Review and Evaluation of the Henderson County Solar, LLC Site Assessment Report

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

October 8, 2021

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October 8, 2021

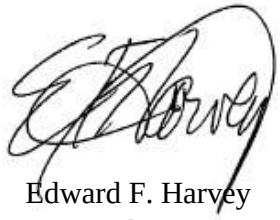
Mr. Cornelius J. Mance
Staff Attorney
Kentucky Public Service Commission
211 Sower Blvd.
Frankfort, KY 40601

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

Dear Mr. Mance,

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

Yours truly,



Edward F. Harvey
Principal

Report

October 8, 2021

Review and Evaluation of the Henderson County Solar, LLC Site Assessment Report

Prepared for

Kentucky Public Service Commission and
Kentucky State Board on Electrical Generation and Transmission Siting
211 Sower Boulevard
Frankfort, Kentucky 40602

Prepared by

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SECTION 1
Introduction

This document provides a review of the Site Assessment Report (SAR) for the proposed Henderson County Solar Facility (Project) submitted to the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board). Henderson County Solar, LLC submitted the SAR to the Siting Board on June 25, 2021. Siting Board staff retained Harvey Economics (HE) to perform a review of the SAR. Henderson County Solar, LLC (Henderson 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 Henderson Solar SAR is the 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 Henderson Solar SAR and certain other components of the Henderson Solar application:

- Review of the contents and information provided in the site assessment report, application and other documents provided by the Applicant;
- Brief review of secondary data sources to obtain background information and geographic setting for the Henderson 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;
- 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 Henderson Solar Facility SAR

Henderson Solar, LLC's Application to the Siting Board consists of two volumes:

- Volume 1 addresses a variety of topics as part of multiple tabs or exhibits, including, but not limited to, the following:
    - Descriptions of the proposed site, including maps of the project area
    - Evidence of public notice
    - Public involvement documents
    - Certificates of compliance with local regulations
    - Generation interconnection feasibility and system impact study reports
    - Economic impact report
    - Site Assessment Report
    - Cumulative Environmental Assessment
- Volume 2 includes additional information, including:
    - Wetlands Delineation Report
    - Phase 1 Environmental Assessment Report
    - Cultural Resources Assessment
    - Endangered Species Assessment

The Applicant's Site Assessment Report (Volume 1, Tab 12) includes a summary addressing each requirement of KRS 278.708 and the following attachments:

- Parcel maps and Site Plan figures

- Description of legal boundaries
- Henderson County Solar Energy System Regulations
- Acoustical Analysis
- Property Value Impact Study
- Traffic Study

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 August 13, 2021; Henderson Solar provided written responses on August 27, 2021.

After HE and the Siting Board staff reviewed Henderson 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 September 10, 2021. Henderson Solar provided written responses to the second request for information on September 24, 2021.

HE and certain representatives from the Siting Board also met with the Applicant for an in-person meeting on September 15, 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 Henderson County 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 Henderson Solar Project and proposed site development plan;
- Section 4 provides a brief profile of Henderson 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 Henderson 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; however, the level of scrutiny and detail of the evaluation 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 Henderson 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 not evaluated. During its review process, HE became aware that two other solar energy generation facilities have been proposed for location in Henderson County.

- The Unbridled Solar Project is a 160-megawatt facility to be located on approximately 1,680 acres in Henderson and Webster Counties, more than 10 miles to the southeast of the Henderson County Solar Project site.[1] That Project's Certificate to Construct was issued on June 4, 2021; as of the date of this report, no construction activities have been commenced.

[1] https://psc.ky.gov/Case/ViewCaseFilings/2020-00242

- Application materials for the Sebree Solar Project were submitted to the Siting Board more recently (August 2021) and review of that Applicant's SAR and associated materials is still underway.[2] That project is described as a 250-megwatt facility covering approximately 1,200 acres in Henderson County and a 4.85-mile nonregulated electric transmission line in Henderson County and Webster County.

In the interest of full disclosure to the Siting Board and public, we have identified these facilities and noted the potential for cumulative impacts on the local area in Section 5, but we have not performed any analyses to quantify or address the full scope of cumulative impacts.

[2] https://psc.ky.gov/Case/ViewCaseFilings/2021-00072

SECTION 2
Summary and Conclusions

On June 25, 2021, Henderson 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. Henderson Solar's application responded to the statutory requirements set forth by the State of Kentucky 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 Henderson 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

Henderson County Solar, LLC (Henderson Solar or Applicant) proposes to construct a 50-megawatt alternating current (MWac) photovoltaic (PV) electricity generation facility (Project) in central Henderson County, KY, southwest of the City of Henderson. The Project site encompasses a total of about 540 acres of rural agricultural land as part of the three separate Project sections – the Northern, Central and Southern sections. Solar infrastructure will include 130,000 solar panels, 72 inverters, associated ground-mounted racking system, and a main transformer that will connect to the 69kV bus at Substation No. 7 owned by Henderson Municipal Power & Light (HMP&L), the purchaser of this solar power.

- ***Surrounding land uses*** – The area around the Project site can be generally described as rural agricultural, including many productive fields and thick trees and existing vegetation in some areas. Acreage surrounding the Project site is largely used for cultivation of corn, soybeans and wheat, with additional smaller surrounding sections of mixed residential/agricultural land or purely residential properties. Adjacent parcels also include a church, a substation, a cell tower and an industrial property. Commercial and industrial development is found north of the Project.

- ***Proximity to homes and other structures*** – A total of 18 structures are within 300 feet of the Project boundary; 31 residential structures and five commercial structures would be located within 1,200 feet of solar panels in the Northern section of the Project. A total of 46 residential structures, 16 commercial structures and one church would be located within 1,200 feet of solar panels in the Central and Southern sections of the Project.

- ***Locations of structures*** – Solar panels, inverters and the racking system will be located throughout the property. The sole transformer will be located within the substation, which will be located in the northwestern portion of the Northern section

of the Project. The Project will interconnect to the 69kV bus at Substation No. 7, which is owned and operated by Henderson Municipal Power & Light. That substation is located along U.S. 60, southwest of its intersection with U.S 41A.

- ***Locations of access ways*** – Five entrance points will allow access to the three Project sections during construction and operations. Those entrances include one access point for the Northern section (on Lover's Lane, south of its intersection with Collier Road); three access points to the Central section (including one on Old Henderson Corydon Road and two on Henderson Bypass / KY 425); and one access point to the Southern section (on Wilson Station Road).

- ***Access control*** – Security fencing (chain link fencing, minimum of seven feet in height) will enclose the facility during construction and operation. Fencing will not include barbed wire, or any sharp points, along any boundary adjoining residential properties or along any sections of the fence surrounding solar panels. The Project substation will be surrounded by a separate fence, including barbed wire. During construction, site access will be controlled with dedicated security guards and security cameras will be installed at each entrance to the site.

- ***Utility service*** – The Project will require a minor amount of electricity during operations. The Applicant anticipates contracting for station service from Kenergy, utilizing existing facilities. No new utilities are proposed. No water or wastewater services will be required during construction or operations.

- ***Project life***—The Applicant anticipates a Project life of approximately 30 years.

Project construction is expected to last approximately six to nine months. An estimated average of 120 workers will be on-site throughout the construction period, ranging from a minimum of 50 to a peak of 150 workers. The peak construction period is expected to last approximately eight weeks. The Project construction schedule and description of construction activities is provided in Section 3.

Setback requirements. The Henderson Solar Project is subject to the requirements of the Henderson County Solar Ordinance, which, among other topics, includes 100 foot setback distance requirements between Project equipment and residences. The Project is proposing a 200 foot setback, more than required in the Solar Ordinance.

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

Henderson County had a 2019 population of about 45,200 people. Population levels have been relatively stable over the past 20 years and are projected to generally remain stable into the future. The City of Henderson has an estimated 28,625 residents. The area around the Project site can be generally described as rural and agricultural, but several manufacturing facilities

currently operate in the area. Residents' income levels are low, as compared to other areas of Kentucky or the U.S. About 16 percent of County residents live in poverty.

Compatibility with Scenic Surroundings

The area immediately surrounding the Project is agricultural and residential. Rolling hills and existing vegetation in certain areas will help mitigate against negative visual impacts to residents and commuters.

Scenic compatibility focuses largely on the solar panels and on the Project substation. Solar panels will be located very close to homes along Lovers Lane; panels would be in full view of those homes without the vegetative buffers proposed by the Applicant in that area. The Project substation would be approximately 600 feet from the closest home in that area; existing vegetation is in place which would shield the substation from view. No visual buffers are proposed for the Central and Southern sections. There is natural vegetation in the area which will shield the Project from view and nearby homes are located at a greater distance from those sections. The rural nature of the Central and Southern areas and the existence of relatively few homes in close proximity to the Project will generally reduce the extent of adverse visual impacts.

The larger region to the North surrounding the Project site contains commercial and industrial developments and interviews with County officials indicate that similar, additional developments are planned for the near future. The Henderson Solar facility would be compatible with other commercial or industrial uses in the area. Those officials believe that the Henderson Solar facility would be compatible with the surrounding area, in terms of its visual presence.

The Project will use anti-glare solar panels. The Applicant has indicated that a formal glare study is currently underway. The Applicant has committed to addressing any glare resulting from panel operation.

Potential Changes in Property Values and Land Use

The Applicant's consultant, Kirkland Appraisals, LLC., has an extensive data base of property values, transactions and 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) interviewed the Henderson County Property Valuation Administrator; (3) prepared further analysis of the data from Kirkland; and (4) examined the potential for impacts to residential and other properties closest to the Project.

The Henderson County Property Valuation Administrator stated that he does not believe the Henderson Solar Project will adversely affect property values in the area surrounding the Project. He has not received any negative feedback or heard any concerns regarding property value impacts from local landowners.

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. Most recent studies indicated no impacts to property values related to solar facilities. HE concludes that there is unlikely to be negative impacts on property values from this Project as a general rule. This conclusion is predicated on the assumption that the mitigation strategies discussed in Section 6 are adopted by Henderson Solar and the Siting Board. Mitigation of visual and other effects, with close property owner coordination, can minimize that uncertainty.

Anticipated Peak and Average Noise Levels

Neither the Commonwealth of Kentucky nor Henderson County have noise ordinances applicable to this Project. As such, HE adopted the noise recommendations generated by the Environmental Protection Agency (EPA) and the World Health Organization (WHO) to gauge acceptable levels of sound.

Construction activities are expected to generate noise emissions greater than 55 decibels (dBA) throughout the six to nine-month construction period. This level is above standards for annoyance, the but the noise will be sporadic and decrease with distance to nearby residences.

The pile driving process, which is the loudest part of the construction process, is estimated to take approximately 30 days throughout an eight-week period. Fencing installation, concrete pouring and ditch digging for electrical cables may also be loud activities, but those activities will only occur in any one location for a very short period of time. Since these construction activities are not sustained, no hearing loss or long-term annoyance to residents is expected.

Construction noise levels could be a particular concern for residences in the Northern Section, especially those along Lover's Lane and Collier Road. The Lover's Lane residents would experience noise above the agency thresholds for annoyance, unless the Applicant mitigates.

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. Operational components would emit relatively low sounds during daylight hours and typically no sound at night. However, 18 homes are located within 300 feet of the Project boundary (near the Northern section); those homes may experience operational sound levels slightly greater than the 50 dbA noted by the World Health Organization as potentially causing moderate annoyance. At a distance of 400 feet, operational components would emit sound of 46.11 dBA. Some area residents live along roadways with light to heavy levels of traffic or near agricultural fields where farming activities have occurred. Noise from the Project's operational components should not annoy them.

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. Existing vegetation and the Applicant's proposed vegetative buffers along portions of the Northern section will likely help mitigate noise for nearby homeowners.

Road and Rail Traffic, Fugitive Dust and Road Degradation

Roads providing access to the three Project sections include KY 425 (Henderson Bypass), Collier Road, Lover's Lane and Wilson Station Road. Construction activities will cause substantial increases in traffic volumes on Collier Road and Lover's Lane (and perhaps Wilson Station Road) and smaller increases on other roads in the area. Brief traffic stoppages on local roads will be necessary to allow for large vehicle access to the Project site during construction. These impacts will be temporary, occurring over the nine-month construction period, but may be annoying to local residents.

Delivery of the substation transformer (to the Northern section) will require an oversized truck and trailer, which will be heavier than the designated weight limit for the Lover's Lane bridge over Canoe Creek. However, the Applicant is considering several options for delivery of the transformer, one of which could include a number of smaller, piecemeal deliveries or use of the railway.

Other deliveries may also require the use of oversized trucks on local roads. 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.

An existing, serviceable CSX railroad line is located along the western edge of the Northern section of the Project site. At this point, the Applicant does not anticipate using or crossing the railway for any construction or operational purposes. The Applicant will need to secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the railway. The evaluation included in this report assumes that the Project will not require use of the railroad; hence, no impacts to the railroad or railway service are anticipated as a result of the Project.

Given the few employees and deliveries required for Project operations, traffic impacts during the operational phase will be minimal.

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 Henderson Solar facility will provide some 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 Kentucky, limiting opportunities for local business activity or generation of additional sales tax.

Operational economic benefits will be confined mostly to property taxes. Annual property tax payments will be made to multiple Henderson County taxing authorities; however, those payments will likely amount to a small percentage of total tax revenues. Operational

employment will be minimal, and purchases of materials or supplies will be small on an annual basis.

Socioeconomic impacts of the Henderson Solar facility represent a positive, albeit small, contribution to the region. However, the Henderson County Judge Executive is optimistic about the existence of solar facilities in the County attracting commercial and industrial firms to the area, which would bring along additional employment and tax benefits.

Decommissioning

The Applicant assumes a 30-year useful life for the Henderson Solar facility. Henderson Solar has not yet prepared a formal decommissioning plan but has provided a draft template consistent with the requirements laid out in the Henderson County Solar Ordinance. The Project site will be returned to pre-existing conditions and decommissioning will include removal of all Project equipment and improvements and restoration of soil surfaces, slopes and fertility levels. Legal lease agreements with participating landowners also include commitments regarding facility removal and land restoration.

After reclamation, this would return the land to Pre-Project productive uses and property values, thereby eliminating 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.

The Applicant will comply with the Henderson County Solar Ordinance with the establishment of a bond to ensure any decommissioning costs are met.

Public Outreach and Communication

The Applicant has pursued public outreach in Henderson County and in the Project area since 2019, including creation of a web-site, hosting a public meeting, offering "in-person office hours" and participating in additional small group or individual meetings with local residents and public officials. However, the public meetings were not well attended, and public awareness of the Project is limited.

The Applicant has stated that a "reasonable complaint resolution process will be put into place before commencement of construction activities and project operations" and that Henderson Solar will notify all adjacent landowners of the start of construction, providing appropriate contact information. HE encourages the development of a formal complaint resolution process, applicable to both the construction and operational periods, and recommends more extensive notification.

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 Henderson 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

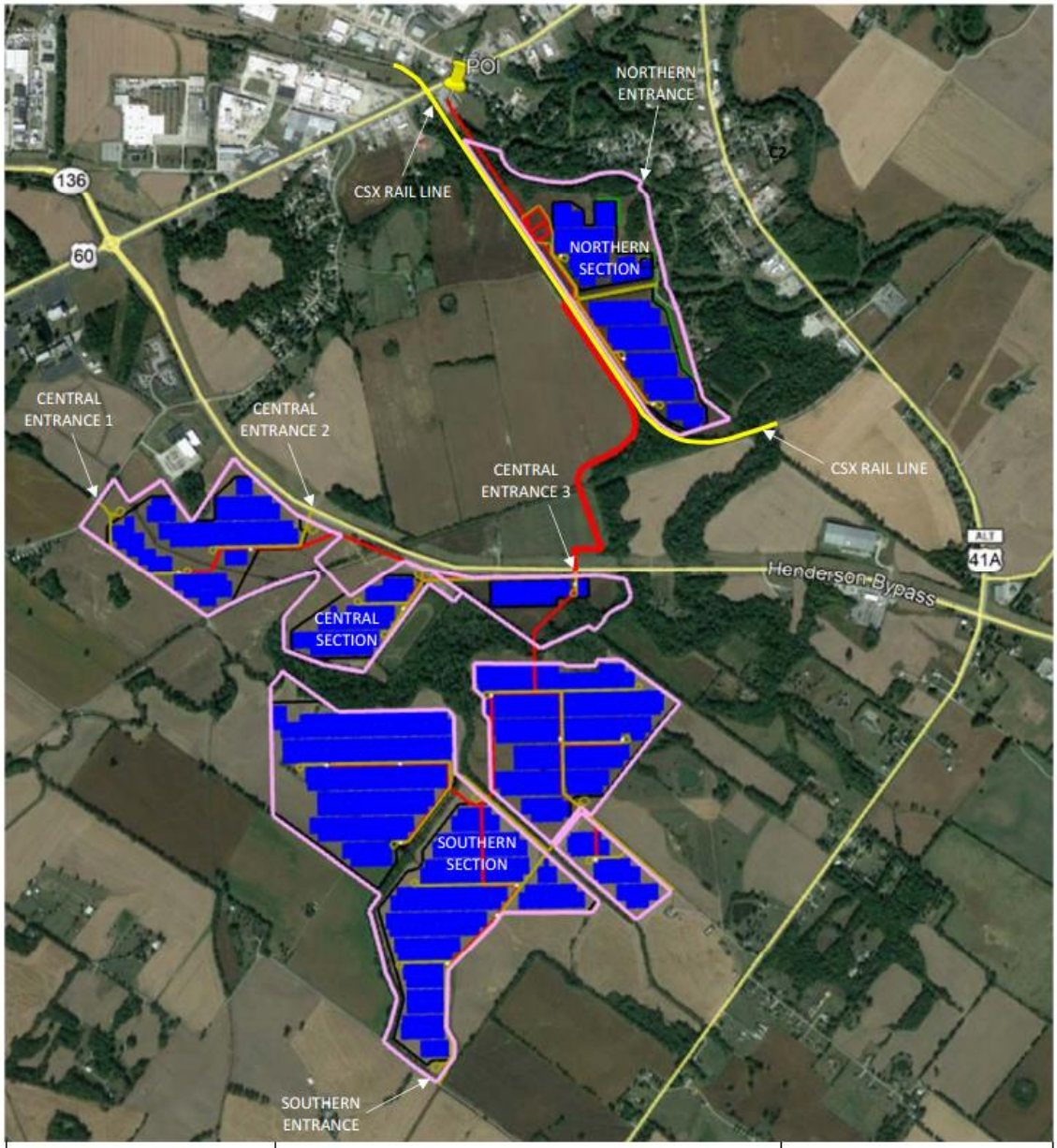
Project Overview

The Henderson County Solar, LLC SAR describes the Henderson Solar Project as follows:

> "The proposed facility (the "Project") is a 50-megawatt alternating current (50MWac) photovoltaic electricity generation facility to be located in central Henderson County, Kentucky. The Northern section of the site is located along Lover's Lane, just outside the city limits of Henderson, Kentucky. The Central section of the site is located along Hwy 425/Henderson Bypass, Henderson, Kentucky. The Southern section of the site is located along Wilson Station Road, Henderson, Kentucky. The sections of the project site will be electrically connected by underground medium-voltage cables.
>
> The Project will be situated on up to 541 acres of land, 467 acres of which are currently in agricultural use for the production of row crops. The Applicant has secured the Project site under long-term leases and utility easements.
>
> The Project will consist of crystalline solar panels, affixed to a ground-mounted single-axis tracking system. The electricity produced will be converted from direct current (DC) to alternating current (AC) by use of inverters located throughout the Project site. The voltage of the electricity produced will be regulated by transformers located throughout the project site. The entire facility will be surrounded by a security fence.
>
> All the electricity produced by the Project will be gathered at a project substation prior to delivery to the local transmission system. The Project will interconnect to the 69kV bus at Substation No.7, which is owned and operated by Henderson Municipal Power & Light ("HMP&L"). The Applicant has signed a long-term contract to sell 100% of the electricity generated by the Project to HMP&L".

Exhibits 3-1 and 3-2 illustrate the boundaries of the Northern, Central and Southern Project sections and the locations of Project components. Additional exhibits, included in Appendix C of this report, provide in-depth illustrations of each Project section.

Exhibit 3-1.
Site Plan Overview Map for the Proposed Henderson Solar Project



Source: Henderson Solar, LLC, August 2021.

Exhibit 3-2.
Proposed Henderson Solar Project Point of Interconnection

Source: Henderson Solar, LLC, June 2021.

The Project site is located approximately 21 miles south of the City of Evansville, Indiana, the largest community in the region, Northern section of the Project is located about one mile southwest of the City of Henderson, Kentucky, while the Southern section of the Project is located about five miles southwest of Henderson.

Construction Activities

Construction of the Henderson Solar facility is expected to occur over a period of about six to nine months.[3] Peak construction activity is anticipated to span a two-month period, occurring during the 3rd and 4th months of construction. Construction within the three separate Project sections will occur concurrently, with different construction activities taking place at the same time within each section and across sections.

Construction activities will generally occur in the following order, although most, if not all, of activities #5 - #18 will overlap to some extent, with some activities occurring simultaneously. According to the Applicant, security fencing can be installed as early as immediately after Pile Installation is complete, but it appears on the list as a late activity because that tends to be the preference of contractors.

1. Engineering
2. Equipment Procurement
3. Construction Survey
4. Erosion and Sediment Control (Stormwater Protections)
5. Civil and Site Preparation
6. Pile Installation (Racking Foundations)
7. Racking Installation
8. Module Installation
9. Trenching and Conduit
10. DC Wiring
11. Combiner Installation
12. Inverter Installation
13. AC Wiring
14. Substation Installation
15. SCADA / DAS Installation
16. Security Fencing
17. Commissioning, Testing and Startup
18. Site Restoration

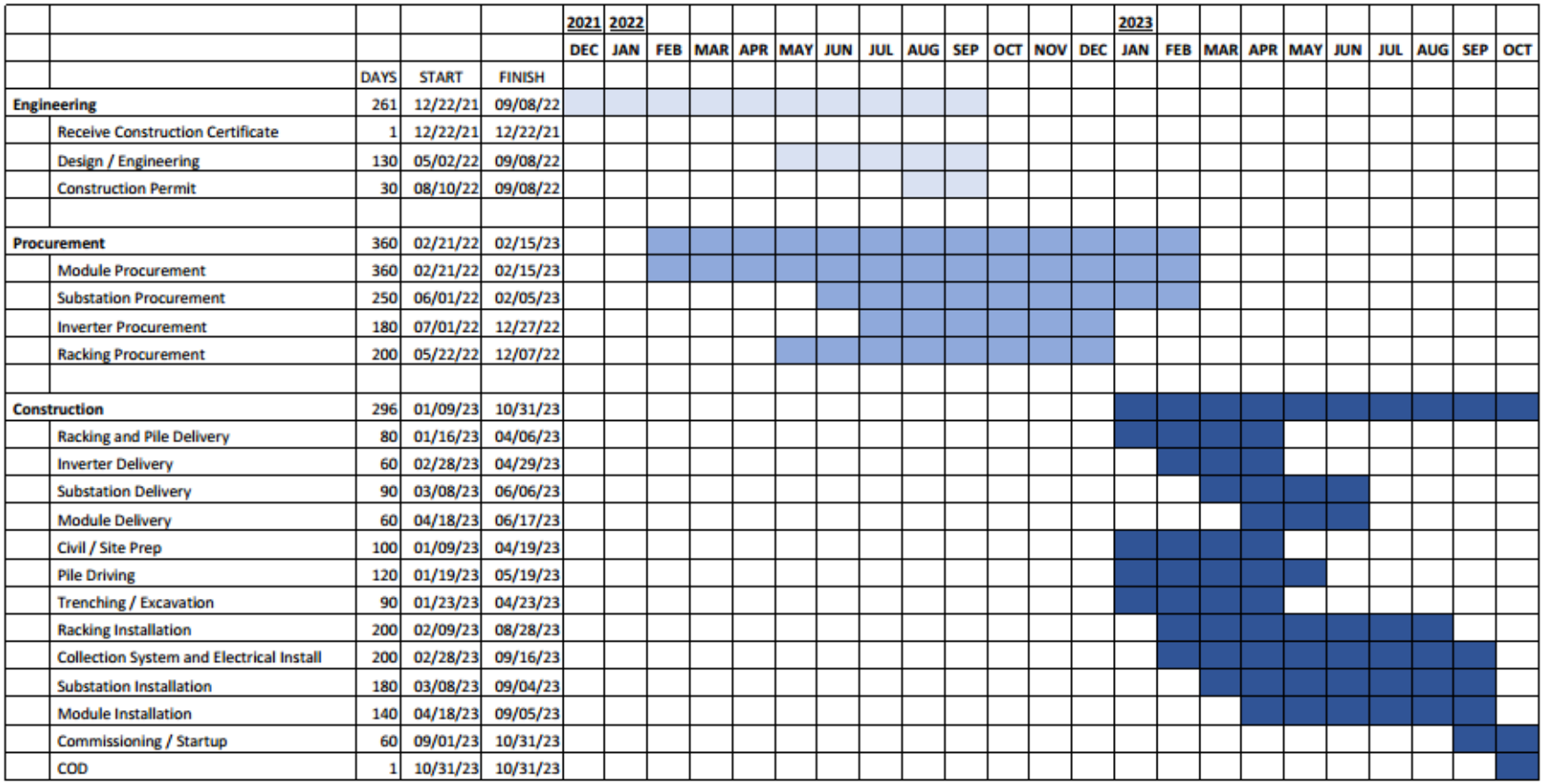
Exhibit 3-3 illustrates the sequence of construction activities over the construction period.

[3] Timing of construction activities can be affected by weather, availability of subcontractors or materials, or other unexpected events.

Exhibit 3-3.
Tentative Construction Schedule for the Henderson Solar Project

HENDERSON COUNTY SOLAR (50MW)
Tentative Construction Schedule

	DAYS	START	FINISH
Engineering	261	12/22/21	09/08/22
Receive Construction Certificate	1	12/22/21	12/22/21
Design / Engineering	130	05/02/22	09/08/22
Construction Permit	30	08/10/22	09/08/22
Procurement	360	02/21/22	02/15/23
Module Procurement	360	02/21/22	02/15/23
Substation Procurement	250	06/01/22	02/05/23
Inverter Procurement	180	07/01/22	12/27/22
Racking Procurement	200	05/22/22	12/07/22
Construction	296	01/09/23	10/31/23
Racking and Pile Delivery	80	01/16/23	04/06/23
Inverter Delivery	60	02/28/23	04/29/23
Substation Delivery	90	03/08/23	06/06/23
Module Delivery	60	04/18/23	06/17/23
Civil / Site Prep	100	01/09/23	04/19/23
Pile Driving	120	01/19/23	05/19/23
Trenching / Excavation	90	01/23/23	04/23/23
Racking Installation	200	02/09/23	08/28/23
Collection System and Electrical Install	200	02/28/23	09/16/23
Substation Installation	180	03/08/23	09/04/23
Module Installation	140	04/18/23	09/05/23
Commissioning / Startup	60	09/01/23	10/31/23
COD	1	10/31/23	10/31/23



Source: Henderson Solar, LLC, August 2021.

On average, 120 construction workers are estimated to be on-site at any one time over the course of the construction period, ranging from a minimum of 50 workers during the first and last months of construction to a maximum of 150 workers during the peak period.

The Applicant is proposing that construction activity occur between the hours of 7:00 am and 7:00 pm, Monday through Saturday, with only a minor amount of construction occurring after 6:00pm. Additionally, the Applicant will designate certain portions of the Project site as "Neighbor Zones", in which noisier construction activity will be limited to 9:00 am to 5:00 pm, Monday through Friday. The Applicant's "Neighbor Zones" are described in the Noise and Traffic sections of Section 5 of this report.

Life of the Project

The Henderson Solar facility is anticipated to operate for approximately 30 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. Henderson County in general, and areas to the southwest of the City of Henderson specifically, are rural residential areas, with low population density and an agricultural emphasis. Although the Project site currently consists of agricultural fields/ cultivated crops, pasture, and forest/ wooded land, it is located only a few miles southwest of the City of Henderson, a city of over 28,000 people. U.S. 60 runs along the west side of the Project site and U.S. 41A runs along the east side of the Project site; many commercial and industrial businesses are located along those roads. 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 current uses of the land surrounding the proposed Project site are agricultural, residential, commercial, and recreational. The majority of the land surrounding the proposed Project site is currently in agricultural production. This includes the cultivation of corn, soybeans, and wheat. The 2nd most-common use of land surrounding the proposed Project site is residential. There are four surrounding commercial uses: a substation, a cell tower, the offices of Kenergy (a regional electric cooperative), and a golf driving range. There is one church adjacent to the site, which for the purpose of this assessment is categorized as a recreational use."

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

[4] Application, Attachment 12.6, Property Value Impact Study.

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

Land Use	Percent of Total Adjoining Acres
Agricultural	56.98%
Agricultural / Residential	27.96%
Residential	12.77%
Industrial	1.45%
Substation	0.45%
Cell Tower	0.35%
Religious	0.03%
Total	100.00%

Source: Henderson Solar, LLC, June 2021.

The Applicant also provided tables describing the distances between nearby residences or other structures and the Project boundary line.[5] That information is provided in Exhibit 3-5 and Exhibit 3-6.

Exhibit 3-5.
Distances between Residential Structures and the Henderson Solar Project Boundary

Distance from Project Boundary	Northern Section	Central and Southern Sections	Entire Project Site	Total
0 - 300	18			18
301 - 600	31	9		40
601 - 900	27	8		35
901 - 1,200			32	32
1,201 - 1,500			49	49
1,501 - 1,800			70	70
1,801 - 2,100			59	59
2,100 - 2,400			70	70
Total Structures:	76	17	280	373

Notes: (1) At distances greater than 900 feet, all three sections were evaluated as one Project site.
(2) Residential structures include residences located on adjacent and non-adjacent parcels.
Source: Henderson Solar, LLC, August 2021.

There are 93 residential properties within 900 feet of any portion of the Project boundary and 303 residential properties within 2,100 feet of the boundary.

[5] Information about distances between residences and other structures and Project facilities (panels, inverters, substation) is provided in Section 5 of this report.

Exhibit 3-6.
Distances between Non-Residential Structures and the Henderson Solar Project Boundary

Distance from Project Boundary	Church	School	Commercial	Total
0 - 300			2	2
301 - 600			4	4
601 - 900			7	7
901 - 1,200	1		17	18
1,201 - 1,500		1	14	15
1,501 - 1,800			12	12
1,801 - 2,100	1	1	14	16
2,100 - 2,400		1	9	10
Total Structures:	2	3	79	84

Note: Data includes non-residential structures in proximity to any of the three Project sections.
Source: Henderson Solar, LLC, August 2021.

Legal boundaries. The SAR provides legal descriptions of the boundaries of the proposed site. The Northern section of the Project site, comprising approximately 94 acres, is made up of a portion of a single parcel. The Central section of the Project site, comprising approximately 150 acres, is made up of portions of two parcels. The Southern section of the Project site, comprising approximately 297 acres, is made up of portions of five parcels. A utility easement connects the Central section of the Project site with the Northern section of the Project site.

Access control. The SAR describes five proposed access points to the Project site from a public roadway. The following access points, identified in Exhibit 3-1, will be used during construction and operations.

- The Northern section of the project site will be accessed via Lover's Lane, at a point approximately 1,900 feet south of the intersection of Lover's Lane and Collier Road.
- The Central section of the project site will be accessed at three (3) locations:
    - The south side of KY 425 / Henderson Bypass, at a point approximately one mile west of the intersection of KY 425 / Henderson Bypass and U.S. 41A.
    - The south side of KY 425 / Henderson Bypass, at a point approximately 1,950 feet east of the intersection of Hwy 425 / Henderson Bypass and Old Corydon Road.
    - The east side of Old Corydon Road, at a point approximately 1,900 feet south of the intersection of Old Corydon Road and KY 425 / Henderson Bypass.

- The Southern section of the project site will be accessed via the north side of Wilson Station Road, at a point approximately 2,300 feet west of the intersection of Wilson Station Road and U.S. 41A.

According to the Application, "the entire facility will be surrounded by a security fence." The security fence will be a minimum of seven feet in height and will be a transparent, chain-link fence. The fence will typically be located immediately adjacent to the solar panels, and not along the boundary line of the site, unless that boundary line is also immediately adjacent to the solar panels. Per the existing Henderson County Solar Ordinance, no barbed wire or sharp points will top the fence in any locations where the Projects adjoins a residential property.[6] Per the Applicant, the fence will not include barbed wire along any sections of the fence surrounding the solar arrays. The Project substation will have its own, separate, fencing, which will also be a minimum of seven feet in height and which will include barbed wire at the top. All portions of the fence will meet National Electric Safety Code regulations, including portions of the fence without barbed wire.

In addition to fencing, security guards will be on-site 24 hours a day, seven days a week during construction. Security cameras will be installed at each entrance to the site and all entrances will be gated and locked when workers are not on-site. Prior to construction, Henderson Solar will consult with local law enforcement agencies to determine the best ways to communicate and coordinate efforts.

Location of buildings, transmission lines and other structures. Exhibit 3-1 and additional detailed maps of each Project section (provided in Appendix C of this report) illustrate the locations of the solar panels, inverters and the substation within the Project boundary. The substation transformer will be located in the northwest portion of the Northern Project section. The Project will connect to the 69kV bus at Henderson Municipal Power & Light's (HMP&L) Substation No. 7 via an overhead circuit running from the Project substation to Substation No. 7. The HMP&L substation is located along U.S. 60, about a mile south of the intersection with U.S. 41A. Additionally, medium voltage system lines will be installed underground between Project sections. Solar panels and inverters will be located throughout the property.

The proposed Project will not require the construction/maintenance of any facility buildings. A storage container may be placed on site for the storage of tools and/or spare parts. No office trailer or permanent buildings will be required.

Approximately 10 to 15 acres of the Project site will be used for construction assembly areas or staging for worker assembly, vehicle parking, and material storage during construction. That acreage will be comprised of multiple small staging areas located across the Project site, each ranging from approximately ¾ of an acre to three acres in size. The number of different staging areas and the location of each staging area will be determined by the general contractor selected for the project and finalized closer to the start of construction. Additional on-site worker

[6] Henderson County Zoning Ordinance Number 19-07, Article XXX. Solar Energy Systems. Approved December 2019. A copy of the Ordinance is provided in Appendix D of this report.

parking areas would also be developed within the Project site. Those areas would be separate from, but perhaps co-located with, the staging areas.

The Applicant anticipates that the staging and parking areas will be bare ground, logging mats, or compacted gravel, depending on the soil and drainage conditions at each area. In locations where solar panels are not eventually installed on these areas, those areas will be returned to their original condition.

Location and use of access ways, internal roads, and railways. As described previously and as shown in Exhibit 3-1, one entrance will allow access to the Northern section; three entrances will allow access to the Central section and one entrance will allow access to the Southern section. These access points will be used during construction and operations.

A network of internal roads (approximately 5.1 miles) will be constructed on the Project site. These will be permeable compacted gravel roads. Internal roads needed to access major electrical equipment such as inverters and transformers will be all-weather in design. All internal roads that conclude in a "dead end" will include a turnaround sufficient in radius to accommodate delivery trucks, fire trucks, and other work or emergency vehicles.

A CSX rail line runs along the western and southern edges of the Northern section of the Project site. No vehicular rail crossing will be required, as that section will be accessed via existing public roadways. The Applicant will secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the railway. The Project will not use the railway for any construction or operational activities.

Existing or proposed utilities to service facility. The Project will require a minor amount of electricity during operation for starting equipment, providing communications and security, and for general back-up power. The proposed Project site is located within the retail service territory of Kenergy. A Kenergy 3-phase circuit runs along Old Corydon Road at the western periphery of the Project site, along U.S. 41A at the eastern periphery of the site, and at a point along KY 425 / Henderson Bypass at the middle of the Project site. The Applicant anticipates contracting for station service from Kenergy, utilizing existing facilities. No new utilities are proposed. No water or wastewater services will be required during construction or operations.

According to the Cumulative Environmental Assessment (Exhibit 13 of the Application), portable chemical toilets will be provided for construction workers during Project development. Sewage waste will be pumped out by a licensed contractor and disposed at the Henderson Wastewater Treatment Plant or regulated wastewater treatment plant. No additional or permanent bathroom facilities are anticipated.

Compliance with applicable setback requirements. KRS 278.706(2)(d) states that a completed Application shall include "A statement certifying that the proposed plant will be in compliance with all local ordinances and regulations concerning noise control and with any local planning and zoning ordinances. The statement shall also disclose setback requirements established by the planning and zoning commission as provided under KRS 278.704(3).

KRS 278.704(3) reads:

"If the merchant electric generating facility is proposed to be located in a county or a municipality with planning and zoning, then setback requirements from a property boundary, residential neighborhood, school, hospital, or nursing home facility may be established by the planning and zoning commission. Any setback established by a planning and zoning commission for a facility in an area over which it has jurisdiction shall:

> (a) Have primacy over the setback requirement in subsections (2) and (5) of this section;[7] and
>
> (b) Not be subject to modification or waiver by the board through a request for deviation by the applicant, as provided in subsection (4) of this section."

In December 2019, the Henderson County Fiscal Court adopted the following ordinance: Article XXX 'Solar Energy System (SES) Regulations' ("Henderson County Solar Ordinance" or "Solar Ordinance"). Pursuant to Section 30.01 of the Solar Ordinance, the Proposed Project is a Level 3 Solar Energy System ("Level 3 SES") defined as any system that does not satisfy the parameters for a Level 1 Solar Energy System (a roof-mounted system, or a ground-mounted system whose footprint is not more than 50% of the primary structure on the parcel) or a Level 2 Solar Energy System (a ground-mounted system in an agricultural zone not more than 1/2 acre in size). A copy of the Solar Ordinance is provided as Appendix D to this report.

Setback requirements for a Level 3 SES are: 1) All equipment shall be at least twenty-five (25) feet from the perimeter property lines of the project area; 2) No interior property line setbacks shall be required if the project spans multiple contiguous properties; 3) All equipment shall be located at least one hundred (100) feet from any residential structure and; the maximum height of any individual component will be 25 feet measured from the ground level of the component.

To mitigate the visual impact of the proposed facility, the Applicant plans to enhance the setback distance between the solar panels and adjacent residences. The proposed setback is a minimum of 200 feet between any solar panel and any adjacent residences. Exhibits C-2, C-4 and C-6, provided in Appendix C of this report, list the distances of the closest residential structures to each Project section.

- For the Northern section, the closest residence would be 202 feet from the property fence line.
- For the Central section, the closest residence would be 578 feet from the property fence line.
- For the Southern section, the closest residence would be 713 feet from the property fence line.

[7] In part, KRS 278.704(2) states all proposed structures or facilities used for generation of electricity must be 2,000 feet from any residential neighborhood, school, hospital, or nursing home facility. Section (5) is related to locating on the site of a former coal processing plant.

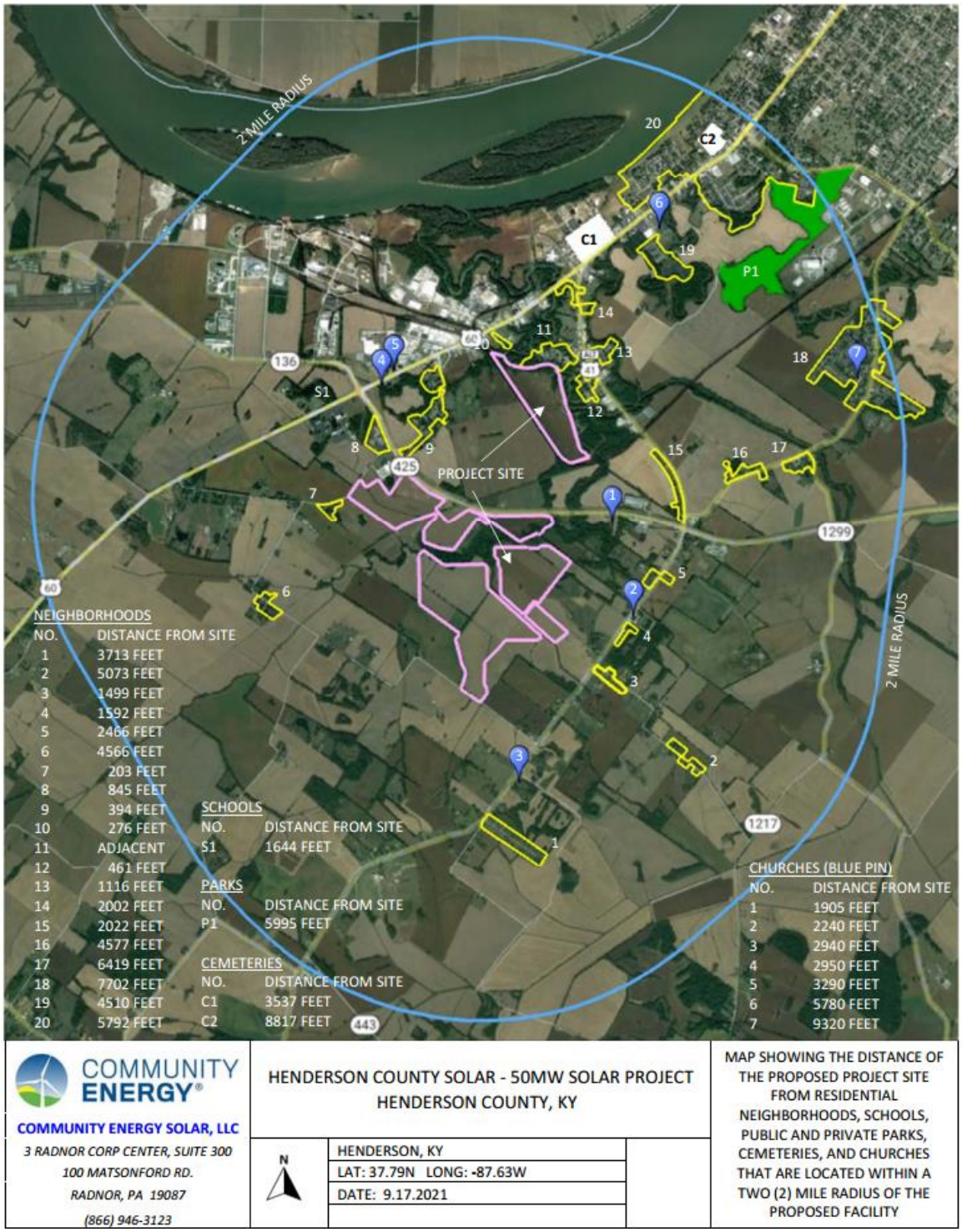
The Applicant has confirmed that the Henderson City-County Planning Commission is responsible for reviewing Project maps and documents to ensure that the applicable setback requirements are met. The Site Plan was reviewed and approved by the Commission in April 2021.

Exhibit 3-7 illustrates and lists the distances between the Project boundary lines and nearby residential neighborhoods, parks, cemeteries, schools and churches.[8] With regards to the Northern Section, one residential neighborhood is located immediately adjacent to that Project section; other nearby neighborhoods are located at 276 and 461 feet from the Northern section boundary line. The closest residential neighborhood to the Central Project section is approximately 203 feet from that section's boundary line and the closest residential neighborhood to the Southern Project section is approximately 1,500 from the boundary line. According to KRS 278.700(6), a residential neighborhood is defined as a populated area of five or more acres containing at least one residential structure per acre. By this definition, there are some additional residences in close proximity to the Project site, which are not included in Exhibit 3-7.

The closest school to the Project site is Henderson Community College, located more than a quarter mile west of the Central section. The closest parks or cemeteries are located approximately three quarters of a mile or more from any Project section. There are no nursing homes or hospitals located within the two-mile radius of any Project boundary.

[8] The distance between the Project and residential neighborhoods is measured from the Project boundary to the nearest parcel line of the neighborhood.

Exhibit 3-7.
Distance Between the Henderson Solar Project Site and Residential Neighborhoods and Other Structures within a Two-Mile Radius



Note: Distances listed are from the Project boundary line.
Source: Henderson Solar, LLC, September 2021.

Results of SAR Review – Proposed Site Development Plan

Conclusions. Based on HE's review of the Henderson Solar SAR, the subsequent information provided by the Applicant in response to two rounds of inquiries, direct discussions with the 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 Henderson Solar Project is subject to the requirements of the Henderson County Solar Ordinance, which, among other topics, includes specific setback distance requirements between Project equipment and residences. The Project is proposing greater setbacks than required in the Solar Ordinance.

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, transformer, substation 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 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 include appropriate signage to warn potential trespassers, pursuant to the Henderson County Solar Ordinance. 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.

9. The Applicant will comply with all applicable regulations for solar facilities as set forth in the Henderson County Solar Ordinance.

10. The Applicant will secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the existing railway line.

SECTION 4
Project Setting

Description of the Area

This section provides a description of the area surrounding the proposed Henderson Solar facility. The Project site is located to the southwest of the City of Henderson, in Henderson County, in western Kentucky, near the northern border of the state. The northern border of Kentucky follows the Ohio River; the topography of the area includes a broad flood plain with ridges along the river and rolling terrain to the south. Henderson County is part of the Western Coal Field region of Kentucky.[9]

Population and housing density. As of mid-2019, approximately 45,200 people resided in Henderson County.[10] The County's population has remained relatively stable over the past 20 years; in 2000 the population was 44,829 and in 2010 the population was 46,250.[11,12] About 92 percent of the population is white, and the median age of residents is 41 years.[13] Projections call for a continuing stable population base in Henderson. The Kentucky State Data Center estimates 43,990 people will reside in the County in 2040, which is less than a three percent decrease from 2019.[14] Currently, there are about 18,600 households in Henderson County, with an average of about 2.4 persons per household.[15] There are 106 people per square mile, which makes Henderson County average in terms of population density as compared with other areas of Kentucky.[16]

The City of Henderson is the only major city in Henderson County and is the County seat. Henderson had a 2019 population of 28,625 people; the City's population has also been stable in recent years. The City of Evansville, Indiana is located just 12 miles to the north of

[9] Kentucky Geological Survey. Groundwater Resources of Henderson County, Kentucky. http://www.uky.edu/KGS/water/library/gwatlas/Henderson/Topography.htm
[10] U.S. Census Bureau. Henderson County QuickFacts. https://www.census.gov/quickfacts/hendersoncountykentucky
[11] U.S. Census Bureau. Henderson County, Kentucky, Profile of General Demographic Characteristics. https://data.census.gov/cedsci/table?q=henderson%20county%20kentucky&y=2000&tid=DECENNIALDPSF42000.DP1&hidePreview=true
[12] U.S. Census Bureau. Henderson County, Kentucky, Annual Estimates of the Resident Population: April 2010 – July 1, 2019. https://data.census.gov/cedsci/table?q=henderson%20county%20kentucky&tid=PEPPOP2019.PEPANNRES&hidePreview=true
[13] U.S. Census Bureau. Henderson County, Kentucky, Age and Sex. https://data.census.gov/cedsci/table?q=henderson%20county%20kentucky&tid=ACSST5Y2019.S0101&hidePreview=false
[14] 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
[15] U.S. Census Bureau. Henderson County QuickFacts. https://www.census.gov/quickfacts/hendersoncountykentucky
[16] Statistical Atlas. Henderson County, Kentucky. https://statisticalatlas.com/county/Kentucky/Henderson-County/Population

Henderson. With a population of 118,000 in 2019, Evansville is the nearest metropolitan city to Henderson.[17] Louisville, Kentucky is located about 130 miles east-northeast of Henderson; Louisville is the largest city in Kentucky and as of 2019, had a population of about 617,000.[18]

Income. In 2019, per capita personal income in Henderson County was $22,695.[19] That was 19 percent less than the average per capita personal income of the Commonwealth of Kentucky, and 33 percent less than the average in the United States.[20] As of mid-2019, about 16 percent of the Henderson County population lived in poverty.[21]

Business and industry. In 2019, there were about 24,500 jobs in Henderson County; 83 percent were classified as wage and salary jobs and 17 percent were identified as proprietors' employment.[22]

- Manufacturing is the largest employment sector in Henderson County, with 5,293 jobs.[23] The area is centrally located to many US highways and Interstates in addition to rail and commercial airways, providing direct access to much of the U.S. Low tax rates, reasonable wage scales, and a trained labor force entice companies to establish there. Some of the major manufacturers in the county: Tyson Foods (poultry feed manufacturer and distribution), Gibbs Die Casting Corp. (Gibbs headquarters and aluminum die casting), River View Coal (coal production), Century Aluminum (aluminum parts), Pittsburg Tank & Tower (above ground steel storage tanks).[24] Pratt Paper, LLC is developing a $400 million paper mill and a future facility to manufacture corrugated boxes and sheets to meet the demands of online ordering. Pratt's investment supports Kentucky's growing logistics and distribution industry. [25]

- Governmental work is the second largest sector in Henderson County, with about 2,700 jobs. Retail trade is the next largest sector with roughly 2,200 jobs. Of Henderson County's 300,000 acres, 60 percent (about 180,600 acres) were designated farmland in

[17] U.S. Census Bureau. Evansville City QuickFacts.
https://www.census.gov/quickfacts/fact/table/evansvillecityindiana,IN,US/PST045219
[18] U.S. Census Bureau. Lexington/Jefferson County QuickFacts.
https://www.census.gov/quickfacts/fact/table/louisvillejeffersoncountymetrogovernmentbalancekentucky,US/PST045219
[19] U.S. Census Bureau. Henderson County QuickFacts.
https://www.census.gov/quickfacts/hendersoncountykentucky
[20] 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
[21] U.S. Census Bureau. Henderson County QuickFacts.
https://www.census.gov/quickfacts/fact/table/hendersoncountykentucky,US/PST045219
[22] U.S. Bureau of Economic Analysis. Henderson County, Total Full-Time and Part-Time Employment.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6
[23] U.S. Bureau of Economic Analysis. Henderson County, Total Full-Time and Part-Time Employment.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6
[24] Henderson County Economic Development. Existing Industries.
https://hendersonkyedc.com/existing-industries
[25] Lane Report, Kentucky's Business News Source. Pratt Paper LLC.
https://www.lanereport.com/144775/2021/07/a-new-paper-mill-coming-to-henderson-kentucky/

2017.[26] However, the agricultural sector employs relatively few people in Henderson County, with about 410 jobs. [27]

Major and minor roads and railways. The Project site is bounded on the north and west by U.S. 60 and on the east by U.S. 41A. KY 425 (Henderson Bypass) runs in an east-west direction between the Project sections. Both U.S. 60 and U.S. 41A provide direct routes north to the city of Henderson from the Project site. I-69 is about three miles east of the Project site; that interstate runs generally from Texas to Michigan. The Henderson County Riverport, located on the Ohio River, is also a designated CSX rail stop.

Overall area description. Based on HE's research, the area around the Project site can be generally described as rural, with a few residences and farms nearby, as well as many manufacturing facilities in the County. The Project site is several miles from Henderson, the closest city, which includes about 60 percent of the County's population. The County's population is expected to remain relatively constant over the next 30 years, reflecting only a small decrease by 2040. Residents' income levels are low; the County currently experiences the same rate of poverty as the entire Commonwealth, which is higher than the U.S. average poverty rate.[28] [29]

[26] U.S.D.A. Agriculture Census 2017. Henderson County Kentucky Profile.
https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Kentucky/cp21101.pdf
[27] U.S. Bureau of Economic Analysis. Henderson County, Total Full-Time and Part-Time Employment.
https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6
[28] U.S. Census Bureau. Kentucky QuickFacts.
https://www.census.gov/quickfacts/fact/table/KY/POP060210
[29] Data USA: Henderson, KY.
https://datausa.io/profile/geo/henderson-ky/

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 Henderson 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 the Unbridled Solar Project, a 160-megawatt facility to be located across approximately 1,680 acres in Henderson and Webster Counties, more than 10 miles to the southeast of the Henderson County Solar Project site.[30] That Project has been granted a Certificate to Construct but has not yet begun construction. Construction of the Henderson Solar and Unbridled Solar Projects may or may not overlap, but both Projects would be simultaneously operational for many years. Additionally, the Sebree Solar Project has also been proposed for location within Henderson County; that Project only recently began its Siting Board review process. Due to the distances between these Projects, the potential for cumulative effects to be experienced by County residents, drivers or visitors would be minimal.[31,32]

[30] The Siting Board granted Unbridled Solar a Certificate to Construct, with conditions, on June 4, 2021.
[31] The topic of cumulative effects is not called out in the KRS and the Siting Board has not directed HE to consider cumulative impacts in this case.
[32] The Applicant has not considered the potential for any types of cumulative effects between the Henderson Solar Project and the Unbridled Solar Project or any other proposed 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 man-made efforts undertaken 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.[33] 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.[34]

A standard visual analysis generally proceeds in this sequence:[35]

- Description of the existing visual setting in the Project area;
- 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.

[33] 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/.
[34] Dean Apostol, James Palmer, Martin Pasqualetti, Richard Smardon, Robert Sullivan. (2016). *The Renewable Energy Landscape: Preserving Scenic Values in our Sustainable Future*. September 2016.
[35] Environmental Design & Research. *Visual Impact Analysis*. May 2019.

Glare from sun shining off of 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 SAR describes the Project site as "a group of farm fields, partially screened by established tree lines and hedgerows." As described in Section 3, current uses of the land surrounding the site are agricultural, residential, commercial and recreational. Agricultural production in the area includes the cultivation of corn, soybeans and wheat; residential homes and neighborhoods are scattered throughout the area, and other structures include churches, a cell tower and a Kenergy Corp. (regional electric cooperative) office building.

The Traffic Study (Attachment 12.7 of the Application) 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 winter foliage conditions when deciduous trees are leafless. The Property Value Impacts Report (Attachment 12.6 of the SAR) states that "most of the site has good existing landscaping for screening the proposed solar farm." Additionally, maps of the Northern, Central and Southern portions of the Project, included in Appendix C of this report, show extensive existing vegetation surrounding many areas of the Project.

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 Application states that the Project will adhere to the Henderson County Solar Ordinance, which requires that the existing natural tree growth shall be preserved when reasonably practicable. The Applicant indicates that "the primary criteria to be used to determine what is reasonably practicable in terms of preserving existing tree growth will be the degree to which the existing trees cast shade on the solar arrays. Except for specific circumstances where trees/hedges restrict access to or within the facility, only those trees which would cast shade on the solar arrays will be considered for removal."

Potential visual impacts from Project operations and proposed vegetative buffers. The Project would include 130,000 solar panels. At a maximum height of about 12 feet when fully tilted, those panels would likely be the source main visual impact of the Project. The 72 inverters located throughout the site could also produce adverse visual impacts. Finally, the Project substation, to be located on the northwestern side of the Northern Project section, could

be another potential source of visual impacts; Exhibit 3-2 highlights the location of the substation. The SAR addresses visual impacts and scenic compatibility via the following statements:

- Solar farms are an assemblage of equipment, temporarily placed in a field. They are low-profile, generally 10 feet tall or less, and installed without foundations or brick-and-mortar structures. As such, they are more similar to greenhouses or center-pivot irrigation systems than commercial or industrial development.

- The Project will adhere to the Henderson County Solar Ordinance, which requires that the existing natural tree growth shall be preserved when reasonably practicable.[36] Also, per the Solar Ordinance, where tree lines do not exist, a double row of staggered evergreens will be planted on 15-foot centers (from adjacent non-participating residential dwellings).

- In addition to preserving and/or installing a visual buffer, the proposed Site Plan would position the solar panels a minimum of 200 feet away from any adjacent residence or public road.

Exhibits 5-1 and 5-2 provide information regarding the proximity of residential and non-residential structures to the closest solar panels for different Project sections. A total of 31 homes are located within 900 feet of solar panels in the Northern Project section and 13 homes are located within 900 feet of panels in the Central / Southern Project sections. Altogether, a total of 306 homes are located within 2,400 feet of a Project solar panel.

Exhibit 5-1.
Distance Between Residential Structures and Henderson Solar Project Panels

Distance from Solar Panels (ft)	Northern Section	Central and Southern Sections	Entire Project Site	Total
0 - 300	6			6
301 - 600	11	1		12
601 - 900	14	12		26
901 - 1,200			33	33
1,201 - 1,500			40	40
1,501 - 1,800			60	60
1,801 - 2,100			64	64
2,100 - 2,400			65	65
Total Structures:	31	13	262	306

Notes: (1) At distances greater than 900 feet, all three sections were evaluated as one Project site.
(2) Residential structures include residences located on adjacent and non-adjacent parcels.

Source: Henderson Solar, LLC, August 2021.

[36] The Henderson County Solar Ordinance is provided in Appendix D of this report.

Exhibits C-2, C-4, and C-6 (included in Appendix C of this report) illustrate the locations of residential structures in relation to each Project section and list the distances of specific residences to the Project fence line. As noted previously in Section 3 of this report, the closest residence to the Northern section would be 202 feet from the property fence line, the closest residence to the Central section would be 578 feet from the property fence line and the closest residence to the Southern section would be 713 feet from the property fence line.

Exhibit 5-2.
Distance Between Non- Residential Structures and Henderson Solar Project Panels

Distance from Solar Panels (ft)	Church	School	Commercial	Total
0 - 300			1	1
301 - 600			3	3
601 - 900			5	5
901 - 1,200	1		12	13
1,201 - 1,500		1	16	17
1,501 - 1,800			13	13
1,801 - 2,100	1	1	13	15
2,100 - 2,400	1	1	11	13
Total Structures:	3	3	74	80

Note: Data includes non-residential structures in proximity to any of the three Project sections.
Source: Henderson Solar, LLC, August 2021.

Exhibit 5-3 describes the minimum distances between residences and Project inverters and the Project substation, by Project section.

Exhibit 5-3.
Distance Between Nearby Residential Structures and the Henderson Solar Project Inverters and Substation

	Minimum Distance from Project (ft)		
Infrastructure	Northern Section	Central Section	Southern Section
Inverters	750	1,000	1,350
Substation	600	NA	NA

Note: The substation is located a great distance from the Central and Southern Project sections.
Source: Henderson Solar, LLC, June 2021.

As seen in Exhibit C-1, vegetative buffers are proposed for areas along the northern and eastern portions of the Northern Project section to shield homes along Lover's Lane and Collier Road from view of the Project. Appropriate plants and trees will be chosen so that the vegetative buffer will grow to a minimum of seven feet in height at maturity. Common evergreens for

screening, including Leyland Cypress and Wax Myrtle, will grow three feet or more per year once established. The vegetative buffer installed around the certain portions of the Northern section should reach a height of seven feet or greater within the first three years of planting.

No vegetative buffers are proposed to be planted along any along any areas of the Central or Southern Project sections. The Solar Ordinance states that "parcel boundaries with no proximity to residential dwellings shall not require screening." The Applicant has stated that the residential dwellings on adjacent lots to the Central and Southern sections of the Project are not in close proximity to the Project site. According to the Applicant provided data shown in Exhibit 5-1, most homes near the Central or Southern sections of the Project are more than 600 feet from the closest solar panel. The Applicant also points out that the proposed Site Plan, including the proposed locations of vegetative buffers, has been approved by the Henderson City-County Planning Commission.

Potential for glare from Project panels. Information about the Henderson Solar Project presented to the public included the following: "The solar farm typically will not produce regular, significant glare. Solar panels are designed to absorb light, not reflect it, and are treated with an anti-reflection coating. Nevertheless, sometimes the sun can hit the solar panels at just the right angle to create glare. This is an infrequent and momentary occurrence, and typically does not have a significant adverse effect on neighboring houses."

The Applicant has stated that the Project will use "Tier-1" (top quality) solar panels, which typically use anti-reflective materials and/ or coatings. Henderson Solar does not anticipate any glare affecting drivers on local roads or homeowners of residences surrounding the Project site. The Applicant has stated that it will address any glare impacts resulting from Project operations. A formal glare study is currently underway.

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 September 15, 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 generally agricultural and residential, but there are some homes located in close proximity to the Project boundary and many businesses located along U.S 60 and U.S. 41A. Rolling hills and groups of trees will help protect against negative visual impacts to residents and commuters in some areas.

Canoe Creek flows along the northern and eastern sides of the Northern Project section, around which heavy vegetation exists. Residences along Lover's Lane will be close to construction activity and close to solar panels once in operation; no vegetation is currently evident between these homes and the Project site. Existing vegetation is sparse in the vicinity of the Central and Southern sections, but homes are further from those sections as well.

U.S. 60 is located to the west of the Project; many industrial, commercial and other non-residential properties are located along that route immediately south of the City of Henderson. Henderson Community College is also located on U.S. 60. Non-residential structures and businesses are also located along U.S. 41A, south of the City of Henderson. Several industrial parks are located in the general area, including one located about 1/8th of a mile northwest of the Project site. South of the City of Henderson, the area becomes more rural and agricultural in nature. In sum, the Project site and the area to the south and west is currently relatively rural, the area to the north is more intensively developed with commercial and industrial property as well as residential areas.

Interviews with County officials. As part of the site visit, HE met with Mr. Brad Schneider, the Henderson County Judge Executive to discuss the Project and potential impacts to various resources. HE also spoke with Mr. Andrew Powell, the Henderson County Property Valuation Administrator, about potential Project-related impacts. Both of those public officials described the non-residential developments currently located in the area of the Project, including nearby industrial parks, and some of the expected future developments, including a paper mill to be located along the north side of Henderson Bypass/ KY 425 near Old Corydon Road close to the Project site.[37] The paper mill property will include between 600,000 and one million square feet of building space; a major development for this area. Mr. Powell stated that the area along KY 425 is expected to be developed as an extension and expansion of the current industrial complex northwest of the Project site. Given that, he sees no issue with the solar facility having any adverse effects on the area, with regards to scenic compatibility.

Mr. Powell also stated the setbacks included in the recently adopted Solar Ordinance provide safeguards for local landowners, with regards to visual impacts. This likely relates more to the homes adjacent to the Northern section than properties proximate to the Central and Southern sections.

Construction activities. Some adjacent landowners and commuters driving along local roads, including Lover's Lane, Collier Road, Wilson Station Road, KY 425 (Henderson Bypass) and portions of U.S. 41A south of the intersection with the Henderson Bypass will likely be able to see construction equipment and activity as it occurs.

- Residents living on Lover's Lane on the east side of the Northern section would be the closest to construction activity. There are few homes in that area and Lover's Lane is not a through street, but those residents are very close to the Project site and would be able to see trucks, pile drivers and other equipment during construction of the Northern section. Residents living on Collier Road to the north of the Northern section would likely be shielded from construction activities during summer due to the existing vegetation in the area, but not when leaves are down. Collier Road is also not a through street.

[37] This will be a recycling mill which manufactures packing cardboard for companies such as Target and Amazon. As such, the facility will be a non-pulp mill, without the typical odor and other impacts associated with pulp mills.

- Drivers on KY 425 would be able to see construction activities occurring in the Central section since portions of that section would abut KY 425 and there is little existing vegetation in certain areas. However, homes near the Central section may be largely shielded from view of construction activities due to the existing vegetation in near those residences.

- Drivers on U.S. 41A south of the intersection with the Henderson Bypass and on portions of Wilson Station Road and Old Corydon Road may be able to see construction activities occurring in the Southern section. However, the Project is located some distance west of U.S. 41A and Wilson Station Road and Old Corydon Road are likely very lightly traveled roadways, limiting the view of Project construction. Homes near the Southern section are at least 700 feet from the Project boundary.

Because of the rural nature of the area, the small number of homes in close proximity to the Project site, the existing vegetation and the fact that construction will be temporary, occurring over a six to nine-month period with activities taking place in different locations at different times, HE expects the temporary visual impacts from construction activities to be minimal, with the exception of the Lover's Lane and Collier Road areas.

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 certain residences, other structures and roads. Project inverters and the substation may also be visible in some locations.

- Existing vegetation and the vegetative buffers proposed for the Northern Project section will shield the panels, inverters, substation and other infrastructure from view for nearby residents. Existing vegetation may largely shield the Project from residences on Collier Road except during non-foliage seasons; however, the homes along Lover's Lane would be in full view of Project facilities without the proposed vegetative buffers.

- The closest residence to the Project substation would be approximately 600 feet from that facility. Existing vegetation is in place which would shield the substation from view by that home.

- While no visual buffers are proposed for the Central and Southern sections, there is natural vegetation in the area which will shield the Project from view. Additionally, the distance between residences and Project infrastructure in these areas is greater than for the Northern section, which will also reduce views of the panels. However, there still may be a few nearby landowners that can see the Project from their residences.

- The Henderson Solar Ordinance states that "parcel boundaries with no proximity to residential dwellings shall not require screening." The term "proximity" is not defined in the ordinance and could be interpreted very differently by different parties.

- Discussions with the Henderson County Judge Executive and the Henderson County Property Valuation Administrator describe the Project area as ready for future commercial and industrial development, to include factories, warehouses and other

non-residential and non-agricultural structures. Project facilities would be interspersed with those types of other structures. Solar panels would be of a similar or shorter height than other structures.

Overall, HE expects the visual impacts associated with the presence of Project facilities to be minimal in most areas, assuming the vegetative buffers are developed as proposed and accommodation with the Lover's Lane and Collier Road areas is achieved.

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:

- Construction vehicles and activity may be visible from local roadways, at several vantage points around the Project site and from nearby residential properties, especially in the Northern section. These effects will be temporary and construction work will move around within each Project section, reducing the duration of visual impacts related to construction. Existing vegetation left in place along Project boundary lines will help to reduce visibility of construction activities occurring on-site in certain areas. Additionally, the general area is relatively remote, with few residents or drivers along local roads, reducing the extent of visual impacts.

- 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 Northern section of the Project. Proposed buffers will 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 existence of relatively few homes in close proximity to the Project will reduce the extent of visual effects.

- The potential need for additional vegetative buffering in the Central and Southern sections of the Project should not be discounted. Landowners in those areas may desire buffering from the Project once panels are in place.

- The substation will be located in the northwestern portion of the Northern section. That facility will be at least partially, if not fully, shielded from view by the existing vegetation in that area.

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

- Based on our understanding of the Project and of the Project area in Henderson County, HE believes that the Henderson Solar facility would be compatible with existing scenic conditions, assuming development of the proposed vegetative buffers in the Northern section.

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

1. The Applicant should maintain existing vegetation to the maximum extent possible. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of solar panels and related structures or is essential for necessary construction or operational activities.

2. Existing vegetation between the solar arrays and the residences should 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 should work with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors.

4. The Applicant should pay particular attention to the visual buffer needs for the homes along Lover's Lane. Individual discussions and agreements about buffering, including vegetative buffers prior to construction commencement, should be considered.

5. The Applicant should provide a visual buffer between Project infrastructure and residences or other occupied structures with a line of sight to the facility, pursuant to the Henderson County Solar Ordinance.

6. The Applicant should follow through on its commitment to providing vegetative buffers at the locations indicated on the Site Plan maps 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.

7. Plantings used for the vegetative buffer 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.

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

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

10. The Applicant should consider planting and maintaining multiple acres of native pollinator-friendly species on-site to help offset lost pollination opportunities from crops.

11. The Applicant will submit a professional glare study to the Siting Board. The Siting Board will review that study to understand the potential for glare surrounding the Project site and determine the need for additional mitigation.

12. 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.

Potential Changes in Property Values and Land Use

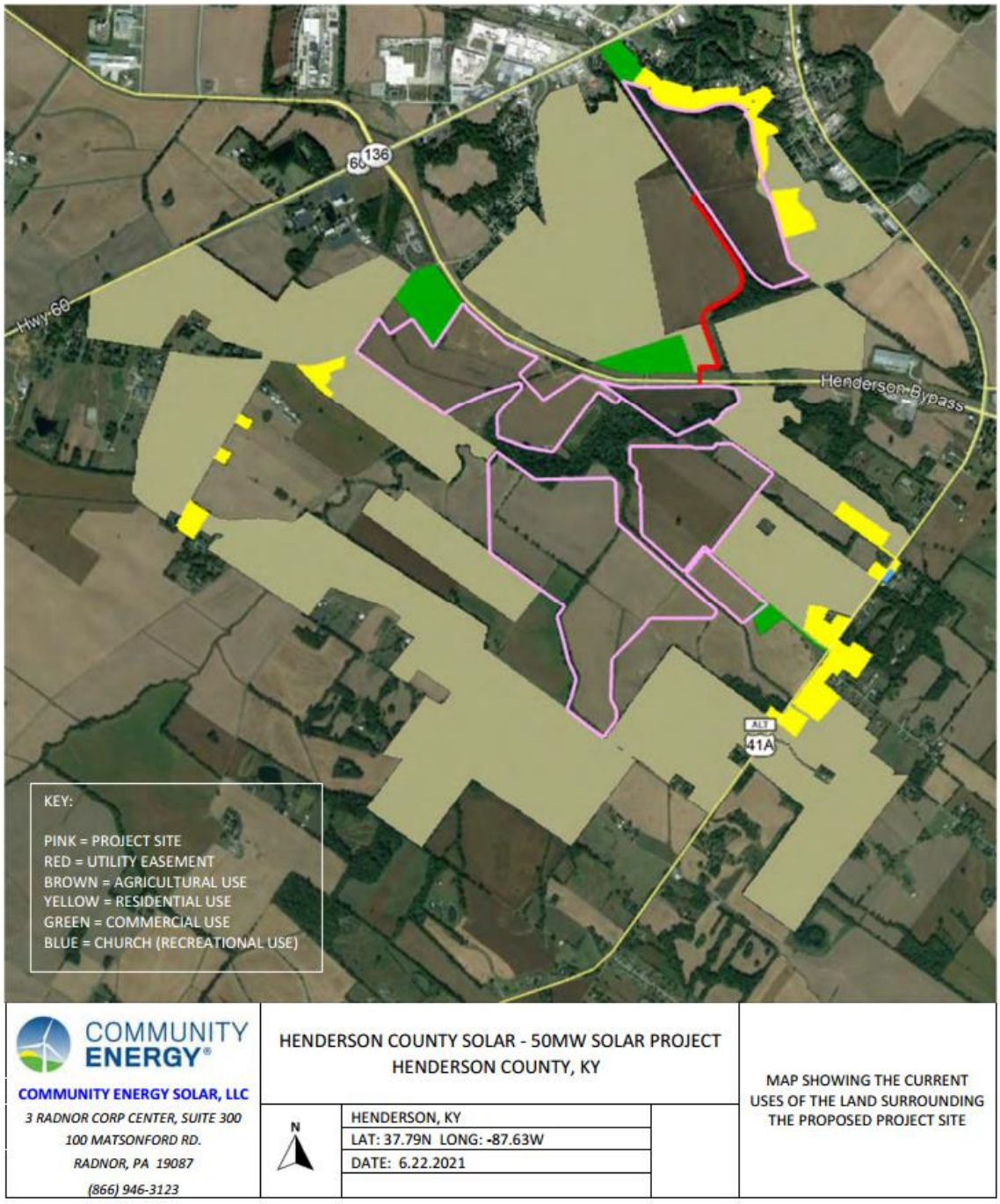
The construction and operation of industrial facilities has the potential to negatively affect property values and/or land uses of those properties adjacent to, or even in the general vicinity of, the facility in question. The magnitude, timing, and duration of increased traffic volume, noise, odor, 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. Exhibit 5-4 shows the current uses of land surrounding the Project site, as provided by the Applicant as Attachment 12.2 of the SAR. The majority of the area is currently used for agricultural purposes, with smaller commercial

Exhibit 5-4.
Map of Land Uses Surrounding the Henderson Solar Project Footprint



Source: Henderson Solar, LLC, June 2021.

The Property Value Impact Report (Attachment 12.6 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*** – Kirkland describes adjoining land as primarily a mix of residential and agricultural uses. About 57 percent of the acreage adjacent to the facility is agricultural; an additional 28 percent is mixed agricultural/residential and about 13 percent is identified as purely residential. Other adjacent properties include one church, an industrial property, a cell tower and a substation. As presented in Exhibits 3-5 and 3-6, there are 125 residences, 30 commercial structures and one church are located within 1,200 feet of the Project boundary line.

- ***Distances between solar panels and homes on adjacent properties*** – the Kirkland report indicates that the closest homes will be at least 240 feet away from a Project solar panel. In response to HE's inquiries, the Applicant provided additional information about the distance between various structures and Project solar panels; those data were provided in Exhibits 5-1 and 5-2, respectively. Altogether a total of 77 homes, 21 commercial structures and one church are located within 1,200 feet of Project panels.

- ***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.[38] 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).[39] The results of this analysis and Mr. Kirkland's overall conclusions are discussed below.

- ***Regional home values compared to the matched pair data*** – Mr. Kirkland also provided additional information regarding regional home values, stating "the available housing data shows the average home value within 1-mile is $132,579, the average home value within 3-miles is $147,784, and the average home value within 5-miles is $140,888." Those values are somewhat less than the average home value of properties in proximity to the solar projects analyzed in the matched-pair data set, but indicate a

[38] 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.
[39] Of the 37 solar facilities used in Kirkland's analyses, 36 facilities are 80 MWs or smaller.

general similarity between the Henderson Solar Project site and other areas in which solar farms have typically located. Mr. Kirkland states that "based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property."

- ***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 [Henderson 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., 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."[40]

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." He concludes that "these matched pairs support a finding of no impact on value at the subject

[40] Kirkland report, 2021.

property for the proposed project, which as proposed will include a landscaped buffer to screen adjoining residential properties."

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:

> "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%."

Mr. Kirkland 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."

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) conducted interviews with several real estate professionals in Henderson County; and (3) prepared further analysis of the data provided in the Kirkland report.

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).[41]

- 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

[41] 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).[42]

- A 2019 article produced by the American Planning Association (APA) 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." [43]

- 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."[44]

- Independent appraisers are often hired to conduct analyses related to property value impacts for solar companies, as is the case here for the Henderson 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.[45]

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,

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[42] 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.

[43] 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/.

[44] 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.

[45] 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.

Interview with the Henderson County Property Valuation Administrator. HE spoke with Mr. Andrew Powell about the Henderson Solar Project and the local real estate sector on August 20, 2021. He described a very strong real estate market characterized by increasing prices, with properties on the market for very short periods of time. Prices have increased by probably 25 percent in the last year or so and the time on the market decreased from as much as two months a year ago to as little as seven days in past months. These trends are true of the County as a whole, but especially of the areas immediately outside of the City of Henderson, where people are close to amenities, but do not have to pay certain city taxes. He believes that these trends are likely to be at least partially a result of the COVID-19 Pandemic, with people looking for larger homes or simply different homes, as well as interested in home renovations – investing in real estate since they are not spending money on other items, such as travel.

Mr. Powell was familiar with the Henderson Solar Project, stating that he has had on-going conversations with both the developers and local landowners about the Project. He commented that the local planning commission has enacted safeguards for adjacent landowners and performed their due diligence to protect those landowners through the setbacks and other requirements included in the Henderson County Solar Ordinance. He has not received negative feedback about the Project from any non-participating adjacent landowners, or from others in the County. He believes that many landowners near proposed solar facilities in Henderson County are satisfied with the Solar Ordinance.

Mr. Powell has also had the opportunity to talk with Property Valuation Administrators from other counties in Kentucky about the topic of property value impacts associated with solar facilities. Those discussions have concluded that there is no evidence of negative effects to land values from the presence of solar facilities. They seem especially confident of that when it comes to agricultural land.

Mr. Powell described the area as currently including commercial and industrial uses, with additional similar types of development planned for the future. He does not have any concerns about the Project with regards to scenic compatibility, land uses or property values.

Review of Kirkland data. Although Mr. Kirkland concludes that there would be no impacts on property values from the Henderson 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 5-5 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.

Exhibit 5-5.
Distribution of Sales Price Differences for Matched Pair Sets, 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 5-6 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 5-6.
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 and other properties 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 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 and non-residential properties in terms of distance to the Project and potential viewshed impacts when considering potential impacts to property values.

- Northern section: As discussed previously in the Scenic Compatibility section, some homes on properties adjacent to the Northern section would be located very close to the Project – six would be within 300 feet of the panels and 18 would be within 300 feet of the boundary line. However, existing vegetation and proposed vegetative buffers in this area would go a long way to shielding the Project from view. Additionally, although this area is somewhat "tucked-away" from U.S. 60 and U.S. 41A, those nearby roadways do offer various retail, commercial and other services, and an industrial park is less than a half mile away, providing a less rural feel immediately outside of the Project site.

- Central and Southern sections: These Project sections would largely be located among what is currently agricultural fields; however, this area is expected to be developed, over time, with additional commercial and industrial uses. One example is the paper mill soon to be located along KY 425 on a property close to the Project.

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.[46]

- 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 six to nine 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 Henderson 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.

- Homes along Lover's Lane on the east side of the Northern section of the Project will be very close to the solar panels. The proposed vegetative buffers might substantially reduce the view of the Project for those residences once in operation. Other residences surrounding the Northern section will be largely shielded from view of the Project by existing vegetation and additional buffering.

- Existing vegetation is less abundant in the areas surrounding the Central and Southern sections of the Project. However, homes in that area are located at a further distance from Project facilities, as compared to the Northern section. Also, the area is planned for other commercial and industrial uses, reducing potential impacts related to property value concerns associated with the Project.

- Operational noise levels are anticipated to be relatively low for all nearby residences, and below the World Health Organization's estimates of moderate or annoying noise levels for residences more than 400 feet from the Project.

- The Henderson County Property Valuation Administrator does not believe that the Henderson Solar Project will have any adverse effects to residential or non-residential property values near the facility. That area of the County is currently experiencing an active real estate market, with rising prices and short sales periods. It is also an area planned for future commercial and industrial development.

- HE concludes that property values in the Project area and in Henderson County are unlikely to be affected by the siting of the Henderson Solar facility. This conclusion assumes that the mitigation strategies discussed in Section 6 are adopted by Henderson Solar, including those that specifically address visual impacts.

[46] 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/

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 impacted and concerned homeowners 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. Henderson 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.[47] 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.[48] 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:[49]

- Measurement of existing ambient noise levels;
- Identification of noise-sensitive receptor sites;
- Calculation of distances between noise sources and sensitive receptors;
- Estimation of Project-related (construction or operational) noise production and exposure, including cumulative noise effects.

[47] 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
[48] 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.
[49] 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;

Summary of information provided by the Applicant. The Acoustical Analysis for the SAR was completed by Copperhead Environmental Consulting (Copperhead) and can be found in Volume 1, Exhibit 12, Attachment 12.5. The Analysis provides data on the existing land use and site conditions, existing acoustic conditions, expected construction and operational sound conditions, including traffic and maintenance activities. Additional details regarding sensitive receptors were provided by the Applicant as part of supplemental materials submitted to the Siting Board.

Baseline (ambient) noise levels. Ambient noise levels in the Project area are primarily from agricultural activities, such farm equipment, and moderate traffic noise. Copperhead estimated that these types of land uses would generally produce sound levels of 45 to 55 dBA. Adjacent and nearby land uses include agriculture, scattered woods, rural residences and commercial businesses. The Acoustical Analysis also provided information on typical sound levels for farm equipment, which ranged from 70 dBA for a chicken coop to 105 dBA for a tractor with no cab. Existing traffic noise in the area is typical for a rural farming community and the local one-lane roads. KY 425 (Henderson Bypass) and U.S. 41A also contribute to existing noise levels. producing from 70 to 80 dBA, with peak levels during normal business hours.

Sensitive noise receptors. As described in the Acoustical Analysis, sound-sensitive receptors generally are defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Typically, sound sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature preserves, recreational areas, and parks. Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Local conditions such as traffic, topography, and winds characteristic of the region can alter background sound conditions.

The Copperhead report identifies 10 noise receptors closest to the Project site; however, there are 373 residences and 84 commercial buildings (including three schools and two churches) are located within 2,400 feet of the Project boundary. The Northern section of the Project has 18 residences within 300 feet of the Project boundary, whereas the Central and Southern Sections have two commercial businesses but no residences within that distance.[50] There are an additional 31 homes and two commercial entities within 600 feet of the Northern section boundary and nine residences and two additional businesses within 600 feet of the Central and Southern sections. In all, 58 homes and six commercial establishments are located within 600 feet of any Project boundary line.

There are 40 structures (38 residential and two commercial) within 2,000 feet of the Project substation, to be located in the Northern section. The closest residence from the substation is 792 feet away, with all other structures at a distance of more than 1,100 feet. There are no sensitive receptors within 600 feet of the nearest inverter.

[50] The nearest residence is about 217 feet from the nearest solar panel (Northern section).

Construction noise emitters. During the construction phase, a variety of heavy equipment will be utilized. Peak construction noise will be created by pile drivers, concrete trucks, backhoes, bulldozers and additional road traffic. The most common method of installing the support posts for the solar panels is to drive them into the ground (pile-driving). The pile driving procedure produces a repetitive, metallic impact sound. Individual piles take only a few minutes to be driven into the ground. Pile driving is anticipated to take approximately 30 workdays to complete over a period of about six to eight weeks. Four homes would be within 300 feet of an anticipated pile driving location; an additional 11 homes would be between 300 and 600 feet of an anticipated pile driving location. All those residences are located near the Northern section of the Project. Exhibit 5-7 provides estimates of the sound levels emitted by pile driving activity and the sound levels experienced at nearby residences.

Exhibit 5-7.
Pile Driving Sound Levels for Nearby Residential Structures

Address	Distance from Nearest Pile Driving Location	Pile Driver Sound Level at 50 Feet	Attenuated Sound Level at Residence
904 Lover's Lane	290 feet	84 dBA	68.73 dBA
904 Lover's Lane	217 feet	84 dBA	71.25 dBA
904 Lover's Lane	268 feet	84 dBA	69.42 dBA
904 Lover's Lane	254 feet	84 dBA	69.88 dBA
Other Lover's Lane Homes	319 feet - 599 feet	84 dBA	67.90 - 62.43 dBA

Source: Henderson Solar, LLC, August 2021.

Limited concrete pouring is anticipated for the Project. Base slabs for the inverters and other electrical equipment will be precast and dropped in place. The transformer base at the substation may be poured concrete. Concrete pouring for the substation will require a concrete pump truck. A concrete pump truck typically generates a sound of approximately 82 dBA at 50 feet. At the nearest receptor to the substation (approximately 600 feet), the sound level is estimated to be 60.42 dBA intermittently for a day or two.

Underground electrical lines also will be constructed on site. The trenches to hold the cabling will be approximately 3- to 4-feet deep and approximately 2-feet wide. A ditch trencher (ditch witch) will be used to dig trenches for laying the electrical cables. The anticipated sound level at 50 feet is 74 dBA. The nearest residence is approximately 242 feet from the nearest solar array. At this distance, temporary and intermittent sound levels for a ditch trencher would be approximately 60.3 dBA. This sound level is temporary and should decrease within hours as sections of the trench are completed and the trencher moves further away from the residence Completion of the electrical installation is projected to take 200 days, with noise levels greater than 55 dBA for 26 days for nearby homes.

Sounds emitted by the concrete pump truck and the ditch witch are shown in Exhibit 5-8.

Exhibit 5-8.
Construction Sound Levels, by Equipment Type and Distance

Equipment	Distance from Nearest Receptor (Feet)	Sound Level at 50 Feet	Sound Level at Nearest Residence
Concrete Pump Truck	~600	82 dBA	60.42 dBA
Ditch Witch	~240	74 dBA	60.3 dBA

Source: Henderson Solar, LLC, June 2021.

The Applicant proposes for construction to occur between 7:00 am to 7:00 pm, Monday through Saturday. In addition, the Applicant proposes the creation of two "Neighbor Zones," which would observe stricter time limits on pile driving and other loud construction activities. Within these zones, loud construction activities would be limited to 9:00 am to 5:00 pm, Monday through Friday. The entirety of the Northern Section will be one Neighbor Zone; the eastern most array of solar panels in the Central section will also be a Neighbor Zone. The Applicant believes that the Neighbor Zones will be sufficient to mitigate project noise and proposes no additional noise suppression methods.

Construction deliveries will require the Applicant to widen Lover's Lane, along the eastern side of the Northern section, to accommodate larger trucks.[51] Road widening activities, including use of a front-end loader and dump truck, will take about two days to complete and will produce sound levels of 71.48 dBA at the nearest residence (250 feet away).

During construction, a temporary increase in traffic volume associated with travel of construction workers (up to 150 workers), delivery of construction equipment and material, delivery of solar panel components and equipment is anticipated. Workers commuting to the Project site would result in two daily traffic peaks (i.e., morning peak and afternoon peak). Deliveries of equipment would occur on trailers, flatbeds, or other large vehicles would occur periodically throughout the construction period at various times of day. According to the Acoustical Analysis, "based upon the sound levels published by the Federal Highway Administration (FHWA), the sound contributed by construction vehicles such as flatbed trucks, light passenger cars and trucks falls within acceptable ranges because the sound is of short duration."[52]

Cumulative noise effects from the construction phase of the Project will depend on the timing of different construction activities. It is possible that the loudest activities could occur in close proximity and simultaneously. These emitters include pile drivers for the racking installation, bulldozers and dump trucks for the excavation of internal roads, and trenching for underground electrical installation. The cumulative effects, including ambient sound of 55 dBA, are shown in Exhibit 5-9.

[51] Road widening is discussed in detail as part of the discussion about road and traffic impacts.
[52] FHWA Construction Noise Handbook, August 2006.

Exhibit 5-9.
Cumulative Construction Noise Levels, by Distance

Activities	Distance (Feet)	Cumulative Sound Level (dBA)
Pile Driving + Excavation	250	75.15
	750	65.61
Pile Driving + Excavation + Electrical Installation	250	75.65
	750	66.11

Source: Henderson Solar, LLC, September 2021.

Operational noise emitters. The primary sources for noise during the operational phase will be from (1) the tracking devices for the solar panels; (2) the inverters, which convert direct current electricity to alternating current; and (3) the main transformer at the substation. Single-axis tracking panels would be distributed evenly across the Project site.

Tracking systems involve the panels being driven by small, 24-volt brushless DC motors to track the arc of the sun to maximize each panel's potential for solar absorption. Panels would turn no more than five degrees every 15 minutes and would operate no more than one minute out of every 15-minute period.

The solar facility would employ multiple inverter pads across the project site. Each inverter pad would contain up to six inverters. The inverter pads are located not less than 750 feet from any residence.

The main transformer at the substation is anticipated to be a 69kV/34.5kV 40/53/66 MVA transformer. The sound from a transformer is characterized as a discrete low frequency hum. The sound from transformers is produced by alternating current flux in the core that causes it to vibrate.

Sounds emitted from operational equipment are shown in Exhibit 5-10.

Exhibit 5-10.
Operational Sound Levels, by Equipment Type and Distance

Equipment	dBA by Distance	dBA at the Closest Residential Receptor
Tracking Systems	78 dBA at 1-foot 34.48 dBA at 150 feet	30.32 dBA
Single Inverter	<80 dBA at 3.28 feet	NA
Inverter Pads	87.78 dBA at 3.28 feet	40.6 dBA
Transformer	50 dBA at 3.28 feet	<4.75 dBA

Note: The closest residence to a tracker is over 200 feet; the closest residence to an inverter pad is 750 feet and the closest residence to the transformer is 600 feet.

Source: Henderson Solar, LLC, June 2021.

In addition to these noise impacts, there will be minor effects from maintenance and repair activities and from vegetation control and mowing activities. Mowing will occur 20-30 times per year and the nearest sensitive receptors will experience an attenuated sound level of 64.64 dBA.

The Applicant provided information on the cumulative impacts of operational noise, including inverters, substation and tracking motors, along with ambient sounds. The predicted levels are shown in Exhibit 5-11.

Exhibit 5-11.
Predicted Cumulative Operational Sound Levels

Predicted Sound Levels if All Equipment Co-located	
Distance (Feet)	**Sound Level (dBA)**
200	52.13
400	46.11
600	42.58

Source: Henderson Solar, LLC, August 2021.

HE's evaluation of impacts. Neither the Commonwealth of Kentucky nor Henderson County have a noise ordinance that is applicable to the Project. As such, HE utilized the noise limit recommendations generated by the Environmental Protection Agency (EPA) and the World Health Organization (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.[53]

- 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.[54]

Construction noise. Construction activities will produce sporadic noise that will exceed 55 dBA during daytime hours. The nature of the Project, which requires that construction activities move around the site as each task is completed, will minimize some of the annoyance created by loud, though sporadic, noise.

Construction noise, such as trenching with backhoes, fence installation and concrete pump trucks will contribute noise that will exceed 55 dBA. Because of the proximity of homes to the Northern section, where solar panels, inverters and the substation will be located, noise impacts

[53] 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
[54] World Health Organization. *Guidelines for Community Noise*. April 1999. https://www.who.int/docstore/peh/noise/Comnoise-1.pdf

will be greatest for residents of that area. While the implementation of Neighbor Zones will help mitigate the impacts, the recent increase in work from home situations may make residents more sensitive to noise during traditional working hours.

The Project has the potential for a number of loud activities to occur simultaneously, but the timing of activities is such that it is not realistic to predict which sources of noise will contribute to these periods of cumulative sounds. To better consider this question, HE looked at methods for calculating cumulative sound levels.

As a reference, one decibel is the "just noticeable difference" (JND) in sound intensity for the human ear.[55] As shown in Exhibit 5-9, adding electrical installation activities to pile driving and excavation increase the cumulative sound level by 0.5 dBA, which should not be a noticeable change. However, this assumes that the frequencies of these sounds are similar. If sounds have widely different pitch, the perceived loudness will be greater. "Compared with dB, A-weighted measurements underestimate the perceived loudness, annoyance factor, and stress-inducing capability of noises with low frequency components, especially at moderate and high volumes of noise."[56] This may mean that very different types of noises have a greater cumulative impact that expected. Cumulative impacts from two noise sources can be calculated based on the difference in the sound levels as shown in Exhibit 5-12.

Exhibit 5-12.
Calculation of Additional Sound Power, in Decibels

Signal Level Difference between Two Sources (dB)	Decibels to Add to the Highest Signal Level (dB)
0	3
1	2.5
2	2
3	2
4	1.5
5	1
6	1
7	1
8	0.5
9	0.5
10	0.5
> 10	0

Source: https://www.engineeringtoolbox.com/adding-decibel-d_63.html.

This suggests that even multiple sources of loud noise will produce only modest increases to overall sound levels, providing the sources of noise are not of very different frequencies.

[55] http://hyperphysics.phy-astr.gsu.edu/hbase/Sound/db.html#c3
[56] https://www.softdb.com/difference-between-db-dba/

Although the residents near the Project site will experience noise at levels expected to cause annoyance, the sporadic nature of the noise will not be sufficient to cause damage to residents' hearing.

Operational noise. The nature of solar projects dictates that noise from operations will occur during daylight hours. For one residence near the Northern section, located 217 feet from the nearest solar panel, cumulative noise impacts could be about 50 dBA during the day, which might be somewhat annoying. Other residences are located further from any type of operational equipment and therefore, operational noises heard by those homeowners would be even lower; noise levels for those residents would be below the WHO's recommended maximum noise level of 50 dBA during the operational phase. HE concludes that, except for residences along Lovers Lane, noise impacts from Project operations will be minimal.

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:

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

- Construction phase noise will likely be annoying for residents surrounding the Project area for short periods of time. This is particularly true for the Northern section of the Project, which has which has 18 residential structures within 300 feet of the boundary line and six homes on Lover's Lane within 300 feet of the nearest pile driving activity. The intermittent nature of the noise might tend to ameliorate the impacts, but for some residents, the construction noise could be troublesome, even if it does not present actual damages to hearing.

- The two Neighbor Zones to be established by the Applicant will reduce sound levels after 5:00 pm, but with more people working from home during regular business hours it is possible that there may be a level of disruption that is upsetting to some.

- Noise from Project components during operations (inverters, motors, transformer) is anticipated to result in only a modest increase to the local sound environment. For the closest residential receptor, daytime noise should be around 40.6 dBA, well within the WHO's recommended maximum noise level of 50.0 dBA.

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 for affected areas at least one month prior to the start of construction.

2. The Applicant should remain in contact with nearby residents, with a special focus on residents on Lover's Lane, to explain the construction schedule and associated noise

impact and duration prior to start of construction. The applicant should confirm that noise levels are not unduly high or annoying during construction. If the noise levels are unduly high or annoying, the Applicant should mitigate those effects as needed.

3. The Applicant should limit the construction activity, process and deliveries to the hours of 8:00 am to 6:00 pm, Monday through Saturday. Pile driving activities should cease by 6:00 pm each day, except for pile driving in the Neighbor Zones, in which case, pile driving should cease at 5:00 pm. 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.

4. The Neighbor Zone should by implemented as the Applicant proposed. In those zones 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 comparably effective method).

5. When possible, construction crews should avoid simultaneous use of multiple sources of loud equipment in the same area. This is especially true for the Northern section.

6. If repairs or maintenance activities occur at night, normally quiet during the operational phase, crews should be aware of nearby homes and reduce loud noise when possible.

Road and Rail Traffic, Fugitive Dust and Road Degradation

Traffic concerns related to the development of the Henderson Solar facility during the construction or operational phases are addressed in this section. The six to nine 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.

There is an existing CSX railway on the western edge of the Northern section of the Project, which is assumed to be used for agricultural purposes. At the time that the application was submitted, the Applicant did not anticipate using or crossing the railway during either during the construction or operational phase of the facility. However, the Applicant is now considering several options for the delivery of the substation transformer, one of which includes use of the rail line for delivery of that transformer.[57] In addition, the Applicant will need to secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the railway.

[57] The Applicant's need to evaluate alternative delivery options for the transformer are discussed later in this section. For purposes of evaluating road and rail traffic impacts, HE assumes that the transformer will be delivered as described in the Application materials.

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
- 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. Bacon Farmer Workman Engineering & Testing, Inc. (BFW) completed a Traffic Study for the Applicant, which is provided in Volume 1, Exhibit 12, Attachment 12.7 of the SAR. Additional information was provided as part of supplemental materials submitted to the Siting Board. The BFW report provided data on existing traffic volumes and road conditions for local roadways expected to be used to access the site. Traffic projections, level of service (LOS) analysis and operational phase impacts were also provided.

Site access, vehicle parking and internal roadways. A total of five entrances are planned for site access during construction and operations. The Northern and Southern Project sections will each be accessed by one entrance, while the Central section will have three entrance points. The Northern section's access point will be off Lover's Lane; Central section entrances will be located on Old Corydon Road and KY 425 (Henderson Bypass); the Southern section will be accessed from Wilson Station Road. The Applicant indicated that it is not known at this time whether the Central section entrances will be used equally, or if a main entrance will be established.

The Applicant anticipates that 10 to 15 acres of the entire Project, will be used for vehicle parking, storage, staging and assembly, with individual staging areas ranging from about ¾ acre to three acres. Approximately five miles of internal roadways will be constructed from compacted gravel within the Project area. Entrance locations, potential staging and parking areas, and internal roadways are identified for each Project section in Exhibits C-1, C-3 and C-5, provided in Appendix C of this report.

The Northern section will be accessed from Lovers Lane, via Collier Road. That approach will necessitate traffic crossing Canoe Creek via an existing 3-span bridge on Lover's Lane that has a weight limit of 18 tons. There is also a curve on the south side of that bridge, which will require modification to accommodate larger delivery trucks and trailers. The Applicant has indicated that all deliveries would observe the bridge weight restriction by delivering partial loads, each less than half full. The sharp curve will be mitigated by adding three feet of pavement/stabilization and widening along both sides of Lover's Lane.

The weight restriction of the bridge will be a particular issue for delivery of the substation transformer, which would greatly exceed the 18-ton maximum. As part of supplemental materials submitted to the Siting Board, the Applicant has stated that they are exploring the following options:

- Selecting an alternate transformer of sufficiently low weight
- Shipping the transformer empty of any cooling fluids
- Utilizing multiple smaller transformers instead of a single transformer
- Delivering the transformer by rail, on the adjacent CSX rail line
- Relocating the Project substation to the POI location

The evaluation of Project impacts included in this report is based on information provided by the Applicant and existing conditions in the Project area. That includes the assumption that one transformer will be delivered to the Northern section of the Project via one large delivery truck using the entrance on Lover's Lane (and the bridge over Canoe Creek). If the Applicant pursues any of the options noted above in relation to the location, delivery or size of the transformer, the Siting Board will examine those Project impacts.

Baseline traffic volumes and road conditions. The Applicant provided the limited information available for the roads surrounding the Project site. The local roads and city streets shown in Exhibit 5-13 are all one-lane roads.

Exhibit 5-13 provides available information on Project area traffic levels, by roadway.

Exhibit 5-13.
Baseline Traffic Volumes for Roads Surrounding the Henderson Solar Project Site

Station ID	Roadway	Classification	Average Daily Traffic (ADT)	Year Counted
051B86	US 60	Principal Arterial (NHS)	11,568	2015
051769	US 41A	Minor Arterial	3,542	2015
051755	KY 425 (Henderson Bypass)	Principal Arterial (NHS)	6,102	2019
N/A	CR 1348 Wilson Station Rd.	Local Road	Not Available	N/A
N/A	Old Henderson Corydon Rd.	Local Road	Not Available	N/A
N/A	Collier Road	City Street	300 (Assumed)	N/A
N/A	Fairmont Ave.	City Street	Not Available	N/A
051915	Lovers Lane	Local Road	90	2012

Source: Henderson Solar, LLC, June 2021.

Photos of these local roadways, provided in the Traffic Study, show narrow roads, unmarked pavement and no shoulders.

An intersection analysis provided by BFW found the only one signaled critical intersection for roads surrounding the Project to be at U.S 41A and Collier Road. That analysis determined that the level of service (LOS) would remain essentially unchanged with projected peak hour traffic.

Construction related traffic volumes and routes utilized. Construction related traffic will include (1) passenger vehicles; (2) heavy-duty delivery trucks; and (3) water trucks.

- Between 50 and 150 workers would be on-site on any individual day.
- Most delivery vehicles will be interstate tractor trailer semis, weighing about 40 tons each.

The Applicant has stated that for their planning purposes, peak and average days are the same. Although the Applicant has indicated that there will be three entrances to the Southern section, traffic volumes were only provided for the two entrances off KY 425 (Henderson Bypass). The Old Henderson Corydon Road entrance was not included in the data provided. Exhibit 5-14 provides the Applicant's estimates of vehicle traffic by type and site entrance for the average and peak days, which includes the peak number of commuter vehicles.

Exhibit 5-14.
Average and Peak Day Traffic, by Site Entrance and Vehicle Type for the Henderson Solar Project

Site Entrance/Average & Peak Day	Commuter Vehicles	Delivery Trucks	Water Trucks
Wilson Station Road via U.S. 41A South	74	2	1
KY 425 (Henderson Bypass) west entrance	19	1	1
KY 425 (Henderson Bypass) east entrance	19	1	1
Lover's Lane via U.S. 41A North	38	1	1
Project Total	150	5	4

Source: Henderson Solar, LLC, September 2021.

The Traffic Study estimated that 73 percent of Project traffic will approach the three Project sections via I-69/KY 425 (Henderson Bypass). Construction traffic coming from the west and north (about 23 percent of total vehicles) will utilize KY 425 West and U.S. 41A North. The remaining four percent, traffic coming from the south, will use U.S. 41A South. KY 425 (Henderson Bypass) will provide direct access to two of the Central section entrances. Access to the Northern and Southern sections, as well as the third Central section entrance on Old Corydon Road, will require construction related vehicles to travel on smaller, local roads. Peak traffic times are projected to be at 6:45 am and 4:15 pm; however, heavy trucks and water trucks are not expected to operate during peak times.

Despite the assumption for planning purposes that peak and average day traffic is the same, the Applicant also estimated that peak deliveries to the Northern section, via Lover's Lane, will include three to four partially loaded trucks.

According to the Traffic Study, all roads utilized by the Project will continue to operate at an acceptable LOS during the construction phase.

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

- Traffic stoppages at the site entrances on Wilson Station Road, Old Henderson-Corydon Road, and Lover's Lane are anticipated. Each entrance may experience one to two stoppages a day; each stoppage should not exceed two minutes.
- In order to better manage traffic during construction, the construction team may issue "route and parking cards" to workers and delivery drivers. These cards would specify time, route and parking areas and indicate entrances to be used.
- Ridesharing during the construction phase will be encouraged.

Operations related traffic volumes. During operations, two to three staff members will be on site during normal business hours. Occasionally, planned maintenance will be performed at night and repairs may occur outside regular business hours.

Road degradation. The Traffic Study indicated no significant impacts to area roads but notes that increased wear would be likely at each entrance location. The Applicant will be responsible for the costs of road repairs directly related to Project activities. This includes the widening of Lover's Lane, which will remain in place after Project completion.

The Applicant does not plan on replacing or improving the bridge over Canoe Creek. The current plan is to take a number of smaller loads over the bridge to stay within the weight limit.[58]

Fugitive dust. The Applicant expects minor impacts from fugitive dust during construction, which will be mitigated by covering open trucks when in motion and using compacted gravel for internal roadways. Water will be applied as needed. No impacts are expected during the operational phase. Along with existing vegetation, buffers planted for visual screening will also tend to minimize dust. In addition, groundcover will be grown across the site and maintained with irrigation, which will further reduce any dust.

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

Baseline traffic volumes. The Applicant provided traffic counts for the roads surrounding the Project area, as shown in Exhibit 5-13. Unfortunately, traffic counts were not available for three roads and an "assumed" figure was given for Collier Road. HE sought supplementary sources but was unable to obtain additional existing traffic information.

Photographs of local roads provided in the Traffic Study and taken by HE on the in-person site visit indicate light levels of existing traffic. HE observed that these roads are generally narrow,

[58] Verbal representation by the Applicant, September 15, 2021.

unmarked and lacking shoulders. Under current conditions, cars may have to pull to one side when there is oncoming traffic due to narrow conditions. Site photos from HE's visit are provided in Appendix B.

According to the Kentucky Transportation Cabinet's (KTC), Truck Weight Classification Map, U.S. 60, U.S.41A and KY 425 (Henderson Bypass) near the Project site are all rated for 80,000lb (40-ton) gross vehicle weights.[59] Gross vehicle weight is the total weight of the vehicle, including passengers and cargo.

Construction related traffic impacts. The Project generated traffic data provided in Exhibit 5-14 is assumed to reflect one-way trips; therefore, those were doubled to reflect the total number of trips on each affected roadway during construction. Increases in daily traffic for select Project roads is presented in Exhibit 5-15.

Exhibit 5-15.
Average(1) Day Traffic Impacts, by Site Entrance for the Henderson Solar Project Site

Station ID	Roadway	Average Daily Baseline Traffic (ADT)	Avg. Daily Project Traffic	% Change in Activity (Avg.)
051769	US 41A	3,542	154	4%
051755	KY 425 (Henderson Bypass)	6,102	84	1%
N/A	CR 1348 Wilson Station Rd.	Not Available	154	
N/A	Old Henderson Corydon Rd.	Not Available		
N/A	Collier Road(2, 3)	300	80	27%
N/A	Fairmont Ave.	Not Available		
051915	Lovers Lane	90	80	89%

Notes: (1) The Applicant has stated that for planning purposes, average and peak day traffic are the same.
(2) The ADT for Collier Road was "assumed" in the SAR.
(3) The project traffic utilizing Lover's Lane will travel on Collier Road, the only access point, therefore construction traffic was assumed to be the same.

Source: Henderson Solar, LLC, September 2021.

- Traffic increases on U.S. 41A and KY 425 (Henderson Bypass) would be four percent or less, which may not be noticeable to other drivers.

The Project's construction activities would increase traffic on Collier Road and Lover's Lane considerably. Lover's Lane would experience an 89 percent increase in daily traffic during the construction phase; that increase is especially impactful since Lover's Lane is a dead-end road. Although there are only a few residences on Lover's Lane, people living in those homes must use Lover's Lane to enter and exit the area; there are no alternative approaches to homes in that area.

- Increased traffic on Collier Road may also be somewhat annoying for residents on that dead-end road.

[59] https://transportation.ky.gov/Planning/Documents/Weight%20Class.pdf

- Although no traffic data are available for Wilson Station Road, the lack of such data suggests that traffic is light and that the estimated level of increase may be noticeable but affect few other drivers Unlike the roads in the area of the Northern Section (Lover's Lane and Collier Road), the areas adjacent to Wilson Station Road are predominately agricultural with few residences.

With traffic stoppages expected to occur once or twice a day at Wilson Station Road, Old Henderson-Corydon Road, and Lovers Lane, residents might perceive the traffic impacts to be greater than the numbers suggest. Widening of Lover's Lane will take two days and may present brief additional aggravation to residents as it is a dead-end road.

Taken together, these data suggest that traffic impacts will be most keenly felt in the Northern section of the Project.

Operations related traffic impacts. With only two or three staff members working regular business hours and the occasional off hours maintenance and repair, traffic impacts during operations should be de minimis. HE does not expect significant traffic effects related to operation of the facility.

Road and bridge degradation. The lack of information about the weight limits, types of existing traffic (especially large trucks) and baseline traffic levels on some roads make it difficult to predict if road degradation will occur. However, the Kentucky Transportation Cabinet (KTC) offers information about the conditions and limitations associated with roads and bridges.

According to the KTC's Bridge Data Miner and Bridge Weight Limit interactive maps, several bridges are located near the Project site, including two on U.S. 60, one on U.S. 41A and two on KY 425 (Henderson Bypass).[60] No weight restrictions are indicated for any of those bridges. Four of those bridges are rated as being in "Fair" condition and the fifth, near Henderson Community College, is rated as being in "Good" condition. However, the bridge over Canoe Creek (on Lover's Lane, near the Northern section) is limited to 18-ton loads and is rated as being in "Fair" condition; as such, that bridge will be insufficient for supporting the Project's heavy truck traffic, including the transformer delivery truck in a single load.

The KTC's Pavement Conditions interactive map provides data regarding road conditions for individual segments of state and county roads; pavement conditions data are not available for local or city roads.[61] Pavement conditions are measured by several factors, including an International Roughness Index (IRI) and a Pavement Distress Index (PDI); higher values of these indices indicate rougher pavement or poorer pavement conditions. The majority of KY 425 (Henderson Bypass) near the Project site has an IRI of 170.08 and a PDI of 0.66; that route is color coded red (on a scale of green, yellow and red) and treatments are recommended to occur by 2024. Smaller portions of that route (near the intersections with U.S. 60, are in better shape and are color coded yellow or green. The majority of U.S. 41A near the Project site is color coded red, with an IRI of 102.33 and a PDI of 0.74; the recommended treatment year was

[60] https://maps.kytc.ky.gov/bridgeweightlimits/ and https://maps.kytc.ky.gov/bridgedataminer/
[61] https://maps.kytc.ky.gov/pavementconditions/

2019. U.S. 60 to the west of the Project site has an IRI of 85.49, a PDI of 0.48 and a color coding of yellow; the recommended treatment year was 2020. HE interprets these data to mean that roadways surrounding the Project site may generally be in fair condition and currently in need of some maintenance.

Given the estimates of Project generated traffic during construction and the available information about road and bridge conditions, the Applicant should be prepared to repair any damage due to commuting workers or heavy trucks traveling on the local roadways.

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

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 and bridge degradation:

- The nature of the local access roads will require that drivers pull over for large vehicles. While residents may be accustomed to this, especially considering farm equipment in the area, this might be a point of dissatisfaction.

- Lover's Lane will experience a two-day road widening project and one to two periods of traffic stoppages per day during construction.

- Construction traffic will be noticeable for the Northern section along Collier Road and Lover's Lane, both dead-end roadways. The need to use partial equipment deliveries over Canoe Creek will increase the number of truck deliveries to that section.

- Baseline traffic data are not available for Wilson Station Road; therefore, the increase in traffic volumes due to construction are unknown. If existing traffic on that road is light, as suggested by the lack of traffic data, the addition of 154 vehicle trips per day may be noticeable to residents.

- Old Henderson Corydon Road does not appear to be a major route for Project traffic.

- The logistics associated with delivery of the main transformer are uncertain at this time due to weight restrictions on the bridge over Canoe Creek, but a 120 ton load over this bridge is an issue. The current plan appears to be to bring the transformer over the bridge in multiple trips

- 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.

- The Unbridled Solar project will be about 13 miles from the Henderson Solar site. The Applicant asserts and HE agrees that the distance between the sites precludes the necessity of an analysis of cumulative traffic impacts even if construction is during the same time period.

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

1. The Applicant should work with the Commonwealth road authorities and the Henderson County Road Department to perform road surveys, before and after construction activities, on all roads to be used by construction vehicles.

2. The Applicant will consult with the Kentucky Transportation Cabinet (KTC) regarding truck and other construction traffic and obtain necessary permits from the KTC.

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

4. The Applicant will develop and comply with any road use agreement executed with the Henderson 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. The Lover's Lane bridge over Canoe Creek, posted as having an 18-ton weight limit, poses a special concern when considering heavy truck traffic and delivery of the Project transformer.

5. The Applicant will fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads or bridges, such as the Lover's Lane bridge over Canoe Creek, that it causes or to which it materially contributes to, regardless of its status as a KY Route or local road.

6. The Applicant should develop and follow a traffic management plan to minimize the impacts of any traffic increases and keep traffic and people safe. To better manage traffic during construction, the construction team may issue "route and parking cards" to workers and delivery drivers. These cards would specify time, route and parking areas and indicate entrances to be used.

7. Ridesharing during the construction phase will be encouraged.

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

9. The Applicant will secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the existing railway line.

10. The Applicant will plant a continuous groundcover across the Project site. Where needed, the Applicant will employ irrigation to establish and maintain such a groundcover.

11. 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.

12. The Applicant has indicated that the curve on Lover's Lane will be mitigated by adding three feet of pavement/stabilization and widening along both sides of Lover's Lane.

13. In addition, the Applicant will secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the railway.

Economic Impacts

Evaluation of the potential economic effects of the Henderson 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 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 Henderson Solar Application included an Economic Impact Report (Attachment 10.1) prepared by Dr. Michael Clark and others at the Center for Business and Economic Research (CBER) at the Gatton College of Business and Economics, University of Kentucky. That report includes a discussion and explanation of the Project's economic benefits, including estimates of employment, earnings and output benefits generated by Project construction and operations, both for

Henderson County and the Commonwealth of Kentucky. Separately, estimates of annual property tax revenues generated over 30 years of operations were confirmed by an outside tax consultant; those calculations are provided in Attachment 10.2 of the Application. In response to HE inquiries, 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: The capital cost of the Henderson Solar Project is estimated at approximately $52.7 million. Much of the total expenditures for this project are expected to be spent outside of Henderson County or Kentucky. These expenditures include the solar panels and other major equipment. Because this equipment is typically manufactured outside of Kentucky, spending on the equipment is not expected to directly affect the economies of Henderson County or the State of Kentucky. Materials, supplies, or equipment to be purchased from within Henderson County and Kentucky include site preparation, fencing, electrical subcontracting, and installation labor.

Construction employment and earnings: Construction of the facility is anticipated to require 150 full-time equivalent (FTE) workers over the six to nine-month construction period, with a total construction payroll of approximately $5.7 million.[62] Approximately 120 workers would be hired from within Henderson County and surrounding counties and about 30 specialty workers are expected to be hired from other areas of Kentucky or from outside the State.[63]

Accounting for the circulation of construction-related monies throughout the local area, construction of the Project is expected to generate a total of about 176 new jobs, or FTEs, in the Henderson County area, with a total payroll of about $6.8 million. An additional nine total jobs, or FTEs, would be created in other areas of Kentucky, with associated income of about $484,000.

An additional area of economic impact is employment-related taxes. Henderson County will collect a one percent occupational license tax on wages and salaries paid for Project-related work occurring in the county. The Commonwealth of Kentucky will collect state income taxes on labor income associated with the Project. The effective income tax rate is estimated to be 4.2 percent. In addition, to the extent any Project-related income is spent on taxable goods and services, that spending will be subject to a six percent Kentucky state sales tax.

The report notes that "the proposed Project will affect the state and local economies by bringing new employment, spending, and taxes to the area. The Construction Phase will provide a temporary increase in economic activity as contractors and workers are hired to construct the facility. While the economic impact will be concentrated in the construction sector, other

[62] 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 will likely be greater than the estimated number of FTEs.

[63] As shown in Exhibit 5-16, the CBER report includes all 150 FTEs as a benefit to Henderson County, noting that while construction workers are "working on the Project in Henderson County, they will contribute to the County's total employment and wages."

sectors will also be affected as contractors purchase supplies and materials from businesses in the area and workers spend a portion of their incomes at local businesses." The economic benefits generated by construction of the Henderson Solar Project are presented in Exhibit 5-16.

Exhibit 5-16.
Total Economic Benefits of the Henderson Solar Project, Construction Phase

	Henderson County			Other Areas of Kentucky		
	Employment	Labor Income	Tax Revenue	Employment	Labor Income	Tax Revenue
Direct	150	$5.7 M	NA	NA	NA	NA
Total	176	$6.8 M	$67,640	9	$484,000	$521,000

Notes: (1) Employment is measured in number of jobs, or full-time equivalents.
(2) Total benefits include direct, indirect, and induced effects.
(3) Direct, indirect and induced impacts from construction occur in Henderson County area; other areas of Kentucky realize only indirect and induced impacts.
(4) Henderson County will collect a one percent occupational license tax on wages and salaries paid for Project related work occurring in the County.
(5) The Commonwealth of Kentucky will collect income tax on labor income and sales tax on taxable goods and services.
(6) Tax revenues for Henderson County and for Kentucky include income generated from the Project's direct, indirect and induced effects.

Source: Henderson Solar, LLC, June 2021.

Operational employment, earnings and expenditures: Project operations will require two to three permanent FTEs for regular operations, maintenance and upkeep of the solar panels, other equipment and the Project site. Operational employees are anticipated to be hired from within Henderson County, or nearby counties. Salaries for those employees are estimated to be approximately $60,000 per FTE per year. A small amount of money would be spent in Henderson County on materials and equipment each year, throughout the life of the Project. Local purchases would generally include landscaping supplies and items required for miscellaneous repairs.

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 between five and 7.5 new jobs, or FTEs, in Henderson County, with a total payroll of between $310,00 and $456,000. As noted by the Applicant, these figures need to be adjusted to account for the loss of economic activity that would have occurred if the land remained in its current use (generally agricultural production). Therefore, the CBER report also provides the net labor income (the difference between the level of economic activity associated with agricultural production and the level of economic activity associated with solar energy production); the reduced farm activity at the Project site would reduce local labor income by $85,000 per year.[64] Exhibit 5-17 offers the estimated economic benefits generated by the operation of the Project, on an annual basis.

[64] Farm employment may decrease by 2.8 jobs. Agricultural jobs are often migratory, part-time and seasonal; therefore, comparison with the FTEs generated by the Project may be misleading and CBER focused instead on the change in labor income.

Exhibit 5-17.
Annual Economic Benefits of the Henderson Solar Project, Operations Phase

	Henderson County			Other Areas of Kentucky		
	Employment	Labor Income	Tax Revenue	Employment	Labor Income	Tax Revenue
Direct	2 - 3	$130K - $188K	$2.2K - $3.7K	NA	NA	NA
Total	5 - 7.5	$310K - $456K	NA	0.9 - 1.3	$58K - $87K	$20K - $33K
Net		$225K - $371K				

Notes: (1) Employment is measured in number of jobs, or full-time equivalents. A portion of an FTE may represent additional part-time jobs and/ or an increase in hours for existing positions.
(2) Total benefits include direct, indirect, and induced effects.
(3) Direct, indirect and induced impacts from construction occur in the Henderson County area; other areas of Kentucky realize only indirect and induced impacts.
(4) Henderson County will collect a one percent occupational license tax on wages and salaries paid for Project related work occurring in the County.
(5) The Commonwealth of Kentucky will collect income tax on labor income and sales tax on taxable goods and services.
(6) Tax revenues for Henderson County and for Kentucky include income generated from the Project's direct, indirect and induced effects.

Source: Henderson Solar, LLC, June 2021.

Property taxes: The Applicant estimates that the proposed Project will result in a significant increase in property tax revenue related to the change of use of the proposed Project site from its current agricultural use to the proposed use for solar electricity generation. The change of use will affect both Real Property Taxes and Tangible Property Taxes.

- Real Property Taxes are calculated based on the assessed value of the underlying land. The Applicant anticipates that Henderson County will reassess the land underlying the proposed Project site at a higher value than its current assessed value as agricultural land.

- Tangible Property Taxes are calculated based on the value of any machinery, personal property, or improvements that are located on the underlying land. This includes all the fixed assets related to the proposed facility

Exhibit 5-18 summarizes the total and net property tax revenues projected to be generated by the Project for Henderson County and the Commonwealth of Kentucky over the expected 30-year life of the Project. Net property tax revenues are the difference between the taxes generated by the Project and the taxes that would have been generated by Project acreage if it were to remain in its current agricultural use.[65] The calculation of the net present value (NPV) of Project generated property taxes over the life of the Project reflects the current value of a future stream of payments.

[65] Estimated 2021 real property taxes levied on Project acreage amounted to an estimated $5,639.

Exhibit 5-18.
Estimated Total and Net Property Tax Revenues Generated by the Henderson Solar Project, Year 1 of Operations and Over the 30-Year Project Life

	Project Generated Taxes		Net Property Tax Revenue	
	Year 1	30-Year NPV	Year 1	30-Year NPV
Real Property Taxes	$33,489	$984,961	$27,850	$819,121
Tangible Property Taxes	$232,582	$3,162,885	$232,582	$3,162,885
Total Proprty Taxes	**$266,071**	**$4,147,846**	**$260,432**	**$3,982,006**

Notes: (1) NPV refers to Net Present Value in which future payments are discounted to a value at the current, or present, time. Two percent is the assumed discount rate.
(2) A portion of both real property taxes and tangible property taxes generated by the Project go to the Commonwealth.

Source: Henderson Solar, LLC, June 2021.

Exhibit 5-19 presents estimates of the property taxes received by specific taxing entities within Henderson County and by the Commonwealth of Kentucky over the Project life.

Exhibit 5-19.
Distribution of Property Tax Revenues Generated by the Henderson Solar Project, 30-Year Project Life

	Henderson County							
	Extension Service	Fiscal Court	Health Depart.	Library	School District	Canoe Ditch District	Commonwealth of Kentucky	Total
Real Property	$27,909	$109,280	$42,687	$94,766	$546,399	$59,762	$104,157	**$984,961**
Tangible Property	$69,166	$283,078	$98,826	$232,924	$984,620	NA	$1,494,270	**$3,162,884**
Total	**$97,075**	**$392,358**	**$141,513**	**$327,690**	**$1,531,019**	**$59,762**	**$1,598,427**	**$4,147,845**

Source: Henderson Solar, LLC, August 2021.

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. The CBER report acknowledges that the solar panels and other major equipment is typically manufactured and purchased from outside of Kentucky. The majority of the Project's capital expenditures are anticipated to occur out-of-state, limiting the economic benefits to Henderson County or 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 six to nine-month construction period. Additionally, the portion of construction period jobs realized for Henderson 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 property tax payments.

- Property taxes distributed to local entities within Henderson 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 on an annual basis.

- Landowner leases are not mentioned in the economic analysis. Those landowners will realize direct benefits from the Project via lease payments, presumably more than offsetting agricultural income.

As part of HE's site visit to the Project area, we met with the Henderson County Judge Executive, Mr. Brad Schneider. Mr. Schneider was knowledgeable about the Henderson Solar Project and very optimistic about the potential economic benefits to the County because of this Project and other solar facilities proposed for the area. He believes that manufacturing and industrial companies interested in locating in the area are attracted by the idea of renewable energy produced in the region; those companies generate employment and tax dollars for the County. Therefore, it is Mr. Schneider's opinion that the solar facilities will indirectly make an important contribution to the local economy by supporting other types of development in the area.

HE also spoke with Mr. Andrew Powell, the Henderson County Property Valuation Administrator, who indicated that the Project would be a net positive for the County. The Project would increase the value of the participating land for taxing purposes, generating additional tax income for the County. He also stated that County residents are generally excited about solar, about getting out ahead of the future of energy and about supporting renewables.

Conclusions and recommendations. Construction and operation of the Henderson Solar facility will provide some limited economic benefits to the region and to the Commonwealth. Overall, the Henderson 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, albeit a small portion of the total, 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 property tax 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. Total property tax payments made to Henderson County entities are estimated to be about $2.5 million. Those payments will generally amount to a small percentage of total tax revenues for any one public entity.

Need for mitigation. Socioeconomic impacts of the Henderson Solar facility represent a positive, albeit small, contribution to the region. 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 all the activity. Therefore, the methods of assessing decommissioning impacts would be similar to those employed to evaluate the construction phase effects.

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 Henderson Solar facility would have an expected useful life of approximately 30 years.

Decommissioning plan and activities. The Applicant has not yet developed a final decommissioning plan; however, a draft template has been developed that is consistent with the decommissioning requirements laid out in Henderson County's Solar Ordinance (Appendix D of this report). The Applicant has stated that the Project site will be returned to pre-existing conditions and that decommissioning activities will include a host of items, as listed in the mitigation measures.

Additionally, Application materials note that specific land restoration commitments, agreed to by individual property owners, are included in signed lease agreements with participating landowners. Leases require Henderson Solar to remove all above-ground and below-grade equipment and all power collection facilities, including all distribution and collection lines. The leases also require the Applicant to restore the soil surface and slope of the leased property to substantially similar conditions as existed prior to the Project and to restore the fertility levels of the soils to then-current industry standard levels for the cultivation and production of row crops. These activities must occur within six months following the termination of the lease.

Decommissioning bond. As required by Henderson County's Solar Ordinance, the Applicant will post a Surety Bond, or other form of security acceptable to the County "for the abandonment of the site and in the event the Commission must remove the facility." The

amount of the Surety Bond (or other form of security) will amount to one percent of the total Project cost. That cost will be re-calculated every five years during the Project life.

HE's evaluation of impacts. The impacts of decommissioning activities are likely to be somewhat smaller than those of construction. Fewer workers may 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. 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 shall file a final decommissioning plan with the Siting Board or its successors. This plan should commit the Applicant to removing all facility components from the Project site and Henderson County at the cessation of operations. As part of that decommissioning plan, the Applicant has committed to these steps:

    a. The Project equipment and improvements shall be disassembled, removed, packaged, and shipped for re-sale, transported to a salvage/recycling facility or other processing facility where possible, or taken to a landfill for disposal.[66]

    b. Any exposed soil where equipment was removed will be stabilized consistent with applicable erosion and sediment control standards, and planted with groundcover.

    c. Vegetative groundcover shall remain. No additional grading or soil ripping shall be performed during decommissioning.

[66] This includes all above ground and below ground facilities.

d. Vegetative buffers shall remain unless landowner requests removal.

e. Internal gravel access drives shall be removed unless landowner requests those drives remain. Paved or gravel aprons from public roads shall remain.

f. Utility-owned interconnection facilities and all ancillary facilities, including but not limited to associated gravel access roads, shall remain.

3. The Applicant will post a Surety Bond, or other form of security acceptable to the County, equal one percent of the total Project cost, naming Henderson County as the third-party beneficiary of the bond so that Henderson 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 Surety Bond (or other form of security) should be reviewed and updated every five years of the Project life at the expense of the Applicant.

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. The term retrofit is defined as the facility being re-designed such that the facility has a different type of operations or function, i.e., no longer operates as a solar electric generation facility.

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 Henderson Solar, LLC staff. Those activities included the following events and actions taken to notify and inform Henderson County officials and residents about the Project:

- Project website:
    - On January 20, 2021, the Applicant launched a Project Website, accessible to the public, containing key information about the Project, in-person office hours, the permitting process, information for submitting comments and questions and instructions for requesting additional information. The address of the Project Website is: https://www.communityenergyinc.com/hendersoncountysolar.

- Public meetings and in-person office hours:

- On Wednesday February 3, 2021, from 7:00am – 9:00pm Central Time (CT) and on Thursday February 4, 2021, from 7:00am – 9:00pm CT the Applicant conducted "In-Person Office Hours" at the Ramada Inn in Henderson. The Applicant published notice of those hours on the Project Website and sent letters to fifty-eight (58) adjacent landowners and nine (9) current and former public officials serving the Henderson County area. Seven interested parties attended the in-person office hours over the course of those two days.

- On Thursday February 11, 2021, from 7:00pm – 8:30pm Central Time (CT) the Applicant conducted a Virtual Public Information Meeting, featuring a live presentation of the Proposed Project, accessible to the public either by the internet or by telephone. Notice of that meeting was published on the Project Website, and letters were sent to all adjacent landowners. The Applicant also published notice in The Gleaner. Thirteen interested parties attended the meeting, including five landowners and family of landowners leasing land for the project, two attorneys representing landowners leasing land for the project, two members of the local media, one local resident and state representative, and three attendees from the general public.

- Outreach to public officials, surrounding landowners and others:

  - Over the course of 2019 and 2020, private meetings were held with (1) Jonathan Dixon, Kentucky State Representative, District 11; (2) Brian Bishop, Executive Director, Henderson County Planning Commission; (3) Brad Schneider, Judge-Executive, Henderson County; (4) Missy Vanderpool, Executive Director, Henderson Economic Development; and (5) Whitney Risley, Director, Henderson Economic Development.

  - Private meetings were held with multiple adjacent landowners in 2019 and 2021.

  - Several public notices and articles about the Project were published in the Gleaner throughout 2021.

  - The Applicant attended and participated in several Henderson City-County Planning Commission meetings in early 2021 to discuss various aspects of the Project.

As noted previously, HE met with Mr. Brad Schneider, the Henderson County Judge Executive, during our site visit. Mr. Schneider indicated that public meetings were not well attended, but that the Applicant has worked diligently to try and get people to participate. Local residents may be unaware of the Project, largely because they do not engage with any type of media outlets (social media, newspapers, radio). Mr. Schneider has spoken or met with some local residents with concerns; some of those concerns may be valid (related to property values or noise), others appeared to be based on misconceptions of solar facilities in general (chemical leakage). A few residents simply do not want the Project to be developed near them, regardless of any Project-specific details.

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

Complaint Resolution

The Applicant has made the following statements to address the complaints of local landowners or others:

Henderson Solar "intends to send a notice of the start of construction activities on the proposed Project site to all adjacent landowners. This notice will include contact information for the Applicant as well as relevant public officials and agencies."

"A detailed process for resolving complaints related to construction activities and project operations has not been formulated at this time. Input from the construction general contractor and the operations and maintenance contractor would be required. Applicant anticipates that a reasonable complaint resolution process will be put into place before commencement of construction activities and project operations."

Need for mitigation. The Applicant's approach to resolving complaints is currently vague and undefined. A formal process for addressing complaints should be developed and implemented during the construction and operational periods to address any issues associated with visual, noise or other Project effects. The following measures should be undertaken to address Project-related complaints:

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.

2. The Applicant should notify residents and businesses within 2,400 feet of the Project boundary about the construction plan and the complaint resolution process at least one month prior to the start of construction.

3. The Applicant should submit to the Siting Board an annual status report associated with the complaint resolution plan and activities, 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 Applicant has indicated the need to obtain the following additional permits from other agencies prior to commencement of construction:

- Federal level permits:
    - The Project has received an Approved Jurisdictional Determination (AJD) from the U.S. Army Corps of Engineers. That process determines whether any aquatic resources in the Project site are considered federally jurisdictional under the Clean Water Act. The AJD states that the identified water resources "are not considered to be "waters of the U.S." and are not regulated under Section 404 of the Clean Water Act."
    - The Project has received a 'No Hazard' ruling from the Federal Aviation Administration. The document states that the Project "does not exceed obstruction standards and would not be a hazard to air navigation".
    - A Spill Protection, Control, and Countermeasures (SPCC) plan may be required from the EPA. The threshold trigger for the SPCC plan requirement is exceeding a total of 1,320 gallons of oil on site. The definition of oil is broad and includes diesel fuel, gasoline, and mineral oils. During either the construction phase or the operations phase, if the amounts of oil onsite trigger the requirement for an SPCC plan, the Applicant intends to fully comply with the related regulations.
- State level permits:
    - The Project has received an approval letter form the Kentucky Airport Zoning Commission.

- Kentucky Department of Environmental Protection Stormwater Construction General Permit (Permit) from the Kentucky Division of Water (DOW) for this construction project because it disturbs one or more acres of land in compliance with the National Pollutant Discharge Elimination System of the Clean Water Act (CWA). The Kentucky Pollution Discharge Elimination System (KPDES) permit (KPDES No: KYR100000) is a General Permit for Stormwater Discharges Associated with Construction Activity.

- Highway Encroachment Permits – as described previously, the Applicant will need to obtain two types of Encroachment Permits from the Kentucky Transportation Cabinet for encroachment on KY 425 (Henderson Bypass). One type of permit will be for a 'Commercial Entrance' to the proposed Project site to provide for the two access points along KY 425. The other type of permit will be for a 'New Underground Utility Crossing' for the medium-voltage feeder connecting the Southern and Central sections of the project site to the project collection substation.

- Local permits:

  - Henderson County Building/ Construction permits – the Building/ Construction Permits will be issued by the Henderson County Building Inspector and will include a 'Commercial Electrical Permit' and a compliance review of the approved Site Plan

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 Henderson 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, transformer, substation 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 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 include appropriate signage to warn potential trespassers, pursuant to the Henderson County Solar Ordinance. 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.

9. The Applicant will comply with all applicable regulations for solar facilities as set forth in the Henderson County Solar Ordinance.

10. The Applicant will secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the existing railway line.

B. Compatibility with scenic surroundings:

1. The Applicant should maintain existing vegetation to the maximum extent possible. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of solar panels and related structures or is essential for necessary construction or operational activities.

2. Existing vegetation between the solar arrays and the residences should 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 should work with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors.

4. The Applicant should pay particular attention to the visual buffer needs for the homes along Lover's Lane. Individual discussions and agreements about buffering, including vegetative buffers prior to construction commencement, should be considered.

5. The Applicant should provide a visual buffer between Project infrastructure and residences or other occupied structures with a line of sight to the facility, pursuant to the Henderson County Solar Ordinance.

6. The Applicant should follow through on its commitment to providing vegetative buffers at the locations indicated on the Site Plan maps 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.

7. Plantings used for the vegetative buffer 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.

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

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

10. The Applicant should consider planting and maintaining multiple acres of native pollinator-friendly species on-site to help offset lost pollination opportunities from crops.

11. The Applicant will submit a professional glare study to the Siting Board. The Siting Board will review that study to understand the potential for glare surrounding the Project site and determine the need for additional mitigation.

12. 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.

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 impacted and concerned homeowners 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 for affected areas at least one month prior to the start of construction.

2. The Applicant should remain in contact with nearby residents, with a special focus on residents on Lover's Lane, to explain the construction schedule and associated noise impact and duration prior to start of construction. The applicant should confirm that noise levels are not unduly high or annoying during construction. If the noise levels are unduly high or annoying, the Applicant should mitigate those effects as needed.

3. The Applicant should limit the construction activity, process and deliveries to the hours of 8:00 am to 6:00 pm, Monday through Saturday. Pile driving activities should cease by 6:00 pm each day, except for pile driving in the Neighbor Zones, in which case, pile driving should cease at 5:00 pm. 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.

4. The Neighbor Zone should by implemented as the Applicant proposed. In those zones 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 comparably effective method).

5. When possible, construction crews should avoid simultaneous use of multiple sources of loud equipment in the same area. This is especially true for the Northern section.

6. If repairs or maintenance activities occur at night, normally quiet during the operational phase, crews should be aware of nearby homes and reduce loud noise when possible.

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

1. The Applicant should work with the Commonwealth road authorities and the Henderson County Road Department to perform road surveys, before and after construction activities, on all roads to be used by construction vehicles.

2. The Applicant will consult with the Kentucky Transportation Cabinet (KTC) regarding truck and other construction traffic and obtain necessary permits from the KTC.

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

4. The Applicant will develop and comply with any road use agreement executed with the Henderson 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. The Lover's Lane bridge over Canoe Creek, posted as having an 18-ton weight limit, poses a special concern when considering heavy truck traffic and delivery of the Project transformer.

5. The Applicant will fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads or bridges, such as the Lover's Lane bridge over Canoe Creek, that it causes or to which it materially contributes to, regardless of its status as a KY Route or local road.

6. The Applicant should develop and follow a traffic management plan to minimize the impacts of any traffic increases and keep traffic and people safe. To better manage traffic during construction, the construction team may issue "route and parking cards" to workers and delivery drivers. These cards would specify time, route and parking areas and indicate entrances to be used.

7. Ridesharing during the construction phase will be encouraged.

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

9. The Applicant will secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the existing railway line.

10. The Applicant will plant a continuous groundcover across the Project site. Where needed, the Applicant will employ irrigation to establish and maintain such a groundcover.

11. 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.

12. The Applicant has indicated that the curve on Lover's Lane will be mitigated by adding three feet of pavement/stabilization and widening along both sides of Lover's Lane.

13. In addition, the Applicant will secure a crossing agreement from CSX for the purpose of installing an underground power line below and perpendicular to the railway.

F. Economic impacts:

1. 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 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.

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 shall file a final decommissioning plan with the Siting Board or its successors. This plan should commit the Applicant to removing all facility components from the Project site and Henderson County at the cessation of operations. As part of that decommissioning plan, the Applicant has committed to these steps:

    a. The Project equipment and improvements shall be disassembled, removed, packaged, and shipped for re-sale, transported to a salvage/recycling facility or other processing facility where possible, or taken to a landfill for disposal.[67]

    b. Any exposed soil where equipment was removed will be stabilized consistent with applicable erosion and sediment control standards and planted with groundcover.

    c. Vegetative groundcover shall remain. No additional grading or soil ripping shall be performed during decommissioning.

    d. Vegetative buffers shall remain unless landowner requests removal.

    e. Internal gravel access drives shall be removed unless landowner requests those drives remain. Paved or gravel aprons from public roads shall remain.

    f. Utility-owned interconnection facilities and all ancillary facilities, including but not limited to associated gravel access roads, shall remain.

3. The Applicant will post a Surety Bond, or other form of security acceptable to the County, equal one percent of the total Project cost, naming Henderson County as the third-party beneficiary of the bond so that Henderson 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 Surety Bond (or other form of security) should be reviewed and updated every five years of the Project life at the expense of the Applicant.

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

[67] This includes all above ground and below ground facilities.

pattern or magnitude of impacts compared to the original project. Otherwise, a new Site Assessment Report will be submitted for Siting Board review. The term retrofit is defined as the facility being re-designed such that the facility has a different type of operations or function, i.e., no longer operates as a solar electric generation facility.

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. Because of the limited attendance at local public meetings and the general sense of local unawareness of the Project, it is suggested that the Applicant pursue additional public outreach and engagement activities within Henderson County.

I. Complaint resolution program:

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.

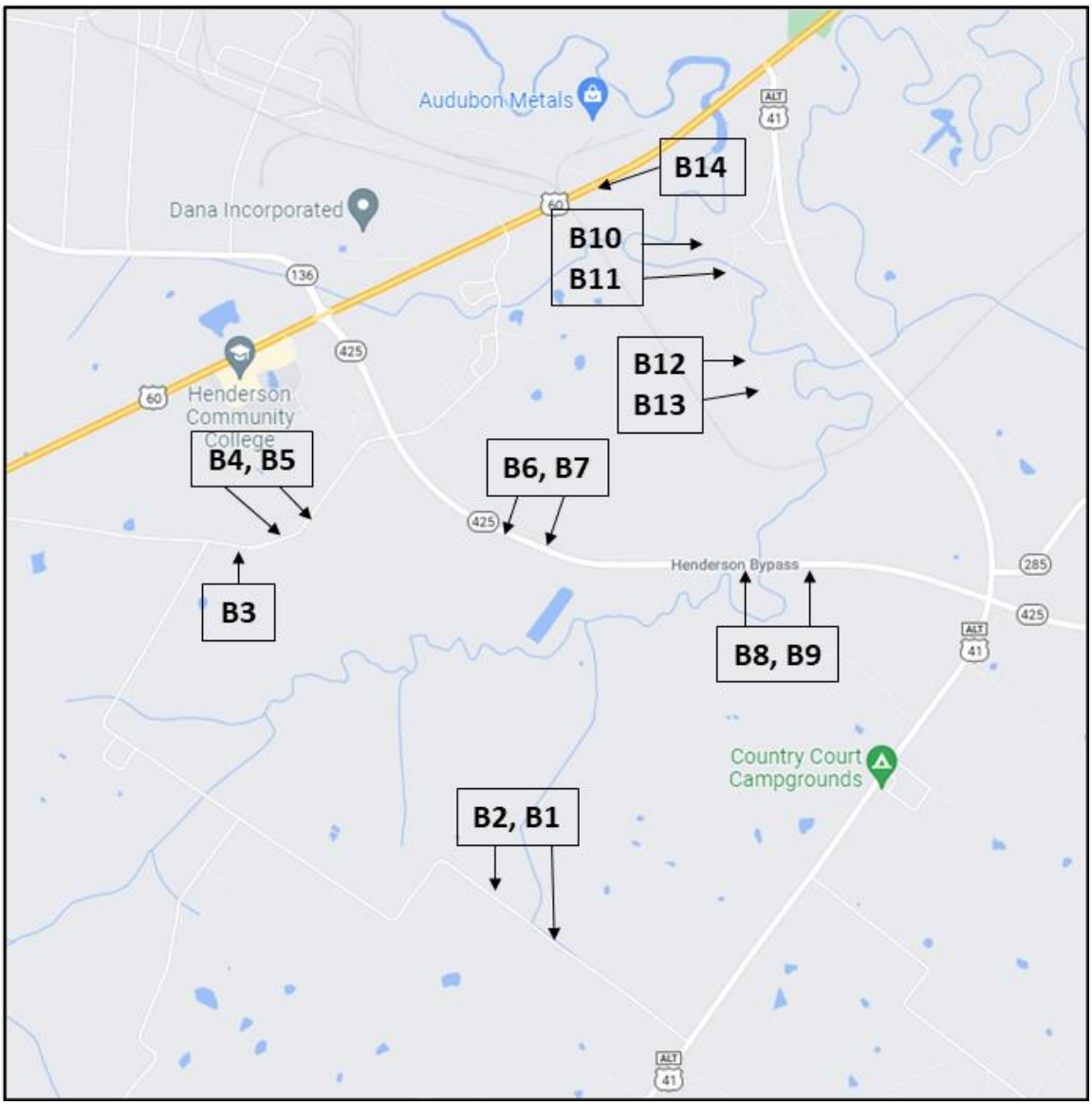
2. The Applicant should notify residents and businesses within 2,400 feet of the Project boundary about the construction plan and the complaint resolution process at least one month prior to the start of construction.

3. The Applicant should submit to the Siting Board an annual status report associated with the complaint resolution plan and activities, 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.

APPENDICES

Appendix A

Photo Log Index Map



Appendix B

Site Photos

Exhibit B-1.
Location of Proposed Site Entrance to the Southern Project Section, on Wilson Station Road, Facing North

Exhibit B-2.
View of the Southern Section of the Project Site from Wilson Station Road, Facing Northwest

Exhibit B-3.
Homes along Old Corydon Road, Southwest of the Central Section of the Project

Exhibit B-4.
View of the Area near the Central Section of the Project, from Old Corydon Road

Exhibit B-5.
Kenergy Corporate Headquarters Building on Old Corydon Road, South of Henderson Bypass (KY 425)

Exhibit B-6.
View of Henderson Bypass (KY 425), North of the Central Section of the Project, Facing East

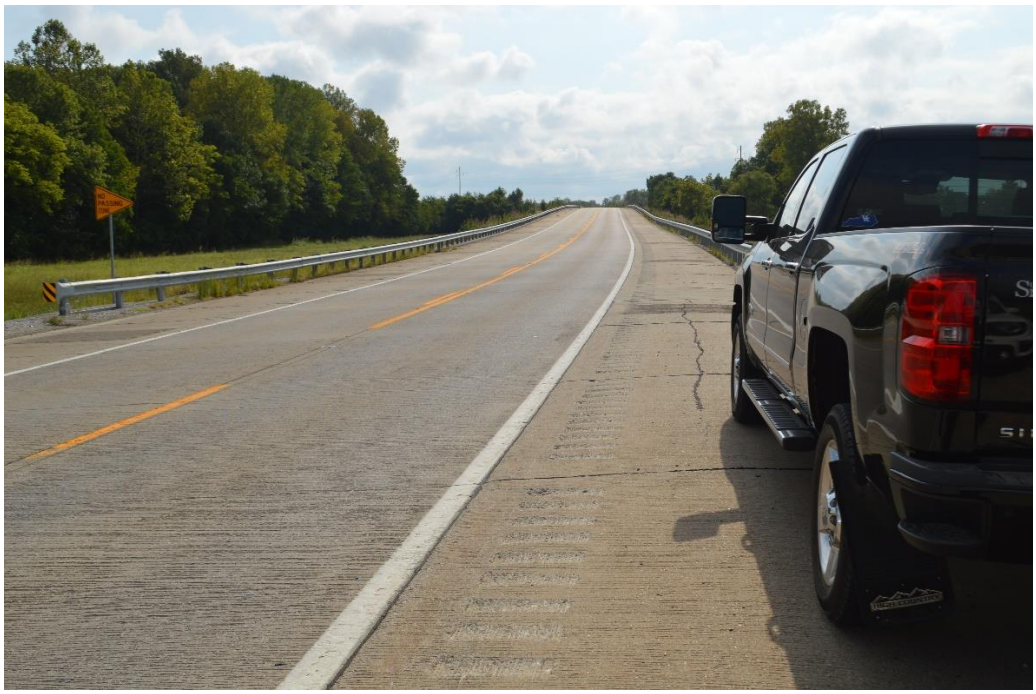


Exhibit B-7.
Views of the Central Section of the Project, from Henderson Bypass (KY 425), Facing South

Exhibit B-8.
Additional Views of the Central Section of the Project, from Henderson Bypass (KY 425), Facing South

Exhibit B-9.
Apostolic Bread of Life Church Located along the Henderson Bypass (KY 425)

Exhibit B-10.
Homes and Neighborhoods along Collier Road, North of the Northern Section of the Project

Exhibit B-11.
Bridge over Canoe Creek on Lover's Lane, Northeast of the Northern Section of the Project

Exhibit B-12.
Location of the Proposed Entrance to the Northern Section of the Project, from Lover's Lane, Facing West

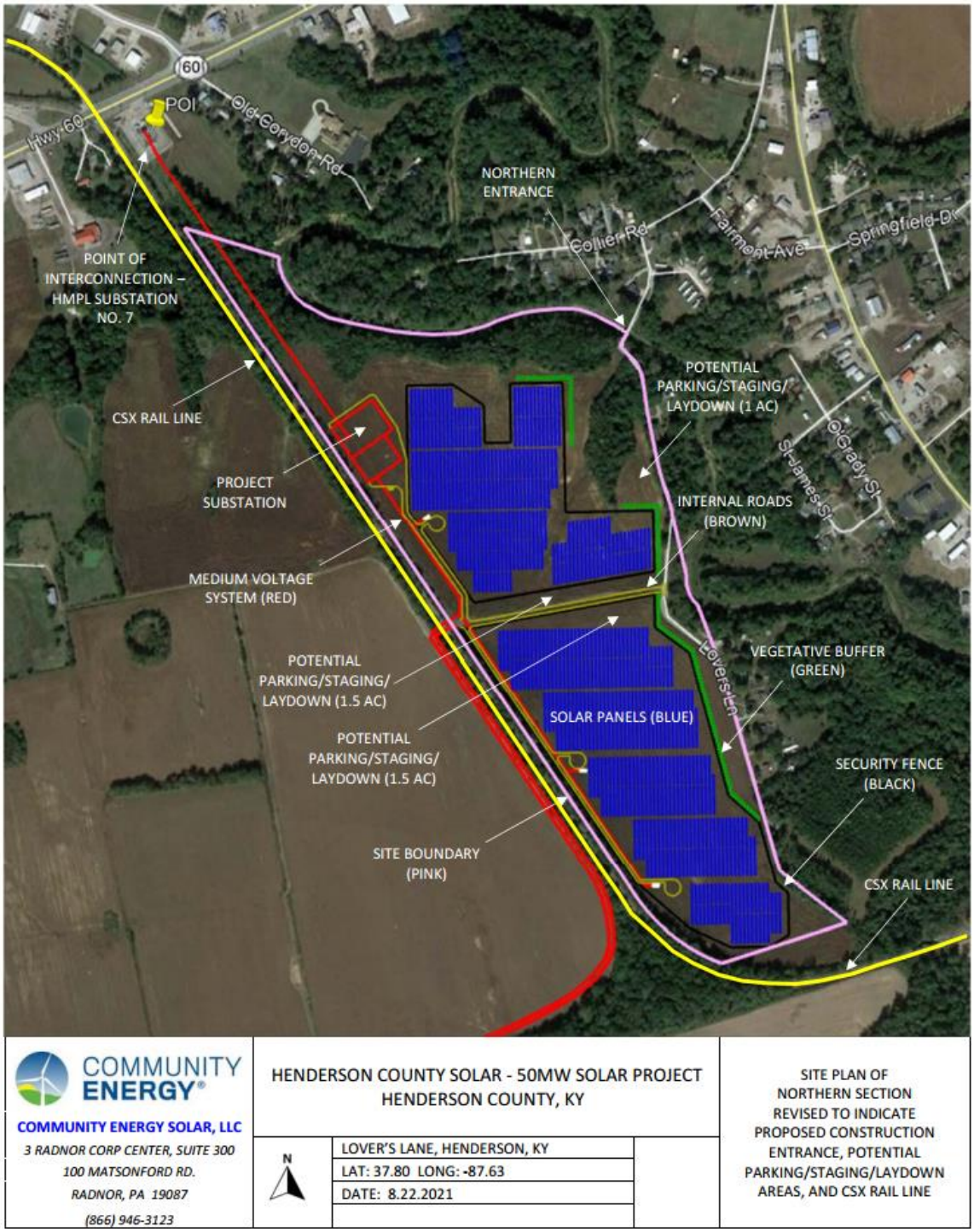
Exhibit B-13.
Homes Located along the East Side of Lover's Lane, across from the Northern Section of the Project

Exhibit B-14.
Site of the Henderson Municipal Power & Light Substation No. 7 on U.S. 60

Appendix C

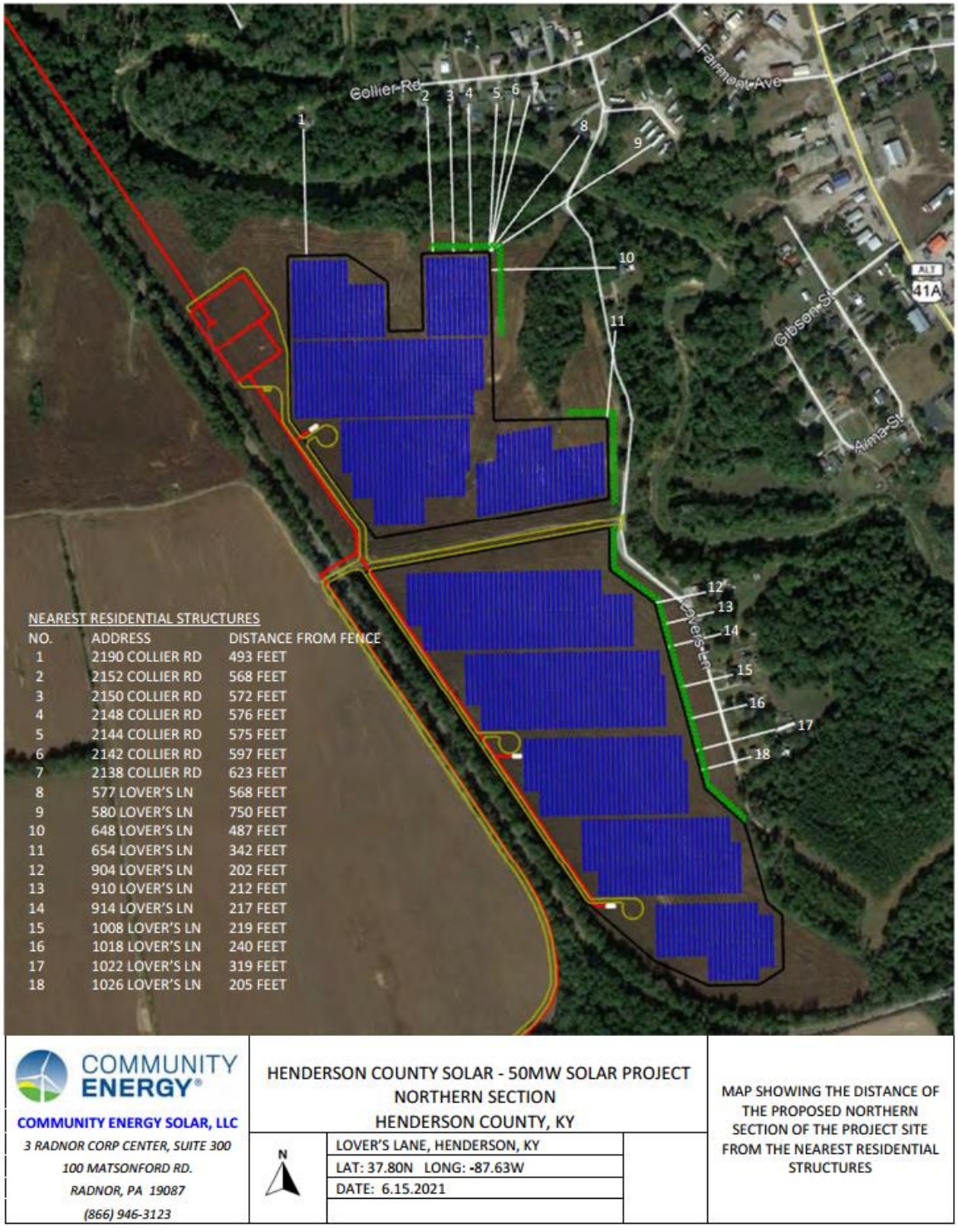
Additional Project Illustrations

Exhibit C-1.
Preliminary Site Plan for the Northern Section of the Henderson Solar Project



Source: Henderson Solar, LLC, June 2021.

Exhibit C-2.
Nearby Residential Properties and Proposed Vegetative Buffer for the Northern Section of the Henderson Solar Project



Source: Henderson Solar, LLC, June 2021.

Exhibit C-3.

Preliminary Site Plan for the Central Section of the Henderson Solar Project

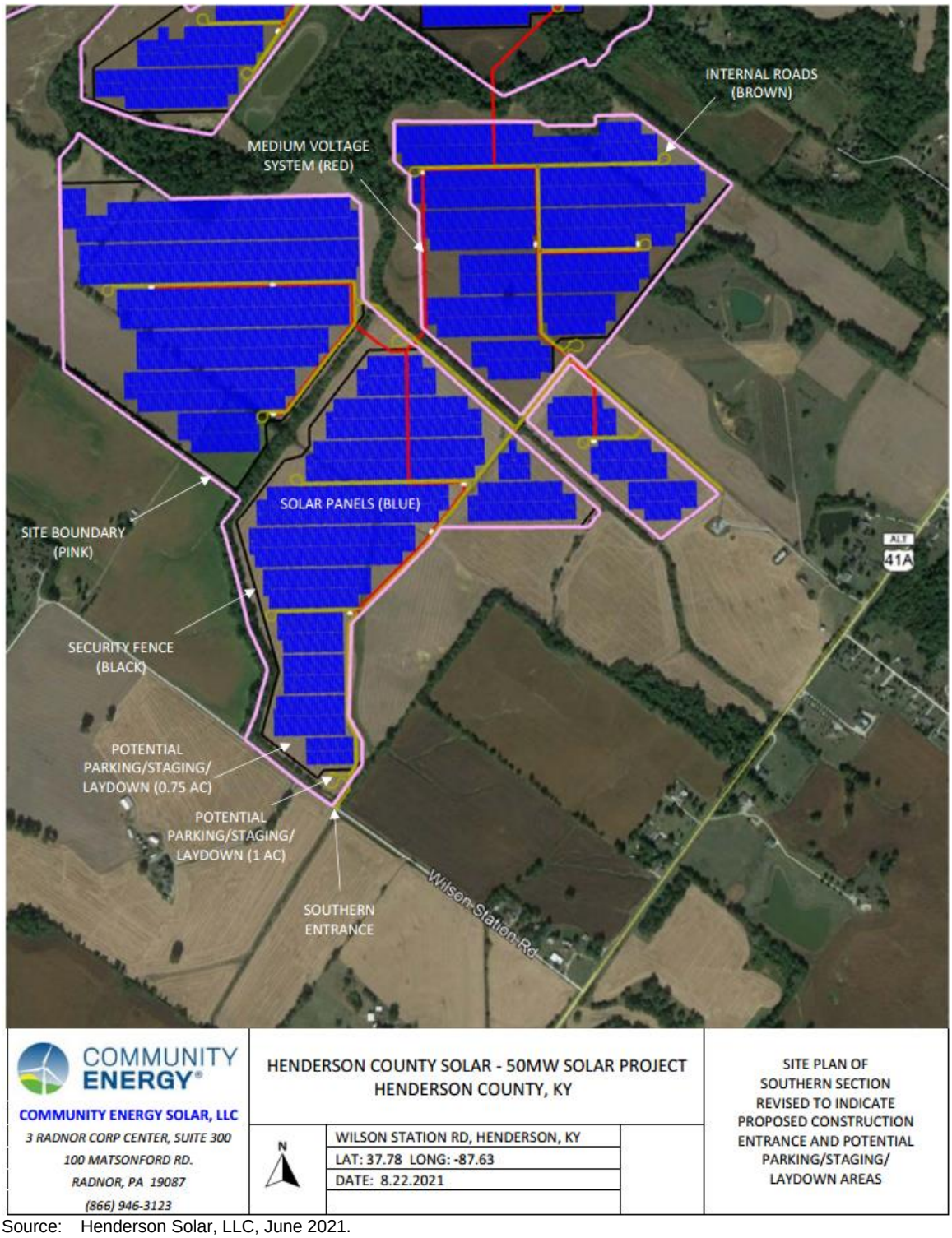
Source: Henderson Solar, LLC, June 2021.

Exhibit C-4.

Nearby Residential Properties for the Central Section of the Henderson Solar Project

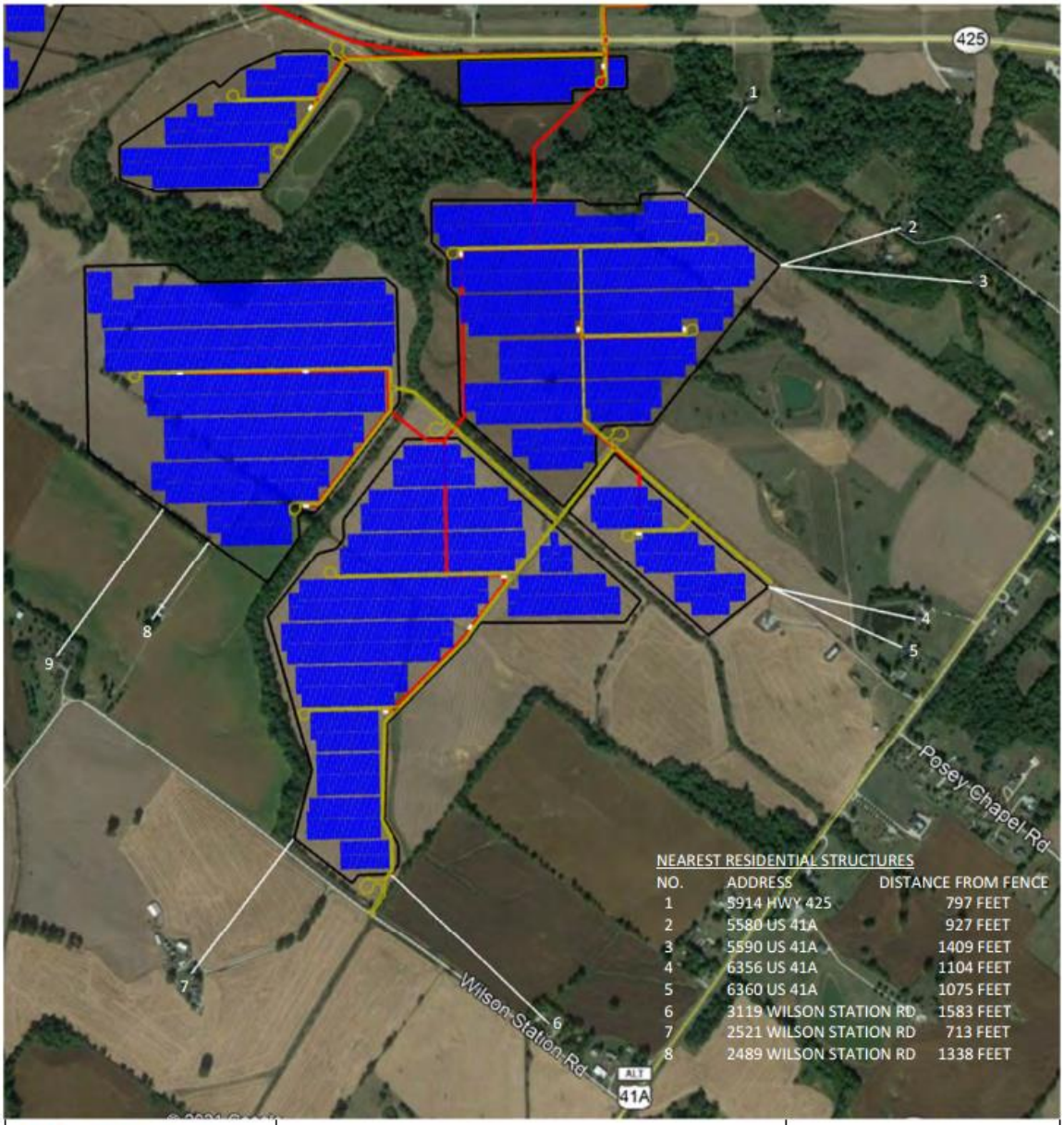
Source: Henderson Solar, LLC, June 2021.

Exhibit C-5.
Preliminary Site Plan for the Southern Section of the Henderson Solar Project



Source: Henderson Solar, LLC, June 2021.

Exhibit C-6.
Nearby Residential Properties for the Southern Section of the Henderson Solar Project



Source: Henderson Solar, LLC, June 2021.

Appendix D

Henderson County Zoning Ordinance

Article XXX, Solar Energy System (SES)

ARTICLE XXX, SOLAR ENERGY SYSTEM (SES)

Section 30.01. Design Standards

The components and subsystems required to convert solar energy into electric energy suitable for use. The area of the system includes all the land inside the perimeter of the system, which extends to any fencing. For the purposes of these zoning regulations, solar energy systems are divided into three (3) classes.

a**. Level 1 Solar Energy System**. A roof mounted system on any code compliant structure or any ground mounted system on an area of up to fifty (50) percent of the footprint of the primary structure on the parcel but not more than one (1) acre and not more than twenty-five (25) feet tall or any building integrated system (i.e. shingle, hanging solar, canopy, etc.)

b. **Level 2 Solar Energy System**. Any ground mounted system not included in a Level 1 SES and meets the following area restrictions:

1. In an agricultural zone the area of the SES shall not exceed one half (1/2) acre in size and shall require a building permit issued by the Henderson County Codes Department. In areas exceeding one half (1/2) acre, a Site Plan shall be required by the Henderson City-County Planning Commission.
2. In an industrial zone the SES shall not exceed ten (10) acres in size.
3. In an Industrial Zone, an SES of any size shall require a site plan approved by the Henderson City-County Planning Commission.

(c) **Level 3 Solar Energy System**. Any system that does not satisfy the parameters for a Level 1 or Level 2 SES.

Section 30.02. Requirements

Solar Energy Systems (SES) shall comply with the following criteria:

a. The height of any ground mounted SES shall not exceed twenty-five (25) feet as measured from the highest natural grade below each solar panel (excludes utility poles, substations and

antennas constructed for the project).

b. Setback requirements for Level 1 and Level 2 SES shall be in compliance with the zoning classification for the parcel.

c. Setback requirements for Level 3 SES shall be as follows: (1) All equipment shall be at least twenty-five (25) feet from the perimeter property lines of the project area; (2) No interior property line setbacks shall be required if the project spans multiple contiguous properties,; (3) All equipment shall be located at least one hundred (100) feet from any residential structure and; the maximum height of any individual component will be 25 feet measured from the local ground level of the component.

d. All Level 3 SES shall be screened with a seven (7) foot tall fence and, to the extent reasonably practicable, a visual buffer that provides reasonable screening to reduce the view of the SES from residential dwelling units on adjacent lots (including those lots located across a public right of way). A vegetation screening plan to reduce the view of the SES from residential dwelling units on adjacent lots will be submitted for approval of the Henderson City-County Planning Commission. The existing natural tree growth and natural land forms along the SES perimeter may create a sufficient buffer and shall be preserved when reasonably practicable. When no alternative vegetation screening plan is approved by the Henderson City-County Planning Commission, a double row of staggered evergreen trees will be planted 15' on center from adjacent non participating residential dwellings including the outdoor living space immediately near residential dwellings. Parcel boundaries with no proximity to residential dwellings shall not require screening. The proposed evergreen trees shall be placed on the exterior of security fencing. The use of barbed wire or sharp pointed fences shall be prohibited in or along any boundary adjoining residential properties.

e. There shall be no signs permitted except those displaying emergency information, owner contact information, warning or safety instructions or signs that are required by a federal, state or

local agency. Such signs shall not exceed 5 square feet in area.

f. Excessive lighting shall be prohibited except that required by federal or state regulations.

g. Decommissioning of Level 3 SES shall be as follows:

1. The developer shall post a Surety Bond, or other form of Security acceptable to the County, for the abandonment of the site and in the event the Commission must remove the facility. Abandonment shall be when the SES ceases to transfer energy on a continuous basis for twelve (12) months. The surety bond or other form or security, shall be one (1) percent of the total project cost re-calculated every 5 years during the project life.

2. A decommissioning plan shall be submitted at the time of application by the developer responsible for decommissioning and must include the following: (1) Defined conditions upon which the decommissioning will be initiated. i.e. there has been no power production for 12 months, the land lease has ended, or succession of use of abandoned facility, etc.; (2) Removal of all non-utility owned equipment, conduit, structures, fencing, roads, and foundations to the depth of three (3) feet; (3) Restoration of the property to substantially similar physical condition that existed immediately prior to construction of the SES; (4) The time frame for completion of decommissioning activities; (5) the party currently responsible for decommissioning, and; (6) Plans for updating the decommissioning plan.