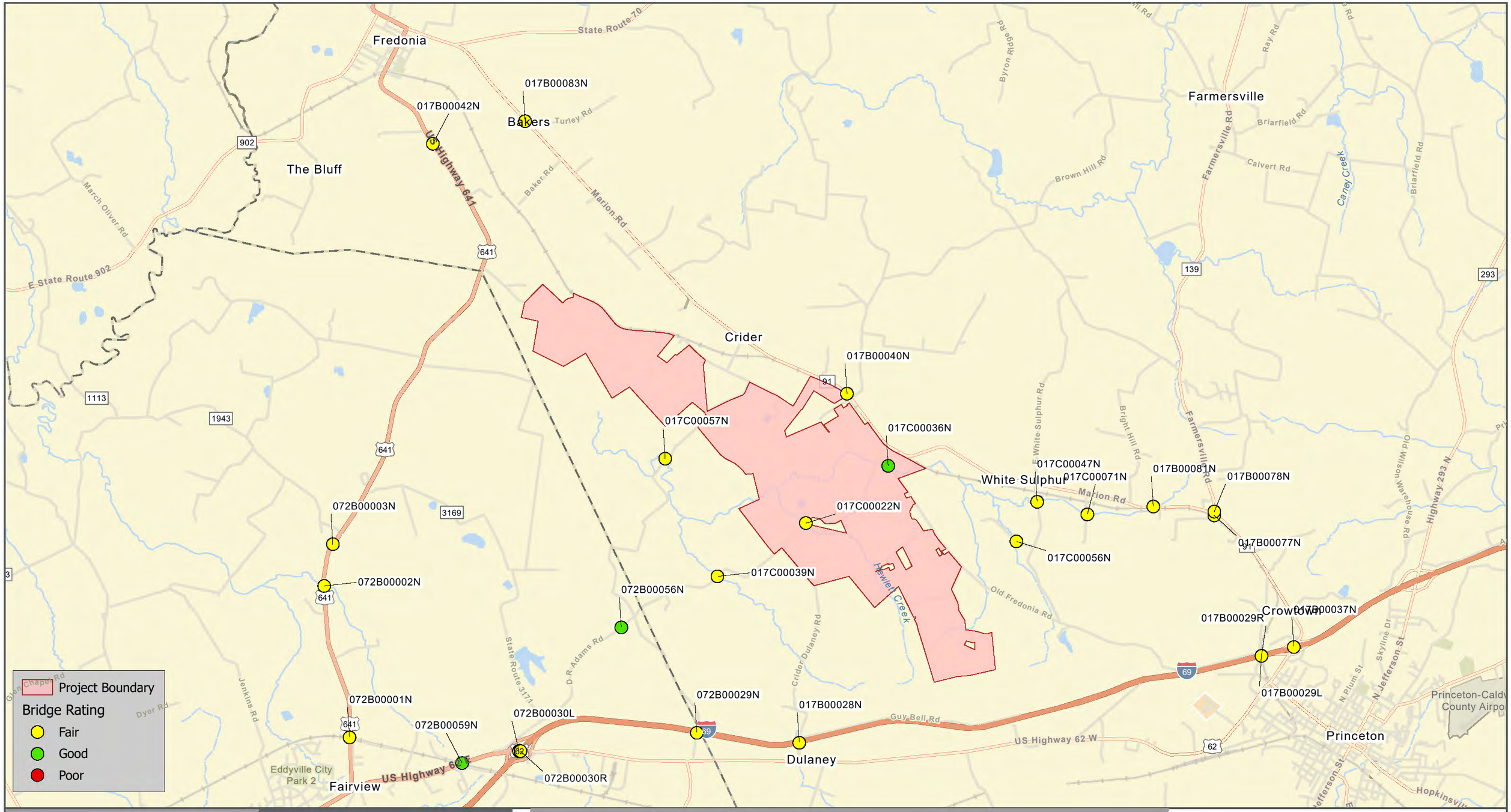
d. Caldwell Solar will obtain and be in compliance with all necessary permits from the applicable road authority. Caldwell Solar will coordinate any required mitigation with the applicable road authority.

Caldwell Solar

Data Request

2

BRIDGE LOCATIONS



This map and all data contained within are supplied as is with no warranty. Cardno Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 2 ESB 12- Bridge Data

Caldwell Solar Project
Caldwell County, Kentucky

0 0.6 1 2 2 3 3 4 4 5 Miles

0 0.8 1.5 2.3 3 3.8 4.5 5.3 6 6.8 7.5 Kilometers

Cardno

Structure ID	Year Built	Condition	Roadway	Design	**Weight Limit**
017B00028N	1968	Fair	WK-9001, I-69	Concrete Culvert	Open-No Restrictions
017B00029L	1962	Fair	I-69	Concrete Tee beam (4 spans)	32-44 Tons
017B00029R	1962	Fair	I-69	Concrete Tee beam (4 spans)	Open-No Restrictions
017B00037N	1962	Fair	MARKET ST (Hwy 91)	Concrete Tee beam (4 spans)	Open-No Restrictions
017B00040N	1923	Fair	KY-91	Concrete Culvert (2 spans)	Open-No Restrictions
017B00042N	1932	Fair	US-641	Concrete Tee beam	32-44 Tons
017B00077N	1990	Fair	KY-91	Concrete Culvert	Open-No Restrictions
017B00078N	1990	Fair	SOUTH JEFFERSON ST	Concrete Culvert	Open-No Restrictions
017B00081N	1997	Fair	KY-91	Concrete Culvert (2 spans)	Open-No Restrictions
017B00083N	2002	Fair	KY-91	Concrete Culvert (2 spans)	Open-No Restrictions
017C00022N	1970	Fair	OLD FREDONIA RD	Prestressed Box beam or girders - Multiple	Open-No Restrictions
017C00036N	1965	Good	CR-1373	Prestressed Box beam or girders - Multiple	Open-No Restrictions
017C00039N	1979	Fair	OLD FREDONIA RD	Prestressed Box beam or girders - Multiple (3 spans)	Open-No Restrictions
017C00047N	1991	Fair	W WHITE SULPHUR RD	Prestressed Box beam or girders - Multiple	Open-No Restrictions
017C00056N	1993	Fair	HIDDEN MEADOW LN	Prestressed Box beam or girders - Multiple	Open-No Restrictions
017C00057N	1993	Fair	PLEASANT VALLEY RD	Prestressed Box beam or girders - Multiple	Open-No Restrictions
017C00071N	2007	Fair	CR1302, Redbud Tra	Steel Stringer/Multi-beam or girder	Open-No Restrictions
072B00001N	1961	Fair	US-641	153 Foot - 3 Span Concrete Tee Beam	31-44 Tons
072B00002N	1932	Fair	US-641	43 Foot - Single Span Concrete Tee Beam	Open-No Restrictions
072B00003N	1932	Fair	US-641	79 Foot - 2 Span Concrete Tee Beam	Open-No Restrictions

Structure ID	Year Built	Condition	Roadway	Design	**Weight Limit**
072B00029N	1968	Fair	KY-2611	225 Foot - 4 Span Concrete continuous Tee Beam	32-44 Tons
072B00030L	1968	Fair	I-69	226 Foot - 4 Span Concrete Tee Beam	Open-No Restrictions
072B00030R	1968	Fair	I-69	226 Foot - 4 Span Concrete Tee Beam	Open-No Restrictions
072B00056N	1997	Good	KY-1199	54 Foot - Single Span Prestressed concrete Box Beam or Girders - Multiple	Open-No Restrictions
072B00059N	2016	Good	US-62 E	250 Foot - 3 Span Prestressed concrete Stringer/Multi-beam or Girder	Open-No Restrictions

Data from Kentucky Data Miner. Jan 2022. https://maps.kytc.ky.gov/bridgeweightlimits/

Request

13. Describe the plans to improve local roads within or adjacent to the Project site.

Response

Local roads will be improved if the engineer of record determines they are unable to support construction vehicle traffic. This may involve widening roads, adding aggregate, widening or adding turning radii, and adding driveway aprons to transition to project access roads. Any improvements will be discussed with the local road authority for approval prior to implementation.

Request

14. Describe actions to be taken to protect local cemeteries from damage related to truck or other vehicle traffic, i.e., blowing dirt or gravel.

Response

Caldwell Solar will use water trucks daily on local gravel roads to manage dust control at the project site in general, as well as to help protect local cemeteries. Any dirt that is tracked out onto paved roads will be cleaned daily as well.

Request

15. Describe the actions to be taken to mitigate Project noise at local cemeteries, both during construction and during operations.

Response

During construction, Caldwell Solar will limit noise-producing construction activities to 7am to 7pm. During operations, Caldwell Solar will produce minimal noise that is not anticipated to impact nearby cemeteries. Caldwell Solar will coordinate any needed mitigation measures with KY SHPO.

Request

16. Refer to Caldwell Solar's response to Staff's First Request, Item 61. State the number of days or months during which the road building phase will occur.

Response

Access road construction will take approximately 3-4 months to complete.

Request

17. Explain where road-building activities are found within the schedule/tasks listed in the response to Item 28(a).

Response

Access road construction will start during site preparation and will continue into pile installation.

Request

18. State the number of days or months during which the trenching phase will occur.

Response

Trenching will occur for approximately 3-4 months.

Request

19. Explain where trenching activities are found within the schedule/tasks listed in the response to Item 28(a).

Response

Trenching will start during site preparation and will continue into pile installation.

Request

20. State the number of days or months over which the laydown yard construction will occur.

Response

Laydown yard construction will take approximately 2 months.

Request

21. Explain where laydown yard construction is found within the schedule/ tasks listed in the response to Item 28(a).

Response

Laydown yard construction will take place during site preparation.

Request

22. Confirm that the "installation phase" refers to the racking installation and module installation, as listed in the response to Item 28(a).

Response

Yes, that is correct.

Request

23. Describe, and provide sound level data for any other equipment used for the substation construction, besides the grader and the front-end loader listed in the response.

Response

Other equipment will be used over the course of the substation construction period; however, most of these vehicles will only be at the site for a very short time – as opposed to the grading equipment, which may be active for a week or two. For example, concrete mixer trucks and, possibly, a concrete pump truck, will be needed to pour the foundation and basin for the transformer and the bases for various other components. These delivery trucks will only be on site for perhaps a half hour, or less, each and the pump may only be needed for a day. Likewise, dump trucks will be needed to deliver gravel once the site is graded and the foundations are in, but each one will only be on site for a matter of minutes. When the transformer is delivered on a flatbed truck, it is likely to be lifted into place with a crane and set in a few hours. The sound emissions from these additional pieces of equipment, as given in the Federal Highway Administration's *Roadway Construction Noise Model User's Guide* (2006), are tabulated below. The *Guide* assigns a 'usage factor' to each sound level to account for the fact that construction equipment is not normally in operation continuously over a typical workday. This adjustment - 10 log(Usage Factor/100), dB - converts the maximum sound level at 50 ft. during use into a representative average level that might be observed over an 8-hour period. However, the additional pieces of equipment listed herein are not likely to be onsite anywhere near that long, nor at the same time.

Substation Construction Equipment Sound Power Levels

Equipment and Model Designation	**Max. Sound Pressure Level (LpAmax) at 50 ft., dBA**	**Usage Factor, %**	**Average Sound Pressure Level at 50 ft. (LAeq), dBA**
Grader	85	40	**81**
Front End Loader	80	40	**76**
Dump Truck	76	40	**72**
Concrete Mixer Truck	79	40	**75**
Concrete Pump Truck	81	20	**74**
Flatbed Truck	81	16	**73**
Crane	74	40	**70**

Request

24. Confirm that "usage factor" is the percentage of the day in which the piece of equipment would be in operation for each phase. For example, trenching requires the use of a backhoe and has a 40 percent usage factor. Confirm this means that a backhoe would be in operation for 40 percent of each workday during the trenching phase.

Response

The FHWA Construction Guide assigns a 'usage factor' to each sound level to account for the fact that construction equipment is not normally in operation continuously over a typical workday. This adjustment - 10 log(Usage Factor/100), dB - converts the maximum sound level at 50 ft. during use into a representative average level that might be observed over an 8-hour period. A usage factor of 40% means that that piece of equipment is likely to be in actual operation only 40% percent of the time and would produce an average 8-hour sound level that is 4 dBA lower than the maximum level. The purpose of this adjustment is to avoid creating the unrealistic impression that every piece of equipment will be generating its peak sound level without any interruption all day, every day. Regardless, both the maximum instantaneous sound levels and the adjusted representative 8-hour averages were given in Table N-5.

Request

25. Confirm that the usage factors noted in Table N-5 are representative of the likely usage for the Caldwell Solar Project specifically.

Response

Yes, the usage factors in Table N-5 are generally representative of the likely usage for the Caldwell Solar Project. The percentage of time each equipment will actually be in use during the construction of Caldwell Solar may differ from the FHWA estimates in some cases. For example, many of the additional pieces of equipment involved in the construction of the substation, discussed in the response to 2 ESB 23, are only likely to be on site for a few minutes to a few hours on a single day, making the FHWA usage factors higher than anticipated for Caldwell Solar's substation construction.

Request

26. In reference to the usage factors, state whether a typical workday is an eight-hour day. Based on an eight-hour day, a backhoe would be in operation for about 3 to 3.5 hours per day during the trenching period.

Response

Over an 8-hour workday, a usage factor of 40% would indicate that the equipment was only in operation for a little over 3 hours. Caldwell Solar expects a typical workday to be 12 hours. In a 12-hour workday, a usage factor of 40% would indicate that the equipment was in operation around 5 hours, consistent with noise producing activities on site.

Request

27. Refer to Table N-5. Explain whether different equipment used for the same phase would operate at the same time during the day or whether equipment operation would be sequential within the same day.

Response

When multiple pieces of equipment are listed for a particular phase in Table N-5 the implication is that one or both may be in operation simultaneously.

Request

28. Refer to Table N-5. State whether the Total Sound Power Level for each phase assumes that multiple pieces of equipment are operating at the same time. If it does not, provide cumulative noise effects.

Response

The original Table N-5 (below) shows the sound levels for individual pieces of construction equipment associated with each phase and the regression in level for each one with distance out to 300 feet.

Table N-5
Average Construction Equipment Sound Pressure Levels at 50, 100 and 300 ft.
with Possible Cumulative Totals per Phase

Phase (Typical unless Noted)	Equipment and Model Designation	Max. Sound Pressure Level (LpAmax) at 50 ft., dBA[i]	Usage Factor, %[i]	Average Sound Pressure Level at 50 ft. (LAeq), dBA		Average Sound Pressure Level at 100 ft. (LAeq), dBA		Average Sound Pressure Level at 300 ft. (LAeq), dBA	
Road/Substation Construction	Grader	85	40	**81**	**82**	**75**	**76**	**64**	**65**
	Front End Loader	80	40	**76**		**70**		**59**	
Trenching	Backhoe	80	40	**76**		**70**		**59**	
Laydown Yard Activity	Forklift (LpAmax estimated)	70	40	**66**	**76**	**60**	**70**	**49**	**59**
	Flatbed Truck	80	40	**76**		**70**		**59**	
Piling	Vermeer PD10 Pile Driver	84	75	**83**		**77**		**66**	
Material Distribution, Installation	Flatbed Truck	80	40	**76**	**76**	**70**	**70**	**59**	**59**
	Forklift (LpAmax estimated)	70	40	**66**		**60**		**49**	

In the augmented table below (Table N-5-1) the likely number of pieces per phase in possible simultaneous operation within a localized area has been estimated and the potential cumulative total for each phase has been added. In all cases, the cumulative total is either equivalent to the sound level of the dominant source or only 1 or 2 dB higher.

Table N-5-1
Average Construction Equipment Sound Pressure Levels at 50, 100 and 300 ft.
with Possible Cumulative Totals per Phase

Phase (Typical unless Noted)	Equipment and Model Designation	Max. Sound Pressure Level (LpAmax) at 50 ft., dBA	Usage Factor, %	Average Sound Pressure Level at 50 ft. (LAeq), dBA		Average Sound Pressure Level at 100 ft. (LAeq), dBA		Average Sound Pressure Level at 300 ft. (LAeq), dBA	
Road/Substation Construction	2 Graders	88	40	**84**	**85**	**78**	**79**	**67**	**69**
	1 Front End Loader	80	40	**76**		**70**		**59**	
Trenching	1 Backhoe	80	40	**76**		**70**		**59**	
Laydown Yard Activity	2 Forklifts (LpAmax estimated)	73	40	**69**	**79**	**63**	**73**	**52**	**62**
	2 Flatbed Truck	83	40	**79**		**73**		**62**	
Piling	3 Vermeer PD10 Pile Drivers	89	75	**88**		**82**		**71**	
Material Distribution, Installation	2 Flatbed Trucks	83	40	**79**	**79**	**73**	**73**	**62**	**62**
	2 Forklifts (LpAmax estimated)	73	40	**69**		**63**		**52**	

Request

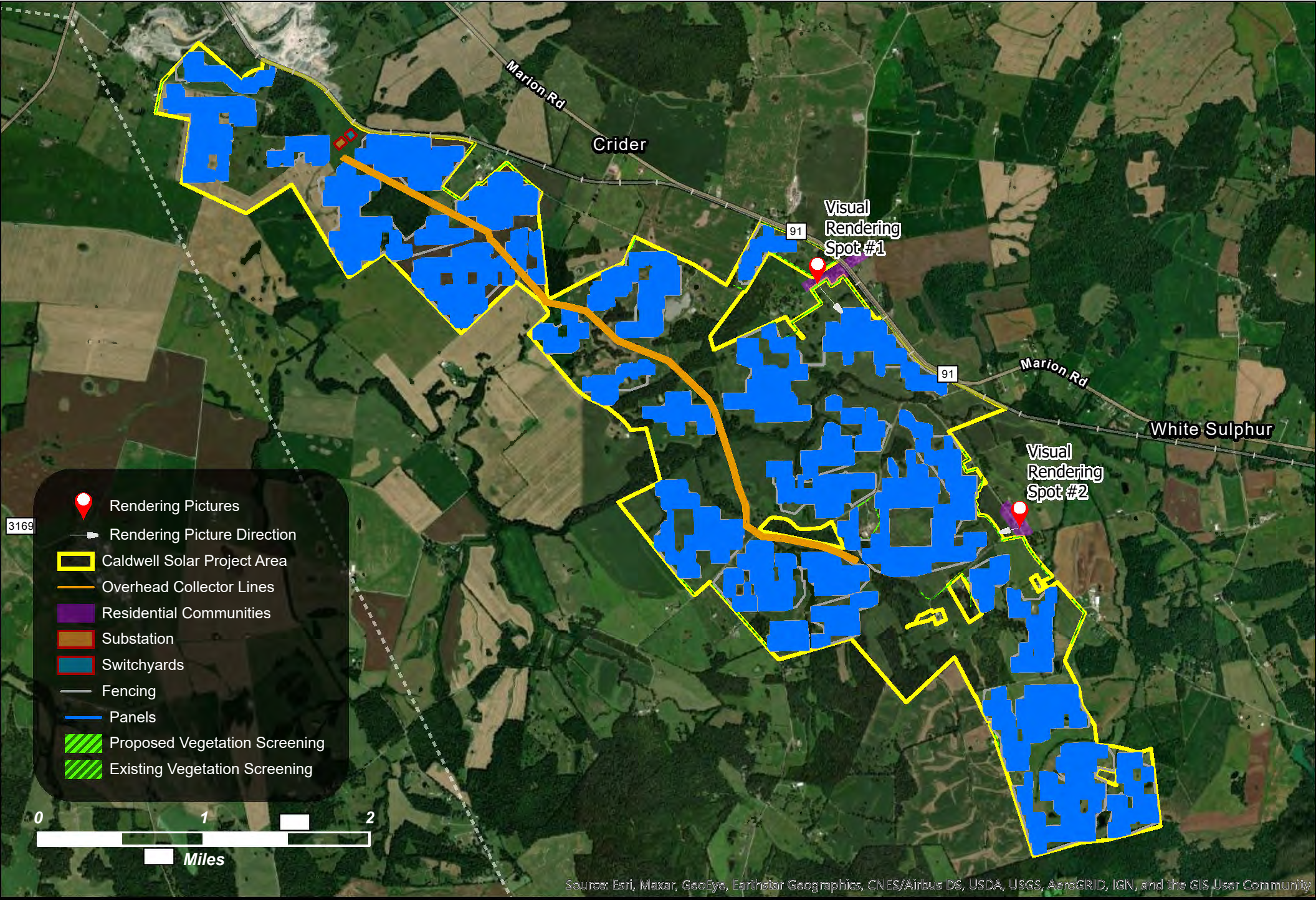
29. Refer to Caldwell Solar's response to Staff's First Request, Items 72(h) and (i). Provide the visual renderings noted.

Response

The visual renderings are attached hereto as Figure 2 ESB 29 Visual Renderings.

Visual Rendering Spot 1 shows the view at the residential cluster off Crider Road facing southeast towards the Project site. Visual Rendering Spot 1 includes renderings of the proposed solar panels, the existing vegetation, and the proposed new vegetation buffer at year 1, year 5-7, and maturity.

Visual Rendering Spot 2 was taken at the residential cluster off Old Fredonia Road facing southwest towards the Project site. Visual Rendering Spot 2 shows the proposed solar panels and existing vegetation buffer. Since the vegetation is already existing and new vegetation is not proposed, only one rendering was needed at this spot.



Caldwell Solar Visual Rendering Spots

Caldwell County, Kentucky

Visual Rendering Spot 1: At Planting

Visual Rendering Spot 1: Year 5-7

Visual Rendering Spot 1: At Vegetation Maturity

Visual Rendering Spot 2

Request

30. Refer to Caldwell Solar's response to Staff's First Request, Item 73. Explain the potential for glare to affect adjacent or nearby residences and confirm that glare may potentially affect adjacent residences or provide additional analyses addressing glare for nearby residences.

Response

Caldwell Solar had a glare consultant prepare an updated analysis of potential glare impacts on nearby residences. See Amended Exhibit H, Attachment C - Glare Report attached hereto.

Based on preliminary design, glare impacts to nearby residences are not anticipated.

HMMH
700 District Ave, Suite 800
Burlington, Massachusetts 01803
781.229.0707
www.hmmh.com

MEMORANDUM

To: Caldwell Solar, LLC - c/o Courtney Pelissero

From: Philip DeVita, HMMH

Date: January 6, 2022

Subject: Caldwell Solar, LLC Glare Analysis

Reference: HMMH Job No.309700.024

Introduction

Harris Miller Miller & Hanson Inc. (HMMH) completed a glare analysis on behalf of Caldwell Solar, LLC for the proposed up to 200 MW solar project located just northwest of Princeton, Kentucky in Caldwell County. The analysis evaluated potential glare from the proposed project on sensitive roadway observer locations on nearby Route 91, Route 641, and Interstate 69 along with nearby residences since no airports were identified within four miles of the project location. **Figure 1** shows the project location relative to Route 91 (to the east), Route 641 (to the west), and Interstate 69 (to the south).

HMMH used the latest version of the GlareGauge solar glare tool, formerly known as the Solar Glare Hazard Analysis Tool (SGHAT) developed by Sandia National Laboratories and Forgesolar to analyze potential glare at the roadway locations. GlareGauge is used to assess glare impacts at airport observation locations from solar photovoltaic (PV) projects and is currently the best tool available for analyzing solar glare impacts from PV projects and has the ability to simulate glare to observers along a continuous roadway segment and at residential locations. In lieu of specific county standards, model results were reviewed and compared relative to the 2013 Federal Aviation Administration's (FAA) Interim Policy of Solar Projects at Airports[1], specifically standards for pilots on final approach.

Design Parameters

In deploying the model, we selected the footprint of the solar project area of the Caldwell Solar, LLC solar array on the GlareGauge map interface and input the project design parameters provided by National Grid Renewables as shown in **Table 1.**

Table 1. Caldwell Solar, LLC Proposed Project Design Parameters

Solar System	*System*	*Orientation*	*Tilt Angle*	*Panel Height (AGL)*
Caldwell Solar, LLC Array	***Single Axis***	***180°***	***60°[1]***	***20 feet***

The Project is proposing up to 200 MW single axis tracking system with a tracking orientation north to south and a maximum tracking angle of 60°. The panels will be located on the ground, and a height of up to 20 feet above ground level was assessed for the modules.

[1] https://www.federalregister.gov/documents/2013/10/23/2013-24729/interim-policy-faa-review-of-solar-energy-system-projects-on-federally-obligated-airports

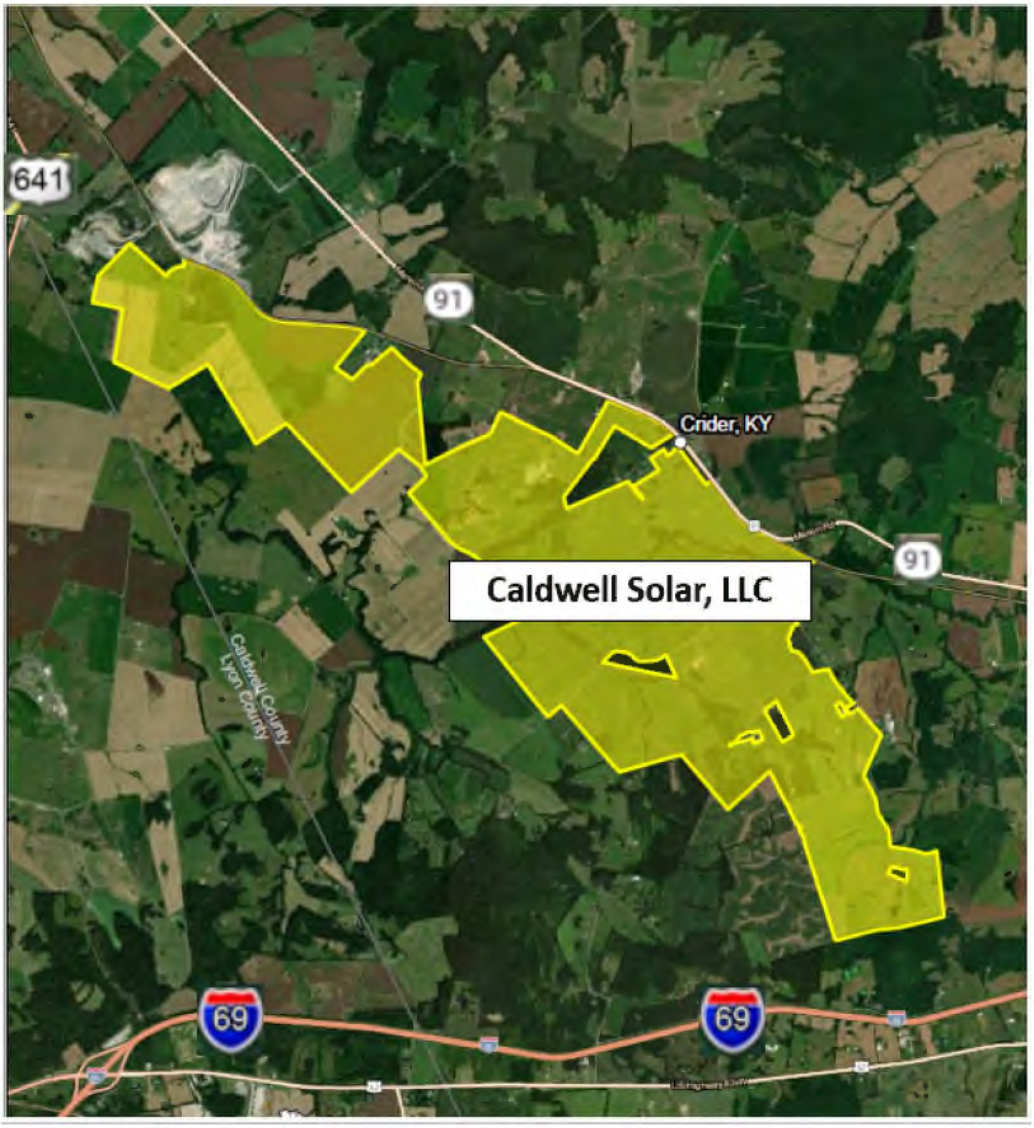


Figure 1. Caldwell Solar, LLC Relative to Nearby Route 91, Route 641 and Interstate 69

Background to FAA Airport Sensitive Receptors and Pilot Analysis

Interim Policy for Solar Projects at Airports as Published on October 23, 2013

To assess airport sensitive receptors, the FAA requires an evaluation of potential glare for pilots on final approach and at the air traffic control tower (ATCT). The FAA published an Interim Policy for Solar Projects at Airports on October 23, 2013. The policy clarifies the FAA's jurisdiction in reviewing solar projects and the standards it uses to determine if a project will result in a negative glare impact to airspace safety.

The Policy also describes the standards for measuring ocular impact:

To obtain FAA approval and a "no objection" to a Notice of Proposed Construction Form 7460-1, the airport sponsor will be required to demonstrate that the proposed solar energy system meets the following standards: (1) no potential for glint or glare in the existing or planned Air Traffic Control Tower cab, and (2) no potential for glare or "low potential for after-image" (shown in green) along the final approach path.

Table 2 presents the airport sensitive receptors that must be evaluated, the potential results presented by the GlareGauge model and whether the result complies with the FAA ocular hazard standard presented in the Policy.

Table 2. Levels of Glare and Compliance with FAA Policy

Airport Sensitive Receptor	Level of Glare	Color Result	Compliance with FAA Policy
ATCT Cab	No glare	None	Yes
	Low Potential for After-Image	Green	No
	Potential for After-Image	Yellow	No
	Potential for Permanent Eye Damage	Red	No
Aircraft along final approach path	No glare	None	Yes
	Low Potential for After-Image	Green	Yes
	Potential for After-Image	Yellow	No
	Potential for Permanent Eye Damage	Red	No

Any glare recorded on the ATCT is not compliant with FAA policy and will not receive a "no objection" determination from the FAA. Measurement of *low potential for after-image* or "Green" is acceptable for aircraft on final approach but greater levels (indicated in yellow and red) are not allowed.

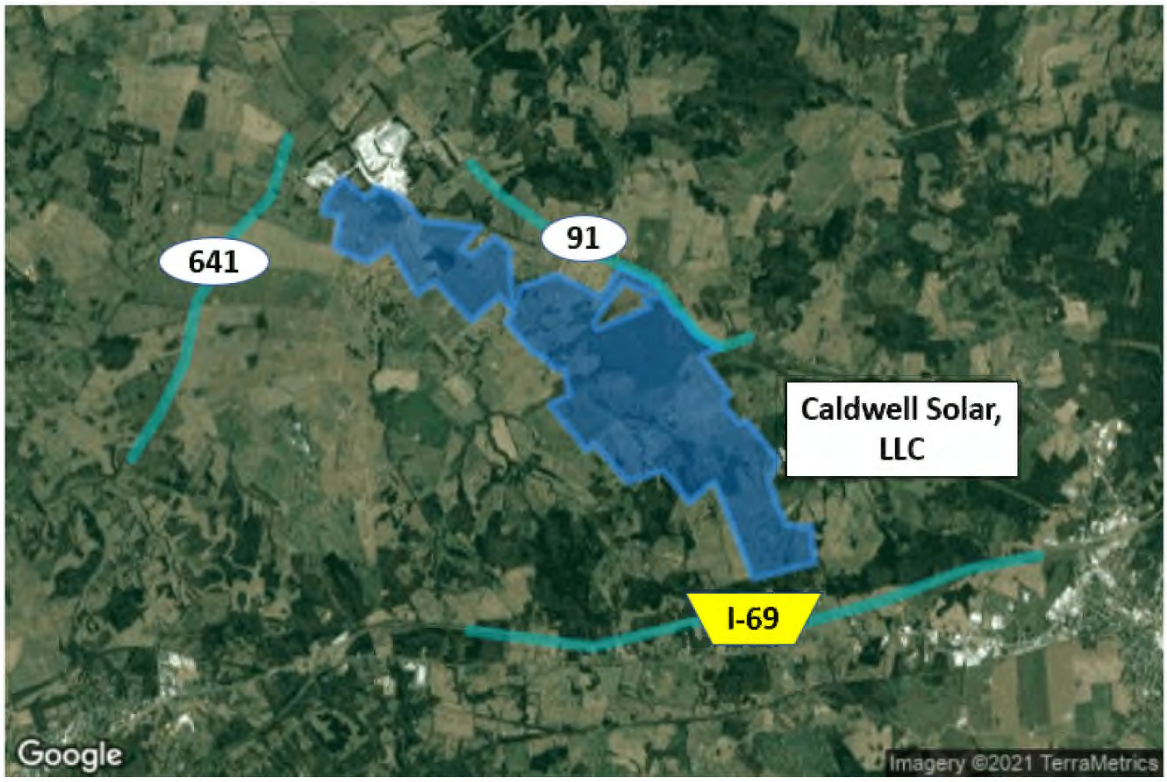
Summary of Results for Nearby Roadway and Residential Observation Locations

HMMH analyzed the potential for the Caldwell Solar, LLC Project to produce glare at nearby roadway and residential observation locations using GlareGauge. As discussed, the GlareGauge model is currently the best tool available for analyzing solar glare impacts from PV projects and is able to simulate glare from proposed solar PV projects to observers along a continuous roadway segment and at residential locations.

Methodology

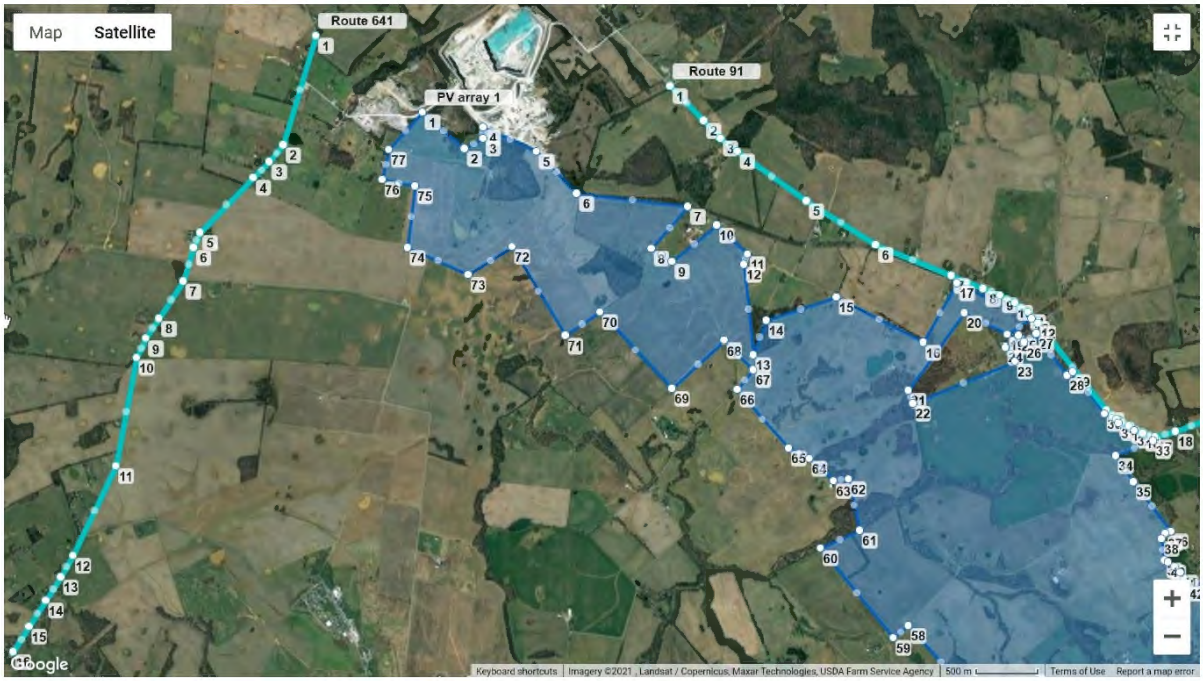
For the roadway analysis, the closest nearby main roadway of Route 91 which runs essentially southeast-northwest, Route 641 which runs northeast-southwest and Interstate 69 which essentially runs east-west were analyzed as they traverse near the project boundaries. **Figure 2** shows the Project array boundaries and roadway segment locations from the GlareGauge model selected for analysis, while **Figure 3** shows only the array boundaries as input into GlareGauge for the northern and southern portions of the project, respectively while **Figure 4** shows the array boundaries with the residence receptor locations as input into GlareGauge for the northern, central and southern portions of the project, respectively.

The roadway segments are depicted in light green/blue (teal) in **Figure 2** while the residence locations are depicted as red OP circle in **Figure 4**.

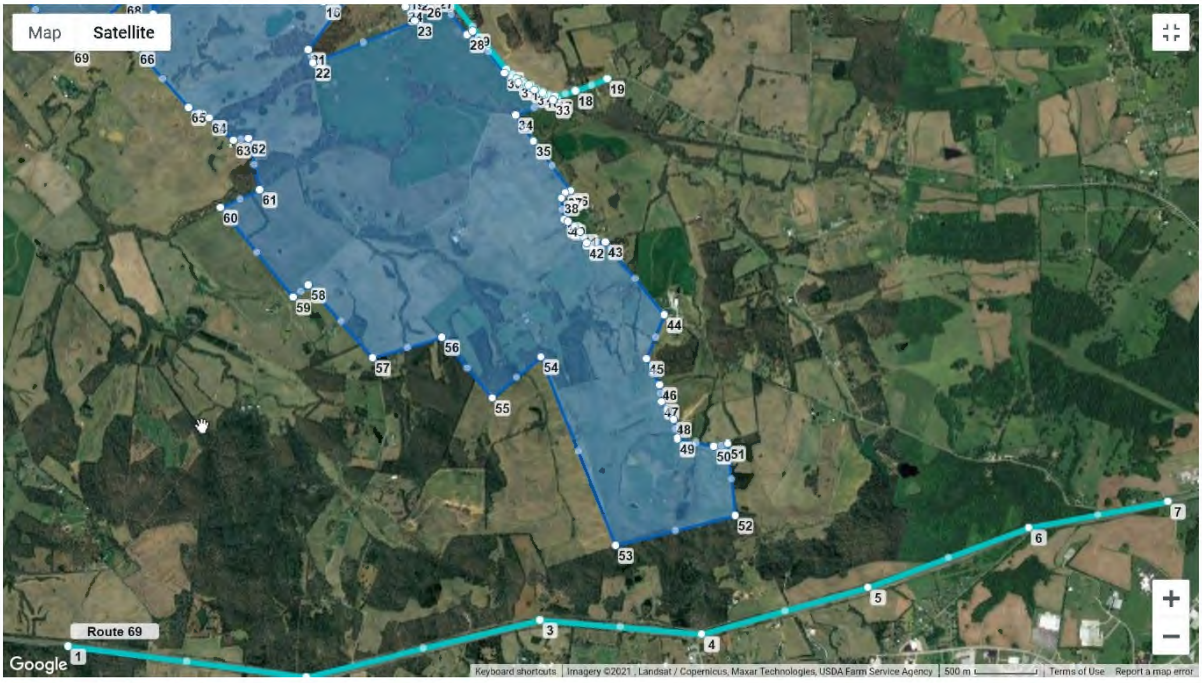


Source: GlareGauge

Figure 2 Route 91, Route 641 and Interstate 69 Roadway Segments Analyzed in GlareGauge

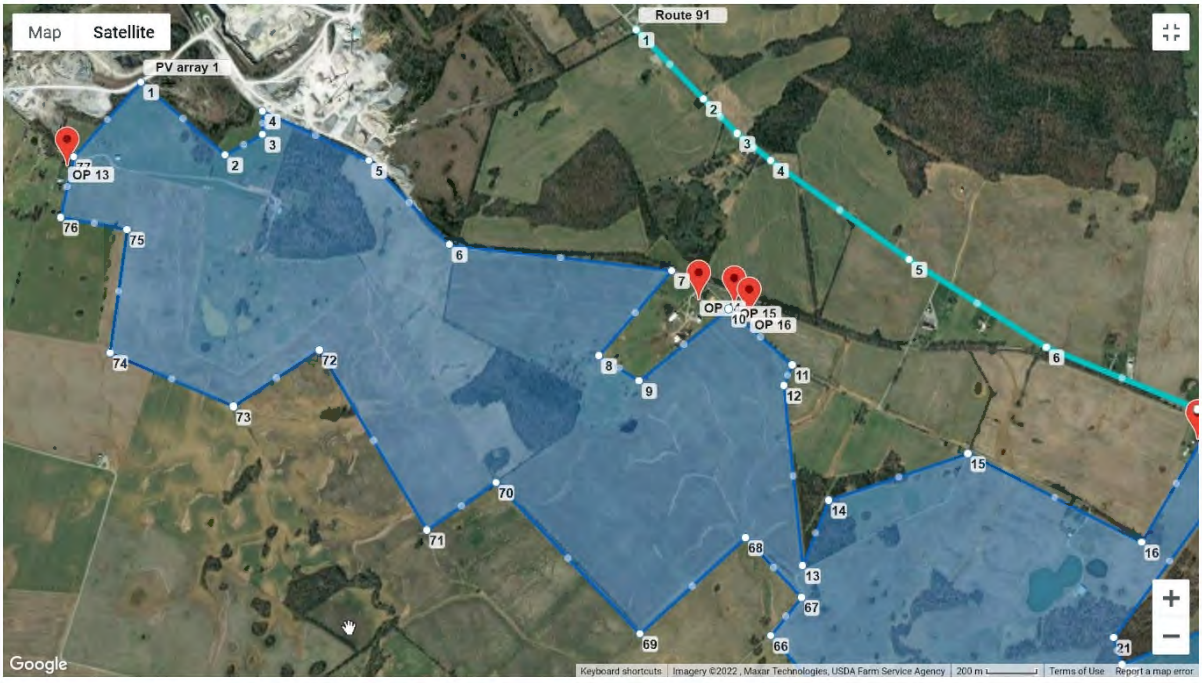


Source: GlareGauge



Source: GlareGauge

Figure 3 PV Array Boundaries Analyzed in GlareGauge (northern and southern boundaries)



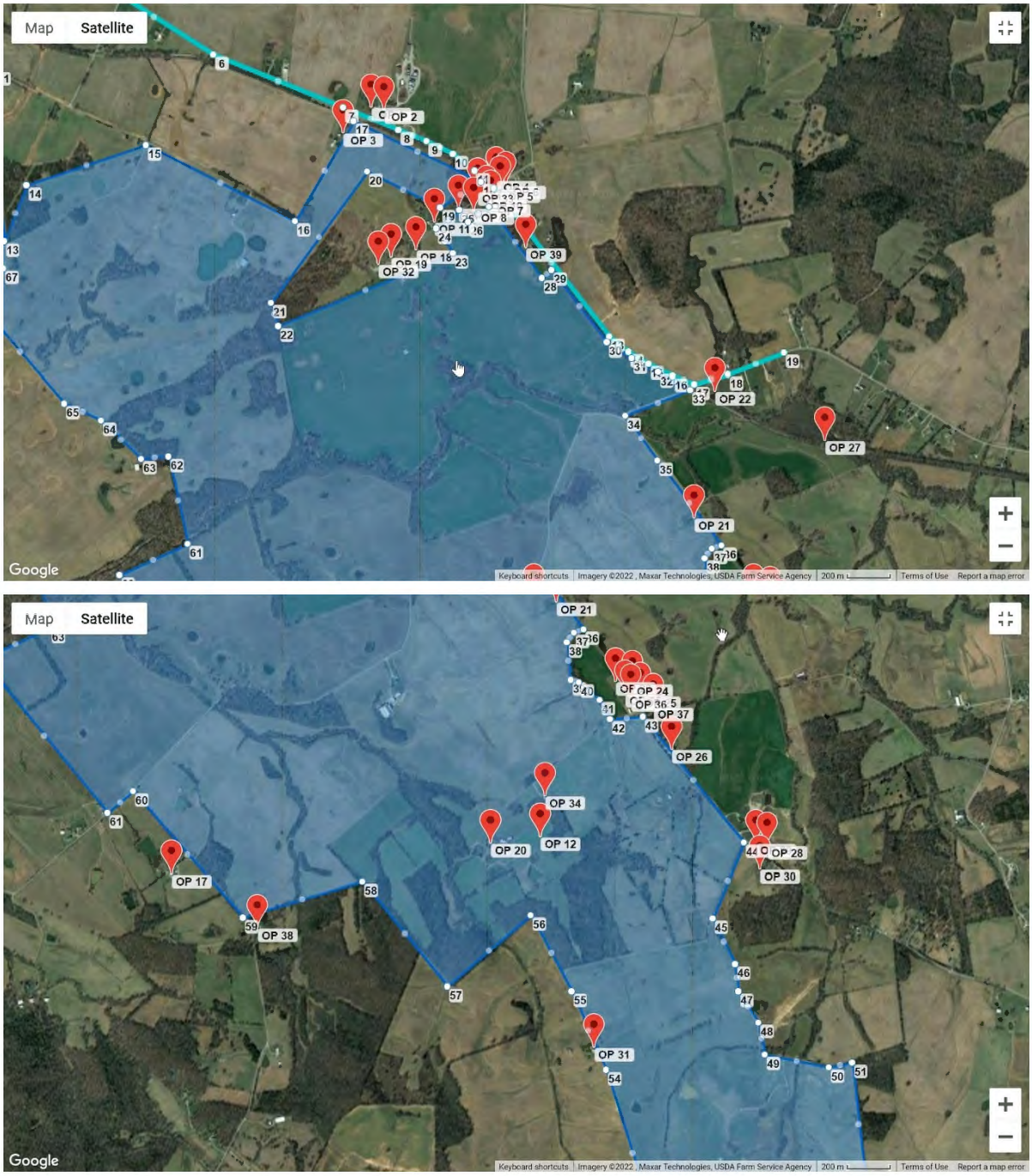
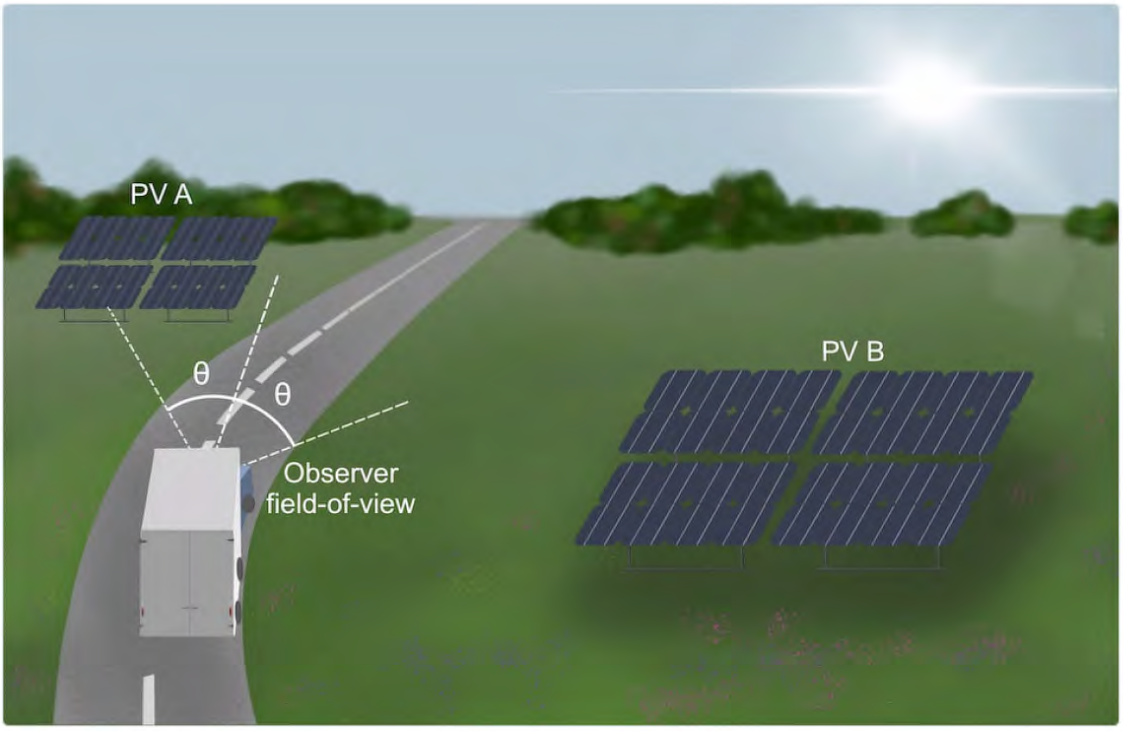


Figure 4 Residence Locations Analyzed in GlareGauge (northern, central and southern boundaries)

HMMH input the same specifications of the project array design parameters as described above in **Table 1**. A smooth panel surface without any anti-reflective coating was assumed to provide maximum flexibility in module selection.

The model was run for a full calendar year to calculate information for every sun position scenario over a typical year and the model assessed potential for glare at one-minute intervals. A viewing height of 6 feet above ground level was chosen as the height of the roadway observer as well as assuming two-way viewing meaning the observers travel along the route in both directions. A viewer default angle of 50°

was chosen as the field of view where the observer can see 50 degrees to the left and right for a total field of view of 100°. **Figure 5** shows a depiction of the route field of view in GlareGauge.



*Route receptor field-of-view is defined by view angle (theta) to left and right. Default FOV is 100° (i.e. 2 * 50° view angle).*

Source: GlareGauge

Figure 5. Route Receptor Field of View in GlareGauge

For the residential locations, each of the occupied locations were input into the model as observation point receptors assuming a viewing height of 6 feet above ground level. **Figure 6** shows an example of a few observer point locations input into Glaregauge. A total of 39 nearby residences were included in the Glaregauge.

Source: GlareGauge

Figure 6. Route Receptor Field of View in GlareGauge

It should be noted that this is a conservative approach for assessing glare at the roadways and residential locations as Glaregauge does not 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.

A summary of the model output is presented in **Table 3** for the Route 91, Route 641 and Interstate 69 road segments and residential observer locations. The modeling result output sheets for the roadway locations and residential locations are provided as **Attachment A** and denoted as Route 91, Route 641, and Route 69 in the model output as well as each of the 39 residential locations. As shown in **Table 3**, no glare was detected by the model for all of the PV locations located within the project perimeter to the nearby roadway and residential observer locations.

Table 3 – GlareGauge Results (in minutes per year) for the Caldwell Solar, LLC Project for Portions of Route 91, Route 641, Interstate 69, and Residential Locations

Site	Fixed/Tracker System	(orientation/tilt)	Route 91	Route 641	Interstate 69	Residential Locations[1]	Comply with FAA Thresholds for Pilots
Caldwell Solar, LLC	Single Axis Tracker	180° (max tracker of 60°)	0	0	0	0	Yes

Notes:

G (Green) = Low Potential for Temporary After-Image
Y (Yellow) = Potential for Temporary After-Image
R (Red) = Potential for Permanent Eye-Damage

N/A = Not applicable, no analysis conducted.

Additional Notes:

1. A total of 39 residential locations were included in the analysis as shown in **Figure 4**.

As discussed above, measurement of no or Low Potential for After-Image or Green is acceptable for aircraft on final approach, but greater levels (indicated in yellow and red) are not allowed.

Any potential solar glare to the vehicles traveling along the nearby roadways and residential locations is very similar or representative to aircraft along final approach in the FAA standards. Therefore in lieu of county specific standards, the standards of acceptable ocular impact as contained in the 2013 FAA policy for aircraft on final approach were applied to the vehicles traveling along these sections of Route 91, Route 641, and Interstate 69 and at residential locations. It should be noted that the model results are conservative in that the GlareGauge model does not consider potential obstacles associated with the landscape such as trees, buildings or hills which could block a direct view of the solar panels to the nearby observer locations.

Based on the design and layout of the Caldwell Solar, LLC Project as modeled, the GlareGauge modeling showed no glare detected at Route 91, Route 641, Interstate 69 observation points, and at residential locations, accordingly, the proposed design locations for these arrays within the project perimeter meets the 2013 FAA Standard for aircraft at each modeled observer location. *Therefore, there is no evidence based upon our modeling of the potential array locations that glare from the Project will cause an adverse impact for drivers along analyzed portions of Route 91, Route 641,Interstate 69, and nearby residential locations.*

Conclusions

HMMH utilized the GlareGauge model developed by the Department of Energy's Sandia National Laboratories and Forge Solar to evaluate potential glare from a proposed Caldwell Solar, LLC Project located just northwest of Princeton, Kentucky in Caldwell County. The analysis evaluated potential glare from the proposed project on sensitive roadway observer locations on nearby Route 91, Route 64,Interstate 69, and at nearby residential locations since no airports were identified within four miles of the project location.

GlareGauge is used to assess glare impacts at airport observation locations from solar photovoltaic (PV) projects for comparison to FAA Solar Glare Standards and is currently the best tool available for analyzing solar glare impacts from PV projects and has the ability to simulate glare to observers along a continuous roadway segment and at residential locations. In lieu of county standards, GlareGauge model results were compared to the 2013 FAA's ocular hazard standard for pilots to determine adverse impacts. **Attachment A** show the GlareGauge modeling results for the nearby roadway segments and residential locations.

Based on the preferred design and potential project boundaries of the Caldwell Solar, LLC Project, the GlareGauge modeling showed no glare detected at Route 91, Route 641, Interstate 69, and nearby residential observation points, accordingly, the proposed design and locations for these arrays meets the 2013 FAA Standard for aircraft at each modeled observer location. *Therefore, there is no evidence based upon our modeling of the potential array locations that glare from the Project will cause an adverse impact for drivers along analyzed portions of Route 91, Route 641, Interstate 69, and nearby residential locations.*

Attachment A

GlareGauge Modeling Results – Caldwell Solar, LLC - Project Design

ForgeSolar

Caldwell Solar LLC

Caldwell Solar LLC Revised 1-temp-1

Site description: Caldwell Solar LLC

Created Jan. 2, 2022
Updated Jan. 2, 2022
Time-step 1 minute
Timezone offset UTC-6
Site ID 63178.10435

Project type Advanced
Project status: active
Category 5 MW to 10 MW

Misc. Analysis Settings

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

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

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
PV array 1	SA tracking	SA tracking	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3,034.4 acres

Name: PV array 1
Axis tracking: Single-axis rotation
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 0.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 60.0 deg
Resting angle: 60.0 deg
Footprint area: 3,034.4 acres
Rated power: -
Panel material: Smooth glass without AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 6.55 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	37.172969	-88.031119	534.19	20.00	554.19
2	37.170301	-88.027278	470.06	20.00	490.06
3	37.171054	-88.025540	482.63	20.00	502.63
4	37.171909	-88.025540	491.83	20.00	511.83
5	37.170113	-88.020648	505.56	20.00	525.56
6	37.167032	-88.016952	481.20	20.00	501.20
7	37.166074	-88.006737	495.37	20.00	515.37
8	37.162962	-88.010106	529.49	20.00	549.49
9	37.162023	-88.008239	488.29	20.00	508.29
10	37.164674	-88.004119	476.60	20.00	496.60
11	37.162605	-88.001222	461.39	20.00	481.39
12	37.161852	-88.001608	467.03	20.00	487.03
13	37.155273	-88.000727	448.44	20.00	468.44
14	37.157685	-87.999547	468.56	20.00	488.56
15	37.159395	-87.993142	462.85	20.00	482.85
16	37.156155	-87.985148	480.42	20.00	500.43
17	37.160426	-87.982043	479.27	20.00	499.28
18	37.157820	-87.975192	466.31	20.00	486.31
19	37.156709	-87.977402	467.89	20.00	487.89
20	37.158265	-87.981307	472.41	20.00	492.41
21	37.152667	-87.986465	479.94	20.00	499.94
22	37.151675	-87.986078	479.99	20.00	499.99
23	37.154760	-87.976709	457.12	20.00	477.12
24	37.155820	-87.977611	471.60	20.00	491.60
25	37.156607	-87.976366	467.12	20.00	487.12
26	37.156111	-87.975894	476.35	20.00	496.35
27	37.156761	-87.974778	472.65	20.00	492.65
28	37.153725	-87.971938	473.86	20.00	493.86
29	37.154049	-87.971423	477.39	20.00	497.39
30	37.150974	-87.968465	487.15	20.00	507.15
31	37.150293	-87.967160	495.60	20.00	515.60
32	37.149715	-87.965747	496.69	20.00	516.69
33	37.148970	-87.964016	487.80	20.00	507.80
34	37.147876	-87.967470	473.66	20.00	493.66
35	37.145961	-87.965774	471.64	20.00	491.64
36	37.142331	-87.962348	483.45	20.00	503.45
37	37.142194	-87.962863	488.39	20.00	508.39
38	37.141784	-87.963250	488.88	20.00	508.88
39	37.140176	-87.963013	499.47	20.00	519.47
40	37.140073	-87.962606	499.15	20.00	519.15
41	37.139320	-87.961490	503.15	20.00	523.15
42	37.138479	-87.960909	502.89	20.00	522.90
43	37.138581	-87.959171	513.29	20.00	533.29
44	37.133230	-87.953775	568.54	20.00	588.54
45	37.129997	-87.955448	596.63	20.00	616.63
46	37.128061	-87.954247	600.52	20.00	620.52
47	37.126881	-87.954075	613.37	20.00	633.37
48	37.125574	-87.952963	570.51	20.00	590.51
49	37.124198	-87.952619	557.57	20.00	577.57
50	37.123651	-87.949208	585.70	20.00	605.70
51	37.123839	-87.947963	569.70	20.00	589.70
52	37.118613	-87.947236	634.31	20.00	654.31

53	37.116389	-87.958286	695.17	20.00	715.17
54	37.123544	-87.961138	604.66	20.00	624.66
55	37.126900	-87.962993	565.99	20.00	586.00
56	37.130152	-87.965148	584.23	20.00	604.23
57	37.127109	-87.969627	543.89	20.00	563.89
58	37.131590	-87.974182	540.82	20.00	560.82
59	37.130057	-87.980595	555.22	20.00	575.22
60	37.135399	-87.986469	495.76	20.00	515.76
61	37.134492	-87.987843	490.84	20.00	510.85
62	37.141063	-87.994585	452.44	20.00	472.44
63	37.142380	-87.990938	466.98	20.00	486.98
64	37.146122	-87.991954	493.29	20.00	513.29
65	37.146020	-87.993392	476.01	20.00	496.01
66	37.147661	-87.995568	459.12	20.00	479.12
67	37.148380	-87.997521	445.56	20.00	465.56
68	37.152724	-88.002220	435.91	20.00	455.91
69	37.154126	-88.000783	448.21	20.00	468.21
70	37.156298	-88.003379	441.75	20.00	461.75
71	37.152792	-88.008228	443.57	20.00	463.57
72	37.158334	-88.014834	439.86	20.00	459.86
73	37.156589	-88.018015	432.12	20.00	452.12
74	37.163152	-88.022916	432.44	20.00	452.44
75	37.161100	-88.026885	420.43	20.00	440.43
76	37.163067	-88.032529	440.08	20.00	460.08
77	37.167581	-88.031778	442.58	20.00	462.58
78	37.168025	-88.034803	456.50	20.00	476.50
79	37.170248	-88.034224	478.66	20.00	498.66

Route Receptor(s)

Name: Route 641
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	37.178601	-88.040932	453.91	6.00	459.91
2	37.170606	-88.043898	448.39	6.00	454.39
3	37.169325	-88.045169	451.33	6.00	457.33
4	37.168182	-88.046677	455.52	6.00	461.52
5	37.164168	-88.051580	471.15	6.00	477.15
6	37.163073	-88.052159	465.43	6.00	471.43
7	37.160611	-88.053082	480.13	6.00	486.13
8	37.157849	-88.055313	466.15	6.00	472.15
9	37.156443	-88.056526	460.98	6.00	466.98
10	37.155070	-88.057373	453.64	6.00	459.65
11	37.147098	-88.059298	425.30	6.00	431.30
12	37.140541	-88.063262	431.39	6.00	437.39
13	37.138949	-88.064382	436.08	6.00	442.08
14	37.137271	-88.065717	412.65	6.00	418.65
15	37.135371	-88.067255	408.63	6.00	414.63
16	37.133471	-88.068729	427.41	6.00	433.41

Name: Route 69
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	37.109015	-88.008589	531.98	6.00	537.98
2	37.106756	-87.986692	586.66	6.00	592.66
3	37.110931	-87.965223	583.71	6.00	589.71
4	37.109904	-87.950396	570.39	6.00	576.39
5	37.113275	-87.935054	550.82	6.00	556.82
6	37.117673	-87.920313	512.83	6.00	518.83
7	37.119623	-87.907567	534.29	6.00	540.29

Name: Route 91
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	37.174893	-88.008364	521.77	6.00	527.77
2	37.172354	-88.005290	514.99	6.00	520.99
3	37.171089	-88.003742	530.45	6.00	536.45
4	37.170089	-88.002184	498.03	6.00	504.03
5	37.166481	-87.995872	468.79	6.00	474.79
6	37.163275	-87.989534	457.10	6.00	463.10
7	37.161013	-87.982585	474.61	6.00	480.61
8	37.160053	-87.979620	472.61	6.00	478.61
9	37.159569	-87.978116	468.93	6.00	474.93
10	37.159008	-87.976697	465.49	6.00	471.49
11	37.158307	-87.975544	463.18	6.00	469.18
12	37.157542	-87.974535	462.83	6.00	468.83
13	37.151214	-87.968323	488.39	6.00	494.39
14	37.150566	-87.967331	493.71	6.00	499.72
15	37.150047	-87.966242	496.51	6.00	502.51
16	37.149534	-87.964933	486.20	6.00	492.20
17	37.149209	-87.963796	489.00	6.00	495.00
18	37.149619	-87.961972	490.26	6.00	496.26
19	37.150522	-87.959002	484.62	6.00	490.62

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
OP 1	37.161000	-87.981100	486.70	6.00	492.70
OP 2	37.160900	-87.980400	492.00	6.00	498.00
OP 3	37.159900	-87.982600	494.70	6.00	500.70
OP 4	37.157900	-87.974400	469.06	6.00	475.06
OP 5	37.157500	-87.974200	468.80	6.00	474.80
OP 6	37.157700	-87.973900	470.02	6.00	476.02
OP 7	37.156900	-87.974700	472.46	6.00	478.46
OP 8	37.156600	-87.975600	474.63	6.00	480.63
OP 9	37.156700	-87.976400	465.77	6.00	471.77
OP 10	37.157100	-87.974900	472.73	6.00	478.73
OP 11	37.156100	-87.977700	478.34	6.00	484.34
OP 12	37.140100	-87.972400	523.47	6.00	529.47
OP 13	37.169900	-88.034500	477.36	6.00	483.36
OP 14	37.165000	-88.005500	484.44	6.00	490.44
OP 15	37.164800	-88.003900	480.93	6.00	486.93
OP 16	37.164400	-88.003200	478.43	6.00	484.43
OP 17	37.131900	-87.984400	549.78	6.00	555.78
OP 18	37.154900	-87.978700	478.27	6.00	484.27
OP 19	37.154600	-87.980000	475.53	6.00	481.53
OP 20	37.133200	-87.967300	564.91	6.00	570.91
OP 21	37.143500	-87.963800	497.16	6.00	503.16
OP 22	37.148900	-87.962700	493.98	6.00	499.98
OP 23	37.140100	-87.960600	521.68	6.00	527.68
OP 24	37.140000	-87.959700	523.11	6.00	529.11
OP 25	37.139500	-87.959300	527.52	6.00	533.52
OP 26	37.137200	-87.957600	524.24	6.00	530.24
OP 27	37.146800	-87.956800	490.81	6.00	496.81
OP 28	37.133100	-87.952500	555.01	6.00	561.01
OP 29	37.133200	-87.953100	565.69	6.00	571.69
OP 30	37.132100	-87.952900	568.31	6.00	574.31
OP 31	37.124500	-87.961800	628.74	6.00	634.74
OP 32	37.154300	-87.980700	469.23	6.00	475.23
OP 33	37.157400	-87.975400	467.37	6.00	473.37
OP 34	37.135200	-87.964400	534.94	6.00	540.94
OP 35	37.139600	-87.960100	525.26	6.00	531.26
OP 36	37.139400	-87.959800	527.26	6.00	533.26
OP 37	37.139000	-87.958600	522.05	6.00	528.06
OP 38	37.129600	-87.979800	548.08	6.00	554.09
OP 39	37.155000	-87.972800	475.91	6.00	481.91

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
PV array 1	SA tracking	SA tracking	0	0	-	

PV & Receptor Analysis Results

Results for each PV array and receptor

PV array 1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: OP 1	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: OP 6	0	0
OP: OP 7	0	0
OP: OP 8	0	0
OP: OP 9	0	0
OP: OP 10	0	0
OP: OP 11	0	0
OP: OP 12	0	0
OP: OP 13	0	0
OP: OP 14	0	0
OP: OP 15	0	0
OP: OP 16	0	0
OP: OP 17	0	0
OP: OP 18	0	0
OP: OP 19	0	0
OP: OP 20	0	0
OP: OP 21	0	0
OP: OP 22	0	0
OP: OP 23	0	0
OP: OP 24	0	0
OP: OP 25	0	0
OP: OP 26	0	0
OP: OP 27	0	0
OP: OP 28	0	0
OP: OP 29	0	0
OP: OP 30	0	0
OP: OP 31	0	0
OP: OP 32	0	0
OP: OP 33	0	0
OP: OP 34	0	0
OP: OP 35	0	0
OP: OP 36	0	0
OP: OP 37	0	0
OP: OP 38	0	0
OP: OP 39	0	0
Route: Route 641	0	0
Route: Route 69	0	0
Route: Route 91	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

Request

31. Refer to Caldwell Solar's response to Staff's First Request, Item 74. Confirm that the preliminary layout map provided in the response (Caldwell PIM prelim layout-map) is the earlier version of the site layout and that the current site layout is reflected in the Amended Exhibit I and Amended Exhibit J.

Response

Yes, that is correct.

Request

32. Refer to Caldwell Solar's response to Staff's First Request, Item 77. Provide any comments provided by representatives of the White Sulphur Church.

Response

Caldwell Solar has not received any comments from representatives of the White Sulphur Church as of January 7, 2022.

Request

33. Refer to Caldwell Solar's response to Staff's First Request, Item 78. Explain the process for addressing complaints during the 20- to 25-year operational period.

Response

Caldwell Solar will provide contact information for nearby landowners to reach out to operational staff with any concerns or questions. If a landowner contacts Caldwell Solar with questions or concerns, Caldwell Solar representatives will discuss the issue with the landowner and work towards a solution to the extent possible.

Request

34. The recently permitted Ashwood Solar Project will be located in Lyon County to the west of the Caldwell Solar project site, on the east and west sides of US 641.
    a. Explain whether Caldwell Solar has reviewed the Ashwood Solar application and subsequent materials to understand that Project in terms of construction activities, traffic levels, noise etc.
    b. Explain whether Caldwell Solar has contacted the Ashwood Solar Project managers to discuss potential cumulative effects or to coordinate construction activities in order to minimize traffic, noise, or other impacts.
    c. Explain whether Caldwell Solar has evaluated the cumulative effects of the two Projects, if construction were to occur at the same time. If so, provide any analyses prepared.
    d. Explain whether both projects would use US 641 to access areas of their respective Project sites.
    e. If both Projects were to use US 641, explain how the costs associated with the mitigation or repair of road damage would be assigned to each Project.

Response

a. Caldwell Solar has reviewed Ashwood Solar's application and subsequent materials related the construction, traffic, and noise. Caldwell Solar was not able to find information regarding Ashwood Solar's construction schedule.

b. Caldwell Solar has not yet contacted the Ashwood Solar Project managers.

c. Caldwell Solar has not evaluated the cumulative effects of the two Projects if construction were to occur at the same time. Caldwell Solar was not able to find information regarding Ashwood Solar's construction schedule and therefore is not aware if construction activities between the two Projects will overlap.

d. Caldwell Solar will likely use US 641 to access areas of the Project site. Based on Ashwood Solar's application and subsequent materials, it is likely that project would also use US 641.

e. If both Projects were to use US 641, any needed road management and cost sharing would be coordinated with the governing road authority.

Request

35. If an application is submitted to the Siting Board, the Golden Solar Project will be proposed for a location immediately to the north and east of the Caldwell Solar Project site.
    a. Explain whether the construction periods of those Projects may overlap.
    b. Explain any mitigation measures that would be put in place to reduce the impacts of traffic, noise or other construction phase impacts, if construction of those two Projects were to overlap.

Response

a. Yes, construction periods may overlap.

b. If both Caldwell Solar and Golden Solar are constructed around the same time, National Grid Renewables will strive to mitigate traffic and noise impacts by creating construction schedules that optimize efficiency and flow across the two Project sites. The goal of constructing two projects around the same time is to share resources and construction activities across the sites to reduce the total construction period time. Caldwell Solar has committed to keeping construction hours to 6am to 10pm and limiting noise-producing construction activities to 7am to 7pm. National Grid Renewables will coordinate construction activities with the Caldwell County Road Supervisor.