Solar Generation Siting Final Report - Crab Run Solar

KY PSC

April 6, 2026

Customer:
Kentucky Public Service Commission

Prepared for:
KY State Board on Electric Generation and Transmission

Revision 0
April 6, 2026

Solar Generation Siting Report – Crab Run Solar

Prepared by:

Cooper Meyers
Power Engineer

Reviewed by:

Collin Abell
Power Systems Engineer

Approved by:

Jim Cook
Chief Operating Officer

Synopsis

This document is the Final Report prepared by Elliot Engineering for the Crab Run Solar Electric Solar Generating facility in Marion County, KY.

WEPSC Order: EE260114011

Public Service Commission PO:
PON2 123 2400002405

Left Blank Intentionally

Contents

REVISIONS

Revision	Date Issued	Issue Type	By	Description
0	4-06-26	Final Report	JCM	Issue for Review & Record

Power Systems Engineering

Since 2004, Elliot Engineering has served utility, industrial, and commercial facilities for all their power needs. Quality and innovation have established Elliot as the go-to engineering firm specializing in the planning, design, control, and analysis of electrical power systems. With a great reputation for working closely with our clients and listening to their requests, our team diligently provides solutions that fit every need.

Our Mission

Our mission is to provide unsurpassed quality engineering service and customer support. We will conduct our business in the most professional manner possible and provide the highest quality product promptly. Our value-added engineering will be recognized and provide the opportunity to earn our customers' confidence. We will use proven technology to create advanced power systems designs to support the development of the safest and most reliable systems for our clients.

Services

PLANNING AND STUDIES. Arc Flash Hazard Analysis • Short Circuit Analysis • Equipment Evaluation Analysis • Coordination Analysis • Load Flow Analysis • Power Factor Correction • Harmonic Analysis • Cable Ampacity Analysis • Motor Starting Analysis • Power Quality Analysis • Voltage Flicker Analysis • Insulation Coordination Analysis • Switching Transient Analysis • Generator Stability Analysis • Ground Mat Analysis • Grounding and Bonding Study • DC Power System Analysis • Project Feasibility Studies

DESIGN ENGINEERING AND EPC SERVICES. Generator Protection & Control • T&D Line • Power Substation • Transmission Switching Stations • Gas Insulated Substations • SCADA • Capacitor & Harmonic Filter Banks • Motor Protection & Control • Protection Relaying Schemes • Underground Ductbanks • Unit Substations • LV/MV Motor Control Centers • AC/DC Traction Power Substations • LV/MV Power Cable Distribution • Emergency Generator Integration • ATS Specifications & Design

APPLICATION ENGINEERING. Relay Protection & Control • RTU & RTAC Programming • Induction Motor Control • Synchronous Motor Control • Capacitor & Filter Banks • SVC Systems • FACTS/STATCOM • Forensic Investigation • Sequence of Events Failure Analysis • Power Systems Planning • Grounding & Bonding • Maintenance Planning & Audits • Troubleshooting • Disaster Recovery Plans • Technical Witness

PROJECT AND CONSTRUCTION MANAGEMENT. Equipment Specifications • Bid Document Facilitation • Subcontractor Qualification • Vendor Selection • Construction Estimates • Contract Administration & Implementation • OEM Factory Witness Testing • Resource Management • Master Project Schedule • Material Tracking • Spare Parts Management • Warranty Negotiation • Procurement Leveraging • Cash Flow Management

TESTING AND COMMISSIONING. MV/HV/EHV Circuit Breakers • Circuit Switchers • MV Switchgear • GSU & Power Transformers • Capacitor Banks • Harmonic Filter Banks • PTs & CCVTs • CTs • Substation Relay Protection & Control • Overcurrent, Fault Locators, & Distance Relays • Generator Protection Relaying Disconnect Switches • Surge Arrestors • Station Batteries • Grounding Resistors/Reactors/Transformers • Ground Grid • Reclosers • Reactors • Thermography • Relay protection & controls • Substation Commissioning • Predictive & Preventative Maintenance • Field Engineering & Troubleshooting • Arc Flash Hazard Analysis & Training • Refurbishment & Repair Electrical System Upgrades • NERC Compliance Testing

DISCLAIMER

Elliot Engineering, Inc. and its affiliates assumes no liability for any consequences, damages, or loss of production as a result of use or misuse of the information or calculations contained in this report. The calculation models that have been produced in this report are based on the industry consensus standard NFPA 70E Standard for Electrical Safety in the Workplace latest Edition which references the IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations. The results published in this report are based on theoretical equations derived from measured test results. The test results are a function of specific humidity, barometric pressure, temperature, arc distance, and many other variables. These parameters will not be the same in your facility or application. All calculations are based on the assumption that existing installed equipment meet all applicable codes and standards. This report approximates the thermal effects of an arc-flash event and the potential of equipment failure but cannot predict an arc blast effect. Many variables contribute to the end result. In the event an Arc-Flash occurs, there is no guarantee a person will be completely protected with the PPE determined by the Arc Flash Hazard Analysis. The results of this report should be applied only by personnel qualified to work on the equipment and that have been trained in the application of electrical safety and arc-flash hazard PPE.

The Arc-Flash Hazard Assessment depends on the operation of the protective devices as shown on the manufacturer's TCC curves. It is essential that all protective devices and associated relays and sensors are tested and calibrated at regular intervals, as recommended by the manufacturer. Proper testing, inspection, and calibration at regular intervals will help ensure clearing times of protective devices as calculated in the studies, thereby protecting personnel. Changes in the electrical system configuration, including but not limited to, available short-circuit current, system impedance, or protective device clearing times, will invalidate the incident energy (cal/cm^2) values provided in this report. Recalculation of incident energy values are required to be performed upon changes to the electrical system in order to maintain a safe and compliant facility according to NFPA 70E Article 130.5.

1 General Statement

The present document is the Final report prepared for the Solar Generation siting project of Crab Run, which is applying for a certificate of construction for an approximately 45-megawatt Merchant Electric Solar Generation Facility in Marion County, KY.

1.1 Scope

As part of the personal service contract for the 'Generation Siting Board 2025', between The Commonwealth of Kentucky Energy Environment Cabinet/Public Service Commission and Elliot Engineering, in the matter of the order issued for case number 2025-00276, Elliot Engineering was appointed to review the Application documents and the Site assessment report submitted by the applicant as per the Kentucky Revised Statutes 278.706, 278.708 and submit a Final report on the Solar Generation Siting for the application for a construction certificate by Crab Run Solar in Marion County, KY.

Elliot Engineering contracted the following expertise based on the requirements of the project,

i) Environmental Resources Management for Noise & Environmental Assessment, Cultural Resources Memo, and Glare Analysis
ii) Joshua C Pinkston, Consulting Economist, for Economic impact.
iii) Richard C. Kirkland, Jr., MAI, ARA at Kirkland Appraisals, LLC, for the review of the impact on property values

1.2 Reference Document

The following documents are referenced for the creation of this document.

i. 20250818_Crab Run Solar, LLC Notice of Intent and Election.pdf
ii. 20250818_PSC Acknowledgment Letter.pdf
iii. Crab_Run_Solar_NOI.pdf
iv. 20251014_PSC Notice of Filing for ad hoc Request Letter to Governor Beshear and Notice of Intent.pdf
v. 20251119_PSC No Deficiency Letter- Notice of Intent.pdf
vi. 20251120_PSC Notice of Check Return.pdf
vii. 20251125_PSC Notice of Check Return.pdf
viii. 20251211_Acknowledgement Letter of Application Fees.pdf
ix. Table_of_Contents_Executive_Summary.pdf
x. Read_1st_Letter_Crab_Run_Application.pdf
xi. Tab_1_Applicant_Information.pdf
xii. Tab_2_Proposed_Site_Description.pdf

xiii. Tab_3_Public_Notice_Evidence.pdf
xiv. Tab_4_Compliance_with_Local_Ordinances_Regulations.pdf
xv. Tab_5_Setback_Requirements.pdf
xvi. Tab_6_Public_Involvement.pdf
xvii. Tab_7_Efforts_to_Locate_Project.pdf
xviii. Tab_8_Proof_of_Service.pdf
xix. Tab_9_Effect_on_Electric_Transmission_System.pdf
xx. Tab_10_Economic_Impact.pdf
xxi. Tab_11_Environmental_Violations_Record.pdf
xxii. Tab_12_Exhibit_A_Project_Site_Map.pdf
xxiii. Tab_12_Exhibit_B_Property_Value_Impact_Study.pdf
xxiv. Tab_12_Exhibit_C_Legal_Description.pdf
xxv. Tab_12_Exhibit_D_Noise_Assessment_Report.pdf
xxvi. Tab_12_Exhibit_E_Visual_Impact_Simulations.pdf
xxvii. Tab_12_Exhibit_F_Landscape_Plan.pdf
xxviii. Tab_12_Exhibit_G_Glare_Analysis_Study.pdf
xxix. Tab_12_Exhibit_H_Traffic_Impact_Study.pdf
xxx. Tab_12_Exhibit_I_Decommissioning_Plan.pdf
xxxi. Tab_12_Site_Assessment_Report.pdf
xxxii. Motion_for_Confidential_Treatment.pdf
xxxiii. 20251223_PSC No Deficiency Letter - Merchant Plant Application.pdf
xxxiv. 20260107_PSC_ORDER.pdf
xxxv. Motion_for_Deviation.pdf
xxxvi. Crab_Run_Motion_for_Leave_to_Reissue_Notice_of_Application.pdf
xxxvii. 20260130_DATA_REQUEST.pdf
xxxviii. Motion_for_Confidential_Treatment.pdf
xxxix. Crab_Run_Read_First_Letter.pdf
xl. Crab_Run_Attachment_A_Control_Lease_Redacted.pdf
xli. Crab_Run_Attachment_B_Site_Map.pdf
xlii. Crab_Run_Attachment_C_Site_Layout_Rev_1.pdf
xliii. Crab_Run_Attachment_D_Residences_within_2000ft.pdf
xliv. Crab_Run_Attachment_E_Non-Residential_Structures.pdf
xlv. Crab_Run_Attachment_F_Non-residential_Structures_Map.pdf
xlvi. Crab_Run_Attachment_G_Delineation_Report.pdf
xlvii. Crab_Run_Attachment_H_Karst_Map.pdf
xlviii. Crab_Run_Attachment_I_Tree_Clearing_Map.pdf
xlix. Crab_Run_Attachment_J_Access_Roads_Map.pdf
l. Crab_Run_Attachment_K_Phase_I_ESA.pdf
li. Crab_Run_Attachment_L_Panel_Specs.pdf
lii. Crab_Run_Attachment_M_Inverter_Specs.pdf
liii. Crab_Run_Attachment_N_Deer_Fence_Examples.pdf
liv. Crab_Run_Attachment_O_Habitat_Assessment.pdf
lv. Crab_Run_Attachment_P_Cultural_Resources_Memo.pdf

lvi. Crab_Run_Attachment_Q_Neighborhoods_Map.pdf
lvii. Crab_Run_Response_to_First_Data_Request.pdf
lviii. Jeannie_Johnson_Verification_of_Responses_to_First_Data_Request.pdf
lix. 20260217_PSC_ORDER.pdf
lx. Attachment_A_Forested_Areas
lxi. Attachment_B_Residences_Distance_Table
lxii. Attachment_C_Site_Layout_With_Internal_Setback_of_2000
lxiii. Attachment_D_Neighborhood_Parcel_Map
lxiv. Attachment_E_Distance_Table_Rev
lxv. Attachment_F_Parcels_Within_500
lxvi. Crab_Run_Read_First_Letter
lxvii. Crab_Run_Response_to_Staff_Second_Data_Request
lxviii. Johnson_Verification_to_Second_Data_Request_Responses

The above documents are available at this link: https://psc.ky.gov/Case/ViewCaseFilings/2025-00276.

2 Solar Electric Power – 'Know-how'

Earth receives energy from the sun in the form of heat and light. The energy from the light can be converted into electricity using a device called a solar cell or photovoltaic cell (PV Cell for short). A solar cell receives 'Photons' from sunlight, which then produces Electric 'Volts', thus giving these devices the name 'Photovoltaic'.

A simple solar cell is relatively small and can only produce a couple watts of electricity, which is insufficient for large-scale utilization. To increase power production, several cells are combined to form a 'Solar Module', which produces a usable amount of electricity. A 'Solar System' is when several solar modules are arranged systematically for large-scale power production.

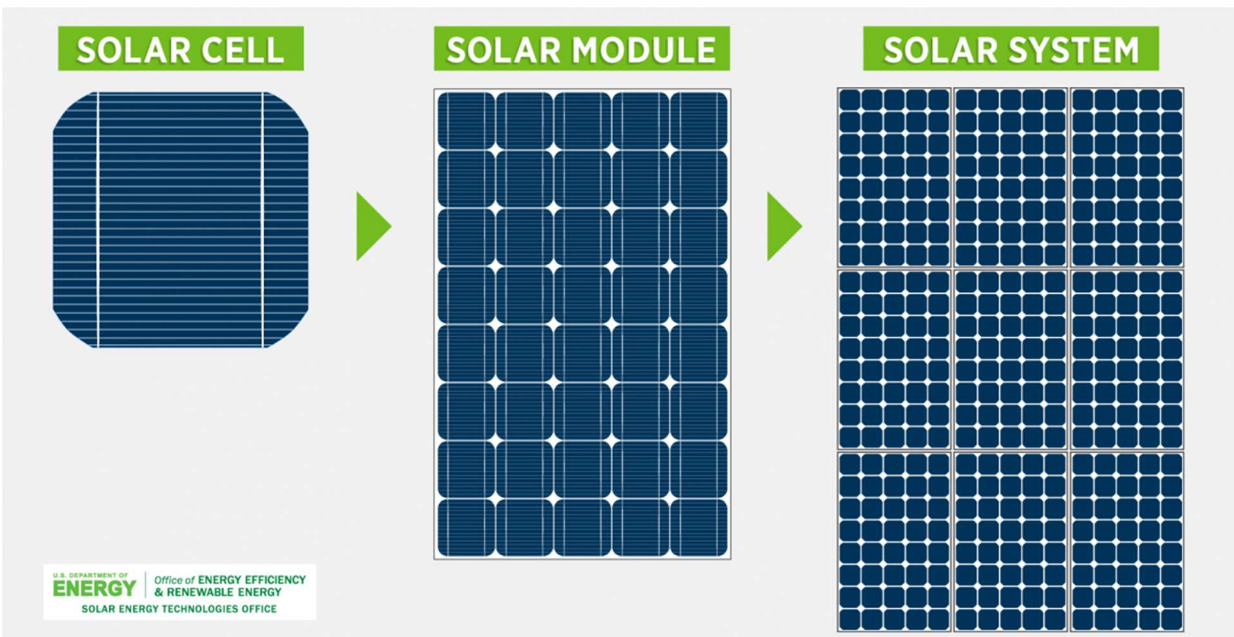

Figure (1)
Solar System[1]

For electricity generated by Solar systems to be utilized, it must first be connected to the regional electric grid. Once the solar system is connected to the electric grid, it can then be distributed to consumers. This is achieved by constructing a solar power plant using solar panels, in which the quantity and arrangement of solar modules are determined by the plant's electrical system design. This plant is then connected to the regional electric grid for distribution to the consumer.

[1] Picture from the official website of 'Office of Energy Efficiency & Renewable Energy'

2.1 Solar Power Plant

A Solar Power plant is an electric power plant that utilizes solar modules to produce electricity. Solar Power Plants consist of a solar system and other associated electrical and plant equipment for transmitting the energy generated.

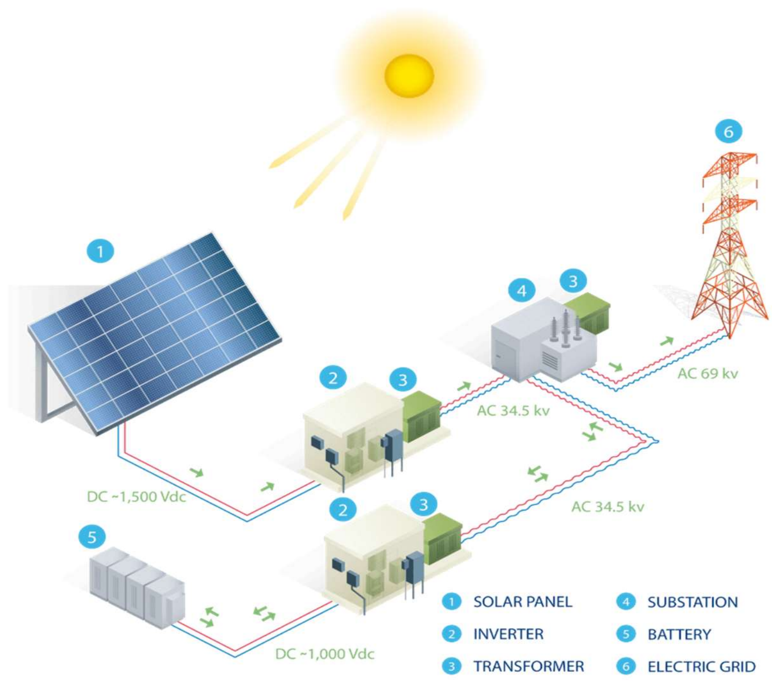

Figure (2)
A Solar Power Plant[2]

Some of the commonly seen equipment in a solar power plant are,

i) Solar Modules
ii) Inverters
iii) Batteries
iv) Power transformer
v) High voltage Circuit breakers, Fuses, and other protection equipment
vi) Utility Metering equipment
vii) Electrical Conductors
viii) Steel & Concrete structures

A Solar Power plant, constructed by a private entity, after making Power Purchase Agreements (PPA) with the local Electric Power grid to supply electric power, is known as a 'Merchant Electric Solar Power Plant'.

[2] Image found from industrial-on-grid-scheme.png (1600×1546) (avenston.com)

2.2 Role of Solar Modules

As stated earlier, a Solar Module, which is 'Photovoltaic', uses 'Photons' that are absorbed from sunlight to then produce electric power. This electric power is unidirectional and requires additional equipment, such as Inverters and transformers, for proper utilization.

Additionally, Solar modules are manufactured to track the sun to increase their efficiency.

Picture (3)
Solar Modules Installed on Farmland[3]

2.3 Role of Inverters

The power produced by a solar system, because of its basic principle of operation, is unidirectional and is in the form of Direct Current (DC). This form of DC Power is not suitable for utilization. The DC power should be converted to alternating current (AC) for commercial use.

A 'Solar inverter' or a 'PV inverter' is a power electronic device that converts the DC Power

[3] Refer to PV magazine Molong Solar Farm nolonger in development, successfully energised – pv magazine Australia (pv-magazine-australia.com)

generated by the Solar system into AC Power. This AC Power is then transmitted to the electrical grid for power distribution.

Picture (4)
Industrial Solar Inverter[4]

2.4 Role of Batteries

A solar system can generate electricity only when sunlight is available. It is because of this drawback that a Solar power plant cannot produce electricity at night. To overcome this drawback, Solar power plants are typically equipped with batteries so that some of the electricity produced by the solar modules during the day is stored in the batteries and retrieved at night.

The solar modules and the batteries function on DC. A proper combination of solar modules and batteries can provide electricity 24 hours a day.

[4] Refer to PV magazine SMA reaches 10 GW of installed Sunny Central inverters in North America – pv magazine USA (pv-magazine-usa.com)

Picture (5)
GE Industrial Battery[5]

2.5 Role of Transformers and Other Associated Switchyard Equipment

Transformers are AC power equipment that either step up or step down the voltage of an electrical power source without changing the voltage's frequency.

In a solar power plant, the DC power produced by the solar modules is converted into AC power by inverters. The AC power produced by inverters is at a relatively lower voltage compared to the voltage available at the electric power grid. Transformers are used to step up the voltage to match the grid, overcoming voltage differences. Now, a point of interconnection can be established to supply power from the solar power plant.

In large solar power plants, inverters are installed with local transformers to step up the voltage to a medium level. This is done to form a network of transformers that collect power from each inverter.

This electric network of transformers has one high-capacity main transformer, which is the final

[5] Refer to PV magazine GE to supply 100 MW/300 MWh battery for South Australia solar farm – pv magazine International (pv-magazine.com)

step-up for the connection with the grid.

Besides the transformers, solar power plants are installed with some other electrical equipment:

i) Electric Switchgear
ii) Electric Bus System
iii) Electric Protection System
iv) Electric Energy Measurement System

Picture (6) Substation Transformer[6]

2.6 Role of Steel & Concrete Structures, Roadways & Fencing

Steel & Concrete structures are necessary for solar module installations and all other necessary electrical equipment. Roadways provide access to the modules, allowing site personnel to maintain and perform general site operations. Fencing is installed at solar facilities to create the

[6] Image found from the following website [Transformer substation THE TRENT - The Trent (thetrentonline.com)](thetrentonline.com)

facility boundary and control site access.

Picture (7)
Steel & Concrete Structures of a 2MW Solar farm[7]

2.7 General Effects of Solar Power Plants

2.7.1 Noise from the Equipment

In a solar power plant, the solar inverters and power transformers are the main sources of noise. The cooling fans mounted on inverters and transformers are the noisiest. However, the noise produced by this equipment is effective only within the equipment's immediate vicinity and

[7] Image found from the following website
https://www.energy.gov/eere/solar/solar-integration-inverters-and-grid-services-basics

decays with distance. If the equipment is appropriately placed within the plant, the noise produced can be minimized.

2.7.2 Increased Road Traffic, Noise, and Fugitive Dust

A solar power plant produces energy using stationary equipment. Additionally, there is no need to transport raw materials or plant waste to generate energy using the photovoltaic effect. Therefore, solar power plants do not increase the traffic, noise, or fugitive dust during operation. However, during construction, there will be considerable traffic of construction vehicles transporting equipment necessary for plant operation. Necessary mitigation measures must be taken to avoid traffic congestion, noise, and fugitive dust during the construction of the Solar Power plant.

2.7.3 Environmental and Wildlife

Solar energy systems/power plants do not produce air pollution or greenhouse gases. In fact, solar energy consumption can have a positive indirect effect on the environment and reduce the use of other energy sources that have a larger environmental impact. However, some toxic materials and chemicals are used to make the photovoltaic (PV) cells of the Solar modules.

Few studies have researched the impact of solar facilities on wildlife. However, it has been found that the following methods can be adopted to minimize the impact of Solar power plants on wildlife:

i) Avoid areas of high native biodiversity and high-quality natural communities
ii) Allow for wildlife connectivity, now and in the face of climate change
iii) Preferentially use disturbed or degraded lands
iv) Protect water quality and avoid erosion
v) Restore native vegetation and grasslands
vi) Providing wildlife habitat

2.7.4 Farming land

One of the biggest concerns with solar farms built on farmland is the effects they will have on the land once all the panels and associated equipment are removed. Another concern after the decommissioning of solar farms is the impact on local wildlife and the land's suitability for domestic animals.

The land occupied by a solar farm can be reverted to agricultural use once the project reaches the end of its operational life. The life of a solar installation is roughly 20-25 years and can provide a recovery period, increasing the value of that land for future agricultural use. Giving soil rest can also maintain soil quality and contribute to the biodiversity of agricultural land. [8]

Silicon-based photovoltaic cells (PV) are the most used. Most solar panels are manufactured with a glass front that protects the PV cell with an aluminum or steel frame. Research shows that trace metals leaching from solar modules is unlikely to present a significant risk due to the sealed nature of the PV cells. Some manufacturers use cadmium telluride (CdTe). Cadmium compounds are toxic, but studies show that these compounds cannot be emitted from CdTe modules during normal operation or even during fires. Industrial incineration temperatures, which are higher than grassfires, are required to release the compounds from the modules. [9]

During plant operation, solar farms can be used to graze domestic animals such as sheep, which are commonly used to control vegetation at the facility, as they do not climb on or damage the PV modules. It is not necessary to raise the PV modules' height to accommodate grazing, as vegetation is accessible beneath the modules at the standard mounting heights. When sheep are used for grazing to control vegetation growth, it can benefit local shepherds, solar operators, and the land due to reduced mowing, herbicide use, and management needs. Cattle grazing is generally not viable with PV facilities due to the potential damage risk they impose. Wild animals can graze under PV modules; however, security fences can be installed to control access and keep out animals if deemed a damage risk. Fencing can be built to accommodate smaller animals such as foxes. The areas below the PV modules can be built to provide habitats and forage to pollinators, birds, and other small species.[10]

[8] Farmer's Guide to Going Solar https://www.energy.gov/eere/solar/farmers-guide-going-solar
[9] Farmer's Guide to Going Solar https://www.energy.gov/eere/solar/farmers-guide-going-solar
[10] Farmer's Guide to Going Solar https://www.energy.gov/eere/solar/farmers-guide-going-solar

3 Crab Run Solar – Application Review & Findings

This document is the final report created after reviewing the application documents submitted by the applicant, Crab Run Solar.

In this section, a detailed discussion is made on the Initial review, Site visit, and the Final review from Elliot Engineering.

3.1 Initial Review

Elliot Engineering and its consultants working on the Siting Project review the applicant document for their adequacy, as part of the requirements of the state order for the applicant's Case No. 2025-00276. After the initial review of the application documents, a list of statements was submitted from First and Second Requests for Information.

3.2 Site Visit

As part of the requirements set by state order, for the applicant's Case No. 2025-00276, Elliot Engineering visited the site as organized by the Siting Board on February 23rd, 2026.

The locations visited are indicated in the picture below, reference Figure 1 through Figure 45.

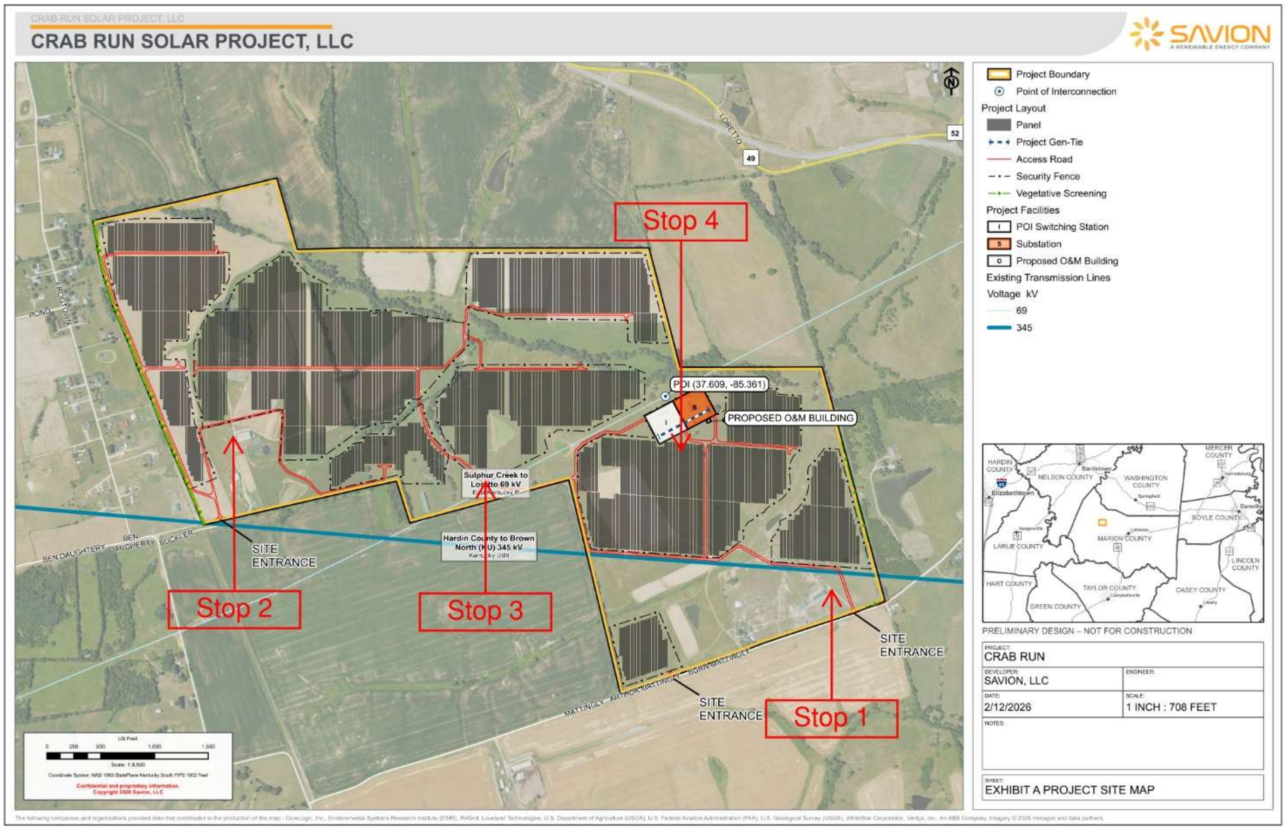

Figure 1 - Crab Run Site Visit Locations

Pictures from the site visit are shown in the following pages. The on-site images are followed by their respective positions and POVs, taken from Google Earth Pro.

Figure 2 - Stop 1 – View 1, Pond before Southeast Site Entrance

Figure 3 - Stop 1 – View 1 (Earth)

Figure 4 - Stop 1 – View 2, Barn within Project Boundary by Southeast Entrance

Figure 5 - Stop 1 – View 2 (Earth)

Figure 6 - Stop 1 – View 3, Property within Project Boundary by Southeast Entrance

Figure 7 - Stop 1 – View 3 (Earth)

Figure 8 - Stop 1 – View 4, Property within Project Boundary by Southeast Entrance

Figure 9 - Stop 1 – View 4 (Earth)

Figure 10 - Stop 1 – View 5, Southeast Entrance

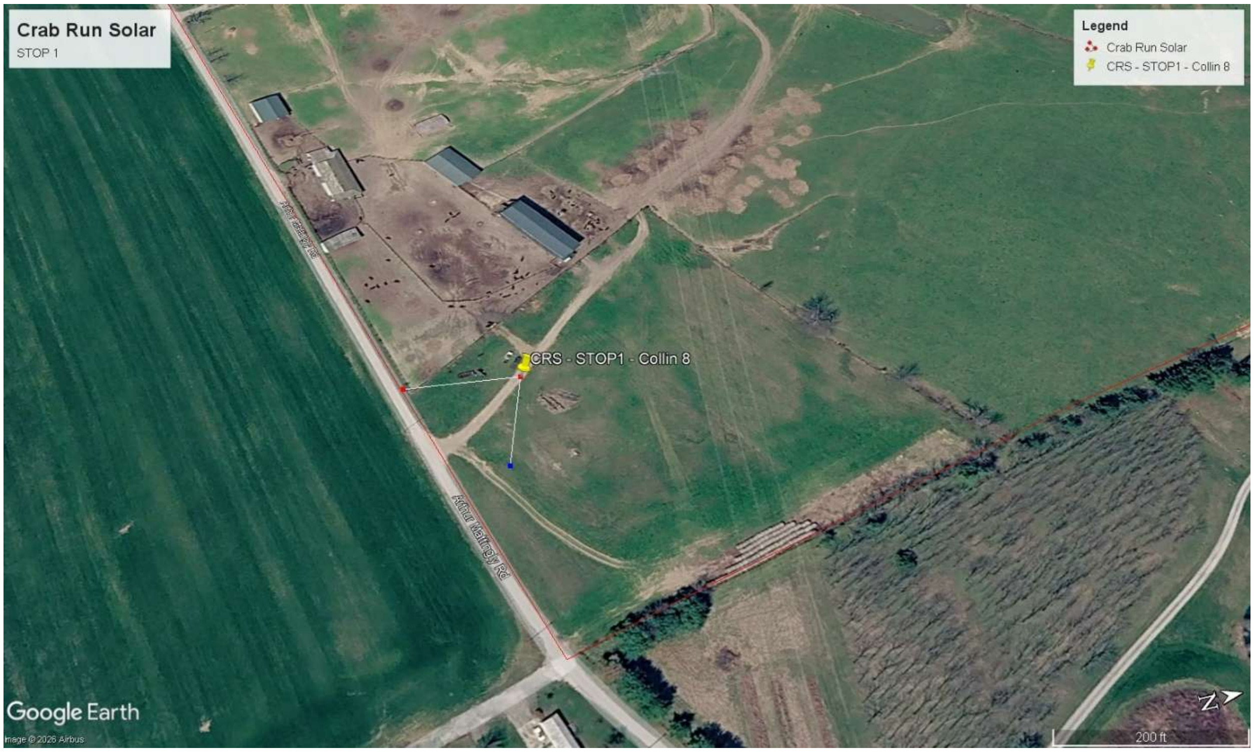

Figure 11 - Stop 1 – View 5 (Earth)

Figure 12 - Stop 1 – View 6, Hardin County to Brown North (KU) 345 kV transmission line 1

Figure 13 - Stop 1 – View 6 (Earth)

Figure 14 - Stop 1 – View 7, Lay of Land Southeast Project Boundary

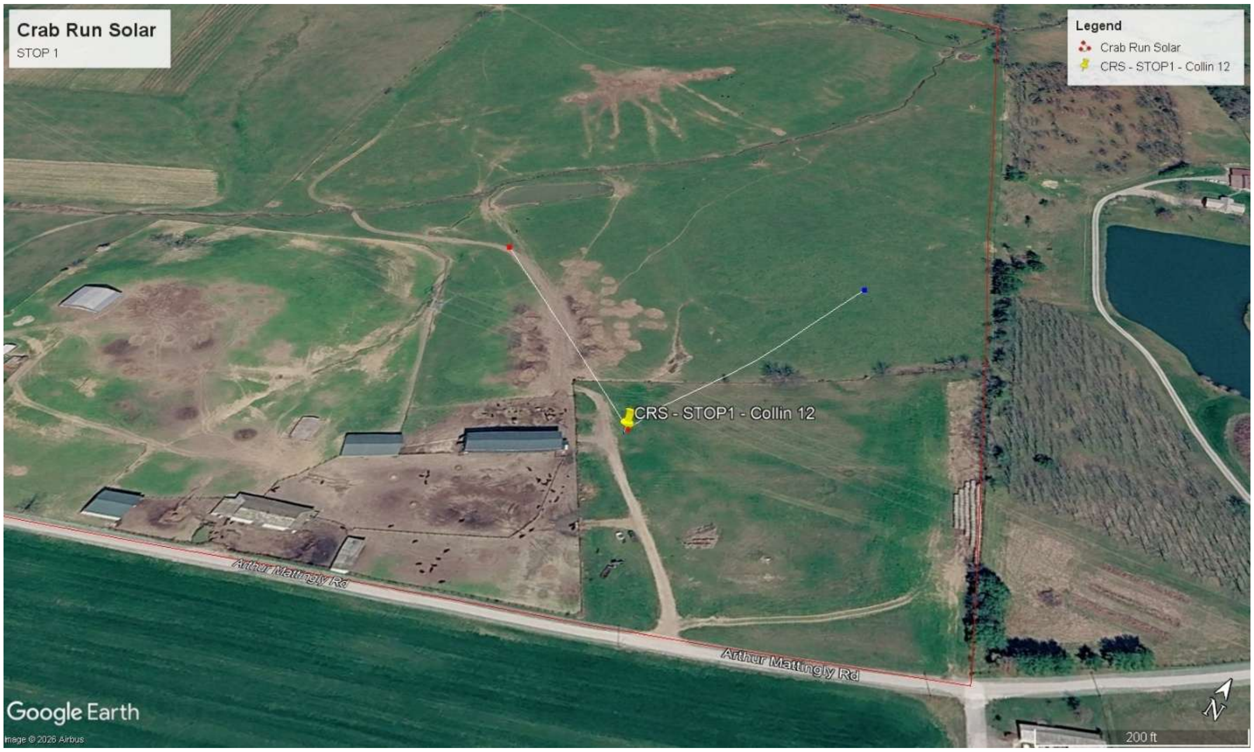

Figure 15 - Stop 1 – View 7 (Earth)

Figure 16 - Stop 1 – View 8, Hardin County to Brown North (KU) 345 kV transmission lines

Figure 17 - Stop 1 – View 8 (Earth)

Figure 18 – Stop 1 - View 9, Propose Southwest Site Entrance

Figure 19 - Stop 1 - View 9 (Earth)

Figure 20 - Stop 2 – View 1, Agricultural Structures within Project Boundary by West Entrance

Figure 21 - Stop 2 – View 1 (Earth)

Figure 22 - Stop 2 – View 2 – Project West Boundary and Lay of Land

Figure 23 - Stop 2 – View 2 (Earth)

Figure 24 - Stop 2 – View 3, Northwest Boundary Residential Structures

Figure 25 - Stop 2 – View 3 (Earth)

Figure 26 - Stop 2 – View 4, Closest Resident, Frogtown Road 3010 (Lined on west property boundary running the length of Frogtown Road)

Figure 27 - Stop 2 – View 4 (Earth)

Figure 28 - Stop 2 – View 5, Closest Residential properties (Lined on west property boundary running the length of Frogtown Road)

Figure 29 - Stop 2 – View 5 (Earth)

Figure 30 - Stop 3 – View 1 A, Sulphur Creek to Loretto 69kV EKP pole 1

Figure 31 - Stop 3 – View 1 B, Sulphur Creek to Loretto 69kV EKP pole 1

Figure 32 - Stop 3 – View 1 (Earth)

Figure 33 - Stop 3 – View 2, Pond by West Site Entrance

Figure 34 - Stop 3 – View 2 (Earth)

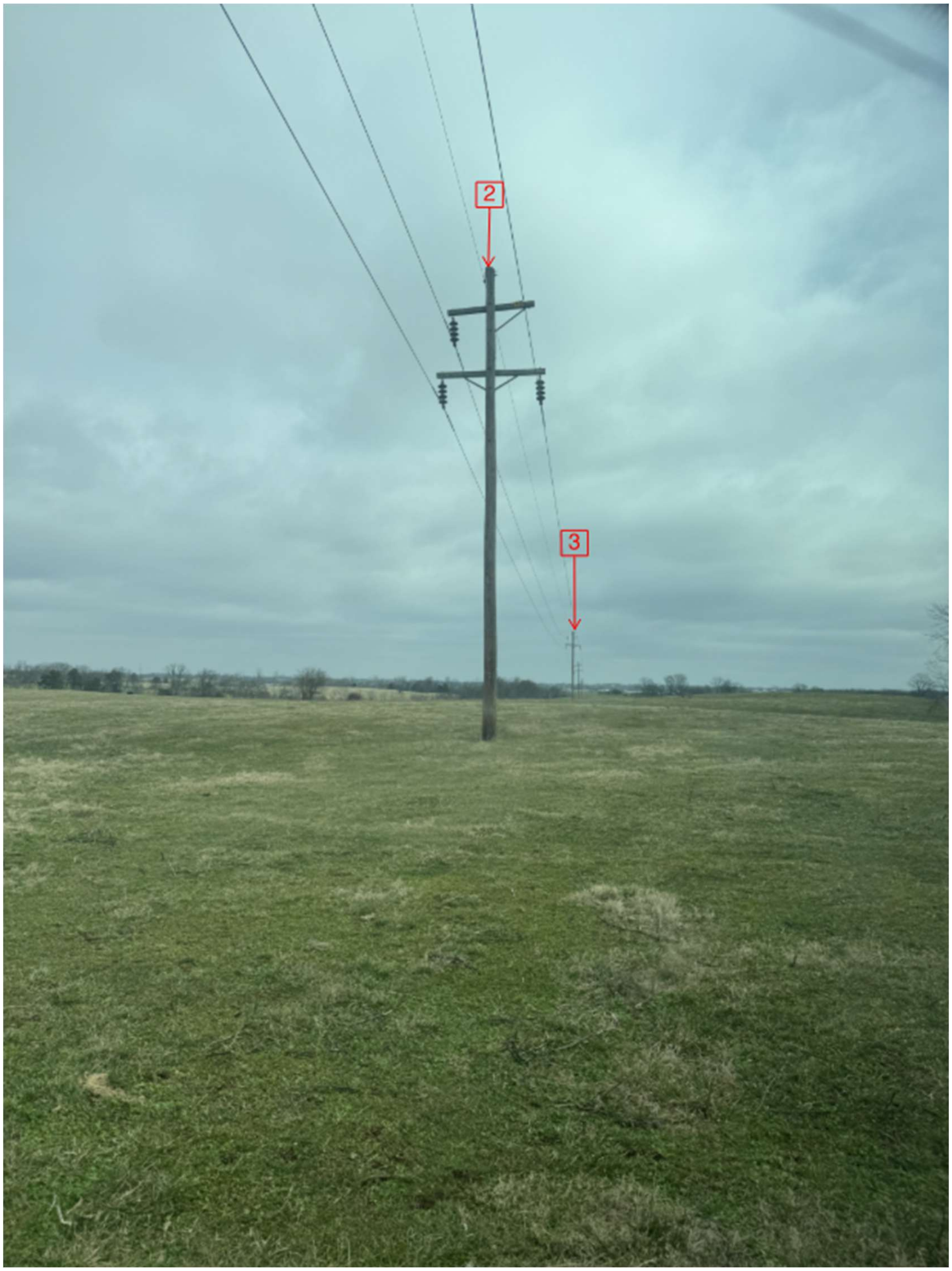

Figure 35 - Stop 3 – View 3, Sulphur Creek to Loretto 69kV EKP poles 2&3

Figure 36 - Stop 3 – View 3 (Earth)

Figure 37 - Stop 3 – View 4, Sulphur Creek to Loretto 69kV EKP pole 4

Figure 38 - Stop 3 – View 4 (Earth)

Figure 39 - Stop 4 – View 1, Sulphur Creek to Loretto 69kV EKP pole 5

Figure 40 - Stop 4 – View 1 (Earth)

Figure 41 - Stop 4 – View 2 A, Sulphur Creek to Loretto 69kV EKP poles 6&7

Figure 42 - Stop 4- View 2 B, Sulphur Creek to Loretto 69kV EKP poles 6&7

Figure 43 - Stop 4 – View 2 (Earth)

Figure 44 - Stop 4 – View 3 Switch Yard, Substation, and Potential O&M location

Figure 45 - Stop 4 – View 3 (Earth)

3.3 Final Review

In this section, a detailed discussion is made on the major aspects of the application documents submitted for their compliance as per the statutes KRS 278.706, 708 & 710

3.3.1 Review of Application Documents

In accordance with KRS 278.706, the applicant, Crab Run Solar, submitted the application documents and a Site Assessment Report addressing the compliance with the different requirements of KRS 278.708.

As per KRS 278.708(3), the Site Assessment Report shall include the following

(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 accessways, internal roads, and railways.
   6) Existing or proposed utilities to service the facility.
   7) Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), (4), or (5).
   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.

(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.

As per KRS 278.710(1)(c) the 'Economic Impact of the facility' is studied for granting a Construction Certificate.

3.3.2 278.708(3)(a)(1) Surrounding Land Uses

Elliot Engineering reviewed the Site Layout and maps submitted by the applicant and visited the site on February 23rd, 2026. The findings after the site visit are discussed below.

Findings on the Site Layouts & Maps

1) As per attachments D and E of (Crab_Run_Attachment_D_Residences_within_2000ft & Crab_Run_Attachment_E_Non-Residential_Structures), all residential and non-residential structures within the 2000ft buffer around the project boundary are detailed with a description and their distance from the closest inverter, panel, substation, or the boundary itself. Attachment F (Attachment_F_Parcels_Within_500) details both residential and non-residential parcels within the 500' buffer of the project boundary. Additionally, Tab 2 provides further details of surrounding structures within a two-mile buffer, including churches and schools. A further description of the boundaries of each neighborhood is detailed in attachment Q of the response to RFI1 (Crab_Run_Attachment_Q_Neighborhoods_Map) and in attachment D of the response to RFI2 (Attachment_D_Neighborhood_Parcel_Map).
2) As a general description of the surrounding land usage, the north, east, and south portions of the buffer area are largely rural and sparsely developed, with isolated farmsteads and accessory agricultural structures. The western portion of the buffer contains a higher concentration of residential structures, primarily situated along and across Frogtown Road. No significant commercial or industrial land uses were observed within the buffer area during the site visit. The land usage is further detailed in response #3 of RFI2, stating, "The unleased portions of the property are expected to remain under the same ownership and current use. With that said, the Project cannot guarantee what the owners' use will be in the future."

3.3.3 278.708(3)(a)(2) Legal Boundaries

The documentation on the legal description of the land was found to be adequate as part of the application. However, any discrepancy identified at any stage of the project shall be brought to the attention of the Public Service Commission and resolved for legal compliance.

3.3.4 278.708(3)(a)(3) Proposed Access Control

As per the KRS requirements, KRS 278.708 (3)(a)(3), the applicant has proposed the access control methods that are adopted for the site.

Findings on Proposed Access Control:

1) At the time of construction and operation of the plant, besides providing fencing (as proposed by the applicant and described in RFI2 response 5), all necessary signage, caution boards, and safety requirements as per OSHA shall be installed.
2) Attachment J details the 3 proposed access points. Further details are discussed in responses 27 & 28 of Crab_Run_Response_to_First_Data_Request.pdf.
3) On-site, only 2 of the proposed site entrances currently exist as accessible roads. The third is set to be located where Figure 20 was taken.
4) Since the traffic impact study found in SAR, Exhibit H, recommends that all truck traffic

must enter the site through the primary access point at Arthur Mattingly Road during the construction and operations phase, the Applicant is to obtain any permits that are required for deliveries to this road. This is detailed in response 34 of the response to RFI2 (Crab_Run_Response_to_Staff_Second_Data_Request) and mentions that an "EPC contractor nor the specific transformer has been selected, so Applicant has not obtained any applicable permits for this delivery yet." Response 34 further details that once the EPC contractor is selected, a haul route study will be performed, and if any permits detail certain routes, the applicant will "comply with that route, as well as any other route requirements imposed by the transporter of the transformer."

3.3.5 278.708(3)(a)(4) Location of Facility Buildings & Transmission Lines

After reviewing the Site Layout and other plans submitted by the applicant and after visiting the site, the following findings were made.

Findings on Location of Facility Buildings and Transmission Lines.

1) The images of the Hardin County to Brown North (KU) 345 kV transmission line towers and the Sulphur Creek to Loretto 69 kV Eastern Kentucky Power (EKP) power poles of relevance can be seen in the images below.

Figure 46 - Hardin County to Brown North (KU) 345 kV transmission line 0

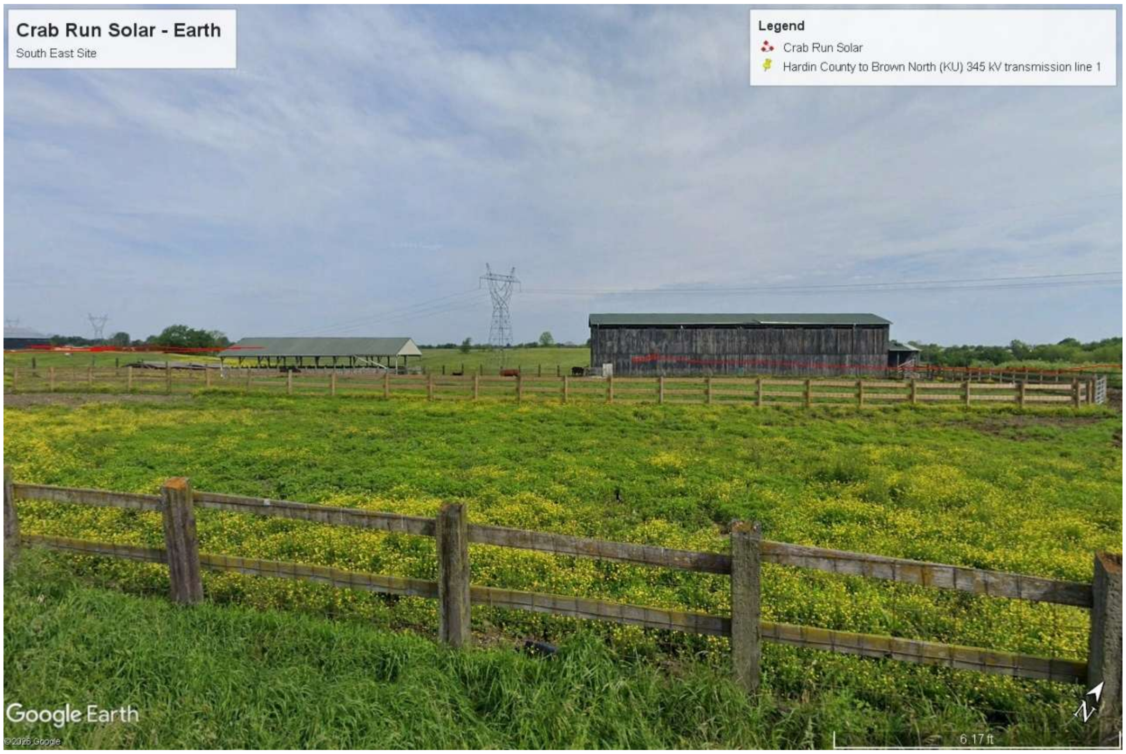

Figure 47 - Hardin County to Brown North (KU) 345 kV transmission line 1

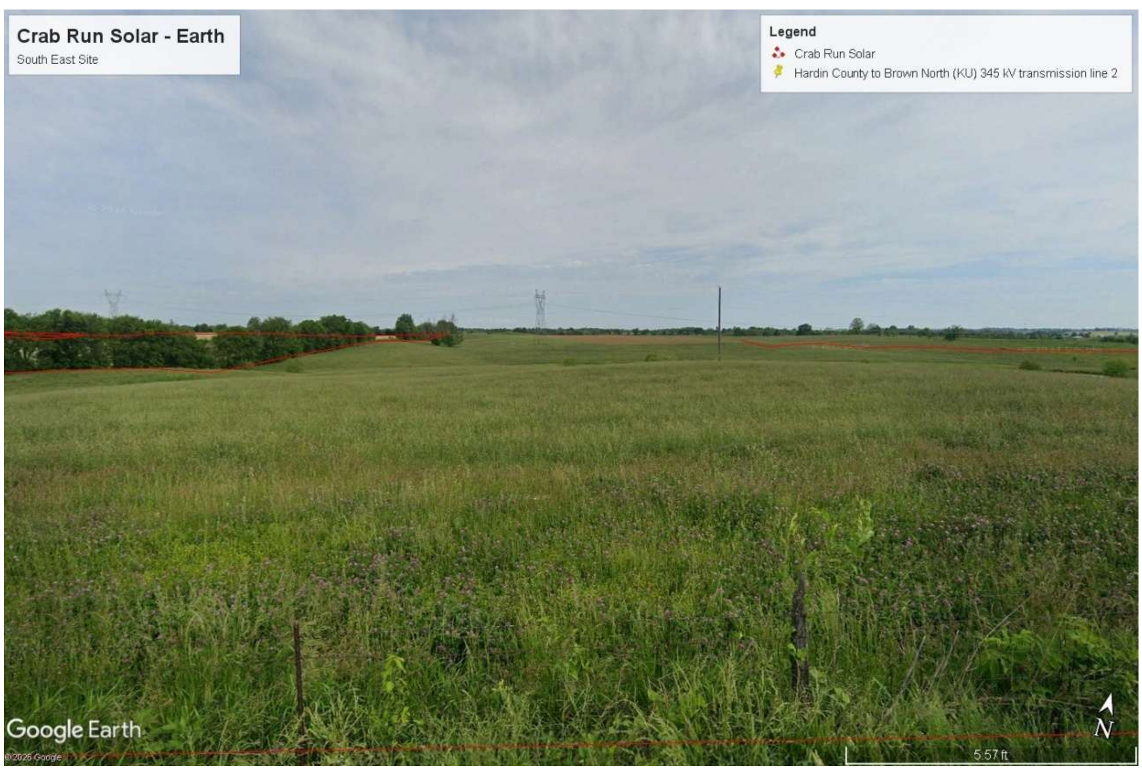

Figure 48 - Hardin County to Brown North (KU) 345 kV transmission line 2

Figure 46 shows the offsite Hardin County to Brown North (KU) 345 kV transmission line shown outside the southwest corner of the project boundary, located at 37°36'13.84"N, 85°21'10.64"W.
Figure 47 shows one of the onsite Hardin County to Brown North (KU) 345 kV transmission lines shown at the southwest section of the project boundary, located at 37°36'14.87"N, 85°21'26.62"W, near the existing site entrance off Aruther Mattingly Rd.

Figure 48 shows the second onsite Hardin County to Brown North (KU) 345 kV transmission line, shown at the southwest section of the project boundary, located at 37°36'16.21"N, 85°21'45.03"W. The line continues to another off

2) The location of the Sulphur Creek to Loretto 69 kV Eastern Kentucky Power (EKP) line enters the site border in the south-central region from a power pole located at 37°36'18.96"N, 85°22'9.53"W. This line continues to travel northeast till the point of interconnection. The following coordinates are the locations of the power poles on site, going from the furthest southwest to the most northeast.
    a. Sulphur Creek to Loretto 69kV EKP **1**: 37°36'21.32"N, 85°22'3.79"W Figure 31
    b. Sulphur Creek to Loretto 69kV EKP **2**: 37°36'23.42"N, 85°21'58.77"W Figure 35
    c. Sulphur Creek to Loretto 69kV EKP **3**: 37°36'25.56"N, 85°21'53.58"W Figure 35
    d. Sulphur Creek to Loretto 69kV EKP **4**: 37°36'27.26"N, 85°21'49.35"W Figure 37
    e. Sulphur Creek to Loretto 69kV EKP **5**: 37°36'29.53"N, 85°21'43.65"W Figure 39
    f. Sulphur Creek to Loretto 69kV EKP **6**: 37°36'32.07"N, 85°21'37.91"W Figure 42
    g. Sulphur Creek to Loretto 69kV EKP **7**: 37°36'35.40"N, 85°21'29.30"W Figure 42
    The interconnection point with the proposed substation is set to occur between power poles 5 and 6.
3) Location of a potential Operations and Management building on site has been temporarily placed adjacent to the substation, as seen in Figure 1 indicated by the O&M. It is located approximately at 37°36'28.83"N, 85°21'35.28"W, as shown in Attachment C (Revised Project Site Map). A decision to construct the O&M building is set to be made 20 months before construction begins.

3.3.6 278.708(3)(a)(5) Location and Use of Accessways, Internal Road & Railways

As part of the site visit, major access points were visited, and the following findings were made.

Findings on Location and Use of Accessways, Internal Road & Road

1) The internal roads are proposed to be all-weather gravel. This is further described in response #38, which states, "As described in the Proposed Site Description (Application, Tab 2), access roads will be newly constructed and will consist of graveled roads approximately 16 feet wide. This construction will include grading the land, but further requirements for their construction will be known once an EPC contractor is engaged."

2) Avoid using oversized trailers for material transport and limit the overall weight as per the bridges and culverts of the surrounding roads. Install new culverts if necessary.
3) Weight limits of the roads should be considered when delivering heavy material for the project.
4) During the construction and delivery of materials, adhere to the results of the Traffic Impact Study and implement the recommended BMP. This is mentioned in response #37 of RFI2, which states, "Applicant will consult its EPC contractor and other appropriate authorities in planning its construction schedule and deliveries. If any upgrades or improvements are required, Applicant will obtain the necessary permits and/or approvals."

Figure 49 - Map showing locations of culverts around the project site.

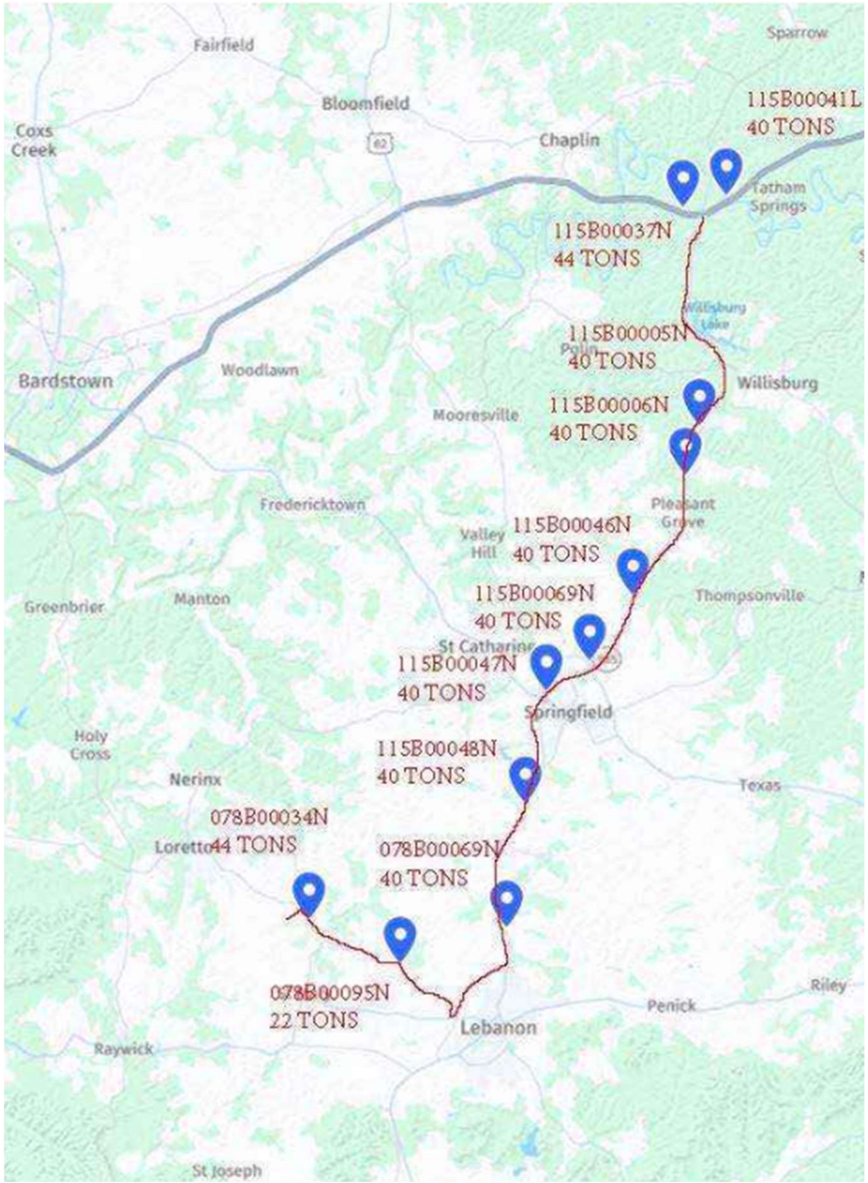

Figure 50 - Map showing locations of bridges around the project site. NBI numbers taken from https://maps.kytc.ky.gov/bridgedataminer/

Figure 51 - Map showing locations of site entrances

3.3.7 278.708(3)(a)(6) Existing or Proposed Utilities to Service the Facility

After reviewing the plot plans submitted by the applicant, it was found that the drawings do not indicate whether the substation control house will have utilities. The applicant has not indicated whether water, internet, or phone connection will be provided to the site. As applicable, there should be necessary drawings created indicating all underground and overhead utilities required at the site at the time of construction.

As stated in response #46 of RFI2, "The decision to utilize an operation and maintenance building would occur approximately 20 months prior to the start of construction, once the final design has been completed." Based on the anticipated construction schedule of June 2029 through June 2030, as noted in response 2 of RFI2, this decision would need to be made by October 2028.

Response Item 84 of RFI1 states, "The Project has not yet chosen an EPC contractor nor finalized the site plan and therefore does not have the specifics for the various utilities that will serve the Project. The final construction plan for the O&M building will determine the extent to the need for water, gas, and sanitary sewer. Electric service will be provided to the site."

Referencing the construction of the Operations and Maintenance (O&M) building, response 9 of the RFI1 states, “The Project has not yet made a final determination as to whether an O&M building will be constructed. However, if one is constructed, the O&M area will be located adjacent to the proposed substation at approximately 37°36'28.83"N, 85°21'35.28"W, as shown in Attachment C (Revised Project Site Map). The O&M area will be accessible via the Arthur Mattingly Road East and Frogtown/Ben Daugherty entrances, but the Arthur Mattingly Road East will serve as the primary entrance.”

A mapped sinkhole feature within the proposed substation area may alter the final location and design of facilities. See Figure 52 below.

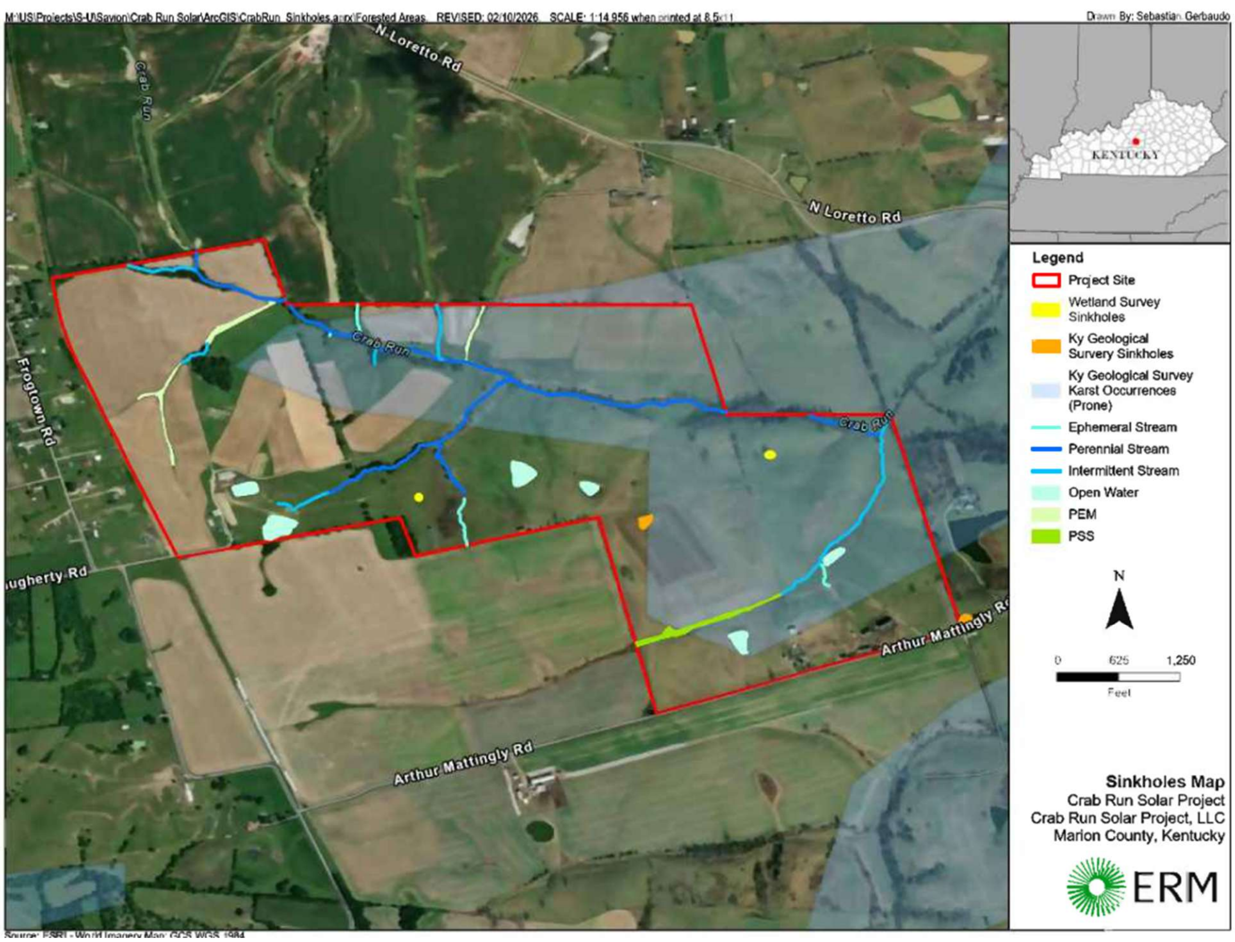

Figure 52 - Crab_Run_Attachment_H_Karst_Map

The Applicant has stated that, should the sinkhole affect substation design or construction, the substation location may be adjusted along the transmission line, subject to approval from PJM Interconnection, L.L.C., and the applicable utility.

Additionally, the Applicant has not completed a geotechnical investigation or Spill Prevention, Control, and Countermeasure (SPCC) Plan. These studies will be conducted during the pre-construction phase and will report on any necessary design changes, including foundation design and transformer oil containment systems.

Accordingly, the final location and design of substation facilities may be subject to change pending the results of geotechnical evaluation and related engineering analyses.

Before the results of the geotechnical evaluation, response #43 of RFI2 states that " … the Project expects to utilize a 75-foot setback from sinkholes and/or karst features, unless the results of the final geotechnical review direct another appropriate setback distance." Further, response #6 of RFI2 details that the current boundaries for substation and switch yards are conservative estimates and that appropriate setbacks informed by the geotechnical study will be followed.

3.3.8 278.708(3)(a)(7) Compliance with Applicable setback requirements

The KRS required setback is 2000 feet. This setback is practical for turbine-based plants but not for solar power plants.

As of the time of this report's submittal, the applicant has filed a motion of deviation from the 2,000-foot setback imposed by KRS 278.706(2)(e). However, the Kentucky State Board on Electric Generation and Transmission Siting has stated that the motion will be ruled on in the final order. As stated in response 18 of RFI 2, if Crab Run is to comply with the 2,000-foot setback requirement, the project cannot be reconfigured to comply within the site boundaries. This is seen in Attachment C of the response to RFI2 of the application.

3.3.9 278.708(3)(a)(8); (b); (d) & (e) Evaluation of Noise levels, Scenic surroundings, Environmental impact & Fugitive Dust

Elliot Engineering has appointed Tom Chaney, of Cloverlake Consulting, for the Environmental Assessment of the site for Noise, Scenic surroundings, historic and archeological, Environmental & Fugitive dust.

Mr. Channey's summary of compliance with Requirement: KRS 278.708(3)(a)(8) Evaluation of the noise levels expected to be produced by the facility:

"The data and conclusions contained in the Site Assessment Report for the Crab Run Solar project regarding the Siting Project Description is in compliance with the intent of KRS 278.708."

Mr. Channey's summary of compliance with Requirement: KRS 278.708(3)(b) An evaluation of the compatibility of the facility with scenic surroundings:

"The data and conclusions contained in the Site Assessment Report for the Crab Run Solar project regarding Compatibility with Scenic Surroundings is in compliance with the intent of KRS 278.708."

Mr. Channey's summary of compliance with Requirement: KRS 278.708(3)(d) Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary:

"The data and conclusions contained in the Site Assessment Report for the Crab Run Solar project regarding Anticipated Noise Levels at Property Boundary is in compliance with the intent of KRS 278.708."

Mr. Channey's summary of compliance with Requirement: KRS 278.708(3)(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:

"The data and conclusions contained in the Site Assessment Report for the Crab Run Solar project regarding the Effect on Road, Railways and Fugitive Dust is in compliance with the intent of KRS 278.708."

Reference Attachment-A for the complete report from Cloverlake Consulting.

3.3.10 278.708(3)(c) Property Values

Elliot Engineering has appointed Clark Toleman of E. Clark Toleman Real Estate Appraisal Services for the assessment of the Application document for the impact on Property Values.

Mr. Toleman's summary of compliance with *278.708(3)(c)* Property Values: 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:

"The evidence presented in the Kirkland Impact Study including the paired sales analysis is a strong indicator that proximity to the proposed Crab Run Solar Project will have a neutral impact on the adjoining property value when the set back and buffer screening is in place. The actual setback distances of this project are greater than the sales data applied in the Impact

Study. The proposed solar farm is a passive entity within a rural neighborhood without the recognized nuisance characteristics of noise, traffic, odor, or other typical stigma considered to create an environmental detrimental effect. A review of published research material on this subject is included in this Impact Study which also indicates the neutral effect on the adjoining property to solar farm projects of similar size and neighborhood characteristics as found in the proposed 45 MW Crab Run Solar project."

Reference the Attachment-B for the complete report from, E. Clark Toleman MAI,SRA.

3.3.11 278.710(1)(c) Economic Impact Analysis

Economic Impact Analysis was performed by Mark Watters of Watters Unclaimed Property Consulting LLC, as contracted by Elliot Engineering, for the Site Assessment.

Mr. Watters' summary of compliance with *278.708(3)(c)* The economic impact of the facility upon the affected region and the state:

"The construction and operation of the Crab Run Solar, LLC solar project facility in Marion County, Kentucky will provide significant positive economic benefits to the region and Commonwealth.

The Project will primarily result in significant positive economic effects to the county, region and Commonwealth during the relatively short construction phase. Measurable employment, payroll and associated occupational taxes, together with indirect and induced impacts, will realize both payroll and occupational tax increases.

During the operations phase, the economic impact is expected to be smaller and spread over the life of the Project. A modest payroll will provide employment for a few individuals with modest state income and local occupancy taxes in the Commonwealth and Marion County. With IRB and PILOT agreements possible over the estimated 30-year life of the operations phase (projected range: 30 to 40 years) it is difficult to project accurately the taxes arising from the Project.

There was no direct analysis of economic impact during the remediation following the Project, but such may be deemed to have minimal impact as decommissioning intends to return the real estate to its original condition. Labor and material costs, plus any incidental taxes, would usually be minimal. "

Reference the Attachment-C for the complete report from Mark M. Watters.

4 Recommendations & Mitigations Measures

After reviewing the application documents and performing the site visit, Elliot Engineering provides the following Recommendations & Mitigation measures.

1. Create an overall plot plan indicating all water bodies, bridges, railroad crossings, culverts, access roads, power lines, residential and public structures, etc.
2. For locating the Solar Modules and Other associated equipment of the plant, maintain sufficient clearance from any existing power lines.
3. Construct new and or repair existing bridges or culverts wherever necessary for equipment and material transportation during projects construction.
4. Coordinate with surrounding nonparticipating landowners to limit the impact of oversized loads delivered to the project (Ex. Project Transformer).
5. Leaving existing vegetation between solar equipment and neighboring residences in place, to the extent practicable, to help screen the Project and reduce the visual impact.
6. Notices to neighbors regarding potential construction and operation noises, as well as limits on working hours during the construction period, as described in the Application.
7. Applicant to maintain open lines of communication with nearby landowners to ensure that construction impact mitigation measures are effective.
8. If upgrades, improvements, or repairs to local roads are required, Applicant will procure the necessary permits and/or approvals.
9. Adhere to the recommendations and results provided by a Geotechnical survey for the location and design of the substation, switchyard, and potential operations and management building.

4.1 Cumulative effect of the Total Solar generation on the Grid

Solar developments are rapidly increasing, and while the impact on the surrounding environment might be minimal, the combined or cumulative effects of multiple developments may have a greater impact. Environmental concerns due to cumulative impacts, such as glint, glare, and emissions, are expected to grow.

The proposed project would create air emissions due to vehicle and dust emissions associated with development activities. Similar effects would be experienced during decommissioning, which would be carried out according to the project's restoration plan.
Generating electricity using solar rather than fossil fuels reduces greenhouse gas emissions and helps address climate change. While solar energy is preferable to fossil fuel generators from an emissions perspective, power output from solar energy sources depends on variable natural resources, which makes these plants more difficult to control and presents challenges for grid

operators.

As the electricity from solar energy can be produced only during daytime, the Solar Power projects have the inherent risk of unavailability during nighttime. The utilities and the transmission planning authorities shall identify the risks associated with this and plan the intake of the energy from Solar plants effectively.

To accurately balance electricity supply and demand on the power grid, grid operators must understand how much solar energy is being generated at any given time, how much solar energy generation is expected, and how to respond to changing generation. This can be challenging for grid operators due to the intermittent nature of solar energy and the wide variety in the size and locations of solar energy across the power grid. As the proportion of solar energy capacity on the grid increases, these issues are becoming increasingly important to understand how renewables connect to the grid, how these connections impact grid operations, and the implications of high penetration of renewables for the grid in the future.

Elliot Engineering delivers innovative solutions aligned with rigid standards and best engineering practices.

Visit us at www.ElliotEngineeringInc.com