



Andy Beshear
Governor

Kent A. Chandler
Chairman

Rebecca W. Goodman
Secretary
Energy and Environment Cabinet

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

August 16, 2021

PARTIES OF RECORD

Re: Case No. 2020-00392

Notice is given to all parties that the attached document has been filed into the record of this proceeding.

If you have any comments you would like to make regarding the contents of the document, please do so within five days of receipt of this letter. If you have any questions, please contact Cornelius J Mance Jr., Staff Attorney III, at 502-782-2581 and cornelius.mance@ky.gov.

Sincerely,

A handwritten signature in cursive script that reads "Linda C. Bridwell".

Linda C. Bridwell, P.E.
Executive Director
On Behalf of the Siting Board

Attachment

August 16, 2021



**Solar Generation Siting Final Report
– McCracken County Solar**

KY State Board on Electric Generation
and Transmission Siting
Case #2020-00392

Customer:
Kentucky Public Service
Commission

Prepared for:
Cornelius J Mance Jr



August 16, 2021

Prepared by:

A handwritten signature in black ink, appearing to read 'V. Chikkeruru'.

Vasu Chikkeruru, P.E.
Sr. Power Systems Engineer

A handwritten signature in blue ink, appearing to read 'Collin Abell'.

Collin Abell
Power Systems Engineer

Reviewed by:

A handwritten signature in blue ink, appearing to read 'Scott Campbell'.

Scott Campbell
Project Manager

Approved by:

A handwritten signature in blue ink, appearing to read 'Jim Cook'.

Jim Cook
Chief Operating Officer

Solar Generation siting Final Report – McCracken County Solar

Synopsis

This document is the Final Report prepared by Wells Engineering for McCracken County Solar siting in McCracken, KY.

WEpsc Order: WE21052097

Public Service Commission PO:
PON2 123 2100001588,
PON2 123 2100001913

Contents

1	General Statement.....	1
1.1	Scope.....	1
1.2	Reference Document	1
2	Solar Electric Power – ‘Know-how’	2
2.1	Solar Power Plant.....	3
2.2	Role of Solar Modules.....	4
2.3	Role of Inverters.....	4
2.4	Role of Batteries.....	4
2.5	Role of Transformers and Other associated switchyard equipment.....	4
2.6	Role of Steel & Concrete Structures, Roadways & Fencing.....	5
2.7	General Effects of Solar Power Plants	5
2.7.1	Noise from the Equipment	5
2.7.2	Glare/Reflection from the Solar Panels	5
2.7.3	Increased Road Traffic, Noise and Fugitive dust.....	6
2.7.4	Environmental and Wildlife	6
2.7.5	Farming land	7
3	McCracken County Solar – Application Review & Findings	8
3.1	Initial Review.....	8
3.2	Site Visit.....	8
3.3	Final Review & Findings	22
3.3.1	Review of Application documents	22
3.3.2	278.708(3)(a)(1) Surrounding Land Uses	23
3.3.3	278.708(3)(a)(2) Legal Boundaries.....	23
3.3.4	278.708(3)(a)(3) Proposed Access Control	23
3.3.5	278.708(3)(a)(4) Location of Facility Buildings & Radial Tie lines.....	23
3.3.6	278.708(3)(a)(5) Location and Use of Accessways, Internal Road & Railways.....	23
3.3.7	278.708(3)(a)(6) Existing or Proposed Utilities to Service the Facility	25
3.3.8	278.708(3)(a)(7) Compliance with Applicable setback requirements.....	25
3.3.9	278.708(3)(a)(8); (b); (d) & (e) Evaluation of Noise levels, Scenic surroundings,	

Environmental impact & Fugitive Dust 25

3.3.10 278.708(3)(c) & (e) Visual Impacts, Traffic and Property Values 25

3.3.11 278.708(3)(c) Economic Impact Analysis 26

4 Recommendations & Mitigations Measures 27

REVISIONS

Revision	Date Issued	Issue Type	By	Description
0	08-16-21	For Review	CA	Issue for Review & Record

ABOUT WELLS ENGINEERING

Power Systems Engineering

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

Our Mission

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



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

Services

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

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

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

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

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

Visit us at
www.wellsengineering.com

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



1 General Statement

The present document is the Final report prepared for the Solar Generation siting project of McCracken County Solar LLC who is applying for a certificate of construction for an approximately 60MW Merchant Electric Solar Generation Facility in McCracken County, KY.

1.1 Scope

As part of the personal service contract for the 'Generation Siting Board Fall 2020', between The Commonwealth of Kentucky Energy Environment Cabinet/Public Service commission and Wells Engineering, in the matter of the order issued for case number 2020-00392, Wells Engineering was appointed to review the Application documents and the Site assessment report submitted by the applicant as per the Kentucky Revised Statutes KRS 278.706 & KRS 278.708 and submit a Final report on the Solar Generation Siting for the application for a construction certificate by McCracken County Solar LLC in McCracken County KY.

Wells Engineering performed the review of the Application documents and the Site Assessment report submitted by the applicant by assigning it to the Senior Engineers and Designers at Wells Engineering and also by hiring experts as per different requirements of the siting project as seen by Wells Engineering.

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

- i) Clover lake Consulting Services for Noise & Environmental assessment
- ii) Watters Unclaimed Property Consulting LLC for Economic impact.
- iii) Mary McClinton Clay, MAI for the review on impact on property values

1.2 Reference Document

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

- i. Commonwealth of Kentucky Order for Case no. 2020-00392
- ii. Application for a certificate to construct a merchant generating facility Vol.I and Vol.II for Case No. 2020-00392 by McCracken County Solar, LLC, KY
- iii. Responses to RFI-I , provided by McCracken County Solar LLC, Case No. 2020-00392
- iv. Responses to RFI-II, provided by McCracken County Solar LLC, Case No. 2020-00392
- v. Kentucky Revised Statutes¹, KRS 278-706, 708, 710

¹For UpToDate statutes, reference, <https://apps.legislature.ky.gov/law/statutes/chapter.aspx?id=38583>

2 Solar Electric Power – ‘Know-how’

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

A simple solar cell is relatively small and can only produce a couple watts of electricity, which is not sufficient for large-scale utilization. To increase the power production, several cells are combined to form a ‘Solar Module’, which can produce a usable amount of electricity. A ‘Solar System’ is when several solar modules are arranged systematically for large-scale power production.

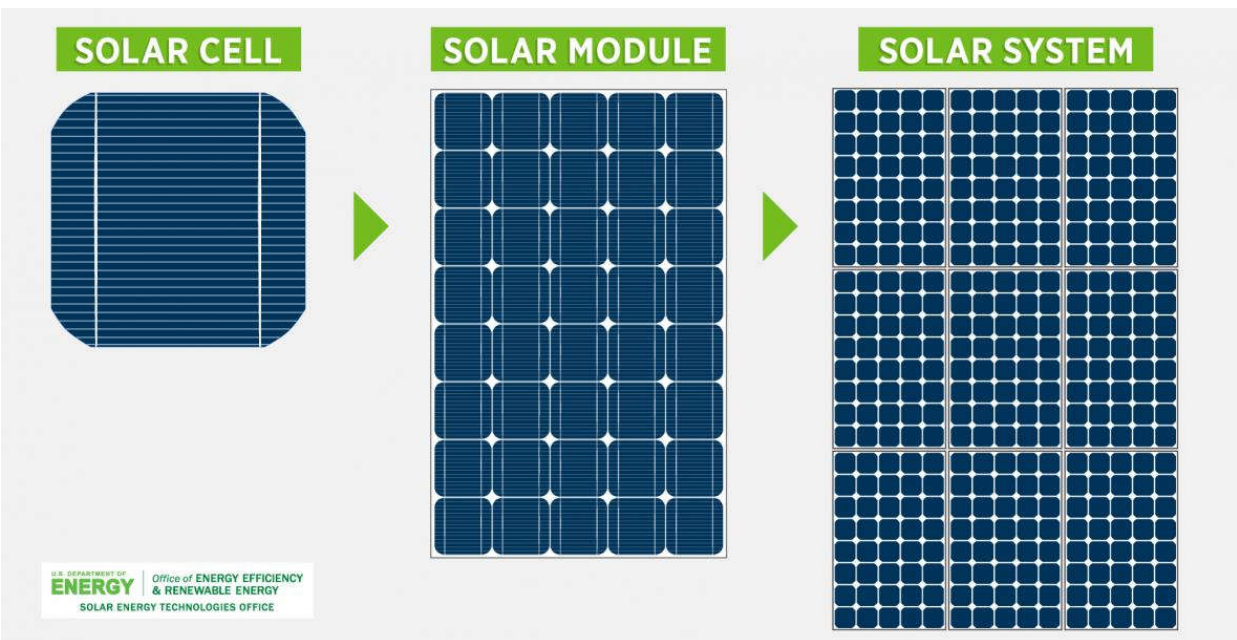


Fig. (1) Solar System²

For electricity generated by Solar systems to be utilized, it first must be connected to the regional electric grid. Once the solar system is connected to the electric grid it can then be distributed to consumers. This system is achieved by constructing a solar power plant with the use of a solar system, in which the quantity and arrangement of solar modules is determined from the electrical system design of the plant and is then connected to the regional electric grid.

² Picture from the official website of ‘Office of Energy Efficiency & Renewable Energy’

2.1 Solar Power Plant

A Solar Power plant is an electric power plant constructed for generating electric power using solar modules. A Solar Power Plant consists of a solar system and the other associated electrical and plant equipment for transmitting the energy generated.

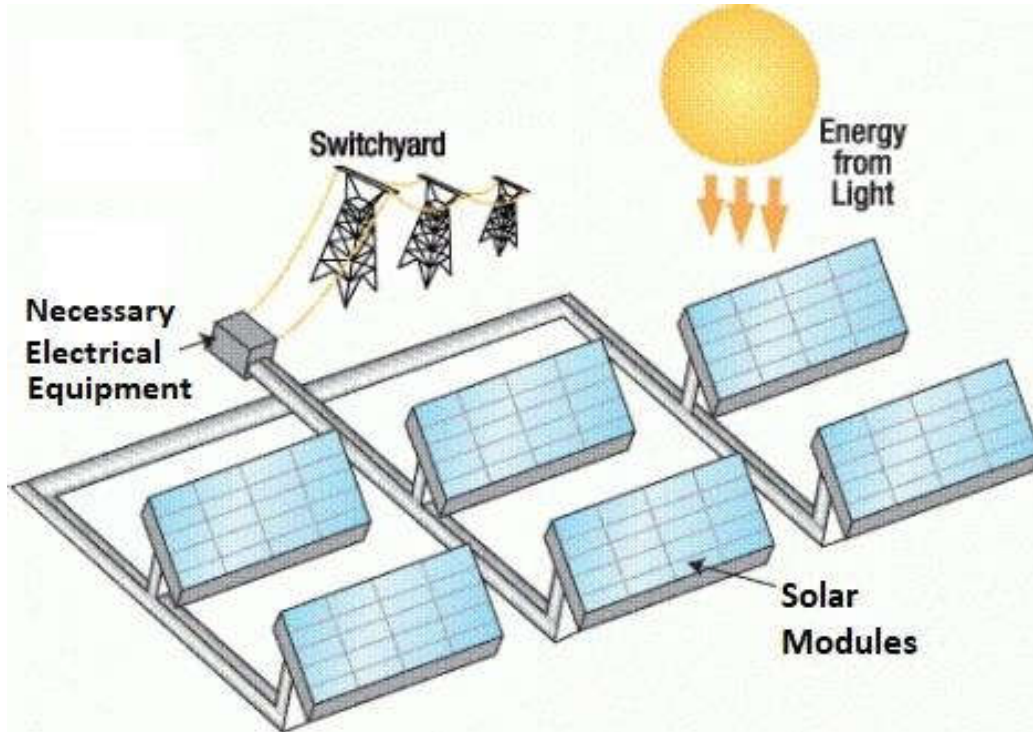


Fig. (2) A Solar Power Plant³

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

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

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

³ Reference the scholarly article <http://holbert.faculty.asu.edu/eee463/SOLAR.HTML>

2.2 Role of Solar Modules

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

Besides the additional equipment, the Solar modules are manufactured with the ability to track the sun to increase their efficiency.

2.3 Role of Inverters

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

A 'Solar inverter' or a 'PV inverter' is a power electronic device which converts the DC Power generated by the Solar system, into AC Power. This AC Power is then transmitted to the electrical grid for power distribution.

2.4 Role of Batteries

As a Solar system can produce electric power only when the sunlight is available. It is because of this drawback a Solar power plant cannot produce electricity during night. In order to overcome this drawback Solar power plants are installed with batteries so that some portion of electricity produced by the solar modules during the day is stored in the batteries and retrieved during night.

The Solar Modules and the Batteries function on DC. A proper combination of Solar Modules and Batteries can produce electricity all day long.

2.5 Role of Transformers and Other associated switchyard equipment

A Transformer is an electrical power equipment which is used either to step-up or to step-down the voltage of an electrical power source without changing the frequency of the voltage. A Transformer is an AC power equipment.

In a Solar Power plant, the power produced by the solar modules is converted into the useful form of AC by Inverters. The AC Power produced by inverters are at a relatively lower voltage compared to the voltage available at the electric power grid. A Transformer, which can step-up

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



the voltage to match it with the grid, is used to overcome the difference in voltages and to establish an interconnection for the supply of power.

In a large Solar Power plant, every Inverter is installed with a Transformer locally to the inverter, to step-up the voltage to a medium level, other than the voltage available at the grid. This is done to form a network of Transformers to collect the power coming from each Inverter.

This Electric network of transformers will have one high-capacity Main Transformer, which does the final step-up for the connection with the grid.

Besides the Transformers, Solar Power plants are installed with some other electrical equipment like,

- i) Electric Switchgear
- ii) Electric Bus system
- iii) Electric Protection system &
- iv) Electric Energy measurement system

2.6 Role of Steel & Concrete Structures, Roadways & Fencing

Steel & Concrete structures are necessary structures for the installation of solar modules and all other necessary electrical equipment. Roadways provide access to the modules for site personnel for work to be completed for maintenance and general site operation. Fencing is installed at solar facilities to determine the boundary of the facility, safety, as well as controlling who has access to the facility.

2.7 General Effects of Solar Power Plants

2.7.1 Noise from the Equipment

In a Solar power plant, the Solar Inverters and the Power Transformers are the main sources of noise. This equipment because of the cooling fans mounted on them cause the noise in the Solar power plant. However, the noise produced by this equipment are effective only in the vicinity of the equipment and decay with the distance. When this equipment is located appropriately in the plant the effect of noise can be minimized.

2.7.2 Glare/Reflection from the Solar Panels

The Glare or the reflection is commonly seen with the 'Concentrating Solar-Thermal Power

plants. On the other hand, the PV Solar modules do not reflect light as the light is absorbed by the modules for the generation of electricity. While some PV modules use mirrors which can cause glare, most PV modules are manufactured using non-reflective glass and are designed to absorb rather than reflect the light that hits the modules. PV modules are generally less reflective than windows.⁴

2.7.3 Increased Road Traffic, Noise and Fugitive dust

The Solar Powerplant is a power plant with stationary equipment producing energy based on the photovoltaic effect. There will not be any transportation of raw material or the plant wastage for the Solar power plant. Hence, Solar power plants do not increase the Traffic, Noise and Fugitive dust. However, during construction there will be considerable traffic of construction vehicles transporting the equipment of the plant. Necessary mitigation measures must be taken to avoid traffic congestion, Noise and Fugitive dust during the construction of the Solar Power plant.

2.7.4 Environmental and Wildlife

Solar energy systems/power plants do not produce air pollution or greenhouse gases. Using solar energy can have a positive, indirect effect on the environment when solar energy replaces or reduces the use of other energy sources that have larger effects on the environment. However, some toxic materials and chemicals are used to make the photovoltaic (PV) cells that convert sunlight into electricity.

There has been a relatively low number of studies that have been done on how solar facilities affect wildlife. However, the following methods can be adopted to minimize the impact of Solar power plants on wildlife⁵,

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

⁴ Top Five Large-Scale Solar Myths by the NREL https://www.nrel.gov/state-local-tribal/blog/posts/top-five-large-scale-solar-myths.html#_ftn1

⁵ Making Solar Wildlife-Friendly

Creating solutions to maximize conservation benefit from solar production

<https://www.nature.org/en-us/about-us/where-we-work/united-states/north-carolina/stories-in-north-carolina/making-solar-wildlife-friendly/>

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



2.7.5 Farming land

One of the biggest concerns with solar farms built on farmland is the effects the farm will have on the land once all the panels and associated equipment are removed from the site, as well the effect on local wildlife species, as well as the ability for the land to be used with domesticated animals.

During the Plant operation, Solar farms can be used to graze domestic animals such as sheep, which are commonly used to control vegetation at the facility as they do not climb on or damage the PV modules. It is not necessary to raise the PV modules in height to accommodate grazing as vegetation is accessible beneath the modules at the standard mounting heights. When sheep are used for grazing to control vegetation growth it can benefit local shepherds, the solar operators, and the land due to a reduction in mowing, herbicide, and other management needs. Cattle grazing is generally not compatible with PV facilities due to the risk of damage to the modules. Wild animals can graze under PV modules; however, security fences can be installed to increase the security of the facility as well as keeping out larger animals if they are deemed to be a damage risk to the modules. Fencing can be built to accommodate smaller animals such as foxes. The areas below the PV modules can be built to provide a habitat and forage to pollinators, birds, and other small species.⁶

⁶ Farmer's Guide to Going Solar <https://www.energy.gov/eere/solar/farmers-guide-going-solar>

3 McCracken County Solar – Application Review & Findings

The present document, as mentioned in the previous sections, is a review report created after reviewing the application documents submitted by the applicant, McCracken County Solar, LLC.

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

- i) Commonwealth of Kentucky Order for Case no. 2020-00392
- ii) Site Assessment Reports Vol.I, Vol.II for Case No. 2020-00392 by McCracken County Solar, LLC, KY
- iii) Responses provided by McCracken County Solar LLC for First RFI
- iv) Responses provided by McCracken County Solar LLC for Second RFI
- v) Kentucky Revised Statutes, KRS 278-706, 708

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

3.1 Initial Review

As part of the requirements of the state order, for the applicant's Case No. 2020-00392, Wells Engineering, after the initial review of the application documents, provided list of questions for First as well as Second Requests for Information.

The initial review included the review of the 'Site Assessment Reports Vol.I, Vol.II for Case No. 2020-00392' submitted by the applicant McCracken County Solar LLC.

The corresponding documents submitted by Wells Engineering is attached as Attachment-A with the present document.

3.2 Site Visit

As part of the requirements of the state order, for the applicant's Case No. 2020-00392, Wells Engineering, made a visit to site as organized by the Siting board, on July 12th, 2021.

The locations visited are indicated on the site layout below.

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392

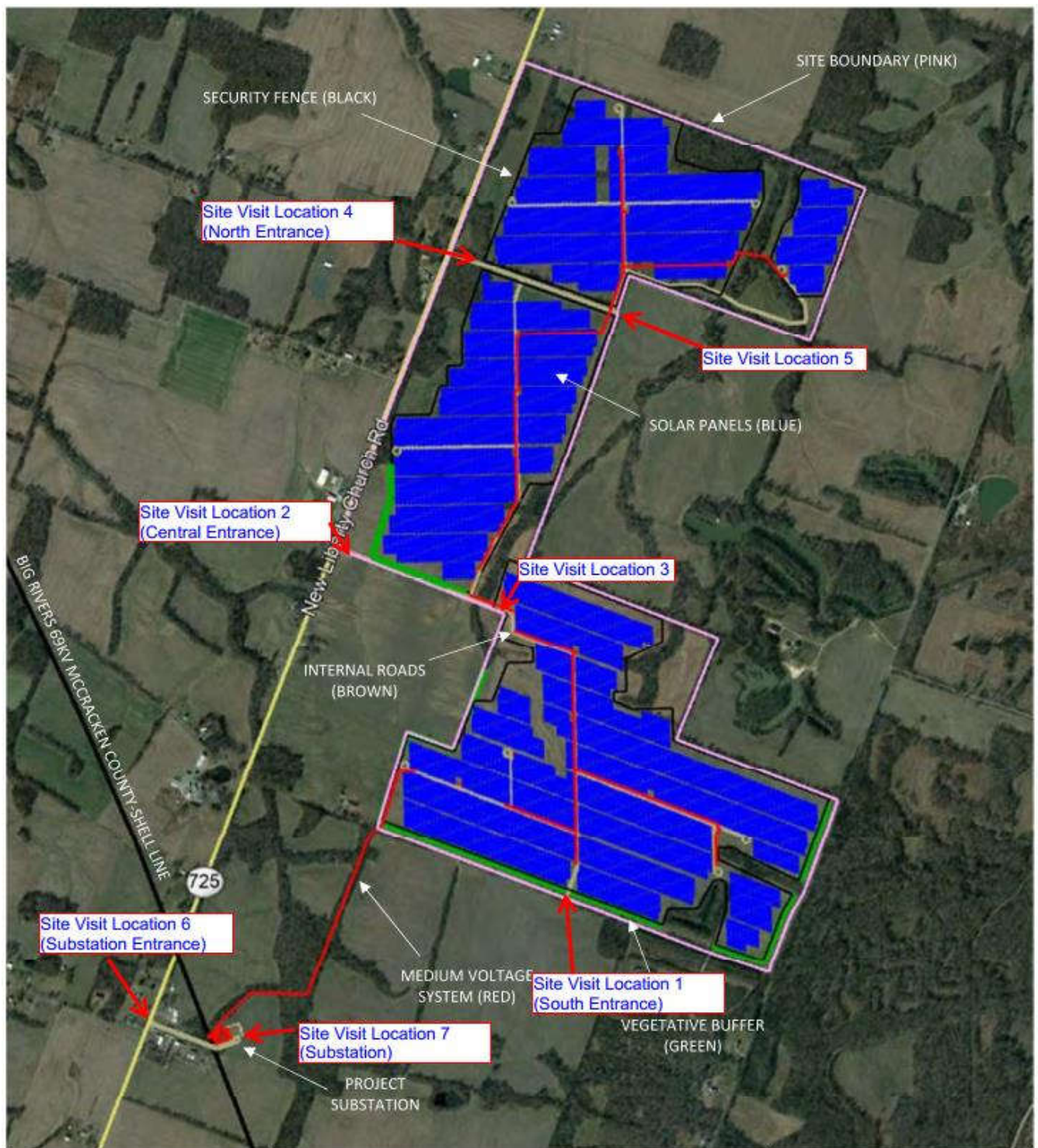


Fig. (3) Site Layout

Pictures from the site visit are shown in the following pages.

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (1) Location #1 – South Entrance Road Access

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (2) Location #2 – Central Entrance Road Access



Picture (3) Location #3 – Existing creek



Picture (4) Location #4 – North Entrance Existing Gate

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (5) Location #5 – Standing Water



Picture (6) Location #5

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (7) Location #6 – Substation Road Access

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (8) Location #6 – Big Rivers 69kV Line

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (9) Location #6 – Substation Road Pathway

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (10) Location #7 – Substation Location



Picture (11) Location #7 – Big Rivers 69kV Interconnection



Picture (12) Location #7 – Big Rivers 69kV Interconnection

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



3.3 Final Review & Findings

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

3.3.1 Review of Application documents

As per 278.706 the applicant, McCracken County Solar LLC, submitted the application documents and a site assessment report addressing the compliances on different requirements of KRS 278.706 & 278.208

Wells Engineering reviewed the Application documents and the Site Assessment report submitted by the applicant and the all the finding were submitted as 'List of Questions' for the First RFI and Second RFI.

The documents submitted for the First RFI and Second RFI are attached as Attachment-A

As per KRS 278.708 the site assessment report shall include the following

- (a) A description of the proposed facility that shall include a proposed site development plan that describes:
 - 1) Surrounding land uses for residential, commercial, agricultural, and recreational purposes;
 - 2) The legal boundaries of the proposed site;
 - 3) Proposed access control to the site;
 - 4) The location of facility buildings, transmission lines, and other structures;
 - 5) Location and use of access ways, internal roads, and railways;
 - 6) Existing or proposed utilities to service the facility;
 - 7) Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), (4), or (5); 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

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



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

Wells Engineering reviewed the Site Layout and the 2-mile vicinity maps submitted by the applicant and performed Site Visit on July 12th, 2021. The findings after the site visit are discussed below.

Findings on the Site Layouts & 2-Mile vicinity maps

1. On the site layout diagrams all the water bodies like ponds, lakes, creeks shall be identified. Reference the picture (3) of Location #3 from site visit.
2. West Kentucky Wildlife Management Area was previously a Uranium Enrichment facility because of this any future expansions will not be able to be done on this property.

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

After reviewing the legal descriptions of the land submitted as part of the application documents with the McCracken County PVA, the following finding were made.

Findings on the Legal descriptions

1. Page 184 Parcel 020-00-00-017 PVA report says owned by WC Fields LLC, while application says owned by Padon, Gregory L. and Watkins, Kimberly M.

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

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

Finding on Proposed Access Control:

1. At the time of construction and operation of the plant, besides providing fencing (as proposed by the applicant), all necessary signage, caution boards and safety requirements as per OSHA shall be installed.

3.3.5 278.708(3)(a)(4) Location of Facility Buildings & Radial Tie lines

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

Findings on Location of Facility Buildings and Radial Tie lines

1. Existing Electric service: Any new power line shall be clear of the existing electric service line, power pole and guy wire. Reference Picture (13).

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

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

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

1. The internal roads are proposed to be gravel roads.
2. Rail roads are not applicable to site.
3. Truck capacity limit on New Liberty Church Road is '8 Tons'. Reference picture (14).

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Picture (13) Existing Power Service Line



Picture (14) New Liberty Church Road

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



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

After reviewing the plot plans submitted by the applicant, it was found that the drawings do not indicate the utilities to the facility buildings of the plant, as the drawings are prepared as preliminary. Applicant has not indicated if water, internet, or phone connection will be provided to the site. If applicable, there shall be necessary drawings created to indicated all underground, overhead utilities required to site at the time of construction.

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

The KRS required setback is 2000 feet. This setback is practical for turbine-based plants and the noise and view generated but not practical for a solar power plant. After reviewing the applications documents and the statutes it was found that the setback distance applicable to site is 100' or as advised by the local planning authority.

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

Wells Engineering has appointed industry leading expert for the Environmental Assessment of site for Noise, Scenic surroundings, historic and archeological, Environmental & Fugitive dust.

The summary of findings of the expert's review is as under,

This adequacy report shows that the application submitted by the client is substantially in compliance with the intent of the Kentucky Revised Statutes .However a few General and Additional mitigation measures are advised for construction of the Solar Plant.

Reference the Attachment-B for complete report.

3.3.10 278.708(3)(c) & (e) Visual Impacts, Traffic and Property Values

Wells Engineering has appointed industry leading expert for the assessment of the Application document for Visual impacts, Traffic and Property Values.

Summary: While there will always be impact to the scenery of neighboring properties the impact of this project is minimal. The combination of the topography, existing tree line, existing human made features, and the large setback from the property line proposed by the developer works well to minimize the impact. The major exceptions to this are the project participants and a few other directly neighboring landowners.

Reference Picture (2) of Location#2 on New Liberty Church Road, a probable location of visibility of Solar Panels.

Reference Attachment-C for complete report.

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



3.3.11 278.708(3)(c) Economic Impact Analysis

Economic Impact Analysis was performed by an industry leading expert, as contracted by Wells Engineering, for the Site Assessment.

Summary: It is notable that all other bases for the economic impact study were based upon a 30-year generation of power; output, representing the Project's income, was only based on the 20-year sales agreement with Big Rivers. While the Kentucky State Board on Electrical Generation and Transmission Siting should be aware of this inconsistency, it does not itself negate the validity of the positive economic impact of McCracken County Solar LLC's proposed construction of a merchant generating facility as proposed by its application.

The complete report is attached as 'Attachment-D

4 Recommendations & Mitigations Measures

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

1. Create a Site Survey Map indicating the property boundaries. This will be a good reference for current and future needs of the project.
2. Create an over-all plot plan indicating all water bodies, bridges, culverts, access roads, power lines, residential and public structures, etc.
3. Update the property ownership records.
4. Provide Site access control as per KRS, FERC, & NERC guidelines.
5. For locating the Solar Modules and Other associated equipment of the plant maintain sufficient clearance from the existing power lines
6. Construct new bridge wherever required necessary.
7. Adhere to the setback distance at all locations as per guidelines from the local planning zone authority.
8. Setbacks for solar equipment from roads and property lines, with increased setbacks for certain equipment. Security fencing, vegetative buffer and pollinator plantings shall not be subject to setback restrictions.
9. Leaving existing vegetation between solar equipment and neighboring residences in place, to the extent practicable, to help screen the Project and reduce visual impact
10. Notices to neighbors regarding potential construction and operation noises, as well as limits on working hours during the construction period, as described in the Application.
11. Fugitive Dust and PM10(Coarse particles)
Coarse (bigger) particles, called PM10, can irritate your eyes, nose, and throat. Dust from roads, farms, dry riverbeds, construction sites, and mines are types of PM10. The applicant will submit in writing the specific plan to control fugitive dust and PM 10 during the construction process ten days prior to commencing construction.
12. Protection of Water Resources in the Project Area
Ten days prior to the commencement of construction, the Applicant will provide a detailed plan on how they will protect water resources in the project area. The site assessment documents in several locations say that certain mitigation measures regarding erosion and protection of water resources “may” be carried out. This needs to be clearly specified. The primary focus should be on preventing turbidity being added to local streams as a result of erosion during construction.

Solar Generation Siting Final Report

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



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

Visit us at

www.wellsengineering.com

Solar Generation Siting Final Report
McCracken County Solar, LLC
KY State Board on Electric Generation and Transmission Siting
Case #2020-00392



ATTACHMENT A

June 24, 2021



List of Questions for Data Request - I

McCracken County Solar, LLC
KY State Board on Electric Generation and
Transmission Siting
Case #2020-00392

Customer:
Kentucky Public Service
Commission

Prepared for:
Cornelius J Mance Jr



June 24, 2021

Prepared by:

A handwritten signature in blue ink that reads 'Collin Abell'.

Collin Abell
Power Systems Engineer

A handwritten signature in black ink that reads 'V. Chikkeruru'.

Vasu Chikkeruru P.E.
Senior Power Systems Engineer

Reviewed by:

A handwritten signature in blue ink that reads 'Scott H Campbell'.

Scott H Campbell
Project Manager

Approved by:

A handwritten signature in blue ink that reads 'Jim Cook'.

Jim Cook
Chief Operating Officer

List of Questions for Data Request - I

Synopsis

This document is a list of questions prepared for the data (or) information to be requested as part of the application process for Solar Electric Generation Plant in McCracken, KY.

WEpsc Order: WE21052097

Public Service Commission PO:
PON2 123 2100001588

CONTENTS

Revision History	iv
About Wells Engineering	v
1 Introduction	
Scope	1
Reference Document	1
2 List of Questions	
1) Technical	2
Questions 1-5	2
Questions 6-11	3
Questions 12-13	4
2) Environmental	4
Questions 14-16	4
Questions 17-21	5
3) Economic	6
Questions 22-23	6
Questions 24	7
Questions 25	8

REVISIONS

Revision	Date Issued	Issue Type	By	Description
0	06-24-2021	For Review	CA	Issue for Review & Record

ABOUT WELLS ENGINEERING

Power Systems Engineering

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

Our Mission

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



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

Services

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

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

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

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

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

Visit us at
www.wellsengineering.com

List of Questions for Data Request - I

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



1 Introduction

The present document is a list of questions prepared for the request of data (or) additional information in the matter of Application of McCracken County Solar, LLC for a certificate of construction for an approximately 60 MW Merchant Electric Solar Generation Facility in McCracken County, KY pursuant to KRS 278.700 & 807 KAR 5:110

Scope

As part of the application evaluation process Kentucky Public Service Commission has appointed Wells Engineering PSC for providing consultancy services.

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

- i) Clover lake Consulting Services for Noise & Environmental assessment
- ii) Watters Unclaimed Property Consulting LLC for Economic impact.
- iii) Mary McClinton Clay, MAI for the review on impact on property values

The present document is created as part of the First request for information required as per the order issued for case number.2020-00392, by the commission.

Reference Document

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

- i. Commonwealth of Kentucky Order for Case no. 2020-00392
- ii. Site Assessment Reports Vol.I, Vol.II for Case No. 2020-00392 by McCracken County Solar, LLC, KY
- iii. Kentucky Revised Statutes, KRS 278-706, 708, 710

2 List of Questions

In this section a detailed list of questions is described. The questions are divided into three categories as,

- 1) Technical
- 2) Environmental
- 3) Economic

1) Technical

Question#1

Electrical One-Line Diagram

Electrical One-Line diagram is a very important document required for understanding and evaluating the Electrical Power Network and Interconnection.

Applicant to submit Electrical One-Line diagram of the installation.

Question#2

Site Map

On the Site Map, reference Exhibit 2 Attachment, Applicant to indicate the Churches, Hospitals, Public & Private parks, etc on the Maps and Plot plans. This information is required to analyze the mitigations proposed by the applicant.

Question#3

Substation

Applicant to provide the substation layout diagram, if available.

Question#4

PV Cell/Solar Panel Specifications/Model #

Applicant to provide information on the specifications/ model number of the PV cell/Solar Panel to be used.

Question#5

Project Schedule

Applicant to submit an over-all tentative schedule of the project, starting from the receipt of the certificate for construction to the completion of the project. Schedule is to include the length of

List of Questions for Data Request - I

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



each construction phase.

This document helps in understanding the total time required and major milestones involved. It will also be used to confirm the timing of the economic benefits listed.

Question#6

Construction Power

Applicant to provide information on the temporary power required for construction of the plant.

Question#7

Energy Storage Potential Hazards

Please Identify if energy storage is being used and provide SDS sheet for energy storage system.

Question#8

Energy Storage Environmental impact

Applicant to provide information on the environment impact and the energy storage system imposes. If batteries are to be used for energy storage, what is the life expectancy of the batteries? How will the batteries be disposed of? Will they be recycled?

Question#9

Fiber Optic Communication & Associated excavation

Applicant to provide information on any fiber optic or any kind of communication network installed as part of the project.

Applicant to provide information on excavation that may be required for the above.

Question#10

PV Cell/Solar Panel Manufacturing

Applicant to provide information on where the PV cells/Solar Panels are manufactured.

Applicant to indicate the % of import & % of Made in USA.

Question#11

Applicant to provide the missing information/documents from the Transmission Analysis report by "Electrical Power Engineers" submitted as Exhibit 9 Attachment 9.3. Provide the spreadsheets 'Table-4 ATC Results' & 'Table 5 Generation Projects'

Question#12

Proposed Access control

In the Application – Exhibit 12, Volume 1, Tab 12 Applicant to provide information on the proposed access control applicable to site. It may include, Fencing and Secured access, etc. Applicant to provide compliance on Physical Access control as per requirements from NERC, FERC and DHS, if found applicable.

Question#13

Applicant to provide pertinent information for,

At end of life when the system is decommissioned will the area be useful for farming? If not, what guarantee will be used to bring the site back to a useful state?

2) Environmental

Question#14

Signage

Applicant to provide information on Signage developed for the Project.

Based on the revision to the McCracken County Zoning Code, this project will require the appropriate signage for safety for both construction and operation of the facility. Has a signage plan been developed? If it has, please provide it and if it has not, please develop it and provide it.

Question#15

Security Fencing Plan

Applicant to provide a security fencing plan as required by the revised zoning code.

Question#16

Comprehensive Ground Maintenance Plan

Applicant to provide a comprehensive ground maintenance plan as required by the McCracken County Zoning Code.

List of Questions for Data Request - I

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



Question#17

Traffic Analysis

What are the specific plans to keep the area safe from a traffic perspective both during construction and operation of the facility? A detailed plan should be submitted to the Kentucky Public Service Commission before construction commences.

Question#18

Fugitive Dust

What will the specific impacts of fugitive dust be on local project area residences and business be during construction and during operation? Please estimate specific levels of fugitive dust, PM and PM10 on a map of the project area.

Question#19

Bats

Three species of bats that are either threatened or endangered are potentially located within the site area. Additionally, what potential mitigation for these species will be provided both during construction and operation?

Question#20

Bald Eagle

The Bald Eagle, a Kentucky Threatened Species could be found in the site area. What mitigation should be performed regarding this species?

Question#21

Consultation with US Army Corps of Engineers (or) US Fish & Wildlife Service

Is a consultation with the U.S. Army Corps of Engineers and/or the US Fish and Wildlife Service planned regarding mitigation for bat, bird and fish endangered, threated or sensitive species?



3) Economic

Question#22

Applicant Business Structure

General Corporate Group Structure

Source: McCracken County Solar LLC's Application for a Certificate to Construct a Merchant Generating Facility, Case No. 2020-00392, page 1, paragraph 1.

Explanation: In the above-referenced paragraph, the corporate information of the Applicant, its associated parent LLC, contact information, and (potential) ultimate parent are provided.

Suggested: Provision of a table of organization or similar structural representation from McCracken County Solar, LLC through its ultimate parent organization, including any intermediate ownership and ownership percentages.

Purpose: Provides understanding of ownership, management, and ultimate responsibilities.

Question#23

Applicable Real Estate Analyses

Question Regarding Real Estate Properties Committed

Source: McCracken County Solar LLC's Application for a Certificate to Construct a Merchant Generating Facility, Case No. 2020-00392, Application Exhibits KRS 278.706(2)(e), Exhibit 5 [Volume 1, Tab 5], pages 6 – 10 & KRS 278.706(2)(j) & Exhibit 10 [Volume 1, Tab 10], Attachment 10.2 pages 2 - 7

Explanation: At both locations there have been described the parcels of real estate upon which the proposed solar energy facilities are to be placed or incorporated. The parcels and descriptions as identified in the two Exhibits do not match. The composite maps on the 3rd and 4th pages of Exhibit 2 and pages 5 through 10 of Exhibit 5 (pages 6 – 10) show contiguous parcels. Of the three parcels in Attachment 10.2, parcel number 020-00-00-017 is not contiguous with parcels 013-00-00-026 & 013-00-00-030.

List of Questions for Data Request - I

McCracken County Solar, LLC
KY State Board on Electric Generation and Transmission Siting
Case #2020-00392



Suggested: Obtain an explanation and a reconciliation of the sets of real estate descriptions and, if necessary, modification of all calculations, descriptions, estimations, and other discrepancies resulting from these differing identifications

Purpose: Reconciliation of the real estate parcels included in the project and the representations resulting therefrom in each Exhibit. It would appear that there is a misrepresentation to either parcel number 020-00-00-017 or parcel number 013-00-00-026; or, in the alternative, an omitted fourth parcel or independently owned and uninvolved parcel making those two included parcels non-contiguous.

Question#24

Real Estate for Substation and Powerlines from Solar Generation Fields

Source: McCRACKEN COUNTY SOLAR LLC'S APPLICATION FOR A CERTIFICATE TO CONSTRUCT A MERCHANT GENERATING FACILITY, Case No. 2020-00392, Application Exhibits KRS 278.706(2)(b), Exhibit 2 [Volume 1, Tab 2]. Note also the substation and transmission lines are not shown in maps displayed in Application Exhibits KRS 278.706(2)(e), Exhibit 5 [Volume 1, Tab 5], pages 6 – 10 & KRS 278.706(2)(j) & Exhibit 10 [Volume 1, Tab 10], Attachment 10.2 pages 2 - 7

Explanation: This exhibit purposes to describe the proposed site and attributes within and nearby to it. On the first map, on Exhibit 2, page 5, the site is shown for the fields together with lines leading to and from a Project Substation. The lease, ownership and easement (if applicable) are not described nor any relationship between the Applicant for this project or the land owner.

Requested: Obtain a description of the nature and means for any lease, easement and ownership of said properties being used to transmit or perform distribution or substation activities involved.

Purpose: Currently no information has been found for the connection of the electricity generated from the solar generation fields into the power grid. Note that the transmission line and substation may be owned by Big Rivers Electric Corporation referenced in the Application on page 2, paragraph 3.

List of Questions for Data Request - I

McCracken County Solar, LLC
KY State Board on Electric Generation and Transmission Siting
Case #2020-00392



Question#25

Usage of the 30-year Operational Life for Economic Impact

Source: McCracken County Solar LLC'S APPLICATION FOR A CERTIFICATE TO CONSTRUCT A MERCHANT GENERATING FACILITY, Case No. 2020-00392, Application Exhibits KRS 278.706(2)(j), Exhibit 10 [Volume 1, Tab 10].

Explanation: In the narrative of Exhibit 10, page 3, under Output, the Applicant asserts that the Project is anticipated to operate for at least 30 years, although the initial contract for sale (presumed to be to Big Rivers Electrical Corporation, see Application, page 2, paragraph 3) of produced electricity generated is 20 years. Estimations beyond the 20 year sales contract, absent reasonable guarantee or anticipation of extension, would appear to excessively inflate projections of economic impact.

Requested: Consider whether the projections of 30 years should be reduced to 20 years for economic impact for the known contractual period under contract.

Purpose: By using a 20 year operational standard consistent with the terms of the electrical sales contract, a truer and more likely estimation of economic impact could be assumed.



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

Visit us at
www.wellsengineering.com

July 21, 2021



List of Questions for Data Request - II

McCracken County Solar, LLC
KY State Board on Electric Generation and
Transmission Siting
Case #2020-00392

Customer:
Kentucky Public Service
Commission

Prepared for:
Cornelius J Mance Jr



July 21, 2021

Prepared by:

A handwritten signature in blue ink that reads 'Collin Abell'.

Collin Abell
Power Systems Engineer

A handwritten signature in black ink that reads 'V. Chikkeruru'.

Vasu Chikkeruru P.E.
Senior Power Systems Engineer

Reviewed by:

A handwritten signature in blue ink that reads 'Scott H Campbell'.

Scott H Campbell
Project Manager

Approved by:

A handwritten signature in blue ink that reads 'Jim Cook'.

Jim Cook
Chief Operating Officer

List of Questions for Data Request - II

Synopsis

This document is a list of questions prepared for the data (or) information to be requested as part of the application process for Solar Electric Generation Plant in McCracken, KY.

WEpsc Order: WE21052097

Public Service Commission PO:
PON2 123 2100001588

CONTENTS

Revision History	iv
About Wells Engineering	v
1 Introduction	
Scope	1
Reference Document	1
2 List of Questions	
1) Technical	2
Questions 1-4	2
2) Environmental.....	3
Questions 5-6	3

REVISIONS

Revision	Date Issued	Issue Type	By	Description
0	07-20-2021	For Review	CA	Issue for Review & Record

ABOUT WELLS ENGINEERING

Power Systems Engineering

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

Our Mission

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



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

Services

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

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

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

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

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

Visit us at
www.wellsengineering.com

List of Questions for Data Request - II

McCracken County Solar, LLC

KY State Board on Electric Generation and Transmission Siting

Case #2020-00392



1 Introduction

The present document is a list of questions prepared for the request of data (or) additional information in the matter of Application of McCracken County Solar, LLC for a certificate of construction for an approximately 60 MW Merchant Electric Solar Generation Facility in McCracken County, KY pursuant to KRS 278.700 & 807 KAR 5:110

Scope

As part of the application evaluation process Kentucky Public Service Commission has appointed Wells Engineering PSC for providing consultancy services.

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

- i) Clover lake Consulting Services for Noise & Environmental assessment
- ii) Watters Unclaimed Property Consulting LLC for Economic impact.
- iii) Mary McClinton Clay, MAI for the review on impact on property values

The present document is created as part of the Second request for information required as per the order issued for case number.2020-00392, by the commission.

Reference Document

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

- i. Commonwealth of Kentucky Order for Case no. 2020-00392
- ii. Site Assessment Reports Vol.I, Vol.II for Case No. 2020-00392 by McCracken County Solar, LLC, KY
- iii. Responses provided by McCracken County Solar LLC for First RFI, Appendix A.
- iv. Kentucky Revised Statutes, KRS 278-706, 708, 710

2 List of Questions

In this section a detailed list of questions is described. The questions are divided into two categories as,

- 1) Technical
- 2) Environmental

1) Technical

Question#1

Substation Layout

The Substation Layout does not exactly follow the one-line diagram.

Applicant to provide compliance on updating the layout according to the One-line at the time of construction. The substation layout shall be designed and constructed as per the NFPA, NESC and OSHA requirements.

Question#2

Access points on the Site Map

On the Site Map, reference Appendix A Item 2 of the responses provided to the First RFI, the Access points or the Entrances of the Plants shall be identified. This information is required to analyze the equipment movement and vehicle traffic during construction.

Question#3

Existing Transmission line on the Site Map

On the Site Map, reference Appendix A Item 2 of the responses provided to the First RFI, the existing 69kV Transmission Line shall be identified. This information will help in understanding the proposed location of the substation

Question#4

Excavation for Optical Fiber Cables

Applicant to provide statement on excavation for Optical Fiber to comply with the excavation requirements of the local jurisdiction as applicable.



2) Environmental

Question#5

Winter Tree Clearing

Applicant to submit the proposed Winter Tree Clearing Coordination Plan, if available, for review and records of the board.

Question#6

Endangered Species

Applicant to identify the potential hibernacula areas exist in close proximity to the project site that would support the bat population that could exist on the project site in the winter months.



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

Visit us at
www.wellsengineering.com

Solar Generation Siting Final Report
McCracken County Solar, LLC
KY State Board on Electric Generation and Transmission Siting
Case #2020-00392



ATTACHMENT B

Kentucky State Board on Electric Generation and Transmission Siting McCracken County Solar, LLC – Case No. 2020-00392

**Developed for Wells Engineering and the Kentucky Public Service
Commission- State Board on Electric Generation and Transmission
Siting**

By Cloverlake Consulting, W. Thomas Chaney, President

August 15, 2021



Table of Contents

Report Section	Page
• Project Description	4
• 1.01 Standard of Adequacy for the Site Assessment Report	6
• 1.02-Specific Requirements by the Statutes and Evaluation on the Applicants Performance	7
• 1.02.1-Surrounding Land Uses	8
• 1.02.2-Legal Boundaries	9
• 1.02.3-Proposed Access Control of the Site	9
• 1.02.4-The Location of Facility Buildings, Transmission Lines and Other Structures	9
• 1.02.5-Location of Access Ways and Internal Roads	10
• 1.02.6-Existing or Proposed Utilities to Service the Facility	10
• 1.02.7-Compliance with Applicable Setback Requirements as Provided under KRS 278.704(2), (3), (4), or (5); a	11
• 1.02.8-Noise and Scenic Surroundings	11
• 2.0 Sound Impact Evaluation	13
• 2.1 Sound Level During Facility Construction	13
• 2.2 Sound Level During Facility Operation	16
• 2.3 Conclusions of Sound Level Impact During Facility Operation	17
• 2.4 Impact on Scenic Surroundings	17
• 3.0 Fugitive Dust	18
• 4.0 Noise Conclusions	18
• 4.1 Sound Level Assessment Conclusions	19
• 5.0 Historic and Archeologic Resources	19
• 6.1 Wetlands, Endangered Species and other Natural Resource Impacts	20

Report Section	Page
• 6.2 Applicants Mitigation Measures	21
• 6.3 Additional Mitigation Measures	22
• Summary of the Adequacy of the Applicants Site Assessment Report	23
• Appendix A-Site Map	24
• Appendix B-Land Use Map	26
• Appendix C-Local Vicinity Map	28
• References	30
• Gallery of Photographs Take During the Site Visit on March 21, 2021	31
• Resume of W. Thomas Chaney	43

Cloverlake Consulting Services August 12, 2021

On Behalf of Wells Engineering, Florence, Kentucky For the McCracken County Solar Project-Kentucky State Siting Board on Electric Generation and Transmission

Introduction

The Kentucky Public Service Commission, State Siting Board requires that applicants for a certificate for Solar Facilities file an application which details the current state of the affected properties to be used for the facilities. It also requires an assessment of the impact on the properties regarding the natural and human environment. This report assesses the adequacy of the assessment on the natural environment including: noise, dust, historic and archeologic resources and natural resources including endangered plant and animal species groundwater and surface water.

At its conclusion this adequacy report shows that the application submitted by the client is substantially in compliance with the intent of the Kentucky Revised Statutes.

Siting Project Description

The Applicant is McCracken County Solar LLC, with an address of Three Radnor Corporate Center, Suite 300, 100 Matsonford Rd., Radnor, Pennsylvania 19087. McCracken County Solar LLC's telephone number is (866) 946-3143. On February 4, 2020 the Kentucky Secretary of State issued a Certificate of Authority for McCracken County Solar LLC to transact business in the Commonwealth. A copy of this

document is provided as Exhibit 1 Attachment. McCracken County Solar LLC is owned and managed by Community Energy Solar, LLC, having an address of Three Radnor Corporate Center, Suite 300, 100 Matsonford Rd., Radnor, Pennsylvania 19087. The principal contact is Chris Killenberg, Regional Development Director, Community Energy Solar, LLC, P.O. Box 17236, Chapel Hill, North Carolina 27516.

The proposed site for the 60-megawatt McCracken County Solar project (the “Project”) is approximately 615 acres of land in western McCracken County, Kentucky, located along New Liberty Church Road approximately 2½ miles northeast of Kevil, Kentucky. The site is bordered on the south by Massey Road and on the east by Bethel Church/Rossington Road. Coordinates for the proposed site are: 37° 7'20.99"N latitude and 88°51'40.45"W longitude. Once completed, the proposed facility will cover approximately 400 acres of the project site. The facility will include approximately 156,000 solar panels on a ground-mounted racking system. The entire facility will be surrounded by a security fence. Existing natural vegetative buffers between the solar farm and New Liberty Church Road will be retained. Where no natural buffer currently exists, a double-row of evergreen plantings will be installed. Access to the proposed facility will be from three points along the eastern side of New Liberty Church Road, with an additional access point along Massey Road.

Distance from Residential Neighborhoods

-RS 278.700 defines “Residential Neighborhood” as a populated area of five (5) or more acres containing at least one (1) residential structure per acre. There are a number of Residential Neighborhoods within a two (2) mile radius of the proposed Project site: • Immediately west of the project site is a group of nine (9) residential structures located along Wallace Road, immediately west of the intersection with New Liberty Church Road. The nearest residential structure is approximately 530 feet from the proposed location of the nearest solar panels. This residence is separated from the project site by New Liberty Church Road and an existing mature natural buffer approximately 100 feet in width. This buffer is within the leased area for the project and will be retained in its current condition. • To the northwest of the project site are two residential neighborhoods. The first, along

Joppa Landing Road, is comprised of sixteen (16) residential structures and is located approximately 1.3 miles from the project site. The second, along Ingleside Road, is comprised of five (5) residential structures and is located approximately 2 miles from the project site.

- Due west of the project site, at the north end of Woodville Road, is a residential neighborhood comprised of twelve (12) residential structures and located approximately 2 miles from the project site.
- To the south of the project site are multiple residential neighborhoods that make up a portion of the town of Kevil. The nearest residential neighborhood to the main body of the project site is approximately 0.7 miles south of the site on Bethel Church Road. The nearest residential neighborhood to the project substation and point of interconnection

to Big Rivers' 69kV McCracken County-Shell transmission line (the "POI") is approximately 0.5 miles south on New Liberty Church Road.

- Nearest Residential Structures The nearest residential structures, and distances from the proposed Project site are:
 - 12620 Massey Road
 - 515 feet from the nearest solar panels
 - 5705-6370 New Liberty Church Road
 - Eight (8) residences, all 530 feet or greater from the nearest solar panels
 - 12190 Massey Road
 - 565 feet from the nearest solar panels
 - 12100 Massey Road
 - 770 feet from the nearest solar panels
 - 5255 New Liberty Church Road
 - 610 feet from the project substation and POI
- Nearest Schools There are no schools within two (2) miles of the proposed Project site.
- Nearest Public Parks There is one public park within two (2) miles of the proposed Project site.
- Immediately east of the project site is the Western Kentucky State Wildlife Management Area (WMA). The WMA is across Bethel Church Road/Rossington Road from the project site. The proposed location of the nearest solar panels to the border of the WMA is approximately 170 feet.
- Nearest Private Parks There are no known private parks within two (2) miles of the proposed Project site. Case No. 2020-00392 Application - Exhibit 2 Includes Attachment (2 pages) A map showing the distance of the proposed site from residential neighborhoods, schools, and public and private parks that are located within a two (2) mile radius of the proposed facility is attached as Exhibit 2 Attachment page 1 of 2.

The generating facility will sell power on the wholesale market as a merchant power plant or independent power producer.

1.01 Standard of Adequacy of the Site Assessment **Report Submitted By McCracken County Solar**

Requirements of KRS 278.216

Kentucky Revised Statutes require the following for applicants who desire to build a Merchant Generating Facility in the Commonwealth of Kentucky: 278.216 Site compatibility certificate --

Site assessment report -- Commission action on application. (1) Except for a utility as defined under KRS 278.010(9) that has been granted a certificate of public convenience and necessity prior to April 15, 2002, no utility shall begin the construction of a facility for the generation of electricity capable of generating in aggregate more than ten megawatts (10MW) without having first obtained a site compatibility certificate from the commission. (2) An application for a site compatibility certificate shall include the submission of a site assessment report as prescribed in KRS 278.708(3) and (4), except that a utility which proposes to construct a facility on a site that already contains facilities capable of generating ten megawatts (10MW) or more of electricity shall not be required to comply with setback requirements established pursuant to KRS 278.704(3). A utility may submit and the commission may accept documentation of compliance with the National Environmental Policy Act (NEPA) rather than a site assessment report. (3) The commission may deny an application filed pursuant to, and in compliance with, this section. The commission may require reasonable mitigation of impacts disclosed in the site assessment report including planting trees, changing outside lighting, erecting noise barriers, and suppressing fugitive dust, but the commission shall, in no event, order relocation of the facility. (4) The commission may also grant a deviation from any applicable setback requirements on a finding that the proposed facility is designed and located to meet the goals of this section and KRS 224.10-280, 278.010, 278.212, 278.214, 278.218, and 278.700 to 278.716 at a distance closer than those provided by the applicable setback requirements. (5) Nothing contained in this section shall be construed to limit a utility's exemption provided under KRS 100.324. (6) Unless specifically stated otherwise, for the purposes of this section, "utility" has the same meaning as in KRS 278.010(3)(a) or (9). Effective: June 24, 2003 History: Amended 2003 Ky. Acts ch. 150, sec. 3, effective June 24, 2003. -- Created 2002 Ky. Acts ch. 365, sec. 13, effective April 24, 2002.

102 Specific Requirements By the Statutes and Evaluation of the Performance of the Applicant's Site Assessment

278.708 Site assessment report -- Consultant -- Mitigation measures. (1) Any person proposing to construct a merchant electric generating facility shall file a site assessment report with the board as required under KRS 278.706(2)(l). (2) A site assessment report shall be prepared by the applicant or its designee. (3) A completed site assessment report shall include:

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

1.02.1. Surrounding land uses for residential, commercial, agricultural, and recreational purposes

McCracken County Solar: Description of the Proposed Facility The proposed facility (the “Project”) is a 60-megawatt alternating current (60MWac) photovoltaic electricity generation facility to be located along New Liberty Church Rd. in western McCracken County, Kentucky. The Project will be situated on up to 615 acres of land, 508 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. 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 a 69kV transmission line on site, which is owned and operated by Big Rivers Electric Corporation (“Big Rivers”). The Applicant has signed a long-term contract to sell 100% of the electricity generated by the Project to Big Rivers. A Site Plan for the proposed facility is provided as Exhibit 12 Attachment 12.1.

COMPLIANCE:

The land use of the proposed facility can be seen in detail on the Land Use map presented in Appendix B to this report.

A detailed description of the surrounding land uses is identified in the Impact Study conducted by Kirkland Appraisals, LLC, for the McCracken County Solar project.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report McCracken County Solar Project, Volumes I and II for land use is in compliance with the intent of KRS 278.216.

1.02.2. The legal boundaries of the proposed site; See Volumes I and II of the Applicants application.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for the McCracken County Solar project, is in compliance with the intent of KRS 278.216. The Appraisal Report by Kirkland Appraisals as well as construction and engineering documents including maps and figures specifically identify the legal boundaries of the site as well as the legal boundaries of adjacent parcels of land. See the Site Assessment for the McCracken County Solar Project. See Appendix B-Project Vicinity Map. And Appendix C for the Project Legal Boundary Map.

1.02.3. Proposed access control to the site

See the application.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment for McCracken County Solar project for access control of the site is in compliance with the intent of KRS 278.216.

1.02.4. The location of facility buildings, transmission lines, and other structures

See the site map in Appendix A and in the Applicants Site Assessment Report.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report the McCracken County Solar project for the location of facility buildings ,transmission lines and other structures is in compliance with the intent of KRS 278.216.

1.02.5. Location and use of access ways and internal roads

See the map in Appendix A and the Site Assessment Report for McCracken County Solar project. **Kentucky PSC Compliance Evaluation:***The data contained in the Site Assessment Report for the McCracken County Solar project for location and use of access ways, internal roads and railways is in compliance with the intent of KRS 278.216.*

1.02.6. Existing or proposed utilities to service the facility

See the map in Appendix A. The map shows the substation and low voltage line serving the site. Existing Utilities The proposed Project will require a minor amount of electricity during operation for starting equipment, providing communications and security, and for general back-up. The proposed Project site is located within the retail service territory of Jackson Purchase Energy Cooperative (JPEC). A JPEC 3-phase circuit runs along New Liberty Church Rd. for the entire length of the western Project periphery. The Applicant anticipates contracting for station service from Jackson Purchase Energy, utilizing existing facilities. Proposed Utilities No new utilities are proposed

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for the McCracken County Solar project for existing or proposed utilities to serve the facility is in compliance with the intent of KRS 278.216.

1.02.7. Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), (4), or (5); a

See the McCracken County Solar Application showing the site development plan. The setback requirements have been met.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for the McCracken County Solar project regarding applicable setback requirements is in compliance with the intent of KRS 278.216.

1.02.8-Noise and Scenic Surroundings

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for McCracken County Solar project regarding 1.02.01-1.02.07 above is in compliance with the intent of KRS 278.216.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial injury to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved adjoining agricultural uses, schools, churches, and residential developments. Industrial uses rarely absorb negative impacts from adjoining uses. Based on the data and analysis in this report, it is the professional opinion of the author that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting property and that the proposed use is in harmony with the area in which it is located. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it's quiet, and there is no traffic."

The data contained in the Site Assessment Report for the McCracken County Solar project , regarding an evaluation of the facility and its impact on property values is in compliance with the intent of KRS 278.216. Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary.

McCracken County Solar LLC is not aware of any solar-specific United States Standards for sound mitigation during project construction or operation. Common practice is to treat solar projects like any other sources of sound, applying existing laws that govern noise pollution from all sources in the applicable jurisdiction (MAREC 2021). Direct and indirect sound impacts associated with implementation of the Project would primarily occur during construction. Construction equipment, such as delivery trucks, backhoes, pile drivers, chain saws, bush hogs, or other large mowers for clearing, produce maximum sound levels at 50 feet of approximately 84 to 85 dBA. This type of equipment may be used for approximately 6-9 months in the PSA primarily during daylight hours, between sunrise and sunset. Most of the proposed equipment would not be operating on site for the entire construction period but would be phased in and out according to the progress of the Project. The activities likely to produce the greatest sound levels for an extended time period would be pile driving during the construction of the solar panel arrays. Standard solar pile drivers are estimated to produce 84 dBA at a distance of 50 feet (Vermeer 20121). The posts supporting solar panels are anticipated to be driven into loess deposits and silty clay; based on current knowledge, rock drilling is not anticipated. Pile driving for the closest solar panel array may temporarily generate sound levels of 63.74 dBA at the nearest residential receptor. Construction sounds at a solar project (which are comparable to other common construction activities that require pile driving) are rarely limited in an absolute way due to their temporary and intermittent nature (MAREC 2021). Sound would be generated on the PSA during construction; however, due to the distance to the nearest receptors, construction would not contribute to a significant sound increase when compared to sound currently occurring on or near the site (i.e., the operation of farming equipment for agricultural activities and crop harvesting as well as moderate traffic on the nearby roads). Following completion of construction activities, the ambient sound environment would be expected to return to existing levels or below, by eliminating the seasonal use of agricultural equipment. The moving parts of the solar panel arrays would be electric-powered and produce minimal sound. The inverters would produce sound levels of approximately 38 dBA at 1,000 feet, and the Project substation transformer would emit approximately 4.75 dBA at 600 feet. As no sound receptors are within 1,000 feet of proposed inverter locations or within 600 feet of the Exhibit 12 Attachment 12.5 Page 16 of 93 COPPERHEAD Environmental Consulting 13 McCracken County Solar LLC Acoustical Analysis Project substation, these effects from the Project are anticipated to be minimal to negligible. No sound is produced at night when no power is being produced. A study of solar power facility acoustics in Massachusetts found that at 150 feet from an inverter pad, sound levels approached background levels (Guldberg 2012). The periodic

mowing of the Project site to manage the height of vegetation surrounding the facility will be mowed 20-30 times per year.

2.0 Sound Impact Evaluation

2.1 Sound Level During Facility Construction

Equipment and Machinery Because the proposed site is used primarily for row cropping, the need for extensive tree removal and earthmoving associated with the Project is anticipated to be minimal. The construction of the solar facility would use equipment typical for site development (i.e., backhoes, generators, pile drivers, and flatbed trucks). The solar facility construction is estimated to last 6-9 months. The construction equipment would be spread out over the entire site, with some equipment operating along the perimeter of the site while the rest of the equipment may be located from several hundred to several thousand feet from the perimeter. The U.S. Department of Transportation Federal Highway Administration (FHWA) publishes noise levels for typical construction equipment as shown in the table below.

Table 3. Sound Levels for Common Construction Equipment.

Equipment Type	Typical Sound Level (dBA) at 50 Feet
Backhoe	80
Chainsaw	85-115
Crane (Mobile)	85
Dozer	85
Dump Truck	84
Generator	81
Grader	85
Front End Loader	80-85

Table 3 Continued

Equipment Type	Typical Sound Level(dBA) at 50 Feet
Pickup Truck	55
Pile Driver	90-95
Pneumatic Tool	85
Pump	76
Roller	74
Scraper	89
Shovel	82
Equipment Type	Typical Sound Level(dBA) at 50 Feet
Spike Driver	77
Tractor	84
Truck (Flatbed)	80-90
Welder/Torch	73

Source: FHWA Construction Noise Handbook, August 2006. Table based on US EPA Report and measured data.

The most common method of installing the support posts for the solar panels is to drive them into the ground. This pile driving procedure produces a repetitive, metallic impact sound. Individual piles take only a few minutes to be driven into the ground. Pile driving activity is short-lived and will take approximately 30 workdays to complete. Depending on the weather, the duration of pile driving activities would be 6-8 weeks. This would occur at the earlier stages of construction, typically in the second or third month. Standard construction pile drivers are estimated to produce between 90 to 95 dBA (calculated at a distance of 50 feet) at close range (USDOT 2015). The specialty pile drivers used for solar panel installation produce less noise, and the piles supporting solar panels will be driven primarily into soil. Based on a common type of pile driver used to install solar panel support posts (e.g., Vermeer Pile Driver - PD 10), the anticipated sound level is 84 dBA at 50 feet (Vermeer 2012). The nearest residence is approximately 515 feet from the nearest solar panel array. At this distance, temporary and

intermittent construction sound levels would be approximately 63.74 dBA when a pile driver is used to install the piles/posts for the nearest solar panel array tracking system. This sound level is temporary and will decrease within hours as sections of the array are completed and the pile driver moves further away. Only 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. During this time period, a concrete pump truck will be needed. A concrete pump truck typically generates a sound of approximately 82 dBA at 50 feet. At the nearest receptor to the substation, the sound level is estimated to be 64 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 (Ditch Witch 2021). The nearest residence is approximately 515 feet from the nearest solar array. At this distance, temporary and intermittent sound levels for a ditch trencher would be approximately 53.76 dBA. This sound level is temporary and will decrease within hours as sections of the trench are completed and the trencher moves further away from the residence. Assembly of Solar Panel Array and Construction of Facilities Solar panels will be manufactured off site and shipped to the site ready for installation. Assembly of the solar panel array tracking system, the installation of solar panels, inverters and other electrical equipment associated with the solar facility and substation would likely employ typical manual hand tools and power tools. These assembly operations would occur several hundred feet to thousands of feet inside the property boundary, and would occur on weekdays. Anticipated sound generated by power equipment would be short in duration.

Roadway Sound During Construction The construction of the proposed solar facility is expected to take 6-9 months for completion. 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. Worker commutes with passenger vehicles and trucks would occur daily with two traffic peaks (i.e., morning peak and afternoon peak), whereas deliveries of equipment would occur on trailers, flatbeds, or other large vehicles periodically throughout the construction process at various times of day. Based upon the sound levels published by 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.

2.2 Sound Level During Facility Operation

The Acoustical Analysis identified the following sources of sounds that will be produced as a result of the operation and maintenance of the proposed facility:

- Solar Arrays - The proposed solar arrays will feature a single-axis tracking system, which will rotate the arrays during the day, following the sun. - The tracking system will be driven by DC motors that produce a humming sound at a level of 78 dBA at a distance of one foot. o At the nearest residence, 515 feet away, this sound level will have attenuated to a level of 23.7 dBA.
- Inverters - The proposed facility will utilize 16 inverter stations, distributed throughout the footprint of the project. Inverters change the flow of electricity from direct current (DC) to alternating current (AC).
 - o The inverters feature a cooling fan that will result in fan noise at each inverter station at a sound level of 87.78 dBA at a distance of 3.28 feet (1 meter).
 - o At the nearest residence, over 1000 feet away, this sound level will have attenuated to a level of 38 dBA.
- Main Transformer -The proposed project will utilize a main transformer at the substation where the solar electrical system will connect to Big Rivers' transmission line.
 - o The main transformer will produce a humming sound at a level of 50 dBA at a distance of 3.28 feet (1 meter). - At the nearest residence, over 600 feet away, this sound level will have attenuated to a level of 4.75 dBA.
- Mowing - It is anticipated that the proposed project site will be mowed 20-30 times per year.
 - o Typical riding mowers will produce a sound level of 102 dBA at a distance of 1 foot.
 - o At the nearest residence, 515 feet away, this sound level will have attenuated to a level of 48 dBA.
- Traffic
 - o It is anticipated that 2-3 workers will be employed in the operation and maintenance of the proposed facility. Employees are anticipated to use mid-size or full-size pickup trucks for transportation.
 - o The sound levels associated with the arrival and departure of employees to and from the proposed project site are expected to be similar to those produced by a typical single-family household. The Acoustical Analysis estimates ambient sound levels at the proposed Project site to be in the range of 45 to 55 dBA, which is typical for an agricultural, rural-residential, and undeveloped area. This ambient sound level is typically comprised of noise from farm machinery, natural sounds such as from wind and wildlife, and moderate traffic sounds.

2.3 Conclusions Sound Level Impact During Facility Operation

The Acoustical Analysis concludes: “Sound levels resulting from regular operation and maintenance of the Project would be below ambient sound levels at the nearest receptor. Sound levels resulting from occasional mowing along the facility’s perimeter would be at or near ambient levels.” A copy of the Acoustical Analysis is provided as Exhibit 12 Attachment 12.5.

2.4 Impact On Scenic Surroundings

Compatibility of the Facility with Scenic Surroundings 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 proposed project site is a group of adjacent farm fields, surrounded on three sides by established tree lines and hedgerows. The Project will adhere to the McCracken County Solar Ordinance, which requires that all perimeter tree lines shall be left in place to serve as a visual buffer. Also, per the Solar Ordinance, where tree lines do not exist, a double row of staggered evergreens will be planted on 15-foot centers. These evergreens will be a minimum of 8 feet tall at planting, and mature to a minimum of 15 feet tall. In addition to preserving and/or installing a visual buffer, the proposed Site Plan would position the solar panels a minimum of 500 feet away from any adjacent residence. The combination of a low-profile construction, the retention of extensive existing natural buffers, the installation of substantial evergreen buffers where needed, and significantly enhanced setbacks, will result in a facility that is visually compatible with its surroundings. Other measures of compatibility include sounds, smells, and the general level of activity. The sounds produced by the facility will be minor, and will dissipate to ambient levels before reaching any adjacent residences. The facility will not produce any odors or smells. The general level of activity, once operational, will be low. The Applicant anticipates hiring 2-3 full-time employees to monitor and maintain the facility. Across these three measures of sound, smell, and activity, the proposed facility will have an impact on the surroundings very similar to those associated with current agricultural production. In summary, the proposed facility will be compatible with its scenic surroundings.

The data contained in the Site Assessment Report Horseshoe Bend Solar Project above is in compliance with the intent of KRS 278.216.

3.0 Fugitive Dust Impacts

While state and local area roadways are paved, fugitive dust is anticipated during construction from land disturbance and use of unpaved driveways. Due to the low-density housing and rural character near the site, and the large size of the site, fugitive dust minor impacts are expected. To reduce potential dust impacts, open bodied trucks will be covered while in motion. Internal roadways will be constructed from compacted gravel.

Due to an increase associated with dust from gravel roads and site use in general, water may be applied to reduce dust generation as needed. Under the KY Pollutant Discharge Elimination System, water used for dust control during facility construction is authorized as a non-stormwater discharge activity. McCracken County Solar will apply best practices for dust mitigation.

Due to the low traffic volumes of existing roadways near the proposed the McCracken County Solar Facility (fewer than 1,500 vehicles per day), construction is not anticipated to cause level of service degradations, generating fewer than 200 additional vehicles per 14-hour working day (7 AM to 9 PM) during the eight to 12-month construction period. Appropriate traffic control such as warning signs and flaggers will be provided during construction to minimize traffic impacts. Once completed, the facility will have occasional employees on site (two or fewer daily vehicles), so long-term traffic impacts will be negligible. McCracken County Solar will restore roadways impacted by construction as required through the permitting process. Dust impacts are anticipated to be minor, and the contractor will work to minimize dust impacts.

4.0 Noise Conclusions

Per evaluation based on KRS 278.708 (3)(a)(8) and (3)(d), KRS 278.710 (1)(b), KRS 278.708 (3)(e), and KRS 278.710 (1)(a), the Sound and Traffic Evaluation Report concludes that anticipated noise and traffic impacts for the construction and operation of the facility will be minimal, and further detailed sound and traffic studies will not be required.

4.1 Sound Level Assessment Conclusions

Due to the nature of this Project including the construction, types of equipment to be installed, and planned operation, it is anticipated the impacts to the existing sound level environment will be minimal in the Consultant's (GAI) opinion.

professional opinion based on the setback distances proposed in Section 2.3.

The data and conclusions contained in the Site Assessment Report for the McCracken County Solar Project for Traffic and Fugitive Dust meets intent of KRS 278.216.

(5) The board shall have the authority to hire a consultant to review the site assessment report and provide recommendations concerning the adequacy of

the report and proposed mitigation measures. The board may direct the consultant to prepare a separate site assessment report. Any expenses or fees incurred by the board's hiring of a consultant shall be borne by the applicant.

The board has hired Wells Engineering and Cloverlake Consulting Services to review the adequacy of the Site Assessment Report.

(6) The applicant shall be given the opportunity to present evidence to the board regarding any mitigation measures. As a condition of approval for an application to obtain a construction certificate, the board may require the implementation of any mitigation measures that the board deems appropriate. Effective: April 10, 2014 History: Amended 2014 Ky. Acts ch. 88, sec. 4, effective April 10, 2014. -- Created 2002 Ky. Acts ch. 365, sec. 5, effective April 10, 2014.

5.0 Historic and Archeologic Resources

A Cultural Historic Overview Study of the proposed Project site was performed by Cultural Resource Analysts, Inc., 151 Walton Avenue, Lexington, KY 40508 ("CRA"). It is dated January 8, 2021. CRA investigated two previously identified resources on the site, and determined they lack either significance and/or integrity and appear to be not eligible for listing in the National Register of Historic Places. One newly recorded resource, a cemetery, was recommended for further investigation, but was determined to be off-site. A copy of the Cultural Historic Overview Study is provided as Exhibit 14 Attachment 14.3. Cultural Resources – Archeology An Archaeological Records Review and Site Reconnaissance of the proposed Project site was performed by Cultural Resource Analysts, Inc., 151 Walton Avenue, Lexington, KY 40508 ("CRA"). It is dated January 8, 2021. CRA identified five locations considered to have high probability for the presence of archaeological sites. All these sites are located at the periphery

of the proposed Project site and will be undisturbed by the development of the Project. A copy of the Archaeological Records Review and Site Reconnaissance Report is provided as Exhibit 14 Attachment 14.4. 0 Historic Resources in the Application.

6.1 Wetlands, Endangered Species and Other Natural Resource Impacts

Threatened & Endangered Species Habitat -A Threatened and Endangered Species Habitat Assessment (“T&E Assessment”) of the proposed Project site was performed by Copperhead Environmental Consulting, Inc., 471 Main St., Paint Lick, KY 40461. It is dated April 26, 2021. The T&E Assessment concluded that the proposed Project site does not appear to contain suitable habitat for federally-listed bird and mussel species. The T&E Assessment did identify suitable habitat on the proposed Project site for three federally-listed species of bats. Potential effects to these species can be mitigated through project-specific conservation and mitigation methods (i.e., tree cutting avoidance or time of year restrictions). The Applicant intends to observe these conservation and mitigation methods. The T&E Assessment concluded that the proposed Project is not likely to significantly affect any state-listed species. A copy of the Threatened and Endangered Species Assessment is provided as Exhibit 14 Attachment 14.5 of the Application

Phase I Environmental Site Assessment Report -A Phase I Environmental Site Assessment (“Phase I ESA”) of the proposed Project site was performed by Linebach Funkhouser, Inc., environmental compliance and consulting engineers, 114 Fairfax Avenue, Louisville, KY 40207. It is dated January 8, 2021. The Phase I ESA revealed no evidence of recognized environmental conditions (“RECs”) in connection with the site. A copy of the Phase I Environmental Site Assessment Report is provided as Exhibit 14 Attachment 14.2.

Cumulative Environmental Assessment- A Cumulative Environmental Assessment (“CEA”) of the proposed Project site was performed by Copperhead Environmental Consulting, Inc., 471 Main St., Paint Lick, KY 40461. It is dated May 6, 2021. The CEA concludes:

- Air Pollutants
 - Potential impacts to air quality from construction-related activities for the Project will be minor
 - Operation of the Project will result in a net benefit to local and regional air quality.
- Water Pollutants

- The operations and maintenance of the solar facility will have little impact on surface water
- No direct adverse impacts to groundwater will be anticipated as a result of the Project.
- Wastes o No adverse effects from waste are anticipated.
- Water Withdrawal
 - Operation of solar electricity generating facilities is not water-use intensive A copy of the Cumulative Environmental Assessment is provided as Exhibit 13 Attachment. The Cumulative Environmental Assessment was submitted to the Kentucky Energy and Environment Cabinet on May 6, 2021.

6.2 Applicant’s Mitigation Measures

REQUIREMENT: per KRS 278.708(4); 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; and per KRS 278.708(6); The applicant shall be given the opportunity to present evidence to the board regarding any mitigation measures. As a condition of approval for an application to obtain a construction certificate, the board may require the implementation of any mitigation measures that the board deems appropriate. The Application does not list specific Mitigation Measures, however, below are mitigation measures gleaned from throughout part I and part II of the Application.

These Proposed mitigation measures are listed below:

As described in Section 1 of the Site Assessment Report:

1. Setbacks for solar equipment from roads and property lines, with increased setbacks for certain equipment.
 - a. Security fencing, vegetative buffer and pollinator plantings shall not be subject to setback restrictions.
2. Leaving existing vegetation between solar equipment and neighboring residences in place, to the extent practicable, to help screen the Project and reduce visual impact
3. Notices to neighbors regarding potential construction and operation noises, as well as limits on working hours during the construction period, as described in the Application.
4. The Project will obtain and comply with permits regarding impacts to wetlands, waters of the US, and stormwater, as described below.
5. The Project has completed an assessment of the current and historical uses of the Project site (ESA Phase I),and will comply with its recommendations where they apply to

the solar facility. Retrofit Plan- If the McCracken County Solar project 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.

6.3 additional mitigating measures recommended by the Consultant (Cloverlake Consultants)

Fugitive Dust and PM10

The applicant will submit in writing the specific plan to control fugitive dust and PM 10 during the construction process ten days prior to commencing construction.

Protection of Water Resources in the Project Area

Ten days prior to the commencement of construction, the Applicant will provide a detailed plan on how they will protect water resources in the project area. The site assessment documents in several locations say that certain mitigation measures regarding erosion and protection of water resources “may” be carried out. This needs to be clearly specified.

Endangered Species and Wetlands

It is the opinion of the reviewer that the Applicant has clearly outlined how endangered species and wetlands will be protected during the construction and operation of the project.

Historic and Archeologic Resources

It is also the opinion of the reviewer that the Applicant has detailed how historic and archeologic resources will be protected.

Summary of the Adequacy of the Applicants Site Assessment Report

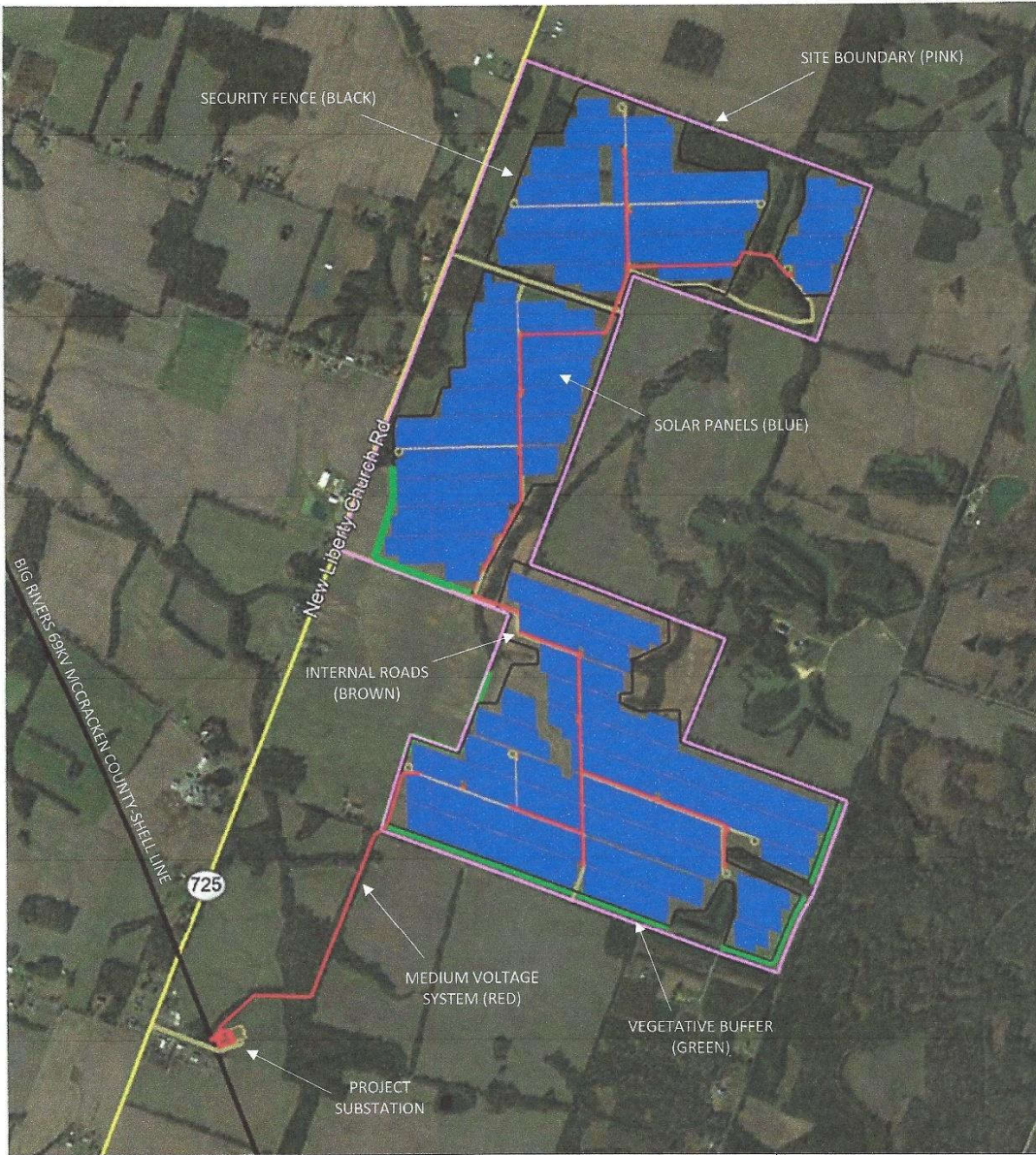
Based on a review of The McCracken County Solar Project Site Assessment Report, by W. Thomas Chaney of Cloverlake Consulting, all of the sections of the report are in compliance with the intent of KRS 278.708.



There are two areas where additional conditions are needed. These proposed conditions are specified in Additional Mitigating Measures proposed by the consultant on page 23 of this report.

By title these measures are

- Fugitive Dust
- Protection of water resources in the Project Area

APPENDIX A-Site Map





 <p>COMMUNITY ENERGY[®]</p> <p>COMMUNITY ENERGY SOLAR, LLC</p> <p>3 RADNOR CORP CENTER, SUITE 300 100 MATSONFORD RD. RADNOR, PA 19087 (866) 946-3123</p>	<p>MCCRACKEN COUNTY SOLAR - 60MW SOLAR PROJECT MCCRACKEN COUNTY, KY</p>		<p>SITE PLAN OVERVIEW</p>	
		<p>NEW LIBERTY CHURCH RD, KEVIL, KY 42053</p>		
		<p>LAT/LONG: 37.12 N / 88.86 W</p>		
		<p>DATE: 5.3.2021</p>		

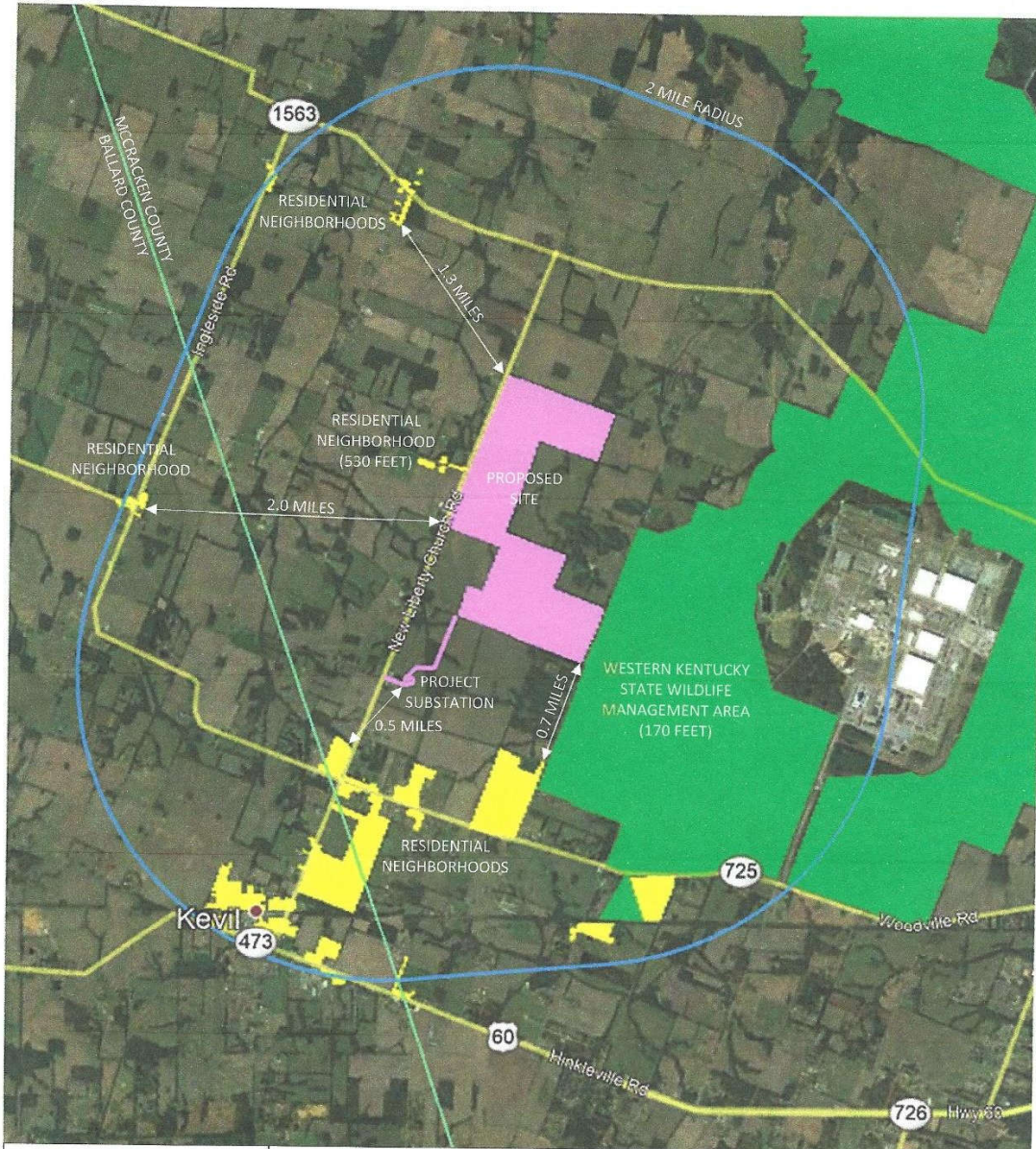
APPENDIX B-Land Use Map



KEY:
 PINK = PROJECT SITE
 BROWN = AGRICULTURAL USE
 YELLOW = RESIDENTIAL USE
 GREEN = RECREATIONAL USE

 <p>COMMUNITY ENERGY COMMUNITY ENERGY SOLAR, LLC 3 RADNOR CORP CENTER, SUITE 300 100 MATSONFORD RD. RADNOR, PA 19087 (866) 946-3123</p>	<p>MCCRACKEN COUNTY SOLAR - 60MW SOLAR PROJECT MCCRACKEN COUNTY, KY</p>		<p>MAP SHOWING THE CURRENT USES OF THE LAND SURROUNDING THE PROPOSED PROJECT SITE</p>	
		<p>NEW LIBERTY CHURCH RD, KEVIL, KY 42053</p>		
		<p>LAT/LONG: 37.12 N / 88.86 W</p>		
	<p>DATE: 5.1.2021</p>			

Appendix C-Local Vicinity Map



COMMUNITY ENERGY
 COMMUNITY ENERGY SOLAR, LLC
 3 RADNOR CORP CENTER, SUITE 300
 100 MATSONFORD RD.
 RADNOR, PA 19087
 (866) 946-3123

MCCRACKEN COUNTY SOLAR - 60MW SOLAR PROJECT
 MCCRACKEN COUNTY, KY

N	NEW LIBERTY CHURCH RD, KEVIL, KY 42053
	LAT/LONG: 37.12 N / 88.86 W
	DATE: 5.1.2021

MAP SHOWING THE DISTANCE OF THE PROPOSED SITE FROM RESIDENTIAL NEIGHBORHOODS, SCHOOLS, AND PUBLIC AND PRIVATE PARKS THAT ARE LOCATED WITHIN A TWO (2) MILE RADIUS OF THE PROPOSED FACILITY

REFERENCES

All the information was extracted from the Applicant's Site Assessment Report, McCracken County Solar Project and a field analysis performed on May 31 and June 1, 2021.

Gallery of Photographs Taken During The Site Visit on May 31 and June 1, 2021

























Resume W. Thomas Chaney

W. THOMAS (TOM) CHANEY

President Cloverlake Consulting



YEARS OF EXPERIENCE

48

Education

- MBA, Point Park University, 2011
- M.A., Environmental Planning, Eastern Kentucky University, 1973
- B.A., Physical Geography and Geology, Eastern Kentucky University, 1972

AREAS OF EXPERTISE

- Strategic training and mentoring of employees
- Management and direction of multidiscipline natural resource management consulting teams
- Environmental Assessment of Energy Facilities
- Harvard Leadership Development Training
- Advanced Project Management Training

CERTIFICATIONS

- Certified Mediator, 2004
- Certified Kepner-Tregoe Rational Process Program Leader, 2003
- Harvard Leadership Development
- Advanced Project Management

HONORS

Cinergy "Above and Beyond Award" for Diversity, CG&E/Cinergy, Duke Energy

Diversity Champion and "Wolf" Award recipient for top individual performance, CG&E/Cinergy, Duke Energy

EXPERIENCE SUMMARY

Mr. Chaney is the President of Cloverlake Consulting Services and directs the work of expert natural resource management teams of engineers and scientists. He has a distinguished background in utility management, organizational development and consultant service to utility companies for environmental and planning work. He has done career management service for large utilities including Cinergy, Cincinnati Gas & Electric and Duke, and has consulting experience with Power Engineers, BHE Environmental, GAI Consultants, Booz-Allen Hamilton, Woolpert Consultants, and Dames and Moore.

Mr. Chaney's current practice involves Siting and Environmental Planning for major utility facilities. In several states in the Midwest. He has developed testimony and testified in front of state siting agencies.

He also specializes in strategically training and mentoring employees, and has grown a prominent Cincinnati multi-discipline environmental engineering and consulting practice. He also provided strategic training and mentoring services for CG&E, Cinergy, and Duke Energy for 25 years and currently provides these services to Master Provisions, a Northern Kentucky food charity.. Mr. Chaney developed and presented the Business Case for Diversity to Cinergy executives in 1995, and was responsible for environmental training and education, and high-performance team training and coaching.

He is a certified mediator and holds a license as a Program Leader for Kepner-Tregoe rational process.

Kentucky Public Service Commission-Siting Board Ohio PowerSiting Board SITING AND CERTIFICATION

Another specialty is the management of the Ohio Power Siting Board siting/certification process. He is also proficient at managing the Kentucky PSC Siting Board Process. He was involved in the original development of the rules for these processes with the PUCO and the OPSB and served as the implementing Principal contact for CG&E, Cinergy and Duke from 1984 to 2006. He has been involved in consulting practices since then that specialize in these siting processes including GAI Consultants, BHE consultants, Power Engineers and ERM.

The following projects are a few examples of this work:

- Kentucky Public Service Commission Siting Board
 - In his position as President of Cloverlake Consulting Services, he has completed the analysis of the adequacy of two solar projects in Kentucky; Madison Solar and Horseshoe Bend Solar. He is currently actively involved in two additional solar projects; McCracken County Solar and Meade County Solar.
- AEP Siting and Permitting Projects, Ohio, Kentucky, Indiana, Virginia and West Virginia
 - In his position with Power Engineers, he supervised over twenty siting and permitting projects in the above states.
- NIPSCO Permitting In Indiana
 - Mr. Chaney, likewise was involved in several Transmission Line permitting projects in Indiana for NIPSCO.
- GAI Consultants, Constance-Zimmer Natural Gas Transmission Line, Ohio
 - Project Manager responsible for the siting, routing and certification of this transmission line. The project required numerous environmental permits and a Certificate of Environmental Compatibility and Public need from the Ohio Power Siting Board (OPSB).
- Dominion East Ohio Gas, Akron-Canton Gas Transmission Line, Ohio
 - Project manager responsible for siting, certification (OPSB) and permitting.
- Management Consulting, Large Aviation and Environmental Projects
 - As a management consultant for a private management consulting firm, Mr. Chaney was responsible for numerous large aviation and environmental projects, including the Chicago, O'Hare International Airport Delta Concourse project, the Miami International Airport Runway Environmental Impact Statement (EIS) project, and the Greater Pittsburgh International Airport Midfield Terminal Studies project that required noise and land use compatibility studies.
- Regional Planning Manager
 - As a planning manager for the Northern Kentucky Area Development District, Mr. Chaney covered all aspects of regional planning for eight counties in northern Kentucky. He supervised professional and clerical staff dealing with issues on the environment, housing, land use and recreation in compliance with the Older Americans Act (Title III) and the Social Security Act (Titles XIX and XX).
- Senior Environmental Planning Consultant
 - Mr. Chaney's experience as a Senior Environmental Planner with a private consulting firm required management of numerous land use planning and environmental assessment projects. His duties included marketing, proposal preparation, budget preparation, staffing, and project management that included accountability to the client.
- Duke Energy, Edwardsport IGCC Start-Up Natural Gas Line, Indiana
 - Project Manager for the routing and permitting of a gas transmission line used to start-up the Edwardsport Indiana IGCC. This project is a clean coal endeavor that utilizes Illinois Basin high sulfur coal.
- Dominion East Ohio Gas Company, Solid Waste Natural Gas Siting Study and Application, Ohio

- Project Manager for the OPSB application for this complex project, which was rerouted due to the construction of a large municipal landfill.
- GAI Consultants, Rockies Express Line, Ohio
 - Project Manager for cultural resources projects associated with this gas transmission line.
- CG&E, Gas Storage Site, Kentucky
 - Project Manager responsible for the environmental permitting of this large gas storage site, formerly a depleted gas and oil production field.
- CG&E/Cinergy/Duke Energy, Natural Gas Licensing Projects, Multiple States
 - Reviewed and led the licensing and environmental permitting for all natural gas transmission line projects.
- CG&E/Cinergy, Numerous Power Plant, Transmission Line and Gas Line Siting and Permitting Projects
 - In his capacity as Licensing Division Director, Mr. Chaney was involved in more than 100 Transmission Line, Gas Line and Power Plant projects during his tenure with CG&E/Cinergy/Duke.



ATTACHMENT C

MARY MCCLINTON CLAY, MAI
218 Main Street
Paris, Kentucky 40361
859-987-5698

July 10, 2021

Mr. Jim Cook
Chief Operating Officer
Wells Engineering
6900 Houston Road
Suite 38
Florence, KY 41042

Re: Review of McCracken County Solar Project Value Impact Report
Prepared by Richard C. Kirkland, Jr., MAI, Kirkland Appraisals, LLC

Dear Mr. Cook:

As requested, I have reviewed the above captioned report which was prepared for the Kentucky State Board on Electric Generation and Transmission Siting for Merchant Facilities on April 11, 2021. This report is part of the application process for the proposed 60-megawatt (MW) utility scale solar facility on 615.00 acres in Grahamville, McCracken County, Kentucky. The solar developer is McCracken County Solar, LLC owned by Community Energy Solar, LLC of Radnor, Pennsylvania.

The purpose of the Siting Board “is to review applications and, as appropriate, grant certificates for the construction of electric generating facilities and transmission line that are not regulated by the Public Service Commission.” Among the information included within the siting application is “a site assessment report containing a detailed description of the project and thorough analysis of the impacts to be considered by the Siting Board (visual impacts, traffic, **property values**, etc.).”

This review considers the report methodology, claims and omissions. It is my professional opinion that this report is fundamentally flawed, noncredible and is not consistent with the Uniform Standards of Professional Appraisal Practice (USPAP). The report should not be used for any decision-making purposes relating to the proposed McCracken County solar electric generating facility. The following report is the basis of my conclusions.

SUMMARY OF KIRKLAND REPORT

LETTER OF TRANSMITTAL

In the letter of transmittal (Page 1) to the report, the appraiser identifies the location and describes the scope of the report. The scope of research includes: “researched and visited existing proposed solar farms in Kentucky as well as in other states, researched articles through the Appraisal Institute and other studies, and discussed the likely impact with other real estate professionals.” The appraiser also states that, “I have not been asked to assign any value to any specific property.” The appraiser characterizes this report as a “limited report of

a real property consulting assignment.” Nonetheless, the preparer of this report is acting as an appraiser and is required to perform valuation services within USPAP.

The appraiser concludes that “the adjoining properties are well set back from the proposed solar panels and most of the site has good existing landscaping for screening the proposed solar farm. Additional supplemental vegetation is proposed to supplement the areas where the existing trees are insufficient to provide a proper screen.”

The premise of the entire report and conclusion of no damage to adjacent property **regardless of location**, is that:

The matched pair analysis shows no impact on home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land where the **solar farm is properly screened and buffered.**

The report also states that, “Data from university studies, broker commentary, and other appraisal studies support a finding of no impact on property values adjoining a solar farm with **proper setbacks and landscape buffers.**”

The appraiser concludes that not only will there be **no damage** to the adjacent McCracken County properties, but that “the proposed use is in **harmony** with the area in which it is located.” In addition, the appraiser lists the “**positive implications**” of solar farms to include “protection from future residential development or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, its quiet and there is minimal traffic.”

The issues that the letter of transmittal raises regarding **compatibility and methodology**, in addition to other **studies’ finding of no damage** will be discussed in the appropriate sections of the review.

PROPOSED PROJECT AND ADJOINING USES (Pages 3 – 7)

The report describes the adjoining land as a “mix of residential and agricultural uses” in addition to a “large industrial site, which is atypical.” The report states that the site contains 3,981 acres and “is operated by the United States Enrichment Corporation (USEC) which operates with the United States Department of Energy (DOE) to produce enriched uranium for use in nuclear power plants. The appraiser observes that the “tract is oversized compared to other tracts in the area. Other than that use, the area is mostly agriculture and residential.”

The rest of the area analysis, neighborhood description and project description include only a listing of the percentage uses by acreage and number of parcels, as well as the distance from the adjacent buildings to the nearest solar panel. The nearest house is 530.00 feet and the average is 860.00 feet.

This is an inadequate description of the area in which the solar farm is proposed. The “large industrial” site is the **Paducah Gaseous Diffusion Plant (PGDP)**. According to the Commonwealth of Kentucky Hazardous Waste Branch, “In July 2013, the Paducah Gaseous Diffusion Plant (PGDP) ended over 60 years of continuous uranium enrichment production. Today, the DOE oversees environmental cleanup activities at the site, including environmental management, waste management, depleted uranium hexafluoride conversion,

dactivation, decontamination and decommissioning...A variety of environmental concerns have been identified at the site since 1988.”¹

In 1999 a class action lawsuit was brought against the Paducah plant by former and current employees who believed they had suffered significant medical expenses because of exposure to ionizing radiation at the plant. The suit was dismissed in 2003 because a judge ruled that the plant was covered by the 1957 Price-Anderson Nuclear Industries Indemnity Act. In addition, to protect human health, the DOE provided city water at no cost to the affected residents.

The following aerial photograph depicts the currently identified off-site ground water plume. The proposed solar farm is approximately 0.70 miles west of the PGDP site. In addition, the PGDP site is surrounded by the 6,425.00 acre West Kentucky Wildlife Management Area, which the appraiser did not include in the area analysis.

As a result of the ongoing nature of the contamination investigation, it may be possible that proximity to the PGDP has affected the surrounding properties to the extent that the proposed solar farm will not have an additional deleterious effect. However, this will not be known until a proper damage study is done of the area, relative to **the impact of proximity to the PGDP.**

The appraiser concludes this section with a breakdown of the 25 parcels surrounding the proposed solar farm with respect to number of acres, percentage of land, distance from solar panels, etc. This technique is used throughout the report comparing the ratios of land uses for all solar farm examples. Because they are similar, therefore, this is the primary justification of compatibility between adjacent properties and solar farms. This, in effect, is remarking the obvious since solar farms tend to be placed in rural areas where land is less expensive than in more developed areas.

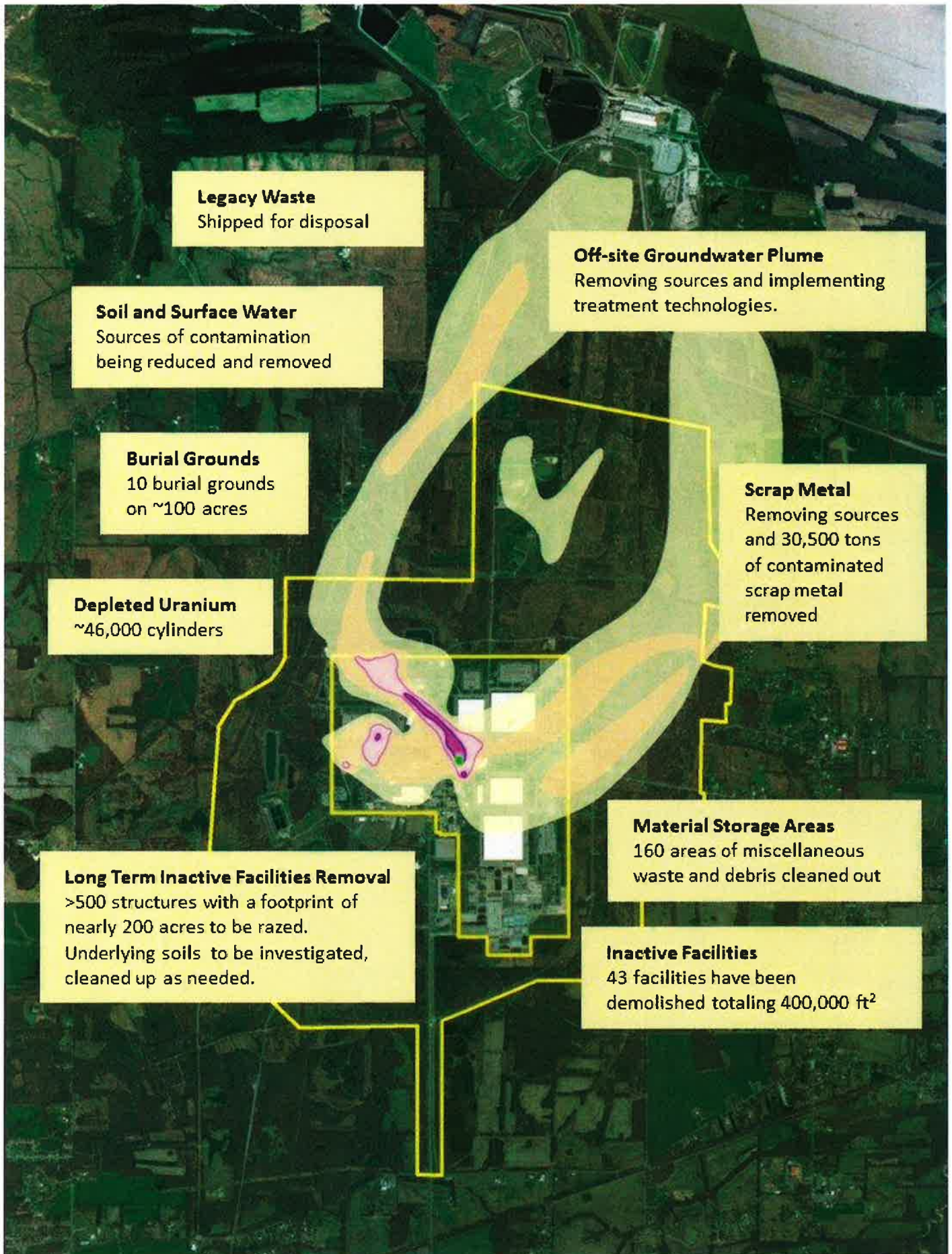
METHODOLOGY AND DISCUSSION OF ISSUES (Pages 8 - 9)

Methodology

The appraiser has stated that he based his study on the standard appraisal practice espoused by the Appraisal Institute and the Uniform Standards of Professional Appraisal Practice (USPAP). The methodology that the report is based on the Matched or Paired Sales Analysis. The report states that, “It is the appropriate methodology for addressing the question of impact of an adjoining solar farm. The paired sales analysis is based on the theory that when two properties are **in all other respects equivalent**, a single difference can be measured to indicate the difference in price between them.”

The primary assumption is that, in order to be reliable and credible, the paired sales must in all other respects be similar, except for proximity to the solar farm. This is not the case with nearly all of the examples used in the report being reviewed. The sales not only have multiple differences to the point that many require gross adjustments in excess of 50.0 percent. For example, two story houses are compared to ranch houses or 0.5 acre lots are compared to 10.0 acres. There is no explanation for why the control sales were selected or how they are competitive with the test area absent the detrimental condition. Many were from different towns.

¹ Kentucky Division of Waste Management, “Environmental Oversight Report 2019 - Paducah Gaseous Diffusion Plant, June 2020: 1.



The Appraisal of Real Estate, fifteenth edition, explains this technique for estimating external obsolescence. “When sufficient data is available, the appraiser might use paired data analysis to directly compare **similar** properties with and without external obsolescence.² For the paired sales analysis to be credible, the comparative sales should be as similar as possible with the only major difference being the external obsolescence.

Moreover, the amount of gross adjustment in many cases exceeds 35.0 percent. This degree of adjustment indicates that the sale truly is not comparable. Therefore, the resulting extracted adjustment for the detrimental condition is not a reliable indicator.

The Appraisal Institute publication, “FHA Appraising for Valuation Professionals” discusses the amount of adjustment acceptable for residential appraisals:

While Fannie Mae has removed the “guidelines” on net and gross adjustment, HUD requires that an explanation be provided if:

- any line adjustment exceeds 10%
- any net adjustment exceeds 15%
- any overall gross adjustment exceeds 25%

Not only is the appraiser’s method of documenting no diminution in value is **one dimensional and improperly executed**, it is also a simplistic approach to a complex problem. Damage studies include several types of analysis to determine if a land use, in fact a detrimental condition. There is no discussion of damage study theory and methodology, as documented in three editions of *Real Estate Damages*, by Randall Bell, PhD, MAI and published by the Appraisal Institute. The appraiser’s methodology of only analyzing two or more paired sales for each of the 27 solar farms in his survey is inadequate to form an opinion as to whether there is diminution of value or not.

Because the trend to industrial scale solar farms is relatively recent and data is limited, it is even more relevant to analyze all the available data as thoroughly as possible.

The following is the correct methodology for a damage study.

1. The first step is to determine the area affected by the detrimental condition. Once the area of influence is determined, this may be expanded as the research progresses.
2. The second step is to determine a control area that is not near a solar farm. This location is not only free of any influence from the disamenity, but it represents a **competing area** to the subject area with respect to land and improvement values, demographics and other economic and environmental factors that make the two groups interchangeable with the exception of the disamenity.
3. The third step is to collect the sales data. This includes useful data on either side of the date of knowledge or appearance of the detrimental condition.

² Appraisal Institute, *The Appraisal of Real Estate*, 15th ed. (Chicago: Appraisal Institute, 2020), 591-597/

4. Once the data has been gathered the sales need to be analyzed with respect to value change (appreciation or depreciation) for the years prior to the event and then after the event. This will determine how the overall community or neighborhood responded to value change, as well as the control area and the subject area. Any difference between these market movements could be attributable to the disamenity. Increased time on the market and decreased sales volume are also indicators of diminution of market value. In addition, proximity to solar farms may affect the absorption rates of vacant lots.
5. After the sales are gathered, they need to be confirmed with a principle to the transaction. It is paramount to gain an understanding of the motivation behind a sale and to determine if it is indeed an arms-length transaction. Any of the latter sales or bank involved sales must be eliminated from the sample.
6. The cleanest way of analyzing paired sales is on a one to one basis since it avoids comingling sales that could lead to distortion. Sale-resales of the same property both before and after the event are alternative indicators.
7. If a large amount of sales data is available a multiple regression analysis is an alternative or an addition to the above methodology.
8. In the absence of actual sales, buy resistance is an important consideration. Means of measuring this includes reductions in listing price, days on the market or withdrawals from the market, concessions, etc.

Determining what is an External Obsolescence

A fundamental flaw in the report is the erroneous **benign characterization** of industrial scale solar generating plants that are an improvement over the former agricultural use, as stated in the Letter of Transmittal.

The appraiser concludes that because a solar farm does not generate **traffic, odor, noise nor produce toxic or hazardous waste**, it is not an external obsolescence.³

The appraiser acknowledges that appearance/viewshed “is one area that potentially applies to solar farms. However, solar farms are generally required to provide significant setbacks and landscaping buffers to address that concern.”

A significant **omission** of this report is the appraiser’s failure discuss the concept of **incompatible land uses** as it relates to agricultural zoning. Because utility scale solar plants are relatively new local existing comprehensive plans and ordinances do not provide for them. The **American Planning Association (APA)**, in its advisory regarding utility scale solar facilities, states that “the emphasis for planners is on the direct land-use considerations that should be carefully evaluated (e.g. **zoning, neighbors, viewsheds and environmental impacts**).”⁴

According to APA, “Utility-scale solar facility proposals must be carefully evaluated regarding the size and scale of the use; the conversion of agricultural, forestry or residential use; and the potential environmental, social and economic impacts on nearby properties and

³ External Obsolescence is defined as: “Any event or development located off-site that negatively impacts the subject property.” Randall Bell, PhD, MAI, *Real Estate Damages*, (Appraisal Journal, 2016): 460.

⁴ Darren Coffey, AICP, “Planning for Utility-Scale Solar Energy Facilities,” September/October 2019: 2.

the area in general.” For example, “if a solar facility is close to a major road or cultural asset, it could affect the **viewshed and attractiveness of the area.**”⁵

Among the land use impacts noted by the APA that utility scale solar may have on nearby communities include “the removal of forest or agricultural land from active use. An argument often made by the solar industry is that this preserves the land for future agricultural use, and applicants typically state that the land will be restored to its previous condition.” However, the APA acknowledges that it is “challenging” to restore. The organization also notes that, “it is important that planners consider whether the **industrial nature** of a utility scale solar use is **compatible** with the locality’s vision. The **use of prime farmland** and ecologically sensitive lands (e.g. riparian buffers, critical habitats, hardwood forests) for these facilities should be **scrutinized.**”⁶

According to the APA:

Solar facilities can be appropriately located in areas where they are **difficult to detect**, the **prior use** of the land has been **marginal** and there is no designated future use specified (i.e., not in growth areas, **not on prime farmland** and **not near recreational or historic areas**). Proposed facilities adjacent to corporate boundaries, public rights-of-way or recreational or cultural resources are likely to be more controversial than facilities that are well placed **away from existing homes**, have natural buffers and don’t change the character of the area from the view of local residents and other stakeholders.⁷

Tourism is recognized as a key sector for economic growth in many regions and any utility-scale solar facilities might be visible from a scenic by-way, historic site, recreational amenity, or similar resources could have **negative consequences** for those tourist attractions.⁸

The APA acknowledges that “**negative impacts to property values are rarely demonstrated** and are **usually directly addressed by applicants** as part of their project submittal.”⁹

Another primary omission of the report is the concept of the **viewshed**, which the **APA recognized** as an **important consideration**. Although the report under review gives a cursory acknowledgement of the concept of the viewshed, it is dismissed because “solar farms are generally required to provide significant setbacks and landscaping buffers that address that concern.” This concept is particularly significant in areas where the market is largely driven by the scenic landscape, such as the inner Bluegrass and historic districts.

Real Estate appraisers recognize that view affects property value. According to *The Appraisal of Real Estate*, “The physical characteristics of a parcel of land that an appraiser **must consider** are size and slope, frontage, topography, location and **view.**”¹⁰

⁵ Ibid.: 3.

⁶ Ibid.: 4.

⁷ Ibid.: 4.

⁸ Ibid.: 7.

⁹ Ibid.: 7.

¹⁰ Appraisal Institute, *The Appraisal of Real Estate*, 11th Ed. (Chicago, Illinois: Appraisal Institute, 1996): 323.

“View diminution, therefore, is any impact on the ability to see or be seen that is perceived by the market as negative. As usual, what the market considers to be a negative impact depends on the actual property in question.”¹¹

“Clearly, view amenities are valuable, and different types of good views can have significantly different quantitative effects on property values.”¹²

“A view is normally considered a scene or outlook from a property. Views of bodies of water, city lights, natural settings, parks, golf courses and other amenities are considered desirable features, particularly for residential properties. Such desirable views are typically an enhancement to value. In some cases, however, a view can be considered a negative attribute. A vista of incompatible land, dilapidated buildings, junk vehicles and other undesirable features can be detrimental to value. Allegations of value diminution most often arise from situations in which the view is altered or changed. Examples might include the blockage or obstruction of a desirable view or the creation of an undesirable view. The rezoning of a neighboring property to allow for an undesirable land use could legitimately result in a negative impact on value when such rezoning was not known or anticipated on the date of value.”¹³

Ultimately, issues relating to **view diminution** are dependent on **relevant market data**. The value of an obstructed view can be measured by the difference between properties with and without similar views.¹⁴

Although only limited peer reviewed published studies of solar farms currently exist, studies of the impact of high voltage transmission lines have the most reliance to the impact of solar farms on surrounding property. Of the “three critical drivers of HVTL effect on residential property values that are generally assumed—**proximity, visibility and encumbrance**,” the first two apply to **solar farms**.¹⁵

“The two concerns of aesthetics and property values are intrinsically linked. It is well established that a home’s value will be increased if high-quality scenic vista is enjoyed from the property (e.g. Seiler, et al, 2001). Alternatively, it is reasonable to assume that if a home’s scenic vista overlaps with a view of a disamenity, the home might be devalued, as has been found for high-voltage transmission lines (HVTL) (Kroll and Priestly, 1992; DesRosier, 2002)...Additionally, there is evidence that proximity to a disamenity, even if that disamenity is not visible and is not so close to as have obvious nuisance effects, may still decrease a home’s sales price, as has been found in the case for a land fill (Thayer et al., 1992).¹⁶

The 2002 published study by Des-Rosier measured how views of a disamenity affected sales prices. This study found that homes adjacent to a power line and facing a

¹¹ Anderson, Ibid.: 28.

¹² James R. Rinehart, PhD. and Jeffery J. Pompe, PhD., “Estimating the Effect of a View on Undeveloped Property Values,” *Appraisal Journal*, January, 1999: 61.

¹³ Bell, Ibid.: 146.

¹⁴ Ibid.

¹⁵ James A. Chalmers, “High-Voltage Transmission Lines and Residential Property Values in New England: What Has Been Learned,” *Appraisal Journal*, Fall, 2019: 266.

¹⁶ Ben Hoen, et al, “The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-site Hedonic Analysis,” Ernest Orlando Lawrence Berkley National Laboratory Publication No. LBNL-289E, December 2009: 52.

HVTL tower sold for as much as **20.0 percent less** than similar homes that are facing a HVTL tower.”¹⁷

Solar farms could be substituted for wind turbines in the following observation from the Hoen study:

It is unclear how well the hedonic literature on other disamenities applies to wind turbines, but there are likely some similarities. For instance, in general, the existing literature seems to suggest that concerns about lasting health effects provides the largest diminution in sales prices, followed by concerns for one’s enjoyment of the property, such as auditory and **visual nuisances** (emphasis added), and that all the effects tend to fade with distance to the disamenity – as the perturbation becomes less annoying.¹⁸

Unlike most adverse influences upon adjacent properties that have a direct impact upon their utility to function, solar farms’ predominant impact is to the viewshed.

The impact of views upon property values has been studied extensively for the past 25 years. These studies have indicated a range of marginal price effect for homes abutting amenities such as lakefront vacant lots: 91.00 to 223.00 percent; ocean front lots: 47.00 to 147.20 percent; lake front 7.50 to 126.70 percent; golf course vacant lots: 7.00 to 85.00 percent; rivers/streams: 3.00 to 54.4 percent; forest/farms: 1.50 to 35.00 percent; golf course: 7.00 to 28.00 percent; trails and greenways: 3.40 to 20.20 percent; urban parks: 1.00 to 20.00 percent.¹⁹

With respect to the intrusion of solar farms into the landscape, what happens when desirable views are blocked? “In real estate, a view can generally be defined as the ability to see or be seen. **View diminution**, therefore, is any impact on the ability to see or be seen that is **perceived by the market as negative**.”²⁰

“Since views from a residential property often carry a large premium, changes to a desirable view may be perceived by the market as having a negative impact on value. When a desirable view is blocked, the question of damages is often a question of abutter’s rights—a property owner’s rights to air, light, view, visibility and access.”²¹

The McCracken County agricultural market may not place a premium on the surrounding landscape as does the Bluegrass, but the report failed to document its importance, one way or the other.

The appraiser’s claim that a “properly screened and buffered” utility-scale solar farm is the scenic equivalent of a natural landscape is contradicted by the following comparative example from the 1,350.00 acre Hillcrest Solar Farm north of Mount Orab (Brown County), Ohio. The photographs were taken opposite each other near the entrance on the east and west side of Driver Collins Road north of County Road 286 (Five Mile Road). It takes several years for the trees to fully conceal the panels and typically 30.0 to 50.0 percent of public

¹⁷ Ibid.: 55.

¹⁸ Ibid.: 55.

¹⁹ Jay Mittal, “Valuation Capitalization Effects of Golf Courses, Waterfronts, Parks, Open Spaces, and Green Landscapes—A Cross Disciplinary Review,” Auburn University, *JOSRE*, Vol. 8. No. 1, 2016: 62.

²⁰ Orell Anderson, MAI, “The Value of a View,” *Right of Way*, March/April 2017: 28.

²¹ Ibid.: 28.

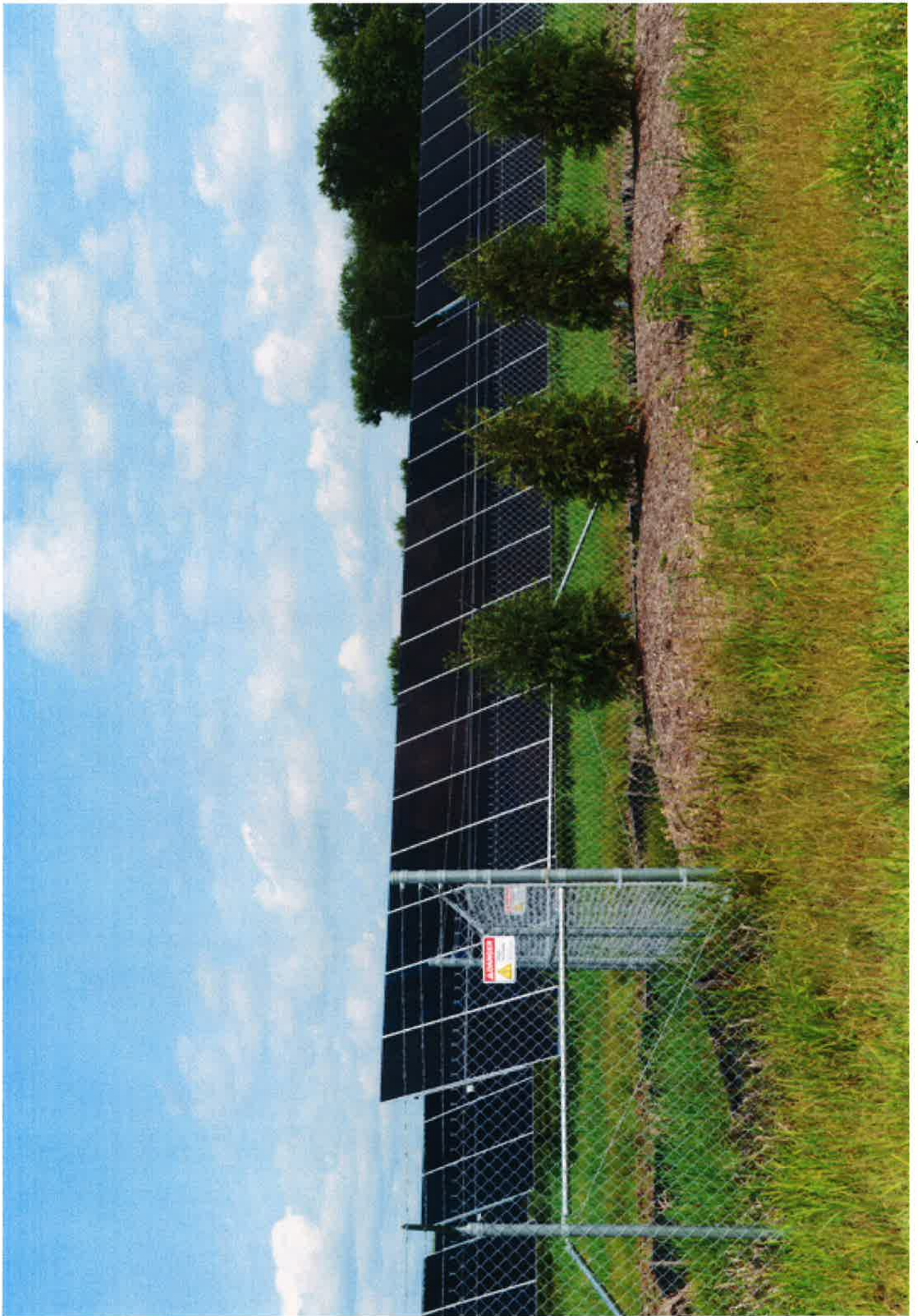


Leasing Landowner

70 Driver Collins

286 5 Mile Road

Neighbors





plantings die, according to the Mathew Bland, the agronomist for the Commonwealth of Kentucky Transportation Cabinet. The photographs were taken July 2021 when construction was completed.

LITERATURE SEARCH (Pages 10 – 16)

The report cites several reports prepared by other appraisers, articles, broker commentary, peer reviewed journals. It is notable that this appraiser has interpreted several of these documents to the reverse of what they were intended to support the report's conclusion that solar farms have no impact upon proximate properties.

APPRAISAL MARKET STUDIES

Cohn-Resnick

The **first** reference is to **Cohn-Reznick's** "Property Value Impact Study: Adjacent Values Solar Impact Study: A Study of Eight Existing Solar Facilities." This study was selected as being representative of this Chicago firm's many such reports prepared for their solar developer clients. According to the Kirkland report, "they analyzed a total of 24 adjoining property sales in the Test area and 81 comparable sales in the Control area over a five-year period"...and concluded "that there is no evidence of **any** negative impact on adjoining property values based on sales prices, conditions of sales, overall marketability, potential for new development or rate of appreciation."

This study's paired sales methodology includes no justification and minimal documentation of sale selection. It is notable that CohnReznick is part of CohnReznick Capital, which, according to their publication, "**the company represents financial institutions, infrastructure funds, strategic participants (IPPS and utilities), and the leading wind, solar, biomass, and other clean energy developers nationwide.**"²²

Christian P. Kaila & Associates

The **second** study was prepared by **Christian P. Kaila & Associates** and **George J. Finley**, MAI for an 83 MW solar farm on Guthrie Road in Stuart's Draft, Augusta County, Virginia. After interviewing appraisers who had conducted studies and County Planners and Tax Assessors in eight Virginia Counties who had not identified any negative impacts, the appraisers concluded no impact on property values adjoining the indicated solar farm. From the description of this case, **no original research** was apparently conducted.

Fred Beck, MAI, CCIM

The **third** study cited in the report under review was prepared by Fred Beck, MAI, CCIM. The description of this report is that it "relied on a single canceled contract for an adjoining parcel where the contracted buyers indicated that the solar farm was the reason for the cancelation. It also relied on the activities of an assessment impact that was applied in a nearby county."

Rather than summarize the report as it was prepared in 2013 as the existing evidence at the time, Kirkland reduced the study to a recent reported conversation with Kaila which

²² <https://www.cohnreznickcapital.com/spower-sale/>
https://2kqvnn450c7y4cnom33e1vx8-wpengine.netdna-ssl.com/wp-content/uploads/2017/12/2017_CRCMS_PressRelease_sPowerSale_2_24_2017.pdf

served to support the theme of the report being reviewed that screening a solar farm is the scenic equivalent of natural landscape.

The following is this office’s summary of the Beck report.

The first widely available report documenting property value diminution as a result of proximity to SEGPs was prepared in 2013 by Fred H. Beck, Jr., MAI, CCIM, MRICS of Denver, North Carolina. The report was prepared for the proposed Webbs Road Solar Farm adjacent to the Sailview Subdivision on Webbs Road and Burton Lane in Denver, Lincoln County, North Carolina. This report summarized the available relevant data from North Carolina at the time it was prepared.

Strata Solar Case Study

The first case study involves a sale contract that was cancel upon knowledge of the proposed Strata solar farm on Webbs Road. Mr. and Mrs. Daniel McLean owned a 0.60 acre tract with a 2,000 square foot residence at 4301 Burton Lane opposite Sailview Subdivision. The owners listed the property for sale in July 2013 for \$225,000. In mid-August 2013, they received an offer to purchase contract for \$200,000 with settlement to occur on October 30th. During this period, the public became aware of Strata Solar’s proposal. With this knowledge, **the potential purchasers canceled the contract.**

According to the Beck report, the potential purchaser stated:

The public announcement of the solar farm was the impetus to cancel the contract. Mr. Hibben is in the construction business. He commented the solar farm would be unattractive, and the view would not be complimentary to single family dwellings. He mentioned he could not justify putting money in a dwelling that would be negatively affected by the solar farm for many years. We asked Mr. Hibben if he would reconsider if the purchase price was reduced by \$50,000. He said that he would not even consider a more substantial reduction in the purchase price.

**Table 1. Impact of Solar Farms on Property Value – Denver, Lincoln County, NC
By Fred H. Beck & Associates**

Location	Denver, NC
Property Owner	Mr. & Mrs. Daniel McLean
Property Description	2,000 Ft ² House on 0.6 acres
Advertised Price & Date Listed	\$225,000 in July 2013
Event causing potential Buyer to reduce offer	Impaired view caused by Solar Farm
Offer Amount & Date Made	\$200,000/August 2013
Potential Settlement Date	October 30, 2013
Event causing Potential Buyer to cancel purchase	Impaired view of Solar Farm caused by potential Buyer to cancel purchase

Clay County Solar Farm Case Studies

Tusquite Trace Subdivision is a 15 lot, primarily second home development in Hayesville, Clay County, NC. The subdivision was developed in 2006 prior to the 2007 to 2009 recession with houses in the \$325,000 range. No lots were sold during the recession. However, from 2009 through 2010, three lots were sold with prices increasing from \$73,000 to \$75,000. In 2011 an adjacent farmer leased his farm for a small solar facility which was opposite the entrance to the subdivision. As of the date of the report, October 2013, **no additional lots sold**. Real Estate brokers have reported, the “buyers are turned off by the solar array on the adjacent farm, and they chose other lots without impaired views.”

In June 2011, Clay County residents successfully petitioned the Board of Equalization to **reduce their assessments an average of -30.0 percent** as a result of the solar farms in the county “hampering their views.”

**Table 2. Impact of Solar Farms on Property Values – Hayesville, Clay County, NC
By Fred H. Beck & Associates**

Location	Hayesville, NC
Type of Development	Subdivision
Date of Development	2006
Price Range of homes	In \$325,000 range
Economic Climate	Recession, 2007 - 2009
Activity in 2009 - 2010	Three lots sold in \$73,000 - \$75,000 range
In 2011, Solar Developer Leases Land across from Subdivision Entrance	Potential purchasers of land adjacent to Subdivision entrance are turned off by impaired view and lose interest.
Subsequent Activity in 2011 - 2013	Potential Buyers were turned off by the solar array to be erected opposite the Entrance
Subsequent Action by land purchasers	Purchasers changed their minds and chose other lots in Subdivision without impaired views.
Community Response	County residents petitioned Clay County Administration to reduce their assessment by an average of 30% as a result of “impaired views.”

Non-residential Use View Impairment Case Study

This case study examines the effect of an incompatible commercial use on a higher priced residential subdivision in Elgin, Richland County, South Carolina. Southridge is a gated community of houses ranging from \$400,000 to \$800,000 that were constructed in the mid-2000s. In the fall of 2010, Verizon Wireless competed a 146,000 square foot call center on 29.00 acres adjacent to Southridge. The appraiser analyzed sales within the subdivision both before and after construction of the call center. Prior to construction, the sales appreciated in value, while after construction, **they declined from -10.70 percent to -23.10 percent, or an average of -15.2 percent.**

AM Best Solar Farm Study

This study examines the effect of smaller scaled solar farms on moderately price houses. As of the date of the report, AM Best was one of the few solar facilities adjacent to a developing subdivision. This 6.65 MW Strata Solar plant is in Goldsboro, Wayne County, North Carolina and adjoins Spring Garden Subdivision to the east. Construction, which began in March 2013 was completed in June 2013 on land zoned I-2 (General Industrial). This zoning classification “is established to accommodate the widest range of manufacturing, wholesale and distribution uses, provided the use does not create smoke, dust, noise, vibration or fumes beyond the property line.”

The appraiser included a graph indicating the average median housing prices within a 1.00 mile radius of the 42 completed major NC solar farms. The majority of solar farms adjoin houses ranging from \$90,000 to \$140,000 compared to the \$153,000 median price of Spring Garden. Also, a chart is included that represents the average household income within 1.00 mile of the NC solar farms indicating \$50,000 to be predominant, which compares to the average Spring Garden household income of \$51,543.

This subdivision began development in the late 1990s and at the time of the report had 60 home sites. Most of the lots have dense trees separating them from the solar farm, however, it is visible during the winter months to potential lots not yet developed. With no indication of diminution in value, the appraiser concluded that due to the industrial zoning of the solar farm, this market would be aware of the potentially incompatible use to residences and at this price level, the expectations of this market would not discount for proximity to such a use.

In reviewing reports prepared for various solar developers, this office examined recent sales from this subdivision. Based on their indication of no diminution in value when compared to earlier sales from the same subdivision with more protection from the solar plant, this office concurs with the Beck conclusion. This is **an example of a market’s perception and expectation of property utility**. Because of the **pre-existing industrial zoning of the solar plant**, the market does **not perceive there to be loss of utility** and therefore, **no damage to their property value**.

NorthStar Appraisal Company

Continuing with the report under review, the appraiser included a fourth example of a study prepared by a MAI in New Jersey which included no concrete data to support his findings of no impact on adjoining value.

Mark W. Heckman

The appraiser **failed to include** a widely circulated study from Mark W. Heckman who testified in a publicized Pennsylvania solar case that the loss of view resulted in a **-15.00 to -20.00** percent loss in value.

ARTICLES

Also, within the report under review are **four articles** that address solar farms and property values. These articles contributed **no documented evidence** to either refute or confirm diminution in value.

The report cites a National Renewable Energy Laboratory claim that **wind farms do not impact property values** and since solar farms have a “significantly reduced visual impact” and can be screened, they should have even less impact upon property values.

North Carolina State University White Paper

The report under review cites two papers written by Tommy Cleveland for the North Carolina Clean Energy Technology Center (Clean Tech). The first paper addresses how solar farms do not cause significant impacts on soils, erosion and other such concerns. It is notable that Cleveland is neither an agronomist nor a soil scientist and Clean Tech is a solar policy and promotional organization housed in the Engineering College at NC State. It is not affiliated with any engineering or agriculture academic department.

The claims in this promotional document are contradicted by numerous publications and articles, both scholarly and journalistic. Most notably by North Carolina State University agronomist Ron Heiniger, PhD whose publications include, “Impact of Solar Farms on Farms and Rural Communities,”²³ “Solar Farming: Not a Good Use of Agricultural Land,”²⁴ “Solar Farming: Changing the Future of Farming,” “Cost of Reclaiming Land Currently in Agriculture,” and “Report on Drainage Issues in Conversion of Land for Lone Oak Solar Complex.”

The second “white paper” addresses health and safety impacts related to solar farms ranging from EMFs, fire safety and weed control. Although the report under review does not describe the issues addressed, there are numerous newspaper and journal articles addressing the safety issues of solar farms and ramification for those living near them.

Broker Commentary

The appraiser also spoke with numerous real estate **brokers** across the United States who have sold residences adjoining solar farms and have indicated “that the solar farms had **no impact** on the **marketing, timing or sale price** for the adjoining homes.”

UNIVERSITY STUDIES

University of Texas

With respect to University Studies, the report under review cited the two widely circulated studies from the University of Texas²⁵ and University of Rhode Island.²⁶

The first study is a survey of appraisers and tax assessors. The appraiser cites the results as “even within 100 feet of a 102 MW facility the response from experienced

²³ Vernon G. James Research Center

²⁴ Ron Heiniger, “Solar Farming: Not a Good Use of Agricultural Land,” *Coastal Agrobusiness*, <http://coastalagro.com/solar-farming-not-a-good-use-of-agriculture>.

²⁵ Insert Footnote

²⁶ Insert Footnote

appraisers were -5% at most on impact.” This finding **contradicts** the report under review of no impact.

University of Rhode Island

According to Kirkland, the second study “does state in the Abstract that they **found depreciation** of homes within 1-mile of a solar farm, that impact is limited to non-rural locations.” Kirkland states that in conversation with the author, “the impact in these heavily populated areas may reflect a loss in value due to the scarce greenery in those areas and not specifically related to the solar farm itself. In other words, any development might have a similar impact on property value.”

The following is a discussion of the University of Rhode Island study prepared by this office.

A study documenting the effect of solar development in Rhode Island and Massachusetts was published in September 2020.²⁷ “The purpose of this paper is to quantify the externalities associated with proximity to utility-scale solar installations using hedonic valuation.”²⁸ This study used “a difference-in-difference (DID) identification strategy, which compares changes in housing prices after construction for nearby properties with those further way.”²⁹ The study included 208 solar installations, 71,337 housing transactions occurring within one mile (treated group), and 347,921 transactions between one to three miles (control group).

The study’s “results suggest that solar installations negatively affect nearby property values...Property values in the treatment group decline on average -1.7% (or \$5,671) relative to the control group.”³⁰ The study also found, with respect to proximity, substantially larger negative impacts on homes located within 0.1 mile of solar installations (-7.0%, or \$23,682). This confirms the hypothesis that nearby solar installations are a disamenity.³¹ Also, “these **results suggest extremely large disamenities for properties in very close proximity.**”³²

This study, which is based on hundreds of thousands of transactions, **unequivocally has determined that SEGPSs negatively affect nearby property values**, contrary to the claims of solar developers’ appraisers that they have no negative impact.

It is notable, that the conclusions represent an average of all the 208 sites, with both large and small installations, of which some may or may not have a negative effect upon the utility of the nearby property. **If the utility of the property is not diminished, or if the expectations of the market are not impacted by the solar facility, then no diminution should be expected.** This average includes such properties. For example, this would include modestly priced houses with small lots in large subdivisions opposite a relatively small scaled industrial solar facility where the owner would not have expectations of a view nor would the utility of their homes be impacted by the solar installation. This is evident in the previous discussion of the AM Best solar farm.

²⁷ Vasundhara Gaur and Corey Long, “Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island,” Department of Environmental and Natural Resource Economics, University of Rhode Island, September 29, 2020.

²⁸ Ibid.: 3.

²⁹ Ibid.: 4.

³⁰ Ibid.: 4.

³¹ Ibid.: 15.

³² Ibid.: 17.

Master's Thesis: Zachary Dickerson

The report under review also included a reference to a master's thesis that survey the opinions of nearby neighbors to a solar farm and found that they generally do not believe solar farms pose a threat to their property values.

This sentiment can be juxtaposed to a survey commissioned by the Clark Coalition of Winchester, KY. The March, 2021 survey was conducted by the Matrix Group, a 35 year old market research firm in Lexington, KY. A total of 15,760 surveys were sent to residents of Clark County during March 13 to May 27, 2021. On the critical question, do you favor or oppose allowing industrial-scale solar facilities in Clark County's **agricultural zone**? 25.2% were in favor, **61.2% opposed** and 13.6% did not know.

Significantly, only **7.2%** of respondents **avored** locating solar energy on agricultural areas with **prime soils**.

94% of respondents said farmland preservation, greenspace and scenic rural roads are important priorities as Clark County grows in the future.

Ernest Orlando Lawrence Berkley National Laboratory Wind Study

The last research reference is to 2019 **wind study** conducted by the Ernest Orlando Lawrence Berkley National Laboratory which "looked into possible stigma, nuisance and scenic vista. The study concluded, "Although the analysis cannot dismiss the possibility that individual homes or small numbers of homes have been or could be negatively impacted, it finds that if these impacts do exist, they are either too small and/or to infrequent to result in any widespread, statistically observable impact."

This conclusion of no impact is contradicted by **Greenfield Advisors** of Seattle, Washington. This firm is one of the most published in the field of environmental damage studies in the United States. An April 5, 2019 blog addressed the impact of wind turbines on property value.³³

According to the blog, "wind turbines interferes with the use and enjoyment of residences. Noise pollution is created by wind turbines, more particularly, groups of turbines at wind farms. Shadows and flicker may impact nearby homes, depending on their proximity to the wind farm. Health impacts may arise for nearby residents whose sleep is interrupted by the noise and light issues noted above. **Impacts to view** may be considered a **disamenity** to residents who experience limited overall visibility and/or a change from **natural vistas to a more industrial view**."

With respect to stigma and decreased demand, "the anticipation of adverse effects from wind farms has been noted in some studies to have more impact on value, than the effects of the wind farms themselves. While all of the above may not deter every buyer or homeowner, the stigma of such issues alone can diminish the pool of potential buyer, thus causing some negative impact on the price of the property."

"Among the studies we reviewed, the **highest diminution** we saw was **-40%**, and that was in circumstances where the wind turbine was located directly on the property. While that loss percentage was on the high end, **most studies** show that the losses in property value from wind farms in the United States is somewhere between **0% and -35%**."

³³ Abigail Mooney, "Do 'Windmills' Affect Property Value?," Greenfield Advisors, April 5, 2019.

SUMMARY OF SOLAR PROJECTS IN KENTUCKY (Page 17-22)

This section of the report lists 6 solar facilities in Kentucky including their size, total and used acres, average and closest distance to home, as well as the percentage of land use. This chart is repeated for every solar generating facility throughout the report. Since nearly all solar plants adjoin either agricultural, residential or commercial use, such calculations are only remarking the obvious. To conclude that “the similarity of the sites in terms of adjoining uses and surrounding demographics makes it reasonable to compare the lack of significant impacts in other areas would translate into similar lack of significant impacts” is inconclusive. Additionally, the six generating plants range in size from 2 to 10 MW have minimal relevance to a 60 MW utility scale plant such as the subject.

MARKET ANALYSIS OF THE IMPACT ON VALUE FROM SOLAR FARMS (Pages 24 – 111)

This section of the report provides the evidence that the appraiser uses to claim that utility scale solar generating facilities have no negative affect upon proximate property values. This appraiser has “researched hundreds of solar farms” in Virginia, South Carolina, Tennessee, Texas, Oregon, Mississippi, Maryland, New York, California, Missouri, Florida, Montana, Georgia, Kentucky and New Jersey and it is remarkable not one of these plants has had an adverse impact on adjacent property values.

A. KENTUCKY AND ADJOINING STATES

No. 1. KY Matched Pair – Crittenden Solar, Crittenden, KY

This analysis examines 34.10 acre solar farm with only 2.7 MW on a 181.70 acre tract of land adjoining I-75 in Crittenden, a community in northern Kentucky. The subdivision consists of manufactured and conventionally constructed residence. The test property is a \$120,000 manufactured house on 0.96 acres that is approximately 750.00 linear feet from the I-75 right of way and 360.00 linear south of the closest solar panel. In addition, there is a streambed with vegetation between the solar farm and the test property. The solar farm is partially screened with opaque fencing. Because of the price range and construction of the dwelling, being “the lowest price range/style in the market” and proximity to the interstate, the solar farm would not diminish the utility³⁴ of this property to the point of expecting it to impact the property value.

Two of the three control sales do not appear to be from Crittenden according to Google Earth.

The second test example is 300 Claiborne Drive, which represents a conventionally constructed dwelling approximately 1,250.00 linear feet east of I-75 and 600 linear feet south of the closest panel. In addition, the dwelling is separated by two tree lines from the solar farm. The utility of this tract would not be expected to be impacted by the adjacent solar farm under these conditions.

³⁴ Utility is defined as the ability of a product to satisfy a human want, need or desire. The influence of utility on value depends on the characteristics of the property. Size utility, design utility, location utility, and other specific forms of utility can significantly influence property value. The benefits of real property ownership are derived from the bundle of rights that an owner possesses. Restrictions on ownership rights may inhibit the flow of benefits and, therefore, lower the property’s value. *The Appraisal of Real Estate, 12th Edition*: 19. Also included within the definition of utility is the legal concept of quiet enjoyment or use of the property in peace and without disturbance.

The control sales either do not appear on Google Earth as listed or are possibly from a different town to the north.

The third test property, 350 Claiborne Drive, is 1,820 linear feet from I-75 and 750.00 linear feet north of the solar farm separated by a stream and tree line. No loss of utility would be expected under these circumstances.

The fourth example, 370 Claiborne Drive, is approximately 2,000 linear feet to I-75 and 900.00 linear feet to the solar farm. This house is also separated by the ravine and tree line.

This sales analysis is not considered reliable as it represents a neighborhood that is impacted by its proximity to I-75, the size of the solar farm is minimal and not comparable in magnitude to the McCracken County proposal, and the expectations of this market do not include a scenic view shed in the first paired sales analysis of manufactured houses. The expectation of this market is for a house, a yard and ease of access to employment.

Regarding the sales selection, in the first paired analysis two of the sales required 35.0 and 24.0 percent gross adjustments and one of the sales in the second group required a 27.0 gross adjustment indicating these are not truly comparable sales.

Although the appraiser concluded this case study indicated **no diminution in value**, 8 of the 15 control sales, or 53.3 percent indicated a decline in value. In the second group of sales, all three sales indicated a diminution in value of **-7.0 to -14.0 percent**. In the third group, 2 of the three sales indicated a diminution in value from **-1.0 to -4.0 percent**. One of the sales in the third group indicated a decline of **-5.0 percent** and one of the sales in the fourth group indicated a **-5.0 percent** diminution in value.

It is significant that the sales with the largest indication of decline are from the conventionally built houses indicating that the **solar farm has negatively impacted** this part of the neighborhood **despite** the **distance** from the solar farm and the intervening rolling **landscape and tree lines**.

No. 2 Matched Pair – Mulberry, Selmer, TN

This case study is based on a 16 MW solar farm that was constructed in 2014 that adjoins two subdivisions at the north and east, respectively. Because of the number of lots involved and the age of the solar farm, this would be a good example for an attempt at a sale/resales analysis. However, such an analysis was not mentioned.

The first paired sales analysis compared a \$176,000 6.86 acre tract abutting the solar farm at a distance of 200.0 linear feet to the property line and 450.0 to the nearest panel to three 1.00 acre sales. These sales are not comparable for a reliable indication of impact or not. Of these sales, the appraiser chose the one that indicated a negative difference as the most comparable.

Regarding the second group, Google Earth does not acknowledge 57 Cooper in Selmer and there does not appear to be such a street adjoining the solar farm. Regardless, there is a \$30,000 unadjusted difference between the test sale and the 3 control sales. In addition, the test sale is a 1.5 story dwelling and the control sales are ranch houses. On its face, these are not comparable sales.

The fourth example consist of lots sales within the adjoining subdivision to the solar farm. The test sales range from 1.28 acres to 2.05 acres with sale prices ranging from \$12,000 to \$16,000, which is reasonable relative to size. The control sales range in size from 1.47 to 1.67 acres and indicate a range of values from \$13,000 to \$20,000. Since the appraiser does not give the address for the Lake Trail sales, the \$13,000 sale cannot be identified. Nonetheless, the other two test sales sold for \$20,000 each for sales that do not adjoin the solar farm. Comparing the 1.67 acre control sales at \$20,000 to the 1.70 acre control sale at \$14,000 indicates a **diminution of -30.00 percent** for abutting the solar farm.

It is expected that a lot sale would indicate such a large percentage adjustment because a new house will be constructed upon it and this discount will offset the inherent diminution in value of the new construction.

No. 3 Matched Pair – Grand Ridge Solar, Streator, IL

In this example, a \$186,000 house is northwest of a 20 MW facility and 480.00 linear feet to the closest panel from the rear of the house. The property is compared to four sales, one of which is from the opposite side of town in Streator, however, the other three sales are from any number of possible communities in Illinois, according to Google Earth. The appraiser does not explain how these various communities relate to the subject and how they are a reliable indicator of value. It is insufficient to merely list four sales from different locations, reducing them to a size per square foot and declaring there to be no diminution in value. Considering the price range of the house the orientation of the property to the solar farm, its utility is likely not diminished. However, this cannot be supported by this analysis.

It is notable that the appraiser considers 712 Columbus Road to be the best comparable sale when the dwelling is 50 years older than the test property.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 4 Matched Pair – Portage Solar, Portage, IN

This case study involves a 2 MW solar farm at the NW corner of a 56.00 acre tract and occupying approximately 0.25 percent of the tract. The test property is a 57 year old house abutting the farm at the southeast corner with 5 other houses shielding its view. The house is 1,320 linear feet from the closest solar panel and considering these aspects of the property, the solar farm does not diminish the utility of this test property. Also, the size of the solar farm has no relationship to a 65 MW generating plant.

A second paired sales analysis compares the 18.70 acre tract to the east of the 56.00 acre solar farm tract. The control sales contain 74.35 acres and 15.02 acres, respectively. The larger tract is not comparable being four times the size and the appraiser made no adjustment for size.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 5 Matched Pair – Dominion Indy III, Indianapolis, IN

The test sale and control sales are from a modestly priced subdivision opposite the 8.6 MW solar farm. The rear of the closest houses are within 400 feet of the solar farm and the subdivision is separated by a 65.00 right of way, a two lane road, and nearly 250.00 linear foot depth of woodland and/or single family lots on the solar side of the road. Because of the

numerous types of intervening uses, this solar farm would not be expected to influence the utility of these residential tracts, on its face. The use of this example is disingenuous and therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 6 Matched Pair – Clark County Solar, Clarke County, VA

This 5.13 acre test tract is 1,230 linear feet north east of the closest panel to this 20 MW facility on a 234.0 acre tract. The tract was purchased prior to the construction of the solar farm. The potential purchaser may have considered the distance to be sufficient. The comparable sales require gross adjustments ranging from 24.9 to 43.2 percent and appear to be from different towns and that any conclusion as to damage or not is speculative.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 7 Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, VA

According to the appraiser, the purchaser of the property directly opposite the solar farm and within 250.00 linear feet, stated that he preferred the privacy the solar farm offered him and paid more than the asking price. Therefore, no analysis is needed. This is another example of a purchaser's indifference to a detrimental condition. As with potential purchasers who would not pay any amount regardless of discount for a property with a detrimental condition, these extremes are not indicative of the market and should be eliminated from the data pool.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 8 Matched Pair – Sappony Solar, Sussex County, VA

This case study examines a 6.00 acre woodland tract improved with a manufactured home 1,425.00 linear feet southwest of the 30 MW solar farm. Such a property's utility with a sale price of \$128,400, and at this distance, would not be expected to be adversely affect by proximity to the solar farm, on its face.

Nonetheless, using the appraiser's data, but giving least emphasis to second control sale because it has only 1.03 acres and required 31.9 percent gross adjustment, the remaining two sales indicate diminution in value of **-3.0 to -6.0 percent**, or an average of **-4.5 percent**.

No. 9 Matched Pair – Spotsylvania Solar – Paytes, VA

This case study is from the first of a four phase 6,412 acre 617 MW solar project to encompass 3,500 acres. The entire project was approved in 2019 with the current phase, known as Pleinmont 1 Solar in Novemeber 2020. This case study consists of three control sales occurring in 2020.

The first paired sales analysis consists of a 5.20 acre tract improved with a 1.5 story dwelling that reportedly adjoins the solar farm on Orange Plank Road. The comparable sales consist of one 1.5 story dwelling and two ranch houses. The sales required gross adjustments of 45.8, 36.4 and 24.4 percent, respectively. Aside from the fact that the sales are not comparable, more significantly, the test sale does **not adjoin** the solar farm. In fact, it is on

the north side of Orange Plank Road and two tracts removed from the solar farm, or approximately 1,000 feet of dense woodland from the property line of the solar farm.

The second paired sales analysis consists of an 11.0 acre tract improved with a 2 story dwelling that reportedly adjoins the solar farm on Nottoway Lane. Although all the control sales are 2 story houses and the adjustments are reasonable, the control property does **not adjoin** the solar farm is separated by a 66.00 acre densely wooded tract. Distance from the dwelling is estimated to be 1,850.0 linear feet.

The third paired sales analysis consists of 2 story houses that are on similar sized 5.00+/- lots. The test sale on Post Oak Road does adjoin the solar farm and its dwelling is approximately 1,080 linear feet southwest of the property line of the solar farm. The distance consists of dense woodland. It is notable that two of the control sales indicate a diminution in value of **-2.0 to -9.0 percent**, or an average of **-5.5 percent**.

It is significant that the appraiser states, "All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three sales show no indication of any impact on property value." On its face, the sales appear too far removed from the solar farm to be affected, particularly since two of the sales are not adjoining. In addition, the first matched pair group required gross adjustments of 45.8, 36.4 and 24.4 percent. It is disingenuous of the appraiser to even include these case studies, and therefore, they are not a credible measure of determining whether there is or is not damage as a result of proximity to this solar farm.

The following case study prepared by this office of land sales at the adjoining Fawn Lake subdivision documents a decline of a minimum of **-30.0 percent** for a vacant lot single family lot that abuts the solar farm.

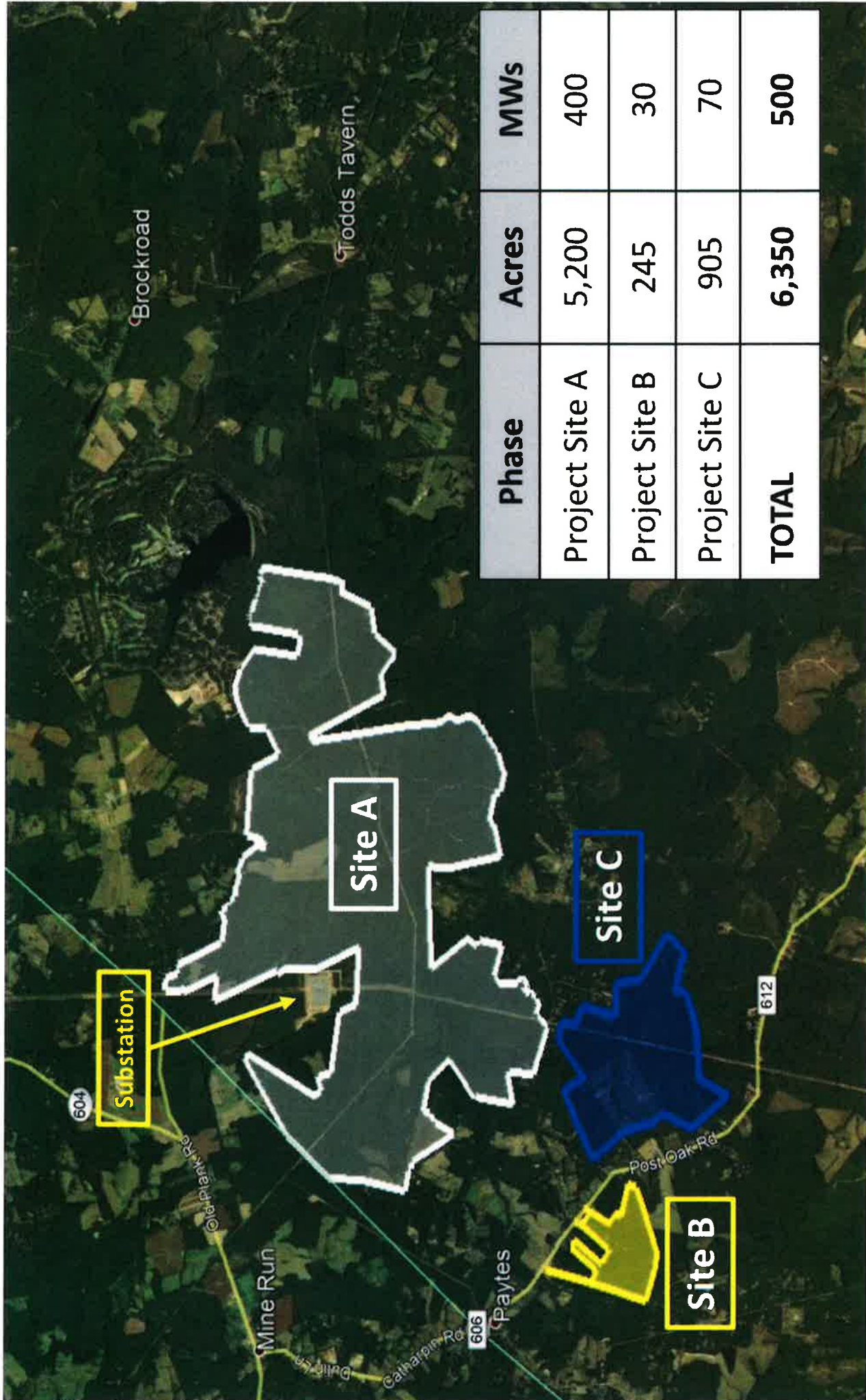
SPOTSYLVANIA SOLAR CASE STUDY – PAIRED SALES ANALYSIS

Spotsylvania Solar in northern Spotsylvania County Virginia, adjoining the 2,350 acre Fawn Leaf gated community to the south. The development consists of 1,398 single family lots with 900 residences and a 288.0 acre lake. Home prices range from the high \$500,000s to \$2,500,000. Of the 1,398 single family lots, 1,080 have sold, leaving a current inventory of 318.

Spotsylvania Solar is a 617 MW industrial scale electrical generating plant, comprised of four solar phases—Pleinmont 1, Pleinmont 2, Richmond and Highlander. The project sites contain a total of 6,350 acre of which 3,500 will be developed with solar panels. The developer is sPower who merged with AES in 2020. The project was announced in 2018 and approved in April 2019. Approximately half of the project was completed in July 2021 with the remaining anticipated to be completed in the fall of 2021. The surrounding areas to the east, west and south are rural, yet populated.

The northeastern most portion of Site A adjoins the Fawn Lake subdivision at the development's southwestern property line as indicated on the following aerial photograph. The chart following represents five land sales that occurred before and after the knowledge of the solar farm. A **plat of the five lots** follows.

Land Sales No. 1 and No. 2 occurred in 2015 indicating a range of values from \$85,000 to \$90,000 depending on size. Sale No. 3 is a 2017 sale that adjoins the site of the future solar farm, which is a slightly more remote location than the prior sales abutting the main road. This property sold for \$77,250.



Phase	Acres	MWs
Project Site A	5,200	400
Project Site B	245	30
Project Site C	905	70
TOTAL	6,350	500

**FAWN LAKE LOT SALES
SPOTSYLVANIA SOLAR**

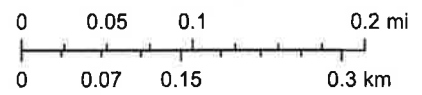
NO.	ADDRESS	GRANTOR	GRANTEE	DATE	PRICE	SIZE	SP/SF	DB INST	MAP	COMMENTS
1	11200 Brander Way	Simply Home LLC	Christopher Pichurko	03/17/15	\$90,000	32,470	\$2.77	0003 960	18C-43-1-205	Interior Lot, North of Brandermill Pk
2	11709 Southview CT	Simply Home, LLC	Bernard J. Logan	06/25/15	\$85,000	23,599	\$3.60	0010 297	18C-43-1-192	Interior Lot, North Side of Southview
3	11602 Southview CT	NA	Casey Pence	11/03/17	\$77,250	30,122	\$2.56	0019 899	18C-43-1-183	Adjoins Solar Farm, S. Side SV
4	11009 Southview HL	NA	Mark S. Wilson	08/05/19	\$65,000	26,893	\$2.42	0012 434	18C-43-1-177	SE Corner of Brandermill & SV HL
5	11700 Southview CT	NA	Charles Pattillo	09/27/19	\$55,000	32,958	\$1.67	0016 191	18C-43-1-185	Adjoins Solar Farm, S. Side SV



July 29, 2021

1:9,028

 Tax County Boundary



Sale No. 4 and 5 represent land sales that occurred after the approval of the solar farm. Sale No. 4 is at the corner of the main road and are in Site A. The lots on Bander Way and Southview Hill. This sale sold for \$65,000, while Sale No. 5, which adjoins the solar farm sold for \$55,000.

Comparing Sales No. 3 and 5 without any adjustment for market change (time) indicates a diminution in value of a minimum of -30.0 percent.

Comparable Sale No. 3:	\$77,250	
Comparable Sale No. 5:	<u>\$55,000</u>	
Difference:		\$22,500, or -28.8, or -30.0 percent (R)

Conclusion

Based on these nine case studies, the appraiser has concluded that “these results strongly support an indication of no impact on property value due to the adjacent solar farm.

It is notable that of the 23 sales listed on Page 49, 11 sales, or 47.8 percent indicate a negative decline in value ranging from -1.0 percent to -7.0 percent.

The following chart summarizes this offices comments and indicates the range of negative values for data advanced by the report under review that had the most “accurate” information. The average of the three examples (-7.5%, -4.5%, and -5.5%) was **-5.8 percent**.

The chart also includes two examples prepared by this office that indicate **-30.0 percent** decline contradicts the appraiser’s conclusion of no value diminution.

These include the fourth example from Selmer, TN using the appraiser’s own data which compares vacant lots within the same subdivision, both adjoining and not. The difference between these groups of sales is **-30.0 percent**. Such matched pairs that have only one difference, being proximity to the solar farm result in a more reliable indicator of value change, or not, than the convoluted adjustment process evident in nearly every case study by this appraiser. This methodology adjusts the sales beyond the point of being reliable indicators and makes then non credible.

The second example is the comparison of lots on the same street in Spotsylvania County, VA both before and after knowledge of the solar farm. Again, in this example, only knowledge of the solar farm is the only difference. This example also indicates a **-30.0 percent** adjustment, even without considering the time difference.

B. SOUTHEASTERN USA DATA – OVER 5 MW

No. 1 Matched Pair – AM Best Solar Farm, Goldsboro, NC

The detailed analysis of this 5.0 MW solar does not need review because the AM Best Solar Farm was constructed on Industrially (I-2, General Industrial) zoned land. Therefore, the market would have anticipated such a use and the effect of the solar farm would be inherent in the sales prices. The fact of the industrial zoning is not divulged by the appraiser.

Because of the size and the zoning, this case study is not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

KIRKLAND SOLAR CASE STUDIES

NO.	STATE	COUNTY	TOWN	ADDRESS	SOLAR FARM	ACRES	MW	DATE		VALUE CHANGE	AVERAGE	CLAY ANALYSIS
								ANN'CE	CONST			
1	KY		Crittenden	Adjacent to I-75	Crittenden Solar	34.10	2.7		2017	-1.0% to -14.0%	-7.5%	
2	TN		Selmer		Mulberry	208.89	16.0		2014	Not Credible	NA	-30.0%
3	IL		Streator		Grand Ridge	160.00	20.0			Not Credible	NA	
4	IN		Portage		Portage	56.00	2.0		2012	Not Credible	NA	
5	IN		Indianapolis		Dominion Indy	134.00	8.6		2013	Not Credible	NA	
6	VA	Clark			Clark County	234.00	20.0		2017	Not Credible	NA	
7	VA		Barhamsville	Barham Road	Walker Correct.	484.65	20.0		2017	Not Credible	NA	
8	VA	Sussex			Sappony	332.68	30.0		2017	-3.0% to -6.0%	-4.5%	
9	VA	Spotsylvania	Paytes		Pleinmont	6,412.00	99.6	2019	2020	-2.9% to -9.0%	-5.5%	-30.0%

No. 2 Matched Pair – Mulberry, Selmer, TN

This case study is based on a 16 MW solar farm that was constructed in 2014 that adjoins two subdivisions at the north and east, respectively. Because of the number of lots involved and the age of the solar farm, this would be a good example for an attempt at a sale/resales analysis. However, such an analysis was not mentioned.

The first paired sales analysis compared a \$176,000 6.86 acre tract abutting the solar farm at a distance of 200.0 linear feet to the property line and 450.0 to the nearest panel to three 1.00 acre sales. These sales are not comparable for a reliable indication of impact or not. Of these sales, the appraiser chose the one that indicated a negative difference as the most comparable.

Regarding the second group, Google Earth does not acknowledge 57 Cooper in Selmer and there does not appear to be such a street adjoining the solar farm. Regardless, there is a \$30,000 unadjusted difference between the test sale and the 3 control sales. In addition, the test sale is a 1.5 story dwelling and the control sales are ranch houses. On its face, these are not comparable sales.

The fourth example consist of lots sales within the adjoining subdivision to the solar farm. The test sales range from 1.28 acres to 2.05 acres with sale prices ranging from \$12,000 to \$16,000, which is reasonable relative to size. The control sales range in size from 1.47 to 1.67 acres and indicate a range of values from \$13,000 to \$20,000. Since the appraiser does not give the address for the Lake Trail sales, the \$13,000 sale cannot be identified. Nonetheless, the other two test sales sold for \$20,000 each for sales that do not adjoin the solar farm. Comparing the 1.67 acre control sales at \$20,000 to the 1.70 acre control sale at \$14,000 indicates a **diminution of -30.00 percent** for abutting the solar farm.

It is expected that a lot sale would indicate such a large percentage adjustment because a new house will be constructed upon it and this discount will offset the inherent diminution in value of the new construction.

No. 3 Matched Pair – Leonard Road Solar Farm, Hughesville, MD

This case study is from the 47.00 acre 5.00 MW Lenard Road Solar Farm in Hughesville, Maryland. This study compared a 3.00 acre residential tract adjoining the solar farm to the south that sold for \$291,000. During the same time period in 2016 a 3.22 acre residential tract sold away from the solar farm for \$329,800. After adjustment for the physical differences in the houses, the appraiser concluded no impact from the solar farm. Although there may be enough woodland screening to effectively preventing the solar facility from visibility at the rear of the property, the control sale appears to be from Waldorf, MD, a different town than the test sale. These two factors make this case study not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 4 Matched Pair – Gastonia NC, Gastonia, NC

This North Carolina case study concerns the 5.00 MW Neal Hawkins Solar Farm in Gastonia, North Carolina. This is an anecdote of a \$270,000 residential sale abutting a proposed solar farm that was acquired by a purchaser who had “no concerns” about the solar farm. There are always potential purchasers who “don’t care” about a disamenity and are willing to pay without a discount, as well as potential purchasers who would not consider purchasing a property in proximity to a disamenity at any price. However, they are not representative of any market. Even if they don’t care, the lender who is lending them 75.0

percent or greater is more concerned about the next purchaser, if, and when the current purchaser is unable to pay his loan.

Prior to the granting of a conditional use permit for the solar farm, the 34.59 acre tract was zoned RS-12 which permitted 12,000 square foot single family lots and 18,000 duplex lots.

This is another example of the appraiser not revealing the entire circumstances of the case study. Since in previous examples, the appraiser has stated that purchasers prefer a solar farm to a residential development, in this case the purchaser may have been relieved that the solar farm was approved. Nonetheless, the case study is not a reliable indicator of whether or not a solar farm impacts the value of proximate properties.

No. 5 Matched Pair – Summit/Ranchlands Solar, Moyock, NC

Although this case study has potentially more credibility than the previous case studies because it is based on a more comparable utility scale solar farm with 80 MW. However, Parcel 48, the test property, is a manufactured home on 4.29 wooded acres that offers protection from the solar farm 950.00 linear feet distant. In addition, there is a woodland directly behind this property within the solar farm which offers additional protection. The control sales are more distant however, they are sited on 1.00+/- acre lots. Given the distance from the solar farm compounded by the woodland protection of the view and the minimal quality of construction, it is not surprising that this example sold for as much as the control sales. Even considering these facts, the appraiser has estimated that the difference in the test sale and the control sales is **-3.0 percent**.

The second test sale, Parcel 53 is approximately 1,000.00 linear feet northeast of the closest solar farm and separated by approximately 675.00 linear feet of woodland. In addition, this sale adjoins an industrial tract immediately south and east of the solar farm. The 3 control sales are from seemingly the same subdivision, however, the third sale, 127 Ranchland is a similar distance from the solar farm and separated by only one lot. The test sale consists of 4.99 acres, while the control sales are approximately 1.00 acre lots. The gross adjustments are excessive at 27.5, 28.3 and 34.8 percent, respectively.

This is not a credible matched pairs analysis.

The next test sale, No. 15 is 430.00 linear feet north of the solar arrays at the northwest corner of the solar plant. In addition, the property is separated from the solar farm by a mature row of trees, as well as the Guinea Mill Run Canal. Because of the distance and intervening tree line and canal, the effect of the solar plant upon the utility of the property is mitigated.

The fourth test sale, Parcel No. 29, is directly across from the interior of the solar facility, but is separated by Ranchland Road, and the tree lined Guinea Mill Run Canal. The house is approximately 440.00 linear feet north of the closest panel. This comparison of manufactured homes indicates an average **-10.0 percent** diminution in value as estimated by the appraiser. The three test sales indicated differences of **2.0, -13.0 and -0.18 percent**, respectively, or an average of -7.5 percent.

The fifth test sale, 358 Oxford, is from a 10.00 acre subdivision that adjoins the generating plant to the west. This tract abuts the solar plant and the dwelling is within 625.00 linear feet of the nearest panel. The first control sale is from the interior of the same subdivision and indicates a loss of value of **-3.0 percent**. The second control sale appears to be the original house from the subdivided farm requiring a gross adjustment of -24.0 percent,

which would indicate this is not a reliable comparable sale. The third control sale is from Caratoke Hwy, a major 4 lane divided highway and is diagonally opposite commercial development.

Only the first matched pair is a reliable indicator.

The sixth group of sales that the appraiser analyzed are from a 10.00 acre subdivision west of the solar plant. The dwelling of the test sale is approximately 1,000.0 linear feet west of the closest solar panel and is one lot removed from the property line of the solar farm.

Because of the test sales distance from the solar farm and that all three control sales are from the same subdivision and could possibly be affected by the solar farm, this is not a reliable comparable matched pairs analysis.

The most reliable indicators for this case study are the first group with an indicated -3.0 percent damage; the fourth group with 2.0, -13.0, and -18.0 percent, or an average of -10.0 percent based on the appraiser's calculations; and the fifth group with one reliable indicator of -3.0 percent. This case study indicates an average diminution in value of -7.5 percent, based on the appraiser's own calculations.

No. 6 Matched Pair – Tracy Solar, Bailey, NC

This comparison involves two communities within 5 miles of each other, which is not indicated in the report. The test sale is in Bailey, NC and the dwelling is within 790.00 linear feet of the closest solar panel. However, the 5 MW generating facility is screened by approximately 500.00 linear feet of dense woodland and it appears that the front of the property is encumbered by a transmission line. However, the appraiser does not indicate this fact. The analysis compares the land sale of the test property with sales from Bailey and Middlesex, NC. However, the location of 427 Young is undeterminable with the information provided, but it appears to be Nashville, NC; and no house number is given for Claude Lewis Road.

The following graph of the sales indicate the superior nature of the 11.22 acre tract for a potential subdivision. Also, the 23.46 acre tract is cleared and appears to have had a new house constructed, indicating the doublewide was not a contributing factor. The 18.73 acre tract is a woodland and the 41.00 acre appears to be at least partially woodland (Google Earth was not able to identify it).

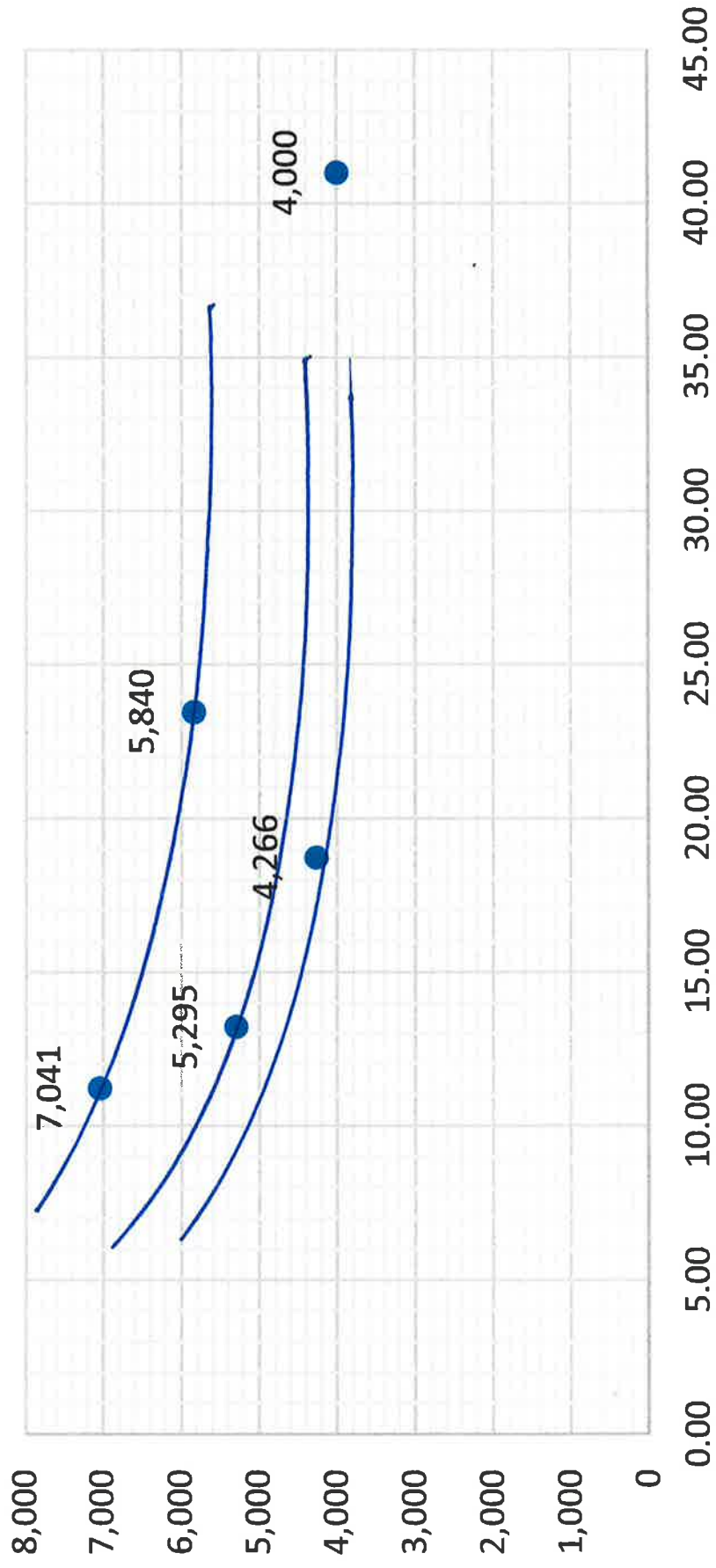
The graph of the sales as well as a visual inspection of the Parcel Nos. 9 and 10 indicate that the property is visually protected from the solar farm with dense woodland indicating that no diminution in value should be anticipated by this case study, on its face.

This case study is not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 7 Matched Pair – Manatee Solar Farm, Parrish, FL

This case study involves a 74.50 MW generating facility that adjoins Lake Parrish, that appears to be a reservoir. The test sale is approximately 1,200.00 linear feet north of the generating facility and separated by approximately 650.00 linear feet of dense woodland and a railroad at the edge of the woods. Because of the protection offered by the woods and the distance from the solar farm, the utility of the test property would be expected to be similar to that of the control properties on its face.

No. 6 Tracy Solar



Without the reduction in utility or loss of the view shed, this case study is disingenuous and not a credible example to refute loss of value as a result of proximity to an industrial scale solar generating facility.

No. 8 Matched Pair – McBride Place Solar Farm, Midland, NC

This case study consists of three improved single family properties that abut McBride Place. This solar farm was approved in early 2017 for a 74.9 MW plant on 627.0 acres of a total 974.59 acre tract.

The first paired sales analysis is of a 12.00 acre woodland tract that adjoins the solar farm at the northwest corner. This sale is compared to three rural residential tracts from various parts of the county with no explanation as to their comparability with respect to location. In addition, the sales required gross adjustments of 22.5, 28.5 and 33.9 percent indicating they truly are not comparable which limits the reliability of the conclusion that this example proves no diminution in value.

The second example includes two sales in the general area and one sale from Concord, NC. The latter abuts a development under construction that appears to consist of zero-lot line houses. Whatever this construction is was not discussed, even though it would appear to have a bearing on the sale price.

In the third example, two of the three comparable sales are from Charlotte (if Google Earth is correct). There is no discussion of a location difference or an explanation why it was necessary to go to Charlotte to find a comparable sale. This is an unreliable paired sales analysis. However, these sales did indicate a -1.0 to -4.0 percent diminution in value,

The most significant aspect of this case study with respect to reliability is the **omission of three sale-resales** that indicate a **minimal decline of -15.0 percent** which contradicts the appraiser's finding of no damage.

Although the appraiser acknowledged these sale-resales in his discussion, he dismissed them because the realtors who were involved with these transactions stated that the solar farm was not a consideration to their clients. Nonetheless, the four indicators of similar diminution in value are consistent with the diminution documented by this office in North Branch, MN; Grandy, NC; Madison County, IN; and Spotsylvania, VA; in addition to other references throughout this review. This evidence is more compelling than a second hand opinion.

MCBRIDE PLACE SOLAR FARM CASE STUDY – SALE-RESALES ANALYSIS

McBride Place Solar Farm is on Mount Pleasant Road in Midland, North Carolina. The project consists of 627 acres of a total tract of 974.59 acres. The 74.9 MW project was approved in 2017.

An analysis of the sales of the single-family dwellings that surround the project indicate that three sale-resales have occurred spanning the time period before and after the project was approved.

A time adjustment derived from the Zillow Home Value Index for North Carolina Single Family Market from 2014 to 2021. The first sale was increased for time based on the indicated rate of appreciation of 5.35 percent, 5.08 percent and 5.00 percent respectively. This resulted in the anticipated value based on market appreciation, as if the solar farm had not been constructed. When comparing these values to the actual sale prices after

construction, these sales indicate diminution of **-15.65 percent, -15.51 percent and -16.44 percent**, respectively, or an average of 15.9 percent. The analysis is depicted on the following chart and aerial photograph.

It is notable that a fourth sale, though not a sale-resale, was **-16.81 percent** below its assessment at the time of sale.

It is significant that Sale-Resale No. 1's property line is **325.0 linear feet west of the closest solar panel and the dwelling is 550.0 linear feet west**. Sale-resale No. 2's rear property line is **200.0 linear feet north of the closest solar panel and the dwelling is 350.0** linear feet north. Sale-resale No. 3 is one lot removed from the solar panels on the west side of Haydens Way. Sale No. 4's east property line is within 150.0 linear feet of the closest solar panel while the dwelling is within 550.0 linear feet. Dense woodland is between the solar panels and all the examples of diminution.

No. 9 Matched Pair – Gaston County, NC

The first example is a 17.74 acre forested site with a 63 year old dwelling that is on the opposite side of the road and approximately **1,165 linear feet** from the solar farm which appears to slope downward from road grade. The utility of this property is clearly not impacted by the 5 MW facility. A second example includes a \$180,000 2.91 acre tract that sold in 2015 after the solar farm was approved, but before it had been constructed. A mitigating influence may have been that the rear third of the property is woodland that separates the front third of the tract that contains the dwelling from the solar farm. Since the solar farm was not yet constructed, the potential purchaser may have taken this fact into his calculus for purchase. A third example is an unimproved 21.15 acre tract approximately 1,500 linear feet south of the solar farm and on the opposite side of Blacksnake Road. Also, across from the example on the north side of the road is a highly improved farm and woodland which blocks the view of the solar farm. Any reduction in utility of this property is speculative.

A fourth paired sales analysis consists of a 17.74 acre test property on same side of Mariposa Road as the solar farm and within approximately 700.0 linear feet of the facility. At the time of sale it was nearly all dense woodland. This sale is consistent with the control sales, as indicated on the following graph. Because of the dense woodland and distance from the small solar facility, any proximity damage is mitigated.

Because of the mitigating circumstances of distance and woodland barriers compounded by the very small solar farm, this case study is not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 10 Matched Pair – Clark County Solar, Clarke County, VA

This 5.13 acre test tract is 1,230 linear feet north east of the closest panel to this 20 MW facility on a 234.0 acre tract. The tract was purchased prior to the construction of the solar farm. The potential purchaser may have considered the distance to be sufficient. The comparable sales require gross adjustments ranging from 24.9 to 43.2 percent and appear to be from different towns that that any conclusion as to damage or not is speculative.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

SALE/RESALES ADJOINING MCBRIDE PLACE SOLAR FARM - MIDLAND, NC

SALE/ RESALE	PARCEL NO.	ADDRESS	SALE DATE	DEED BOOK/PAGE	GRANTEE	SALE PRICE	SALE TAX ASSESSM'T	ACRES	COMMENTS
1	5556-26-2054	4504 Chanel Court	1/17 1/20	12328-116 NA 13932-047	Phillip G. Pees	\$399,000 \$393,500	\$396,720 \$474,750	1.730	2005 2,558 SF 1 Sty BV, 4-3.5, Full Bsmt, 2-CAG, FAG, CA, FP Adjust 1/17 Sale to 1/20, or \$399,000/3.0 Yr/5.35%* = \$466,527, or -15.65%
2	5556-27-5419	4599 Chanel Court	9/15 8/20	11575-087 NA 14404-283	Peter Weinziel	\$462,000 \$500,000	\$473,490 \$531,440	1.000	2007 2,411 SF 2 Sty BV, 5/4.5 Full Bsmt, 2-CAG, HP, CA, FP Adjust 9/15 Sale to 8/20, or \$462,000/5.0 Yr/5.08% = \$591,775, or -15.51%
3	5556-15-6844	8704 Haydens Way	7/12 4/19	10081/209 NA 13463/180	Ben. Merriman	\$322,000 \$375,000	\$306,680 \$372,460	1.960	2001 1,353 SF 2 Sty BV, 4/3 Full Bsmt, 2-CAG, HP, CA, FP Adjust 7/12 Sale to 4/19, or \$322,000/6.8 Yr/5.0% = \$448,771, or -16.44%
4	5556-46-7264	5811 Kristi Lane	4/20	14095/125	Fred E. Trull, Jr.	\$530,000	\$637,100	3.740	2019 2,462 SF 2 Sty BV, 6/4 Part. Bsmt, 2-CAG, FAE, CA Sale Price compared to Assessment = -16.81%

*The time adjustment was based on the Zillow Home Value Index for the North Carolina Single Family Market from 2014 to 2021.



No 9 Mariposa Solar



No. 11 Matched Pair – Simon Solar, Social Circle, GA

This paired sales analysis considers the effect of a 30 MW solar farm on a 36.86 acre tract adjoining the plant to the south. The tract was sold in two parcels that are separated by the access lane to two flag lots at the rear of the 20.5 acre tract adjoining the solar farm and the 16.36 acre tract to the southeast. The two lots fronting on Hawkins Academy Road were transferred in the same deed (DB 3891, Page 481) on March 31, 2016. An existing easement meanders through the two tracts what lead to the rear northwest flag lot which was originally owned by the grantor of both tracts. Presumably, the access lanes of the flag lots will provide the ultimate access to the rear residential tracts. The fact that the 20.5 acre tract and the 16.36 together sold as two platted tracts would offset the current easement access.

The combined 36.86 acres sold for a total of \$180,000, or \$4,883 per acre. This is also the same per acre value of each of the two individual lots.

The following graph depicts the 36.86 acre tract and the three sales included in the report under review. The graph indicates that the 36.86 acre tract abutting the solar farm sold for **-30.0 percent less** than the comparable sales that did not.

This office's indicated -30.0 percent diminution in value is significantly different than the Kirkland estimate that there was no difference, although one sale indicated a -12.0 percent decline. The primary reason that this conclusion is different is that the size adjustments made in the report under review are incorrect.

It is notable that the appraiser's opinion that, "Still at -2% impact as the best indication for the solar farm, I consider that to be no impact given that market fluctuations support +/- 5.0%.

Though a -5.0 percent adjustment may seem insignificant to Kirkland, the University of Rhode Island report put this diminution in perspective. According to the report, "This model indicates that on average, housing lying within **one mile** of solar installations sell for 1.7% less post construction relative to properties further away, all else being equal." We find this confirms our hypothesis that **nearby solar installations are a disamenity**.³⁵ The report also stated: "Our complete sample (prior to any data cuts) consists of 289,254 unique properties located within 1 mile of all solar installations in the dataset. Put together, we estimate a net loss of \$1.66 billion in aggregate housing value due to proximate solar installations in MA and RI."³⁶

It is also notable that the -30.0 percent adjustment for this vacant tract corresponds to the -30.0 percent adjustment for vacant lot in the Selmer, Tennessee and Spotsylvania case studies, which did not have a woodland buffer from their respective solar farms.

No. 12 Matched Pair – Candace Solar, Princeton, NC

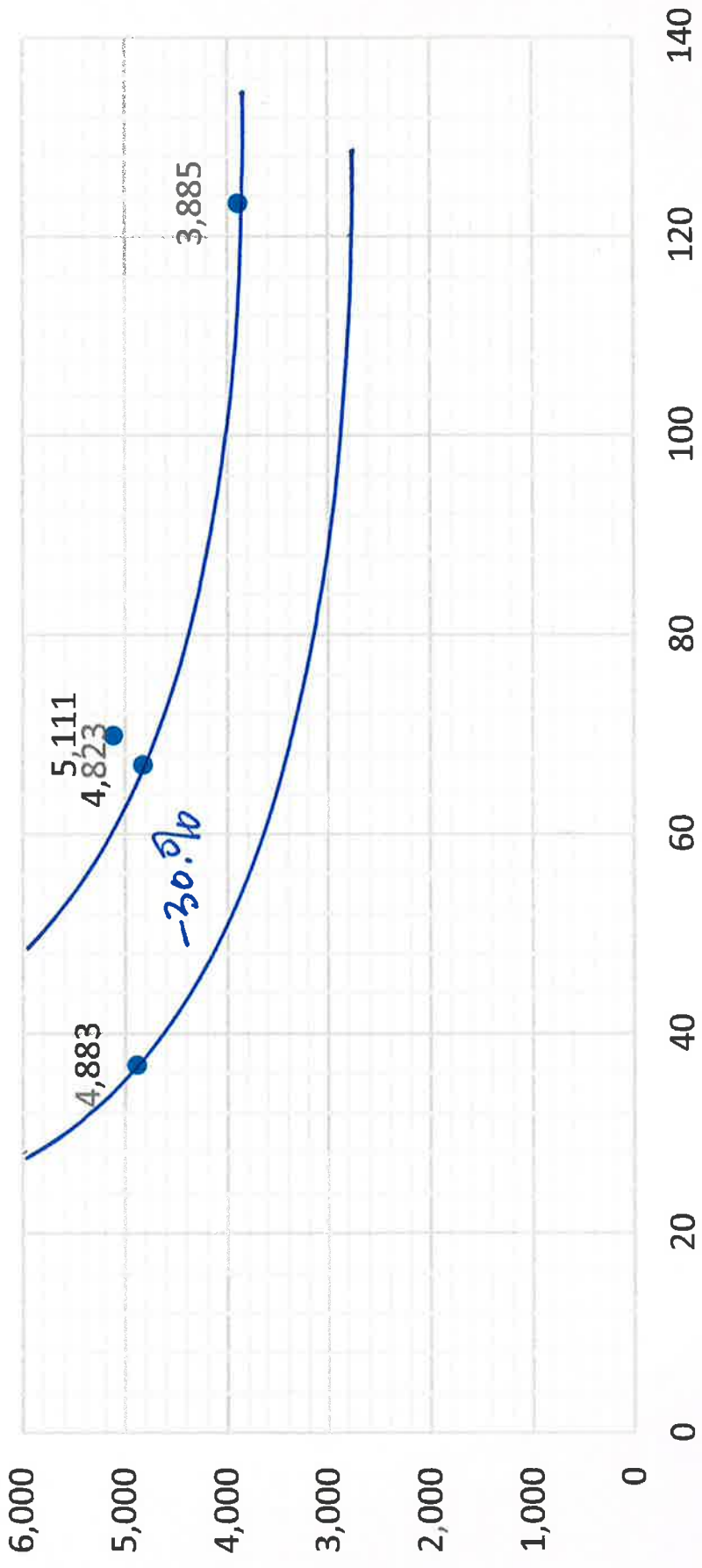
This case study consists of a paired sales comparison of a single-family lot, as well as the subsequent sale of the lot as improved with a modular home.

The 2.03 acre lot is east side of Herring Road and adjoins the solar farm at its rear property line. The dwelling is within 450.00 linear feet of the closest panel, but is separated by 250.0 feet of dense woodland in the rear yard. The non-adjoining sales include two 0.87

³⁵ Vasundhara Gaur and Corey Lang, op. cit.: 15.

³⁶ Ibid.: 19.

No. 11 Simon Solar



and 0.88 acre tracts and a 2.13 acre tract. The most relevant sale is the latter which is opposite the adjoining sale on the west side of Herring Road. It is 950.0 linear feet west of the solar farm and the front of this yard has a dense tree stand. Based on the following chart which depicts the per square foot values of the sales, the larger tract sold for \$0.38 per square foot while the smaller tract sold for \$0.34 per square foot. Adjusting the larger tract \$0.01 per square foot based on the graph, the indicated diminution in value for the adjoining lot is **-13.0 percent**. This indication is consistent with the McBride lots that had some woodland visual protection from the abutting solar farm.

The second analysis, as improved indicates a range of -3.0 percent to 26.0 percent. This is an unreliable comparison due to the number of adjustments required, particularly the first sale at 58.8 percent and the second and third sales are from a different town.

The analysis as prepared by the appraiser is not credible.

No. 13 Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, VA

According to the appraiser, the purchaser of the property directly opposite the solar farm and within 250.00 linear feet, stated that he preferred the privacy the solar farm offered him and paid more than the asking price. Therefore, no analysis is needed. This is another example of a purchaser's indifference to a detrimental condition. As with potential purchasers who would not pay any amount regardless of discount for a property with a detrimental condition, these extremes are not indicative of the market and should be eliminated from the data pool.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 14 Matched Pair – Innovative Solar 46, Roslin Farm Road, Hope Mills, NC

This 78.5 MW generating plant has potential of being a relevant indicator for the McCracken County proposal given its size. This single paired sales analysis uses comparable sales which one of the three required over a 45.4 percent gross adjustment, which results in an unreliable indication. The other two sales are 2.5 and 3.5 miles from the test sale in different type neighborhoods. The second sale is more rural while the test sale is in proximity to the Interstate. The third sale appears to be more urban. The appraiser has made no locational difference nor has he justified the comparability.

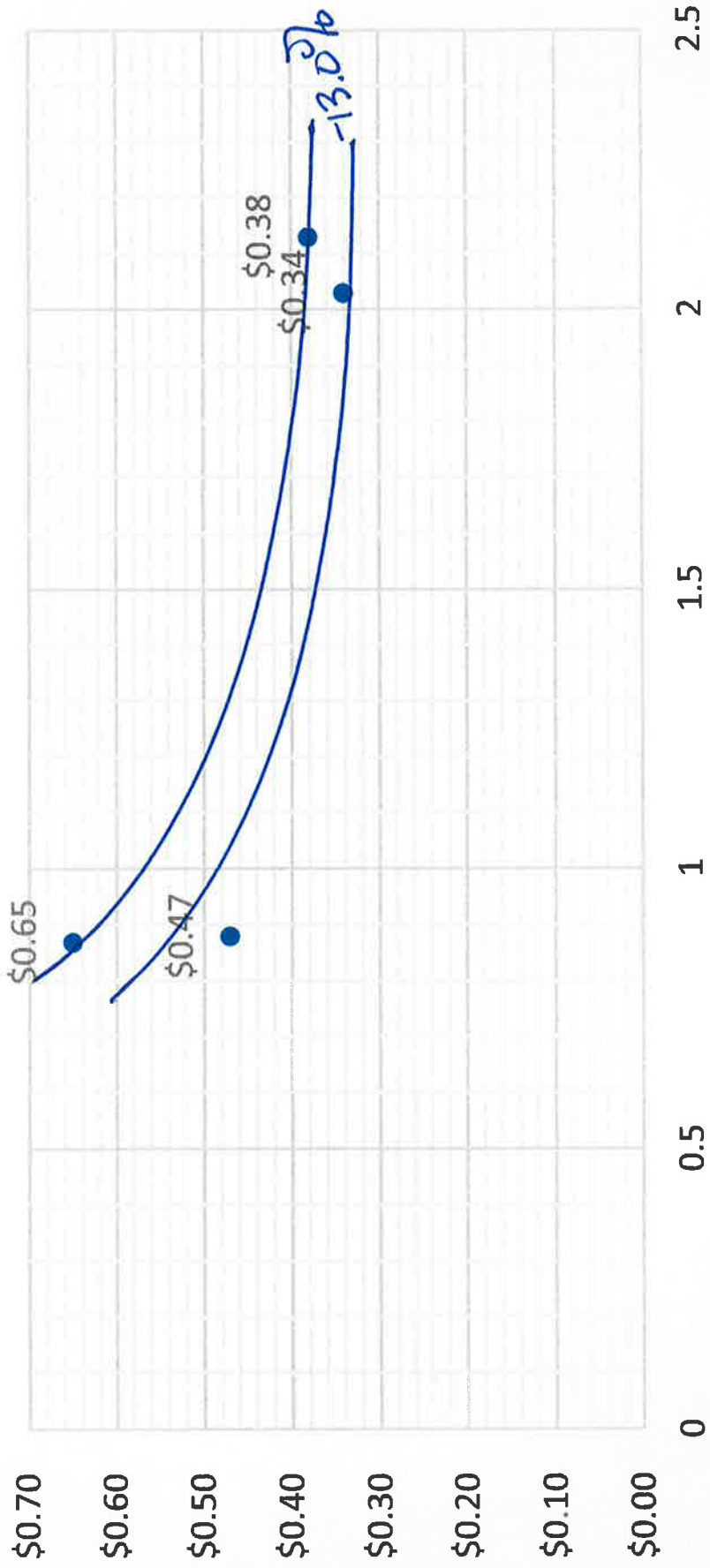
With such a large solar generating plant, the proper analysis would be to examine all the adjacent properties for sale-resales prior to and after construction, such as the case of No. 14, McBride Place Solar Farm in Midland, N.C.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 15 Matched Pair – Innovative Solar 42, Country Line Road, Fayetteville, N.C

This case study examines two adjacent properties opposite a 71 MW generating plant. With respect to the first study, the Shaw Mill Road sale appears in the center of a commercial/industrial intersection and the address of the second sale appears to be in Hope Mills. The first sale required a 40.0 percent adjustment and the second, a 20.0 percent adjustment. The sales are too dissimilar to result in a reliable indication.

Candace Solar



Regarding the second comparison, the sales are within the general vicinity and are comparable to the subject. The Hemingway sale is directly behind the test sale and may be influenced by the solar facility. Assuming the data is correct, this example may not be adversely affected by the solar farm. However, because of the number of adjoining tracts, a search for sale-resales should be made to support the indication of no diminution of value.

No. 16 Matched Pair – Sunfish Farm, Keenebec Road, Willow Spring, NC

This case study examines a \$185,000 house whose rear corner is diagonally across from a 6.4 MW generating plant. The appraiser concluded that the property was not affected and due to the property's alignment with the solar farm and the woodland and field directly behind the property the likelihood of a reduction in utility is minimal.

No. 17 Matched Pair – Sappony Solar, Sussex County, VA

This case study examines a 6.00 acre woodland tract improved with a manufactured home 1,425.00 linear feet southwest of the 30 MW solar farm. Such a property's utility with a sale price of \$128,400, and at this distance, would not be expected to be adversely affected by proximity to the solar farm, on its face.

Nonetheless, using the appraisers data, but giving least emphasis to second control sale because it has only 1.03 acres and required 31.9 percent gross adjustment, the remaining two sales indicate diminution in value of -3.0 to -6.0 percent.

No 18 Matched Pair – Camden Dam, Camden, NC

This case study involves a single-family dwelling that sold in three tracts with the second presumably able to be developed that adjoined the 5 MW solar farm. The issue in this instance is did the purchaser of the property lose a building right as a result of that tract adjoining the solar farm. This would be the loss of utility as a result of proximity. However, the appraiser did not discuss this issue. It may not have been a buildable lot, but since it is the central issue, it should have been addressed. Instead the appraiser compared the entire tract to three other sales in the county of which two required gross adjustments of -26.9 and -31.9 percent percent and concluded that there was no damage.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 19 Matched Pair – Grandy Solar, Grandy, NC

This 20 MW solar farm is apparently under construction on a former golf course site. According to the appraiser's map exhibit, there are 62 single family and commercial lots that appear to abut the former golf course. The most likely analysis of this tract would be to examine all the lots for sale-resales both before and after the announcement of the conversion to a solar farm. Also, the most probable historic motivation for the purchase of these lots was for the view of the golf course. Several articles have addressed this issue and have documented a premium paid for such locations. The appraiser did not discuss the issue of the removal of a view from such a subdivision. The loss of utility for any of these sales would be the transition from a landscaped natural scenic view to an industrial view. The appraiser did not address any of these issues.

The report included two paired sales analysis of properties that abutted the former golf course. The first example was a 1.5 story from a cul-de-sac off the through-fare, Grandy Road. The first sale is a ranch style house from Harbinger, a town to the south of Grandy.

The second sale was a 1.5 story, but from Jarvisburg, the community to the north. No explanation was given as to why only one sale was available from Grandy. The first two examples indicated a decline in value from -2.0 to -4.0 percent. However, the appraiser concluded no damage because the third sale indicated 5.0 percent superiority.

The second example was a ranch style dwelling that fronts on Grandy Road, although Google Earth identifies the address as a vacant wooded lot. The first sale, a 1.5 story dwelling fronts on Grandy Road adjacent to the Par Four Cul-de-sac and is screened from the golf course. The other two sales are from other subdivisions in Grandy. Although the subject is a ranch, two of the three non-adjointing sales are 1.5 story dwellings with no explanation as to why only one ranch sale was available.

The following case study of land sales at the adjoining subdivision to the north of the Grandy solar farm documents a decline of a minimum of **-15.5 percent** for a vacant lot single family lot that abuts the solar farm.

SUNSHINE FARMS CASE STUDY – SALE-RESALES ANALYSIS

Ecoplexus, Inc., a San Francisco solar developer built a 20 MW project on the former 121.4 acre Goose Creek Golf and Country Club at 6562 Caratoke Highway in Grandy, North Carolina. This is an example of single-family lots that were generally acquired by virtue of their abutting a golf course view, and then having it replaced by the view of solar panels.

The North Carolina Utilities Commission gave its approval for the facility in January 2015. Based on concerns from the neighbors regarding its incompatibility with neighboring residential lots, the Currituck County Planning Board denied Ecoplexus a permit in April 2016. The solar company filed suit, and in March 2017, a Superior Court judge upheld the county's decision to turn down the project. However, on appeal, the North Carolina Court of Appeals overturned the decision in December 2017. The project was constructed in 2019.

The solar farm is surrounded by 62 properties, which consist predominantly of single-family lots and improved tracts on Grandy Road and Uncle Graham Road. The east side, on Caratoke Highway, is predominantly improved with commercial tracts. The northern property line abuts a single-family subdivision, Carolina Club, that also encircles a second golf course.

All the properties that encircle the solar farm were examined for sale-resales prior to and after the knowledge of the proposed golf course. Since there were no sale-resales, which are the most reliable measure of damage since they require the least adjustment, the only sale-resales available to analyze were the vacant lot sales from the adjacent Carolina Club Subdivision on Savannah Drive, abutting the solar farm to the north.

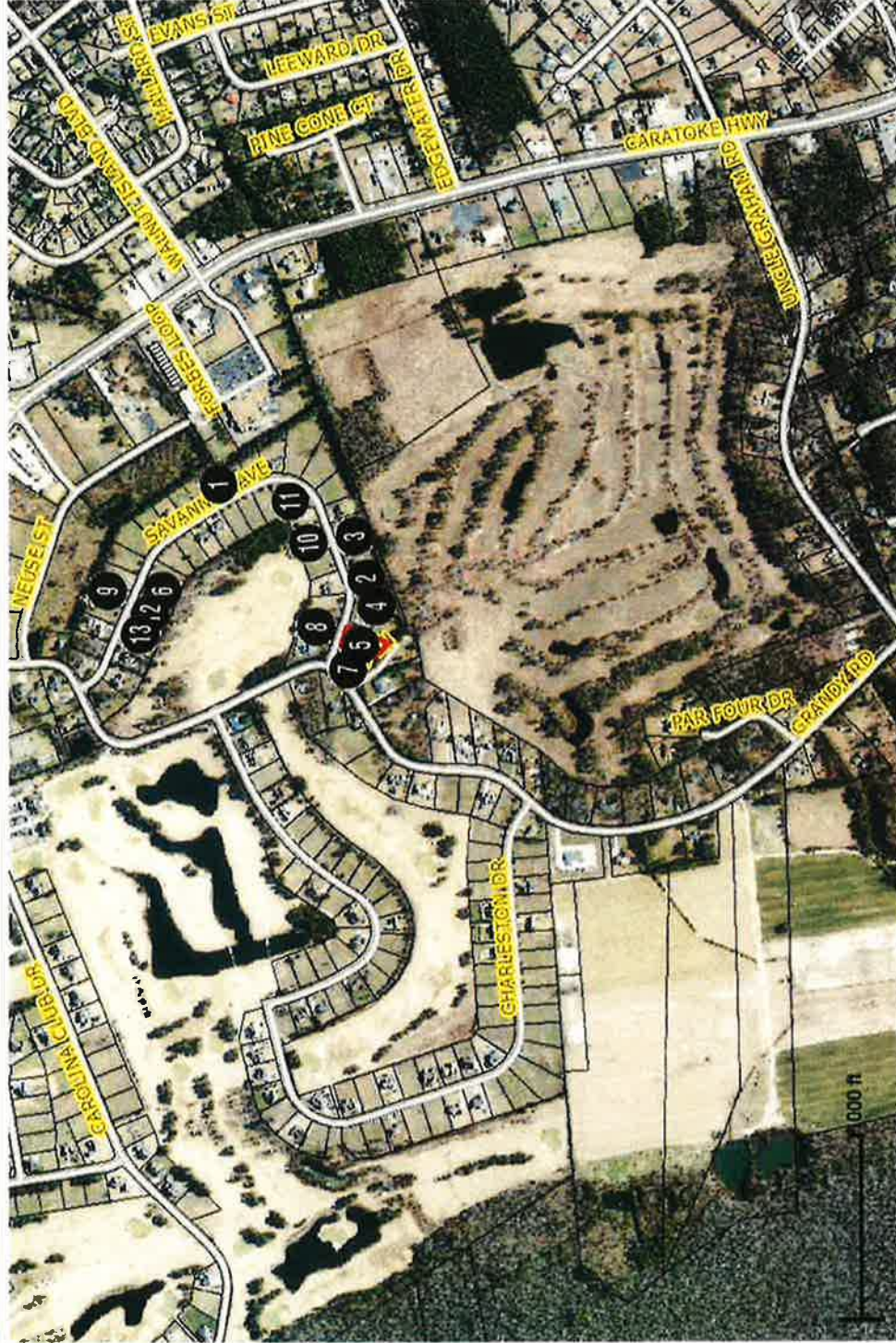
The chart and aerial photograph represents two groups of sales—those abutting the solar farm or commercial uses and those not abutting. Sale Nos. 1 through 5 represent the former, while Sale Nos. 6 through 13 represent the latter. Sales No. 1, No. 2 and No. 3 contain approximately 0.50 acre and sold in mid-2017 for \$27,000 to \$28,000, or an average of \$27,500. Sale No. 4 is larger, containing 0.870 acres and sold for \$29,500 during this same period. Though Sale No. 5 did not abut the solar farm, it was only two lots to the northwest. This sale sold in late 2018 for \$30,000.

Sale Nos. 6 through 13 sold between late 2017 and mid-2021. These sales are 0.50 acre in size and ranged in price from \$32,500 in 2017 to \$38,500 in 2021.

GRANDY, NORTH CAROLINA SINGLE FAMILY LOT SALES

SALE	PARCEL ID	ADDRESS	GRANTOR	GRANTEE	DB/PAGE	SALE PRICE	LOT SIZE	SP/SF	SALE DATE	COMMENTS
Lots Abutting Solar Farm or Commerical Use										
1	94G-16	125 Savannah	George Mills	Earl Thomas Hall	1404-149	\$27,000	0.510	\$1.22	4/25/17	Abutts Commercial at Rear
2	94G-5	147 Savannah	Wm Weatherly	Branden Shuler	1404-848	\$27,000	0.580	\$1.07	4/28/17	Abutts Solar Farm
3	94-G	143 Savannah	Wm Weatherly	Roger Mihovch	1404-848	\$28,000	0.460	\$1.40	6/20/17	Abutts Solar Farm
4	94G-4	149 Savannah	Wm Weatherly	David A. King	1402-737	\$29,500	0.870	\$0.78	7/13/17	Abutts Solar Farm
5	94G-2	153 Savannah	Rodney Blake	G. Romero-Mendez	1465-529	\$30,000	0.510	\$1.35	12/10/18	2 Lots NW of Solar Farm
Lots Not Abutting Solar Farm or Commerical Use										
6	94G-35	112 Savannah	Jeff Weatherly	Frasca Custom Hms	1425-482	\$32,500	0.460	\$1.62	11/15/17	
7	94G-1	155 Savannah	Keith Ostrom	Hunter D. Wright	1447-837	\$35,000	0.490	\$1.64	06/15/18	
8	94G-5	142 Savannah	Michael Mills	Lutz Quality	1510-321	\$35,000	0.460	\$1.75	12/17/18	
9	94G-24	109 Savannah	John Peterson	Michael Locicero	1430-662	\$33,000	0.450	\$1.68	01/09/18	
10	94G-46	134 Savannah	Bernard Hall	Anthony Leete	1534-847	\$37,000	0.460	\$1.85	05/11/20	
11	94G-44	130 Savaannah	John Bergstrom	Scott Shaker	1601-332	\$38,500	0.610	\$1.45	02/23/21	
12	94G-34	110 Savannah	Jonathan Thau	Kelly Coon	1591-766	\$38,000	0.460	\$1.90	01/14/21	
13	94G-33	108 Savannah	Lina Ward	Joaqin Salazar	1618-635	\$37,400	0.460	\$1.87	04/27/21	

Currituck County GIS Data Viewer



- County Boundary
- State
- County
- Streets
- Wright Memorial Bridge
- Major Streets
 - Arterial_Principal
 - Arterial_Major
 - Collector_Major
- Parcels
- Currituck County
- Aerial Photography (2011)
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3

Currituck County GIS
 Phone: (252) 232-2034
 E-mail: gis@currituckcountync.gov

This map should be used for general reference purposes only. Currituck County assumes no legal liability for the information shown on this map.

Comparing the two groups of sales from 2017 indicates a range in price from \$27,500 to \$32,500, or a **difference of -15.38 percent**.

There is insufficient data to determine if the lots that adjoin the solar farm continue to increase in value at the same or a reduced rate as the rest of the local market, or if their value stabilized. Nonetheless, this case study indicates a minimal diminution of **-15.50 percent (R)** as a result of their proximity to the solar farm. This diminution in value reflects an ordinance that requires a **300.0 linear feet setback for the solar panels from the residential property line; no chemicals can be used to control vegetation throughout the life of the project; and the solar farm had to submit a decommissioning plan.**

Among the neighboring property owners' concerns during the permitting process was the potential damage to their residences in the case of a hurricane. The developer claimed that the arrays would withstand winds up to 120 miles per hour. However, the effect of Hurricane Dorian in 2019 was that dozens of frames and panels were mangled even though the storm was 50 miles offshore and the winds were 60 miles per hour. This is an example of the solar developer's misrepresentation and the unpredictable nature of the impact of an unstable structure occupying immense areas of land.

No. 20 Matched Pair – Champion Solar, Lexington County, S.C.

This 11.05 acre abutting tract is not depicted on the aerial photo in the report. It is, in fact immediately to the southeast with its woodland rear yard shown. The tract is also **directly opposite the Lexington County Airport**, which is also not shown on the aerial photo. This is one example of a solar farm potentially not influencing the surrounding properties, but not for the reason the appraiser has depicted.

No. 21 Matched Pair – Barefoot Bay Solar Farm, Barefoot Bay, FL

This matched pair analysis is perhaps the most disingenuous in the report. All the "adjoining sales" are from the concentrated development at the northeast corner of the L-shaped solar farm, as shown on the following aerial photograph. The first two of such sales are on the west side of the development which appears to have approximately 10.0 feet between each house. This fact belies the description of the neighborhood by the appraiser as "medium density." Parcel No. 14 is 950.0 feet from the nearest solar panel on the east side of Papaya Court. In addition, it is separated from the solar panels by a lot on the west side of the street, the canal and approximately 570.0 linear feet of green space.

The second adjoining sale is nearby the first, but on the west side of the street. This tract is 750.0 linear feet from the solar panels and is separated by the canal and the 500.0 foot setback.

The remaining four sales are on the southside of the development. These lots are 700.0 linear feet from the panels and are separated by a dense 150.0 foot woodland strip and the 500.0 foot setback.

Considering the densely developed character of the neighborhood which is improved only with \$150,00 +/- manufactured homes, on its face, the utility of these properties would not be impacted by the solar farm. In fact, the 500.00 foot buffer may give the abutting lots some sense of space. However, to conclude from this example, that solar farms have no impact on adjoining properties to apply this conclusion to other situations misrepresents the intent of the appraisal process.



No. 22 Matched Pair – Miami-Dade Solar Farm, Miami, FL

The address of the adjoining property is incorrect as 13600 SW 182nd Street. Based on the aerial photograph it presumably is on SW 136th Street. The property is also in the direct flight path of the Miami Executive Airport which is within 2.5 miles to the east. This fact compounds any measurable effect that the solar farm might have on this tract on the opposite side of SW 13th Street and being 1,390 linear feet from the solar panels. In addition, the first two sales required gross adjustments of -39.1 and -36.3 percent, respectively, resulting in an unreliable extraction of the difference attributable to the solar farm. Even considering these problems, the sales indicated -2.0 to -3.0 percent diminution in value.

This case study is, therefore, not a credible measure of determining whether there is or is not damage as a result of proximity to a solar farm.

No. 23 Matched Pair – Spotsylvania Solar – Paytes, VA

This case study is from the first of a four phase 6,412 acre 617 MW solar project to encompass 3,500 acres. The entire project was approved in 2019 with the current phase, known as Pleinmont 1 Solar in November 2020. This case study consists of three control sales occurring in 2020.

The first paired sales analysis consists of a 5.20 acre tract improved with a 1.5 story dwelling that reportedly adjoins the solar farm on Orange Plank Road. The comparable sales consist of one 1.5 story dwelling and two ranch houses. The sales required gross adjustments of 45.8, 36.4 and 24.4 percent, respectively. Aside from the fact that the sales are not comparable, more significantly, the test sale does **not adjoin** the solar farm. In fact, it is on the north side of Orange Plank Road and two tracts removed from the solar farm, or approximately 1,000 feet of dense woodland from the property line of the solar farm.

The second paired sales analysis consists of an 11.0 acre tract improved with a 2 story dwelling that reportedly adjoins the solar farm on Nottoway Lane. Although all the control sales are 2 story houses and the adjustments are reasonable, the control property does **not adjoin** the solar farm is separated by a 66.00 acre densely wooded tract. Distance from the dwelling is estimated to be 1,850.0 linear feet.

The third paired sales analysis consists of 2 story houses that are on similar sized 5.00+/- lots. The test sale on Post Oak Road does adjoin the solar farm and its dwelling is approximately 1,080 linear feet southwest of the property line of the solar farm. The distance consists of dense woodland. It is notable that two of the control sales indicate a diminution in value of **-2.0 to -9.0 percent**, or an average of **-5.5 percent**.

It is significant that the appraiser states, "All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three sales show no indication of any impact on property value." On its face, the sales appear too far removed from the solar farm to be affected, particularly since two of the sales are not adjoining. In addition, the first matched pair group required gross adjustments of 45.8, 36.4 and 24.4 percent. It is disingenuous of the appraiser to even include these case studies, and therefore, they are not a credible measure of determining whether there is or is not damage as a result of proximity to this solar farm.

The following case study prepared by this office of land sales at the adjoining Fawn Lake subdivision documents a decline of a minimum of **-30.0 percent** for a vacant lot single family lot that abuts the solar farm.

SPOTSYLVANIA SOLAR CASE STUDY – PAIRED SALES ANALYSIS

Spotsylvania Solar in northern Spotsylvania County Virginia, adjoining the 2,350 acre Fawn Leaf gated community to the south. The development consists of 1,398 single family lots with 900 residences and a 288.0 acre lake. Home prices range from the high \$500,000s to \$2,500,000. Of the 1,398 single family lots, 1,080 have sold, leaving a current inventory of 318.

Spotsylvania Solar is a 617 MW industrial scale electrical generating plant, comprised of four solar phases—Pleinmont 1, Pleinmont 2, Richmond and Highlander. The project sites contain a total of 6,350 acre of which 3,500 will be developed with solar panels. The developer is sPower who merged with AES in 2020. The project was announced in 2018 and approved in April 2019. Approximately half of the project was completed in July 2021 with the remaining anticipated to be completed in the fall of 2021. The surrounding areas to the east, west and south are rural, yet populated.

The northeastern most portion of Site A adjoins the Fawn Lake subdivision at the development’s southwestern property line as indicated on the following aerial photograph. The chart following represents five land sales that occurred before and after the knowledge of the solar farm. A plat of the five lots follows. The exhibits are included in Case Study 9 of the previous section (Kentucky group).

Land Sales No. 1 and No. 2 occurred in 2015 indicating a range of values from \$85,000 to \$90,000 depending on size. Sale No. 3 is a 2017 sale that adjoins the site of the future solar farm, which is a slightly more remote location than the prior sales abutting the main road. This property sold for \$77,250.

Sale No. 4 and 5 represent land sales that occurred after the approval of the solar farm. Sale No. 4 is at the corner of the main road and are in Site A. The lots on Bander Way and Southview Hill. This sale sold for \$65,000, while Sale No. 5, which adjoins the solar farm sold for \$55,000.

Comparing Sales No. 3 and 5 without any adjustment for market change (time) indicates a diminution in value of a minimum of -30.0 percent.

Comparable Sale No. 3:	\$77,250	
Comparable Sale No. 5:	<u>\$55,000</u>	
Difference:		\$22,500, or -28.8, or -30.0 percent (R)

CONCLUSION – SOUTHEAST OVER 5 MW

The report under review concludes that the data set presented of 23 solar farms “show that residential and agricultural uses are the predominant adjoining uses” by calculating the acres and percentage of these uses for all the solar farms which, nonetheless, remarks the obvious conclusion, evident on its face.

With respect to value, the appraiser concludes that, “This data strongly supports an indication of no impacts on adjoining residential uses to a solar farm.” The appraiser, further concludes, that the finding of no diminution will be assured because the proposed project “will include a landscaped buffer to screen adjoining residential properties.”

The primary problem that characterizes this report as being non-credible is that this report is one dimensional not only in its methodology, but in its assumption that any finding of no diminution, no matter how it is established, can be applied to any other circumstance. In other words, just because a solar farm may not affect one market, does not mean that it will not affect every market. Also, the mere addition of a buffer is not the scenic equivalent to a natural view. Each solar farm and market are different, and the impact must be analyzed accordingly

The following chart summarizes the solar farms that this report has analyzed indicates the amount of diminution in value the report has documented. The chart also summarizes the credibility of each of the case studies in the professional opinion of this reviewer. It also lists the documented diminution in value analyzed by this office that was not recognized by the report being reviewed.

The reasons for finding these case studies not to be credible includes the following:

1. In many of the cases, the adjoining properties to the solar farm in question were not affected by proximity to the facility, on its face. The solar farm did not impact the utility of the property, either because of the distance, dense woodland screening, expectations of the market for a view, competing detrimental conditions, etc. In other words, it was disingenuous of the appraiser to include these examples, to justify there to be no diminution in value, when the rational observer would have concluded that on its face.
2. The methodology used by the appraiser was to take any unaffected adjoining property and compare it to seemingly random sales, whether they were comparable or not (many sales required adjustments beyond the acceptable gross limit of 25.0 percent, even approaching 50.0 percent or more) and upon a convoluted adjustment process declaring that they had been adjusted to indicate no damage.
3. This method of analysis is not only disingenuous, but it misrepresents the data and misleads the reader of the report.
4. The methodology corrupts the appraisal process with limited documentation, explanation and true analysis of the data. Merely making undocumented adjustments to comparable sales is not analysis.
5. This limited and haphazard method omits several layers of analysis that goes to the issue of market resistance which is necessary for a situation in which the data is scarce and the solar farm phenomena is relatively new. There is no discussion of numbers of listings, days on the market, rates of or lack of appreciation compared to the overall market, no residential market rental analysis, etc.
6. Rather than a random accumulation of paired sales throughout the United States without any documented analysis, a more relevant and meaningful method would be to **fully analyze** at least one (or more) solar farms with all the various methods available to appraisers. This would enable the appraiser to qualify the nuances of impact relative to a particular market, proximity to the solar farm, density of any natural buffer, direction and extent of the view, considerations of the decommission plan, nearby

KIRKLAND SOLAR CASE STUDIES

NO.	STATE	COUNTY	TOWN	ADDRESS	SOLAR FARM	ACRES	MW	DATE		VALUE CHANGE	AVERAGE	CLAY ANALYSIS
								ANN'CE	CONST			
KENTUCKY												
1	KY		Crittenden	Adjacent to I-75	Crittenden Solar	34.10	2.7		2017	-1.0% to -14.0%	-7.5%	
2	TN		Selmer		Mulberry	208.89	16.0		2014	Not Credible	NA	-30.0%
3	IL		Streator		Grand Ridge	160.00	20.0			Not Credible	NA	
4	IN		Portage		Portage	56.00	2.0		2012	Not Credible	NA	
5	IN		Indianapolis		Dominion Indy	134.00	8.6		2013	Not Credible	NA	
6	VA	Clark			Clark County	234.00	20.0		2017	Not Credible	NA	
7	VA		Barhamsville	Barham Road	Walker Correct.	484.65	20.0		2017	Not Credible	NA	
8	VA	Sussex			Sappony	332.68	30.0		2017	-3.0% to -6.0%	-4.5%	
9	VA	Spotsylvania	Paytes		Pleinmont	6,412.00	99.6	2019	2020	-2.9% to -9.0%	-5.5%	-30.0%
SOUTHEAST USA												
1	NC		Goldsboro		AM Best		5.0		NA	Not Credible	NA	
2	TN		Selmer	Spring Garden S/D	Mulberry	208.89	16.0		2014	Not Credible	NA	-30.0%
3	MD		Hughesville		Leonard Road	47.00	5.0		NA	Not Credible	NA	
4	NC		Gastonia	Neal Hawkins Rd	Neal Hawkins	NA	5.0		1017	Not Credible	NA	
5	NC	Currituck	Moyock	1374 Caritoke Hwy	Wildwood	2,034.00	80.0	2015		+2.0% to -18.0	-7.50%	
6	NC		Bailey		Tracy Solar	50.00	5.0		2016	Not Credible	NA	
7	FL		Parrish		Manatee	1,180.36	74.5			Not Credible	NA	
8	NC	Cabarrus	Midland	Mount Plaessant Rd	McBride Place	627.00	74.9	2017		Omitted Data	NA	-15.9%
9	NC	Gaston			Mariposa	87.61	5.0		2016	Not Credible	NA	
10	VA	Clark			Clark County	234.00	20.0		2017	Not Credible	NA	
11	GA		Social Circle	Hawkins Academy Rd	Simon	NA	30.0			Not Credible	NA	-30.0%
12	NC		Princeton	3839 US 70	Candace	NA	5.0		2016	Not Credible	NA	-13.0%
13	VA		Barhamsville	Barham Road	Walker Correct.	484.65	20.0		2017	Not Credible	NA	
14	NC		Hope Mills	Roslin Farm Road	Innovative 46	532.00	78.5		2016	Not Credible	NA	
15	NC		Fayetteville		Innovative 42	413.99	71.0		2017	Credible	3.0%	
16	NC		Willow Spring	Keenebeck Road	Sunfish Farm	49.60	6.4		2015	Credible	3.0%	
17	VA	Sussex			Sappony	332.68	30.0		2017	-3.0% to -6.0%	-4.5%	
18	NC		Camden			49.83	5.0		2019	Not Credible	NA	
19	NC		Grandy		Grandy	121.00	20.0		2019	Not Credible	NA	-15.5%
20	SC	Lexington			Champion	366.04	10.0		2017	Not Credible	NA	
21	FL		Barefoot Bay		Barefoot Bay	504.00	704.5		2018	Not Credible	NA	
22	FL		Miami		Miami-Dade	346.80	74.5		2019	Not Credible	-2.5%	
23	VA	Spotsylvania	Paytes		Pleinmont	6,412.00	99.6	2019	2020	-2.9 to -9.0%	-5.5%	-30.00%

detrimental conditions, etc. All these factors will result in diminution in value that will vary from location to location and solar farm to solar farm.

DISTANCE BETWEEN HOMES AND SOLAR PANELS (Page 112)

The appraiser “has measured distances at matched pairs as close as 105 feet between panel and home to show no impact on value.” This claim is not credible due to the unreliable matched pair analysis as described in the case study reviews.

TOPOGRAPHY (Page 112)

The appraiser claims that despite the elevation changes of the topography which impacts the viewshed, the adjacent solar farm, regardless of the resulting view would have no impact upon the corresponding value of the abutting property based on his study. However, because of the flaws numerated within the review of this report, the appraiser’s study is not credible and therefore, an unreliable predictor of a lack of diminution in value.

POTENTIAL IMPACTS DURING CONSTRUCTION (Page 112)

The appraiser has noted that he does not anticipate any impacts on property value due to construction on the site. Some solar farm construction has caused temporary damages for such things as erosion and flooding on adjacent properties. Notable examples are in Spotsylvania and Essex Counties in Virginia. These events were highly publicized and litigated.

SCOPE OF RESEARCH (Page 113)

It is remarkable, that this appraiser has worked in 19 states and has “research over 750 solar farms and sites on which solar farms are existing and proposed” and in every instance he concluded that solar farms have “no negative consequences.”

SPECIFIC FACTORS RELATED TO IMPACTS ON VALUE (Page 114 - 116)

The appraiser has determined, from his experience in completing Impact Studies “that the most common areas for impact on adjoining values follow a hierarchy with descending levels of potential impact” and he discussed them as they relate to solar farms.

1. Hazardous material: The appraiser states that, “a solar farm presents no potential hazardous waste byproducts as part of normal operation.”
2. Odor: “Solar farms produce no odor.”
3. Noise: “There is no negative impact associated with noise from a solar farm.”
4. Traffic: “The solar farm will have no onsite staff.”
5. Stigma: “There is no stigma associated with solar farms and people generally respond favorably towards such a use.”

Except for odor, solar farms do have the above detrimental conditions that the appraiser claims are not present. Dozens, if not hundreds of articles or studies document these conditions. A discussion of some of the hazardous considerations that was prepared by this office is included in the Addendum.

6. Appearance/Viewshed: "Larger solar farms...are a passive use of the land that is in keeping with a rural/residential area."

In this discussion, the appraiser compares "larger solar" farms with greenhouses and confined animal operations, and even single family dwellings claiming that their lower height profile limits their impact on the landscape. However, the appraiser fails to acknowledge the vast difference in area of land cover—a few thousand square feet compared to thousands of acres.

In addition, the appraiser diminishes the impact of utility scale solar farms on the viewshed by distorting the concept of a "protected view." The implication is that only properties opposite a "protect view" are entitled to the expectation of a scenic view. This is contrary to zoning, particularly in the agricultural sector where generally non-farm related uses are prohibited (commercial, industrial, multi-family). As described previous discussion of the view shed, the APA, specifically stated that industrial scale solar farms should not be sited in prime agricultural areas and other areas not compatible to such zoning.

CONCLUSION

Based on the **lack of any detrimental condition** associated with utility scale solar farms, the appraiser concluded that the industrial use within the agricultural sector will have no negative impact on adjoining property values.

Although the appraiser concedes that "the only impact of note is appearance," however, "setbacks and landscaping buffers" will address this issue. According to the appraiser, "the matched pair data supports that conclusion."

FINAL CONCLUSION OF REPORT UNDER REVIEW

The appraiser concludes that "the matched pair analysis shows no impact in home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land. Furthermore, it is his "professional opinion is that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting property."

CONCLUSION OF THE REPORT REVIEW

In addition to the inadequacy of the paired sales analysis to develop a credible conclusion that solar farms are not detrimental conditions and they have no adverse impact on adjacent property values, the report under review has omitted additional items of widely known evidence that contradicts the report's conclusion.

OMMISSION OF NEIGHBORHOOD AGREEMENTS

Richard Kirkland is not the only appraiser who has concluded that solar farms have no impact on value. The Solar Energy Industries Association (SEIA) published the following claim that "large-scale solar arrays often have no measurable impact on the value of adjacent properties, and in some cases many even have positive effects."³⁷ This publication also included the following quotes from **appraisers used by the solar developers**.

³⁷ SEIA, "Solar and Property Values, Correcting the Myth that Solar Harms Property Value," July, 2019, www.seia.org.

- A study conducted across Illinois determined that the value of properties within one mile increased by an average of 2 percent.³⁸
- An examination of 5 counties in Indiana indicated that upon completion of a solar farm, properties within 2 miles were an average of 2 percent more valuable compared to their value prior to installation.³⁹
- An appraisal study spanning from North Carolina to Tennessee shows that properties adjoining solar farms match the value of similar properties that do not adjoin solar farms within 1 percent.⁴⁰

These conclusions, however, are belied by the actions of appraiser's solar developer clients who have not only acquired, in fee, adjoining residential properties to their solar farms and resold them (North Star Solar Farm, North Branch, MN), but have paid nearby adjoining property owners a **"good neighbor" fee to refrain from objecting to their proposals**. The question is: if industrial-scale solar farms are benign and could possibly even enhance adjacent property values, then why is it necessary for solar developers to not only pay adjoining owners, but purchase their properties?

The first "Neighbor Agreement" from Wisconsin, offering \$17,000, is such an offer. This agreement applies to adjacent owners whose property abuts the proposed Western Mustang Solar, LLC project on two or more sides. The agreement binds the adjacent property owners "to cooperate with Western Mustang's development, construction and operation of the project."

By cooperation, the solar developer expects the property owner to "fully support" the developer's efforts to obtain any permits and approvals and to agree "not to oppose, in any way, whether directly or indirectly, any such application or approval at any administrative, judicial or legislative level."

In return for this "cooperation," the developer will pay the property owner a "signing payment" of **\$2,000.00** within 45 days after the effective date. In addition, within 45 days of vertical construction of the project, the developer will pay a one-time **additional payment of \$15,000**. The agreement is to remain confidential.

A second "Neighbor Agreement," was discussed in a November 23, 2020 article in *The Lima News* of Lima, Ohio. This article described the second public forum which was required by the Ohio Power Siting Board (OPSB) that approves or rejects the proposed 2,600.00 acre 300 MW Birch Solar Project. Lighthouse BP, the developer, stated that: "Landowners who are adjacent to the project will be offered anywhere from **\$5,000 to \$50,000**, depending on their closeness to the solar farm."

A third neighborhood agreement was recently issued by Posey Solar to the community of Posey County, Indiana. This agreement offered **"an upfront payment equal to 10% of appraised home value** for neighbors within 300 feet of the solar field. This is in

³⁸ Richard C. Kirkland, "Grandy Solar Impact Study," Kirkland Appraisals, February 25, 2016.

³⁹ Andrew Lines, "Property Impact Study: Solar Farms in Illinois," *Mcleancounty.gov*, Nexia International, August 8, 2018.

⁴⁰ Patricia McGarr, Property Value Impact Study, Cohn Reznick, LLP Valuation Advisory Services, May 2, 2018.

addition to the **annual \$1,000 payment (\$35,000 for project life)** during operations for those who would like to sign a Good Neighbor Agreement.

A copy of the Western Mustang Solar, LLC neighbor agreement is included in the Addendum.

OMMISSION OF NORTH STAR SOLAR BUY-OUT

The North Star solar facility is the example of a solar farm that resulted in the purchase and subsequent resale of adjoining properties. According to the Minnesota Public Utilities Commission in a February 4, 2021 email to this office:

At no time did the Minnesota Public Utilities Commission require the developer, North Star Solar LLC, to purchase any properties as part of the site permit application review process or as part of granting a site permit. A condition or requirement to purchase property is not something the Public Utilities Commission can require of an applicant/permittee. North Star Solar, LLC, on its own accord, offered purchase options to landowners within or near their proposed project boundary.

At the time of its completion, in December 2016, North Star Solar PV was the largest industrial scale plant in the Midwest. This 1,000.00 acre, 138 MW solar farm is in North Branch, Minnesota. It is notable that it cost the North Star developer \$627,000 more to acquire these properties than the price for which they were sold.

These four examples of voluntary payments to the surrounding property owners by the solar developer are significant because their own appraisers have determined that their proposed solar farms will have no adverse impact on adjacent property values. However, these neighbor agreements and purchases can only reasonably be interpreted as a **tacit admission of potential impairment**.

NORTH STAR SOLAR AS AN INDICATION OF VALUE DECLINE

Considering how few industrial scale facilities exist with enough time to experience sales, it is significant that the appraiser did not include the available sales data from the North Star Solar Farm in North Branch, Minnesota, as have other solar developer's appraisers. These appraisers determined that there was no indication of diminution in value.

This office analyzed this data and the results are included on the following chart, as well as a discussion in the Addendum.

The sales include 7 tracts that were surrounded by the solar farm that were purchased voluntarily by the developer at a premium and subsequently exposed to the market on the local multiple listing service and sold at market value. An analysis comparing the sale to the original owner and to the current owner indicate that the North Star solar farm has negatively impacted property values ranging from **-6.30 percent for -28.00 percent**, with a median decline of **-16.90 percent** and an average decline of **-16.80 percent**.

As indicated on the previous Kirkland Solar Case Studies Chart, the results of the North Star Analysis are consistent with the other analyses made by this office. The **current evidence** indicates that the **market** does consider utility-scale **solar farms** to be a

NORTH STAR SOLAR PV SALE/RESALE COMPARISON

SALE/ RESALE	PARCEL NO.	ADDRESS	SALE DATE	GRANTOR	GRANTEE	SALE PRICE	\$ CHANGE	% CHANGE	ANNUAL % CHNG	SALE TAX ASSESSMT	ACRES	COMMENTS
5	110072820	10132 367th Street	07/02/01	Corey Holcomb	Richard Daniels	\$226,800	NA	NA	NA	NA	9.308	2001 1,446 SF 3LS, 700 SF Fin Bsmt
5	110072820	10132 367th Street	09/23/16	Richard Daniels	CER Land, LLC	\$371,800	\$145,800	63.58	3.30	\$239,900	9.308	4BR-2.5B: SF at Rear & Front
5	110072820	10132 367th Street	10/20/17	CER Land, LLC	Tyler Winczewski	\$333,000	(\$38,800)	-10.44	NA	\$256,600	9.308	Time Adjustment from 7/3/01 Sale to 10/20/17, or 16.3 yrs. \$226,800/16.3 Yr/1.8% = \$303,352 28' x 50' Pole Barn Not Included. Constructed after 2001 Sale. 0%
6	110072830	10200 367th Street	10/27/04	Corey Holcomb	Thomas B. Hoch	\$309,000	NA	NA	NA	NA	9.300	2003 1,472 SF TL, 4BR-3.5B, Barn
6	110072830	10200 367th Street	07/27/16	Thomas B. Hoch	CER Land, LLC	\$387,900	\$78,900	25.53	4.71	\$262,800	9.300	Renov. 2009, SF at Front
6	110072830	10200 367th Street	11/28/17	CER Land, LLC	Mikael Koldste	\$320,100	(\$67,800)	-16.77	NA	\$281,200	9.300	Time Adjustment from 11/8/04 Sale to 11/18/17, or 13.0 Yrs. \$324,500/13.0 Yr/0.4% = \$341,785 \$341,560 v. \$320,100 = -6.3%
<p>Pole Barn was constructed in 2006 for \$15,500. 10/27/04 Sale Price is adjusted to \$324,500. 10/28/17 Sale Price was \$330,000 with seller paid amount of \$9,900, or \$320,100.</p>												
7	110052600	37206 Keystone	07/31/12	John M. Mosley	Kristine Anderson	\$212,000	NA	NA	NA	NA	20.110	1996 1,092 SF SE, 900 SF Fin. Bsmt
7	110052600	37206 Keystone	07/20/16	Kristine Jacobsen	CER Land, LLC	\$450,000	\$238,000	112.30	NA	\$258,000	20.110	4BR-2B, Det. Gar. w/Apt
7	110052600	37206 Keystone	06/15/17	CER Land, LLC	Todd R. Iverson	\$282,200	(\$167,800)	-37.3	NA	\$273,700	20.110	Time Adjustment from 6-4-13 Sale to 5-15-17, or 3.9 Yrs. \$212,000/3.9 Yr/8.6% = \$292,552 \$292,552 v. \$282,200 = -3.5%

Contract for Deed on 7/31/12 with Deed transfer on 6/4/13.

6/15/17 Sale Price was \$290,000 with seller paid amount of \$7,800, or \$282,200.

Total Purchase Price to CRE Land, LLC \$2,773,000
 Total Sales Price from CRE Land, LLC \$2,143,044
 Total Loss \$629,956
 -22.72%

detrimental condition and the following conclusions can be drawn. (The Rhode Island study also concludes that solar farms are a detrimental condition).

1. Unimproved residential lots without natural pre-existing barriers are damaged approximately **-30.0 percent**; and possibly more for sites for houses in excess of \$500,000. (Case Study No. 9 and 23 – Spotsylvania, VA)
2. Although there is only one example of a larger tract—the combined 16.2 and 20.0 acre tract at Social Circle Georgia. This tract also had no natural pre-existing screening and indicated a **-30.00 percent** damage. (Case Study 11)
3. Unimproved residential lots with some natural pre-existing screening, 300.00 foot setbacks and strict maintenance requirement are damaged **-15.0 percent**. (Case Study No. 19 – Grandy, NC)
4. Improved residential lots with some natural pre-existing screening indicate a range of diminution from -13.0 to -16.0 percent, or **-15.0 percent (R)**. (Case Study 8, Midland, NC and Case Study 12, Princeton, NC).

These results are consistent with the “Kentucky Environmental Damage Studies” prepared by this office that are included in the Addendum.

FINAL CONCLUSION

Because of the numerous reasons documented in the preceding analysis, the Kirkland Impact Study is not credible and is unreliable as the basis for decision making by the Kentucky Siting Board relative to property values and the siting of solar farms.

The alternative evidence presented by this office which supports a negative impact by solar farms on property value is more substantial than that presented by Kirkland. **This indicates the need for a more robust and comprehensive analysis of the effect of utility scale solar farms on property values prior to the approval of additional solar farms.**

With respect to the McCracken site in proximity to the Paducah Gaseous Diffusion Plant, **a specific damage study needs to be made of the area to determine if it has been negatively impacted by such proximity prior to any consideration for a solar farm.** If it can be classified as a “brownfield,” additional damage by the inclusion of a solar farm may be mitigated. However, a study is needed before this can be determined.

If you have any questions, or need further documentation, please call.

Sincerely,



Mary McClinton Clay, MAI

ADDENDUM

NEIGHBOR AGREEMENT

This Neighbor Agreement (the "Agreement") is made as of this ___ day of _____, 2020 (the "Effective Date"), by and between **WESTERN MUSTANG SOLAR, LLC**, a Delaware limited liability company ("Western Mustang") and *****

RECITALS

A. Owner owns the residential property located at ****, identified by Parcel Identification Number 000000000 (the "Property").

B. Western Mustang intends to study, develop and use certain property identified by Parcel Identification Number 00000000000 (the "Project Property"), which Project Property is adjacent to the Property, for a solar project (collectively, the "Project").

C. Owner has agreed to cooperate with Western Mustang's development, construction, and operation of the Project in accordance with the terms and conditions set forth herein.

D. The Owner is eligible for this Agreement because Western Mustang, LLC has determined that the Project Property is located on two or more sides of the Owner's residential Property.

AGREEMENT

NOW, THEREFORE, the parties agree as follows:

1. Cooperation. Owner shall fully support and cooperate with Western Mustang's development, construction, and operation of the Project, including in Western Mustang's efforts to obtain from any governmental authority or any other person or entity any environmental impact review, permit, entitlement, approval, authorization, or other rights necessary or convenient in connection with the Project. Without limiting the generality of the foregoing, in connection with any application by Western Mustang for a governmental permit, approval, authorization, entitlement or other consent related to the Project, Owner agrees not to oppose, in any way, whether directly or indirectly, any such application or approval at any administrative, judicial, or legislative level.

2. Consideration. All terms in this Section 2 shall be subject to Owner complying with this Agreement. Western Mustang shall pay Owner a signing payment of Two Thousand and 00/100 Dollars (\$2,000.00) within 45 days after the Effective Date. Within 45 days of the date when Western Mustang begins construction of vertical improvements for the Project and is diligently pursuing construction of the Project (such date being the "Construction Commencement Date"), Western Mustang shall pay Owner a one-time additional payment of Fifteen Thousand Dollars and 00/100 (\$15,000.00).

3. **Merger.** This Agreement, including any exhibits attached hereto, contains the entire agreement between the parties in connection with any matter mentioned or contemplated herein, and all prior or contemporaneous proposals, agreements, understandings and representations, whether oral or written, are merged herein and superseded hereby. No modification, waiver, amendment, discharge or change of this Agreement shall be valid unless the same is in writing and signed by the party against whom the enforcement thereof is sought

4. **Confidentiality.** Owner shall hold in confidence all information related to this Agreement and the Project (collectively, the "Confidential Information"). Owner shall not use any such Confidential Information for its own benefit, publish or otherwise disclose such Confidential Information to others, or permit the use of such Confidential Information by others for their benefit or to the detriment of Western Mustang. Owner may disclose Confidential Information to brokers, accountants and attorneys so long as such parties agree to not disclose the Confidential Information.

5. **Attorney's Fees and Costs.** Each party shall be responsible for their own costs and attorneys' fees in the event there is a dispute over this Agreement.

6. **Governing Law.** This Agreement shall be governed and construed in accordance with the laws of the State of Wisconsin.

7. **Counterparts.** It is anticipated that this Agreement will be executed in counterparts. This Agreement will, therefore, be binding upon each of the undersigned upon delivery to counsel for the parties of two or more counterparts bearing all required signatures.

8. **Successors and Assigns.** All provisions of this Agreement shall be binding upon and inure to the benefit of Western Mustang and Owner, and their respective successors, assigns, heirs, and personal representatives. Western Mustang may freely assign its rights and obligations under this Agreement without Owner's prior written consent; provided, however, that any such assignee is an owner or operator of the Project.

(Signatures on following page)

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed and delivered by their duly authorized representatives as of the Effective Date.

WESTERN MUSTANG:

WESTERN MUSTANG SOLAR, LLC, a
Delaware limited liability company

By: _____

Printed Name: _____

Title:

OWNER:

By: _____

Printed Name: *****

EVIDENCE OF DETRIMENTAL CONDITIONS FROM THE MARKET

CONTAMINANTS

The solar panels contain toxic materials such as cadmium telluride, lead and chromium and other toxic materials. Among the problems with such toxins, is that most solar panels are manufactured in China, where the manufacturing process is beyond the United States' control and the panel composition is often unknown. Moreover, current zoning applications do not require that the solar developer identify the source of the panels or the model number.

Cadmium Telluride: Cadmium is used in solar panels to absorb and convert sunlight into electricity. Cadmium is a heavy metal often associated with lead poisoning and birth defects. Neighbors adjoining Strata Solar's proposed 1,632 acre project in Lancaster County, Virginia are concerned that, "if damaged, solar panel runoff could include the toxins of Teflon, cadmium and more and seep into the land, as well as Lancaster Creek."¹

"In the Spotsylvania case, Concerned Citizens of Spotsylvania County, an opposer of the 500-megawatt solar farm project, has claimed that the solar panels contain cadmium telluride that could leak out and contaminate groundwater supplies." Typical of the solar lobby's reaction to citizen's group, they respond that, "The claim is a lie. Cadmium telluride is a non-soluble black crystalline powder. The Spotsylvania group is apparently repeating information it has received from climate-denying organizations supported by the Koch Brothers."²

GenX: Among the most concerning contaminants in solar panels is GenX. According to a DuPont marketing publication:

DuPont Teflon fluoropolymer films are ideal as protective font sheets for solar modules because they have a unique

¹ "Potential solar farm raises more concern," *Northern Neck News*, January 30, 2020.

² <https://www.resilience.org/stories/2019-03-13/What-Happens-When-Communities-Say-No-to-Solar-and-Wind/>

balance of properties. They are smooth, flexible, lightweight, and long lasting with superior power output. Teflon films also have proven performance in both solar thermal and **photovoltaic (PV) applications**, offering a preferred, technologically advance alternative to traditional glass.”³

This contaminant was first identified in 2015 in the Cape Fear River downstream from a DuPont chemical plant, the Fayetteville Works, where it had polluted drinking water supplies and private wells. According to an EPA physical scientist, Dr. Mark J. Strynar, “GenX technically is not a chemical but rather a chemical process. The GenX process produces two PFAS (perfluorinated alkylated substances) compounds commonly referred to as FRD903 and FRD 902...and the GenX chemicals are included in the broad classification of PFAS compounds.”⁴ According to the EPA, “PFASs (which include GenX precursors PFOA and PFOS and the GenX chemical) are in a class of man-made chemicals not found naturally in the environment... Both chemicals are very persistent in the environment and in the human body when exposure occurs... The long-term health effects of chemicals related to the GenX process in humans is unknow, but studies submitted to the EPA by DuPont from 2006 to 2013 show that it caused tumors and reproductive problems in lab animals.”⁵ Dr. Strynar has confirmed that certain PFASs are used in the production of solar panels by documenting 39 records from the SciFinder database used by the EPA to identify applications of PFAS with solar panels. Dr. Strynar has concluded that solar panels have the capacity to be sources of PFAS.

Reportedly, PFAS leach out continuously over their life. Among the drawbacks of the toughness of PFAS is that the chemical degrades slowly, if at all, once it is released into the environment. It is also unaffected by most drinking water treatment. In 2017, the Cape Fear Public Water Utility Authority filed a federal lawsuit against DuPont and Chemours for polluting water, river sediments, soil and air.⁶

³ DuPont, “DuPont Teflon Films for Photovoltaic Modules: Lightweight, Long Lasting, Flexible Films Offer Greater Power Output;” December 2006.

⁴ Donna, King, “Solar panels could be a source of GenX and other perflourinated contaminants; Environmental group has revealed PFAS contamination in 11 counties in N.C.,” North State Journal, February 19, 2018.

⁵ Ibid.

⁶Catherine Clabby, “Local Scientists Uncovered Cape Fear GenX Story,” *NC Health News*, October 18, 2017.

One of the first to raise concerns about GenX in solar panels was with state Utilities Commissions were the neighbors opposing the industrial-scale Wilkinson Solar Plant in Beaufort County. They expressed “concerns about toxic chemicals, fluids, and substances leaking into the soil and groundwater as solar installations age and deteriorate or suffer damage from windstorms or other disasters.”⁷

In addition to citizen concern, “Donald van der Vaart, former secretary of the N.C. Department of Environmental Quality, who holds a doctorate in chemical engineering, sees reasons for concern given North Carolina’s more than 7,500 solar installations. ‘North Carolina’s solar power capacity is now the second highest in the nation. **EPA researchers recognize that solar panels may be a source of GenX compounds...**I would expect Duke Energy and the Public Utilities Commission would want to see test results to protect them from future liability.”⁸

“Noting that GenX ‘may present an unreasonable risk of injury to human health and the environment,’ EPA requires that the company keep 99 percent of the potential pollutants from entering the environment.”⁹

On February 14, 2019, the EPA unveiled the Agency’s Per- and Polyfluoroalkyl Substances (PFAS) Action Plan to identify, monitor and define clean up strategies for these substances. **The action plan is the most comprehensive cross-agency plan to address an emerging chemical of concern ever undertaken by the EPA.**¹⁰

Subsequently, On February 26, 2020, the EPA (U.S. Environmental Protection Agency) issued an update on the Action Plan. Listed among the key highlights from the past year include:

⁷ Dan Way, “EPA confirms GenX-related compounds used in solar panels,” *CJ Exclusives*, August 27, 2018.

⁸ Ibid.

⁹ Vaughn Hagerty, “Chemours vows to reduce pollutants, but concern persist downstream,” *Carolina Public Press*, January 5, 2018 newsobserver.com.

¹⁰ U.S. Environmental Protection Agency News Release, February 26, 2020, “EPA Releases Action Plan: Program Update.”

- On February 20, 2020, EPA issued a supplemental proposal to ensure that new uses of certain persistent long-chain PFAS chemicals in surface coatings cannot be manufactured or imported into the United States without notification and review under TSCA
- On November 22, 2019, EPA announced availability for \$4.8 million in funding for new research on managing PFAS in agriculture.¹¹

Solar farms with their thousands or millions of solar panels are of concern to the EPA because they concentrate the PFAS source in a relatively small area. In other words, a single panel may not be a problem, but a large collection of them changes the equation.

Zinc: Many solar panels are supported by galvanized steel platforms. The steel oxidizes over time and releases zinc into the soil, which can be toxic to plants at certain levels. Zinc is also detrimental to micro-organisms in the soil. Therefore, the impact of zinc is on and below the surface of the soil compounding the poor prospects of potential future reclamation of the land.

EROSION

One of the most dramatic examples of erosion is the result of the construction of a 500 MW SEGPS on 6,300 acres in Spotsylvania County, Virginia by sPower. Michael O'Brier, whose property has been impacted by the project was cited in one of the project's zoning violations. According to Mr. O'Brier, "it's been a war zone." Impacts from construction of the project range from muddy runoff streaming through his property to having portable toilets placed across his property line by the developers get submerged in muddy water after a rain storm.¹²

As a result of the damage to Mr. O'Brier's farm the solar developer, Sustainable Property Holdings, LLC, purchased his 3.00 acre property on June 8, 2020 for \$460,000.

¹¹ Ibid.

¹² Mark Hand, "Solar Farm's Construction Upsets Spotsylvania Residents: Report," *Patch*, January 29, 2020.

The assessed value at the time of sale, according to the deed, was \$231,200. The tax map parcel number is 17-2-10A and the transaction is recorded Instrument #200011260.

Soil scientists note that “the data shows that **solar panels ‘channelize water,’** causing it to leave the site faster, and infiltrate neighboring properties. Some farmers have confirmed their fields became wetter than before the placement of a nearby solar facility, and they were having difficulty getting in to till their land to prepare it for the growing season.”¹³

Tree removal results in barren land whose topsoil is removed and compacted, along with frequent mowing to control vegetation compacts the soil and leads to the soil being resistant to absorbing water.

¹³ Dan Way, “Big solar farms may be stressing agricultural ecosystem,” <https://carolinajournal.com/news-article/>, May 25, 2017.

NORTH STAR SOLAR PV CASE STUDY – SALE-RESALES ANALYSIS

The North Star SPGPS is the example of such a facility that required the purchase and subsequent resale of adjoining properties.

At the time of its completion, in December 2016, North Star Solar PV was the largest SEGPS in the Midwest. This 1,000.00 acre, 138 MW facility is in North Branch, Minnesota. As a result of pressure from property owners who abutted at least three sides of the SEGPS, the developer purchased their seven properties and subsequently resold them. The following charts summarize the sale-resales data of these seven properties.¹ A map depicting these properties follows and is followed by a map depicting the solar farm.

The chart depicting the seven sales purchased and resold by the developer, CER Land, LLC, for deed transfer purposes, includes three transfers for each property. The first deed represents the sale to the original property owner, which is an arms-length or market sale because it meets the definition of market value.² The second sale is from the original owner to CER Land, LLC. This is not considered a market value sale because it does not meet the definition of market value, primarily because it was negotiated under duress. The third sale is from the developer to a new owner (except for Sale-resale No. 1 which was sold back to the original owner). The third sale is a market value sale because, except for No. 1, the sales were adequately exposed to the market having been placed on the local Multiple Listing Service prior to the last sale.

¹ The sales data was obtained from county records, MLS data, and information present to the Minnesota Public Utilities Commission on March 15, 2016 regarding the resolution of the negotiations with landowners.

² Definition of Market or Arms-length Sale: A transaction between unrelated parties who are each acting in his or her own best interest. *The Dictionary of Real Estate Appraisal*, 5th ed., s.v. "arms-length transaction."
Definition of Market Value: The most probable price that the specified property interest should sell for in a competitive market after a reasonable exposure time, as of a specified date, in cash, or in terms equivalent to cash, under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, for self-interest and assuming that neither is under duress. *The Dictionary of Real Estate Appraisal*, 5th ed., s.v. "market value."

Because the first and third sale for each property are market value sales, it is possible to apply the sale-resale methodology to these sales to determine if they indicate a “before and after” change in value. The first sale represents a sale that occurred before any knowledge of the solar development existed, while the third sale occurred after construction of the facility. Generally, the only difference between the two sales is time, also referred to as market condition.

In order to compare the two sales, an adjustment must be made to the older sale to bring it up to the value level of the second sale. This is done by making a time adjustment based on supporting data from the market. The following chart represents the annual median and average sale price for houses in North Branch and Chisago County.³ The median sale price for North Branch, specifically, was judged to be the most relevant of the two sources since it does not include the extreme values.

This data was used to calculate the compound rate of increase from the date of the first sale to the second sale and then increase the first sale by the indicated rate. After this adjustment is made, then the adjusted sale price of the first sale can be compared to the sale price of the third sale. A difference in the two sale prices will indicate if there is a diminution in value as a result of the construction of the SEGPS.

Description of the Sales Chart

For ease of comparing the sales data at once, the North Star sales are depicted on the North Star Solar Farm Sale-resale Comparison Chart. The following describes each column of the chart.

Sale-resale: This column identifies the 7 transactions that involved the developer of North Star.

Parcel No.: This is the Chisago County Tax Assessors identifying number of the property.

³ The time adjustment chart was prepared by David Abbot, a statistician with the Minneapolis Area Board of Realtors.

Address: This is the street address of the property being analyzed.

Sale Date: This is the date that the deed was transferred, i.e. the date on the deed.

This date is not to be confused with the date that the deed was recorded, which is sometimes a few days later.

Grantor: This is the seller of the property.

Grantee: This is the buyer of the property.

Net Sale Price: The net sale price is the gross sale price less any money paid by the seller that was applied to reduce the sale price. If the sale price includes any seller paid amount, it will be described in the note after the property transactions.

\$ Change: This is the dollar amount difference between the first and second sale, as well as the dollar amount difference between the second and third sale.

% Change: This is the percentage difference between the first and second sale, as well as the percentage difference between the second and third sale.

Annual % Change: This is the annualized rate of change between the first and second sale.

Sale Tax Assessment: This is the property tax assessment of the property as of the date of sale.

Comments: The comments include a description of the property in the following order: date of construction; square footage above ground level; architectural design (3 or 4 level split, 1-story, tri-level, split entry); basement square footage of finish; number of bedrooms and baths; location of solar farm, i.e. rear and front.

Also, under comments, the time adjustment is made from the date of the first sale to the date of the third sale. This includes calculating the number of years between the two sales and determining the rate or percentage change between these two years based on the North Branch median sale price chart. After the number of years is determined and the rate of increase between that time, these numbers are applied to the first sale price which adjusts it

the level of the third sale price. In other words, this indicates, in the first example, that the value of the \$216,000 sale price in 7.9 years increased at 6.8 percent, is \$364,296.

Sale-Resale Analysis

The following is a discussion of the results of each of the seven properties with the first sale adjusted for time from its sale date to the date of the third sale and the resulting comparison of the two sales, adjusted for time, to determine if there is a change in value.

Regarding Sale-Resale No. 1, Scott Dornbusch not only sold his property to CER Land, LLC, for \$360,000, but he bought it back for \$302,500. However, with respect to the comparison between the first sale price, increased for time, to the date of the third sale, this example indicates a **diminution in value of -17.0 percent**. Although this sale-resale is not arms-length, it is nonetheless, consistent with the other 6 arms-length sales. Because this sale was repurchased by the same individual, it is reasonable that his prior invested interest in the property would indicate this to be a minimal indication of value loss.

Sale-resale No. 2 is the property on the south side of 367th surrounded on three sides by the solar plant. The rear 6.24 acres of this property was encumbered by a 30 year lease to North Star Solar PV, LLC at a rate of \$1,000 per year to be increased at 1.0 percent annually. This example represents a highest rate of **decline in value of -28.0 percent**. The most predominant rate of decrease is -17.00 percent (Sale/resales No. 1, No. 3, and No. 4), which suggests that this encumbrance would add an additional -11.00 percent, despite that it contributes an annual income stream of \$12,000.

Sale-resale No. 3 represent an original sale that occurred in 2000 that was extensively renovated, subsequent to that sale, with the additional construction of a pole barn. The seller indicated that the cost of such improvements was approximately \$100,000. Adjusted for these improvements, this sale-resale **indicates -16.0 percent diminution in value**.

Sale-resale No. 4 is at the corner of Keystone Avenue and represents a **diminution in value of -12.9 percent**.

Sale-resale No. 5 **does not indicate a decrease in value** between the original sale and the second resale. However, the sale price does not reflect the addition of a pole barn in the estimates. According to reports from the Chisago County Assessor's office more than one purchaser indicated that they did not consider the solar plant to be detrimental—in fact, they preferred this industrial use to having neighbors.

Sale-resale No. 6 **indicates a -6.3 percent diminution in value.**

Sale-resale No. 7 is the largest property among this group on the west side of Keystone Avenue. This example indicates a **diminution in value of -3.5 percent.** The original purchaser reported that the last purchaser stated that, "he did not want neighbors."

The sale-resales indicate a range of diminution in value from 0 to -28.0 percent, or an average of -12.5 percent and a median of -15.9 percent. **The median of -15.9 percent diminution in value is consistent with the indication from the Madison County Indiana case study with a -16.43 percent value decline.**

It is notable that CER Land, LLC purchased the seven properties for a total of \$2,773,000 and sold them for \$2,143,044. This represents a loss of -\$629,956, or -22.72 percent.

MARY MCCLINTON CLAY, MAI
218 Main Street
Paris, Kentucky 40361
859-987-5698

KENTUCKY ENVIRONMENTAL DAMAGE STUDIES

In the event that there is insufficient sales data within a subject area to extract an indication of diminution of value as a result of a specific detrimental condition, it is acceptable appraisal methodology to use another location with sufficient data or a similar detrimental condition with similar diminution upon utility as a proxy for the subject area or detrimental condition.

The following summary of environmental damage studies conducted by this office include the following detrimental conditions: ground water contamination by tannery sludge; animal odors; leaking underground storage tanks; cell tower and transmission line easements; and fugitive particulate emissions (dust).

GROUND WATER CONTAMINATION

The ground water contamination study was prepared for the plaintiffs in *Yellow Creek Concerned Citizens v. Middlesboro Tannery*. This study estimated the effect of tannery contamination on 350 properties along Yellow Creek, in Bell County. This study was conducted after city water had replaced well water in the affected watershed. The analysis compared affected sales along Yellow Creek and associated Williams Creek with three creeks upstream that were not contaminated. The multiple regression analysis found that there was residual diminution in value of **-16.5 percent** for improved properties and **-22.00 percent** for unimproved land.

ANIMAL ODORS

A damage study prepared for the case *James E. Sullivan, et al v. Board of Regents, et al* estimated the effect of an animal waste fermentation project at the Organic Pasteurization

Plant at North Farm of Murray State University on Sullivan's Executive Par 3 Golf Course and Sports Center and on-site residential improvements in Murray. An income analysis of the golf course before and after the construction of the "manure cooker" indicated that the golf course was damaged 28.00 percent. Based paired sales analysis of dwellings within proximity to chicken houses, it was estimated that the two residential improvements had diminution in value from **-21.0 to -28.0 percent**.

Two studies in western Kentucky measure the effect of hog barns on proximate vacant land and residential properties. The first study estimated the damage of hog barns on residential properties in five western Kentucky counties including Calloway, Graves, Carlisle/Hickman, Warren and Davies. Sales data to within 2.00 miles of hog barns were analyzed using matched pairs. The study indicated that vacant land values within one mile of a hog barn diminished approximately 40.0 percent, while improved properties declined between 26.7 and 11.00 percent depending on their proximity to the barn. This study was prepared for the case of *Gene Nettles, et al v. Environmental and Public Protection Cabinet; Division of Water, David Morgan, Director, and J.P. Amberg Hog Farm*.

The second study was prepared for the case *Terry Powell, et al v. Tosh, et al*. This study estimated the diminution of value as a result of proximity to 5,000 hog confined animal feeding operations (CAFOs) in Marshall County. The results of the paired sales study were that improved properties adjacent to or within approximately 0.25 miles to hog farms are damaged approximately **-50.0 percent**. Properties from approximately 0.5 mile to 1.25 miles are damaged **-25.0 percent**. Farms beyond 1.25 miles to 1.5 miles and/or those adjacent to agricultural fields that may experience routine manure spreading are damaged approximately **-10.0 to -12.0 percent**. Vacant land was damaged **-40.0 percent**.

LEAKING UNDERGROUND GASOLINE STORAGE TANKS

This study was prepared for the case *Terrence G. Kerschner, et al v. Burley Oil Company, et al*. The study estimated the effect of leaking underground gasoline storage

tanks on Country Lane Estates in Frankfort and, specifically, on a residence where the petroleum surfaced. The results of this study was that the property most affected by the leak was damaged **-100.0 percent**, with adjoining properties damaged **-50.0 percent** and the remaining properties within the subdivision were damaged **-20.0 percent**.

CELL TOWERS AND HIGH VOLTAGE TRANSMISSION LINES

The overhead transmission line study was prepared for the case *Kentucky Utilities Company v. James and Mary Jent, CDH Preserve, LLC and Farm Credit Services of Mid-America, FLC, Violet Monroe* and estimated the effect of High Voltage Transmission Lines on three Hardin County agricultural properties. The study was later expanded to include cell towers in a Bourbon County property division dispute.

The paired sales analysis indicated a range of diminution in value as a result of the encumbrance of high voltage transmission lines (HVTL) on agricultural properties. The amount of damage is the result of the degree to which HVTL impact the utility and degree of trespass upon the bundle of rights. The study indicated a range of diminution in value from minimal impact of **-12.0 percent** to a **maximum of -50.0 percent** depending on the placement of the easement within the property.

The study also indicated buyer resistance to lots impacted by HVTL. Two subdivisions in the same area were analyzed—one with and one without the encumbrance. The subdivision without the easement consists of 14 lots that sold from 2005 until 2011, with the absorption rate of 2 lots per year. The other is significantly encumbered by the transmission line. This subdivision consists of 16 lots of which only 6 have sold from 2007 to 2011, or 1.2 lots per year. The transmission line diagonally traverses the remaining lots, which had yet to sell when the study was conducted in 2012.

With respect to the effect of cell towers on agricultural property a paired sales analysis was made between two farms on opposite sides of the road in Bourbon County. The

analysis indicated a **-24.28 percent** damage to the farm. The comparison indicates buyer resistance and damage as a result of proximity to vertical structures similar to HVTL.

FUGITIVE PARTICULATE EMISSIONS

This study examined the condition of Claremont Acres, a single-family residential subdivision in the closest proximity to the Louisville Gas and Electric Plant (LG & E) at 5252 Cane Run Road in western Louisville. This four street subdivision was developed in the late 1960s and consists of predominantly 1,000 square foot masonry ranch houses with detached garages. The subdivision abuts a single row of dwellings which front along Cane Run Road on the south side of the street opposite the LG & E facility. The properties suffered from air borne dust contamination from coal ash landfills that were expanded in 2010. The most affected properties were 300 feet southeast of the ash pond, 2,500 feet from the ash landfill, and 3,000 feet from the stacks. The Claremore Acres properties that suffered from the dust, which the EPA tested were 0.31 to 0.45 miles from the Cane Run generating plant.

The study documented an **overall diminution in value of -25.8 percent for properties within approximately 0.50 mile of the source of the detrimental condition.**

PROXIMITY TO REGIONAL AIRPORT

This study of a Kentucky regional general aviation airport was prepared for the case, *Mary Williams v. Henderson City-County Airport Board*. The study examined three 5.00 acre residential subdivisions in the vicinity of the Georgetown-Scott County Regional Airport. The control subdivision was 1.75 miles southwest of the runway. The two impacted subdivisions were within 0.33 and 0.50 miles northwest of the runway.

The study indicated a **diminution of -20.5 percent as a result of being within 0.5 mile west of the beginning of the Runway Protective Zone (RPZ) and diminution of -20.18 percent for lots abutting the RPZ from approximately the mid-point to the end. Lots within the RPZ indicated a diminution of -50.15 percent.**

CERTIFICATION

The undersigned does hereby certify that, except as otherwise noted in this appraisal report.

To the best of my knowledge and belief, the statements of facts contained in this appraisal report are true and correct.

The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and are my personal, impartial, and unbiased professional analyses, opinions and conclusions.

I have no present or prospective interest in the property, that is the subject of the work under review, and I have no personal interest with respect to the parties involved.

I have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of the work under review within the three-year period immediately preceding acceptance of this assignment.

My engagement in this assignment was not contingent upon developing or reporting predetermined results.

My compensation for completing this assignment is not contingent upon the development or reporting of predetermined assignment results or assignment results that favors the cause of the client, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal review.

My analysis, opinions, and conclusions were developed and this review report was prepared in conformity with the *Uniform Standards of Professional Appraisal Practice*.

I have not made a personal inspection of the subject of the work under review.

No one provided significant appraisal or appraisal review assistance to the person signing this certification.



Mary McClinton Clay, MAI

August 11, 2021

STATEMENT OF LIMITING CONDITIONS

1. No liability is assumed an account of matters of legal character affecting the property such as title defects, liens, encroachments, overlapping boundaries, etc.
2. No survey was made of the property.
3. Value is reported in dollars on the basis of the current prevailing market on the date of appraisal. The current purchasing power of the dollar is the basis for the value reported.
4. The distribution of the total valuation between land and the improvements applies only under the existing program of utilization and conditions stated in this report. The separate valuations for land and building must not be used in conjunction with any other appraisal and is invalidated under the programs of utilization of conditions, or if used in making the summation appraisal.
5. Possession of this report or copy thereof does not carry with it the right to publication nor may it be used for any purpose by any but the applicant without the previous written consent of the appraiser(s), and in any event, only in its entirety.
6. The information contained in this report, gathered from reliable sources, and opinion is furnished by others, were considered correct, however, no responsibility is assumed as to the accuracy thereof.
7. The appraiser(s) is not required to give testimony in court with reference to the subject property unless further arrangements are made.
8. No liability is assumed for subsoil conditions which would adversely affect construction.
9. "The American Institute of Real Estate Appraisers conducts a voluntary program of continuing education for its designated members. MAI's who meet the minimum standards of this program are awarded periodic education certification." Mary McClinton Clay, MAI has completed this program.
10. Environmental Disclaimer: The values estimated in this damage study is based on the assumption that the property is negatively affected by the existence of detrimental environmental conditions as described within the report. The appraiser is not an expert in the identification of hazardous substance and detrimental environmental conditions. The appraiser's routine inspection of and inquiries about the subject property established the basis for the analysis of the market reaction to the detrimental conditions reported by the owner and neighbors. It is possible that test and inspection made by a qualified hazardous substance and environmental expert would reveal, qualify and quantify the existence of hazardous materials and environmental conditions on or around the property that would negatively affect its value.

MARY MCCLINTON CLAY
PROFESSIONAL QUALIFICATIONS

Mary McClinton Clay, MAI
218 Main Street, Paris, KY 40361
859-987-5698/Cell: 859-707-5575
mclayky@bellsouth.net

Market Area: Commonwealth of Kentucky

Primary Practice Focus: Litigation and zoning support with an emphasis on damage studies, including environmental and eminent domain.

Appraisal Experience:

1985 to Present: Self-employed - engaged in commercial, industrial and farm valuation.
1979-1984: Employed by Realty Research - engaged primarily in income property appraisal.
1976-1979: Residential appraisal experience with fee appraisers.

Previous assignments include: Eastern State Hospital; Gateway Shopping Center; Lakeside Heights Nursing Home, N. KY; L&N Office Building, Louisville; Alltech Biotechnology Center, Nicholasville, Paris Stockyards; Conrad Chevrolet, Lexington; CSX Rail Yards in Mt. Sterling and Paris; First Baptist Church, Cold Spring; Lusk-McFarland Funeral Home, Paris; Feasibility Study of proposed Hamburg Place Office/Industrial Park, Lexington; Rent Analysis of IRS Service Center, Covington; Surtech Coating, Nicholasville; Clem Refrigerated Warehouse, Lexington; Bluegrass Manufacturing, Lexington; Finley Adhesives, Louisville; Central Manufacturing and Central Light Alloy, Paris; Review Appraisal of Rand McNally Plant, Versailles and Timberland Distribution, Danville; Old Scott County Jail; Millspring Battlefield; Truck Terminals, Fast Food Restaurants, Retail Centers, Lumber Mills, Car Wash, Multi-Family Residential, Mobile Home Parks, Convenient Stores and Subdivision Analyses.

Thoroughbred Horse Farms including Pin Oak Farm, Bunker Hunt Farms, Pillar Stud Farms, Elmendorf Farm, Summer Wind Farm, Hidaway Farm, Stoner Creek Stud, Runnymede Farm, Wilshire Farm, Lynnwood Farms, Stonereath Farm, Idle Hour Farm, Canefield Farm, Elk Creek Farm, Lochness Farm, Stoneleigh Farm, Elizabeth Station Farm.

Right of Way Experience: Rose Street Extension, Lexington, 1986-87; AA Highway: Greenup Co., 1989, Carter Co., 1990-91; U.S. 27 Campbell Co. 1991-1992, 1993; Bridge Realignment, Walton, 1992; Industry Rd, Louisville, 1993; 19th St. Bridge, Covington, 1994; U.S. 27, Alexandria, 1994; S. Main St., London, 1995; Paris Pike, Paris and Bourbon County, 1995-98; KY Hwy 22 at I-75, Dry Ridge, 1996; Bridge Projects on KY Hwy 19, Whitley County, 1997; US 150, Danville, 1998; US 460 Morgan Co., 1999; US 62 South, Georgetown, 2000; Bluegrass Pkwy and KY 27 Interchange, Anderson Co., 2001; KY 519, Rowan County, 2002; US 641, Crittenden County, 2005; US 25, Madison County, 2008-09; US 68, Bourbon County, 2009-10; Clark County, 2011; US 68 Millersburg By-pass, Bourbon County, 2012-13; US 119, Bell County, 2014-15; US 25, Madison County, 2016-17; Excess Land, Georgetown By-pass, 2020; Access Break, Industrial Drive, Lebanon, 2020.

Railroad Right of Way Experience: CSX in Floyd, Perry, Clark, Woodford, Franklin, Montgomery, Johnson, Magoffin, Breathitt, Fayette, Madison, Mason, and Bourbon Counties, 1987-2016.

Rails to Trails: Rowan County, 2005; Montgomery County, 2009, Franklin County, 2014; Floyd County, 2016.

MARY MCCLINTON CLAY
PROFESSIONAL QUALIFICATIONS

Environmental Damage Studies: *Yellow Creek Concerned Citizens v. Middlesboro Tannery*: effect of tannery contamination on 350 properties along Yellow Creek, Bell County, KY, 1988; *James E. Sullivan, et al v. Board of Regents, et al*: effect of Animal Waste Fermentation Project at the Organic Pasteurization Plant at North Farm of Murray State University on Sullivan's Executive Par 3 Golf Course and Sports Center, Murray, KY, 2003; West Farm Subdivision, Pulaski County: effect of contamination of groundwater from underground storage of dry cleaning solvents on residential lot values, 2004; *Gene Nettles, et al v. Environmental and Public Protection Cabinet: Division of Water, David Morgan, Director and J.P. Amberg Hog Farm*: Diminution of Value Analysis As a Result of Proximity to Hog Facilities in Daviess, Warren, Calloway, Graves, Hickman and Carlisle Counties, Kentucky, 2006; *Terry Powell, et al v. Tosh, et al*: Diminution of Value Analysis as a Result of Proximity to Hog CAFOs in Marshall County, KY, 2007; *City of Versailles v. Prichard Farm Partnership, Ltd.*: effect of sewage treatment pump station and ancillary easements upon Woodford County cattle farm, 2008; *Kentucky Utilities Company v. James and Mary Jent, CDH Preserve, LLC and Farm Credit Services of Mid-America, FLC, Violet Monroe*: the effect of High Voltage Transmission Lines on three Hardin County agricultural properties, 2011; *Terrence G. Kerschner, et al v. Burley Oil Company, et al*: the effect of Leaking Underground Gasoline Tanks on Country Lane Estates, Frankfort, KY, 2013; *Jerry Whitson v. Donnie Cross*: effect of Drainage Encroachment upon Adjacent Property, 2013; the effect of Cell Tower on Bourbon County Farm, 2014; *Steve D. Hubbard v. Prestress Services Industries, LLC*: effect of Fugitive Particulate Emissions upon a Single Family Dwelling, 2016; *Henderson City-County Airport v. Mary Janet Williams, et. al.*: the effect of Proximity of a Regional General Aviation Airport on Agricultural Values, 2019; *Patricia Kushino, et al v. Federal Aviation Administration, et al*: the effect of Stormwater Drainage on Woodland Value, 2021.

Additional Damage Studies:

Faulty Construction: 172 Post Oak Road, Paris, KY; 152 Cross Creek Drive, Paris, KY; Hartland Subdivision, Lexington, KY
Flood Damage: 208 Cary Lane, Elizabethtown, KY
Blasting Damage: Chicken Farm, Tolesboro KY
Super Fund Sites: KY Wood Preserving, Inc., Winchester, KY; River Metals Recycling, Somerset, KY

Expert Witness: Circuit Courts of Bourbon, Carter, Fayette, Franklin, Hardin, Laurel and Woodford Counties

Court Testimony:

Laurel Circuit Court: *Yellow Creek Concerned Citizens v. Middlesboro Tannery*, 1995.
Franklin County Circuit Court: *Richard McGehee v. Commonwealth of Kentucky Transportation Cabinet*, 2008; *Terrence G. Kerschner, et al v. Burley Oil Company, et al*, 2014.
Hardin County Circuit Court: *Richard McGehee v. Commonwealth of Kentucky Transportation Cabinet*, 2008.
Woodford County: *Horn v. Horn*, 2009
Bourbon County Circuit Court: Blasting Case, 1980s; Waterway Impediment Case, 2000; Faulty Construction, 2009, *Hadden v. Linville*, 2015.
Fayette County Circuit Court: Faulty Construction, 1980s; Bluegrass Manufacturing (Divorce Case), 1999, *Whitson v. Cross*: Drainage Encroachment, 2013.
Carter County: Condemnation for Commonwealth of KY Transportation Cabinet.

MARY MCCLINTON CLAY
PROFESSIONAL QUALIFICATIONS

Conservation and Wetland Easements: Bluegrass Heights Farm, Fayette County: Conservation and Preservation Easement; Wetland Easements in Pulaski, Lincoln, and Fulton Counties for NRCS.

Zoning Support: *John Vance, et al v. Paris City Commission* 2019; *Citizens for Progressive Growth and Development v. Paris Bourbon County Planning Commission* 2004-2007 and 2016; *Paris First v. Paris Bourbon County Planning Commission* 2003-2006; *Paris First v. Paris City Commission* 2002-2003; *Coppers Run Historic District, Inc. v. Abundant Life Worship Center* 1995; *Sugar Grove Farm v. East Kentucky Power* 1994-1996; *Lawrence Simpson, et al v. Harry Laytart* 1986-1996.

Professional Organizations:

Appraisal Institute: MAI, 1985; SRPA, 1982; SRA, 1980

Appraisal Institute Education Certification:

The Appraisal Institute conducts a voluntary program of continuing education for its designated members. I am certified under this program through December 31, 2023.

Education: Hollins College, B.A., 1972

Appraisal Education: Society of Real Estate Appraisers Course 101, 1977; SREA Course 201, 1978; SREA Course 301, 1981; AIREA Course VIII, 1979; AIREA Course VI, 1979; AIREA Course II, 1980; AIREA Course in Investment Analysis, 1980; AIREA Course in Valuation Litigation, March, 1986; Appraisal Institute Standards of Professional Practice, 1992; AIREA Comprehensive Examination, August, 1983; Courses in Real Estate Finance, Income Property Appraisal, Real Property Valuation, and Investment Analysis, 1977-1978, Eastern Kentucky University; Appraisal Institute Course 400G, Market Analysis/Highest and Best Use, 2008, Conservation Easement Certification, 2008.

Attended numerous seminars covering a variety of topics including investment analysis, feasibility and market analysis, eminent domain and condemnation, valuation of lease interests, component depreciation, risk analysis, current issues in subdivision and zoning law, Yellow Book and appraiser as expert witness.



ATTACHMENT D

Review of the Applicant's Economic Impact Analyses McCracken County Solar LLC Project McCracken County, Kentucky

Prepared for

**Wells Engineering PSC
6900 Houston Road, Suite 38
Florence, Kentucky 41042**

By

**Mark M. Watters
Watters Unclaimed Property Consulting LLC
2519 Ashton Court
Cincinnati, Ohio 45244**

**Before the Kentucky State Board on Electric Generation and
Transmission Siting
Case No. 2020-00392**

Summary Findings

The economic impact analyses by Applicant McCracken County Solar LLC are for the most part properly structured and evaluated for the purposes of the *Application for a Certificate to Construct a Merchant Generating Facility* (“Application”). The only reservation to the analyses of economic impact is in projections relating to the Operations Phase of the Project, wherein the Applicant has used a twenty (20) year projection for output sales of generated electricity, whereas other criteria are evaluated based on a thirty (30) year projection. While the Applicant has 30-year real property leases and anticipates a useful life of the facility for that term, its current electrical sales agreement extends 20 years; it otherwise hopes for a 10-year extension with its current purchaser or other sales via spot pricing on the wholesale market. This does not necessarily invalidate the positive economic impacts of the Operation Phase of the Project; however, validation would be surer and more certain if a single period were used.

Introduction and Background

Pursuant to *McCracken County Solar Energy LLC’s Application for a Certificate to Construct a Merchant Generating Facility*, the Applicant is required to make certain statements and representations regarding the suitability and compliance with statutory requirements for said proposed Project and facility. These present analyses are a review of the Economic Impact portion of those statements and representations. The analyses encompass the entirety of the Application including its Exhibits, with a primary focus on the Application’s *Exhibit 10, Analysis of the proposed facility’s economic impact on the affected region and the state*, and its two subordinate attachments, “Economic Impact of a 60 MW Solar Project in McCracken County Kentucky”, authored by the Center for Business and Economic Research, Gatton College of Business and Economics (“CBER”), University of Kentucky, Attachment 10.1 and 10.2, “Property Tax Calculations”.

The proposed facility is to be located on one site of contiguous leased parcels, generally facing New Liberty Church Road, Kevil, Kentucky and fronting a portion of the Western Kentucky State Wildlife Management Area. The proposed site and its surroundings (absent the Wildlife Area) are in current use for agrarian and rural residential purposes. *See generally, Application – Exhibit 2*. The proposed facility will consist of approximately 714 acres, with reference coordinates 37.12383° N, 88.85978°W.

The Applicant’s analyses consist of:

- Direct, indirect and induced impacts – measuring the impact of wages (the “direct impact”), the impact of purchases of materials and supplies (“indirect impact”), and the local impact purchases by employees of the Project site
- Impact of taxes, including
 - Local occupational license taxes – taxes paid by local workers

- Kentucky state income taxes – both corporate and personal
- State sales and use taxes
- Local real property taxes
- State tangible property taxes
- Impact of the facility’s electrical output – generated and sold

The analyses for output and real property taxes are analyzed by net increases following construction; other analyses are further bifurcated into Construction and Operation Phases.

The CBER Report [Attachment 10.1], is a third-party analyses using the IMPLAN (Impact Analysis for Planning) model for estimating the short-term impacts during the Construction Phase and long-term impact expected to be experienced during the Operation Phase of the Project.

Property taxes were analyzed by netting the valuation and taxation of the proposed assets against the current values and taxes for the unimproved parcels in their current farm use. The analyses were provided by MCM CPAs & Advisors, Louisville, Kentucky in consultation with a representative of the Office of Property Taxation, Kentucky Department of Revenue.

Findings and Conclusions

Other than the assumption of a thirty (30) year life for the project’s Operational Phase, the work progression and findings are valid. The CBER Report, prepared by the University of Kentucky [Attachment 10.1], uses the IMPLAN (Impact Analysis for Planning) model as a legitimate means for estimation of short- and long-term economic impact. The overall economic impact of the Project and Facility as projected is netted against the current impact of current uses as farm properties using established valuation techniques.

The evaluation during the **Construction Phase** is based upon a construction model utilized by the Applicant in similar projects. The number of construction workers, the period necessary for that construction, and the costs of materials at current valuation is reasonably established. The 30-year leases are in place with the local land owners and necessary easements considered.

For the **Operation Phase**, there is a concern over the representation of the length electrical generation and sales that permeates the totality of the estimations for this Phase.

The Applicant has represented its intent to sell generated electricity to Big Rivers Electric Corporation (“Big Rivers”) through a transmission line owned by Big Rivers under a 20-year power purchase agreement or contract (“sale agreement”). *Application*, page 3, paragraph 3. Subsequently, in response to Question 25 of *McCracken County Solar LLC’s Response to Siting Board Staff’s First Request for Information*, page 57 of 57¹, the Applicant’s Response clarifies

¹ *Responses to Staffs First Request for Information 7/9/2021 11:15:05 AM*, attachment

that while the initial contract period under the sale agreement is for 20 years, the Applicant asserts its confidence that the market for power after the termination of the sale agreement “will be sufficiently economically attractive to support continued operation” for a subsequent 10-year period. This position is based upon the Applicant’s connection to a Miso-controlled transmission line and thus, to the MISO wholesale market. The Applicant expects to continue sales of electricity for the additional decade either through “a bi-lateral contract with a MISO-connected offtaker” or utilizing spot pricing on the wholesale market. The basis for belief in further attraction of sales in the subsequent decade are not self-evident and no further proof was provided. To put the Applicant’s assertions in their most favorable light and to no way disparage the Applicant and its assumption, we must assume that the market for electricity will remain static or positively dynamic.

There are two additional factors to consider. One, that there is a mechanical reduction to solar power efficiency. Two, that obsolescence might render ongoing generation economically infeasible.

It is an admitted fact that solar panels over time loose efficiency. The Applicant admits this in its response to Question 10 of *McCracken County Solar LLC’s Response to Siting Board Staff’s First Request for Information*, page 20 of 57². The Applicant in that response has allocated 0.5% per year reduction in production efficiency in its calculations after the first year, or 9.5% over the 20-year analysis³; however, for the additional 10-year expected life for production, this would decrease efficiency by an additional 5%, or by 14.5% by the 30th year.

The manufacturer’s (Trina Solar’s) claim of *maximum* efficiency is 21.0%⁴; in contrast, EnergySage has rated the Trina Solar panels (minimum-maximum-average efficiencies) at 17.20%, 19.40%, and 18.69%.⁵ Thus, after the 9.5% degradation after 20 years, the panels will further degrade another 5% to 14.5% reduction over the decade.

During this next 20 year period, and beyond into the following decade, improvements to solar panel efficiencies may be expected, rendering present technology obsolete. There is no discussion in the *Application*, its Exhibits and responses of any program of upgrades during either the 20-year initial sale agreement or for any period following.

Final_Responses_to_Staffs_First_Request_-210708.pdf, Item 25, page 57 of 57.

² Ibid., Item 10, page 20 of 57.

³ Ibid.

⁴ *Responses to Staffs First Request for Information 7/9/2021 11:15:05 AM*, attachment *Final_Responses_to_Staffs_First_Request_-210708.pdf*, Item 4, pages 29-30 of 57.

⁵ “Most Efficient Solar Panels: Solar Panel Cell Efficiency Explained”, Feb. 5, 2021, <https://news.energysage.com/what-are-the-most-efficient-solar-panels-on-the-market/>.

Also, in addition to lower generation efficiency, over time one can normally expect need for more maintenance from normal wear-and-tear. Such maintenance is not likely to improve generation efficiency of the individual panels and transmission equipment, but the cost of such increasing maintenance will likely result in higher costs or panel shutdowns.

The utilization of the 20-year output analysis may invalidate analyses of the anticipated direct, indirect, and induced benefits, and taxes. Should the generation of electricity cease or sales fall after the original 20-year sale agreement, many of these economic impacts may cease or be greatly reduced. Minimal employment and maintenance would likely result. Generation and transmission equipment would likely be removed, lowering tangible personal property taxes. Occupational taxes, state corporate and personal income taxes would evaporate, along with sales and use tax benefits. The real property tax analysis, due to the 30-year lease encumbrances, would likely not change.

Thus, it is not unreasonable to assume that as generating efficiency falls and costs rise, and more efficient generation alternatives arise, there will be a reduction in the projected net income from this Project facility. At the same time, because the facility of the assets should be paid for prior to the cessation of the original 20-year sale agreement, there is more likely to be an ongoing positive impact resulting from the output of the facility than closure for production inefficiencies. In short, better projections would have result from utilizing either 20- or 30-year analyses rather than both.

Recommendations

It is notable that all other bases for the economic impact study were based upon a 30-year generation of power; output, representing the Project's income, was only based on the 20-year sales agreement with Big Rivers. While the Kentucky State Board on Electrical Generation and Transmission Siting should be aware of this inconsistency, it does not itself negate the validity of the positive economic impact of McCracken County Solar LLC's proposed construction of a merchant generating facility as proposed by its Application.

Mark M. Watters
2519 Ashton Court
Cincinnati, Ohio 45244-2810
Office (513) 232-1769
Mobile and Text (513)225-6153
mwatters@wattersup.com
www.WattersUP.com



Professional Experience

Watters Unclaimed Property Consulting LLC, Cincinnati, Ohio

Proprietor, 2018 - Present

Federal, state & local taxes, business registration, and property analyses

DuCharme, McMillen & Associates, Inc., Cincinnati, Ohio

Technical Director – 1997 - 2018

Client Resources – All federal, state and local taxes, unclaimed property, business registration and government compliance

Borden, Inc., Columbus, Ohio

Senior Tax Analyst

Federal, state and local taxes – compliance, analysis, valuation and audit
Property taxes – rendering, valuation, appraisal review, audit and protest

Education

Juris Doctorate (J.D.), Ohio Northern University, Claude W. Pettit College of Law, Oxford, Ohio

Bachelor of Arts in History, Miami University, Oxford, Ohio

*L Allyson Honaker
Goss Samford, PLLC
2365 Harrodsburg Road, Suite B325
Lexington, KENTUCKY 40504

*David S Samford
Goss Samford, PLLC
2365 Harrodsburg Road, Suite B325
Lexington, KENTUCKY 40504

*Mark David Goss
Goss Samford, PLLC
2365 Harrodsburg Road, Suite B325
Lexington, KENTUCKY 40504