Review and Evaluation of the Fleming Solar, LLC Site Assessment Report

Kentucky Public Service Commission and
Kentucky State Board on Electrical Generation and Transmission Siting

August 30, 2021

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August 30, 2021

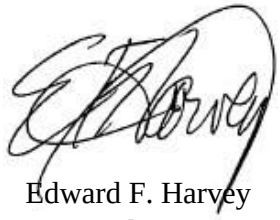
Mr. Cornelius J. Mance, Jr.
Staff Attorney
Kentucky Public Service Commission
211 Sower Blvd.
Frankfort, KY 40601

Re: Harvey Economics' Review of Fleming Solar, LLC's Site Assessment Report for Solar Facilities in Fleming County, Kentucky

Dear Mr. Mance,

Harvey Economics is pleased to provide you with our final report, *Review and Evaluation of the Fleming Solar, LLC Site Assessment Report.*

Yours truly,



Edward F. Harvey
Principal

Report

August 30, 2021

Review and Evaluation of the Fleming Solar, LLC Site Assessment Report

Prepared for

Kentucky Public Service Commission and
Kentucky State Board on Electrical Generation and Transmission Siting
211 Sower Boulevard
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SECTION 1
Introduction

This document provides a review of the Site Assessment Report (SAR) for the proposed Fleming Solar Facility (Project) submitted to the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board). Fleming Solar, LLC submitted the SAR to the Siting Board by on May 28, 2021. Siting Board staff retained Harvey Economics (HE) to perform a review of the SAR. Fleming Solar, LLC (Fleming Solar or Applicant) submitted the SAR as part of its application for a construction certificate to construct a merchant electric generating facility under KRS 278.706 and 807 KAR 5:110. Requirements specific to the SAR are defined under KRS 278.708, detailed below.

Statutes Applicable to the SAR Review

KRS 278.706 outlines the requirements for an application to receive a certificate to construct a merchant electric generating facility. Section (2)(l) of that statute requires the Applicant to prepare a SAR, as specified under KRS 278.708. The Fleming Solar SAR is the main focus of HE's review. However, the Siting Board also requested that HE review the economic impact report prepared by the Applicant. The economic impact report is a requirement of the application under KRS 278.706(2)(j), separate from the SAR.

KRS 278.708(3) states the following:

A completed site assessment report shall include:

(a) A description of the proposed facility that shall include a proposed site development plan that describes:

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

(b) An evaluation of the compatibility of the facility with scenic surroundings;

(c) The potential changes in property values and land use resulting from the siting, construction, and operation of the proposed facility for property owners adjacent to the facility;

(d) Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary; and

(e) The impact of the facility's operation on road and rail traffic to and within the facility, including anticipated levels of fugitive dust created by the traffic and any anticipated degradation of roads and lands in the vicinity of the facility.

KRS 278.708(4) states that "the site assessment report shall also suggest any mitigating measures to be implemented by the applicant to minimize or avoid adverse effects identified in the site assessment report."

KRS 278.706(2)(j) states that a completed application shall include "an analysis of the proposed facility's economic impact on the affected region and the state."

KRS 278.706(2)(d) addresses specific setback requirements, as related to distances from adjacent property owners of various types (i.e., residential neighborhoods, schools, hospitals, nursing homes).

SAR Review Process and Methodology

HE completed the following tasks as part of the review of the Fleming Solar SAR and certain other components of the Fleming Solar application:

- Review of the contents and information provided in the site assessment report, application and other documents provided by the Applicant;[1]
- Brief review of secondary data sources to obtain background information and geographic setting for the Fleming Solar Project;
- Limited review of relevant evaluation criteria to identify potential issues and assessment approaches to serve as benchmarks for the adequacy review;
- Identification of additional information we deemed useful for a thorough review, and submittal of questions to the Applicant via Kentucky Public Service Commission General Counsel;
- Review of additional information supplied by the Applicant in response to first submitted HE questions, and discussion of responses with the Siting Board staff;

[1] Fleming Solar, LLC submitted a motion for deviation from the setback requirements. That document includes a 19-page letter from Fleming Solar, LLC counsel, along with several attached Exhibits.

- Completion of interviews and data collection with outside sources as identified in this document;
- Review of additional information supplied by the Applicant in response to a second set of questions submitted by HE, and discussion of responses with the Siting Board staff;
- Participation in a site visit, including a tour of the Project site with the Applicant and in-person meetings with local officials;
- Completion of analyses and evaluation of the impacts upon each of the previous identified resources; and
- Preparation of this report, which provides HE's conclusions as to potential Project impacts and mitigation recommendations.

Components of the Fleming Solar Facility SAR

Fleming Solar, LLC's Application to the Siting Board consists of multiple documents:

- Application document, which addresses a variety of topics and includes several Exhibits as attachments:
    - Descriptions of the proposed site, including maps of the project area;
    - Proof of notice of application;
    - Public involvement documents;
    - Certificates of compliance with local regulations;
    - Generation interconnection feasibility and system impact study reports;
    - Economic impact report; and
    - Certificate of authority.
- The Site Assessment Report (Exhibit I) includes a summary addressing each requirement of KRS 278.708 and the following attachments:
    - Parcel maps and Site Plan figures;
    - Property Value Impact Study;
    - Description of legal boundaries;
    - Noise and Traffic Study;
    - Visual Assessment; and
    - Solar Glare Hazard Report.

In addition to the application, Fleming Solar, LLC also provided the Siting Board with a document titled Motion for Deviation from Setback Requirements, which HE reviewed and considered as part of the evaluation of the proposed site development plan.

Additional Information Provided by the Applicant

Once HE reviewed the contents of the SAR, HE and the Siting Board staff independently developed a first list of detailed questions, either requesting additional information or asking for clarification about items in the SAR. The Siting Board staff submitted the first request for information, including questions from HE, on July 9, 2021; Fleming Solar provided written responses on July 23, 2021.

After HE and the Siting Board staff reviewed Fleming Solar's responses to the first request for information, HE and the Siting Board staff independently developed a second list of detailed questions. The Siting Board staff submitted the second request for information, including questions from HE, on August 6, 2021. Fleming Solar provided written responses to the second request for information on August 20, 2021.

HE and certain representatives from the Siting Board also met with the Applicant for an in-person meeting on July 28, 2021, to conduct a site visit and discuss remaining issues.

Report Format

This report is intended to support the Siting Board in its decision-making process pertaining to a construction certificate for Fleming Solar, LLC. The report is structured to respond to the requirements for a SAR as outlined in KRS 278.708, the economic analysis described in KRS 278.706(j) and to our contract:

- This section of the report, Section 1, introduces the purpose and process of the SAR review and HE's work;
- Section 2 offers a summary and conclusions as to the results of HE's SAR evaluation;
- Section 3 describes the Fleming Solar Project and proposed site development plan;
- Section 4 provides a brief profile of Fleming County's economic and demographic characteristics as context for the Project setting;
- Section 5 offers detailed findings and conclusions for each resource area; and
- Section 6 presents recommendations concerning mitigation measures and future Siting Board actions.

Caveats and Limitations

Review limited to resource areas/issues enumerated in the statutes. HE's evaluation of the Fleming Solar Project is contractually limited to a review of the SAR and associated materials, as well as the economic impact analysis. Statutes dictate the issues to be

covered in the SAR; HE focused on those specific topic areas, which are addressed in this report. The Siting Board might have additional interests or concerns related to the construction, siting, or operation of the Project; those may be addressed in other documents or by other parties.

Level of review detail determined by expert judgement. KRS 278.708 identifies the required components of an SAR; the level of scrutiny and detail of the evaluation, however, depends upon expert judgement as to what information is relevant and what level of detail is appropriate. This level of review generally relates to the assessment methodologies, geographic extent of impacts and the degree of detailed information about the Project as requested by the consultant in follow-up inquiries. Given our experience related to project impact assessments and evaluation of impacts on various socioeconomic and natural resource components, HE believes that we have performed a thorough and comprehensive review of the Fleming Solar SAR, which will meet the needs of the Siting Board.

Assumption of accurate Applicant data. HE reviewed all the data and information provided by the Applicant as part of the SAR and associated documents, including responses to two sets of inquiries. Although we evaluated Applicant data for consistency and clarity as part of our review, we did not perform any type of audit to confirm the accuracy of the provided information. We assume that the Applicant has provided an honest representation of the Project, based on the best data available at the time.

In instances where the Applicant was unsure about certain aspects of the Project, such as exactly where the solar panels would be placed, HE assumed a "worst case" for the purposes of the impact analysis. Should the actual Project development deviate in a manner that materially changes the Project magnitude or location of impacts, or affected parties, the Applicant can be required to notify the Siting Board for it to evaluate such a deviation and take appropriate action as deemed necessary. See mitigation recommendations in Section 6.

Cumulative impacts from multiple proposed solar facilities. In addition to the Fleming Solar Project, the AEUG Fleming Solar, LLC solar project (AEUG Fleming Project) is also proposed to be located in Fleming County. That Project is proposed to be a 188-megawatt alternating current photovoltaic facility built on portions of approximately 1,590 acres. The AEUG Fleming Project would be located immediately to the south and west of the Fleming Solar Project; Kentucky Route 559 (Old Convict Road) would border both Projects, with the AEUG Fleming Project to the south and the Fleming Solar Project to the north. On May 24, 2021, the Siting Board conditionally granted AEUG Fleming Solar, LLC with a Certificate to Construct, subject to full compliance with specific mitigation measures and conditions.[2] That Project has not yet begun construction; the start date for construction of the AEUG Fleming Project is unknown at this time. Therefore, in the interest of full disclosure to the Siting Board and public, this report discusses the potential for cumulative impacts on the local area from the construction and operations of the two Projects as related to scenic compatibility, land uses and property values, noise, and traffic (Section 5).

[2] HE also completed the SAR review for the AEUG Fleming Solar Project.

SECTION 2
Summary and Conclusions

Fleming Solar, LLC (Fleming Solar or Applicant) proposes to construct an 80-megawatt (MW) photovoltaic (PV) electricity generation facility (Project) in Fleming County, Kentucky (County), to be located less than one mile northwest of the City of Flemingsburg (City). On May 28, 2021, Fleming Solar applied to the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board) for a construction certificate to construct a merchant electric generation facility. Fleming Solar's application responded to the statutory requirements set forth in KRS 278.706 and 278.708.

The Siting Board retained Harvey Economics (HE) to review and evaluate the Site Assessment Report (SAR) included in the Fleming Solar application, as well as other supporting information provided by the Applicant. In addition to the topic areas included in the SAR, HE also addressed the Applicant's economic impact analysis and the topic of decommissioning. The results and conclusions of HE's review and evaluation are provided below. Recommended mitigation measures are offered in Section 6 of this report.

Facility Description and Site Development Plan

The Project site encompasses a total of about 830 acres of rural agricultural land with a potential Project footprint of approximately 725 acres.[3] Solar infrastructure will include 193,050 solar panels, 22 inverters, the racking system, a substation and an operations and maintenance (O&M) building. The power generated by the Project will be linked to the electric transmission grid via the existing Flemingsburg-Spurlock 138-kilovolt (kV) line. The Fleming Solar substation will connect with a new Point of Interconnection (POI) to be constructed and operated by the East Kentucky Power Cooperative (EKPC).

- ***Surrounding land uses*** – The area around the Project site can be generally described as rural agricultural, with rolling hills and some trees. Acreage surrounding the Project site is largely residential agriculture, with additional smaller sections of purely agricultural land or residential properties. Adjacent parcels also include one commercial property and one church.

- ***Proximity to homes and other structures*** – A total of 43 residential structures, one church and 83 other structures (including barns, warehouses, and similar ancillary structures) would be located within 1,200 feet of the property fence. One home would

[3] According to the Applicant, the potential Project footprint represents the furthest extent that any Project equipment will be considered for placement and is based only on the setbacks related to proximity to neighboring properties.

be located within 300 feet of the property fence and two homes would be located within 300 feet of the Project footprint.[4]

- ***Locations of structures*** – Solar panels, inverters and the racking system will be located throughout the Project site. The single transformer will be located within the substation, which, along with the O&M facility and the EKPC substation, will be in the southern portion of the Project site along Old Convict Road (KY 559). The Flemingsburg-Spurlock 138 kV transmission line generally runs in a North-South direction and bisects the eastern portion of the Project site.

- ***Locations of access ways*** – Four entrance points will allow access to different areas of the property during construction; two of those entrances will be used for operations. Access points include the Main Plant Entrance and a proposed construction entrance on KY 559 and the Northern Site Entrance and a construction access easement along Maysville Road (KY 11). The Main Plant Entrance and the Northern Site Entrance will be used during the operational phase.

- ***Access control*** – Security fencing (six- to ten-foot high chain link fencing topped with barbed or razor wire) will enclose the facility during construction and operation. During construction, site access will be controlled with dedicated guards or with electronic gating systems. During operations, all gates will have access control systems including cameras.

- ***Utility service*** – Electric power will be needed for construction contractor trailers and the O&M building; that service will be provided by either the Fleming-Mason Energy Cooperative or the Kentucky Utilities Company, which both serve the Project area. The Applicant will evaluate whether water and sewer utilities are needed for the O&M building and coordinate with appropriate providers, if necessary.

- ***Project life*** – The Applicant anticipates a 35-year Project life.

Project construction is expected to last approximately 12 months. Construction of the Eastern Kentucky Power Cooperative substation may require up to 15 months, due to certain time of year restrictions. An estimated average of 115 workers will be on-site throughout the construction period, ranging from a minimum of six to a peak of 250 workers.[5] The Project construction schedule and description of construction activities is provided in Section 3.

Setback requirements and requested deviation. The Applicant has entered a motion for a deviation from the existing setback requirements. HE reviewed this motion and believes that the Project meets the specific statutes of a setback deviation. The Siting Board must determine if these measures are sufficient.

[4] The homes located within 300 feet of the Project (fence line or footprint) are located on participating parcels.
[5] The peak construction period is expected to last approximately six weeks.

Conclusions and recommendations. HE believes that the Applicant has generally complied with the legislative requirements for describing the facility and a site development plan, as required by KRS 278.708.

Project Setting

Fleming County had a 2019 population of about 14,600 people. Population levels have been stable and are projected to remain so. The City of Flemingsburg has an estimated 2,800 residents. The area around the Project site can be generally described as rural and agricultural. The County population is relatively older. Residents' income levels are low, and they experience higher than average rates of poverty than in other counties in Kentucky and the U.S.

Compatibility with Scenic Surroundings

The area surrounding the Project is agricultural and residential. Rolling hills and groups of trees help mitigate against any negative visual impacts to residents and commuters, but since the area is converted farmland, there are numerous open spaces that make the solar panels visible from many different viewpoints. Local residents indicate that they value the agrarian aesthetic in Fleming County.

Scenic compatibility focuses on the solar panels, with an above ground height of six feet and ten feet at full angle, and on the Project substation. A large portion of the Project will be visible from Old Convict Road (KY 559) on the south side of the Project site. Few native visual buffers exist along the southern side of the Project, making it visible to commuters and residents. The Project will also be visible to commuters and residents along Helena Road (KY 1200), on the eastern side of the Project. The northern portion of the Project site will be visible to commuters and residents on Maysville Road (KY 11).

The Applicant has prepared a specific plan for establishing vegetative buffers at various locations around the Project site, in areas of high visibility. Vegetative buffers would at least partially shield the Project from nearby roads and residences and reduce any negative visual impacts. The Applicant has also committed to working with neighboring homeowners and business owners to address concerns related to visual impacts of the Project.

The Project will use anti-glare solar panels. The Applicant's glare study concluded that there was no potential for glare at numerous locations surrounding the Project site.

Potential Changes in Property Values and Land Use

The Applicant's consultant, Kirkland Appraisals, LLC (Kirkland), prepared an extensive data collection effort and analysis of property value impacts of solar facilities in diverse locations, concluding that the Project would have no effect on property values during construction or once in operation. To further assess potential property value impacts, HE: (1) reviewed existing literature related to solar facility impacts; (2) considered information provided by real estate professionals in Fleming County; (3) prepared further analysis of the data provided in the Kirkland report; and (4) examined the potential for impacts to residences and neighborhoods closest to the Project.

The Fleming County Property Valuation Administrator has concerns regarding the potential effects of solar facilities on property values, especially the cumulative impacts of multiple facilities in the area. One recent academic study indicated the potential for negative impacts to property values for homes in close proximity to solar facilities; however, most recent studies indicated no impacts to property values related to solar facilities. HE's further evaluation of the data provided by Kirkland also suggests that property values are unlikely to be affected by solar facilities, although some uncertainty exists.

Mitigation of visual and other effects, with close property owner coordination, can minimize that uncertainty. This conclusion is predicated on the assumption that the mitigation strategies discussed in Section 6 are adopted by Fleming Solar and the Siting Board.

Anticipated Peak and Average Noise Levels

Neither the Commonwealth of Kentucky nor Fleming County have noise ordinances applicable to this Project. As such, HE utilized the noise recommendations generated by the Environmental Protection Agency (EPA) and the World Health Organization (WHO) to gauge acceptable levels of sound. The topography, natural vegetation of the area and the Applicant's proposed vegetative buffers will help mitigate noise emissions that may be caused by construction or operational components of the Project.

Construction noise may be annoying for residents surrounding the Project area for short periods of time. The pile driving process, which is the loudest part of the construction process, is estimated to last for between two- and four-months across the Project. Fencing installation is also a loud activity. However, those activities will only occur in any one location for a very short period of time, quickly moving around the Project site. Construction activities are expected to generate noise emissions greater than 55 decibels (dBA) throughout the 12-month construction period, but the noise will be sporadic and decrease with distance to nearby residences. Since these construction activities are not sustained, no hearing loss or long-term annoyance to residents is expected.

Noise from Project components during operations (inverters, motors, transformer) is anticipated to result in only a small increase, if any, to the local sound environment. At a distance of 300 feet, these components would emit relatively low sounds during daylight hours (45.6 dBA, which is lower than the WHO's recommended maximum noise level of 50 dBA) and typically no sound at night. The area surrounding the Project is largely agricultural; residents living in the area are located along roadways with light to heavy levels of traffic and noise from the Project's operational components should not annoy them.

Road and Rail Traffic, Fugitive Dust and Road Degradation

KY 559 (Old Convict Road), KY 11 (Maysville Road) and KY 57 will provide access to the Project site. Construction activities will cause substantial increases in traffic volumes on KY 559 and smaller increases on other roads in the area. Off-site worker parking areas will be established, and shuttle busses will transport most construction workers to the Project site. Brief traffic stoppages on KY 559 and KY 11 will allow for large vehicle access to the Project site during construction. These impacts will be temporary, occurring over the 12-month

construction period. Delivery of the substation transformer will require an oversized truck and multiple other deliveries will also require the use of oversized trucks that are heavier than designated road weight limits. Those vehicle trips will be permitted separately and may have the potential to cause road degradation. The Applicant has committed to restoring impacted roadway to pre-construction conditions, either paying for or fully fixing any damage.

Given the few employees and deliveries require for operations, traffic impacts during operations will be minimal.

An existing railroad line is located to the west of the Project site. The Project will not utilize the railroad for any construction or operational purposes; no impacts to the railroad or railway service are anticipated as a result of the Project.

Fugitive dust should not be an issue given the Applicant's proposed best practices for construction and operational activities.

Economic Impact Analysis

Construction and operation of the Fleming Solar facility will provide limited economic benefits to the region and the Commonwealth. Construction employment and income opportunities will be temporary, but local hires will increase employment and incomes in an area that needs it. The bulk of construction purchases will be made outside of Kentucky, limiting opportunities for local business activity or generation of additional sales tax.

Operational employment will be minimal, and purchases of materials or supplies will be small on an annual basis. Operational economic benefits will be confined mostly to property taxes, or payment in lieu of taxes (PILOT), if the Applicant's request for issuance of an Industrial Revenue Bond is granted. Annual payments will be made to Fleming County and distributed to local taxing authorities; however, those payments will likely amount to a small percentage of total tax revenues for any one group.

Socioeconomic impacts of the Fleming Solar facility represent a positive, albeit small, contribution to the region.

Decommissioning

The Applicant assumes a 35-year useful life for the Fleming Solar facility. Fleming Solar has not yet prepared a formal decommissioning plan; however, they have described decommissioning as including the removal of all above-ground and below-ground structures and site restoration activities. Legal lease agreements with participating landowners include commitments regarding component removal and land restoration. The County is seeking assurances that a decommissioning plan be explicit and that all facility components be removed from the County.

Decommissioning the facility and returning the site to its original condition can be accomplished if all the components are removed. After reclamation, this would return the land to pre-Project productive uses and property values, and eliminate long term Project-related

impacts, compared with simply shuttering the solar facility. This process will also add a modest, temporary positive economic stimulus to the region.

Public Outreach and Communication

The Applicant has pursued public outreach in Fleming County and in the Project area since September 2019, including two public meetings, a community picnic and additional small group or individual meetings with local residents or agency representatives. A Project website was also developed. However, the public meetings were not well attended, and public awareness of the Project is limited.

Complaint Resolution

The Applicant has developed a process for addressing and resolving Project-related complaints. Fleming Solar plans to establish a dedicated voicemail and e-mail prior to construction of the Project for registering complaints or concerns. That information will be provided to City and County officials, emergency responders, schools and public libraries, and neighboring residents within the Project area, as well as posted on the Project website. Fleming Solar is committed to resolving reasonable complaints within 30 days; all complaints and resolution details will be documented.

Conclusions and Recommendations

Based on our findings related to the specific siting considerations in the statutes and as addressed in this report, HE recommends that the Siting Board approve Fleming Solar, LLC's application for a certificate to construct a merchant electric generating facility. This finding assumes that the Project is developed as described in the SAR and the supplemental information, and the mitigation measures set forth in Section 6 of this report are adopted.

SECTION 3
Project Overview and Proposed Site Development Plan

Project Overview

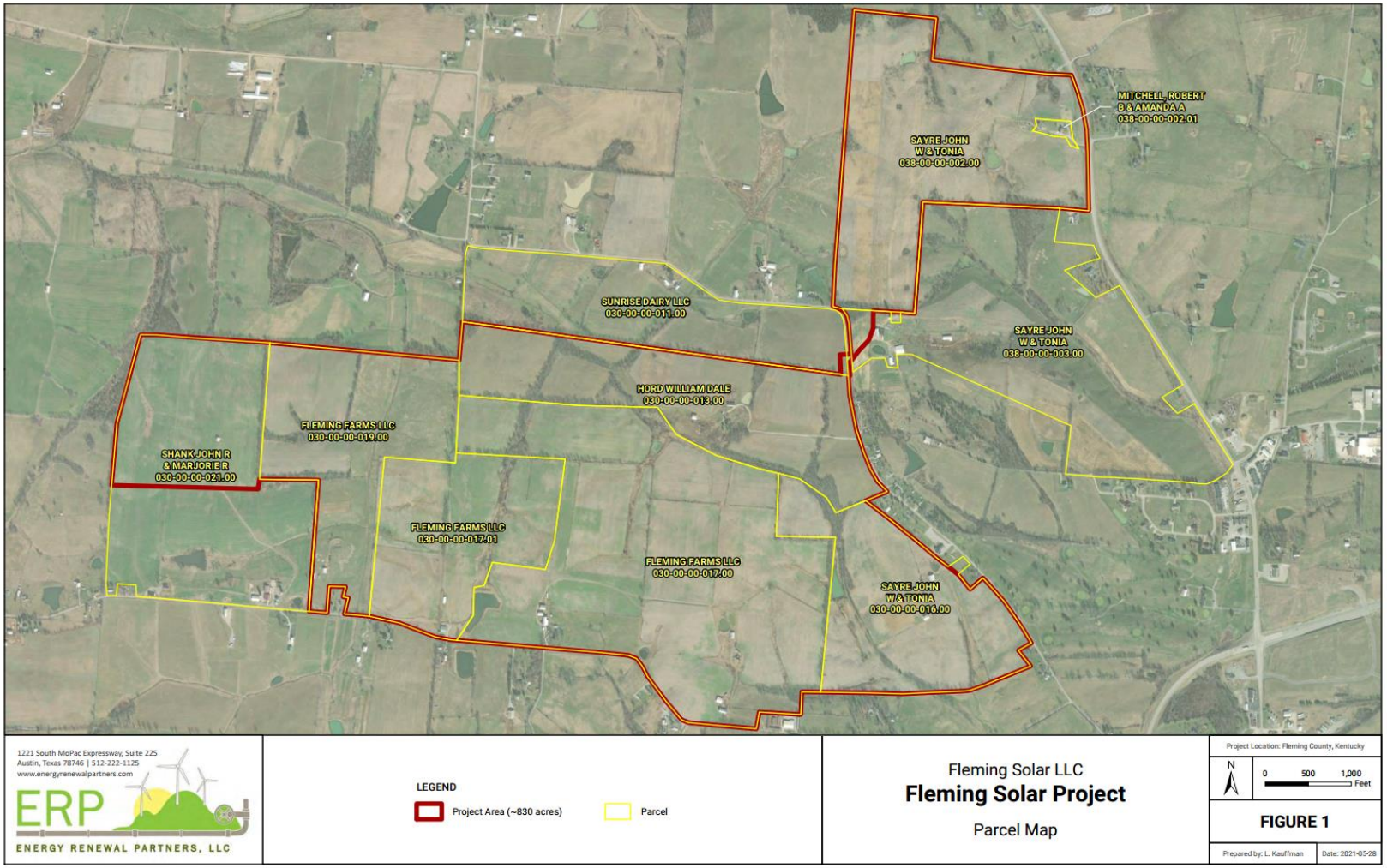
Fleming Solar, LLC describes the Fleming Solar Project as follows:[6]

> "Fleming Solar, LLC (Fleming Solar) proposes to develop the 80-megawatt (MW) photovoltaic (PV) Fleming Solar Project (Project) in Fleming County, Kentucky. The Project would be built on portions of approximately 830 acres (Project Area). The majority (94.4%) of the Project Area currently is in agricultural use.
>
> The Project Area is located in the northern portion of unincorporated Fleming County less than a mile northwest of the town of Flemingsburg, Kentucky. The Project Area is bounded to the south by Old Convict Road (also known as Convict Pike or Kentucky Route [KY] 559), to the northeast by Maysville Road (also known as KY 11), and Helena Road (also known as KY 1200) bisects the central portion of the Site, oriented southeast to northwest.
>
> The Project will consist of the following components: solar panels that range in height from six (6) to ten (10) feet as they track the sun throughout the day; inverters; racking system; associated wiring and balance of system; substation; and operations and maintenance (O&M) building. The power generated by the Project will be interconnected to the electric transmission grid via the existing Flemingsburg-Spurlock 138-kilovolt (kV) line that crosses the Project area.
>
> Fleming Solar would secure the Project perimeter using six- to ten-foot-high chain-link fencing topped by barbed or razor wire and meeting national electrical code requirements. All fencing would be placed at or above grade to ensure drainage flows are unobstructed.
>
> Fleming Solar will build a Project Substation near the O&M building and the utility substation East Kentucky Power Cooperative (EKPC) plans to build for the Project's interconnect. The Project Substation will be located on the south side of the site adjacent to the Main Plant Entrance. Equipment to be located in the Project Substation includes protective circuit breakers and the generator step-up transformer (GSU), that will raise the voltage of the power to match the 138kV utility line voltage."

Exhibits 3-1 and 3-2 illustrate the Project boundaries and locations of Project components.

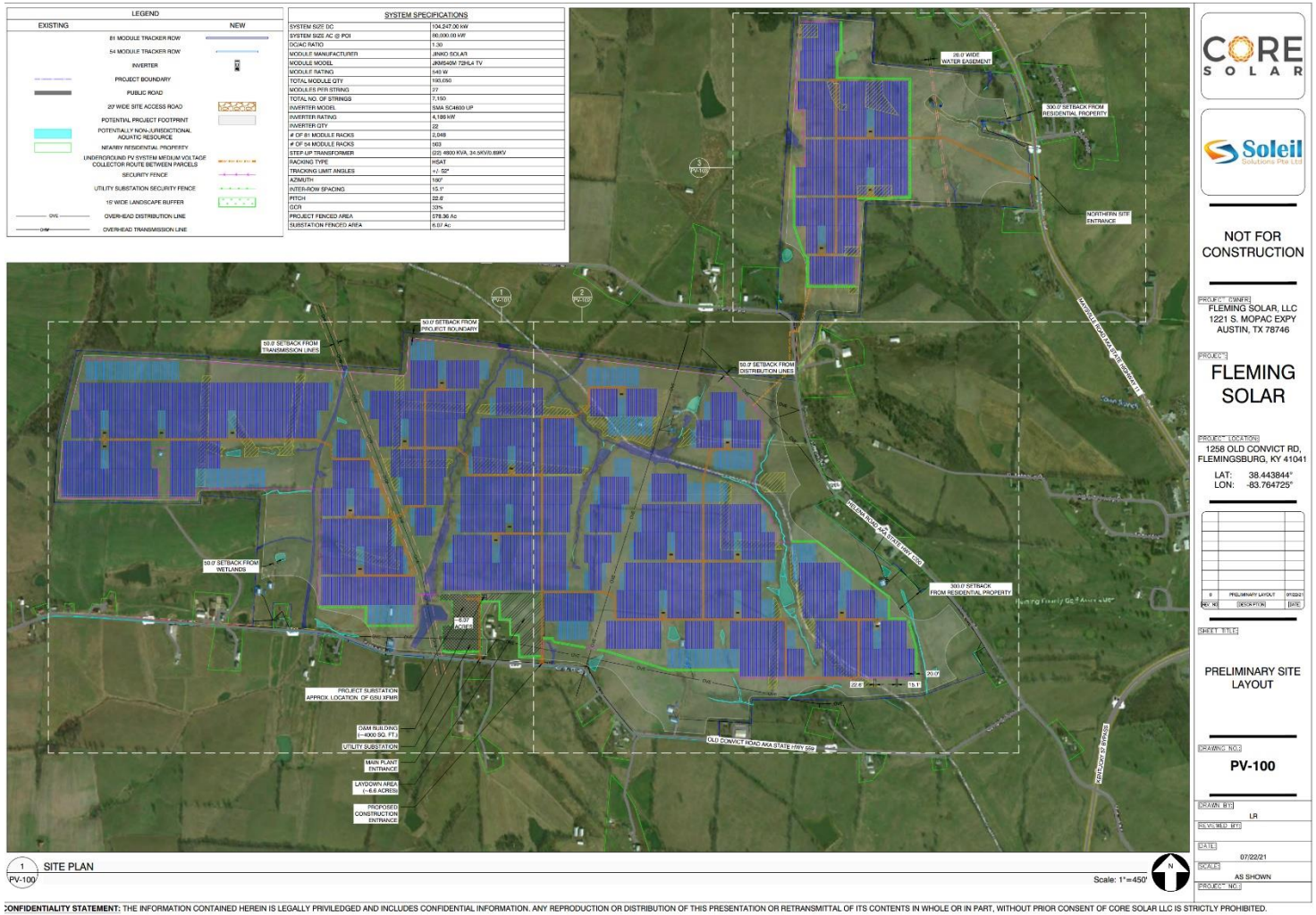
[6] Application, Section 2. "Proposed Site Description"

Exhibit 3-1.
Map of the Proposed Fleming Solar Project Site and Included Parcels



Source: Fleming Solar, LLC, May 2021.

Exhibit 3-2.
Proposed Fleming Solar Project Layout



Source: Fleming Solar, LLC, July 2021.

The Project site is located approximately 64 miles northeast of the City of Lexington, the largest community in the region. The easternmost portion of the Project site is located less than one mile northwest of the City of Flemingsburg.

Construction Activities

Construction of the Fleming Solar facility is expected to occur over a period of about 12 months, although construction of the EKPC substation could extend that period to as long as 15 months, depending the time of year that construction of that facility commences.[7] The potential timeline extension to accommodate construction of the EKPC substation will not affect the total manhours required for construction of the Project and will not affect the time required to construct Project facilities other than the EKPC substation. Therefore, HE assumes a 12-month construction period for the Fleming Solar Project. Peak construction activity is anticipated to last approximately six weeks and to occur during the third quarter of construction.

Certain construction activities may occur sequentially across the entire Project site; however, the Applicant anticipates that most activities will take place at different times in different areas. Construction activities will be sequenced to be as efficient as possible given the restricted time windows for pile driving activities. The first phase of construction will include the following:

- Site preparation,
- Civil works, including construction of access roads and temporary laydown areas,
- Fencing, pre-construction erosion control measures, vegetation removal and grading.

Following the site preparation phase, construction will progress in two parallel paths:

- Construction of the substation and associated infrastructure, including the nearby O&M building and storage buildings,
- Development of the PV field, including the single axis trackers, PV modules, inverters, and collection system.

Reseeding and revegetation will occur throughout the Project site as each area's construction activities are completed.

Exhibit 3-3 offers a visualization of the construction activities and schedule, provided by the Applicant.

[7] According to the Applicant, EKPC stated that they can only take the transmission line out of service during Spring and Fall, which could extend the timeline for when the Project can come online.

Exhibit 3-3.
Representative Construction Schedule for the Fleming Solar Project

	Week #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Laydown yard/Site office		Laydown & Site Offices																									
Civil Works, Clearing (MWdc/Wk)	104.0					1	1	2	3	3	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6	6
Foundations / Piles (MWdc/Wk)	104.0								1	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
Tracker Mechanical Assembly (MWdc/Wk)	104.0												1	2	2	3	3	3	3	3	4	4	4	4	4	4	4
Module Mechanical Assembly (MWdc/Wk)	104.0															3	3	3	3	4	4	4	4	4	4	4	4
Low Voltage Infrastructure (MWdc/Wk)	104.0													1	1	3	3	4	4	4	4	4	4	4	4	4	4
Inverters, Medium Voltage Infrastructure (MWdc/Wk	104.0														1	1	4	4	4	4	4	4	4	4	4	4	4
Project Substation (MWdc/wk)	104.0																						2	4	5	6	6
Commissioning	104.0																										2
Testing																											
Utility Substation construction onsite																											
Backfeed																											
Commissioning: Tests and Start-Up (Cold) (MW/Wk)	104.0																										
Commissioning: Tests and Start-Up (Hot) (MW/Wk)	104.0																										
Completion																											
Manpower Estimated Count		6	10	18	25	25	30	35	35	35	60	60	60	60	75	80	85	80	130	145	145	150	150	155	155	170	185
Average Manpower per quarter		35													131												
Max Manpower per quarter		60													185												

	Week #	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Laydown yard/Site office																											
Civil Works, Clearing (MWdc/Wk)	104.0	4																									
Foundations / Piles (MWdc/Wk)	104.0	4	4	4	4	4	4	4	4	3	3																
Tracker Mechanical Assembly (MWdc/Wk)	104.0	4	4	4	4	4	4	4	4	4	4	4	4	4	4												
Module Mechanical Assembly (MWdc/Wk)	104.0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4											
Low Voltage Infrastructure (MWdc/Wk)	104.0	4	4	4	4	4	4	4	4	4	4	4	4	4	4												
Inverters, Medium Voltage Infrastructure (MWdc/Wk	104.0	5	5	5	5	6	6	4	4	3	3	3	3	2	2	2											
Project Substation (MWdc/wk)	104.0	6	6	6	6	6	6	6	6	6	6	6	6	6	2	1											
Commissioning	104.0	4	4	4	6	6	8	8	8	8	10	10	10	6	5	5											
Testing																	Testing										
Utility Substation construction onsite																											
Backfeed																											
Commissioning: Tests and Start-Up (Cold) (MW/Wk)	104.0										6	8	8	8	8	6	6	6	6	6	6	6	6	6	6	6	
Commissioning: Tests and Start-Up (Hot) (MW/Wk)	104.0											4	6	6	6	6	8	8	8	8	8	6	6	6	6	6	6
Completion																											
Manpower Estimated Count		185	220	220	220	220	250	250	250	250	250	250	190	175	130	115	115	110	90	85	85	65	30	30	30	25	20
Average Manpower per quarter		225													72												
Max Manpower per quarter		250													130												

Note: The Project is sized at 80MWac/ 104MWdc. Numbers in yellow and orange describe the "level of work" required for each component of construction activity. Those numbers provide an estimate of the portion of each activity that will occur in each week of construction.

Source: Fleming Solar, LLC, July 2021.

On average, 115 construction workers are estimated to be on-site at any one time over the course of the 12-month construction period. However, depending on the specific tasks and activities occurring at any particular time, the number of workers on-site will range from a minimum of six to a peak of 250. Exhibit 3-3, above, provides the number of workers on-site by week for the duration of the construction period, as well as the average and maximum manhours required by quarter.

The Applicant is proposing that construction activity occur between the hours of 7:30 am and 7:00 pm, Sunday through Saturday, with the following exceptions: (1) pile driving activities within 1,000 feet of a non-participating residence or business will be restricted to the hours of 9:00 am to 5:00 pm and (2) No heavy construction activities (including pile driving) will take place prior to noon on Sundays.

Life of the Project

The Fleming Solar facility is anticipated to operate for approximately 35 years. Project decommissioning (the process of closing the facility to retire it from service) is discussed in Section 5 of this report.

Proposed Site Development Plan

The following discussion addresses each of the SAR requirements for a proposed site development plan, as laid out in KRS 278.708(3)(a).

Surrounding land uses. Fleming County in general, and the area north of the City of Flemingsburg specifically, are rural residential areas, with low population density and an agricultural emphasis. Section 4 of this report provides a general overview of the County's demographic and economic characteristics.

The SAR describes the land uses surrounding the Project site as follows:

"The Site is bordered to north by agricultural fields and rural residential areas. The Site is bordered to the east by rural residential development, the New Creation Praise and Worship Center, and a privately owned golf course. The Site is bordered to the south by mixed rural development and agricultural fields. An apparent car repair shop or junk yard is adjacent to the southern Site boundary. The Site is bordered to the west by mixed rural development and agricultural fields." However, if constructed, the AEUG Fleming Project site would be located to the south and southwest of the Fleming Solar Project site. The easternmost portion of that Project site would be located directly south of the Fleming Solar Project, on the south side of Old Convict Road (also known as Convict Pike or KY 559). [8]

[8] On May 24, 2021, the Siting Board granted AEUG Fleming a Certificate to Construct, subject to conditions. As of late August 2021, construction of that Project has not yet begun.

Additionally, the Applicant's consultant, Kirkland Appraisals, LLC (Kirkland), identifies the acreage surrounding the Project site as a mix of residential and agricultural uses.[9] The Kirkland report provides the data shown in Exhibit 3-4, describing the land uses adjacent to the Project.

Exhibit 3-4.
Land Uses Adjacent to the Fleming Solar Project Site

Land Use	Percent of Total Adjoining Acres
Agricultural / Residential	49.27%
Agricultural	47.56%
Residential	2.93%
Religious	0.12%
Warehouse	0.12%
Total	100.00%

Source: Fleming Solar, LLC, May 2021.

The Applicant also provided a table describing the distances between nearby residences or other structures and the potential Project footprint, provided in Exhibit 3-5.

Exhibit 3-5.
Distances between Nearby Structures and the Fleming Solar Project Footprint

Distance from Project Footprint (ft)	Residential Structures	Commercial Structures	Churches	Other Structures
0 - 300	2	0	0	24
301 - 600	33	0	1	25
601 - 900	19	0	0	32
901 - 1,200	8	0	0	16
1,201 - 1,500	10	0	0	17
1,501 - 1,800	7	0	0	16
1,801 - 2,100	14	0	0	14
2,100 - 2,400	13	1	0	15
Total Structures	106	1	1	159

Note: The two residences located within 300 feet of the Project footprint are participating parcels.
Source: Fleming Solar, LLC, August 2021.

There are 54 residential properties and one church within 900 feet of the Project footprint and 93 residential properties and one church within 2,100 feet of the boundary.

Legal boundaries. The Site Assessment Report (SAR) included a parcel map (Figure 1 of the SAR, included previously in this report as Exhibit 3-1) and legal descriptions of the portions of the individual parcels included within the Project area and additional parcels with utility or

[9] SAR Appendix A, Property Value Impact Report.

construction access agreements (SAR Appendix B, Description of Legal Boundaries). The parcel map and legal descriptions correspond to the total acreage of the participating properties, approximately 830 acres. As shown in Exhibit 3-1, the Sunrise Dairy property is located outside the Project boundary; Fleming Solar has entered into an access/ utility easement agreement with the property owners associated with 0.56 acres in the southeast corner of that property. Fleming Solar has a temporary construction easement agreement on the Mitchell parcel for use of an existing gravel road through the property.

Access control. The Site Plan map (Figure 2A of the SAR, included previously in this report as Exhibit 3-2) identifies four entrance points allowing access to different areas of the property during construction. The Main Plant Entrance will be located on the southern side of the Project, along KY 559 (Old Convict Road), near the Project substation and the O&M building. An additional construction entrance will be located a short distance to the east of the Main Plant Entrance, allowing access to the Project laydown area. The Northern Site Entrance and an additional construction access entrance will be located along KY 11 (Maysville Road). During operations, Project access will be limited to the Main Plant Entrance and the Northern Site Entrance.

According to the Application, Fleming Solar would secure the Project perimeter using six- to ten-foot high chain link fencing topped by barbed or razor wire and meeting national electrical code requirements. The Project substation will have its own separate security fencing installed, as will the EKPC substation. All fencing would be placed at or above grade to ensure drainage flows are unobstructed. Project entrance gates are anticipated to be approximately eight feet high and twelve feet wide to allow for emergency and maintenance access.

Site access will be controlled during construction with dedicated guards or with electronic gating systems. During the operation phase the main entrance and northern entrance gates will have access control systems including cameras. Site managers for both construction and operations will have contact information for local law enforcement agencies in order to coordinate security. Construction and operations personnel will receive regular training to ensure their familiarity with emergency procedures and emergency contact numbers.

Location of buildings, transmission lines and other structures. Exhibit 3-2 illustrates the locations of the solar panels, inverters, O&M building, Project substation, EKPC substation, laydown area and security fencing within the potential Project footprint. The solar panels and inverters will be located throughout the Project site. The substations, O&M building and the sole laydown area will be located along KY 559 along the southern edge of the Project site.[10] The Flemingsburg-Spurlock 138 kV transmission line generally runs in a North-South direction and bisects the eastern portion of the Project site.

As noted previously, the potential Project footprint represents the furthest extent that any Project equipment will be considered for placement, based on setbacks related to the proximity of neighboring properties. Applicant materials state that "Within the Potential Project

[10] It is anticipated that the laydown area will be returned to original conditions once construction is complete; however, that acreage will be considered for placement of solar panels if needed (within the limitations of the Project's setbacks)

Footprint, there are many constraints that apply (such as easements, wetlands, structures, etc.). These constraints become known over time as the Project develops. The Potential Project Footprint will not change over time, but the location of Project components within the Potential Project Footprint may change."

The Applicant is also proposing the following minimum setbacks for Project equipment:

- Substation GSU transformer/HVAC:
    - 300 feet from the Project Boundary
- Inverters:
    - 300 feet from the Project Boundary adjacent to non-participating parcels with nearby residences
    - 150 feet from the Project Boundary adjacent to non-participating parcels without nearby residences
- All other equipment:
    - 300 feet from the Project Boundary adjacent to non-participating parcels with nearby residences
    - 50 feet from the Project Boundary adjacent to non-participating parcels without nearby residences
    - 50 feet from adjacent roads

Location and use of access ways, internal roads, and railways. As noted previously and as shown in Exhibit 3-2, four entrance points will allow access to different areas of the property during construction; two of those entrances will be used for operations. Access points include the Main Plant Entrance and a proposed construction entrance on KY 559 (Old Convict Road) and two the Northern Site Entrance and a construction access easement along KY 11 (Maysville Road). The Main Plant Entrance and the Northern Site Entrance will be used during the operational phase.

About 5.7 miles of internal roadways will be constructed with compacted gravel as needed in order to support construction and O&M activities for the Project. Total roadway length will be determined in the final design.

An existing railway line is located to the west of the Project site, generally to the southwest of the intersection of KY 170 (Junction Road) and KY 559.[11] The Project will not utilize the railroad for any construction or operational purposes.

Existing or proposed utilities to service facility. The Flemingsburg to Spurlock 138 kV line owned by EKPC would be connected to the facility and carry power generated by the Project. The area is serviced by the Fleming-Mason Energy Cooperative and the Kentucky Utilities Company, and the Project will need electric service for construction contractor trailers

[11] The railway is considered active; however, no operations have occurred on this line for several years.

and for the O&M building. The Contractor will arrange power to these facilities from the local electric suppliers with appropriate jurisdiction. Fleming Solar will evaluate whether water and sewer utilities are needed for the O&M building and will coordinate with the appropriate providers.

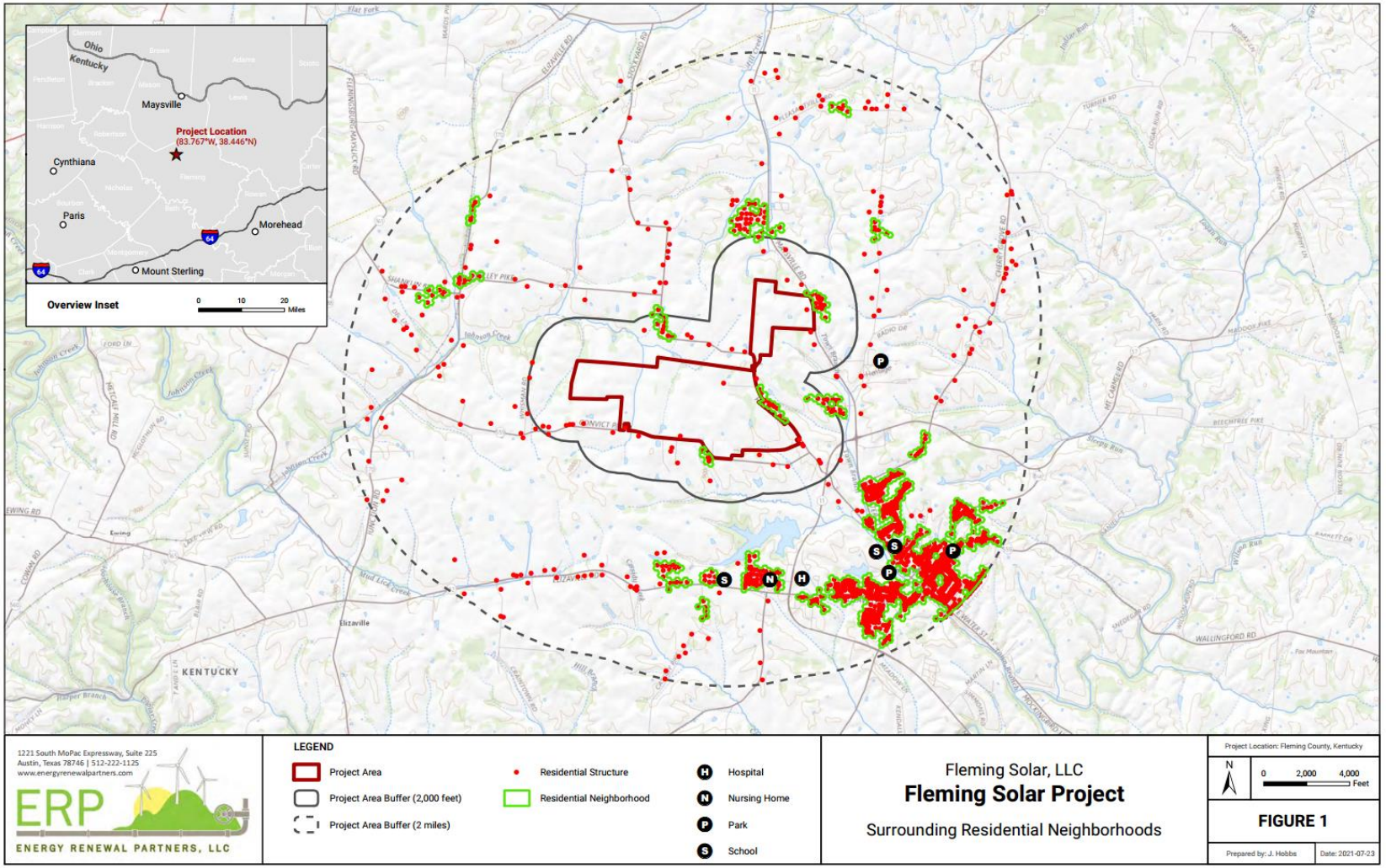
According to the Cumulative Environmental Assessment included in the Motion for Deviation from Setback Requirements, portable chemical toilets will be provided for personnel during Project construction and operations. Sewage waste will be pumped out by a licensed contractor and disposed of at the Flemingsburg Wastewater Treatment Plant or other appropriate facility.

Compliance with applicable setback requirements. Applicable portions of the setback statute (KRS 278.706(2)(e)) require that Fleming Solar Project facilities be located at least 2,000 feet from any residential neighborhood, school, hospital, or nursing home facility.[12] Because six residential neighborhoods are within 2,000 feet of Project facilities, the Applicant is seeking a deviation from the setback requirements. The Applicant has stated that without the deviation, the Project would not be feasible due to significant loss of generating capacity and increased costs.

Exhibit 3-6 shows the project boundary and surrounding residential neighborhoods.

[12] According to KRS 278.700(6), a residential neighborhood is a populated area of five or more acres containing at last one residential structure per acre.

Exhibit 3-6.
Map of the Project Boundary and Surrounding Residential Neighborhoods



Source: Fleming Solar, LLC, July 2021.

KRS 278.704(4) states that deviations from the setback requirements may be granted "on a finding that the proposed facility is designed to, and as located, would meet the goals of KRS 224.10-280, 278.010, 278.212, 278.214, 278.216, 278,218, and 278.700 to 278.716 at a distance closer than" those outlined in the setback statute.

The Applicant has submitted a document titled Motion for Deviation from Setback Requirements (Motion for Deviation). That document addresses each of the statutes listed above, describing the Applicant's or facility's compliance with each, as follows:

- ***KRS 224.10-280: Cumulative Environmental Assessment (CEA):*** The Applicant has provided a CEA that addresses air pollutants, water pollutants, waste, and water withdrawal. That report provides a detailed discussion of each topic area and concludes the following:

    - ***Air pollutants*** **–** The Project will generate temporary air pollutant emissions during construction activities, primarily resulting from the staging of equipment and supplies and the operation of vehicles, heavy machinery, and worker personnel vehicles. Air quality impacts from construction activities will be temporary and will depend on both man-made factors (intensity of activity, control measures, etc.) and natural factors such as weather. However, even under adverse conditions, air emissions will have only a minor, short-lived impact on off-site air quality.

      During Project operation, the solar generating equipment produces zero air emissions. Air quality impacts from the Project will be below the applicable ambient air quality standard. The effects to air quality from facility operations will be negligible. Overall, the potential impacts to air quality from construction-related activities and operation of the Project will be minimal.

    - ***Water pollutants*** **–** Prior to construction, the Project will obtain coverage under the Kentucky Pollutant Discharge Elimination System ("KPDES") permit for Stormwater Discharges Associated with Construction Activities ("KYR10"). As required by the KYR10 permit, a stormwater pollution prevention plan ("SWPPP") will be prepared by the engineering, procurement, and construction (EPC) contractor and implemented to minimize impacts associated with the construction activities. Project design may result in either or both temporary and permanent impacts to surface waters as a result from trenching of utility lines, temporary construction access roads or fill placement, and permanent road crossings and placement of culverts in streams. These activities will be avoided to the maximum extent practicable by utilizing the Waters of the U.S. delineation data and U.S. Army Corps of Engineers verified jurisdictional determination. The construction, operations, and maintenance of the Project facilities will have little impact on surface waters. Project development will commence according to approved site plans and permitted authorizations to ensure construction activities control onsite pollutants and avoid impacts to surface waters. Best management practices (BMPs) will be employed to control potential sediment runoff and other potential surface water pollutants. The

operation of the solar facility will likely have an indirect benefit to surrounding surface waters with the facility usage of native vegetation and the reduction in fertilizer and pesticide use.

Project construction will include petroleum products including fuels, lubricants, and hydraulic fluids that will be present onsite. Construction BMPs and implementation of a Soil Protection and Control, and Countermeasure (SPCC) plan will control leaks and spills to minimize the potential for adverse impacts to groundwater. Operations of the Project solar facilities will not adversely impact groundwater. Generally, studies have demonstrated that solar farms improve site pervious characteristics and reduce offsite runoff. No direct adverse impacts to groundwater are anticipated to occur as a result of the Project due to the use of a SPCC plan; there will be minor beneficial indirect impacts to groundwater due to the reduction in fertilizer and herbicide use as land use changes from agriculture to solar energy generation. Given the minimal chemical use and implemented BMPs, it is unlikely that the Project will negatively impact any water resources in the area during the construction and operations phases.

- ***Wastes –*** Wastes will be generated as a result of the construction and operation of the solar facility. All waste materials will be handled and disposed of in accordance with local, state, and federal regulations. Construction and operation generated wastes will be disposed off-site at a permitted facility to be determined by the designated contractor(s), and materials capable of being recycled will be removed from the Project site and recycled at an appropriately licensed facility. During the decommissioning process, Project components will be removed from the site and recycled or disposed of at an appropriately licensed disposal facility. No hazardous materials or waste will be used during operation of the solar facility, and disposal of hazardous material or waste will not be required during decommission. Based on a review of Project waste generation activities, no adverse impacts from waste are anticipated to occur as a result.

- ***Water withdrawal –*** During Project construction, water trucks may be utilized to transport water from off-site facilities. Potable water will be transported onsite during construction and stored at construction trailers and staging areas for workers and personnel consumption. Construction-related water usage would support site preparation and grading activities. The Project may require installation of a permanent water well to provide water for the O&M building. If required, the Project will obtain all necessary approvals. Operation of Project facilities will not be water intensive. Precipitation in the region is adequate to remove dust from the PV panels; therefore, manual panel washing with water will not constitute a significant water withdrawal. Water will be used for ongoing vegetation management needs, including vegetation installation and during periods of drought. Water withdrawal for the Project is not expected to create an adverse impact on regional water resources.

- ***KRS 278.010: Definitions applicable to associated statutes:*** The Motion for Deviation states that Fleming Solar has met the goal of KRS 278.010 by filing a complete Application pursuant to the applicable statutes utilizing the definition of any applicable term defined in KRS 278.010.

- ***KRS 278.212: Filing of plans for electrical interconnection with merchant electric generation facility; costs of upgrading existing grid:*** The Motion for Deviation states that Fleming Solar will comply with all applicable conditions relating to electrical interconnections with utilities through its compliance with the PJM Interconnection process. Additionally, Fleming Solar will be responsible for the appropriate costs resulting from interconnecting with the electric utility.

- ***KRS 278.214: Curtailment of service or generation and transmission cooperative:*** The Motion for Deviation states that, to the extent they apply to the Project, Fleming Solar will comply with the requirements of KRS 278.214.

- ***KRS 278.216: Site compatibility certificate; site assessment report; commission action on application:*** This statute applies to jurisdictional utilities; Fleming Solar is not such a defined utility. However, the Motion for Deviation states that "by submitting its application to the Board and complying with the similar requirements in KRS 278.700 to KRS 278.716, the Fleming Solar Project meets the goals of KRS 278.216."[13]

- ***KRS 278.218: Approval of commission for change in ownership or control of assets owned by utility:*** Fleming Solar is not a utility as defined by the applicable statute; therefore, the Motion for Deviation indicates that this statute does not apply. The Motion for Deviation does state that "to the extent Board approval may at some time be required for Fleming Solar to transfer ownership or control of its assets, Fleming Solar will comply with the applicable statutory and regulatory requirements."

- ***KRS 278.700 – 278.716: Electric Generation and Transmission Siting:*** The Motion for Deviation states that "Fleming Solar has met the goals set forth in these provisions as evidenced by the Application in its entirety", noting the submittal of a "comprehensive Application with a detailed discussion of all of the criteria applicable to its proposed facility under KRS 278.700 – 278.716."

Evaluation of noise levels produced by facility. Noise levels related to facility construction and operations are discussed in detail in Section 5 of this report.

Results of SAR Review – Proposed Site Development Plan

Conclusions. Based on HE's review of the Fleming Solar SAR, the subsequent information provided by the Applicant in response to two rounds of inquiries, direct discussions with the

[13] The Cumulative Environmental Assessment (CEA) notes that six separate environmental reports were completed prior to the CEA, including three Phase 1 Site Assessments (2019, 2020 and 2021), an Environmental Constraints Analysis (2020), a Jurisdictional Waters of the U.S. Delineation (2021) and a Protected Species Habitat Assessment (2021).

Applicant, and other secondary area research, HE offers the following conclusions regarding the proposed site development plan:

- We believe that the Applicant has generally complied with the legislative requirements for describing the facility and a site development plan, as required by KRS 278.708.

- Security and access control measures appear to be adequate, given the type of facility and its location in a rural area.

- The Fleming Solar Project does not meet the existing setback requirements, so the Applicant has submitted a motion for a deviation from those requirements. HE believes that the Project, as proposed, does meet the specific statutes noted for consideration in a setback deviation, assuming the mitigation HE proposes is adopted. The Siting Board will need to judge the quality of the Applicant responses in the setback deviation request.

Need for mitigation. Mitigation measures described in the SAR, or recommended by HE, which are related to the description of the facility and the proposed site development plan, include:

1. A final site layout plan should be submitted to the Siting Board upon completion of the final site design. Deviations from the preliminary site layout plan, which formed the basis for HE's review, should be clearly indicated on the revised graphic. Those changes would include, but are not limited to, location of solar panels, inverters, substations, operations and maintenance building or other Project facilities or infrastructure.

2. Any change in Project boundaries from the information which formed this evaluation should be submitted to the Siting Board for review.

3. The Siting Board will determine if any deviation in the Project boundaries or site development plan is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required, but if so, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.

4. A final Project-specific construction schedule, including revised estimates of on-site workers and commuter vehicle traffic, should be submitted to the Siting Board. Deviations from the preliminary construction schedule should be clearly indicated.

5. The Siting Board will determine if any deviation to the construction schedule or workforce estimates is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required. If so, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.

6. The Applicant or its contractor will control access to the site during construction and operation. All construction entrances will be gated and locked when not in use.

7. The Applicant's access control strategy should also include appropriate signage to warn potential trespassers. The Applicant must ensure that all site entrances and boundaries have adequate signage, particularly in locations visible to the public, local residents and business owners.

8. According to National Electrical Safety Code regulations, the security fence must be installed prior to any electrical installation work. The substation will have its own separate security fences installed.

SECTION 4
Project Setting

Description of the Area

This section provides a description of the area surrounding the proposed Project site. The Project site is located near Flemingsburg, a small city in Fleming County, in northeastern Kentucky. The topography of the area is mostly rolling hills and agricultural land, with wooded areas sprinkled throughout.[14]

Population and housing density. As of mid-2019, approximately 14,600 people resided in Fleming County.[15] The County's population has increased slightly over the past 20 years; in 2000 the population was 13,800 and in 2010 the population was 14,350.[16,17] About 97 percent of the population is white and the median age of residents is 41.[18] Fleming County is predicted to remain stable in population; the Kentucky State Data Center estimates 14,600 people will reside in the County in 2040, which is the current population.[19] Currently, there are about 5,800 households in Fleming County, with an average of about 2.5 persons per household.[20] There are 42 people per square mile, which makes Fleming County more sparsely populated than most other counties in Kentucky.[21]

Flemingsburg, the County seat of Fleming County, is a small city in northcentral Kentucky with about 2,800 people. Lexington, located about 64 miles southwest of Flemingsburg, is the

[14] Kentucky Geological Survey. Generalized Geologic Map for Land-Use Planning: Fleming County, Kentucky.
https://kgs.uky.edu/kgsweb/olops/pub/kgs/mc137_12.pdf
[15] U.S. Census Bureau. Fleming County Quickfacts.
https://www.census.gov/quickfacts/flemingcountykentucky
[16] U.S. Census Bureau. Fleming County, Kentucky, Profile of General Demographic Characteristics.
https://data.census.gov/cedsci/table?q=fleming%20county%20kentucky&y=2000&tid=DECENNIALDPSF42000.DP1&hidePreview=false
[17] U.S. Census Bureau. Fleming County, Kentucky, Annual Estimates of the Resident Population: April 2010 – July 1, 2019.
https://data.census.gov/cedsci/table?q=fleming%20county%20kentucky&tid=PEPPOP2019.PEPANNRES&hidePreview=true
[18] U.S. Census Bureau. Fleming County, Kentucky, Age and Sex.
https://data.census.gov/cedsci/table?q=fleming%20county%20kentucky&tid=ACSST5Y2019.S0101&hidePreview=false
[19] Kentucky State Data Center, Projections of Population and Households, State of Kentucky, Kentucky Counties, and Area Development Districts 2015 – 2040.
http://www.ksdc.louisville.edu/wp-content/uploads/2016/10/projection-report-v16.pdf
[20] U.S. Census Bureau. Fleming County Quickfacts.
https://www.census.gov/quickfacts/flemingcountykentucky
[21] Statistical Atlas. Fleming County, Kentucky.
https://statisticalatlas.com/county/Kentucky/Fleming-County/Population

nearest metropolitan area in Kentucky. Lexington has a population of about 323,000.[22] The Lexington-Fayette metropolitan statistical area has a population of about 517,000.[23]

Income. In 2019, the per capita personal income in Fleming County was $34,732.[24] This was 21 percent less than the average per capital personal income of the Commonwealth of Kentucky, and 39 percent less than the average in the United States.[25] As of mid-2019, about 21 percent of the Fleming County population lives in poverty.[26]

Business and industry. In 2019, there were about 6,300 jobs in Fleming County, with 58 percent classified as wage and salary jobs and 42 percent being proprietors' employment.[27] Prior to the recession of 2007-2009, the number of jobs in Fleming County hovered around that same level, but in 2009-2010, the number of full-time jobs fell below 6,000 jobs for a short period.[28]

- Agriculture is the largest employment sector in Fleming County, with 1,060 jobs.[29] As of 2017, 171,000 acres were in farms, which equates to roughly 77 percent of the total acreage in Fleming County.[30] Forage-land used for hay and grass silage account for most of the cropland, and soybeans and corn are the next most commonly grown crops. In 2015, there were roughly 50,000 head of cattle and calves.[31]

- Government is the second largest sector in the County, with about 740 jobs. Retail trade is the next largest sector with roughly 690 jobs. The manufacturing sector follows with about 640 jobs. Major industries in the area include A. Raymond Tinnerman (makers of automotive and appliance trim), GreenTree Forest Products (specialty pallets and skids, and hardwood grade lumber products), Wallingford Pallet (pallets, lumber, and sawdust), Appalachian Floor Vents (hardwood floor registers), Hypac Inc. (hydraulic

[22] U.S. Census Bureau. Lexington-Fayette, Total Population.
https://data.census.gov/cedsci/table?q=Lexington-Fayette,%20Kentucky&tid=ACSDT1Y2019.B01003&hidePreview=false
[23] U.S. Census Bureau. Lexington-Fayette, Annual Estimates of the Resident Population by Metropolitan Statistical Area.
https://www.census.gov/data/tables/time-series/demo/popest/2010s-total-metro-and-micro-statistical-areas.html
[24] U.S. Bureau of Economic Analysis. Fleming County, GDP and Personal Income.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6
[25] U.S. Bureau of Economic Analysis. United States and Kentucky, GDP and Personal Income.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=2
[26] U.S. Census Bureau. Fleming County Quickfacts.
https://www.census.gov/quickfacts/fact/table/flemingcountykentucky,US/PST045219
[27] U.S. Bureau of Economic Analysis. Fleming County, Total Full-Time and Part-Time Employment.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6
[28] U.S. Bureau of Economic Analysis. Fleming County, Total Full-Time and Part-Time Employment.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6
[29] U.S. Bureau of Economic Analysis. Fleming County, Total Full-Time and Part-Time Employment.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6
[30] U.S. Census of Agriculture. Fleming County, Kentucky Profile.
https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Kentucky/cp21069.pdf
[31] Fleming County Agricultural Development Council. Update of County Comprehensive Plan, 11/15/2015.
https://agpolicy.ky.gov/SiteCollectionDocuments/county-plans/FLEMING.pdf

equipment refurbishing), Riverside Plastics (plastic flower pots, boat parts, and plastic livestock equipment), Toyo Seat USA (makers of automotive seat tracks, latches, and seat frames), and Ridley Block Operations (manufacturer of agricultural feed supplements).[32] The area touts itself as a good place for companies looking for low operating costs, low tax rates, reasonable wage scales, and a quality labor force.

Major and minor roads and railways. The main portion of the Project site is bounded on the south by KR 559 (Old Convict Road) and on the east and north by KR 1200 (Helena Road). The northeastern portion of the Project site is bounded to the east by KY 11 (Maysville Road). No railroad tracks are located within the Project site and there are no interstate highways in Fleming County.

Overall area description. Based on HE's research, the area around the Project site can be generally described as rural and agricultural. The population is generally stable and older; population is expected to remain stable over the next 30 years. Residents' income levels are low, and they experience higher than average rates of poverty than in other counties in Kentucky and the U.S.[33]

[32] Fleming County Chamber of Commerce. Economic Development Profile.
http://www.flemingkychamber.com/ecdev.html
[33] U.S. Census Bureau. Kentucky Quickfacts.
https://www.census.gov/quickfacts/fact/table/KY/POP060210

SECTION 5
Description of Impacts

This section of the report addresses impacts to the following resource topics, as enumerated in KRS 278.708 and KRS 278.706(j):

- Compatibility of the facility with scenic surroundings;
- Potential changes in property values and land use for adjacent property owners;
- Anticipated peak and average noise levels;
- Road and rail traffic, fugitive dust and anticipated degradation of roads and lands; and
- Economic impacts on the region and the state.

The statutes require that the SAR provides information about impacts to the above resources resulting from short-term construction activities and longer-term operational activities. The Siting Board also directed HE to address the potential effects of decommissioning activities, and that discussion is included in this section.

For each resource topic, HE describes generally accepted assessment criteria or methodology necessary to evaluate impacts of a project of this nature. We then summarize the relevant information included in the SAR, as well as supplemental information about the Fleming Solar Project provided by the Applicant in response to data inquiries. HE also provides additional information gathered about the Project and its potential impacts on the region through secondary source research, including interviews. Finally, HE draws conclusions about Project impacts as well as recommended mitigation measures.

HE is also aware of and knowledgeable about the AEUG Fleming Solar, LLC solar project (AEUG Fleming Project), proposed to be located in Fleming County immediately to the south and west of the Fleming Solar Project.[34] That Project is proposed to be a 188 MW(ac) photovoltaic facility built on portions of approximately 1,590 acres on the south side of KY 559 (Old Convict Road). A map of the AEUG Fleming Project is provided in Appendix C to this report for context. That Project has not yet begun construction; the start date for construction of the AEUG Fleming Project is unknown at this time. Construction of the two Projects may or may not overlap to some extent; however, both Projects would be simultaneously operational for many years. Therefore, in the interest of full disclosure to the Siting Board and public, this section of the report discusses the potential for cumulative impacts on the local area from the construction and operations of the two Projects as related to scenic compatibility; land uses and property values; noise; and traffic.

[34] HE also completed the SAR review for the AEUG Fleming Solar Project and is familiar with the details of that Project.

Facility Compatibility with Scenic Surroundings

This component of the statute relates to how well the proposed facility will "blend-in" or is compatible with its physical surroundings and associated land uses. For example, certain industrial facilities can be unsightly, visually unappealing, and generally incongruous with the surrounding area. Coal-fired electric generating plants often have large smokestacks that can be seen from far away. Wind turbines are tall, and their blades can be seen spinning from miles away, etc. Generally, solar farms are considered to be less visually intrusive, as they are relatively short, and can be effectively visually blocked naturally with topographic variation or intervening vegetation, or through strategic means utilized by an applicant.

General methods of assessment. Visual impacts of solar facilities are highly dependent on the characteristics of the surrounding area, i.e., industrial, suburban residential, rural/agricultural. As a result, different methods may be used to assess the visual impacts of solar facilities, depending on location. The Argonne National Laboratory's Environmental Science Division and the National Park Service jointly developed the *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects*; that document is a guide designed to help planners evaluate the quality and completeness of visual impact assessments for solar and wind facilities.[35] Additional reports have been published from public agencies and private firms on visual impact assessments for solar facilities.

Most visual impact assessments focus on visualizations of the appearance of the project from key observation points (KOPs). Since it is impossible to visualize proposed projects from every observation point, it is common for planners to utilize a "worst-case" potential visual impact, i.e., locations where perceived change may be greatest. The overarching goal of visual impact assessments is to determine potential visual impacts that may result from construction, operations, and decommissioning of a project, in a manner that is logical, repeatable, and defensible.[36]

A standard visual analysis generally proceeds in this sequence:[37]

- Description of the Project's visual setting;
- Identification of KOPs. KOPs are locations near the Project site where there is potential for solar facility components to be seen from ground-level vantage points, i.e., a nearby residence or a passing vehicle;
- Analysis of the visual characteristics of the Project, i.e., height of solar panels, descriptions of other facility components; and
- Evaluation of impacts from KOPs.

[35] National Park Service, U.S. Department of the Interior. *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects*. August 2014. http://visualimpact.anl.gov/npsguidance/.
[36] Dean Apostol, James Palmer, Martin Pasqualetti, Richard Smardon, Robert Sullivan. (2016). *The Renewable Energy Landscape: Preserving Scenic Values in our Sustainable Future*. September 2016.
[37] Environmental Design & Research. *Visual Impact Analysis*. May 2019.

Glare from sun shining off solar panels can also be a potential issue in certain locations (i.e., along roadways, near airports, or close to residential properties) or at specific times of the day (generally in the early morning or later in the afternoon as the panels rotate to capture the light). Glare analyses evaluate the potential for different types of glares (red, which is the most severe; yellow, which is less severe; and green, which has the lowest severity rating) at different locations around a Project site and the duration of potential glare, if applicable, at different times of the day. Measures can be implemented to reduce the potential for glare impacts, including the use of anti-glare panels, appropriate panel location and growth of vegetative buffers.

Summary of information provided by the Applicant. The existing scenic setting of the area, potential visual impacts associated with the Project and proposed mitigation are addressed in several portions of the SAR.

Scenic surroundings. The Application describes the Project area as "relatively flat with gently rolling hills, and there are several surface-water ponds and drainage features. Land use is primarily pasture and agricultural. Forested areas, including scrub-shrub vegetation, are primarily located along surface water features as well as property boundaries and fence lines. Adjacent properties similarly consist of cultivated cropland, pastureland, and rural residences."[38]

Appendix D of the SAR is a Visual Assessment prepared by GAI Consultants, Inc. (GAI). GAI evaluated potential viewshed impacts to areas surrounding the Project and made recommendations for vegetative screening at different locations, Attachment B of the Visual Assessment includes a series of photo images taken from various roads surrounding the Project site. Those photos show a variety of trees, shrubs and grasses along roads surrounding the Project site; in some cases, the existing vegetation is dense enough that there is no view from the road of anything beyond the trees. Photo images show both winter and summer foliage conditions, along with simulations of the proposed vegetative screen at maturity.

Additionally, the Property Value Impacts Report (Appendix A of the SAR) states that "most of the site has good existing landscaping for screening the proposed solar farm."

Potential visual impacts from Project construction. The SAR does not address the potential for visual impacts to adjacent landowners, local visitors, or drivers during the construction phase; however, the Applicant notes, both in the SAR and in supplemental materials, that there is extensive existing vegetation surrounding large portions of the Project site.

Potential visual impacts from Project operations and proposed vegetative buffers. The Project would include 193,050 solar panels. At a maximum height of about 10 feet, those panels would likely be the source main visual impact of the Project. The Project substation, to be located along KY 559, is another potential source of visual impacts.

[38] Section 2, Proposed Site Description

As noted by the Applicant, the potential Project footprint was established using a setback of 300 feet from the Project boundary if there is a nearby residence and 50 feet from the Project boundary of there is no nearby residence.[39] Therefore, all (non-participating) residences surrounding the Project site will be at least 300 feet from any panels or other infrastructure. Seven homes are between 300 and 400 feet of the Project footprint; all other homes are further than that. Exhibit 3-2 specifically points out the 300-foot setback between the Project and nearby residences along KY 1200.

In addition to the setbacks for residential properties, the Applicant is proposing vegetative buffers along many edges of the Project, in locations where panels or other infrastructure would be visible. Section 2 of the SAR states the following:

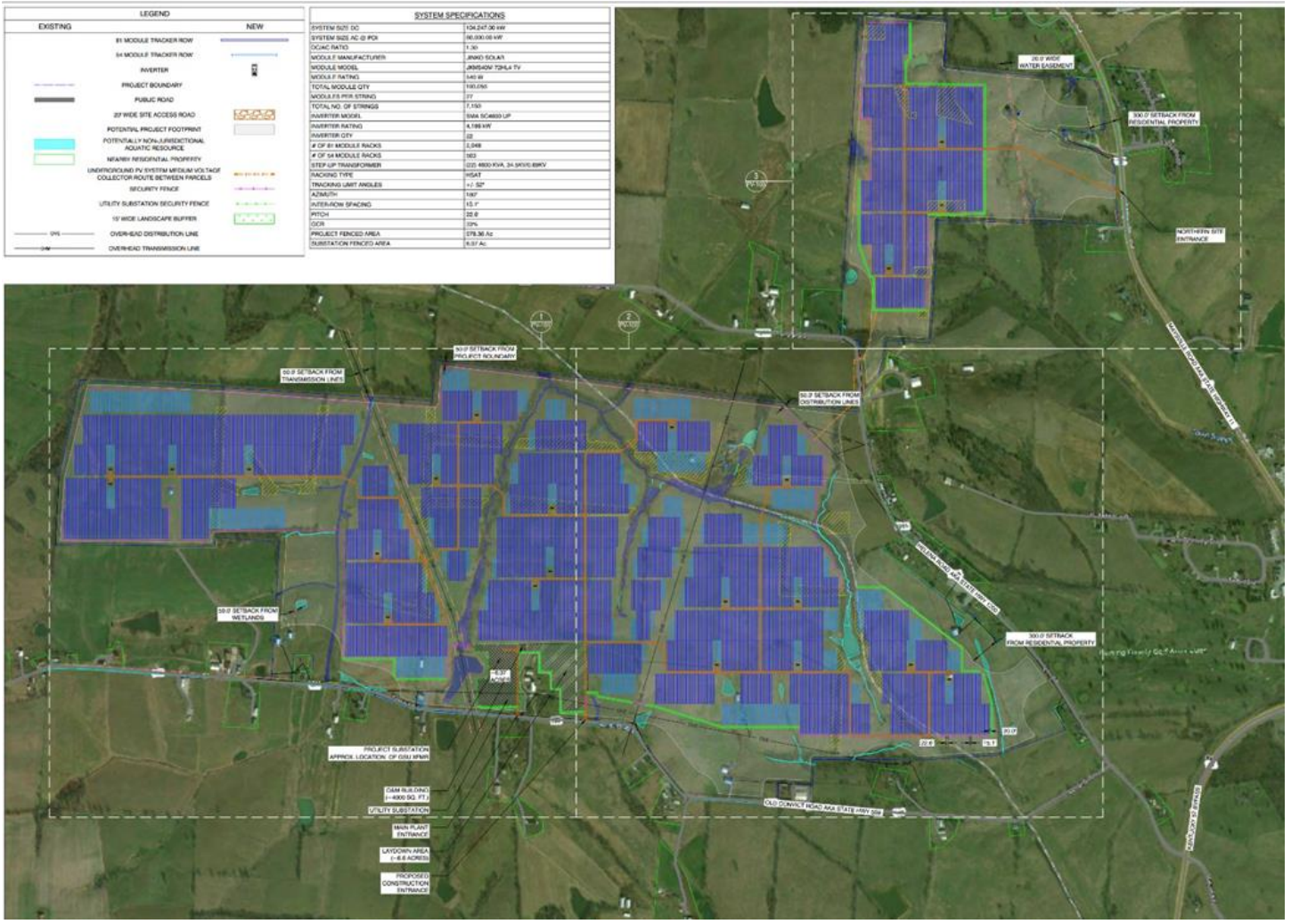
"To the best ability, through the completion of the Visual Assessment, GAI has reviewed all possible scenarios where visual impacts could have been made by the community from the adjacent residences and along the right-of-way surrounding the project site. The assessment provided Core Solar with a better understanding of where landscape screening would need to be considered, and thus they have made the proper alteration to their layout. The facility is proposed to be well screened by existing and proposed vegetation, as well as structures associated with the development. It should be noted that all screening solutions benefit those who reside nearest the project, while areas such as roadways and rural residential development located outside of built communities could have possible elevated views towards the project site. This does present the opportunity of views that could vary from completely screened to partially and unobstructed screening with every attempt made towards screening the proposed development."

Vegetative buffers are proposed for areas along KY 559 on the south side of the Project (including in front of the substation area); along on the east side of the Project near KY Road 1200 (Helena Road); and along the east side of the Project near KY 11 (Maysville Road). Buffers consisting of evergreen shrubs and small trees would grow to a minimum of eight feet tall within four years of planting. Buffers would be located outside of the security fencing. Once the Project is operational, staff will survey vegetation and identify and perform any necessary management actions, including vegetation replacement.

Exhibit 5-1 offers the Preliminary Project Layout map provided by the Applicant (previously shown as part of Exhibit 3-2), which also highlights the proposed vegetative buffers.

[39] For purposes of establishing the Project footprint, "nearby" was defined as within 300 feet of the Project boundary.

Exhibit 5-1.
Preliminary Project Layout, with Proposed Vegetative Buffers



Source: Fleming Solar, LLC, July 2021.

Potential for glare from Project panels. The Project will use anti-reflective coated panels to minimize any potential for glare. Appendix E of the SAR is a Solar Glare Hazard Report prepared by PurePower Engineering. That report presented the results of an analysis of the potential for glare impacts on "various discrete observation points and adjacent roadways", evaluating the "entire calendar year from when the sun rises above the horizon until the sun sets below the horizon". Forty ground level "receptor points" included all residences within 300 feet of the Project boundary, the viewshed locations identified by GAI for the Visual Assessment, the adjacent church, the adjacent golf course, and several points along KY 559, KY 1200 and KY 11. No potential for glare was predicted at any of those locations.

HE's evaluation of impacts. HE reviewed maps and Google Earth satellite imagery of the site and used Google Maps to "drive" around the area to assess viewpoints of the Project from a vehicle commuter's point of view. In addition, HE staff made a visit to the Project site on July 28, 2021. During this site visit, we visited all proposed access points, drove around the property to gain line-of-sight to various viewpoints, and compiled a photo log of the Property boundary at different areas. The photo log can be found in Appendix B of this report.

Visual setting. HE's site visit and inspection largely confirmed information provided by the Applicant and gathered as part of the Project evaluation, with regards to the rural nature and "look" of the area. The area surrounding the Project is agricultural and residential, but there are homes in close proximity to the Project boundary, specifically to the south along KY 559 and to the east along KY 1200 and KY 11. Rolling hills and existing trees will help protect against negative visual impacts to residents and commuters, but there are areas in which the Project would be visible from the road or from nearby properties. According to the Applicant's representative, the areas that would be exposed to viewshed impacts would be buffered. The northern facing boundaries were found to be remote to human sight in most instances. Natural topography and vegetation blocked views from most residential areas.

As presented in Exhibit 3-5, two residences are located within 300 feet of the solar panels, 54 residences are located within 900 feet, and 106 residences are located within 2,400 feet of the Project footprint.[40] One church is located within 600 feet and one commercial property is located within 2,400 feet of the Project footprint. Several neighborhoods (clusters of homes) are located around the Project site, as shown in Exhibit 3-6, but in most areas, homes are further apart and separated by vegetation, hills or simply distance. The City of Flemingsburg, home to about 2,800 people, is located a short distance (less than one mile at the closest point) from the Project site.

Construction activities. Some adjacent landowners and commuters driving along local roads, including KY 559, KY 1200 and KY 11 will likely be able to see construction equipment and activity as it occurs. Commuters and residents along KY 559 would be the closest to construction activity, but traffic along that road is minimal and there are relatively few homes in this area. The Project footprint is located further away from KY 1200 (as compared to KY 559) and the northern portion of the Project site is even further from KY 11; drivers and residences along KY 111 will be at some distance from construction activities. Additionally,

[40] The two residential structures located within 300 feet of the Project footprint are located on participating parcels.

construction will be temporary, occurring over a 12-month period and activities will take place in different locations within the Project site during that time, potentially limiting the duration of visible activity in any one location. Therefore, HE expects the visual impacts from construction activities to be minimal.

Project facilities. HE's focus of the scenic compatibility evaluation is upon the solar panels, as those structures will be above ground in close proximity to several residences and roads. The substations, located along KY 559, would also be visible. However, existing vegetation and the vegetative buffers proposed for specific locations surrounding the Project site will shield the panels from view for nearby residents and drivers. As illustrated in Exhibit 5-1, the Applicant is proposing extensive buffers along the edges of the northern portion of the Project and along portions of the Project near residences and businesses on KY 1200. Additional buffers will be placed in specific locations along KY 559. Those buffers will reduce views of the panels, substations, or other Project infrastructure. Additionally, setbacks between homes and the Project footprint along KY 1200 and the distance between residences and the Project footprint along KY 11 and some portions of KY 559 will also reduce views of the panels. The Applicant has committed to working with neighboring homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors. The Project will use also anti-glare panels, reducing or eliminating any glare. Overall, HE expects the visual impacts associated with Project facilities to be minimal.

Cumulative visual effects in combination with the AEUG Fleming Project. Cumulative visual impacts, during construction or operations, would be most likely to occur along KY 559 since both Projects abut that roadway. If construction of the two Projects occurs simultaneously, a driver or homeowner in that area may be able to see construction activity on both sides of the road, although that would be a temporary impact. Visual impacts during construction would be minimized, or avoided, if activities in areas along KY 559 were staggered.

During the operational phases of the Projects, drivers or homeowners in that area might also be able to see solar panels associated with both Projects. The Fleming Solar Project has proposed buffers along portions of KY 559; AEUG Fleming is also proposing buffers along KY 559. However, the buffers associated with those Projects would be located along different sections of KY 559. Therefore, panels may be in view on one side of the road or the other along portions of KY 559. Potentially, although drivers or homeowners may know that Project panels are in the area, they may not be able to see facilities from both Projects at the same time.

Conclusions and recommendations. Based on our review of the SAR, supplemental information provided by the Applicant, and additional research conducted by HE, we offer the following conclusions and recommendations regarding scenic compatibility:

- Fleming County residents value agricultural vistas and are concerned about being overwhelmed by solar panels.

- Construction vehicles and activity may be visible from local roadways and at several vantage points around the Project site, but these effects will be temporary as

construction work moves around the site. Existing vegetation left in place along the Project boundary line will reduce visibility of construction activities occurring on-site.

- Operational infrastructure, including the solar panels, will be shielded by existing vegetation in the area (trees, shrubs, and grasses) and by the vegetative buffers proposed for specific areas along the Project boundary. Proposed buffers will largely be used to shield infrastructure in highly visible areas. Rolling hills in the area will also reduce the visibility of the infrastructure in some areas for residents and drivers.

- The use of anti-glare panels will reduce, or eliminate, the potential for glare from solar panels for local residents and drivers.

- The substation will be located along KY 559 but will be at least partially shielded from view by the proposed vegetative buffer in that location.

- Residents and drivers along KY 559 will be subject to cumulative visual effects from the Fleming Solar and AEUG Fleming Projects during operations, and possibly during construction unless the two project schedules are staggered.

Need for mitigation. The visual impacts are likely to be such that the Applicant should consider certain mitigation:

1. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of solar panels.

2. Existing vegetation between the solar arrays and the residences will be left in place, to the extent practicable, to help screen the Project and reduce visual impacts from the nearby homes and roadways.

3. The Applicant will work with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors.

4. The Applicant should provide a visual buffer between Project infrastructure and residences or other occupied structures with a line of sight to the facility to the satisfaction of the affected property owners. If vegetation is used, plantings should reach eight feet high within four years. To the extent that an affected property owner indicates to the Applicant that such a buffer is not necessary, the Applicant will obtain that property owner's written consent and submit such consent in writing to the Siting Board.

5. The Applicant will follow through on its commitment to providing vegetative buffers at the locations indicated on the Preliminary Site Layout map included in the application materials. If the final site layout plan deviates from the preliminary plan with regard to the locations of solar panels, inverters, substation or other Project infrastructure, an additional evaluation of the need for vegetative buffers will be conducted and reviewed by the Siting Board.

6. Landscape screening will extend and connect to existing site vegetation, to help create a more natural transition between existing vegetation and developed.

7. The Applicant will develop a vegetation management plan that describes the approach and procedures for maintaining or replacing vegetative buffers as needed.

8. Applicant will cultivate a minimum of six acres of native pollinator-friendly species on-site.

9. The Applicant has committed to using anti-glare panels and operating the panels in such a way that glare from the panels is minimized or eliminated. The Applicant will immediately adjust solar panel operations upon any complaint about glare from those living, working, or traveling in proximity to the Project. Failing this, the Applicant will cease operations until the glare is rectified.

10. The Applicant should work with the Siting Board regarding the timing of construction activities in relation to those of the AEUG Fleming Project in order to minimize or eliminate any potential for cumulative impacts to the viewshed during construction, especially along KY 559.

Potential Changes in Property Values and Land Use

The construction and operation of industrial facilities has the potential to negatively affect property values and/or land uses of those properties adjacent to, or even in the general vicinity of, the facility in question. The magnitude, timing, and duration of increased traffic volume, noise, odor, visual impairments, or other emissions associated with the facility can influence the marketability and value of nearby properties. Each of those factors are addressed in this report and are considered here in examining property value impacts.

General methods of assessment. The value of a residential property is based on several factors, including characteristics of the home and the land on which it is situated, the uses and values of the surrounding property, among other attributes. The value of a residential property will take into account things such as lot size, age of home, size of home, number of bedrooms and bathrooms, etc. A residential property located near public lands or open spaces may be more highly valued, whereas the same property located near a heavy industry facility might have a lower value. Residential properties will be assessed differently than agricultural or industrial properties.

Several methods are available to assess the impacts of a new development on nearby property values. A technique known as hedonic pricing analysis can be used to determine the impacts of a specific characteristic on the price or value of a property. However, this method of valuation requires large amounts of data, statistical experience, and careful evaluation. Formal appraisal is a technique which uses the concept of specific property characteristics in comparing different properties. Matched pair analysis is another technique. A matched pair analysis makes a comparison between similarly situated properties that sold before and after a new industrial facility is constructed. This approach is described in more detail below.

Summary of information provided by the Applicant. The Property Value Impact Report (Attachment B of the SAR) was completed by the Applicant's consultant, Richard Kirkland of Kirkland Appraisals, LLC. Referred to here as the Kirkland report, that document, along with additional follow-up information from Mr. Kirkland provides the following relevant information:

- ***Land uses of adjacent properties*** – Mr. Kirkland describes adjoining land as primarily a mix of residential and agricultural uses. About 49 percent of the acreage adjacent to the facility is mixed agricultural/ residential; an additional 48 percent is agricultural and about three percent is identified as purely residential. A very small amount of acreage adjacent to the Project site is identified as Religious (church) or as a Warehouse.

- ***Distances between solar panels and homes on adjacent properties*** – The Kirkland report indicates that the closest homes will be at least 325 feet away from the Project footprint. In response to HE's inquiries, the Applicant provided additional information about the distance between various structures and the potential Project footprint; that data was provided in Exhibit 3-5. Altogether a total of 62 homes, one church and 97 other structures are located within 1,200 feet of the Project footprint; other structures include barns, sheds, garages, and similar types of structures.

- ***Academic research studies, appraisal market studies and other publications–*** The Kirkland report provides summaries of four research papers addressing property value impacts of solar or wind facilities. Based on his understanding of each study, Mr. Kirkland concludes that proximity to a solar facility has no impact (positive or negative) on property values. Mr. Kirkland also provides the results of several appraisal studies focused on the presence of solar facilities, which all conclude finding no impacts on property values due to proximity to solar facilities.

- ***Discussion of a "matched pair" analysis*** – The Kirkland report employs an analytical approach described as a matched pair analysis, which aims to determine the impact of a specific feature or attribute on property value. This form of "matched pair" analysis compares differences between the sales prices of properties adjacent to a solar facilities and sales prices of properties located further from that same facility.[41] Mr. Kirkland identifies and compares the sales prices of properties sold using data from 37 different solar farms across multiple states. In general, each of the solar farms included in the analysis are relatively similar in terms of rural, less densely populated locations. Nearby land uses are typically residential and agriculture in nature. The size of the solar facilities evaluated ranges from 5.0 MW up to 617 MW and from an overall property size of 35 acres (5 MW facility) up to 3,500 acres (617 MW facility).[42] The results of this analysis and Mr. Kirkland's overall conclusions are discussed below.

[41] Mr. Kirkland adjusts for such factors as date of sale, age of home, square footage, number of bedrooms and bathrooms and garage spaces prior to comparing sales prices.
[42] Of the 37 solar facilities used in Mr. Kirkland's analyses, 36 facilities are 80 MWs or smaller.

- ***Effects of landscaping buffers on property values*** – The Kirkland report also provides an analysis of home price differentials based on Project size in combination with the amount of vegetative buffer (light, medium or heavy) from existing landscaping and Project planting and the distance between the home and solar panels. Mr. Kirkland concludes that once Project facilities have been substantially screened with a light buffer (such that no price differential exists), additional buffering has no further beneficial effect on property values, regardless of Project size.

- ***Narrative discussion of specific factors related to impacts on property values –*** Mr. Kirkland briefly addresses the topics of hazardous materials, odor, noise, traffic, stigma, and appearance as related to solar facilities in general and concludes that the "proposed solar farm [Fleming Solar] will not negatively impact adjoining property values". He does state that "the only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers."

- ***Construction related impacts to property values –*** Mr. Kirkland states that no impacts to property values are anticipated due to construction activity on the Project site. The report notes that "construction will be temporary and consistent with other development uses of the land and in fact dust from the construction will likely be less than most other construction projects given the minimal grading".

Kirkland's conclusions. The Kirkland report presents two sets of analysis: (1) property price differentials for 23 solar facilities (56 matched pairs) located in the Southeastern U.S. and (2) property price differentials for 37 solar facilities (94 matched pairs) located across the entire U.S. Those analyses note the degree of vegetative buffer (light to heavy) between the adjacent property and the solar facility for each matched pair set.

Southeastern U.S. solar facilities. Based on analysis of the 56 residential dwelling matched pairs associated with the 23 solar facilities located in the Southeastern part of the U.S., Mr. Kirkland concludes that:

> "The range of differences (in sales prices) is from -10% to +10% with an average of +1% and median of +1%. This means that the average and median impact is for a slight positive impact due to adjacency to a solar farm. However, this +1% rate is within the typical variability I would expect from real estate. I therefore conclude that this data shows no negative or positive impact due to adjacency to a solar farm."[43]

Mr. Kirkland acknowledges that the range is "seemingly wide," but notes that the "vast majority of the data falls between -5% and +5% and most of those are in the 0 to +5% range."

National solar facility data. Mr. Kirkland's analysis of the 94 matched pair sets associated with solar facilities across the U.S. found the following:

[43] Kirkland report, 2021.

> "The matched pairs show no negative impact at distances as close as 105 feet between a solar panel and the nearest point on a home. The range of impacts is -10% to +10% with an average and median of +1%."

The Kirkland report notes that the range is "broad", but that only three data points out of the 94 matched pairs show a negative impact. Nine sets indicate a positive impact, and the remaining sets show no impact. Mr. Kirkland states that he considers this data "to strongly support a finding of no impact on value as most of the findings are within typical market variation and even within that, most are mildly positive findings."

In addition to the conclusions summarized above, Mr. Kirkland also states that the analyses described above indicate that solar facilities have no impact on the values of adjacent properties (residential, agricultural, or vacant) "where the solar farm is properly screened and buffered".

HE's evaluation of impacts. To assess the topic of impacts to property values, HE: (1) reviewed relevant existing literature related to solar facility impacts; (2) considered information provided by real estate professionals in Fleming County; (3) prepared further analysis of the data provided in the Kirkland report; and (4) examined the potential for impacts to residences and neighborhoods closest to the Project.

Literature review. HE reviewed the existing literature related to the relationship between property values and utility – scale solar facilities. Overall, there are not many studies available that address the issue of changes in property values specifically related to solar facilities; the few that are available include the following:

- A 2020 study completed by economists at the University of Rhode Island found that in areas of high population density, houses within a one-mile radius depreciate by about 1.7 percent following construction of a solar array. The study found "substantially larger negative effects for properties within 0.1 miles and properties surrounding solar sites built on farm and forest lands in non-rural areas." However, additional analysis focused on impacts in more rural areas found that the "effect in rural areas is effectively zero (a statistically insignificant 0.1%) and that the negative externalities of solar arrays are only occurring in non-rural areas." The researchers note that this may be due to solar facilities being less visible in rural areas (due to land abundance for vegetative buffers).[44]

- A 2020 study focusing on the property value effects of wind turbines and solar facilities in the Netherlands states evidence suggesting that the negative effects of solar facilities (including noise (buzzing sounds), glare and visibility) results in decreased residential housing prices (2-3%). They found these effects to be localized (within 1km of the facility, or a little more than half a mile). However, the researchers also note that the relatively small number of solar facilities in the

[44] Gaur, V., and C. Lang. *Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island*. University of Rhode Island, Department of Environmental and Natural Resource Economics, September 2020. https://web.uri.edu/coopext/files/PropertyValueImpactsOfSolar.pdf

Netherlands makes the results less precise (as compared to the wind farm analysis).[45]

- A 2019 article produced by the American Planning Association indicates that the "impact of utility-scale solar facilities is typically negligible on neighboring property values." The issue of property value impacts "can be a significant concern of adjacent residents, but negative impacts to property values are rarely demonstrated." [46]

- A 2018 University of Texas study included a geospatial analysis and a survey of residential property assessors to determine the potential for property value impacts. The results show "that while a majority of survey respondents estimated a value impact of zero, some estimated a negative impact associated with close distance between the home and the facility, and large facility size. Regardless of these perceptions, geospatial analysis shows that relatively few homes would be impacted."[47]

- Independent appraisers are often hired to conduct analyses related to property value impacts for solar companies, as is the case here for the AEUG Fleming solar facility. Those analyses focus on property value trends of lands adjacent to existing solar farms across the country, using a paired sales or matching pair approach. HE reviewed several appraisal reports (not completed by Kirkland Associates); those appraisals indicate differences in property values ranging from about -3.2% to as much as +27%, although generally in cases with positive impacts, property values increased by about 5% or less. Overall, the conclusions were that solar facilities do not negatively impact property values.[48]

It is interesting to note that although the few existing studies related to this issue generally indicate no impacts to property values, local residents often bring up concerns about property values during public hearings or open houses related to specific solar facilities. In many cases,

[45] Koster, H. and M. Droes. *Wind turbines and solar farms drive down house prices.* VoxEU, September 2020. https://voxeu.org/article/wind-turbines-and-solar-farms-drive-down-house-prices. Mr. Koster is Professor of Urban Economics and Real Estate at Vrije University in Amsterdam; Mr. Droes is Assistant Professor of real Estate Finance at the University of Amsterdam.
[46] Coffey, Darren. *Planning for Utility-Scale Soar Energy Facilities.* American Planning Association, PAS Memo, September – October 2019. https://www.planning.org/pas/memo/2019/sep/.
[47] Al-Hamoodah, Leila, et al. *An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations.* Policy Research Project, LBJ School of Public Affairs, The University of Texas at Austin, May 2018. https://emp.lbl.gov/sites/default/files/property-value_impacts_near_utility-scale_solar_installations.pdf.
[48] McGarr, P. and A. Lines, CohnReznick, Property Value Impact Study, Proposed Soar Farm, McLean County, IL, 2018; McGarr, P. and A. Lines, CohnReznick, Property Value Impact Study, Proposed Soar Farm, Kane County, IL, 2018; McGarr, P., CohnReznick, Property Value Impact Study, Adjacent Property Values Solar Impact Study: A Study of Nine Existing Solar Farms Located in Champaign, LaSalle, and Winnebago Counties, Illinois; and Lake, Porter, Madison, Marion, And Elkhart Counties, Indiana, 2018; McGarr, P., CohnReznick, Property Value Impact Study, Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Farms Located in Lapeer County, Michigan; Chisago County, Minnesota; Marion County, Indiana; LaSalle County, Illinois; Bladen, Cumberland, Rutherford and Wilson Counties, North Carolina; and Isle of Wight County, Virginia, 2020.

as evidenced by newspaper articles or other media, residents believe that property values will be reduced by nearby solar farms. So, there may at least be a perception of negative effects on property values that permeates communities.

Interviews. As part of efforts to review and evaluate the AEUG Fleming Project SAR, HE conducted interviews with two individuals familiar with property valuation and real estate in Fleming County, including the Property Valuation Administrator and a local real estate professional.[49] At that time, both of those individuals described the local real estate market as strong, with rising home prices and shorter sales time than in the past. Those occurrences were attributed, in part, to COVID-19 effects (people wanting to get away from more densely packed areas) and current low interest rates. Ms. Butler expressed considerable concern about negative impacts to property values from solar facilities, specifically related to visual impacts – solar panels and other infrastructure being visible from nearby residences. Mr. Story also thought that solar facilities could have a negative on property desirability and sales price, likely as tied to visibility of the Project.

As part of the evaluation of the Fleming Solar Project, HE spoke with Ms. Butler a second time to discuss both the Fleming Solar Project specifically and the potential for cumulative impacts from the presence of both the AEUG Fleming and Fleming Solar Projects. Ms. Butler stated that she continues to be concerned about the effects of solar facilities on local property values, especially in the face of multiple proposed Projects in the County.[50] The locations of the AEUG Fleming and Fleming Solar Projects make the properties and residences along KY 559 (Old Convict Road) a special concern. She believes that property values will decline in areas adjacent to solar facilities and that the existence of multiple facilities will have a greater impact; she acknowledges that time will tell whether or not that will be the case in Fleming County.

Review of Kirkland data. Although Mr. Kirkland concludes that there would be no impacts on property values from the Fleming Solar facility, the matched pair analysis does indicate the potential for a range of positive or negative effects. Therefore, HE examined more closely the data provided in the matched pair sets to determine the likelihood of a positive impact, negative impact, or no impact.

Exhibit 5-2 summarizes that effort, presenting a detailed picture of the distribution of price differences for matched pair sets. About 87 percent of matched pair comparisons reflected a sales price differential of between negative five percent and positive five percent, with almost 18 percent of comparisons showing no price differential at all. About 23 percent of all comparisons showed a negative impact on home prices, as compared with almost 59 percent of comparisons indicating a positive effect. Overall, these data appear to support Mr. Kirkland's conclusion of no property value impacts due to proximity to solar facilities.

[49] Ms. Michele Butler, Fleming County Property Valuation Administrator and Mr. Merd Story, Story Realty, conducted on February 11, 2021, and February 17, 2021, respectively.

[50] Ms. Butler explained that in addition to the AEUG Fleming Project and the Fleming Solar Project, there are several other potential projects in various stages of preparation in Fleming County. She knows of at least one other in which companies have obtained lease agreements on land and described three others that may be located in various areas of the County.

Exhibit 5-2.
Distribution of Sales Price Differences for Matched Pairs, Southeastern U.S.

	Southeastern U.S. Facility Analysis	
# Facilities Included	23	
# Matched Pair Sets	56	
Range of Impact		
-6% to -10%	2	3.6%
-1% to -5%	11	19.6%
0%	10	17.9%
1% to +5%	28	50.0%
+6% to +10%	5	8.9%
Total	56 Pairs	100.0%

Source: Kirkland report data set, 2021.

Exhibit 5-3 provides a summary of Mr. Kirkland's analysis of the effects of different levels of landscaping and vegetative buffers on home sales price. Although Mr. Kirkland concluded that medium or heavy buffering provides no additional benefits (in mitigating impacts to property values) over "substantial" light buffering, the summary provided below seems to suggest that heavier buffering could potentially minimize the large range of price impacts evident with lighter buffering. However, the three matched pair sets identified as having heavy landscaping buffers may not provide a large enough sample size to accurately test that theory.

Exhibit 5-3.
Effects of Light, Medium or Heavy Vegetative Solar Facility Buffers on Home Prices, Southeastern U.S.

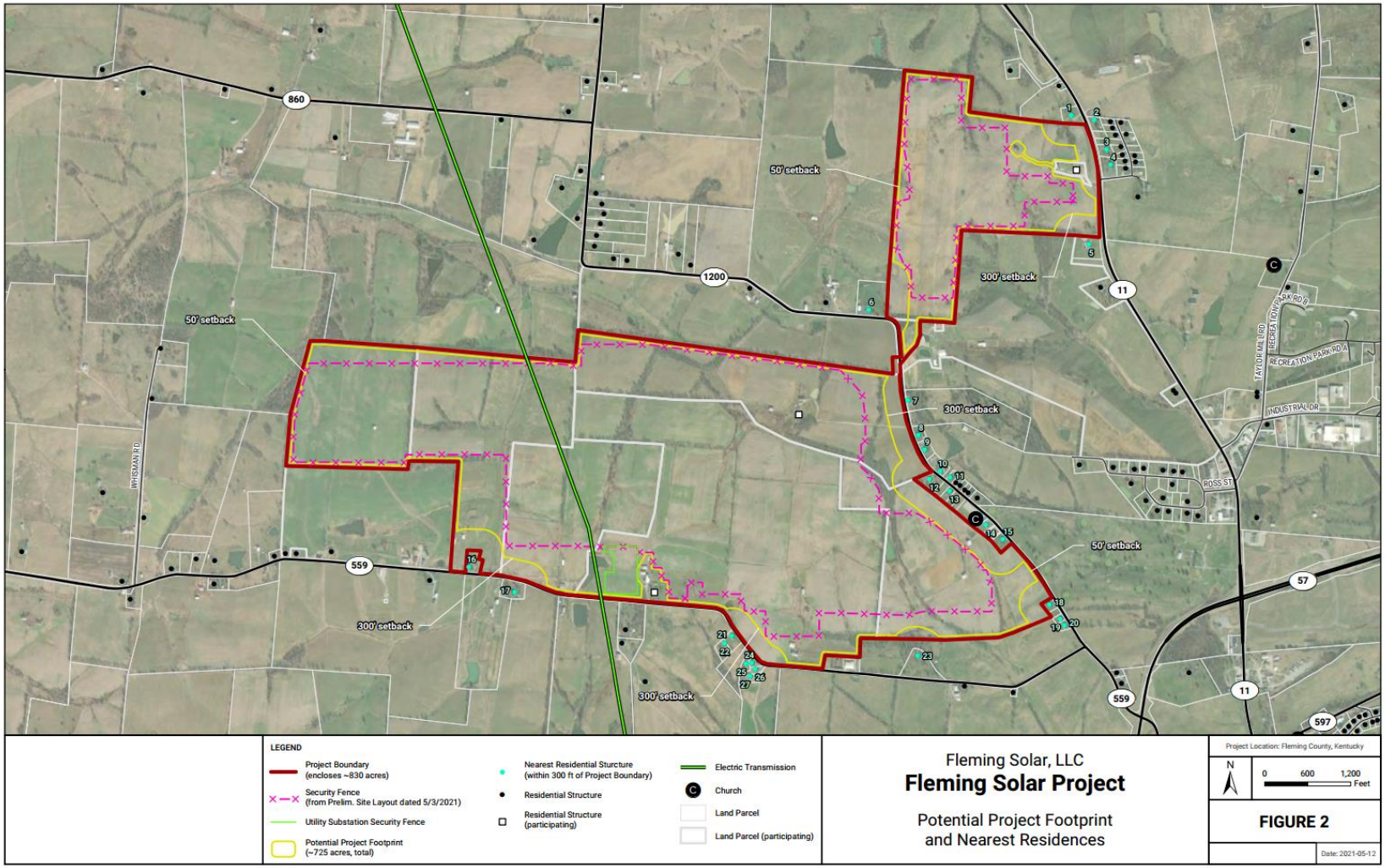
	Southeastern U.S. Facility Analysis			
# Facilities Included	23			
# Matched Pair Sets	56			
		Price Differencial		
Vegetative Buffer	**# Matched Pair Sets**	**Average**	**Median**	**Range**
Light	41	2%	1%	-10% - +10%
Medium	12	1%	2%	-7% - +9%
Heavy	3	0%	0%	0% - +1%

Source: Kirkland report data set, 2021.

Residential neighborhoods and home in close proximity to the Project site. Information obtained in HE's literature search and statements made by Mr. Kirkland indicate that impacts to the values of adjacent or surrounding properties may be very much related to the ability to see or hear the Project and that vegetation or other visual barriers may reduce the potential for adverse impacts to property values. Therefore, HE more closely examined the locations and situations of nearby residential properties in terms of distance to the Project and potential viewshed impacts when considering potential impacts to property values.

Exhibit 5-4 identifies the residences nearest to the potential Project footprint, including several along KY 559 (Old Convict Road), KY 1200 (Helena Road) and KY 11 (Maysville Road).

Exhibit 5-4.
Map of the Fleming Solar Potential Project Footprint and Nearest Residences



Source: Fleming Solar, May 2021.

- Along KY 559 (Old Convict Road), nine homes are located between 362 feet and 529 feet from the Project footprint. For at least eight of those properties, it appears that proposed vegetative buffering would reduce, but may not completely eliminate, views of the panels, substations and O&M building. The home located furthest east, on the north side of KY 559, appears to be the least shielded from view by proposed buffering; however, existing vegetation may be available in that area.

- Along KY 1200 (Helena Road), twelve homes and one church are located between 326 feet and 507 feet from the Project footprint. Vegetative buffering is proposed along a length of the Project footprint in that area. However, homes located in the more northern portion of that residential area may have greater views of the Project, if natural vegetation does not exist, since no buffers are proposed in that area.

- Along KY 11 (Maysville Road), five homes are located between 415 feet and 460 feet from the Project footprint. Vegetative buffers are proposed for large portions of the eastern edge of the Project in that area. It appears that natural vegetation to the southeast of that portion of the Project would also provide a visual buffer.

Given the extent of existing vegetation in the Project area and the proposed vegetative buffers, HE concludes that property values in Fleming County are unlikely to be affected by the Fleming Solar Project.

Cumulative land use/ property value effects in combination with the AEUG Fleming Project. As part of supplemental materials provided by the Applicant, Fleming Solar stated that they "do not anticipate any negative impacts to property values or land uses due to the proximity of the AEUG Fleming Project." Mr. Kirkland agreed with that conclusion, based on the concept that many large solar projects are developed such that multiple separate sections are located in the same area, essentially acting and appearing as multiple solar projects. He describes three examples of cases where either one project included multiple sections or several projects were located in the same area; in all cases, Mr. Kirkland states that no property value impacts were found. However, those cases provided very few examples of homes truly surrounded by solar infrastructure.

Additionally, the Applicant has stated that, "the majority of the landowners with adjacent properties to Fleming Solar along Old Convict Road are leasing their property (or portions of their property) to AEUG Fleming Solar." Based on HE's knowledge of the AEUG Fleming Project, that statement is generally accurate. Appendix C of this report includes a map of the parcel boundaries for the AEUG Fleming Project; many of the properties located on the south side of KY 559 (Old Convict Road) are included in that Project. However, there may be a few other properties, either located to the south of the Fleming Solar Project's western edge (immediately north of the AEUG Fleming site) or located south of Fleming Solar and east of AEUG Fleming, that are not participating parcels in either Project.

HE believes that the potential for property values to be adversely affected by the close proximity of two large solar Projects does exist. The length of time required to find a willing buyer and complete a sale for homes in that area may be extended for properties relatively surrounded by solar panels. In this particular instance, considering the locations of both the

Fleming Solar and AEUG Fleming Project sites, cumulative impacts to property values would most likely be associated with specific properties along KY 559 since both Projects generally abut that roadway. However, those impacts may be limited to the few non-participating landowners in the area. Vegetative buffering may reduce those impacts, as will the distance between the home and the solar infrastructure.

Conclusions and recommendations. Based upon review of the Kirkland report and our additional research efforts and interviews, HE offers the following conclusions related to potential impacts to property values or land uses for adjacent property owners:

- Certain literature and our interviews suggest that concerns surrounding impacts to property values from solar facilities stems from visibility of panels and other infrastructure. If that is the case, the creation of vegetative or other buffers may go a long way to reducing concerns or mitigating potential reductions in property values.[51]

- Current research suggests that the existence of solar facilities does not, in general, measurably result in negative influences on property values for adjacent landowners in rural areas. HE's data analyses also generally point to a conclusion of no discernible impacts to property values, although there is a small risk of negative impacts.

- Construction activities will be temporary, occurring over a period of about 12 months. Those activities will result in increased traffic and noise in the vicinity of the project; however, homebuyers and those interested in buying other types of properties often have a longer-term mindset when deliberating a purchase. Additionally, the high level of current market activity in Fleming County, coupled with current low interest rates, will likely have a larger influence on desirability and prices than the solar facility construction. Even so, some sales might be delayed because of uncertainty.

- The Fleming County Property Valuation Administrator is concerned that the Fleming Solar Project will have negative effects on local property values. Homes along KY 559 (Old Convict Road) are a special concern, especially since the AEUG Fleming Project is proposed to be located immediately to the south and west of the Fleming Solar site, on the opposite side of KY 559.

- It appears that the proposed vegetative buffers, in combination with existing vegetation in some locations, will substantially reduce the view of the Project from nearby residences.

- HE concludes that property values in the Project area and in Fleming County are unlikely to be affected by the siting of the Fleming Solar facility, with the possible exception of some properties located along KY 559 due to their additional close proximity to the AEUG Fleming Project. This conclusion assumes that the mitigation

[51] Community & Environmental Defense Services, located in Maryland supports coordination between solar companies and landowners related to screening measures to protect the view. Community & Environmental Defense Services, Solar Farms: Protecting Homes, Property Value, Views & the Environment While Reaping Solar Energy Benefits. https://ceds.org/solar/

strategies discussed in Section 6, including the planting of vegetative buffers to minimize views of the panels, are adopted by Fleming Solar.

Need for mitigation. No unique mitigation measures are recommended related to potential impacts to property values or adjacent land uses because other mitigation can accomplish this. However, close coordination by the Applicant with concerned homeowners, especially those located along KY 559 (Old Convict Road), regarding these mitigation measures should be initiated.

Anticipated Peak and Average Noise Levels

Noise issues stem from construction activities and operational components of the solar facility. During construction, noise will include graders, bulldozers, excavators, dozers, dump trucks, pile drivers, and other equipment. During operations, noise will be emitted from transformers, inverters, and the tracking motors that tilt the panels to track the sun throughout the day. Distance from noise emitters to noise receptors is important since noise levels decrease the further a noise receptor from a noise emitter. Fleming County does not have a noise ordinance.

General methods of assessment. Sound levels are measured in decibel units (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity. Sound levels are typically described as dBA, which is the measure of the overall noise level of sound across the audible spectrum to compensate for the varying sensitivity of the human ear to sound at different frequencies. The impacts of noise are not strictly related to loudness – the time of day when noise occurs, the duration of the noise, and baseline or background noise levels are also important factors in determining the "loudness" of a noise.

Generally speaking, an increase in 10 dBA is perceived as a doubling of loudness, that is to say, 70 dBA is perceived as twice as loud as is a level of 60 dBA.[52] A change of three decibels is barely noticeable, but a change of five decibels is typically noticeable. Once sounds reach 90 dBA humans can experience pain from the noise and sounds above 150 dBA can cause permanent hearing damage.[53] For additional context, 30 dBA is the sound emitted by a whisper, 55 dBA are emitted from a percolating coffee-maker, and 90 dBA would be the sound emitted by an individual's yell.

A standard noise impact assessment focuses on several key factors:[54]

- Measurement of existing ambient noise levels;
- Identification of noise-sensitive receptor sites;
- Calculation of distances between noise sources and sensitive receptors;

[52] RECON Environmental, Inc. *Noise Analysis for the Drew Solar Project, Imperial County, California*. July 24, 2018. http://www.icpds.com/CMS/Media/Drew-Solar---Appendix-G.pdf
[53] Alpine Hearing Protection website, https://www.alpinehearingprotection.co.uk/5-sound-levels-in-decibels/#:~:text=0%20decibel%20is%20the%20so,permanent%20damage%20to%20your%20hearing.
[54] Department of Energy. Noise and Vibration Impact Assessment Methodology. https://www.energy.gov/sites/prod/files/edg/media/EIS0250F-S2_0369_Volume_V_Part_3.pdf;

- Estimation of Project-related (construction or operational) noise production and exposure, including cumulative noise effects.

Summary of information provided by the Applicant. Appendix C of the SAR is the Noise and Traffic Study completed by GAI Consultants, Inc. The Study provides information about Project noise levels during construction and operations potential impacts to area homes, businesses, and other noise receptors.

Baseline (ambient) noise levels. The areas surrounding the Project site are described as agricultural, residential, or agricultural/residential. Several residential neighborhoods are located adjacent to the Project site, as shown in Exhibit 3-6, and local roads, some well-traveled, are also located in the Project area. The Applicant indicates that the local sound environment is currently dominated by several existing significant sources of sound. These existing sources consist of primary and secondary roadways including KY 559 (Old Convict Road), KY 1200 (Helena Road) and KY 11 (Maysville Road). Additional, transient, and less significant sources of noise typical to these types of areas may also be present. The Noise and Traffic Study states that ambient daytime outside sound level for the area surrounding the Project is anticipated to average between 50.0 and 60.0 dBA. The areas immediately adjacent to the roadways described above will experience higher outdoor sound levels between 60.0 to 70.0 dBA depending on the time of day and traffic levels.

Sensitive noise receptors. The potential Project footprint, located within the Project boundary, reflects the furthest extent that would be considered for placement of any equipment.[55] As shown in Exhibit 3-5, 33 residential structures and one church are located within 600 feet of the potential Project footprint.

The closest home to one of the Project's 22 inverters, located throughout the Project site, would be 736 feet; other nearby homes would be about 860 feet or further from an inverter. One participating residence would be located within 300 feet of the Project substation, one non-participating residence would be located within 600 feet of the substation and one additional residence would be located within 900 feet of the substation.

Other structures in the area are barns and other out-buildings that are not considered sensitive noise receptors According to the Noise and Traffic Study, no schools, hospitals, nursing homes, parks or cemeteries were identified as potential noise sensitive areas.

Construction noise emitters. Construction equipment expected to be utilized for this Project can generate considerable noise. The Applicant states that sound levels generated by equipment used on the site are anticipated to range from 70 to 125 dBA at the source, based on professional judgement and experience with equipment in typical use for similar types of projects. There are myriad pieces of construction equipment (bulldozers, backhoes, saw, tractors, dump trucks and similar types of equipment) that emit noise levels greater than 80 dBA at 50 feet, which can be clearly heard from over 1,000 feet away. As construction moves across the Project site,

[55] The Applicant's proposed setbacks between Project infrastructure and the Project boundary line were outlined previously, in Section 3 of this report.

activities would only occur in immediate proximity to individual receptors for a limited duration.

During construction activities, the loudest piece of equipment used will be a pile driver (approximately 125.0 dBA at three feet from the source), which pounds posts into the ground. The posts are a critical part of the operational infrastructure, as they hold the solar panels off the ground. These pile drivers will move throughout the Project site, pounding posts into the ground wherever solar panels are to be constructed. Individual piles generally require between five and 30 minutes to drive (including staging), depending on soil conditions. Spacing between piles depends on site characteristics and the type of trackers used but are generally 10 to 15 feet apart. Pile driving activity for the Project is anticipated to occur over a two-to-four-month period and will generate noise emissions greater than 55 dBA for nearly a mile.

Exhibit 5-5 presents the sound levels produced by pile driving activities, up to 2,500 feet.

Exhibit 5-5.
Sound Level Impacts Produced by Pile Driving Activity, by Distance

Distance (feet)	dBA Contributon
3	125.0
50	100.6
100	94.5
200	88.5
300	85.0
500	80.6
1,000	74.5
1,500	71.0
2,000	68.5
2,500	66.6

Source: Fleming Solar, LLC, July 2021

During the construction phase of the project, sound level impacts at 300 feet from active pile driving operations (the closest non-participating residence is 326 feet from the Project footprint) would be equivalent to the sound level produced by the use of a household hairdryer (60 to 95 dBA).

The Applicant indicates that six- to 10-foot-high security fencing will be installed along the Project and that additional fencing will be placed around the Project substation. Steel fence posts are installed using pneumatic handheld post drivers. The noise from the installation might exceed 90 dBA at the source. However, fence post driving is a short intermittent activity, less than two minutes per post, and the activity will move quickly past houses as each post is in place.

According to the Applicant, the maximum sound level impact during construction is anticipated to be approximately 85.0 dBA for the residence closest to the Project, due mainly to pile driving activity. Noise impacts for further away residences would be expected to be less.

Fleming Solar plans to address noise mitigation through restricting pile driving activity hours and the proposed setbacks. The Applicant is proposing that construction activity occur between the hours of 7:30 am and 7:00 pm, Sunday through Saturday, with the following exceptions: (1) pile driving activities within 1,000 feet of a non-participating residence or business will be restricted to the hours of 9:00 am to 5:00 pm and (2) No heavy construction activities (including pile driving) will take place prior to noon on Sundays.

In response to direct inquiries from the Siting Board, the Applicant stated that noise suppression methods, such as sound blankets on fencing or semi-tractors and canvas, do not tend to mitigate noise from pile driving activities. However, they also stated that to be consistent with the mitigation measures set forth by the Siting Board in other cases, those strategies would be implemented if pile driving activity occurs within 1,500 feet of a residence or business.

Operational noise emitters. The two main sources of noise during Project operations would include the 22 inverters (cooling fans are co-located with each inverter) and the substation transformer. Additionally, the motors that turn the single axis tracking system also produce noise. These tracking motors are expected to generate sound levels of approximately 40 dBA at a distance of 10 feet, which is stated as being well below the existing anticipated background noise levels.[56]

The inverters (including the cooling fans) are estimated to produce a sound pressure level of 55.1 dBA at 100 feet, and at 300 feet this noise reduces about 46.6 dBA. As noted previously, the closest non-participating residence is about 736 feet away from the nearest inverter; at a distance of 800 feet, the inverters and fans would emit 37.1 dBA.

The substation transformer will emit sound pressure level of 71.0 dBA at a distance of three feet. At 300 feet, this noise dissipates to imperceptible levels or 31.0 dBA. As noted previously, the closest residence to the substation is a participating property within 300 feet; other homes are located at a distance of 300 feet or more to the substation.

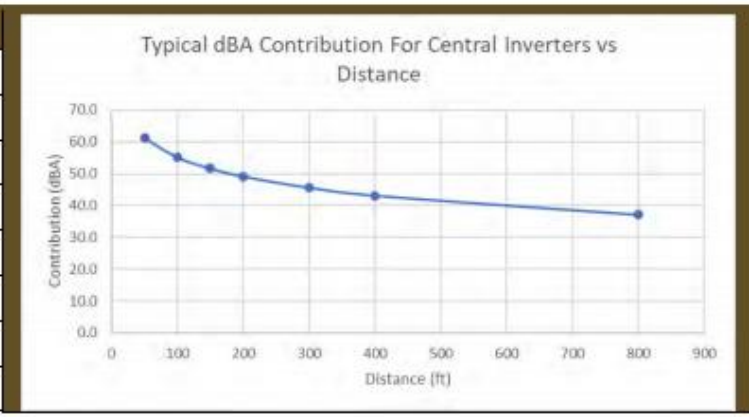
During operations, Project facilities will operate during daylight hours. When inoperative at night, the inverters, motors, and substation would be effectively silent. Cooling fans on inverters and the transformer might operate at night if ambient temperatures are high enough to require cooling.

Exhibits 5-6 and 5-7 present sound levels for typical inverters, including cooling fans, and the substation transformer at different distances, as presented in the Noise and Traffic Study.

[56] A heating, ventilation, and air conditioning unit (HVAC) may or may not be installed in the O&M building. If necessary, that unit would emit a sound level of less than 18.5 dBA for the closest homes.

Exhibit 5-6.
Sound Level Impacts from Inverters (Typical), by Distance

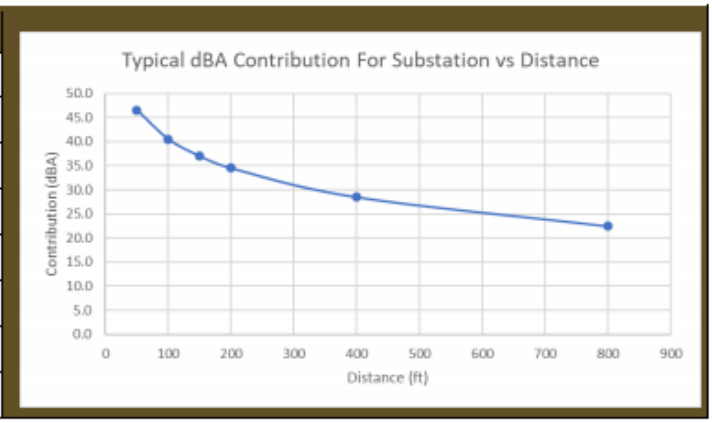
Distance (feet)	dBA
3	85.6
50	61.2
100	55.1
150	51.6
200	49.1
300	45.6
400	43.1
800	37.1



Source: Fleming Solar, LLC, May 2021

Exhibit 5-7.
Sound Level Impacts from the Substation, by Distance

Distance (feet)	dBA
3	71.0
50	46.6
100	40.5
150	37.0
200	34.5
300	31.0
400	28.5
800	22.5



Source: Fleming Solar, LLC, May 2021.

Calculation of cumulative noise effects. The Noise and Traffic Study describes the engineering methodology and approach to measuring the cumulative effect of sound generated by multiple sources. Those calculations are illustrated in Exhibit 5-8, below.

Exhibit 5-8.
Approach to Calculating Cumulative Noise Impacts

When the numerical difference in dBA between two sound levels is:	Add this dBA amount to the higher of the two sound levels for a total:
0	3.0
0.1 to 0.9	2.5
1.0 to 2.4	2.0
2.4 to 4.0	1.5
4.1 to 6.0	1.0
6.1 to 10.0	0.5
10.0	0.0

Source: Fleming, LLC, May 2021

The Applicant provided calculations of total cumulative operational noise levels for the closest home to the Project footprint (326 feet), based on the mathematical approach illustrated in Exhibit 5-8. According to those calculations, total operational noise would be equivalent to less than approximately 45.6 dBA.

If the ambient sound level is 50.0 dBA, the contribution of 45.6 dBA results in a total sound level of 51.0 dBA. If the ambient sound level is closer to 60.0 dBA, the contribution of 45.6 dBA from Project operations results in a total sound level of 60.0 dBA (essentially no Project-related impacts). These calculations indicate that the additional noise produced by Project operations would increase total sound levels by only a small amount.

HE's evaluation of impacts. The Commonwealth of Kentucky does not have an applicable noise ordinance and neither does Fleming County. As such, HE utilized the noise recommendations generated by the EPA and WHO to gauge acceptable levels of sound.

- The EPA determined that a constant sound of 70 dBA over a 24-hour period is enough to start causing permanent hearing loss for individuals, and a sound of 55 dBA outdoors is enough to cause activity interference and annoyance.[57]

- The WHO determined that daytime noise emissions greater than 55 dBA over a 16-hour period can cause serious annoyance, and noise emissions greater than 50 dBA over a 16-hour period can cause moderate annoyance. The WHO recommends limits of 45 dBA over an 8-hour period during the night.[58]

Construction noise. The Project is expected to generate noise emissions greater than 55 dBA throughout construction, but that noise will be sporadic and typically cease at the end of the day. Although the duration of specific activities will depend on contractors' schedule, site

[57] United States Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March 1974. https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF
[58] World Health Organization. *Guidelines for Community Noise*. April 1999. https://www.who.int/docstore/peh/noise/Comnoise-1.pdf

conditions, weather and other factors, construction activities will be temporary. Additionally, the Applicant's proposed setbacks will reduce construction noise for local residents. Even so, pile driving activity will result in noise impacts for nearby residents.

Pile driving, fence installation and other construction may be loud and annoying for residences in the immediate vicinity of those activities; however, as described above, those activities would occur over a relatively brief period of time in any one location, moving quickly to other areas. As construction equipment migrates across the dispersed Project site, construction noise will probably not be loud enough to interfere with the quality of life of most residents. Since these construction activities are not sustained, no hearing loss or long-term annoyance to residents is expected. HE does expect construction activities to be at least somewhat annoying to nearby residences in the short-term, as the pile driver can be heard from more than a mile away.

Operational noise. The Project will generate noise during the day, as this is when the inverters, motors and transformer will all be operating. The Applicant's analyses show that noise emissions from operational components are below the WHO's recommended maximum noise level of 50 dBA during the operational phase. Based on information provided by the Applicant, at 300 feet the cumulative sound level from Project components will be approximately 45.6 dBA, during daylight hours, which might be somewhat annoying. However, very few residences will experience that level of noise; most will experience lower noise levels. HE concludes that, overall, noise impacts from Project operations will be minimal.

Cumulative noise effects in combination with the AEUG Fleming Project. During construction, cumulative noise impacts would occur if any construction activities associated with the two Projects occur simultaneously. As part of supplemental materials provided by the Applicant, Fleming Solar stated that they "do not anticipate any overlap in construction activities at this time. However, final construction schedules have not been completed for either Project, so Fleming Solar is not able to confirm that. Should any concurrent construction take place, it will likely be in the early stages of Fleming Solar's construction and final stages of AEUG Fleming's construction. In other words, peak construction activities are unlikely to overlap." Additionally, Fleming Solar stated that based on the construction sound levels reported by AEUG Fleming and "given the distance between the two sites, the contribution to the existing sound environment at the location of the Fleming Solar Project is anticipated to be negligible."

HE believes that any cumulative noise impacts may be most noticeable along portions of KY 559 (Old Convict Road) since both Projects generally abut that roadway. Construction related noise would be temporary; however, if louder activities, such as pile driving, were to occur at the same time in close proximity, local residents are likely to be affected, finding that noise quite annoying. Cumulative noise impacts during construction would be minimized, or avoided, if activities in areas along KY 559 were staggered between the two Projects.

During operations, homeowners in that area might also be able to hear sounds associated with both Projects. Although both Projects indicate maximum operational noise levels less than 55 dBA, declining as the distance to homes increases, there will be some potential for noticeable cumulative noise effects in specific locations along KY 559.

The Applicant and its contractors should establish and maintain a relationship with AEUG Fleming staff to minimize cumulative noise impacts and to discuss mitigation measures to reduce noise impacts.

Conclusions and recommendations. Based on our review of the SAR, supplemental information provided by the Applicant, and additional research conducted by HE, we offer the following conclusions and recommendations regarding noise emissions:

- Construction noise may be annoying for residents surrounding the Project area for short periods of time. The pile driving process, which is the loudest part of the construction process, is estimated to last for between two- and four-months Project-wide. Fencing installation is also a loud activity. However, those activities will only occur in any one location for a very short period of time, quickly moving around the Project site. Construction noise coming from the Project site will be intermittent in any particular area and will not be permanently impactful to nearby residents.

- Noise from Project components during operations (inverters, motors, transformer) is anticipated to result in only a modest increase, if any, to the local sound environment. At a distance of 300 feet, these components would emit relatively low sounds during daylight hours (45.6 dBA, which is lower than the WHO's recommended maximum noise level of 50.0 dBA) and typically no sound at night.

- The area surrounding the Project is largely agricultural; residents living in the area are located along roadways with light to heavy levels of traffic and noise from the Project's operational components should not annoy them.

- The topography, natural vegetation in the area and the proposed vegetative buffers will help mitigate noise emissions that may be caused by construction or operational components of the Project.

- Residents and drivers along KY 559 (Old Convict Road) will be subject to cumulative noise effects from the Fleming Solar and AEUG Fleming Projects during construction, unless the two project schedules are staggered. Some potential exists for cumulative noise effects during operations as well.

Need for mitigation. The Applicant should consider certain mitigation to reduce noise impacts:

1. The Applicant should notify residents and businesses within 2,400 feet of the Project boundary about the construction plan, the noise potential, and the mitigation plans at least one month prior to the start of construction.

2. The Applicant should remain in contact with nearby residents to confirm that noise levels are not unduly high or annoying after the pounding and placement of the solar panel racking begins. If the noise levels are unduly high or annoying, the Applicant should mitigate those effects as needed.

3. If pile driving activity occurs within 1,500 feet of a noise sensitive receptor, the Applicant should implement a construction method that will suppress the noise generated during the pile driving process (i.e., semi-tractor and canvas method; sound blankets on fencing surrounding the Project site; or any other comparable method).

4. Pile driving activities should cease by 6pm each day, except for pile driving locations within 1,500 of noise receptors, in which case, pile driving should begin no earlier than 9:00 am and cease by 5:00 pm. Since the area is largely rural, a constant pounding during evening hours has the potential to upset the natural tranquility of the area and severely annoy residents.

5. The Applicant should limit the construction activity, process, and deliveries to the hours of 8:00 am to 6:00 pm, Monday through Saturday. No construction work should be conducted on Sundays. These hours represent a reasonable timeframe to ensure that nearby property owners are not unduly impacted by construction activities.

6. The Applicant and its contractors should establish and maintain a relationship with AEUG Fleming staff to ensure a common understanding of development and construction schedules and to discuss mitigation measures to reduce noise impacts.

7. The Applicant should work with the Siting Board regarding the timing of construction activities in relation to those of the AEUG Fleming Project in order to minimize or eliminate any potential for cumulative noise impacts during construction or operations.

Road and Rail Traffic, Fugitive Dust and Road Degradation

Traffic concerns related to the development of the Fleming Solar facility during the construction or operational phases are addressed in this section. The 12-month long construction phase would include commuting construction workers, vehicles, and equipment on-site, plus the delivery of heavy loads of solar components, infrastructure, and other equipment. Increased traffic during operations will occur as employees travel to and from the property to monitor and maintain the site.

An existing railway line is located to the west of the Project site, generally to the southwest of the intersection of KY 170 (Junction Road) and KY 559 (Old Convict Road).[59] The Project will not utilize the railroad for any construction or operational purposes.

General methods of assessment. A typical evaluation of traffic-related impacts include:

- Establishing existing traffic conditions in the area;
- Identifying primary access points that will be used by the Project;
- Estimating changes in traffic due to construction and operations; and

[59] The railway is considered active; however, no operations have occurred on this line for several years.

- Assessing the impacts of Project-related traffic on local areas. This includes determining whether additional traffic will lead to congestion, changes in service levels of existing road networks and identifying any potential degradation to existing roadways.

Summary of information provided by the Applicant. Appendix C of the SAR is the Noise and Traffic Study completed by GAI Consultants, Inc. (GAI). That document, along with supplemental information provided by the Applicant, offers information about Project related traffic volumes (commuting workers and trucks), use of local roads, potential road impacts and dust emissions during the construction and operations phases of the Project.

Site access, vehicle parking and internal roadways. As shown previously in Exhibit 3-2 and below in Exhibit 5-10, a total of four construction entrance points will allow access to different areas of the Project during construction. The two entrances along KY 559 (Old Convict Road) will allow access to the Project and EKPC substations, O&M building, and construction laydown area. The two entrances along KY 11 (Maysville Road) will allow access to the northern portion of the Project site.[60] During the operational period, access to the Project site will be limited to the Main Plant Entrance on KY 559 and the Northern Plant Entrance along KY 11.

During the construction period, a single laydown area will be located on the northern side of KY 559 to accommodate construction deliveries; that area will be developed using compacted gravel. Additionally, an on-site parking area holding approximately 50 vehicles will be located near the O&M building and along the laydown area. Access to that parking area will be through the Construction Entrance on KY 559.

About 5.7 miles of internal roads will be constructed throughout the Project site in order to access all areas within the Project boundary.

Baseline traffic volumes and road conditions. The area immediately surrounding the Project site is generally rural and traffic on local roads, including portions of KY 559 (Old Convict Road) and KY 1200 (Helena Road), is relatively light, averaging fewer than 1,000 vehicles per day. In contrast, the section of KY 11 (Maysville Road) located immediately east of the northern portion of the Project experiences much heavier traffic, with as many as 7,500 vehicles per day. KY 559 is a two-lane road with marked double yellow centerlines and small shoulders. KY 1200 is a two-lane road without a double yellow centerline and with small shoulders. KY 11 is a much larger road, with double yellow centerlines, wider lanes and larger shoulders.

Exhibit 5-9 presents data on average daily traffic volumes and peak hour traffic volumes for roads in the Project area. Following that, Exhibit 5-10 illustrates the locations of each traffic station in relation to the Project boundary.

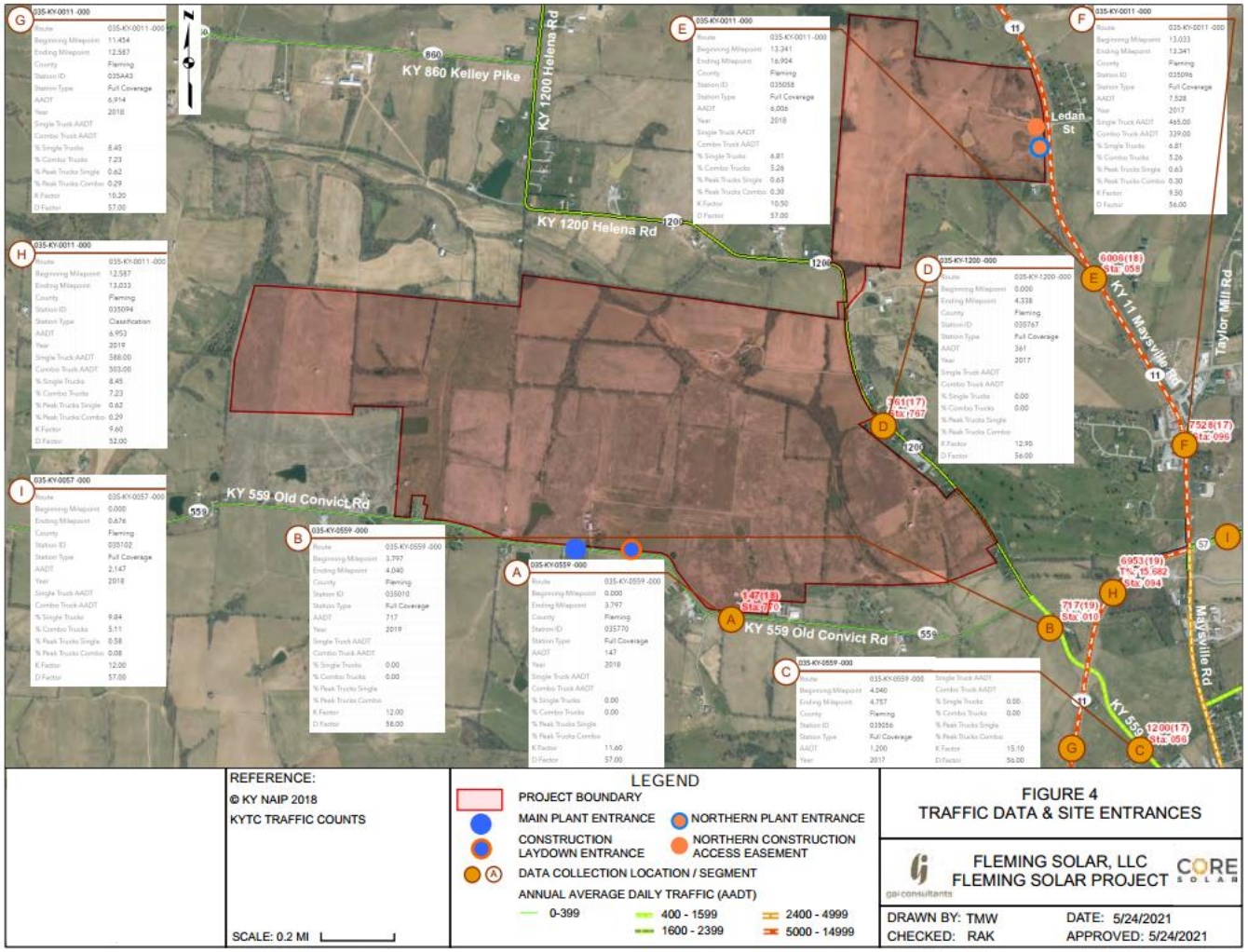
[60] One of the entrances along KY 11 is a construction access easement.

Exhibit 5-9.
Hourly and Daily Traffic Volumes for Roads Surrounding the Fleming Solar Project Site

Station ID	Roadway	Classification	Average Daily Traffic (ADT)	Peak Hour Traffic Volume	Year Counted
035770	KY 559	Local Road	147	18	2018
035010	KY 559	Minor Collector	717	87	2019
035056	KY 559	Minor Collector	1,200	182	2017
035767	KY 1200	Minor Collector	361	47	2017
035058	KY 11	Minor Arterial	6,006	631	2018
035096	KY 11	Minor Arterial	7,528	716	2017
035A43	KY 11/57	Minor Arterial	6,914	706	2018
035094	KY 11/57	Minor Arterial	6,953	668	2019
035102	KY 57	Minor Collector	2,147	258	2018

Source: Fleming Solar, May 2021.

Exhibit 5-10.
Construction Site Entrances and Baseline Traffic Volumes for Roads Surrounding the Fleming Project Site



Source: Fleming Solar, May 2021.

Construction related traffic volumes and routes utilized. Construction traffic includes both worker commuter vehicles and larger trucks delivering materials and supplies to the Project site. During the construction period, between six and 250 workers will be on-site each day, assuming a 12-month construction schedule.[61]

Project contractors will work with local property owners to establish the off-site remote parking location(s). Up to two shuttle bus round trips per hour are anticipated from remote parking to the site on average, though during periods of maximum employment there may be up to five shuttle bus round trips for employee arrival and departure peaks as necessary.

Construction deliveries are anticipated to average five deliveries per day with an expected maximum of ten deliveries per day. Typical deliveries will be made on 40 ton (max weight) semi-trailers and flatbed trailers. Concrete delivery trucks for building foundations will use the Construction Laydown Entrance from KY Route 559 (Old Convict Road) and will be scheduled for approximately three days.[62] Deliveries of larger site construction components, such as work trailers and larger cranes, will occur infrequently.

Oversized trucks will be required infrequently. These trucks will be permitted separately and will adhere to their permitting conditions by the transport contractor. The largest of these permit loads is anticipated to be the site transformer, weighing approximately 140 tons.[63] It will be transported on a "low boy" specialty, multi-axle trailer, pulled by standard semi-tractor. This delivery will use the KY Route 559 Construction Laydown Entrance.

Worker shuttles and equipment deliveries would be routed though the Construction Laydown Entrance. Construction vehicles will then proceed to the northern entrances as needed when that portion of the Project is under construction.

Exhibit 5-11 summarizes the Project's construction-related traffic activity, by entrance location, including shuttle busses, other worker vehicles, delivery trucks and oversized vehicles.

[61] Peak construction activity will occur over a period of about six weeks.
[62] Concrete delivery trucks will primarily be needed for inverter foundations and substation construction. An average of approximately seven trucks per day will access the Project site for a three-day period.
[63] Other than the 140-ton delivery of the substation transformer, oversized trucks would include 60-ton Class 21 trucks.

Exhibit 5-11.
Anticipated Daily and Peak Hour Construction Vehicles to the Fleming Solar Project Site, by Entrance Location

Vehicle Type	Average Daily Vehicles[1]	Maximum Daily Vehicles[2]	Average Peak Hour Vehicles[3]	Maximum Peak Hour Vehicles[4]
Remote Parking Site				
Employee	125	250	125	250
Shuttle[5]	15	20	2	5
Totals	**140**	**270**	**127**	**255**
KY Route 559 Main Entrance and Construction Laydown Entrance				
Shuttle[5]	15	20	2	5
On-Site Vehicle[5]	25	75	10	27
Delivery Truck	5	10	2	2
Oversized Truck	1	5	1	1
Visitor	4	25	5	25
Totals	**50**	**135**	**20**	**60**
KY Route 11 North Entrance				
Shuttle[5]	15	20	2	5
On-Site Vehicle[5]	25	75	7	27
Delivery Truck	5	10	1	3
Totals	**45**	**105**	**10**	**35**

Notes: (1) Assumes zero to two shuttles per hour and 25 on-site vehicles making external trips once per day. Shuttles are assumed to have a 50-person capacity.

(2) Assume five shuttles for each peak hour and zero to one at other times of the day. Assume each of the 25 on-site vehicles making three external trips per day and a maximum of five oversized trucks bringing in construction trailers, large cranes, etc. to the main site. Assume each visitor space being used.

(3) Assume two shuttles per peak hour, plus 1/3 to ¼ of on-site vehicles making external trips.

(4) Assume maximum employment, additional deliveries per peak hour, and each visitor space being used.

(5) Since shuttles and off-site vehicles make multiple trips per day, assume volumes are per round trip.

Source: Fleming Solar, May 2021.

Construction traffic management. The Applicant addresses traffic management for certain roads or for specific construction activities as follows:

- The construction contractor will provide adequate traffic control signs and devices that are compliant with Manual on Uniform Traffic Control Devices. These will include work zone signage and Kentucky Transportation Cabinet (KYTC) certified flaggers to facilitate safe construction deliveries.

- Due to its narrow width, the contractor will need to conduct traffic stoppages on KY 559 during construction to accommodate larger trucks.[64] There may also be

[64] The Construction Laydown Entrance located along KY Route 559 will experience the majority of construction deliveries. Traffic may be stopped for a minute or two to allow trucks to turn in and out of the Project site and up to 10 minutes to allow any oversized truck to travel along KY Route 559 to or from KY Route 11, less than 1.5 miles away.

temporary stoppages along KY 1200 and KY 11 to facilitate deliveries in and out of construction access points.[65]

- Consideration will be given to coordinating delivery schedules to minimize the need for trucks to pass each other on KY 559.

Operations related traffic volumes. According to the Noise and Traffic Study, the Project will be staffed 24 hours a day during operations, with three eight-hour shifts per day. Two operators will staff each shift plus occasionally the plant manager and warehouse attendant during the morning shift and one or two maintenance workers during the evening shift. Therefore, typical peak hour trips during operation will be four entering and four exiting trips. Total daily trips will be 20. Employees will use the Main Plant Entrance from KY 559 (Old Convict Road); the North Plant Entrance from KY Route 11 (Maysville Road) will only be used for maintenance activities. Infrequent additional trips to the site could also occur, including large truck deliveries for repairs (weighing up to about 7,000 pounds). In the unlikely event that a major component, such as an inverter, needs to be replaced, the maximum weight of the truck could be approximately 30,000 pounds across four axles.

Road degradation. The SAR states that the construction contractor will document roadway conditions in accordance with all applicable transportation permits obtained from State and local road authorities before construction commences and will be responsible for restoring impacted roadway to pre-construction conditions as required through the permitting process. The Applicant further clarified that statement, confirming that Fleming Solar will pay for or fully fix any road damage that occurs as a result of Project construction.

Fugitive dust. According to the Applicant, impacts related to fugitive dust are anticipated to be "minor in nature due to the large size of the site and the low-density of housing and rural character of the area." Reasonably available control measures will be used to mitigate fugitive dust emissions. The chosen contractor will develop and implement a dust control plan to include the following best practices:

- Identify and monitor each day's expected weather conditions, including precipitation and wind speed and direction, to anticipate what dust control measures will be needed. Disturbance areas will be minimized to the maximum extent feasible. Open piles will be covered.

- Construct and upgrade internal roads and driveways with compacted gravel as needed. Vehicles will be required to travel slowly along site roads (typically 10 miles per hour). Speed limits will be posted and enforced.

- Construction vehicles such as opened bodied trucks will be covered while in motion, and soil loads shall be kept below the freeboard of the trucks.

[65] Traffic stoppages along KY Route 11 are anticipated to be infrequent. If vehicles delivering solar equipment have difficulty turning in and out of KY Route 11, stoppages would be a minute or two, just long enough to facilitate a truck turning in or out.

- Water will be applied in accordance with industry best practices to control dust along site roadways and clean equipment and vehicles when needed. Under the KY Pollutant Discharge Elimination System, water used for dust control during facility construction is authorized as a non-stormwater discharge activity.

- Compacted gravel will be used at all site driveway entrances and at the laydown yard. Internal roadways will either have compacted gravel or be watered periodically for dust suppression using water trucks.

HE's evaluation of impacts. HE conducted the following additional research and analyses related to traffic, road degradation and fugitive dust.

Baseline traffic volumes and road descriptions. The Applicant supplied traffic count data for numerous traffic stations in the Project vicinity, as previously shown in Exhibit 5-9. HE gathered information about the designated weight limits on specific roads, which is presented in Exhibit 5-12, along with Applicant provided lane widths of specific roadways.

Exhibit 5-12.
Lane Widths and Road Weight Limits for Roads Surrounding the Fleming Solar Project Site

Station ID	Roadway	Road Weight Limit (pounds)	Lane Width (feet)
035770	KY 559	80,000	18
035010	KY 559	80,000	20
035056	KY 559	80,000	20
035767	KY 1200	44,000	16 - 18
035058	KY 11	80,000	46
035096	KY 11	80,000	46
035A43	KY 11/57	80,000	NP
035094	KY 11/57	80,000	NP
035102	KY 57	80,000	NP

Notes: (1) Road weight limits represent the total gross weight of the vehicle and the load.
(2) NP indicates Not Provided by the Applicant.

Source: Fleming Solar, May 2021; Kentucky Transportation Cabinet, August 2021.

According to the Kentucky Transportation Cabinet's Bridge Data Miner interactive map, there are no bridges on the portions of KY 559 (Old Convict Road), KY 1200 (Helena Road) or KY 11 (Maysville Road) in the vicinity of the Project.[66]

From the site visit, HE observed light traffic on KY 559 and KY 1200. These roads are paved, and in average condition, but are narrow. Trucks may travel on these roads giving attention to other traffic. The site photos offered in Appendix B include several photos of roads surrounding the Project site.

[66] https://maps.kytc.ky.gov/bridgedataminer/.

Construction related traffic impacts. Project construction traffic will use KY 559 or KY 11 to access the Project site. Using the data provided by the Applicant in Exhibit 5-11, HE estimated a "worst-case" percent increase in average daily traffic and peak hour traffic, based on the following assumptions:

- Construction traffic on KY 559 (Old Convict Road) would only include vehicles accessing the site via the Main Plant Entrance or the Construction Laydown Entrance. Vehicles accessing the site through the northern entrances would not need to use this road.

- Construction traffic on KY 11 (Maysville Road) or KY 57 includes vehicles accessing the site via the KY 559 entrances and the northern site entrances. This cumulative approach was taken to estimate total traffic on those roads because the Applicant was unable to provide information about the point of origin for commuting vehicles and trucks. KY 11 and KY 57 are major roads in this area and construction traffic may use those routes to access the site from any entrance.

Exhibits 5-13 and 5-14 present HE's estimates of the increases in average daily traffic volume and peak hour traffic volume resulting from construction-related traffic for affected road segments.

Exhibit 5-13.
Increases in Average Daily Traffic Volumes for Roads Surrounding the Fleming Solar Project Site

Station ID	Roadway	Average Daily Baseline Traffic	Average Daily Project Traffic	% Change in Traffic Volume	Max Daily Project Traffic	% Change in Traffic Volume
035770	KY 559	147	50	34%	135	92%
035010	KY 559	717	50	7%	135	19%
035056	KY 559	1,200	50	4%	135	11%
035767	KY 1200	361				
035058	KY 11	6,006	95	2%	240	4%
035096	KY 11	7,528	95	1%	240	3%
035A43	KY 11/57	6,914	95	1%	240	3%
035094	KY 11/57	6,953	95	1%	240	3%
035102	KY 57	2,147	95	4%	240	11%

Notes: (1) Maximum daily Project traffic levels would occur during the approximately six-week peak construction period.
(2) No data was provided by the Applicant regarding construction vehicle traffic on KY 1200.

Source: Fleming Solar, May 2021; Harvey Economics, August 2021.

Exhibit 5-14.
Increases in Peak Hour Traffic Volumes for Roads Surrounding the Fleming Solar Project Site

Station ID	Roadway	Peak Hour Traffic Volume	Peak Hour Project Traffic	% Change in Traffic Volume	Max Peak Hour Project Traffic	% Change in Traffic Volume
035770	KY 559	18	20	111%	60	333%
035010	KY 559	87	20	23%	60	69%
035056	KY 559	182	20	11%	60	33%
035767	KY 1200	47				
035058	KY 11	631	30	5%	95	15%
035096	KY 11	716	30	4%	95	13%
035A43	KY 11/57	706	30	4%	95	13%
035094	KY 11/57	668	30	4%	95	14%
035102	KY 57	258	30	12%	95	37%

Notes: (1) Maximum peak hour Project traffic levels would occur during the approximately six-week peak construction period.

(2) No data was provided by the Applicant regarding construction vehicle traffic on KY 1200.

Source: Fleming Solar, May 2021; Harvey Economics, August 2021.

On an average day, Project construction activities would result in a 34 percent increase in traffic volume on KY 559 near the Main Plant Entrance and the Construction Laydown Entrance (50 additional vehicle trips). Traffic volume in that area would increase by 92 percent on a peak day (135 additional vehicle trips). Increased traffic, in combination with periodic traffic stoppages might annoy local drivers and residents that use that road.

Construction traffic using other portions of KY 559 or KY 11, or KY 57 would result in much smaller increases in traffic volumes (between one percent and seven percent on average) due to the heavier existing traffic volumes on those roads. Traffic increases on those roads due to the Project may not be noticeable.

As shown in Exhibit 5-14, traffic increases during the peak hour of the peak construction period will be significant for KY 559 and considerable for other roads. Traffic congestion will likely occur in several areas and be annoying to local drivers but will be limited to short periods of the day over the six-week peak construction period.

Development and use of off-site remote parking areas will help to reduce Project traffic on local roads, especially on KY 559. However, workers commuting to those locations will increase traffic volumes on the local roads leading to those remote parking areas. Because the Applicant has not yet established specific locations for those parking areas and because the Applicant does not have knowledge of where workers will commute from, HE was unable to quantify or further describe potential impacts to traffic related to commuting workers.

Operations related traffic impacts. HE does not expect operations-related vehicles to impact commuters or residents in the vicinity of the Project. A maximum of four employees may be on-site at any one time, requiring as many as four vehicles to enter and four vehicles to exit the Project site every eight hours (one shift). Total daily trips are estimated to be a maximum of 20. Operational employees will likely use KY 559 for most trips, since the

substation, O&M building and majority of the Project site can be accessed via the Main Plant Entrance. Although 20 daily trips on KY 559 would amount to about a 14 percent increase in traffic, these trips will be clustered to at most eight vehicles at a time for a brief time and no Project vehicles during the majority of the day. A smaller number of trips may require use of KY 11 (Maysville Road) to access the Northern Entrance.

Road degradation. Weight limits for roads surrounding the Project site were presented in Exhibit 5-12. As described by the Applicant, Project construction would require a single 140-ton delivery of the substation transformer and multiple truck trips using oversized 60-ton Class 21 trucks. Therefore, there is some potential for road degradation to occur due to Project activities. The severity of road degradation is difficult to predict, since it depends on a host of factors, such as the combinations between the number of axles on a vehicle, the vehicle weight, weight distribution on each tire and other factors.

As discussed previously, the construction contractor will document existing roadway conditions, obtain all applicable permits, and restore impacted roadways, as required. The Applicant will pay for or fix road damage caused from Project activities.

Fugitive dust. Fugitive dust should not be an issue given the Applicant's proposed best practices for construction and operational activities.

Cumulative traffic, road degradation and dust effects in combination with the AEUG Fleming Project. During construction, cumulative traffic-related impacts would occur if any construction activities associated with the two Projects occur simultaneously. As discussed previously, the Applicant "does not anticipate any overlap in construction activities at this time. However, final construction schedules have not been completed for either Project, so Fleming Solar is not able to confirm that. Should any concurrent construction take place, it will likely be in the early stages of Fleming Solar's construction and final stages of AEUG Fleming's construction. In other words, peak construction activities are unlikely to overlap."

HE believes that any cumulative traffic-related impacts may be most noticeable along KY 559 (Old Convict Road) since Fleming Solar has two entrances along that road (main construction entrances) and AEUG Fleming has four entrances proposed for KY 559 (secondary and less heavily trafficked construction entrances), two of which are close to those of the Fleming Solar Project; a map of the AEUG Fleming Project Site, including the construction entrances, is included in Appendix C of this report. Construction activities and related traffic increases would be temporary; however, local residents may be annoyed by road congestion and traffic stoppages. If construction of the two Projects does overlap, traffic on KY 559 could as much as double on an average day. KY 57, to the southeast of the Fleming Solar Project site, may also experience cumulative traffic increases for the two Projects. Cumulative traffic impacts during construction would be minimized, or avoided, if vehicle trips associated with use of Project entrances along KY 559 were staggered between the two Projects, or if no construction activities occurred simultaneously.

HE would expect cumulative traffic-related impacts during operations to be minimal at most, and most likely negligible due to the few operational employees and occasional deliveries

required for each Project and because the Projects' main access points for operations are not close to one another, requiring use of different roads.

Conclusions and recommendations. Based on our review of the SAR and subsequent information provided by the Applicant, as well as other secondary research conducted regarding roads and dust, HE offers the following conclusions regarding traffic, fugitive dust, and road degradation:

- Construction traffic will be noticeable along KY 559 (Old Convict Road) near the Project entrances because of the light existing traffic in that area. Construction activities would require an average of 50 round-trips per day on that road, including cars, trucks, and shuttle busses, increasing average daily traffic volumes by 34 percent. Peak day activities would increase traffic volume by as much as 92 percent. Brief traffic stoppages may be required along KY 559 to accommodate larger trucks; those short stoppages are not likely to cause much annoyance to local drivers or residents.

- Construction traffic using KY 11 (Maysville Road), KY 57 and other portions of KY 559 would result in much smaller increases in traffic volumes (between one percent and seven percent) due to the heavier existing traffic volumes on those roads. Traffic increases on those roads due to the Project may not be noticeable.

- Delivery of the main transformer would require one 140-ton truck trip on KY 559, which has a weight limit of 80,000 pounds (40 tons). Depending on the specific route taken, that truck may also use KY 11, which also has a 40-ton weight limit. Whether or not that one trip has the potential to cause noticeable road degradation is unclear, but special attention to that activity is warranted.

- Other oversized truck trips using 60-ton trucks also have the potential to cause road degradation. However, the Applicant has committed to paying for repairs or fully fixing any Project-related road damage.

- Given the small number of employees on-site during operations, HE does not anticipate any noticeable traffic impacts during the operational period.

- Fugitive dust should not be an issue given the Applicant's proposed best practices for construction and operational activities.

- If the Fleming Solar and AEUG Fleming Projects are constructed simultaneously, cumulative impacts will include considerable traffic congestion on KY 559.

Need for mitigation. The Applicant should consider certain mitigation to reduce impacts associated with traffic and dust:

1. The Applicant should work with the Kentucky Transportation Cabinet (KYTC) and the Fleming County Road Department to perform road surveys, before and after construction activities, on all roads to be used by construction vehicles.

2. The Applicant should fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads that it causes or to which it materially contributes to, regardless of its status as a KY Route or local road.

3. The Applicant will consult with the Kentucky Transportation Cabinet regarding truck and other construction traffic and obtain necessary permits from the KYTC.

4. The Applicant will consult with the Fleming County Road Department (FCRD) regarding truck and other construction traffic and obtain necessary permits from the FCRD.

5. The Applicant should develop special plans and obtain necessary permits before bringing the very heavy loads, especially the substation transformer, onto Kentucky or county roads.

6. The Applicant will comply with any road use agreement executed with the Fleming County Road Department. Such an agreement might include special considerations for overweight loads, routes utilized by heavy trucks, road weight limits and bridge weight limits.

7. The Applicant should develop and follow a traffic management plan to minimize the impacts of any traffic increases and keep traffic and people safe.

8. The Applicant will comply with all laws and regulations regarding the use of roadways.

9. Prior to establishment of the remote parking location(s), the Applicant will provide the Siting Board with detailed information about the development and use of those locations, including, but not limited to location; size; required land improvements; use of specific access roads; traffic management and safety measures; and post-construction land restoration activities.

10. The Applicant will develop a fugitive dust control plan and follow best practices to suppress fugitive dust emissions. The Applicant will monitor dust emissions occurring during construction or operations and adjust activities, if necessary, to minimize dust emissions.

11. The Applicant and its contractors should establish and maintain a relationship with AEUG Fleming staff to ensure a common understanding of development and construction schedules and to discuss mitigation measures for traffic, dust, and related impacts.

12. The Applicant should work with the Siting Board regarding the timing of construction activities in relation to those of the AEUG Fleming Project in order to minimize or eliminate any potential for cumulative traffic or dust impacts during construction, especially along KY 559 (Old Convict Road).

Economic Impacts

Evaluation of the potential economic effects of the Fleming Solar Project is based on knowledge of the Project's construction timeline and activities and the solar facility's long-term operational activities. Project employment needs, local expenditures (labor, materials/supplies, equipment) and payment of applicable taxes (sales tax, lodging tax, property tax) and other fees are considered over the short- and long-term and placed within the context of existing demographic and economic conditions.

General methods of assessment. Both the construction and operational phases should be evaluated to include:

- Detailed understanding of the project: specific activities to occur, the timeline of those activities, geographic extent of project effects;
- Quantification of direct effects: Number of employees and range of wage levels, materials purchases, supplies and equipment and associated sales tax payments, other tax payments including property taxes. Determining the portion of purchases to occur in the local area or within the Commonwealth is key;
- Estimation of total effects: Use of region and industry specific multipliers to estimate indirect and induced effects to calculate total effects such as employment, income, and overall economic activity;
- Other social or economic benefits, including potential non-monetary benefits, to the local community or surrounding area; and
- Potential curtailments or impacts to other industries.

Summary of information provided by the Applicant. The Fleming Solar Application included an Economic Impact Study Report (Exhibit H of the SAR) prepared by economic consultant Dr. David Loomis, titled Fleming Solar Economic Impact Analysis, which included a discussion and explanation of the Project's economic benefits. That report provided estimates of employment, earnings and output benefits generated by Project construction and operations, both for Fleming County and the Commonwealth of Kentucky. Estimates of annual property tax revenues generated over 35 years of operations were also included in the report.[67] In response to HE inquires, the Applicant provided additional information regarding construction and operational expenditures and tax payments.

Excerpts from the Applicant's economic impact analysis and supplemental materials provided to HE included the following:

Capital investment: At the time that the Application and Economic Impact Analysis were completed, the capital investment for the Project was estimated at approximately $80 million,

[67] As discussed later in this section, Fleming Solar intends to request that Fleming County issue an Industrial Revenue Bond (IRB) to finance the Project.

exclusive of interconnection costs paid to the utility.[68] Some of the Project's materials and equipment may be purchased from within Fleming County and within Kentucky; however, the specific percentage of those items that would be sourced locally is unknown. Therefore, in an effort to conservatively estimate the Project benefits, the assumption was that none of the materials and equipment would be sourced from within Fleming County and from within Kentucky. However, the Project contractor may arrange for local purchase of concrete, gravel, fencing and other locally available commodities as construction commences. Inverters, solar panel modules, trackers and specialized pre-construction equipment will be sourced from outside Kentucky.

Construction employment and earnings: Construction of the facility is anticipated to require an average of 125 workers hired from within Kentucky, with a total construction payroll of $10.4 million.[69] The estimate of 125 workers is equivalent 99 "jobs" or "full-time equivalents" (FTEs) over a 12-month construction period. [70] Approximately 62 FTEs are expected to be hired from within Fleming County, accounting for about $6.5 million in earnings. The report notes that construction requires highly-skilled workers in the fields of construction, management and engineering and goes on to state that "these well-paid professionals boost economic development in rural communities where new employment opportunities are often welcome due to economic downturns."

Accounting for the circulation of construction-related monies throughout the local area, construction of the Project is expected to generate a total of about 80 new jobs, or FTEs, in Fleming County, with a total payroll of about $7.1 million. An additional 62 total jobs, or FTEs, would be created in other areas of Kentucky.

The economic benefits generated by construction of the Fleming Solar Project are presented in Exhibit 5-15.

[68] According to the Applicant, due to recent supply chain constraints, and commodities and equipment price increases, the capital investment amount for the Project is expected to increase by 10 to 20 percent.
[69] Additional, specialized workers will also be hired from outside Kentucky.
[70] 1 job = 1 FTE = 2,080 hours worked in one year. A part-time or temporary position would constitute a fraction of one job or FTE. Therefore, the number of individual people hired for construction is greater than the estimated number of FTEs.

Exhibit 5-15.
Total Economic Benefits of the Fleming Solar Project, Construction Phase

	Fleming County			Commonwealth of Kentucky		
	Employment	Earnings	Economic Output	Employment	Earnings	Economic Output
Direct	62	$6.5 M	$6.6 M	99	$10.4 M	$10.5 M
Total	80	$7.1 M	$8.9 M	142	$12.5 M	$17.0 M

Notes: (1) Employment is measured in number of jobs, or full-time equivalents.
(2) Total benefits include direct, indirect, and induced effects.
(3) Economic output includes earnings.
(4) Commonwealth of Kentucky columns are inclusive of Fleming County

Source: Fleming Solar, LLC, May 2021.

Operational employment, earnings, and expenditures: Project operations will require approximately seven permanent FTEs for ongoing operations and maintenance of the facility, including positions for plant manager, electricians/instrument technicians, mechanical maintenance, and warehouse clerk. Operational employees are anticipated to be hired from within Fleming County. Salaries for those employees are estimated to be about $50,000 per FTE per year. An estimated $157,000 would be spent in Fleming County on materials and equipment throughout the life of the Project, or roughly $4,500 per year for a 35-year Project lifespan.[71] Local purchases would include a variety of commodities, such as office supplies and equipment; warehouse and shop tools; fence repair material, vegetation management materials and transportation equipment.

Accounting for the circulation of construction-related monies throughout the local area, the operation and maintenance of the Project is expected to generate a total of about 11 new jobs, or FTEs, in Fleming County, with a total payroll of about $461,000. Exhibit 5-16 offers the estimated economic benefits generated by the operation of the Project.

Exhibit 5-16.
Annual Economic Benefits of the Fleming Solar Project, Operations Phase

	Fleming County		
	Employment	Earnings	Economic Output
Direct	6.6	$326,600	$326,600
Total	10.9	$461,000	$1.0 M

Notes: (1) Employment is measured in number of jobs, or full-time equivalents.
(2) Total benefits include direct, indirect, and induced effects.
(3) Economic output includes earnings.

Source: Fleming Solar, LLC, May 2021.

[71] This estimate does not include spending on services or lease payments to participating landowners.

Payment in Lieu of Taxes (PILOT) Agreement: Fleming Solar has requested that the Fiscal Court of Fleming County adopt a resolution agreeing to issue bonds to finance the Project at the appropriate time in the future (an Industrial Revenue Bond, or IRB). The Applicant is currently in discussions with officials of the County about the terms and conditions of the resolution and the bonds that will be issued, including negotiated contractual payments while the bonds are outstanding. If approved, Fleming Solar would execute a payment-in-lieu-of-taxes, or PILOT, agreement with the County.[72]

The Economic Impact Analysis states that the negotiated contractual payments are expected to be between $48,000 and $96,000 in the first year. Over 35 years, the total contractual payments are expected to be between $835,000 and $1.67 million. Additionally, the estimated total leasehold taxes to the Commonwealth of Kentucky are estimated to be $883,000 over 35 years. Exhibit 5-17 summarizes the PILOT revenues generated by the Project for Fleming County.

Exhibit 5-17.
Estimated PILOT Revenues Generated by the Fleming Solar Project, 35-Year Project Life

	Fleming County
Payment Year 1	$48,000 - $96,000
Total Payments, 35 Years	$835,000 - $1.67 M

Source: Fleming Solar, LLC, May 2021.

Fleming County would be the recipient of the contractual payments; the County would then distribute those funds to the appropriate local taxing jurisdictions.

HE's evaluation of impacts. An economic impact analysis can be an opportunity to identify the monetary and other benefits provided by Project construction and operational activities. A meaningful discussion of the monetary and other benefits must provide some quantification of said benefits, along with additional context to determine the magnitude of those benefits:

- For most solar facilities, the purchase of materials, supplies and equipment makes up a large portion of total project construction costs. In response to HE inquiries, the Applicant noted that the economic analysis assumes that none of the materials and equipment would be sourced from within Fleming County. The majority of the Project's capital expenditures are anticipated to occur out-of-state, limiting the economic benefits to the Commonwealth. Therefore, the economic benefits of construction focus mainly on labor activities.

- It is also important to note that direct construction jobs, as well as indirect and induced, will be temporary, resulting from the 12-month construction period. Additionally, the

[72] As described by the Applicant, the IRB will reduce the state and local ad valorem property taxes on Project assets. The land leased to Fleming Solar will remain fully taxable.

portion of construction period jobs realized for Fleming County residents will depend on the number of available and qualified workers in the area.

- Annual operations and maintenance expenditures for the Project would be minimal on an annual basis; the majority of economic benefits generated during operations would result from employee earnings and PILOT payments.

- PILOT payments distributed to local entities within Fleming County provide additional revenue for these agencies; however, those payments will generally amount to a small percentage of total tax revenues for any individual entity.

- Landowner leases are not mentioned in the economic analysis. Those landowners will realize direct benefits from the Project via lease payments.

Conclusions and recommendations. Construction and operation of the Fleming Solar facility will provide some limited economic benefits to the region and to the Commonwealth. Overall, the Fleming Solar Project will result in measurable, but temporary, positive economic effects to the region during the construction phase. Construction activity will generate regional employment and income opportunities; those effects will be temporary, but local hires will increase employment and incomes to an area that needs it. Most construction purchases will be made outside of Kentucky.

Operational economic benefits will be confined mostly to PILOT revenues, although these will be relatively minor. Operational employment will be minimal, and purchases of materials or supplies will be very small on an annual basis. Annual PILOT payments made to Fleming County are estimated to range from $48,000 to $96,000 in the first year; over 35 years, the total contractual payments are expected to be between $835,000 and $1.67 million. Those payments will generally amount to a small percentage of total tax revenues for any one entity.

Need for mitigation. Socioeconomic impacts of the Fleming Solar facility represent a positive contribution to the region. However, the economic benefits to the local area are small and largely temporary. The Applicant should attempt to hire local workers and contractors to the extent they are qualified to perform the construction and operations work. The Applicant should also consider other opportunities to optimize local benefits; for example, by purchasing as many materials as possible in the local area during construction and operation.

Decommissioning Activities

Decommissioning is the process of safely closing the solar facility to retire it from service at the end of its useful life, and subsequently returning the land to its original condition. This might include removal of solar panels and all associated facilities, and restoration of the property to pre-Project conditions. Although not specifically addressed in the statutes, the Siting Board requested that HE discuss the potential impacts associated with decommissioning activities.

General methods of assessment. The types of impacts likely to result from decommissioning might be similar in nature to those experienced during construction. For

example, workers would need to commute to the site daily, trucks would be required to haul equipment away using local roads and noise may be generated by the activity. Therefore, the methods of assessing decommissioning impacts would be similar to those employed to evaluate the construction phase effects.

In addition, the decommissioning of a facility is often compared to the conditions that might exist if the facility is not commissioned. This step is relevant if decommissioning is not required, or the facility owner is not committed to decommissioning.

Removal and disposal of the project components should also be addressed in this assessment.

Summary of information provided by the Applicant. According to the Applicant, the Fleming Solar facility would have an expected useful life of approximately 35 years.

Decommissioning plan and activities. The discussion of mitigation measures included in the SAR states that Fleming Solar will develop an explicit decommissioning plan. That plan will be completed prior to posting the decommissioning bond at Notice to Proceed. Additionally, the SAR notes that specific land restoration commitments, agreed to by individual property owners, are included in signed lease agreements with participating landowners.[73] Lease agreements state that the land will be restored to substantially the same physical condition that existed immediately before construction.

According to supplemental information provided by the Applicant, the decommissioning and restoration processes include the removal of above-ground structures and underground wiring; grading to the extent necessary; restoration of topsoil (if needed) and seeding. Project infrastructure will consist of numerous materials that can be recycled, including steel, aluminum, glass, copper, and plastics. The components and materials will be transported to the appropriate facilities for reconditioning, salvage, recycling, or disposal. Measures will be taken to minimize transportation impacts. Temporary erosion and best management practices for sedimentation control will be used during the decommissioning phase of the Project. The Noise and Traffic Study submitted with the SAR states that the decommissioning process would occur over a period of about 12 months.[74]

Decommissioning bond. The Applicant is willing to issue a decommissioning bond prior to construction, but no sooner than the Notice to Proceed. The amount of the bond would encompass all decommissioning and restoration activities and would be adjusted over time to account for changes in costs. The beneficiaries of the bond would be the Project landowners.

HE's evaluation of impacts. The impacts of decommissioning activities are likely to be somewhat smaller than those of construction. Fewer workers should be able to complete facility removal activities in a shorter time period, as compared to construction activities. Additionally, decommissioning work may not require the same level of experience or skill sets as project construction, resulting in the employment of more general laborers at lower wages.

[73] Landowners may request that all or any part of the roadway improvements be left for future use.
[74] That Study also notes that decommissioning work will require approximately six employees, working eight hour shifts for five days per week.

Therefore, the benefits to local employment and income during decommissioning would be somewhat less than those described for the construction phase.

Conclusions and recommendations. HE believes that decommissioning the facility and returning the site to its original condition can be accomplished if all the components will be removed. After reclamation, this would return the land to its pre-Project productive use and property value, and eliminate long term Project-related negative impacts, compared with simply shutting the solar facility. This process will also have a modest and temporary positive economic stimulus to the region.

Need for mitigation. The Applicant's approach to decommissioning and restoration includes removal of above-ground and underground structures associated with the Project, as well as site restoration activities. Commitments regarding land restoration are included in individual lease agreements with participating landowners. To ensure that those decommissioning commitments are met, we recommend the following:

1. The Applicant, its successors, or assigns shall decommission the entire site if the Project ceases producing electricity for a period of more than twelve (12) months. Decommissioning shall involve the removal of all solar panels, racking, and equipment including concrete pads and trenched electrical wiring.

2. The Applicant should develop an explicit decommissioning plan. This plan shall be filed with the Siting Board or its successors. This plan should commit the Applicant to removing all facility components from the Project site and Fleming County at the cessation of operations. Internal access roads shall also be removed unless the landowner states in writing that they prefer internal roads to remain in place.

3. The Applicant will file a decommissioning bond equal to the amount necessary to complete site decommissioning and restoration activities, naming Fleming County as a third-party beneficiary of that bond, so that Fleming County will have the authority to draw upon the bond to effectuate the decommissioning plan. The bond shall be in place by the commencement of operations.

4. The amount of the decommissioning bond should be reviewed and updated every five years at the expense of the Applicant to determine and update the cost of facility removal.

5. As applicable to individual lease agreements, the Applicant, its successors, or assigns will abide by the specific land restoration commitments agreed to by individual property owners, as described in each signed lease agreement.

6. If the Applicant proposes to retrofit the current proposed facility, it shall demonstrate to the Siting Board that the retrofit facility will not result in a material change in the pattern or magnitude of impacts compared to the original project. Otherwise, a new Site Assessment Report will be submitted for Siting Board review.

7. The Applicant shall also prepare a new Site Assessment Report for Siting Board review if the Applicant intends to retire the currently proposed facility and employ a different technology.

Public Outreach and Communication

The Application details the public involvement activities undertaken by Fleming Solar, LLC staff. Those activities included the following actions taken to notify and inform Fleming County officials and residents about the Project:

- Public meetings and events:
    - An initial public meeting (limited in-person capacity, with virtual and phone-in options) was held on December 11, 2020. A notice announcing the public meeting was printed in the Flemingsburg Gazette on November 25, 2020. The Project also mailed letters to all adjoining landowners notifying them of the public meeting. An estimated ten people participated in the meeting virtually and an estimated six people participated in person. According to the Applicant, "the attendee's dialogue was inquisitive in nature and no concerns were raised."
    - Following the initial public meeting, Fleming Solar expanded the Project area, creating two new adjoining property owners. A second public meeting was held on March 25, 2021, to provide the additional adjacent property owners an opportunity to participate. A notice announcing the second public meeting was printed in the Flemingsburg Gazette on March 10, 2021. The second public meeting was virtual without an in-person component. Fleming Solar also mailed letters to the new adjoining landowners notifying them of the public meeting. Fifteen people participated in the meeting virtually and seventeen participated in person.
    - A Community Picnic was held on June 5, 2021, at the New Creation Praise & Worship Center, adjacent to the proposed Project Boundary. Mailed invitations were delivered to those who live within 2,400 feet of the Project, along with a corresponding ad posted in the local Fleming Shopper.
- Project website:
    - A Project website was developed, including a list of Frequently Asked Questions and other Project resources (e.g., preliminary site layout, photo simulations, and the public meeting presentation). A feedback form was added to the webpage for community members to directly submit questions or concerns. The Project webpage has been continually updated as the Project progresses, the layout becomes more refined, and as more questions are received.

- Outreach to surrounding landowners and others:

    - Following the second public meeting, Fleming Solar reached out to all meeting attendees who provided contact information via phone and/or email to see if they had any additional questions and offered to set up an individual meeting with the lead project developer. Two people requested a follow up meeting with the developer, and one person expressed their opposition to the Project and did not wish to meet with the developer. Concerns relayed by adjacent landowners were primarily related to viewshed and impacts to property values.

    - Fleming Solar initiated and established relationships with various community stakeholders over the course of the Project development period. This includes Fleming County Schools Superintendent, Flemingsburg Police Department Chief of Police, and the New Creation Praise and Worship Center Flemingsburg Pastor. The New Creation Praise and Worship Center adjoins the Project Boundary, and Fleming Solar received feedback that the noise and visual mitigation measures proposed were sufficient and appreciated.

    - Fleming Solar went before the Fleming County Fiscal Court in a regular monthly meeting on June 8, 2021. An overview of the IRB process in Kentucky and an initial payment in lieu of taxes (PILOT) proposal to the County was presented. Discussion was held regarding the current project status as well as long-term decommissioning plans and property valuation impacts.

As part of HE's site visit to the Project area, we met with the Fleming County Judge Executive, Larry Foxworthy. Mr. Foxworthy indicated that some local residents were concerned about the Project and its impacts related to noise, visual impairment, and property values. Ms. Michele Butler, the Fleming County Property Valuation Administrator, was concerned that conflicting or incomplete information about the Project was being discussed in different venues; she feels there has not been enough communication between the Applicant and the County regarding details of the Project. There is a basic concern that the County is receiving insufficient benefits from this project or the AEUG Fleming Project.

Need for mitigation. Because of the limited attendance at local public meetings and the general sense of a lack of local awareness of the Project, it is suggested that the Applicant pursue additional public outreach and engagement activities within Fleming County.

Complaint Resolution

The SAR includes the following information regarding complaint resolution:

"Fleming Solar will establish a dedicated voicemail and email prior to construction of the Project. This information will be provided to city and county officials, emergency responders, schools, and public libraries, and neighboring residents within the Project Area. This information will also be posted on the Project website. To register a complaint or concern,

individuals may either call the voicemail, send an email, or submit a form on the website. All complaints and concerns will be responded to within five business days."

In response to HE inquiries regarding how individual complaints would be addressed during construction and operations, the Applicant provided the following:

- Fleming Solar will coordinate with the complainant to address issues quickly and effectively such that both parties are satisfied. Complaints will be logged, and the construction manager will assign an appropriate on-site construction or development staff to investigate the complaint.

- Fleming Solar will determine if complaints violate federal, state, or local laws or permit conditions, and if there are notifications or required steps to address those violations. Fleming Solar will also determine if outside resources are necessary to address issues. Once a corrective action or response has been determined, Fleming Solar will contact the complainant by telephone or return mail to inform them of the proposed corrective action, if any.

- Fleming Solar is committed to resolving reasonable complaints within 30 days, unless extenuating circumstances necessitate a longer time period, or it is determined that the complaint is unresolvable. Fleming Solar will provide an explanation to the complainant for the extended period and the timeline for addressing the complaint should complaint resolution take longer than 30 days.

- Individuals who register a complaint with Fleming Solar will receive correspondence from Fleming Solar as soon as possible, but no later than three business days after registering the complaint. The intent of the initial correspondence is to gather more information to better understand the complaint.

- Within 30 days of the complaint being logged, Fleming Solar will initiate reasonable action to resolve the legitimate interference or disturbance that is a direct result of the Project.

- The logbook will also document Fleming Solar's recommended resolution, the date agreement was reached on a proposed resolution, and the date when the proposed resolution was implemented. Fleming Solar personnel will generate a quarterly report based on the information recorded in the logbook about the nature and resolution of all complaints received in that quarter, and file the report at the site office during construction.

Need for mitigation. The Applicant's approach to resolving complaints appears generally adequate for addressing issues that arise during construction. This process should also be followed during the operational period to address any issues associated with visual, noise or other Project effects in the longer-term. The following measures encompass the Applicant's description of the complaint resolution process described above, expanding that approach to include the operational phase of the Project:

1. The Applicant should develop a complaint resolution plan that describes the process for filing complaints during construction and during operations; how the complaint will be addressed; the timeframe in which a complainant can expect a response; and an explanation of how resolution will be determined if the complainant is not satisfied with the response from the Applicant. That plan should be communicated to nearby residents prior to the start of construction.

2. The Applicant should submit to the Siting Board, annually, a status report associated with the complaint resolution plan, providing the individual complaints, how the Applicant addressed those complaints and the ultimate resolution of those complaints, identifying whether or not the resolution was to the complainant's satisfaction.

SECTION 6
Recommended Mitigation

This section identifies actions the Applicant can take to mitigate potential negative impacts on certain regional resources. Other regulatory processes will determine the need for particular actions; these are only noted here, and Harvey Economics makes no recommendation as to their merit. Beyond those actions, HE recommends a list of mitigation actions for Siting Board and Applicant consideration.

Regulatory Actions and Mitigation Outside Siting Board Jurisdiction

The Siting Board should be aware of the following permitting and regulatory actions that will require Applicant compliance and possible mitigation efforts. No action on these actions is required by the Siting Board since these are outside the Siting Board's jurisdiction.

The Application states that "All necessary air, water, and waste permits and authorizations will be obtained before construction and operation of the Project." Exhibit 6-1 is a list of potential permit authorizations anticipated to be received during Project development.[75]

[75] As stated in the Application, "the final Project design and EPC selection can affect what will ultimately be required and determine that not all of the listed permits will be necessary."

Exhibit 6-1.
Environmental Permitting Matrix

Permit	Regulatory Authority	Activity	Regulatory Citation
Spill Protection and Control, and Countermeasure (SPCC) Plan	U.S. Environmental Protection Agency (EPA)	SPCC required for total capacity of (Aboveground Storage Tanks) ASTs and oil filled equipment greater than 1,320 gal and with a reasonable likelihood of impacting water bodies. Likely not needed until construction.	40 CFR 112
Kentucky Pollutant Discharge Elimination System (KPDES) Construction Storm Water General Permit	Kentucky Department of Environmental Protection (KDEP)	Construction sites that will disturb one acre or more of land must prepare a Storm Water Pollution Prevention Plan (SWPPP) and submit a Notice of Intent to the KDEP Division of Water (DOW).	401 Kentucky Administrative Regulation (KAR) 5:055
USACE Permit (Section 10 and/or Nationwide or Individual)	U.S. Army Corps of Engineers (USACE)	Structures in Navigable Waters/Work Affecting the Course, Location, Condition, or Physical Capacities of Navigable Waters requires Section 10 Permit. Impacts to jurisdictional waters will require a Clean Water Act (CWA) Section 404 permit, which could include a Nationwide Permit (NWP) or Individual Permit (IP).	33 U.S. Code (U.S.C.) §403 33 U.S.C. §§404 (404 permit)
401 Water Quality Certification (WQC)	KDEP	KDEP must certify all Nationwide and Individual Permits. If jurisdictional features are to be impacted by Project, 401 WQC will be required.	33 U.S.C. §§401

Source: Fleming Solar, LLC, May 2021.

Mitigation for Siting Board and Applicant Consideration

The following mitigation measures are based upon: (1) Applicant commitments set forth in the SAR; (2) measures discussed with the Applicant in subsequent information exchanges or discussions; and (3) additional mitigation steps HE believes will reduce or eliminate negative Project impacts and are reasonable for the Applicant to undertake.

In performing this comprehensive review of the Fleming Solar SAR, HE has gained an understanding of the Project, the location, the construction and operational activities, the Applicant's intentions, and the Project's impacts. Our recommended mitigation actions are intended to reduce or eliminate potential adverse impacts.

A. Site development plan:

1. A final site layout plan should be submitted to the Siting Board upon completion of the final site design. Deviations from the preliminary site layout plan, which formed the basis for HE's review, should be clearly indicated on the revised graphic. Those changes would include, but are not limited to, location of solar panels, inverters, substations, operations and maintenance building or other Project facilities or infrastructure.

2. Any change in Project boundaries from the information which formed this evaluation should be submitted to the Siting Board for review.

3. The Siting Board will determine if any deviation in the boundaries or site development plan is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required, but if yes, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.

4. A final Project-specific construction schedule, including revised estimates of on-site workers and commuter vehicle traffic, should be submitted to the Siting Board. Deviations from the preliminary construction schedule should be clearly indicated.

5. The Siting Board will determine if any deviation to the construction schedule or workforce estimates is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required. If yes, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.

6. The Applicant or its contractor will control access to the site during construction and operation. All construction entrances will be gated and locked when not in use.

7. The Applicant's access control strategy should also include appropriate signage to warn potential trespassers. The Applicant must ensure that all site entrances and boundaries have adequate signage, particularly in locations visible to the public, local residents and business owners.

8. According to National Electrical Safety Code regulations, the security fence must be installed prior to any electrical installation work. The substation will have its own separate security fences installed.

B. Compatibility with scenic surroundings:

1. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of solar panels.

2. Existing vegetation between the solar arrays and the residences will be left in place, to the extent practicable, to help screen the Project and reduce visual impacts from the nearby homes and roadways.

3. The Applicant will work with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors.

4. The Applicant should provide a visual buffer between Project infrastructure and residences or other occupied structures with a line of sight to the facility to the satisfaction of the affected property owners. If vegetation is used, plantings should reach eight feet high within four years. To the extent that an affected property owner indicates to the Applicant that such a buffer is not necessary, the Applicant will obtain that property owner's written consent and submit such consent in writing to the Siting Board.

5. The Applicant will follow through on its commitment to providing vegetative buffers at the locations indicated on the Preliminary Site Layout map included in the application materials. If the final site layout plan deviates from the preliminary plan with regard to the locations of solar panels, inverters, substation or other Project infrastructure, an additional evaluation of the need for vegetative buffers will be conducted and reviewed by the Siting Board.

6. Landscape screening will extend and connect to existing site vegetation, to help create a more natural transition between existing vegetation and developed.

7. The Applicant will develop a vegetation management plan that describes the approach and procedures for maintaining or replacing vegetative buffers as needed.

8. Applicant will cultivate a minimum of six acres of native pollinator-friendly species on-site.

9. The Applicant has committed to using anti-glare panels and operating the panels in such a way that glare from the panels is minimized or eliminated. The Applicant will immediately adjust solar panel operations upon any complaint about glare from those living, working, or traveling in proximity to the Project. Failing this, the Applicant will cease operations until the glare is rectified.

10. The Applicant should work with the Siting Board regarding the timing of construction activities in relation to those of the AEUG Fleming Project in order to minimize or eliminate any potential for cumulative impacts to the viewshed during construction, especially along KY 559 (Old Convict Road).

C. Potential changes in property values and land use:

1. No unique mitigation measures are recommended related to potential impacts to property values or adjacent land uses because other mitigation can accomplish this. However, close coordination by the Applicant with concerned homeowners, especially those located along KY 559, regarding these mitigation measures should be initiated.

D. Peak and average noise levels:

1. The Applicant should notify residents and businesses within 2,400 feet of the Project boundary about the construction plan, the noise potential, and the mitigation plans at least one month prior to the start of construction.

2. The Applicant should remain in contact with nearby residents to confirm that noise levels are not unduly high or annoying after the pounding and placement of the solar panel racking begins. If the noise levels are unduly high or annoying, the Applicant should mitigate those effects as needed.

3. If pile driving activity occurs within 1,500 feet of a noise sensitive receptor, the Applicant should implement a construction method that will suppress the noise generated during the pile driving process (i.e., semi-tractor and canvas method; sound blankets on fencing surrounding the Project site; or any other comparable method).

4. Pile driving activities should cease by 6pm each day, except for pile driving locations within 1,500 of noise receptors, in which case, pile driving should begin no earlier than 9:00 am and cease by 5:00 pm. Since the area is largely rural, a constant pounding during evening hours has the potential to upset the natural tranquility of the area and severely annoy residents.

5. The Applicant should limit the construction activity, process, and deliveries to the hours of 8:00 am to 6:00 pm, Monday through Saturday. No construction work should be conducted on Sundays. These hours represent a reasonable timeframe to ensure that nearby property owners are not unduly impacted by construction activities.

6. The Applicant and its contractors should establish and maintain a relationship with AEUG Fleming staff to minimize cumulative noise impacts and to discuss mitigation measures to reduce noise impacts.

7. The Applicant should work with the Siting Board regarding the timing of construction activities in relation to those of the AEUG Fleming Project to minimize or eliminate any potential for cumulative noise impacts during construction or operations.

E. Road and rail traffic, dust, and road degradation:

1. The Applicant should work with the Kentucky Transportation Cabinet (KYTC) and the Fleming County Road Department (FCRD) to perform road surveys, before and after construction activities, on all roads to be used by construction vehicles.

2. The Applicant should fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads that it causes or to which it materially contributes to, regardless of its status as a KY Route or local road.

3. The Applicant will consult with the Kentucky Transportation Cabinet regarding truck and other construction traffic and obtain necessary permits from the KYTC.

4. The Applicant will consult with the Fleming County Road Department regarding truck and other construction traffic and obtain necessary permits from the FCRD.

5. The Applicant should develop special plans and obtain necessary permits before bringing the very heavy loads, especially the substation transformer, onto Kentucky or County roads.

6. The Applicant will comply with any road use agreement executed with the Fleming County Road Department. Such an agreement might include special considerations for overweight loads, routes utilized by heavy trucks, road weight limits and bridge weight limits.

7. The Applicant should develop and follow a traffic management plan to minimize the impacts of any traffic increases and keep traffic and people safe.

8. The Applicant will comply with all laws and regulations regarding the use of roadways.

9. Prior to establishment of the remote parking location(s), the Applicant will provide the Siting Board with detailed information about the development and use of those locations, including, but not limited to location; size; required land improvements; use of specific access roads; traffic management and safety measures; and post-construction land restoration activities.

10. The Applicant will develop a fugitive dust control plan and follow best practices to suppress fugitive dust emissions. The Applicant will monitor dust emissions occurring during construction or operations and adjust activities, if necessary, to minimize dust emissions.

11. The Applicant and its contractors should establish and maintain a relationship with AEUG Fleming staff to ensure a common understanding of development and construction schedules and to discuss mitigation measures for traffic, dust, and related impacts.

12. The Applicant should work with the Siting Board regarding the timing of construction activities in relation to those of the AEUG Fleming Project in order to minimize or eliminate any potential for cumulative traffic or dust impacts during construction, especially along KY 559 (Old Convict Road).

F. Economic impacts:

1. Socioeconomic impacts of the Fleming Solar facility represent a positive contribution to the region. However, the economic benefits to the local area are small and largely temporary. The Applicant should attempt to hire local workers and contractors to the extent they are qualified to perform the construction and operations work.

2. The Applicant should consider other opportunities to optimize local benefits; for example, by purchasing as many materials as possible in the local area during construction and operation.

G. Decommissioning:

1. The Applicant, its successors, or assigns shall decommission the entire site if the Project ceases producing electricity for a period of more than twelve (12) months. Decommissioning shall involve the removal of all solar panels, racking, and equipment including concrete pads and trenched electrical wiring.

2. The Applicant should develop an explicit decommissioning plan. This plan shall be filed with the Siting Board or its successors. This plan should commit the Applicant to removing all facility components from the Project site and Fleming County at the cessation of operations. Internal access roads shall also be removed unless the landowner states in writing that they prefer internal roads to remain in place.

3. The Applicant will file a decommissioning bond equal to the amount necessary to complete site decommissioning and restoration activities, naming Fleming County as a third-party beneficiary of that bond, so that Fleming County will have the authority to draw upon the bond to effectuate the decommissioning plan. The bond shall be in place by the commencement of operations.

4. The amount of the decommissioning bond should be reviewed and updated every five years at the expense of the Applicant to determine and update the cost of facility removal.

5. As applicable to individual lease agreements, the Applicant, its successors, or assigns will abide by the specific land restoration commitments agreed to by individual property owners, as described in each signed lease agreement.

6. If the Applicant proposes to retrofit the current proposed facility, it shall demonstrate to the Siting Board that the retrofit facility will not result in a material change in the pattern or magnitude of impacts compared to the original project. Otherwise, a new Site Assessment Report will be submitted for Siting Board review.

7. The Applicant shall also prepare a new Site Assessment Report for Siting Board review if the Applicant intends to retire the currently proposed facility and employ a different technology.

H. Public outreach and communication:

1. It is suggested that the Applicant pursue additional public outreach and engagement activities within Fleming County.

I. Complaint resolution:

1. The Applicant should develop a complaint resolution plan that describes the process for filing complaints during construction and during operations; how the complaint will be addressed; the timeframe in which a complainant can expect a response; and an explanation of how resolution will be determined if the complainant is not satisfied with the response from the Applicant. That plan should be communicated to nearby residents prior to the start of construction.

2. The Applicant should submit to the Siting Board, annually, a status report associated with the complaint resolution plan, providing the individual complaints, how the Applicant addressed those complaints and the ultimate resolution of those complaints, identifying whether or not the resolution was to the complainant's satisfaction.

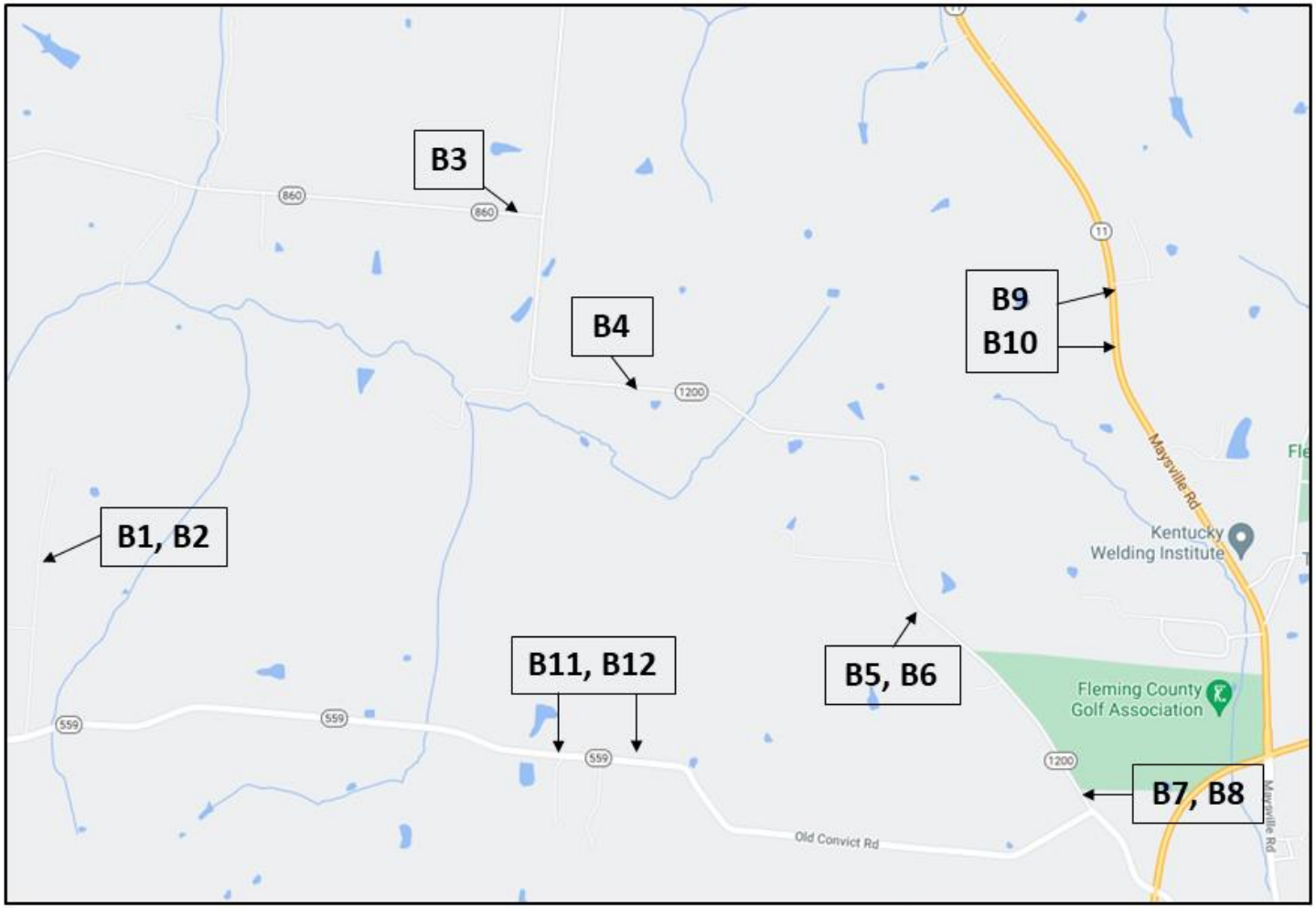
Deviation from Setback Requirements

As presently proposed, the Fleming Solar Project does not meet the existing setback requirements. As such, the Applicant has entered a motion for a deviation from those requirements. HE reviewed this motion and believes that the Project does meet the specific statutes noted for consideration of a setback deviation. The Siting Board will need to judge whether the quality of the Applicant responses on the setback deviation request is satisfactory.

APPENDICES

Appendix A

Photo Log Index Map



Appendix B

Site Photos

Exhibit B-1.
View of the Fleming Solar Project Site from Whisman Road, Facing East

Exhibit B-2.
View of Whisman Road, Located West of the Fleming Solar Project Site

Exhibit B-3.
View of the General Area North of the Fleming Solar Project Site, at the Intersection of KY 1200 (Helena Road) and KY 860 (Kelley Pike)

Exhibit B-4.
View of the Fleming Solar Project Site from KY 1200 (Helena Road), Facing South

Exhibit B-5.
View of the Fleming Solar Project Site, Facing West from a Church on KY 1200 (Helena Road), near the Intersection with KY 559 (Old Convict Road)

Exhibit B-6.
View of Residences along the East Side of KY 1200 (Helena Road), which Face the Fleming Solar Project Site

Exhibit B-7.
View of the Fleming Solar Project Site from KY 1200 (Helena Road), North of the Intersection with KY 559 (Old Convict Road), Facing West

Exhibit B-8.
View of KY 1200 (Helena Road), at the Intersection with KY 559 (Old Convict Road)

Exhibit B-9.
View of the Fleming Solar Project Site and the Location of a Proposed Construction Entrance from KY 11 (Maysville Road), near the Intersection with Ledan Street, Facing West

Exhibit B-10.
View of the Fleming Solar Project Site from KY 11 (Maysville Road), Facing Northwest

Exhibit B-11.
View of the Proposed Construction Entrance and Laydown Area on KY 559 (Old Convict Road), Facing North

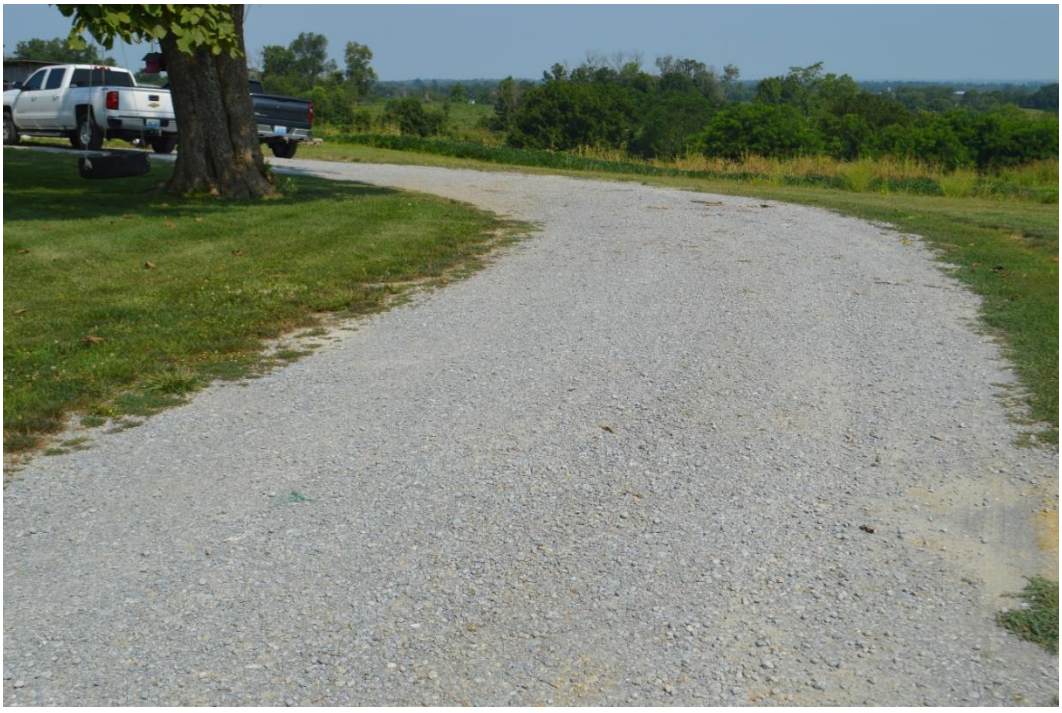
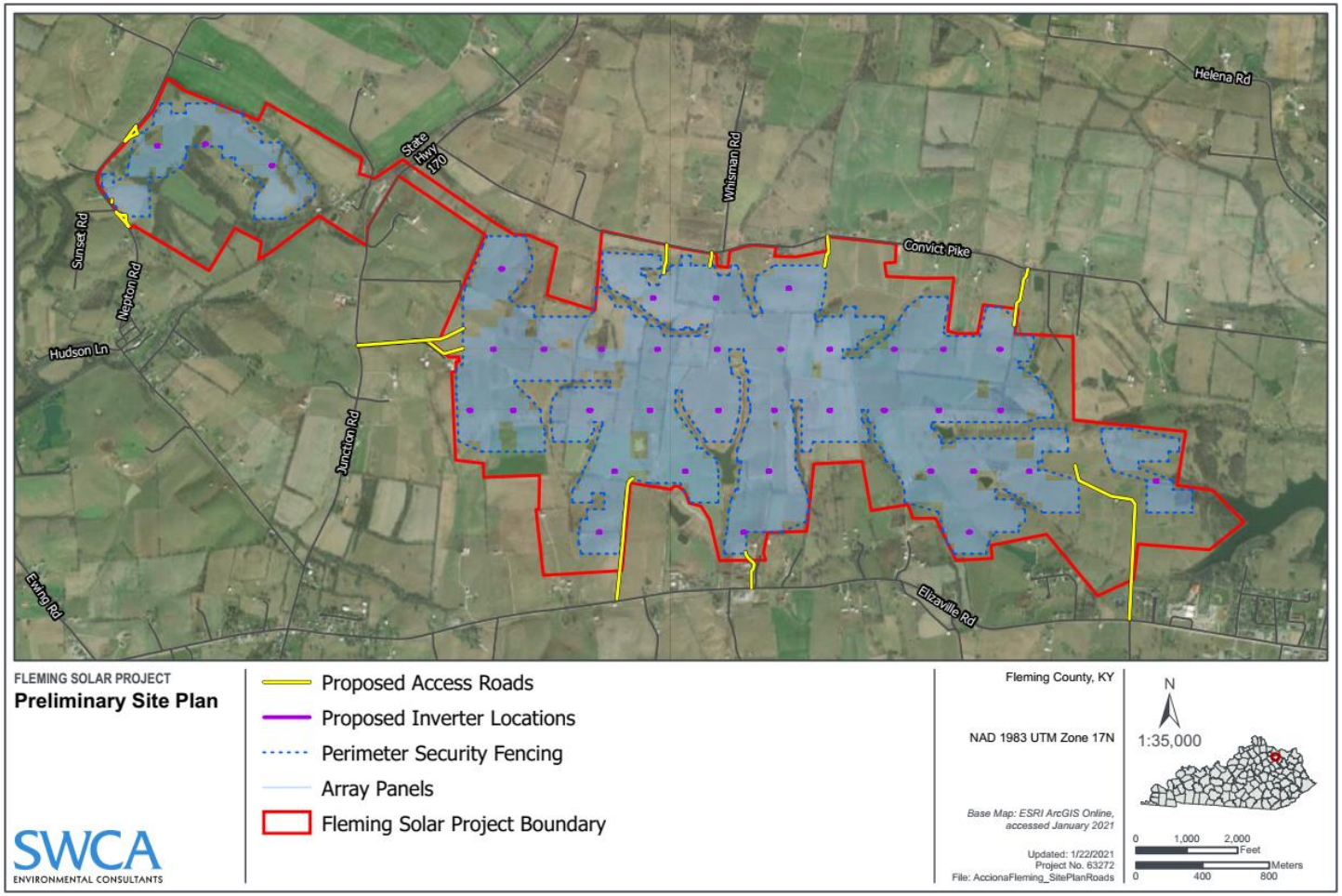


Exhibit B-12.
View of the Fleming Solar Project's Proposed Substation Site along KY 559 (Old Convict Road) from a Participating Landowner's Property, Facing West

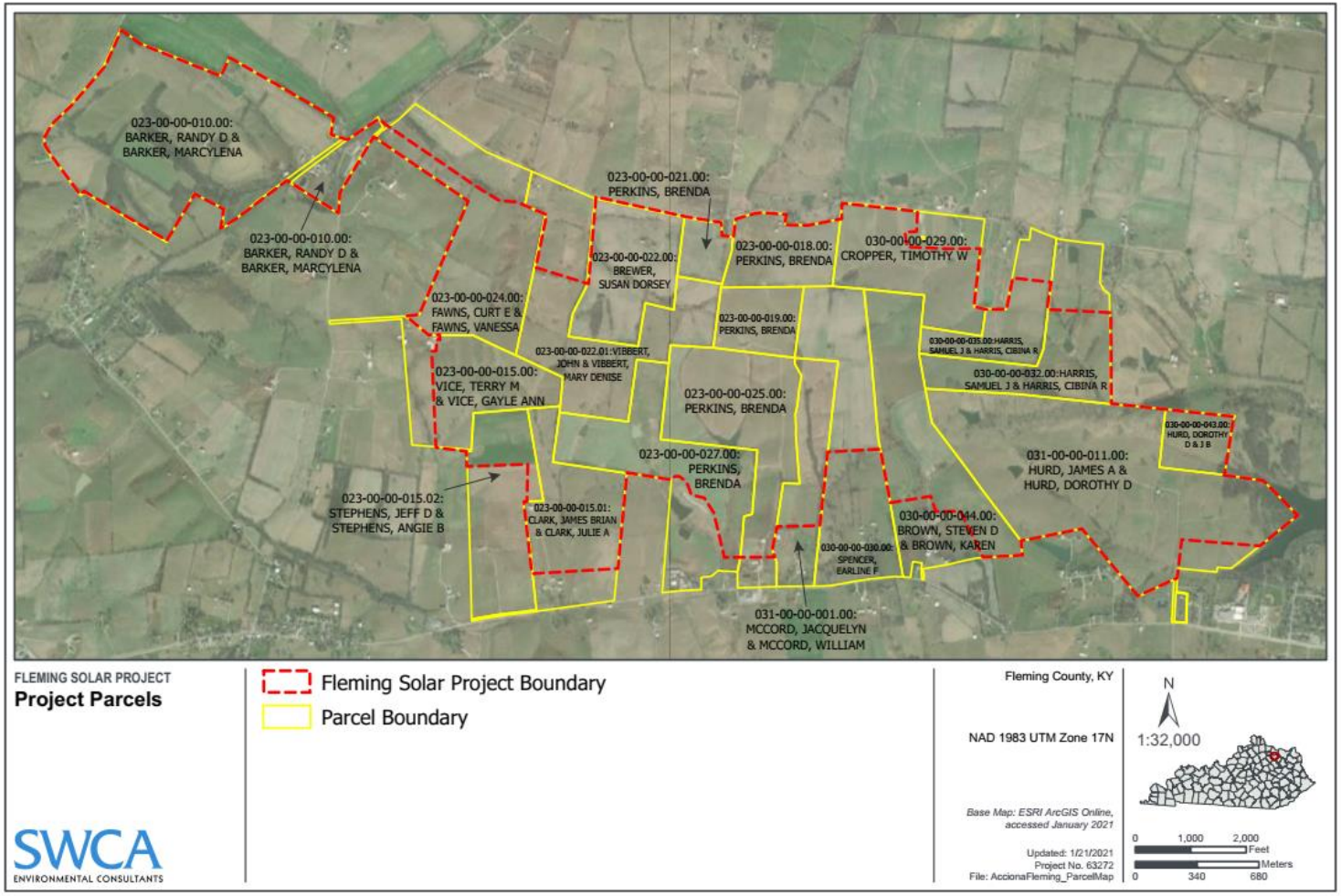
Appendix C

Map of Proposed AEUG Fleming Solar, LLC Project Site



Source: AEUG Fleming Solar, LLC, November 2020.

Map of Project Parcels (Participating Landowners) and the AEUG Fleming Solar, LLC Project Boundary



Source: AEUG Fleming Solar, LLC, November 2020.