Andy Beshear
Governor

Rebecca W. Goodman
Secretary
Energy and Environment Cabinet

Commonwealth of Kentucky
Kentucky State Board on Electric Generation and Transmission Siting
211 Sower Blvd.
P.O. Box 615
Frankfort, Kentucky 40602-0615
Telephone: (502) 564-3940

Michael J. Schmitt
Chairman

April 7, 2021

TO: FILINGS DIVISION

RE: Case No. 2020-00280
ELECTRONIC APPLICATION OF ASHWOOD SOLAR I, LLC FOR A CERTIFICATE OF CONSTRUCTION FOR AN APPROXIMATELY 86 MEGAWATT MERCHANT ELECTRIC SOLAR GENERATING FACILITY IN LYON COUNTY, KENTUCKY PURSUANT TO KRS 278.700 AND 807 KAR 5:110

Please file in the administrative record of the above-referenced case the attached copy of the final report of BBC Research & Consulting, "Review and Evaluation of Ashwood Solar 1, LLC Siting Assessment Report," dated April 6, 2021.

Sincerely,

Linda C. Bridwell, PE
Executive Director
Public Service Commission *on behalf* of the Kentucky State Board on Electric Generation and Transmission Siting

Attachment

cc: Parties of Record

BBC RESEARCH & CONSULTING

Review and Evaluation of Ashwood Solar 1, LLC Siting Assessment Report

FINAL REPORT

FINAL Report

April 6, 2021

Review and Evaluation of Ashwood Solar 1, LLC Siting Assessment Report

Prepared for

Kentucky State Board on Electrical Generation and Transmission Siting
211 Sower Blvd.
P.O. Box 615
Frankfort, Kentucky 40602

Prepared by

BBC Research & Consulting
1999 Broadway, Suite 2200
Denver, Colorado 80202-9750
303.321.2547 fax 303.399.0448
www.bbcresearch.com

BBC RESEARCH & CONSULTING

Table of Contents

SECTION A.

General Statement

SECTION A.
General Statement

This document provides a review of the Site Assessment Report (SAR) for the proposed Ashwood Solar merchant electric generating facility submitted to the Kentucky State Board on Electrical Generation and Transmission Siting (the "Board"). Ashwood Solar 1, LLC submitted an administratively complete document titled "Application of Ashwood Solar 1, LLC" (the "application") to the Board in December 2020. The SAR and supporting documents and reports were included with the application. Ashwood Solar has submitted the SAR to support its application for a certificate to construct a merchant electric generating facility in Lyon County under KRS 278.700 *et seq.* (the Act), passed by the General Assembly of the Commonwealth of Kentucky in 2002. Board staff retained BBC Research & Consulting (BBC) to perform this review.

Provisions of the Act Establishing the SAR Review Process

The part of KRS 278 entitled "Electric Generation and Transmission Siting" defined a class of merchant power plants and required them to obtain construction certificates as a prerequisite to the commencement of actual construction activity. Those statutes also created the Board and gave it the authority to grant or deny construction certificates requested by individual applicants. The Board is attached to the Kentucky Public Service Commission (PSC) for administrative purposes.

The Act created the application process and, within the process, a series of steps for preparing and submitting this report:

- The applicant files for a construction certificate and pays the fees. KRS 278.706.
- The applicant submits required items, including an SAR. KRS 278.706 & KRS 278.708.
- If it wishes, the Board may hire a consultant to review the SAR and provide recommendations about the adequacy of the information and proposed mitigation measures. KRS 278.708.
- The consultant must deliver the final report so the Board can meet its own statutory decision deadline — 120 days or 180 days from receipt of an administratively complete application, depending upon whether the Board will hold a hearing. KRS 278.710.

SAR Review Methodology

BBC undertook the following tasks to review Ashwood Solar 1, LLC's SAR and complete this report:

- Reviewed BBC's prior SAR reviews prepared for the Board, including reviews of proposed Turkey Creek Solar, Unbridled Solar LLC, ecoPower, and SunCoke projects;
- Reviewed the contents of the site assessment and application;
- Identified additional information we considered useful for a thorough review, and submitted questions to the applicant;
- Conducted the required site visit, including obtaining oral and written information supplied by the applicant, on February 19th, 2021;
- Completed interviews and data collection with a number of outside sources as sourced in this document; and
- Compiled and incorporated all of the foregoing in the analysis.

Report Format

This report is structured to be responsive to KRS 278 and our contract. It begins with this general statement that introduces the review. In Section B of the report, we present the executive summary. Section C offers detailed findings and conclusions of the study, and in Section D, we present the detailed recommendations concerning mitigation measures and future Board actions.

Certain Limitations

There are inherent limitations to any review process of documents such as the SAR. These must be understood in utilizing this report for decision-making purposes.

Based on previous experience with the SAR review process, BBC has exercised judgment in deciding what information is relevant and what level of detail is appropriate. This relates to project components, geographic extent of impacts, and assessment methodology. Board staff has provided review and guidance in this context.

At this point in the planning process, Ashwood Solar 1, LLC has not finalized the specific locations and layout of the solar arrays and other project infrastructure. The SAR, and this review, are based on the best available information at this time.

SECTION B.

Executive Summary

SECTION B.
Executive Summary

This report documents the evaluation of a Site Assessment Report (SAR) in compliance with KRS 278.704 and KRS 278.708. The Kentucky State Board on Electrical Generation and Transmission Siting (the "Board") received an application from Ashwood Solar 1, LLC (Ashwood Solar) for approval to construct a commercial, photovoltaic solar merchant electric generating facility in Lyon County, Kentucky, in December 2020. Board staff retained BBC Research & Consulting (BBC), a Denver-based firm, to review the SAR. BBC was directed by Board staff to review the SAR for adequacy, visit the site and conduct supplemental research where necessary, and provide recommendations about proposed mitigation measures. This is the summary of BBC's final report, which encompasses the SAR review, establishes standards for evaluation, summarizes information from the applicant, notes deficiencies, offers supplemental information, and draws conclusions and recommendations related to mitigation. Issues outside the scope of KRS 278.708, such as regional economic impact, electricity market or transmission system effects, and broader environmental issues, were not addressed in this engagement.

Description of the Proposed Facility/Site Development Plan

The SAR provides a description of the proposed Ashwood Solar facility in terms of surrounding land uses, legal boundaries, access control, utility service, setback requirements, visual impacts, impacts on surrounding property owners, noise levels, and traffic impacts. The proposed Ashwood Solar generating facility would be in southwestern Kentucky, about one mile south of Bakers along U.S. 641 and about 40 miles northwest of the City of Hopkinsville. The proposed Ashwood Solar facility would be an 85-megawatt alternating current photovoltaic (PV) electricity generation facility, situated on agricultural land that has historically been used for row cropping and winter wheat production. Facility equipment will consist of crystalline solar panels, inverters, a substation transformer, and associated wiring and balance of system. An existing 161 kilovolt transmission line is located on the property and would be used to supply facility-generated electricity to the power grid.

Conclusions with respect to other descriptive elements of the facility follow:

- **Surrounding land use.** The site is currently used for agricultural purposes, and most of the acreage adjoining the site is also agricultural (46%) or part of the nearby Western Kentucky Correctional Complex (27%). In terms of the number of parcels, the majority of adjoining parcels are residential (54%). Parcels used for residential purposes are primarily located east and southeast of the proposed site, while agricultural and agricultural/residential parcels are located north, east, southeast, south, and west of the site. The six large lot parcels classed as agricultural/residential range in distance from 200 feet to 1,445 feet from the nearest solar panel. The 21 adjoining residential parcels range in distance from 126 feet to 2,070 feet from the nearest solar panel. One residential parcel is identified as being within less than 200 feet of a future solar panel. The Western Kentucky Correction Complex, a medium security prison, is located southeast of the proposed project boundary, east of US 641 on New Bethel Church Road. New Bethel Baptist Church is also

located southeast of the proposed project boundary on New Bethel Church Road, just west of the state correctional facility. The church is 1,470 feet from the nearest solar panel and 581 feet from the nearest inverter or transformer.

- **Proposed access control and security.** Ashwood Solar states that the site would be enclosed by a fence meeting National Electrical Code (NEC) requirements, typically a six-foot fence with three strings of barbed wire at the top. The proposed site will have as many as six access points as shown in Exhibit E in the SAR. There will be two fully functional access points on both US 641 and KY 1943, as well as single access points on Coleman-Doles Road and KY 3169. The proposed access points will be secured with a standard keyed or combination lock. Emergency personnel will be provided a key or combination for access.

Relative to other siting applications that BBC has reviewed for facilities involving fuel combustion to produce electricity, the proposed access control for this facility is relatively minimal. However, the proposed access control measures are consistent with siting applications for other solar developments BBC has evaluated in Kentucky. Further, the level of potential risk to surrounding areas associated with a commercial solar facility would seem much lower than for a fossil fuel (or renewable fuel) facility. In a response to the Board's Second Request for Information, Ashwood Solar stated that the proposed substation site would also have its own fence meeting National Electrical Code requirements. NEC 110.31 requires either a 7-foot fence, or a 6-foot fence with three strands of barbed wire above it.

- **Utilities.** The applicant's SAR stated that it does not anticipate the project will need to receive external utility services during typical plant operations, but subsequent follow up with the applicant indicated that, "Local utility services may be required during operations to provide auxiliary and backup power to the project substation and operational storage shed." According to Ashwood Solar's response to BBC's First Request for Information, it is too early in development to determine the engineering approach to substation design. As currently planned, the substation would be located in the Kentucky Utilities service territory."[1]

- **Setback requirements.** Kentucky statute 278.704(2) states that "…beginning with applications for site compatibility certificates filed on or after January 1, 2015, the proposed structure or facility to be actually used for solar or wind generation shall be required to be at least one thousand (1,000) feet from the property boundary of any adjoining property owner and two thousand (2,000) feet from any residential neighborhood, school, hospital, or nursing home facility." The nearest neighborhood (Breezy Loop) includes homes within 338 feet of the nearest proposed solar panel. Siting panels within this distance would require a setback deviation from the Siting Board. On March 10, 2021, Ashwood Solar filed a document titled "Applicant's Motion for Deviation from Setback Requirements" with the Siting Board.

- **Other facility site development plan descriptions provided in the SAR.** Legal boundaries; location of facility buildings, transmission lines, structures; location of access roads, internal roads and railways are all addressed in the SAR. Noise levels are briefly addressed and then evaluated

1 Ashwood Solar 1, LLC Responses to BBC Research and Consulting's First Request for Information. February 26, 2021.

more fully in a subsequent section of the SAR. These materials appear to meet the informational requirements identified in KRS 278.708.

Compatibility with Scenic Surroundings

Visual impact analysis commonly includes a description of the visual setting, visual features of the facility and its appurtenances, and an identification of places where humans might observe the facility or its components. These factors contribute to the evaluation of visual impacts and the facility's compatibility with the existing setting.

The applicant did not include a formal visual assessment in the SAR. However, Sections III-VI from Exhibit A of the SAR discusses the compatibility of the proposed project with the scenic surroundings based on distance between the facility and neighboring homes; topography; and harmony of use in the context of hazardous material, odor, noise, traffic, stigma, and appearance.

Topography of the landscape directly impacts the visibility of the facility, and Exhibit A states that the topography around the site is gently sloping. The site is located on relatively flat ground adjoining the nearest neighborhood (Breezy Loop) and other adjoining residences. As a result, there is little visual buffer from the surrounding topography to limit, or possibly eliminate, the view of solar panels from the homes in that neighborhood or other nearby residences.

As stated in Section 2 of the SAR, representatives from Ashwood Solar have met personally on various occasions with adjoining landowners to address their concerns about the project's impact on the viewsheds from their properties. In response to these concerns, Ashwood Solar is proposing to establish additional vegetative buffers at several locations along the perimeter of the proposed site to further limit visual impacts.

In response to a request from BBC, Ashwood Solar also provided visual simulations of the proposed facility from key observation points (KOPs) depicting the visual impacts when vegetative buffers are first planted and five years later.

In general, BBC agrees with Ashwood Solar's statements that the proposed facility would not be incompatible with its surroundings from a scenic standpoint. This assessment is based on an evaluation of the compatibility of existing solar installations in other areas with similar land use mixes to the surroundings of the proposed site and the visual simulations provided by the applicant. It also recognizes that solar facilities have a relatively low profile—similar to or lower than most single-family homes and greenhouses—and Ashwood Solar has agreed to install vegetative buffers to help screen the site from adjoining landowners.

Potential Changes in Property Values for Adjacent Property Owners

The central issue related to property values is whether, and to what extent, property values of other landowners will change because of development and operation of the proposed Ashwood Solar facility. Exhibit A of the applicant's SAR (the Property Value Impact report) provides a comparative study using data from numerous solar facilities across the US on property values in proximity to such facilities with similar homes which are not in proximity. The study uses an analysis of comparable home values design that is similar to the approach by which appraisers commonly estimate residential property values.

Regarding the impact of the facility based on distance to the nearest home, Exhibit A of the SAR showed that the average distance of a home to the nearest solar panel is 785 feet and claimed that at this distance, there would be no negative value impacts felt by neighboring property owners. The Property Value Impact report also presents an assessment of the proposed facility's harmony with the area, noting that solar facilities do not create any traffic during normal operation, nor do they produce odor; generate noise at levels that have a negative impact on the surrounding properties; or generate toxic or hazardous waste.

To obtain further perspective regarding potential effects on property values, BBC reviewed recent studies and articles related to potential concerns regarding solar facility effects on nearby property values. In some cases, recent proposals to construct large scale commercial solar projects have met with substantial public opposition. Although concerns regarding nearby property values have been one of the issues raised by project opponents, no data or analysis has been provided to substantiate that concern.

A more neutral evaluation was provided in a 2018 study conducted by the LBJ School of Public Affairs at the University of Texas. Based on a survey of public sector property appraisers in counties with commercial solar facilities, the study found that most assessors believed that commercial solar facilities had no impact (66 percent of all estimates) on home prices, or a positive impact (11 percent of all estimates). While some respondents did estimate a negative impact on home prices, assessors who had actual experience in assessing home values near solar facilities expected smaller impacts than those without such experience. Subsequent studies using large statistical samples of home sales before and after the installation of commercial-scale solar facilities in Rhode Island and Massachusetts found that there are no negative impacts to property values when solar facilities are located in rural areas.[2]

Based upon review of the applicant's SAR, subsequent information obtained during our visit to the site and surrounding areas, and other supplemental research, BBC concludes that the proposed facility is unlikely to have measurable impacts on the property values of adjacent properties or other properties in the vicinity of the project.

Expected Noise from Construction and Operation

The applicant's SAR includes a Noise and Traffic Study (Exhibit C in the SAR). The study states that noise in the assessment area will increase temporarily and intermittently during the construction phase of the project due to increase in vehicular traffic, construction equipment use, and assembly of the solar facility components. The assessment concludes that anticipated noise levels will be within accepted ranges and of short duration at any location and that the majority of noise producing activities will occur hundreds or thousands of feet from noise sensitive receptors. The noisiest periods of construction are expected to occur when pile drivers are used to install the solar panel supports. During this time, the peak noise from the pile drivers is expected to be 92.8 dB at the nearest receptor, or about the same level as a motorcycle engine running. The

[2] Gaur, V. and Lang, C. 2020. Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island. University of Rhode Island, Department of Environmental and Natural Resource Economics. Available at: https://works.bepress.com/corey_lang/33/

continuous noise from the pile drivers is expected to be about 86.0 dB, or about the same as a gas-powered lawnmower.

The assessment further concludes that ongoing noise from the daily operation of the proposed facility's panel tracking system, transformers, and inverters will not significantly contribute to noise within the assessment area, particularly with the installation of vegetative buffers as described in the applicant's SAR. The estimated noise levels associated with the trackers and inverters would be approximately equivalent to the noise level of a normal conversation. The estimated noise levels from the inverters would be about the same as a household air conditioner.

Given the moderate decibel ratings of the facility's motors and inverters, the distance between the proposed facility's noise-emitting equipment and the nearest residences, and the installation of vegetative buffers that will mitigate both the visual and audible impacts of the facility, BBC concludes that noise levels at the proposed facility during normal operations will not be a significant concern. There is more potential for noise impacts during construction, particularly when pile drivers are being used on the site. While such noise would be an inevitable effect from the construction process, it is above the threshold the Centers for Disease Control and Prevention cites as having potential to damage hearing over prolonged periods of time. Ashwood Solar should contact homes within 500 feet of any pile driving activity and notify them in advance of the upcoming activity, its timing, and anticipated duration, rather than waiting for complaints from those residents. It should also provide the opportunity for residents to ask questions or provide feedback, if desired.

Impacts on Transportation

The applicant's SAR supplies a traffic study in Exhibit C (Noise and Traffic Study). The proposed facility is adjacent to one major roadway, US 641, which is a two-lane road classified as rural minor arterial roadway with a posted speed limit of 55 miles per hour. The site is also adjacent to KY 1943, KY 3169, and Coleman-Doles Road. KY 1943 is a two-lane rural minor collector road between KY 373 and US 641, and KY 3169 is a two-lane urban local street. There is no rail access to the site.

According to Exhibit C in the SAR, data from the Kentucky Transportation Cabinet (KYTC) Division of Planning estimated that an average of 2,500 vehicles per day (VPD) use the stretch of US 641 north of the proposed site, while 2,550 vehicles per day use the stretch of US 641 on the site's northern boundary. Approximately 3,100 VPD use the stretch of US 641 south of the site. KY 1943 has a daily volume of 140 VPD according to Figure 2 in Exhibit C of the SAR, while KY 373 has a daily traffic volume of 300 VPD.

Once construction of the site begins, the number of vehicle trips on local roadways will increase. Workers will access the site by road each morning and depart the site by road each afternoon. Trucks will deliver heavy machinery to the site, and after that there will be daily truck deliveries of installation materials to site.

Ashwood Solar did not provide an estimate of the number of vehicle trips that would occur during construction of the site in the SAR, but the applicant did provide this information in response to the Siting Board's First Request for Information. Ashwood Solar anticipates that approximately 80 to 100 workers will access the site each day, on average, with 150 workers at peak. The applicant did not know how many workers would utilize ride sharing arrangements to reduce the number of

vehicles accessing the site. Ashwood Solar said it anticipates 10 delivery truck trips to and from the site each day for approximately 6 months.

In response to the Siting Board's First Request for Information about the weight of vehicles accessing the site, Ashwood Solar stated:

Generally, trucks and equipment arriving on a daily basis at the Project site will weigh no more than 46 tons (including fully loaded concrete trucks, loaders, and equipment delivery trucks). If required for civil work, an oversized excavator or articulated dump truck might weigh as much as 90 tons. At this stage of the project, we do not know if the oversized equipment will be needed.

The heaviest piece of equipment delivered to the Project site will be the substation transformer. This piece of equipment for a project of this size can weigh in the range of 70-80 tons, and the transportation vehicle for the transformer weighs an estimated 20 tons. An estimate of the total weight of the substation transformer and its delivery vehicle is therefore 100 tons. There will be one substation transformer delivery for the Project.

During the construction period, there could be noticeable effects on traffic volumes during the beginning of the day and end of the day peak periods, particularly on US 641. There is also a potential for impacts to traffic flows on KY 1943 if workers access the site through the two proposed access points along the road during day and end of the day peak periods. Additional short-term transportation impacts are possible when Ashwood Solar transports the substation transformer to the site.

After construction, the proposed Ashwood Solar facility would have very little impact on traffic flows and the local transportation infrastructure, likely comparable to or less than the effects from a typical single-family home.

Recommendations

In general, the Ashwood Solar site appears to have been well selected in terms of both access to existing transmission infrastructure and modest local impacts. The applicant has provided the required information for the site assessment, including providing information on the number of daily vehicle trips to and from the site and Ashwood Solar's plan to transport heavy equipment to the site in response to BBC's review of their SAR.

Additional information needed from the applicant. Ashwood Solar should determine their proposed route for delivering the substation transformers to the project site and should communicate their proposed route to the Lyon County road department and the KYTC.

Mitigation recommendations. Ashwood Solar has proposed the following mitigation measures in their SAR:

- Planting of native evergreen species as a visual buffer to mitigate viewshed impacts. Plantings to primarily be in areas directly adjacent to the Project without existing vegetation. Evergreen shrubs at least three feet high and fifteen feet wide will be planted in two staggered rows and will grow to at least six feet high three years after planting.

- Cultivation of at least 2 acres of native pollinator-friendly species onsite.

Ashwood Solar had an Environmental Site Assessment (ESA) Phase 1 completed for the site, which was provided with their SAR.[3]

Although no significant adverse transportation impacts are anticipated, BBC recommends that Ashwood Solar pursue mitigation measures outlined in their SAR, such as ridesharing between construction workers, using appropriate traffic controls or allowing flexible working hours outside of peak hours to minimize any potential delays during AM and PM peak hours. The trajectory of the COVID-19 pandemic will influence the feasibility of some of these mitigation measures, in particular ridesharing between employees.

BBC supports the foregoing mitigation identified by Ashwood Solar. We also recommend the following additional mitigation measures to minimize the impacts of the proposed facility:

Access points and internal roadways

- The application should continue discussions with Texas Gas Transmission to finalize encroachment and crossing agreements as soon as possible so the exact location and characteristics of internal roadways can be designed to meet weight and frequency limits and other applicable crossing requirements.

Visual compatibility

- Ashwood Solar should complete screening plan agreements with nearby homeowners as stated in Section 2 of the SAR to address their general concerns about viewshed impacts by limiting tree clearing and planting vegetative buffers to mitigate viewshed concerns.

Transportation

- Ashwood Solar must ensure that all site entrances and boundaries have adequate signage, particularly in locations visible to the general public, local residents, and business owners.

- Ashwood Solar should contact the Kentucky Transportation Cabinet as soon as possible to discuss the transportation requirements and possible restrictions for transportation of the substation transformer on US 641. If the route requires on-site assessment by KYTC before approval and permitting, Ashwood Solar should allow as much time as possible for that process to occur.

Noise

- Ashwood Solar should contact homes within 500 feet of any pile driving activity and notify them in advance of the upcoming activity, its timing, and anticipated duration, rather than waiting for complaints from those residents. It should also provide the opportunity for residents to ask questions or provide feedback, if desired.

- Ashwood Solar should respond to any noise-related complaints from residents adjacent to the project boundary, and work with those residents to reduce noise-related concerns through careful scheduling or other means to the extent feasible.

[3] SAR, Exhibit D.

Subject to review of the additional information needs identified earlier in this section, and to the Siting Board's decision on whether to grant Ashwood Solar a deviation from setback requirements identified in KRS 278.704 (2), BBC recommends that the Siting Board approve the application for a certificate to construct based upon the siting considerations addressed in this review. This recommendation presumes that the project is developed as described in the applicant's SAR and supplemental information, and that the mitigation measures above are implemented appropriately. Based upon the information available to BBC at the time of this report and if these presumptions are correct, there are unlikely to be significant unmitigated impacts from construction and operation of the Ashwood Solar project regarding scenic compatibility, property values, noise, or traffic.

SECTION C.

Findings and Conclusions

SECTION C.
Findings and Conclusions

This section provides detailed review and evaluation of each element of the SAR as prescribed in KRS 278.708. It is organized into five subsections:

1. Description of Proposed Facility/Site Development Plan;

2. Compatibility with Scenic Surroundings;

3. Potential Changes in Property Values for Adjacent Property Owners;

4. Expected Noise from Construction and Operation; and

5. Impacts on Transportation.

Although the Siting Board will likely consider economic impacts and other issues in making its decision, these are beyond the present scope of our inquiry and so are not addressed here.

Within each subsection identified above, BBC has followed a consistent structure:

- First (where applicable), BBC describes the generally accepted assessment criteria or methodology necessary to evaluate impacts of a project of this nature (**Potential Issues and Standard Assessment Approaches**).

- Second, we summarize relevant information that was included in the Application and SAR (**Information Provided in the Applicant's SAR**).

- Third, we describe supplemental information about the proposed Ashwood Solar 1 generating facility, along with other information BBC obtained about the project and its impacts (**Supplemental Investigations, Research, and Analysis**).

- Finally, BBC draws our own conclusions about the project's potential impacts and recommended mitigation (**Conclusions and Recommendations**).

We believe that this format transparently presents the basis for our conclusions and recommendations.

Description of Proposed Facility/Site Development Plan

Potential Issues and Standard Assessment Approaches

The primary purpose of this initial component of the SAR review is to ensure the applicant has provided the required information to the Siting Board and to assess that information.

As required by KRS 278.708(3)(a), the SAR must contain the following information:

- Subsection 1—surrounding land uses for residential, commercial, agricultural and recreational purposes;
- Subsection 2—the legal boundaries of the proposed site;
- Subsection 3—proposed access control to the site;
- Subsection 4—the location of facility buildings, transmission lines, and other structures;
- Subsection 5—location and use of access ways, internal roads, and railways;
- Subsection 6—existing utilities to service the facility;
- Subsection 7—compliance with applicable setback requirements as provided under KRS 278.704(2), (3), and (5); and
- Subsection 8—evaluation of the noise levels expected to be produced by the facility.

BBC found each of these required information items in the SAR and examined them. To some extent, the required elements of the description of the facility and site development plan specified in the legislation overlap with topic-specific evaluations also required in the statute. In particular, the statute calls for specific evaluations of impacts on nearby property values, traffic, and noise levels. Both the applicant's SAR and the BBC team's evaluation provide further detail on these topics in subsequent sections.

Information Provided in the Applicant's SAR

The required description of the proposed facility and site development plan is mainly set forth in Section 1 of the SAR. Other related or supplementary information comes from various exhibits contained in the SAR and application.

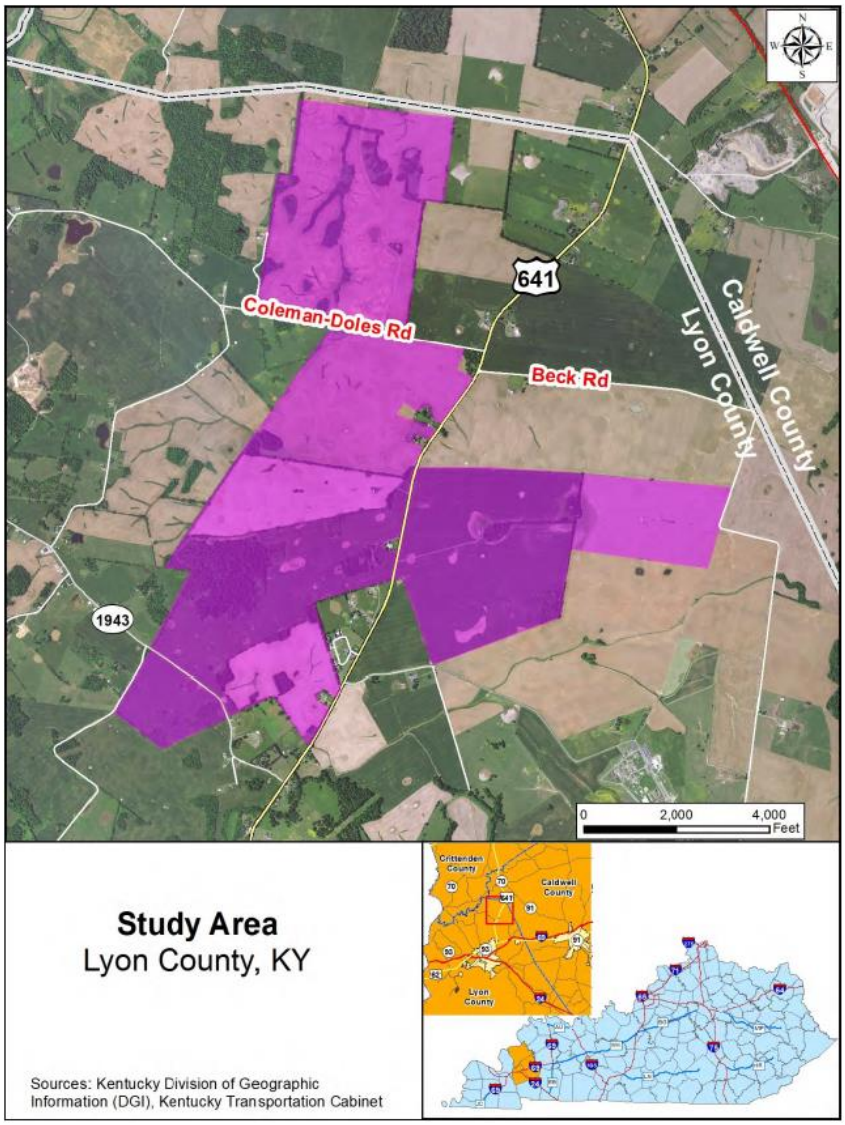
Overview of proposed facility. As described by Ashwood Solar 1, LLC (Ashwood Solar) in Section 1 of the SAR:

> *The proposed Ashwood Solar 1 Facility (the Project) will be an 86-megawatt alternating current (MWac) photovoltaic electricity generation facility. The project is to be located in Lyon County, one mile south of Bakers, Kentucky along US 641. The power generated by the project will be transported on the existing KU/LGE transmission line infrastructure that crosses the property.*
>
> *The project will be situated on up to 1,521 acres which has historically been used for row crop and winter wheat production. The equipment onsite will consist of crystalline solar panels, inverters, a substation transformer, and an associated wiring balance of system. Ashwood Solar secured rights to over 2,000 acres, including land in Caldwell County, but this application seeks a construction certificate for the Project to be located only in Lyon County. References in studies performed for Ashwood Solar may analyze the larger area, not all of which will be used for the Project.*

The racking system has a small footprint that uses minimal concrete (concrete will only be used to support posts that cannot be driven to adequate depths), and the panels are not considered impervious as rainwater can travel over and around the panels, making this a low impact development. A fence meeting National Electric Safety Code (NESC) requirements, typically a six-foot fence with three strings of barbed wire at the top, will enclose the facility. Where there are potential visual impacts created by the facility, a vegetative buffer will be planted. The vegetative buffer, where applicable, will consist of two staggered rows of evergreen shrubs at least three feet in height at time of planting.

The proposed project site covers an area of approximately 1,500 acres. Most of the site is located west of US 641, north of KY 1943, and south of Coleman-Doles Road. A smaller portion is located east of US 641 and south of Beck Road, another smaller segment is located south of KY 1943 and an additional segment is located north of Coleman Doles Road and south of the Caldwell County border (Figure C-1).

Figure C-1, Aerial View of Proposed Site and Surrounding Land Uses.



Surrounding land uses. Section 1.1 of the SAR describes land use classifications of the surrounding land in percentage terms. The site is currently used for agricultural purposes, and most of the acreage adjoining the site is also agricultural (46 percent) or correctional acreage used for the Western Kentucky Correctional Complex (27 percent). Residential and agricultural/residential acreage make up 4 percent and 23 percent of the surrounding acreage, respectively.

Figure C-2 from Exhibit A (Property Value Impact Report) in the SAR presents the same information with additional detail, including all adjoining parcels, property owners, present use, acreage, and distance from the home to the facility's nearest solar panel.

Figure C-2, Data for Parcels Adjacent to the Ashwood Solar Project Boundary.

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	Distance (ft) Home/Panel
1	38-4	Williams	124.95	Agri/Res	5.70%	2.70%	225
2	38-7	Vied	51.10	Agricultural	2.33%	2.70%	N/A
3	38-21	McDowerll	138.40	Agricultural	6.32%	2.70%	N/A
4	38-17-01	Hooks	1.28	Residential	0.06%	2.70%	570
5	38-17	Hooks	4.62	Residential	0.21%	2.70%	475
6	38-18	Sutton	284.00	Agricultural	12.96%	2.70%	N/A
7	38-18-01	Melander	1.00	Residential	0.05%	2.70%	1,160
8	38-16-01	Dean	4.08	Residential	0.19%	2.70%	750
9	38-16-02	N/A	0.73	Residential	0.03%	2.70%	N/A
10	38-15-01	N/A	1.78	Residential	0.08%	2.70%	N/A
11	38-23	Phelps	1.35	Residential	0.06%	2.70%	630
12	49-5	Gregory	102.60	Agricultural	4.68%	2.70%	N/A
13	-	West KY Farm	595.90	Correctional	27.20%	2.70%	N/A
14	39-29	Hooks	44.19	Agricultural	2.02%	2.70%	N/A
15	39-31	Pierson	11.80	Residential	0.54%	2.70%	435
16	38-20-01	Williams	1.42	Residential	0.06%	2.70%	170
16	39-3	Gish	15.80	Residential	0.72%	2.70%	780
17	39A-11	Wileman	0.50	Residential	0.02%	2.70%	395
18	39A-10	Schenk	0.58	Residential	0.03%	2.70%	405
19	39A-9	Widner	0.47	Residential	0.02%	2.70%	535
20	39A-8	Equity Trust	0.41	Residential	0.02%	2.70%	615
21	39A7	Brunsen	0.58	Residential	0.03%	2.70%	740
22	39A-5	N/A	0.50	Residential	0.02%	2.70%	875
23	39A-6	Hawkins	0.60	Residential	0.03%	2.70%	N/A
24	39-5	Herring Trust	161.36	Agricultural	7.37%	2.70%	N/A
25	39-6-01	Ferguson	2.00	Residential	0.09%	2.70%	1,085
26	39-25	Walton	6.08	Residential	0.28%	2.70%	2,070
27	39-7	Walton	18.86	Residential	0.86%	2.70%	1,905
28	39-8	Stewart	6.65	Residential	0.30%	2.70%	575
29	39-11	Dorroh	62.30	Agri/Res	2.84%	2.70%	1,335
30	29-39	Young	73.50	Agricultural	3.36%	2.70%	N/A
31	29-20	Engler	44.00	Agri/Res	2.01%	2.70%	200
32	29-21	Engler	47.40	Agri/Res	2.16%	2.70%	550
33	29-15	White	127.10	Agri/Res	5.80%	2.70%	1,445
34	38-12	Patton	30.00	Agricultural	1.37%	2.70%	N/A
35	38-10-01	O'Daniel	106.00	Agricultural	4.84%	2.70%	N/A
36	38-11	Doles	67.80	Agri/Res	3.10%	2.70%	920
37	38-3	White	48.93	Agricultural	2.23%	2.70%	N/A
		Total	**2190.610**		**100.00%**	**102.70%**	785

The six large lot parcels classed as agricultural/residential range in distance from 200 feet to 1,445 feet from the nearest solar panel, according to Figure C-2. The 21 residential parcels range in distance from 170 feet to 2,070 feet from the nearest solar panel. Three homes are identified as within 300 feet of a future solar panel, and three residential parcels do not have an identified distance between the home and the nearest solar panel.

Figure C-3, copied from Exhibit A of the SAR, provides an aerial view of the proposed site with adjoining parcels numbered.

Figure C-3, Map of Parcels Adjacent to the Ashwood Solar Project Boundary.

Parcels used for residential purposes are primarily located along US 641. Seven residences are located on US 641 just south of Coleman-Doles Road. The Breezy Loop neighborhood contains an additional seven residences, and is located at the southeast boundary of the site on US 641 just north of KY 1943. Four residences are located along the site's southern boundary on the north side of KY 1943, near US 641. Five agricultural/residential parcels are located on the site's western boundary between KY 1943 and Coleman-Doles Road.

Legal boundaries. The legal boundaries of the proposed site are described in Exhibit B (Legal Description of Site) of the SAR. The site consists of 10 parcels in Lyon County, totaling approximately 1,506.8 acres. The legal description of a parcel must contain all necessary information for a competent surveyor to locate the parcel based on the description. BBC's review of the legal description of the parcels in the Ashwood Solar project indicates the description appears to meet this standard.

Access control. Section 1 of the SAR provides a brief description of access control and security for the site during operations, indicating that the site would be enclosed by a fence meeting national electrical code requirement, typically a six-foot fence with three strings of barbed wire at the top. Exhibit C (Noise and Traffic Impact Study) contained in the SAR also says: "The development will have as many as two fully functional access points on both US 641 and KY1943, as well as single access points on Coleman-Doles Road and KY 3169." According to Exhibit E (Preliminary Site Layout) in the SAR, the proposed access points will be secured with a standard keyed or combination lock and emergency personnel will be provided a key or combination for access.

Location of buildings, transmission lines and other structures. The aerial map of the site, presented in Exhibit E, shows the projected location of the solar arrays, the existing transmission lines, access points, vegetative buffers, pollinator planter areas, electrical sub-station sites, and battery storage sites that would be constructed as part of the project. Exhibit E does not depict any buildings associated with the proposed Ashwood Solar facility. While not shown in Exhibit E, a note in the lower right hand side of the exhibit says the site will be surrounded by a tall chain link fence meeting National Electric Code regulations.

Location and use of access ways, internal roads and railways. Exhibit E of the SAR shows six proposed access points to the facility. These are described in more detail in Exhibit C in the SAR which says: "The development will have as many as two fully functional access points on both US 641 and KY1943, as well as single access points on Coleman-Doles Road and KY 3169." Internal roads would be developed from each access point, but the proposed location of the roads is not shown in any of the aerial figures depicting the project site. The SAR also does not discuss construction guidelines for internal access roads. Exhibit E of the SAR and Ashwood Solar Phase I Environmental Site Assessment page 4.5 and page 5.3 identified an interstate natural gas transmission pipeline and two natural gas distribution service areas that cross the project site. The pipeline is owned by Texas Gas Transmission. The buried pipeline may require Ashwood Solar's internal roadways to meet construction guidelines on vehicular weight and frequency limits from the pipeline owner or the U.S. Department of Transportation's Pipeline and Hazardous Materials Administration or otherwise impact the location of internal roadways. There is no rail access to the site.

Existing or proposed utilities. Section 1 of the SAR states, "At this time, it is not anticipated that the project will need to receive external utility services during typical plant operation." The SAR does not indicate what circumstances, if any, could require external utility services. In its First Request for Information, BBC sought clarification from the applicant regarding what foreseeable circumstances could necessitate external utility services at the site and what those service requirements could be.

Compliance with applicable setback requirements. Kentucky statute 278.704(2) states, in part, that "… no construction certificate shall be issued to construct a merchant electric generating facility unless the exhaust stack of the proposed facility and any wind turbine is at least one thousand

(1,000) feet from the property boundary of any adjoining property owner and all proposed structures or facilities used for generation of electricity are two thousand (2,000) feet from any residential neighborhood, school, hospital, or nursing home facility."

Section 1, item seven of the SAR (Description of Proposed Site) refers the reader to Exhibit E to see the proposed setbacks, which indicates the applicant is proposing 250-foot setbacks from the Breezy Loop neighborhood and 50-foot setbacks from the individual residences on US 641 south of Coleman-Doles Road. Section 1 of the SAR also notes that Ashwood Solar will seek a deviation from the setback requirements.

The site of the proposed project is in Lyon County and must comply with its setback requirements, if any. Volume 1, Section 4 of the applicant's application makes Ashwood Solar's argument for a deviation from the setback requirement and states:

> *The Project lies in Lyon County. The county has not enacted any zoning ordinances or setback requirements for the location of the Project. There is no planning and zoning commission with jurisdiction over the location of the project and, therefore, no setback requirements set by such a planning commission exist.*

Section 4 of Volume 1 of the application goes on to state that there are no established setback requirements from the property boundary of any adjoining property owner to the Ashwood Solar site because the site is not a former coal processing plant, does not have any existing electricity generating facilities on-site, will not include any exhaust stacks or wind turbines, and will not use coal as a fuel source. Additionally, Section 4 of Volume 1 of the Ashwood Solar's application states that the City of Eddyville and Lyon County have no established set back requirements that apply to the site, nor has any other planning unit. However, since the Breezy Loop residential neighborhood is withing 2,000 feet of the proposed site, Ashwood Solar will be "moving the Siting Board for a deviation from this setback requirement."[1]

Evaluation of Noise Levels. Section 4 of the SAR summarizes the evaluation of noise levels associated with the proposed Ashwood Solar facility and refers the reader to Exhibit C which provides the more detailed noise study. The summary in Section 4 notes that:

> *Noise is expected to increase temporarily and intermittently during the construction phase of the project due to increases in vehicular traffic, construction equipment and assembly of the solar facility components. This increase in noise is expected to be within accepted ranges and of short duration at any given location within the project with the majority of the noise producing activities to occur many hundreds to thousands of feet from the nearest noise sensitive receptors.*

Section 4 of the SAR states that the noise from construction equipment will be similar to existing noise levels from crop cultivation and livestock operations that currently surround the site. Peak construction noise will occur when pile drivers are used to install the solar panel supports. The noise from the pile drivers will reach a maximum of 92.8 dB at the nearest receptor, which the SAR notes is equivalent to the sound from a motorcycle.

[1] Ashwood Solar 1, LLC Siting Assessment Report, Section 1, item 7.

The equivalent continuous sound from the pile drivers is 86.0 dB, which the SAR notes is like the sound from a lawnmower or heavy traffic. Pile drivers are expected to be used briefly and would move around the site so that their noise would not reach a sensitive receptor for more than a few days or weeks.

Once the site is constructed and operational Ashwood Solar says:

> *[..,]intermittent noise related to the panel tracking system and the constant noise of the inverters is expected. The increase in noise is negligible due to the distance between the panels / inverters and the nearest noise sensitive receptors. The nearest receptor is more than 120 feet from any solar panels and approximately 500 feet from an inverter. Sound levels from the tracking system can be expected to be the levels of a normal conversation at the nearest receptor (~67 dBA), while the sounds will be much quieter at most receptors. During average operation the inverters will be similar in noise level (~49 dBA) to a household air conditioner.*[2]

Exhibit C of the SAR states that the decibel level (dB) estimate for the inverters was measured at a distance of 10 meters. Exhibit C of the SAR does not indicate at what distance the noise level from the trackers was measured. In a response to questions issued by BBC, Ashwood Solar indicated tracker noise levels were estimated based on a distance of 10 meters.[3]

Supplemental Investigations, Research and Analysis

After reviewing the applicant's SAR, the BBC team sought to supplement the information provided in the SAR where necessary to more fully describe the proposed facility and site development plan.

Surrounding land uses. As noted in the review of the SAR provided previously, three residential parcels identified as being in proximity to the proposed site did not have an identified distance between the home and the nearest solar panel. In its response to the Siting Boards' Second Request for Information, Ashwood Solar provided a map showing the distances between adjoining residential structures and the nearest solar panel.[4] According to Ashwood Solar's response, residences missing distance information in Figure C-2 (Table 1 of Exhibit A in the SAR) are between 338 feet and 605 feet from the nearest solar panel.

In their response to the Second Request for Information, Ashwood Solar also noted that the distances shown in Figure C-2 (Table 1 of Exhibit A in the SAR) were created using an older project layout and that more accurate distances can be found in Table 1 of Exhibit C in the SAR, which is shown later in this report on page C-38. According to this table, the closest residence is 126 feet from the nearest solar panel, rather than the 170 feet shown in Figure C-2 (Table 1 of Exhibit A in the SAR).

During the site visit, the study team also visited nearby areas and took a number of photos to help put the proposed site into additional context. Figures C-4 provides a view looking west towards the site

2 Ashwood Solar 1, LLC Site Assessment Report, Exhibit C.

3 Ashwood Solar 1, LLC Responses to BBC Research and Consulting's First Request for Information. February 26,

2021. 4 Ashwood Solar 1, LLC Responses to Siting Boards' Second Request for Information, March 25, 2021.

from the Breezy Loop neighborhood. Figure C-5 provides a view west from the eastern boundary of the site near one of the two potential substation locations.

Figure C-4.
Proposed Ashwood Solar Site Seen Looking West from Breezy Loop Neighborhood.

Source: BBC Research & Consulting, February 2021.

Figure C-5. View West from the Site of Potential Substation Location Near East Boundary of Site.

Source: BBC Research & Consulting, February 2021.

Legal boundaries. BBC believes that the legal descriptions of the parcels that comprise the proposed site, found in Attachment B of the SAR, meet the Kentucky statutory requirements. The applicant clarified the specific acreage involved in the proposed site in response to BBC Research and Consulting's First Request for Information, stating that the correct surveyed acreage is 1,506.82 acres.

Access control. Relative to other siting applications that BBC has reviewed for facilities involving fuel combustion to produce electricity, the proposed access control for this facility is relatively minimal. However, the proposed access control measures are consistent with siting applications for other solar developments BBC has evaluated in Kentucky. Further, the level of potential risk to surrounding areas associated with a commercial solar facility would seem much lower than for a fossil fuel (or renewable fuel) facility. The proposed access control measures appear to be consistent with industry standards if Ashwood Solar also posts adequate signage to warn potential trespassers. In a response to the Boards' Second Request for Information, Ashwood Solar stated that the proposed substation

site would also have its own fence meeting national electric code requirements. NEC 110.31 requires either a 7-foot fence, or a 6-foot fence with three strands of barbed wire above it.[5]

Location of buildings, transmission lines and other structures. BBC believes the SAR provides sufficient information and graphical representation of proposed locations of transmission lines, buildings, and other structures. During the site visit in February 2021, representatives of Ashwood Solar stated that an operations and maintenance building could be sited near the proposed locations of the project's sub-stations. The potential site of the maintenance building was not shown in Exhibit E. In its response to the Siting Boards' Second Request for Information, Ashwood Solar stated that upon further evaluation the construction of a new/permanent building will not be required for ongoing maintenance and operations.

Location and use of access ways, internal roads and railways. In response to BBC and the Siting Board's First Request for Information regarding site access and roads, Ashwood Solar provided further information about site entrances.[6] In response to questions from the Siting Board regarding exact locations of entrances and exits, Ashwood Solar said "Entrances shown to the project are provided as representations. Further development of the project is needed to identify exact location of project entrances" and that "the locations currently depicted are based on existing entrances to the properties."

When asked about the access points most likely to be used during construction, the applicant stated that:

> *During construction, the main access points to the Project site are likely two driveway entrance locations off US Hwy 641 N. During operations, all six access points will be used as needed to enter the specific area of the project that needs maintenance.*

Ashwood Solar also provided information regarding the internal roads in response to a question posed by the Siting Board asking for clarification about the types of roads that will be constructed on-site. In response, Ashwood Solar stated:

> *There are no plans for paving or graveling internal roads. The road design is expected to be compact native material but may temporarily substitute gravel roads when necessary to improve drivability during construction when absolutely necessary.*

In response to a question from the Siting Board with respect to how the location of internal roadways would be impacted by the presence of pipelines and natural gas distribution areas, Ashwood Solar stated that the location of pipelines could affect the location of internal roadways, but that "further development of the project is needed to identify exact locations of the project entrances and also internal roads." The applicant went on to say that "Engineering has not yet been completed for the Ashwood project, which will provide specific construction guidelines for internal roads. Ashwood Solar will ensure that the project will be engineered and designed in a manner that meets all vehicular weight, frequency limits, or other applicable crossing requirements of the pipeline

---

[5] http://www.teces.org/docs/1218.pdf

6 Ashwood Solar 1, LLC Responses to BBC Research and Consulting's First Request for Information. February 26, 2021.

company and also the U.S. Department of Transportation's Pipeline and Hazardous Materials Administration."

Utilities. The applicant's SAR stated that external utility services should not be required at the site during typical operation, and BBC sought clarification from the applicant regarding any possible circumstances in which such services would be required. In its response to BBC's First Request for Information, Ashwood Solar stated:

> *Local utility services may be required during operations to provide auxiliary and backup power to the project substation and operational storage shed. It is too early in development to determine the engineering approach to substation design. As currently planned, the substation would be located in the Kentucky Utilities' service territory.*[7]

Compliance with applicable setback requirements. As noted in the Exhibit A of the SAR, the nearest neighborhood (Breezy Loop) includes homes ranging in distance from 395 feet to 875 feet from the nearest proposed solar panel. Subsequent information from the applicant indicated that the nearest home in Breezy Loop is actually 338 feet from the nearest solar panel.[8] For development of the proposed Ashwood Solar facility to proceed as planned by the applicant, a deviation from the setback requirements would be required.

Ashwood Solar filed a document titled "Applicant's Motion for Deviation from Setback Requirements" with the Siting Board on March 10th, 2021. As part of the Motion, Ashwood Solar also included a map with the location of adjacent neighborhoods, a Siting Board action from the application of ecoPower Generation-Hazard LLC, and a Cumulative Environmental Assessment. Ultimately, the Siting Board must make the determination regarding the sufficiency of the Motion.

Conclusions and Recommendations

Based upon review of the applicant's SAR, subsequent conversations with the applicant and additional data collected by the BBC team, we reach the following conclusions concerning the description of the facility and the proposed site development plan:

- The applicant has complied with the legislative requirements for describing the facility and site development plan. Additional information provided by the applicant in response to BBC Research and Consulting's First Request for Information clarified the location and use of the six proposed access points, including the primary access points that would be used during construction and the additional proposed access point for future operations and maintenance.

- The applicant clarified the proposed design of internal roads, which would be constructed with native material unless use requirements demanded roads be constructed with more robust materials in response to the Siting Boards' First Request for Information.

7 Ashwood Solar 1, LLC Responses to BBC Research and Consulting's First Request for Information. February 26, 2021. 8 Ashwood Solar 1, LLC Responses to BBC Research and Consulting's Second Request for Information. March 25, 2021.

- The applicant clarified potential situations in which utility services could be required in response to *BBC Research and Consulting's First Request for Information*.

- The applicant clarified the extent (acreage) of the proposed site and the number of acres within the site that would be used for construction in response to *BBC Research and Consulting's First Request for Information*.

- The access control identified in the SAR is generally consistent with industry standards, but should also include appropriate signage to warn potential trespassers.

- Approval from the Siting Board would be contingent on granting Ashwood Solar a deviation from the setback requirements described in KRS 278.704(2) relating to the distance between the facility and nearby neighborhoods.

Recommended mitigation. Based upon review of the applicant's Application and SAR, subsequent conversations with the applicant and additional data collected by the BBC team, we reach the following conclusions concerning the description of the facility and the proposed site development plan:

- The applicant should continue discussions with Texas Gas Transmission to finalize encroachment and crossing agreements as soon as possible so the exact location and characteristics of internal roadways can be designed to meet weight and frequency limits and other applicable crossing requirements.

- The applicant should ensure that the project is engineered and designed in a manner that meets all vehicular weight, frequency limits, or other applicable crossing requirements of the pipeline company and also the U.S. Department of Transportation's Pipeline and Hazardous Materials Administration.

Compatibility with Scenic Surroundings

This section of the SAR review addresses the compatibility of the proposed Ashwood Solar facility with the scenic surroundings. This component of the SAR is identified in KRS 278.708(3)(b).

Potential Issues and Standard Assessment Approaches

Various government agencies throughout the country employ visual assessment methodologies based on professionally accepted techniques. These techniques are fundamentally consistent in their approach to evaluating the elements of a project and its compatibility with existing landscapes and other surroundings.

An example of a visual assessment methodology in use by a state power plant siting agency is the methodology employed by the staff of the California Energy Commission. In California siting assessments, the assessment of potential incompatibility between a project and its scenic surroundings focuses on project structures, such as smoke stacks. Typically, the assessment also addresses project lighting and the potential for visible cooling tower plumes.

A standard visual analysis generally proceeds in this sequence:

- Analysis of the project's visual setting;
- Identification of key observation points (KOP);
- Descriptions of visual characteristics of the project; and
- Evaluation of impacts to KOPs.

A KOP is a location where people may periodically or regularly visit, reside or work within the viewshed of the project's structures or emissions. [9]

In general practice, visual impact evaluations are conducted within one of three general frameworks, depending upon the relevant jurisdiction and its level of involvement at the project site. These are listed in order of structural formality:

- A formal visual resource or scenery management system, typically in effect only on federal lands, such as the U.S. Forest Service Scenery Management System or the U.S. Bureau of Land Management Visual Resource Management System;
- Locally applicable laws, ordinances, regulations or standards, where imposed by state or local governments; and
- The cultural context, including the influence of previous uses on the landscape and public attitudes toward the compatibility of various types of land use.

Each framework, in its own way, embodies explicit or implicit consideration of some or all of the standard measures of visual impact: viewer exposure and sensitivity; relative project size, quality, visibility, exposure, contrast and dominance; and prevailing environmental characteristics, such as season and light conditions. Local regulations especially focus on screening of facilities from public view and the effects of glare from outdoor lighting upon adjacent property.

In this instance, the visual impact evaluation followed the third, and least formal, of the three approaches listed above. The selected approach is appropriate given that there is no formal visual resource system, nor are there any local ordinances related to visual impacts for the area surrounding the proposed facility. The primary project features under consideration for scenic compatibility are the solar panels, which would be less than 15 feet in height.[10]

Applicant's Submittal

In compliance with KRS 278.708, Section 2 of the SAR summarizes the assessment of compatibility with scenic surroundings and refers the reader to Sections III-VI of Exhibit A for further detail.

Visual assessment. The applicant did not include a formal visual assessment in the SAR. However, Exhibit A (Property Value Impact report) provides an assessment of scenic compatibility based on

[9] The viewshed is defined as an area of land, water, or other part of the environment visible to the eye from a vantage point. Conversely, the vantage point is presumed to be visible from locations within the viewshed.

[10] Ashwood Solar 1, LLC Site Assessment Report, Section 2.

distance between the facility and neighboring homes; topography; and harmony of use based on the relatively benign characteristics of solar generating facilities. Exhibit A notes that solar facilities do not create any hazardous wastes during normal operation, nor do they produce odor; generate noise at levels that have a negative impact on the surrounding properties; or generate vehicle traffic at a significant level. In addition, the analysis states that there is no stigma attached to solar facilities, that they are visually similar in many ways to greenhouses commonly present in similar landscapes, and that they are not at odds with the surrounding agricultural or rural residential landscape.

However, in Section 2 of the SAR (page 5 of 205), Ashwood Solar states that: "…representatives from the Project have met personally on various occasions with adjoining landowners to address their concerns…about the viewsheds from their particular properties." Ashwood Solar has agreed to address adjoining landowner's concerns by using vegetative buffers to reduce the visual impacts on nearby residences, as shown in Exhibit E in the SAR.

Supplemental Investigations, Research and Analysis

Visual assessment. Topography of the landscape directly impacts the visibility of the facility and Exhibit A states that the topography around the site is gently sloping. The site is located on relatively flat ground adjoining the nearest neighborhood (Breezy Loop) and other adjoining residences. As a result, there is little visual buffering from the surrounding topography to limit, or possibly eliminate, the view of solar panels from the homes in that neighborhood or other nearby residences.

In the Siting Board's Second Request for Information, Ashwood Solar was asked which property owners had expressed concerns about the proximity of the solar panels to their properties and whether or not it was possible to locate panels further from these residences. In its response to the Siting Board's question, Ashwood Solar indicated that there were four residences that had expressed concern:

- Residence on the northwestern edge of the project, 300 feet from the nearest propose panel;
- Northern most residence on US 641, 327 feet from the nearest proposed panel;
- Two residences in the middle of the project area, which are 126 and 219 feet from the nearest proposed panel, respectively; and
- A residence on the southwestern edge of the project, 217 feet from the nearest proposed panel.

In its response, Ashwood Solar said solar panels could potentially be relocated, dependent on constraints within the remainder of the site and if relocation/removal of panels is practicable and economically feasible. Ashwood Solar said it would establish vegetative buffers around these residences as shown in Figure E of the SAR and limit the removal of existing vegetation along tree and fence lines in direct viewshed to the proposed panels, to the extent possible.

To help assess the visual impacts, Ashwood Solar provided a map depicting the location of these four residences as shown in Figure C-6. The residence on the northwestern edge of the project is shown by the circle labeled VP01; The residence located on the northern most point of the project on US 641 is shown by the circle labeled VP03A_04; the two residences in the middle of the project area are

depicted by the circles VP07 and VP05, respectively; and the residence on the southwestern edge of the project is sown by the circle labeled VP08.

Figure C-6. Overview of Visual Simulation Sites of Proposed Ashwood Solar Project.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Ashwood Solar also provided copies of visual simulations showing the view of the proposed project site from neighboring properties, including the four residences that expressed concern about visual impacts. BBC included two simulations for each of the four residences expressing concern in Figures C-7 through C-16. The simulations for those residences show the vegetative buffer at the project boundary at the time of installation and planting and then at year 5 of operations.

Figure C-7. Simulated View East from Residence on Northwestern Edge of Project at Planting.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-8. Simulated View East from Residence on Northwestern Edge of Project at Five Years.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-9. Simulated View Northwest from Residence on at Northern Most Point of Project on US. 641 at Planting.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-10. Simulated View Northwest from Residence on at Northern Most Point of Project on US 641 at Five Years.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-11. Simulated View Northeast from Residence in the Middle of the Project, Existing.

Source: Ashwood Solar, LLC Responses to Siting Board's Second Request for Information

Figure C-12. Simulated View Northeast from Residence in the Middle of the Project, Proposed.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-13. Simulated View Southwest from Residence in the Middle of the Project at Planting.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-14. Simulated View Southwest from Residence in the Middle of the Project at Five Years.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-15. Simulated View Northeast from Residence on Southwestern Edge of the Project at Planting.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

Figure C-16. Simulated View Northeast from Residence on Southwestern Edge of the Project at Five Years.

Source: Ashwood Solar 1 LLC Responses to Siting Board's Second Request for Information

BBC visited the proposed Ashwood Solar site in February 2021 with Siting Board and Ashwood Solar representatives to assess the project's visual setting. Figure C-17 looks west into the proposed site from near the southeastern corner. A partly screened residence in the Breezy loop neighborhood can be seen on the right and a vegetative buffer would be planted in this location.

Figure C-17. View West from the Breezy Loop Neighborhood to Southeastern Portion of the Project.

Source: BBC Research & Consulting, 2021

Figure C-18 looks south from KY 1943 to the southern portion of the project. As evident from this Figure and other photos from the site, the topography of the site and adjoining properties is relatively flat, offering little mitigation to potential visual impacts.

Figure C-18. View South from KY 1943 to Southern Portion of the Project.

Source: BBC Research & Consulting, 2021

Figure C-19 looks southwest from KY 1943 to the southern portion of the project. A nearby residences can be seen in the bottom right quarter of the photo, behind existing vegetative screening.

Figure C-19. View Southwest from KY 1943 to Southwestern Portion of the Project.

Source: BBC Research & Consulting, 2021

Conclusions and Recommendations

In general, BBC concurs with Ashwood Solar's statements that the proposed facility would not be incompatible with its surroundings from a scenic standpoint. This assessment recognizes that solar facilities have a relatively low profile – similar to or lower than most single-family homes – and Ashwood Solar has agreed to install vegetative buffers to help screen the site from nearby homeowners as shown in Figures C-7 to C-16 and Exhibit E of the SAR.

Recommended mitigation. BBC recommends the following mitigation measures in regard to this portion of the Kentucky statutory requirements (KRS 278.708(3)(b):

- The study team agrees with Ashwood Solar's proposal to plant a vegetative buffer "where there are potential visual impacts created by the facility…" This buffer will consist of two staggered

rows of evergreen shrubs at least three feet high at time of planting, approximately 15 feet wide.[11]

- Ashwood Solar should complete screening plan agreements with nearby homeowners as stated in Section 2 of the SAR to address their general concerns about viewshed impacts by limiting tree clearing and planting vegetative buffers to further buffer viewshed concerns.

- Ashwood Solar must carry out the screening plan and make sure the proposed new vegetative buffers are successfully established and develop as expected over time.

Potential Changes in Property Values for Adjacent Property Owners

Potential Issues and Standard Assessment Approaches

Development of new power plants can raise issues related to potential changes in property values for nearby property owners. These issues may arise from the widespread perception that a power plant and its ancillary facilities—such as ash disposal landfills, overhead electric transmission lines and electric transformer sites—may be "undesirable land uses" whose impacts are expected to be translated economically into negative effects on property values. Studies also show that impacts may extend for some distance from the site, and possibly beyond the immediately adjacent properties. These findings, however, primarily apply to conventional, fossil fuel-fired plants.

Criteria for evaluating property values effects that reflect the concerns of a broad range of interested parties typically include these aspects of the issue:

- Land use compatibility;

- Findings from other empirical studies; and

- Potential for effects to other than adjacent property owners.

Land use compatibility. State and local governments around the country use standards of land use compatibility to minimize the effect of industrial land uses, like power plants, upon nearby properties. KRS Chapter 278 incorporates setback requirements as its primary standard for buffering the siting of power plants. Land use compatibility, in the strict sense of legal use, and in the general sense of reasonably probable use for a given location and "neighborhood," are also factors in a general appraiser's judgment and analysis concerning the "highest and best use" of a property.

Other general issues are also considered to encourage facility siting in compatible settings where negative effects to the uses and values of nearby properties would be minimal. In Wisconsin, for example, the Public Service Commission publishes this general definition of the range of potentially compatible sites for power plants:

Typically, active or vacant industrial lands may be more compatible and urban residential lands may be less compatible with power plants. Generally, sites that are more compatible with present and

[11] Ashwood Solar 1, LLC Site Assessment Report, Section 2.

planned land uses are more desirable, as are those where the plant would comply with existing land use regulations.

General land use planning practice offers the option to adopt or negotiate for performance standards for outdoor lighting, noise, vibration, odor, smoke or particulate matter, and so forth to minimize off-site impacts to adjacent uses.

Findings from empirical studies. Standard real estate appraisals are the most common type of empirical study used to evaluate potential changes to property values. The appraiser generally relies upon an examination of as many actual sales as possible of comparable properties in similar locations and with similar expectations for highest and best use.

Academic studies published in the land and environmental economics literature have used a variety of property value-based analyses to estimate the actual effect of power plants and other "undesirable land uses" whose impacts may have translated economically into negative effects on adjacent property values. So called "undesirable" uses that have been studied in this fashion over time include nuclear and non-nuclear power generation; hazardous, toxic, and nuclear waste disposal; conventional solid waste disposal; waste incineration; and hazardous industrial facilities.

For example, one study investigated the effect newly opened power plants had on property values in neighborhoods located within five miles of the plant. The study included 60 power plants, several of which were located in Kentucky and the surrounding states. The study found that housing values decreased by 3 to 5 percent between 1990 and 2000 in these neighborhoods compared to neighborhoods located further away from the plant. Another study of 262 undesirable or "noxious" facilities located across the country, including 92 coal, natural gas, or oil-fired power plants (of which two were in the East South Central region that includes Kentucky), illustrates this effect. Power plants were found to significantly decrease property values in the communities where they are located. The literature also includes numerous studies of the effect of electric transmission lines upon property values.

The standard statistical technique for evaluating the potential effects of an environmental amenity (such as beach frontage) or a dis-amenity (such as proximity to a hazardous waste site) is called hedonic pricing analysis. This technique recognizes that before one can evaluate the impact of an external characteristic on property values, the influences of other important value factors must be isolated and held constant using statistical techniques (e.g., multiple regression analysis). A hedonic pricing model treats the good in question (in this case local property values) as a bundle of amenities (size, aesthetic quality of property, access to local town, etc.) and dis-amenities (pollution, noise, etc.). Such a model is designed to isolate and quantify the implied effect on overall property value from each amenity or dis-amenity. Hedonic pricing models have been used to evaluate the impacts of many different factors contributing to the value of a piece of property. Examples include examining the effect of the proximity to hog farms (Palmquist, Roka and Vukina, 1997), beaches (Pompe and Rinehart, 1995), airports, and electric power plants (Blomquist, 1973).

Hedonic models are statistically estimated using multiple regression analysis. However, hedonic studies are complex and require extensive statistical training and large amounts of data. Moreover, not all factors that influence a home's selling price can be measured, and housing markets vary greatly from one region to another.

Potential for more distant off-site effects. Most analyses of property value impacts are local in scope. However, the effect of power plants and other facilities on property values has been shown to extend well beyond the site. This has been shown in at least one study, where negative effects of a small power plant located within the city of Winnetka, Illinois, were significant out to a distance of 11,500 feet, or more than two miles. As noted earlier, these findings also primarily apply to conventional, fossil-fuel fired plants.

Information Provided in the Applicant's SAR

Exhibit A of the applicant's SAR (the Property Value Impact report) provides a comparative study using data from numerous solar facilities across the US on property values in proximity to such facilities with similar homes which are not in close proximity. The study uses an analysis of comparable home values design that is similar to the approach by which appraisers commonly estimate residential property values.

Exhibit A of the SAR states that the closest home to the proposed facility site is 170 feet away and the average distance of a home is 785 feet to the nearest panel, further than a distance at which negative value impacts could be felt by neighboring property owners. This section of the Property Value Impact report concludes that there is no impact on the value of adjoining properties at this distance from the proposed facility.

Topography of the landscape directly impacts the visibility of the facility. The site is located on level ground compared to the surrounding area and closest neighborhood (Breezy Loop), which would not limit, or eliminate, the view of solar panels from the homes in that neighborhood. However, existing vegetative buffers on the north and west sides of the Breezy Loop neighborhood would limit views of the solar panels, particular in the spring, summer, and fall. Additionally, Ashwood Solar is proposing to establish additional vegetative buffers on the north and west sides of the Breezy Loop neighborhood to further limit visual impacts. Ashwood Solar is also proposing to add vegetative buffers between the site and existing residences on US 641, State Road 1943, and Clift Road north of Coleman-Doles Road, at the request of homeowners.

The Property Value Impact report also presents an assessment of the proposed facility's harmony with the area, noting that solar facilities do not create any traffic during normal operation, nor do they produce odor; generate noise at levels that have a negative impact on the surrounding properties; or generate toxic or hazardous waste.

The Property Value Impact report included in the applicant's SAR concludes:

> *[…] the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting property 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's quiet, and there is minimal traffic.*

Supplemental Investigations, Research and Analysis

To obtain further perspective regarding potential effects on property values, BBC reviewed recent studies and articles related to potential concerns regarding solar facility effects on nearby property values.

In some cases, recent proposals to construct large scale commercial solar projects have met with substantial public opposition. Notable examples include the proposed 500 MW facility at Fawn Lake, in Spotsylvania County, Virginia and the proposed 120 MW facility in Madison County, Indiana.[12] Although concerns regarding nearby property values have been one of the issues raised by project opponents, no data or analysis has been provided to substantiate that concern.

A more neutral evaluation was provided in a 2018 study conducted by the LBJ School of Public Affairs at the University of Texas. That study contacted public sector property assessors in 430 counties across the United States that had at least one utility-scale PV solar facility in place. Thirty-seven assessors agreed to fill out the on-line survey. Among the findings of that study were that:

- "The majority of responses suggested either no impact (66 percent of all estimates) on home prices, or a positive impact (11 percent of all estimates), as a result of proximity to solar installations."
- "However, some respondents did estimate a negative impact on home prices associated with solar installations." In the 23 percent of cases where are negative value was estimated, the negative effect was estimated to increase with closer proximity and larger scale solar installations. Respondents who had actual experience in assessing homes near solar installations estimated a 3 percent decline in value for home within 100 feet of a 20 MW solar installations and a 5 percent decline in value for homes within 100 feet of a 102 MW solar facility.
- "The results also suggest that experience assessing near a solar installation is associated with a much less negative estimate of impact."[13]

Most recently, a 2020 study published by economists from the University of Rhode Island using the hedonic pricing analysis approach described earlier identified statistically significant negative impacts on home prices due to proximity to commercial solar sites—under certain conditions. The study, based on "over 400,000 transactions within three miles of a solar site", found that property values within one mile of a solar facility declined by 1.7 percent, with larger effects on home values within 0.1 miles (500 feet) of a solar site (-7.0 percent). However, these findings were specific to solar sites in suburban areas. Solar sites in industrial or rural areas had no statistically significant impact on home prices.[14]

---

[12] *When Residents Support Solar – Just Not in My Backyard*. Linda Poon. CityLab.com. November 20, 2019; and *County Council Rescinds Revitalization Area Designation for Lone Oak Solar*. Ken de la Bastide. The Herald Bulletin. January 15, 2020.

[13] *An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations.* Project Director: Dr. Varun Rai. Policy Research Project (PRP), LBJ School of Public Affairs, The University of Texas at Austin, May 2018.

[14] Gaur, V. and Lang, C. 2020. Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island. University of Rhode Island, Department of Environmental and Natural Resource Economics. Available at: https://works.bepress.com/corey_lang/33/

Conclusions and Recommendations

Based upon review of the applicant's SAR, subsequent information obtained during our visit to the site and surrounding areas, and other supplemental research, we conclude that the proposed facility is unlikely to have measurable impacts on the property values of adjacent properties or other properties in the vicinity of the project.

Recommended mitigation. As described in the applicant's SAR, and noted earlier as recommended mitigation for compatibility with scenic surroundings, the primary mitigation for impacts to the adjoining properties would be installation of a vegetative buffer consisting of "two staggered rows of evergreen shrubs at least three feet high at time of planting." This mitigation appears sufficient given the projected negligible visual impacts of the proposed facility on property values.

Expected Noise from Construction and Operation

This section evaluates the studies and conclusions discussed in the SAR concerning peak and average noise levels associated with construction and operation of the proposed Ashwood Solar facility. This component of the SAR is identified in KRS 278.708(3)(d).

Standard Methodology and Issues for Noise Studies

Various governmental agencies throughout the country employ noise assessment methodologies based on professionally accepted techniques. In evaluating the construction and operational stages of a project, these techniques are fundamentally consistent in that they seek to estimate the potential contribution to ambient noise levels at the site in terms of sensitive receptors. Generally, the assessment methodologies are meant to measure the increase in noise levels over the ambient conditions at residential and non-residential sensitive receptors.

A standard noise impact assessment focuses on several key factors:

- Identification of sensitive receptor sites;
- Existing local ambient noise levels;
- Estimated construction or operational noise intensities;
- Distances between noise sources and sensitive receptors;
- Time of day during which peak noises are anticipated;
- Noise created by transportation features such as conveyors, trucks and rail lines; and
- Calculation of the cumulative effect of the new noise sources when combined with the existing ambient noise level, recognizing that new noise sources contribute to the ambient noise level, but not in an additive way.

Information Provided in the Applicants SAR

Section 4 of the applicant's SAR summarizes the findings from the Noise and Traffic Study (Exhibit C in the SAR). The applicant summarizes noise impacts during the construction phase:

- "Noise is expected to increase temporarily and intermittently during the construction phase of the project due to increases in vehicular traffic, construction equipment, and assembly of the solar facility components."

- "Traffic noise is expected to increase temporarily during construction due to the mobilization of labor and materials, equipment and staff moving between sections of the project and vehicles like dump trucks leaving the site. Construction related activity will be occurring between 7 a.m. and 9 p.m. and will be of short duration at any given location within the project."

- "The increase in noise is expected to be within accepted ranges and of short duration at any given location within the project…" and "…noise levels of construction equipment are not unlike the existing noise levels related to cultivation and livestock operations within and surrounding the project."

- The Noise and Traffic study does highlight the sound that will occur during construction from the pile drivers which drive the solar panel supports. This sound will be loud, estimated at 101 dB at 50 feet and 92.8 dB at the nearest receptor (Table 3 and Table 4 of Exhibit C of the SAR).

These last two points are in contradiction, as the noise from the pile drivers would be substantially louder than typical farm and livestock equipment. However, the applicant notes that pile drivers are only expected to be used during installation of the solar panel supports.

The noise assessment for the project's operational phase focuses primarily on the tracking motors and inverters, as well as noise emitted from the substation:

- "During site operation, intermittent noise related to the panel tracking system and the constant noise of the inverters is expected." "Sound levels from the tracking system can be expected to be about the level of a normal conversation at the nearest receptor (~67 dB), while the sounds will be much quieter at most receptors." The closest residence will be within 126 ft of the nearest solar panel (Table 1, Exhibit C of the SAR).

- "During average operation, the inverters will be similar in noise level (~49 dB) to a household air conditioner." According to manufacturer specifications the loudest the transformer is expected to be is just over 60 dB, or the level of a normal conversation, at a distance of 1 meter. The closest residence will be within 395 ft of the nearest inverter (Table 1, Exhibit C of the SAR) and the New Bethel Baptist Church is the closest sensitive receptor to the transformer at just under 600 feet away.

- "The solar facility is expected to have a maximum of one technician visiting the site daily for inspection and two to three technicians up to 70 days per year. Operation and maintenance work may proceed at night for up to 30 days per year. Weekend work is not anticipated but may be required upon any component outages that may impact energy production from the site. Other than the scenarios mentioned, vehicular traffic onsite will be limited to typical weekday business hours. Technicians…will not contribute noticeably to the existing traffic noise levels."

As shown above, the noise experienced by residences adjoining the site depend on their distance from the noise source. Figure C-20 (Table 1 of Exhibit C in the SAR) shows the distance from the property boundary, nearest solar panel, and nearest transformer, respectively, to the nearest

sensitive receptor site for residences surrounding the proposed site. The nearest residence to a solar panel is 126 feet away, while the nearest residence to an inverter or transformer is 395 feet away.

Figure C-20. Nearest Sensitive Receptor to the Site.

Type	Direction from Project Site	Distance from Property Boundary	Distance from Nearest Solar Panel	Distance from Nearest Inverter or Transformer
Residences – Coleman Doles Road	Northwest of the property boundary	Within 87 ft	Within 300 ft	Within 1,448 ft
Residences – US 641	Along US 641 through the center of the project site	Within 62 ft	Within 126 ft	Within 395 ft
Residences – Breezy Loop Neighborhood	South of the project boundary	Within 35 ft	Within 338 ft	Within 1,482 ft
Residences – State Road 1943	Southwest of the property boundary	Within 63 ft	Within 627 ft	Within 1,937 ft
Place of Worship – New Bethel Baptist Church	South of the property boundary	Within 514 ft	Within 1,470 ft	Within 581 ft

Source: Table 1, Exhibit C, Ashwood Solar 1 LLC Site Assessment Report

Supplemental Investigations, Research and Analysis

BBC requested further details from the applicant regarding the amount of time each type of machine is expected to be used during construction of the site as part of its First Request for Information. In their response, Ashwood Solar indicated that:

> *Pile drivers are expected to be used on-site for 1.5 months to 4.5 months for pile installation. Grading and excavating equipment are expected to be used for approximately 3 months of the project. Forklifts, skid steers, and tractors are expected to be used for approximately 8 months of construction. Dust control water trucks are expected to be used for the duration of construction on an as needed basis only.*

Exhibit C in the SAR states that the facility's tracking motors emit noise at a level of 78 dB when measured at a distance of 10 meters. Exhibit C also states that the facility's inverters emit noise at a level of 67 dB, but does not clarify at what distance that noise emission was measured. BBC submitted a written request for this information to the applicant as part of its First Request for Information. The applicant responded to BBC's inquiry by clarifying that both measurements were taken at a distance of 10 meters.[15]

BBC researched sound attenuation principles to approximate the noise levels from the proposed facility's panel tracking motors and inverters that would be audible at the nearby affected properties,

[15] Ashwood Solar 1, LLC Responses to BBC Research and Consulting's First Request for Information. February 26, 2021.

as well as louder sounds anticipated during construction. Across an open area with neither reflective surfaces nor absorbent barriers, sound attenuates at approximately 6 dB for every doubling of distance and can be estimated using the inverse square law.[16]

Using this calculation (and noting that the distance from the solar panels to the nearest home is reported as 126 feet in Figure C-20 (Table 1 of Exhibit C in the SAR) the maximum noise level of the facility's panel tracking motors (78 dB at 10 meters) would be between 53 dB and 56 dB at the nearest residence. At 126 feet, BBC estimates that sound from the pile drivers during the project's construction phase will be approximately 92 dB, or roughly as loud as a subway train or a motorcycle engine. Inverters are located further away from residences than solar panels. The closest residence is 395 feet from an inverter. At this distance, the proposed facility's inverters (67 dB at 10 meters) would have a noise level of about 35 dB - or, approximately the background noise of a whisper.[17]

To put the above sounds in context, BBC consulted noise levels for activities published by the Centers for Disease Control and Prevention (CDC). According to the CDC, the noise level from a whisper is 30 dBA, while a normal conversation has dBA of 60. The CDC notes that noise over 70 dB can damage hearing over a prolonged period and that noises over and noises over 120 dB can cause immediate harm to ears.[18] However, it is important to note that these estimations are approximated for a landscape with no absorbent barriers. It is not possible calculate in advance the precise effect that vegetative buffers and topographical shift will have on facility noise attenuation, but the effects will reduce noise levels at the nearest residences from the decibel levels calculated above.

Conclusions and Recommendations

The noise generation from a solar facility's panel tracking motors and inverters is not substantial, particularly when compared with conventional power plants and associated equipment. Given the moderate decibel ratings of the facility's motors and inverters, the distance between the proposed facility's noise-emitting equipment and the nearest residences, and the installation of vegetative buffers that will mitigate both the visual and audible impacts of the facility, BBC concludes that noise levels at the proposed facility during normal operations will not be a significant concern.

There is more potential for noise impacts during construction, particularly when pile drivers are being used on the site. In Exhibit C of the SAR, Ashwood Solar states:

> *The noisiest portion of the construction includes the use of pile drivers to install the solar panel supports. These will only be used very briefly and the worst-case maximum noise [Lmax (dBA)] expected to occur at the nearest receptor is 92.8 dBA which is similar to a motorcycle. The equivalent continuous sound level [Leq (dBA)] from construction including the pile driver is 86.0 dBA which is similar to a lawnmower or heavy traffic.*

---

[16] Estimating Sound Levels with the Inverse Square Law. Georgia State University. http://hyperphysics.phy-astr.gsu.edu/hbase/Acoustic/isprob2.html

[17] Estimating Sound Levels with the Inverse Square Law. Georgia State University. http://hyperphysics.phy-astr.gsu.edu/hbase/Acoustic/isprob2.html

[18] Available at: https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html

Exhibit C of the SAR does not indicate what noise threshold would be considered too high but based on the 70 dBA threshold the CDC considers to be unsafe for hearing over prolonged periods, the sound of the pile drivers is likely to impact nearby homeowners during their use. While such noise would be an inevitable effect from the construction process, it is above the threshold the CDC sites as having potential to damage hearing if continued over prolonged periods of time. Another way to examine this issue is to look at the National Institute for Occupational Safety and Health's (NIOSH) recommended exposure limit. According to NOISH, occupational noise exposure should be limited to sounds of no more than 83 dB.[19] Based on sound attenuation estimates across open space, a residence would need to be at least 400 feet from the nearest pile driver in order to experience a sound of 83 dB or less.

Recommended mitigation. BBC recommends that Ashwood Solar should clarify precisely where and when pile driving will occur across the site and consider the distances to each home within 500 feet of this activity to appropriately mitigate hazardous or annoying noise as necessary. Further:

- Ashwood Solar should contact homes within 500 feet of any pile driving activity and notify them in advance of the upcoming activity, its timing and anticipated duration, rather than waiting for complaints from those residents. It should also provide the opportunity for residents to ask questions or provide feedback, if desired.

- Ashwood Solar should respond to any noise-related complaints from residents adjacent to the project boundary, and work with those residents to reduce noise-related concerns through careful scheduling or other means to the extent feasible.

Impacts on Transportation

This portion of the SAR review examines the impacts of the proposed Ashwood Solar facility on road and rail transportation. This also includes traffic effects, such as congestion, safety, fugitive dust, and degradation of the transportation infrastructure. This component of the SAR corresponds to KRS 278.708(3)(e).

Potential Issues and Standard Assessment Approaches

Development of a new power plant can raise a variety of potential traffic related issues. These issues may arise from the movement of construction workers and heavy and oversized loads during the construction process and added congestion during both construction and subsequent operations.

Standard components of the evaluation of traffic related impacts include:

1. Identification of access methods, and a description and visual portrayal of primary access routes to the site during construction and during operation.

2. Description of baseline traffic conditions: existing traffic counts, road capacity and level of service and any major existing constraints (e.g., bridge weight limitations, etc.).

[19] Noise and Hearing Loss Prevention. The National Institute for Occupational Safety and Health. https://www.cdc.gov/niosh/topics/noise/default.html

3. Identification of any special transportation requirements during construction (e.g., the need to reinforce or "ramp over" existing bridges, detours, temporary closures, etc.).

4. Projection of traffic volumes related to construction and operation.

5. Determination of whether the additional traffic, during construction and operation, would lead to congestion, changes in the level of service of the existing road network or additional road maintenance costs.

Information Provided in the Applicant's SAR

The applicant's SAR supplies a traffic study in Exhibit C (Noise and Traffic Study). The proposed facility is adjacent to one major roadway: US 641, which is a two-lane road classified as rural minor arterial roadway with a posted speed limit of 55 miles per hour. The site is also adjacent to KY 1943, KY 3169, and Coleman-Doles Road. KY 1943 is a two-lane rural minor collector road between KY 373 and US 641 and KY 3169 is a two-lane urban local street. There is no rail access to the site.

According to Exhibit C in the SAR, data from the Kentucky Transportation Cabinet (KYTC) Division of Planning estimated that an average of 2,500 vehicles per day (VPD) use the stretch of US 641 north of the proposed site, while 2,550 vehicles per day use the stretch of US 641 on the site's northern boundary. 3,100 VPD use the stretch of US 641 south of the site. KY 1943 has a daily volume of 140 VPD according to Figure 2 in Exhibit C of the SAR, while KY 373 has a daily traffic volume of 300 VPD.

Once construction of the site begins, the number of vehicle trips on local roadways will increase. Workers will access the site by road each morning and depart the site by road each afternoon, trucks will deliver heavy machinery to the site, and there will be daily truck deliveries of installation materials to site. Ashwood Solar anticipates that most workers will arrive to the site between 7:00am and 9:00am and depart the site between 3:00pm and 6:00pm, however construction may take place as late as 9:00pm. Equipment deliveries will occur on trailers, flatbeds, or other large vehicles. Ashwood Solar did not provide an estimate of the number of vehicle trips that would occur during construction of the site. Instead, the traffic impact study assumed that construction of the site would increase peak traffic volumes on local roads by 10 percent compared to current conditions. The Noise and Traffic Study in Exhibit C of the SAR concluded that:

> *As demonstrated in the traffic analysis, the construction period trip generation of workers and trucks will not generate a significant number of trips on local roadways. KY 1943, KY 3169, and US 641 will continue to operate at a LOS A during worst-case scenario construction peak traffic. Although no significant, adverse traffic impacts are expected during project construction or operation, using mitigation measures such as ridesharing between construction workers, using appropriate traffic controls or allowing flexible working hours outside of peak hours could be implemented to minimize any potential for delays during the AM and PM peak hours.*

After the construction period at the proposed facility site, traffic volumes in and out of the site will be minimal during daily operations.

Supplemental Investigations, Research and Analysis

BBC conducted supplemental investigations to explore issues surrounding the number of vehicle trips made by workers and delivery vehicles during construction and the anticipated weight of construction equipment that would be transported to the site. Each issue is discussed separately, below.

Vehicle trips. Exhibit C of the SAR notes that construction will take eight to twelve months and will produce a temporary increase in traffic from construction workers and delivery of equipment and material (Exhibit C in the SAR). The SAR does not provide any information regarding the number of anticipated workers (average or peak) or the number of expected truck deliveries during construction.

In response to a question asking for the above information as part of the Siting Board's First Request for Information, Ashwood Solar replied that it anticipates that there will be an average of 80-100 workers on site at any given time, with 150 workers at peak. In Exhibit C of the SAR and its response to the First Request for Information, the applicant indicated it did not know how many vehicles would access the site each day because it could not forecast the number of workers that would utilize ride sharing arrangements. In response to BBC's First Request for Information, Ashwood Solar said it anticipates 10 delivery truck trips to and from the site each day for approximately 6 months.

To put the worker and truck trip numbers in perspective, if a daily peak of 150 workers and 10 delivery vehicles commuted to and from the site via US 641 (and each worker arrived alone in their own vehicle), it would increase the average daily traffic volume on that road by about 6 percent (160/2,500 = 6.4%) based on traffic flow volumes shown in Exhibit C in the SAR. Since the average construction workforce is expected to be about two-thirds of the potential peak workforce (or approximately 100 workers per day), the average effect on traffic volumes would be about half of the peak increases described above.

Vehicle weight. In response to the First Request for Information about the weight of vehicles accessing the site, Ashwood Solar said:

> *Generally, trucks and equipment arriving on a daily basis at the Project site will weigh no more than 46 tons (including fully loaded concrete trucks, loaders, and equipment delivery trucks). If required for civil work, an oversized excavator or articulated dump truck might weigh as much as 90 tons. At this stage of the project, we do not know if the oversized equipment will be needed.*
>
> *The heaviest piece of equipment delivered to the Project site will be the substation transformer. This piece of equipment for a project of this size can weigh in the range of 70-80 tons, and the transportation vehicle for the transformer weighs an estimated 20 tons. An estimate of the total weight of the substation transformer and its delivery vehicle is therefore 100 tons. There will be one substation transformer delivery for the Project.*

BBC conducted further research on the weight limits and vehicle classes permitted to travel on specific roadways in Kentucky. The primary road located near the proposed project site, US 641, a rural minor arterial road rated at 40 tons (80,000 pounds) (KYTC). Any vehicle loads exceeding this limit could subject the roadway and shoulder to damage or degradation. Additionally, potential

routes to the site may also include local county roads, which could be susceptible to degradation from heavy loads.

US 641 and KY 3169 – the main roads that will likely be used to transport the transformer based on Exhibit E in the SAR – are both state roads and would require an overweight/over-dimension vehicle permit according to the Lyon County State Highway Superintendent, who spoke with BBC as part of our supplemental analysis. Assuming Ashwood Solar is able to successfully secure a permit, the Lyon County State Highway Superintendent said the state would work with Ashwood Solar to develop a logistical plan to transport the transformer to the site. The Lyon County State Highway Superintendent said they had recently led such an exercise effort on behalf of another company transporting a large generator to a site and that similar deliveries are not difficult to orchestrate.

BBC also contacted the Lyon County road department to discuss the potential overweight/over-dimensional delivery of the transformers. BBC spoke about the issue with Lea the Lyon County Road Department Assistant Foreman. He indicated that there is no permitting process and no permit required in Lyon County and that the roads that would likely be used would only require a state and potentially a federal permit.

The Siting Boards' Second Request for Information asked Ashwood Solar to describe how the substation transformer will be transported to the site, the anticipated impacts, and proposed mitigation measures. In its response, Ashwood Solar said it does not know what mode(s) of transportation or routes will be used to transport the substation transformer to the project site, but that Ashwood will comply with all federal, state, and local regulations to prevent or mitigate damage to roadways.[20]

Conclusions and Recommendations

After construction, the proposed Ashwood Solar facility would have very little impact on traffic flows and the local transportation infrastructure, likely comparable to or less than the effects from a typical single-family home.

During the construction period, however, there could be noticeable effects on traffic volumes during the beginning of the day and end of the day peak periods – particularly on US 641. There is also a potential for impacts to traffic flows on KY 1943 if workers access the site through the two proposed access points along the road during day and end of the day peak periods.

Recommended mitigation.

- As indicated in Exhibit C of the applicant's SAR, the applicant should reduce the potential for traffic issues during construction by using: *"…mitigation measures such as ridesharing between construction workers, using appropriate traffic controls or allowing flexible working hours outside of peak hours could be implemented to minimize any potential for delays during the AM and PM peak hours."*

[20] Ashwood Solar 1, LLC Responses to Siting Board's Second Request for Information. March 25, 2021.

- Additionally, Ashwood Solar should comply with all signage and traffic lights required by the Kentucky Department of Transportation and any other governmental agencies.

- Ashwood Solar should contact the Kentucky Transportation Cabinet as soon as possible to discuss the transportation requirements and possible restrictions for transportation of the sub-station transformer on US 641. If the route requires on-site assessment by KYTC before approval and permitting, Ashwood Solar should allow as much time as possible for that process to occur.

*James W Gardner
Sturgill, Turner, Barker & Moloney, PLLC
333 West Vine Street
Suite 1400
Lexington, KENTUCKY 40507

*Ashwood Solar I, LLC
353 N. Clark Street, 30th FL
Chicago, ILLINOIS 60654

*M. Todd Osterloh
Sturgill, Turner, Barker & Moloney, PLLC
333 West Vine Street
Suite 1400
Lexington, KENTUCKY 40507