COMMONWEALTH OF KENTUCKY
BEFORE THE KENTUCKY STATE BOARD ON
ELECTRIC GENERATION AND TRANSMISSION SITING

IN THE MATTER OF:

THE ELECTRONIC APPLICATION OF McCRACKEN COUNTY SOLAR LLC FOR A CERTIFICATE TO CONSTRUCT AN APPROXIMATELY 60 MEGAWATT MERCHANT SOLAR ELECTRIC GENERATING FACILITY IN McCRACKEN COUNTY, KENTUCKY PURSUANT TO KRS 278.700, ET SEQ., AND 807 KAR 5:110	)	CASE NO. 2020-00392

McCRACKEN COUNTY SOLAR LLC'S
APPLICATION FOR A CERTIFICATE
TO CONSTRUCT A MERCHANT
GENERATING FACILITY

Comes now McCracken County Solar LLC ("McCracken County Solar"), by counsel, pursuant to KRS 278.700, *et seq.,* and 807 KAR 5:100, *et seq.,* and other applicable law, and does hereby submit its application for a certificate to construct an approximately 60 megawatt ("MW") merchant solar electric generating facility in McCracken County, Kentucky (the "McCracken County Solar Project" or "Project"). In support of this Application, McCracken County Solar states as follows:

1. McCracken County Solar is a Delaware limited liability company, formed on February 3rd, 2020, and owned by Community Energy Solar, LLC. Its principal offices are located at Three Radnor Corporate Center, Suite 300, 100 Matsonford Rd., Radnor, Pennsylvania 19087. Its principal contact is Chris Killenberg, Regional Development Director, Community Energy Solar, LLC, P.O. Box 17236, Chapel Hill, North Carolina 27516, telephone (919) 360-9792, email: chris.killenberg@communityenergyinc.com. Community Energy Solar, LLC is an affiliate of Community Energy, Inc., an industry leader in renewable energy development for more than 20

years completing many of the first utility-scale wind and solar projects in the United States. Since its inception, Community Energy, Inc. has developed and financed more than 2,000 MW of renewable energy power projects, including 1,300 MW of solar power. Community Energy, Inc. is also headquartered in Radnor, Pennsylvania.

2. McCracken County Solar was granted authority to conduct business in Kentucky evidenced by a Certificate of Authority issued by the Commonwealth of Kentucky, Office of the Secretary of State, on February 4th, 2020. A copy of this Certificate of Authority is provided as Exhibit 1 Attachment, page 1 of 1.

3. The McCracken County Solar Project is a 60 MW ground mounted solar photovoltaic electric generating facility comprising approximately 615 acres of land in western McCracken County, Kentucky, located along New Liberty Church Rd., 2.5 miles northeast of Kevil, Kentucky 42053. The Project includes approximately 156,000 photovoltaic solar panels, associated ground-mounted racking, 16 inverter stations, and a substation transformer that will connect to the 69kV 'McCracken County-Shell' transmission line owned by Big Rivers Electric Corporation ("Big Rivers"). The power generated by the facility will be sold to Big Rivers under a 20-year power purchase agreement.

4. Pursuant to KRS 278.706 and 807 KAR 5:100, Section 1., because the manufacturer's nameplate rated electric generating capacity is 61.32 MW, McCracken County Solar has submitted its application fee of sixty-one thousand three-hundred-twenty dollars ($61,320.00) to be deposited into the Kentucky Public Service Commission's "siting fund" created pursuant to KRS 278.716.

5. McCracken County Solar, by and through its attorneys, has the ability to receive electronic transmissions in this matter at the electronic mail addresses listed below.

6. Greater detail about the Project and compliance with all information required by KRS 278.700, *et seq.*, and 807 KAR 5:100, *et seq.*, to support a complete Application and granting of a Construction Certificate are provided in the Application Exhibits, which are specifically incorporated herein. Reference is made to the attached Table of Contents for a description of each statutory filing requirement and related compliance information.

7. The McCracken Solar Project complies with all provisions of KRS 278.700 – KRS 278.716 and 807 KAR 5:100 – 807 KAR 5:110, and the Siting Board should so find and grant McCracken Count Solar a Construction Certificate to construct the Project.

WHEREFORE, on the basis of the foregoing, McCracken County Solar respectfully requests that the Siting Board:

1. Accept this Application for filing as administratively complete;

2. Grant a Construction Certificate for McCracken County Solar to construct the McCracken County Solar Project; and,

3. Afford McCracken County Solar all other due and proper relief to which it may by entitled.

Done this 11th day of May, 2021.

Respectfully Submitted,

Mark David Goss
David S. Samford
L. Allyson Honaker
GOSS SAMFORD, PLLC
2365 Harrodsburg Rd., Suite B-325
Lexington, Kentucky 40504
Telephone: (859) 368-7740
mdgoss@gosssamfordlaw.com
david@gosssamfordlaw.com
allyson@gosssamfordlaw.com

Counsel for McCracken County Solar LLC

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of this Application has been served via electronic mail to Craig Z. Clymer, McCracken County Judge-Executive, at cclymer@mccrackencountyky.gov, and by United States first-class mail at 300 Clarence Gaines Street, Paducah, KY 42003-1700, and to Wayne Elliott, Chairman, McCracken County Planning and Zoning Commission at welliott@bigrivers.com, and by United States first-class mail at 300 Clarence Gaines Street, Paducah, KY 42003-1700, this 11th day of May, 2021.

Counsel for McCracken County Solar LLC

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibits
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	electric generating facilities are located.			
KRS 278.706(2)(h)	Proof of service of a copy of the application upon local officials.	Chris Killenberg	1	8
KRS 278.706(2)(i)	An analysis of the proposed facility's projected effect on the electricity transmission system in Kentucky.	Chris Killenberg	1	9
KRS 278.706(2)(j)	An analysis of the proposed facility's economic impact on the affected region and the state.	Chris Killenberg	1	10
KRS 278.706(2)(k)	Summary of environmental violations.	Chris Killenberg	1	11
KSR 278.706(2)(l)	Site Assessment Report.	Chris Killenberg	1	12
KRS 224.10-280	Cumulative Environmental Assessment.	Chris Killenberg	1	13
KRS 278.706	Additional Information	Chris Killenberg	2	14

Kentucky State Board on Electric Generation and Transmission Siting
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Application – Exhibit 1
Volume 1, Tab 1

Filing Requirement: KRS 278.706(2)(a)

The name, address, and telephone number of the person proposing to construct and own the merchant electric generating facility.

Respondent: Chris Killenberg

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. Mr. Killenberg can be reached by telephone at (919) 360-9792, and by email at chris.killenberg@communityenergyinc.com.

EXHIBIT 1
ATTACHMENT

FRANKLIN COUNTY
A141 PG310

Exhibit 1 Attachment
Page 1 of 1

1086043.06 vmiller ADD

Michael G. Adams
Kentucky Secretary of State
Received and Filed:
2/4/2020 2:09 PM
Fee Receipt: $90.00

COMMONWEALTH OF KENTUCKY
ALISON LUNDERGAN GRIMES, SECRETARY OF STATE

Division of Business Filings
Business Filings
PO Box 718, Frankfort, KY 40602
(502) 564-3490
www.sos.ky.gov

Certificate of Authority
(Foreign Business Entity)

FBE

Pursuant to the provisions of KRS 14A end KRS 271B, 273, 274,275, 362 and 386 the undersigned hereby applies for authority to transact business in Kentucky on behalf of the entity named below and, for that purpose, submits the following statements:

1. The entity is a :
- ☐ profit corporation (KRS 271B)
- ☐ business trust (KRS 386).
- ☐ limited partnership (KRS 362).
- ☐ non-profit llc (KRS 275)
- ☐ nonprofit corporation (KRS 273)
- ☒ limited liability company (KRS 275)
- ☐ ltd cooperative assn. (KRS)
- ☐ cooperative assn. (KRS)
- ☐ professional service corporation (KRS 274)
- ☐ professional limited liability company (KRS 275)
- ☐ statutory trust

2. The name of the entity is McCracken County Solar LLC.
(The name must be identical to the name on record with the Secretary of State.)

3. The name of the entity to be used in Kentucky is (if applicable): _____.
(Only provide if "real name" is unavailable for use; otherwise, leave blank.)

4. The state or country under whose law the entity is organized is Delaware.

5. The date of organization is 2/3/2020 and the period of duration is _____.
(If left blank, the period of duration is considered perpetual.)

6. The mailing address of the entity's principal office is

Street Address	City	State	Zip Code
Three Radnor Corporate Center, Suite 300	Radnor	PA	19087

7. The street address of the entity's registered office in Kentucky is

Street Address (No P.O. Box Numbers)	City	State	Zip Code
308 W. Main Street, Suite 512	Frankfort	KY	40601

and the name of the registered agent at that office is CT Corporation System.

8. The names and business addresses of the entity's representatives (secretary, officers and directors, managers, trustees or general partners):

Name	Street or P.O. Box	City	State	Zip Code
R. Brent Alderfer	3 Radnor Corp Ctr, Ste 300	Radnor	PA	19087
Brent Beerley	3 Radnor Corp Ctr, Ste 300	Radnor	PA	19087

9. If a professional service corporation, all the individual shareholders, not less than one half (1/2) of the directors and all of the officers other than the secretary and treasurer are licensed in one or more states or territories of the United States or District of Columbia to render a professional service describe

10. I certify that, as of the date of filing this application, the above-named entity validly ex

11. If a limited partnership, it elects to be a limited liability limited partnership. Check the

12. If a limited liability company, check box if manager-managed: ☑

13. This application will be effective upon filing, unless a delayed effective date and/or tir
The effective date or the delayed effective date cannot be prior to the date the application

DOCUMENT NO: 501026
RECORDED:February 05,2020 09:49:00 AM
TOTAL FEES: $46.00
COUNTY CLERK: JEFF HANCOCK
DEPUTY CLERK: ANITA WHITAKER
COUNTY: FRANKLIN
BOOK: A141 PAGES: 310 - 310

Please indicate the Kentucky county in which your business operates:
County: McCracken.

To complete the following, please shade the box completely.

Please indicate the size of your business:
- ☑ Small (Fewer than 50 employees)
- ☐ Large (50 or more employees)

Please indicate whether any of the following make up more than fifty percent (50%) of your business ownership:
- ☐ Women-Owned
- ☐ Veteran Owned
- ☐ Minority Owned

Please indicate which of the following best describes your business:
- ☐ Agriculture
- ☐ Mining
- ☐ Services
- ☐ Construction
- ☐ Wholesale Trade
- ☐ Retail Trade
- ☐ Manufacturing
- ☐ Finance, Insurance, Real Estate
- ☐ Public Administration
- ☐ Transportation, Communications, Electric, Gas, Sanitary Services
- ☑ Other

Signature of Authorized Representative	Printed Name & Title	Date
	Brent Beerley, Manager	2/4/2020

I, CT Corporation, consent to serve as the registered agent on behalf of the business entity.
Type/Print Name of Registered Agent

Signature of Registered Agent	Printed Name	Title	Date
	Leslie J Martin	Assistant Secretary	2/4/2020

(05/17)

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 2
Volume 1, Tab 2

Filing Requirement: KRS 278.706(2)(b)

A full description of the proposed site, including a map showing the distance of the proposed site from residential neighborhoods, the nearest residential structures, schools, and public and private parks that are located within a two (2) mile radius of the proposed facility.

Respondent: Chris Killenberg

Description of the Proposed Site

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

KRS 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.

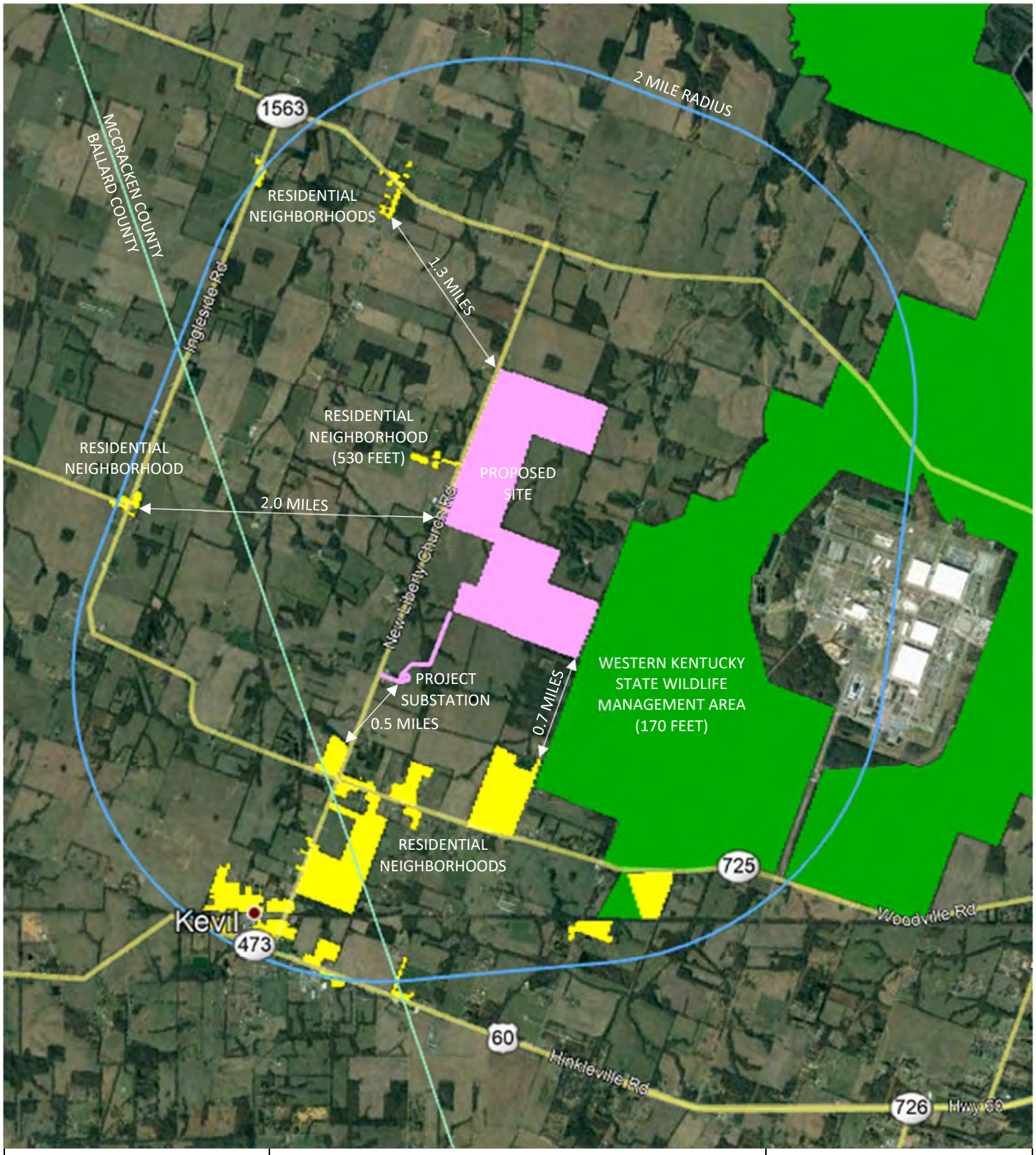
Nearest Private Parks

There are no known private parks within two (2) miles of the proposed Project site.

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.

A map showing the distance of the proposed site from the nearest residential structures is attached as Exhibit 2 Attachment page 2 of 2.

EXHIBIT 2
ATTACHMENT



COMMUNITY ENERGY®

COMMUNITY ENERGY SOLAR, LLC

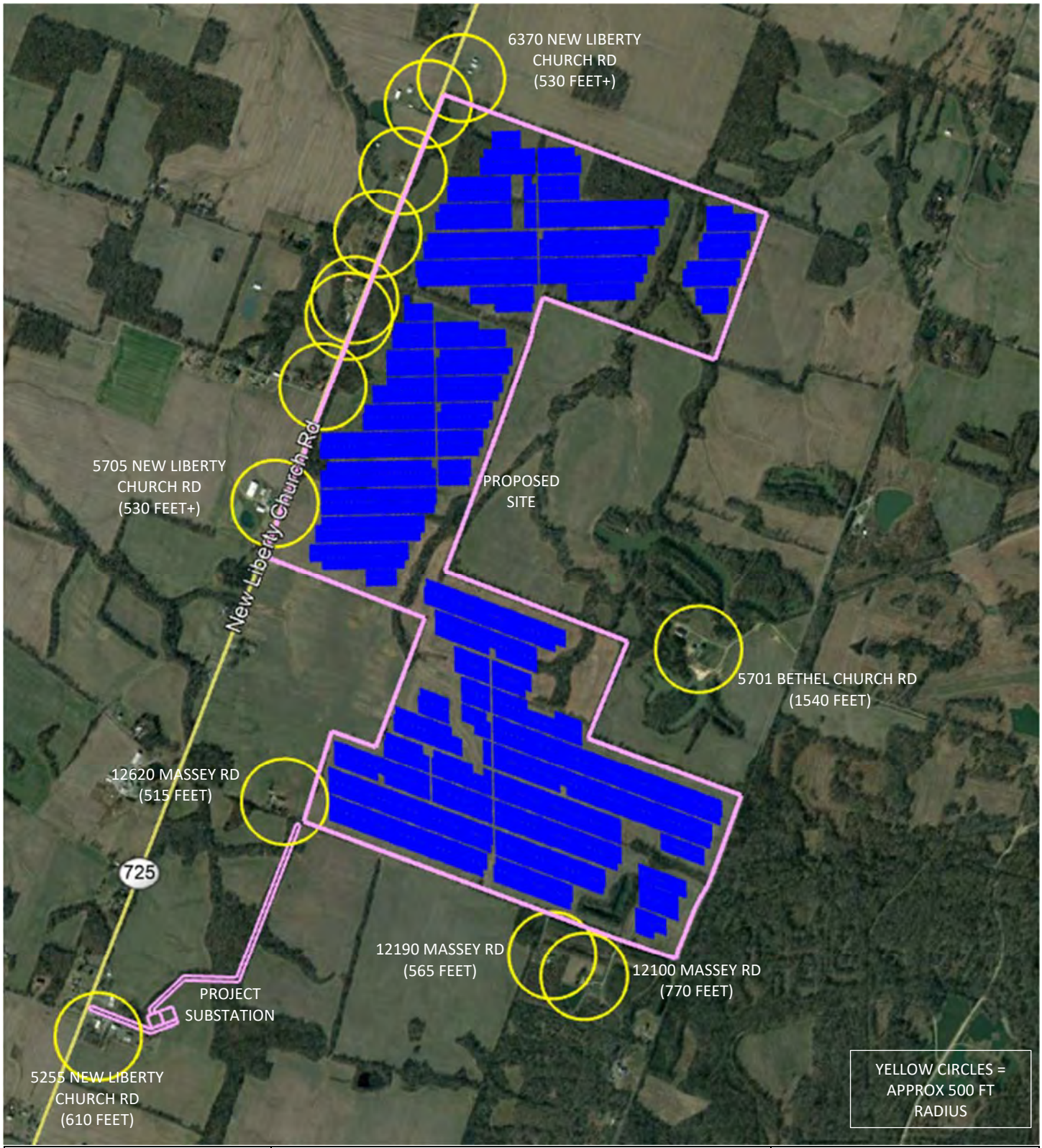
3 RADNOR CORP CENTER, SUITE 300
100 MATSONFORD RD.
RADNOR, PA 19087
(866) 946-3123

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



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: 5.3.2021

MAP SHOWING THE DISTANCE OF THE PROPOSED SITE FROM THE NEAREST RESIDENTIAL STRUCTURES

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 3
Volume 1, Tab 3

Filing Requirement: KRS 278.706(2)(c)

Evidence of public notice that shall include the location of the proposed site and a general description of the project, state that the proposed construction is subject to approval by the board, and provide the telephone number and address of the Public Service Commission. Public notice shall be given within thirty (30) days immediately preceding the application filing to: 1. Landowners whose property borders the proposed site; and 2. The general public in a newspaper of general circulation in the county or municipality in which the facility is proposed to be located.

Respondent: Chris Killenberg

LANDOWNER NOTICE: The notice required by KRS 278.706(2)(c) to all individuals owning property adjacent to the proposed McCracken County Solar Project was provided by a letter dated and posted in the United States mail, on April 13, 2021, a date that is within thirty days immediately preceding the Application's filing. A sample of this letter and a list by name and address of all individuals to whom this letter was mailed are attached as Exhibit 3 Attachment pages 1- 3 of 4.

GENERAL PUBLIC NOTICE: The notice required by KRS 278.706(2)(c) to the general public was provided on April 16-17, 2021, dates that are within thirty days immediately preceding the Application's filing, by publication in the *Paducah Sun* newspaper, a daily newspaper of general circulation, printed and published in Paducah, McCracken County, Kentucky. The Affidavit of Publication, including the text of the notice, is attached as Exhibit 3 Attachment page 4 of 4.

EXHIBIT 3
ATTACHMENT

COMMUNITY ENERGY®

April 13, 2021

[Name]
[Address]
[City, State, Zip]

Re: McCracken County Solar LLC project in McCracken County, Kentucky
Notice of Application before Kentucky State Board on Electric Generation and Transmission Siting

Dear [Name],

We are again writing to inform you of a solar energy project which is being developed on 615 acres of land adjacent to your property in western McCracken County, located along New Liberty Church Road, approximately 2.5 miles northeast of Kevil, Kentucky.

The project details have now been finalized and we intend to formally submit it to the Kentucky State Board on Electric Generation and Transmission ("Siting Board") in the coming days for review and approval to issue a construction certificate. The Siting Board's contact information is: c/o Kentucky Public Service Commission, P.O. Box 615, 211 Sower Boulevard, Frankfort, Kentucky, 40602-0615, telephone (502) 564-3940. Assuming the Siting Board issues its approval, construction on the project will begin in 2022 and operations will commence in 2023.

We previously held a virtual public informational meeting describing the project and have responded to questions and requests for additional information from landowners and the public-at-large. Should you wish to learn more about the project and review the presentation given at this public meeting, please visit https://www.communityenergyinc.com/mccrackencountysolar.

You will find attached a copy of the public notice which we are placing in the Paducah Sun discussing the upcoming filing for approval of a construction certificate with the Siting Board. If you have any questions about the project or would like to learn more, please contact Chris Killenberg, Regional Development Director, by email at chris.killenberg@communityenergyinc.com or by telephone at (919) 360-9792.

Sincerely Yours,

McCracken County Solar LLC

By: Community Energy Solar, LLC
Its Managing Member

Joel Thomas
Executive Vice President

Enclosure: Public Notice

NOTICE OF APPLICATION

McCracken County Solar LLC is proposing to construct and operate a 60 megawatt ground mounted solar photovoltaic electric generating facility on approximately 615 acres in western McCracken County, located along New Liberty Church Road, approximately 2.5 miles northeast of Kevil, Kentucky. The proposed McCracken County Solar project will consist of solar photovoltaic panels and associated racking, inverters, substation transformer and other necessary equipment to support the project.

McCracken County Solar LLC is required to file an application for approval to construct and operate the proposed facility. This application is subject to the approval of the Kentucky State Board on Electric Generation and Transmission Siting, having the following contact information: P.O. Box 615, 211 Sower Blvd., Frankfort, Kentucky 40602-0615, or by telephone at (502) 564-3940.

Any person wishing to become a party to a proceeding before the Siting Board may, by written motion filed no later than thirty (30) days after the application has been submitted, request leave to intervene.

A party may, upon written motion filed no later than thirty (30) days after an application has been filed, request the Siting Board to schedule an evidentiary hearing at the offices of the Kentucky Public Service Commission, P.O. Box 615, 211 Sower Blvd., Frankfort, Kentucky 40602-0615.

A request that the Siting Board conduct a local public hearing or local public information meeting shall be made by at least three (3) interested persons who reside in the county or municipal corporation in which the facility is proposed to be constructed to consider the application for a construction certificate. The request shall be made in writing and shall be filed no later than thirty (30) days after a complete application is filed.

Any questions related to the application or other aspects of the approval process may be directed to the Kentucky State Board on Electric Generation and Transmission Siting, P.O. Box 615, 211 Sower Blvd., Frankfort, Kentucky 40602-0615, or by telephone at (502) 564-3940.

Adjacent Landowner Mailing List_4-13-21

Parcel Number	Parcel Address	Acreage	Owner Name	Street	City	State	Zip
013-00-00-023	5706 New Liberty Church Road	65.3	[redacted]	10765 Ogden Landing Road	Kevil	KY	42053
020-00-00-018.01	6155 Bethel Church Road	77		10839 Ogden Landing Road	Kevil	KY	42053
012-00-00-017	5905 New Liberty Church Road	0.7		11510 US Highway 60 West	Kevil	KY	42053
012-00-00-014	11920 Burnley School Road	39		11920 Burnley School Road	Kevil	KY	42053
021-00-00-008	12100 Massey Road	24.8		12100 Massey Road	Kevil	KY	42053
021-00-00-008.02	12190 Massey Road	10.3		12190 Massey Road	Kevil	KY	42053
013-00-00-029.01	12620 Massey Road	10		12620 Massey Road	Kevil	KY	42053
013-00-00-013	5025 New Liberty Church Road	1		2030 S. Kitley Avenue	Indianapolis	IN	46203
013-00-00-013	5025 New Liberty Church Road	2		1790 S. Irvington Avenue	Indianapolis	IN	46203
013-00-00-035	12450 Massey Road	266.6		3705 Apperson Road	Kevil	KY	42053
020-00-00-020.07	6381 Bethel Church Road	26.7		4598 Broadwell Circle	Flowery Branch	GA	30542
012-00-00-045	6235 New Liberty Church Road	12.8		4860 New Liberty Church Road	Kevil	KY	42053
021-00-00-001	11460 Burnley School Road	154.8		4860 New Liberty Church Road	Kevil	KY	42053
013-00-00-033	4860 New Liberty Church Road	37.2		4860 New Liberty Church Road	Kevil	KY	42053
013-00-00-012	4905 New Liberty Church Road	1.9		4905 New Liberty Church Road	Kevil	KY	42053
013-00-00-012.02	4925 New Liberty Church Road	2		4925 New Liberty Church Road	Kevil	KY	42053
013-00-00-012.01	4955 New Liberty Church Road	1.9		4955 New Liberty Church Road	Kevil	KY	42053
013-00-00-014	5045 New Liberty Church Road	2		499 SW Namott Place	Port St. Lucie	FL	34983
013-00-00-015.01	5055 New Liberty Church Road	2.2		5055 New Liberty Church Road	Kevil	KY	42053
013-00-00-015	5075 New Liberty Church Road	1.3		5115 New Liberty Church Road	Kevil	KY	42053
013-00-00-017	5235 New Liberty Church Road	36		5225 New Liberty Church Road	Kevil	KY	42053
013-00-00-027	5420 New Liberty Church Road	51		5255 New Liberty Church Road	Kevil	KY	42053
013-00-00-022	5525 New Liberty Church Road	54		5255 New Liberty Church Road	Kevil	KY	42053
053-00-00-001.02	5600 Hobbs Road	3422		1017 Majestic Drive, Suite 200	Lexington	KY	40513
021-00-00-002	11290 Burnley School Road	86.6		5701 Bethel Church Road	Kevil	KY	42053
021-00-00-006	5701 Bethel Church Road	140.7		5701 Bethel Church Road	Kevil	KY	42053
012-00-00-047	6115 New Liberty Church Road	1.2		6065 New Liberty Church Road	Kevil	KY	42053
012-00-00-014.01	6065 New Liberty Church Road	1.3		6065 New Liberty Church Road	Kevil	KY	42053
012-00-00-046	6145 New Liberty Church Road	2		6145 New Liberty Church Road	Kevil	KY	42053
020-00-00-020.06	6365 Bethel Church Road	27.1		6150 Bethel Church Road	Kevil	KY	42053
012-00-00-044	6285 New Liberty Church Road	0.6		6315 New Liberty Church Road	Kevil	KY	42053
012-00-00-043	6315 New Liberty Church Road	82.3		6315 New Liberty Church Road	Kevil	KY	42053
020-00-00-020.05	6355 Bethel Church Road	26.7		6345 Bethel Church Road	Kevil	KY	42053
020-00-00-020.04	6485 Bethel Church Road	23		6515 Bethel Church Road	Kevil	KY	42053
020-00-00-020	6405 Bethel Church Road	26.7		8512 Axis Drive	Austin	TX	78749
013-00-00-029	5300 New Liberty Church Road	48		PO Box 307	Kevil	KY	42053
020-00-00-016	6370 New Liberty Church Road	150.7		209 Springheaven Drive	Evansville	IN	47710

AFFP
NOTICE OF APPLICATION McCracke

Affidavit of Publication

STATE OF KY }
COUNTY OF MCCRACKEN } SS

Patricia Ware, being duly sworn, says:

That she is of the Paducah Sun, a daily newspaper of general circulation, printed and published in Paducah, McCracken County, KY; that the publication, a copy of which is attached hereto, was published in the said newspaper on the following dates:

April 16, 2021, April 17, 2021

That said newspaper was regularly issued and circulated on those dates.
SIGNED:

Patricia Ware

Subscribed to and sworn to me this 17th day of April 2021.

Tina Scott

Tina Scott, Notary Public, McCracken County, KY

My commission expires: July 10, 2022

TINA SCOTT NOTARY ID # 604477 My Commission Expires July 10, 2022 PUBLIC STATE AT LARGE, KENTUCKY

70016993 70030046

Christene Tashjian
Community Energy
3 Radnor Corp, Ctr, Ste. 300
100 Matsonford Rd.
Radnor, PA 19087-4645

NOTICE OF APPLICATION
McCracken County Solar LLC is proposing to construct and operate a 60 megawatt ground mounted solar photovoltaic electric generating facility on approximately 615 acres in western McCracken County, located along New Liberty Church Road, approximately 2.5 miles northeast of Kevil, Kentucky. The proposed McCracken County Solar project will consist of solar photovoltaic panels and associated racking, inverters, substation transformer and other necessary equipment to support the project.
McCracken County Solar LLC is required to file an application for approval to construct and operate the proposed facility. This application is subject to the approval of the Kentucky State Board on Electric Generation and Transmission Siting, having the following contact information: P.O. Box 615, 211 Sower Blvd., Frankfort, Kentucky 40602-0615, or by telephone at (502) 564-3940.
Any person wishing to become a party to a proceeding before the Siting Board may, by written motion filed no later than thirty (30) days after the application has been submitted, request leave to intervene.
A party may, upon written motion filed no later than thirty (30) days after an application has been filed, request the Siting Board to schedule an evidentiary hearing at the offices of the Kentucky Public Service Commission, P.O. Box 615, 211 Sower Blvd., Frankfort, Kentucky 40602-0615.
A request that the Siting Board conduct a local public hearing or local public information meeting shall be made by at least three (3) interested persons who reside in the county or municipal corporation in which the facility is proposed to be constructed to consider the application for a construction certificate. The request shall be made in writing and shall be filed no later than thirty (30) days after a complete application is filed.
Any questions related to the application or other aspects of the approval process may be directed to the Kentucky State Board on Electric Generation and Transmission Siting, P.O. Box 615, 211 Sower Blvd., Frankfort, Kentucky 40602-0615, or by telephone at (502) 564-3940.

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 4
Volume 1, Tab 4

Filing Requirement: KRS 278.706(2)(d)

A statement certifying that the proposed plant will be in compliance with all local ordinances and regulations concerning noise control and with any local planning and zoning ordinances. The statement shall also disclose setback requirements established by the planning and zoning commission as provided under KRS 278.704(3).

Respondent: Chris Killenberg

The Proposed Project complies with McCracken County Ordinance No. 2021-03, a copy of which is provided in Exhibit 5 Attachment, pages 1 through 5 of 10. Pursuant to Ordinance No. 2021-03, 'Level 2 Solar Energy Systems' (defined as ground-mounted systems greater than one-half (1/2) acre or greater in size for the commercial production of electricity and transmission to a public utility) are required to be set back 100 feet from all exterior property lines. Further, Solar Energy Systems that extend across multiple parcels do not have to follow setback requirements (zero lot lines) for property lines located within the security fencing.

McCracken County Solar certifies that the Project will be in compliance with all local ordinances and regulations, if any, concerning noise control and with McCracken County Ordinance No. 2021-03, and all other applicable local planning and zoning ordinances.

A statement from Joel Thomas, Executive Vice President of Community Energy Solar, LLC, which is the Managing Member of McCracken County Solar, certifying these facts is attached as Exhibit 4 Attachment.

EXHIBIT 4
ATTACHMENT

Kentucky State Board on Electric Generation and Transmission Siting

McCracken County Solar, LLC – Case No. 2020-00392

CERTIFICATION REQUIRED BY KRS 278.706(2)(d)

Comes the undersigned, Joel Thomas, and states as follows:

1. That my name is Joel Thomas, and I am Executive Vice President of Community Energy Solar, LLC, which is the Managing Member of McCracken County Solar LLC, the Applicant herein.

2. That I am over the age of 18 years of age and am a resident of the State of Pennsylvania.

3. That I have conducted an inquiry into the facts contained in this Statement and believe them to be true to the best of my knowledge and belief.

4. That the proposed facility as planned and to be constructed in McCracken County, Kentucky will be in compliance with any and all local ordinances and regulations concerning noise control, and will further be in compliance with any and all local ordinances and regulations relating to planning and zoning as provided in KRS 278.704(3).

5. Under McCracken County Fiscal Court Ordinance No. 2021-03[1], the proposed facility is considered a Level 2 Solar Energy Systems (SES) by virtue of being a ground mounted system greater than one-half (1/2) acre intended for the commercial production of electricity and transmission to a public utility. Level 2 SES are required to be setback 100 feet from all exterior

[1] A complete copy of McCracken County Fiscal Court Ordinance No. 2021-03 is provided herein.

property lines. SES that extends across multiple parcels do not have to follow setback requirements (zero lot lines) for property lines located within the security fencing.

Signed this 27th day of April, 2021.

Joel Thomas

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 5
Volume 1, Tab 5

Filing Requirement: KRS 278.706(2)(e)

If the facility is not proposed to be located on a site of a former coal processing plant and the facility will use on-site waste coal as a fuel source or in an area where a planning and zoning commission has established a setback requirement pursuant to KRS 278.704(3), a statement that the exhaust stack of the proposed facility and any wind turbine is at least one thousand (1,000) feet from the property boundary of any adjoining property owner and all proposed structures or facilities used for generation of electricity are two thousand (2,000) feet from any residential neighborhood, school, hospital, or nursing home facility, unless facilities capable of generating ten megawatts (10MW) or more currently exist on the site. If the facility is proposed to be located on a site of a former coal processing plant and the facility will use on-site waste coal as a fuel source, a statement that the proposed site is compatible with the setback requirements provided under KRS 278.704(5). If the facility is proposed to be located in a jurisdiction that has established setback requirements pursuant to KRS 278.704(3), a statement that the proposed site is in compliance with those established setback requirements.

Respondent: Chris Killenberg

The McCracken County Solar Project is not proposed to be located on the site of a former coal processing plant, nor will it utilize waste coal as a fuel source. The project site also does not have any existing electricity generating facilities. Because the proposed Project is a ground mounted solar photovoltaic electric generating facility it will not contain any exhaust stacks or wind turbines, rendering the 1,000/2,000 setback requirements contained in KRS 278.706(2)(e) for such structures inapplicable to this Application.

The proposed Project complies with the 100-foot Setback Requirements contained in McCracken County Ordinance No. 2021-03, 'Level 2 Solar Energy Systems' which is provided as Exhibit 5 Attachment pages 1 through 5 of 10.

For additional reference to the relative proximity of the proposed Project to adjoining property boundaries, residences, and other buildings and structures, see the Site Plan provided on pages 6 through 10 of Exhibit 5 Attachment.

EXHIBIT 5
ATTACHMENT

COMMONWEALTH OF KENTUCKY
MCCRACKEN COUNTY FISCAL COURT
ORDINANCE NO. 2021-03

AN ORDINANCE AMENDING THE MCCRACKEN ZONING CODE AS SET FORTH IN MCCRACKEN COUNTY ORDINANCE NO. 2017-07, AS AMENDED, BY ENACTING A NEW SECTION THERETO RECOGNIZING TWO TYPES OFSOLAR ENERGY SYSTEMS AND ESTABLISHING THE REGULATIONS RELATING TO THE USE, INSTALLATION AND MAINTENANCE OF THE SAME.

WHEREAS, Kentucky Revised Statutes, Chapter 100, provides for the adoption of zoning text, specific provisions and regulations related to and facilitating the implementation thereof and provides for amendments thereto; and

WHEREAS, the McCracken County Fiscal Court and the McCracken County Planning Commission have recognized the need for zoning regulation in McCracken County for the purpose of promoting the health, safety, welfare and general prosperity of the County and to ensure that development takes place in a manner compatible with adjacent land uses, is consistent with and appropriate to existing or proposed infrastructure and is adequately served by necessary and essential services; and

WHEREAS, in order to better address and regulate the evolving nature of land use land use issues and to ensure compliance with developing law, it was proposed that the present amendments and revisions to the McCracken County Zoning Ordinance and Subdivision Regulations be adopted; and

WHEREAS, a public hearing was conducted before the McCracken County Planning Commission regarding the amendment proposed herein and such measure was approved on January 27, 2012.

NOW THEREFORE, BE IT ORDAINED BY THE FISCAL COURT OF MCCRACKEN COUNTY, COMMONWEALTH OF KENTUCKY, AS FOLLOWS:

The presently existing McCracken County Zoning Ordinance set forth and published in McCracken County Ordinance 2017-07, as amended, is hereby amended and revised as follows:

Section 1. Planning Commission Approval.

The McCracken County Planning Commission conducted a public hearing related to the proposal of the amendment herein and approved the same on January 27, 2021, and recommended that such amendment be adopted by the McCracken County Fiscal Court.

Section 2. Amendment to McCracken County Zoning Ordinance – Enactment of a New Section Entitled "Section 150.040 – Solar Energy Systems".

There shall hereby be enacted a new section of the McCracken County Zoning Ordinance entitled "Section 150.040 – Solar Energy Systems" appearing in its entirety as set forth herein:

"SECTION 150.040 – SOLAR ENERGY SYSTEMS

Definition

Solar Energy Systems (SES) are the components and subsystems required to convert solar energy into electric energy.

Levels of SES

a. Level 1 – systems designed to provide power to the structures on a parcel. Level 1 systems include roof mounted systems (panels, solar shingles, etc.) and ground mounted systems larger than sixty (60) square feet but covering less than one-half (1/2) acre. Level 1 systems are considered accessory structures; and

b. Level 2 – ground mounted systems greater than one-half (1/2) acre or greater in size for the commercial production of electricity and transmission to a public utility.

Conditional Use

Level 2 SES are a conditional use in the AG zone. Level 2 SES are not permitted in RR, UR, C, ML, or MH zones.

The conditional use application shall include a detailed plan regarding the decommissioning of the SES.

Level 1 SES are permitted in all zones.

Setbacks

Level 1 SES which are ground mounted are not permitted in front or side yards. In rear yards, ground mounted systems shall be a minimum of fifty (50) feet from any principal structure on an adjoining property.

Level 2 SES are required to be setback 100 feet from all exterior property lines. SES that extends across multiple parcels do not have to follow setback requirements (zero lot lines) for property lines located within the security fencing.

Screening

All perimeter tree lines shall be left in place to serve as a visual buffer. Where tree lines do not exist or are removed, a natural screen of a double row of staggered evergreens (minimum eight-foot height at planting and maturing to a minimum of fifteen (15) feet tall) planted fifteen (15) feet on center from any public right-of-way or adjacent residential use shall be used. Screening shall remain 90% visually solid year-round. Visual buffers shall be placed on the exterior of the security fence.

Level 1 SES are exempt from screening requirements excluding ground mounted systems which shall be screened from adjacent residential uses located within 200 feet of the ground mounted system. Screening shall be a six (6) foot high fence that is 90% visually solid or six (6) foot tall shrubs and/or evergreen trees that remain 90% visually solid year-round.

Security Fencing

A security fence shall surround all Level 2 SES and be at least 7 feet tall or 6 feet tall with 3 strands of barbed wire. Level 1 SES are exempt from security fencing requirements.

Signage

There shall be no signs permitted except those displaying emergency information, owner contact information, warning or safety instructions or signs that are required by a federal, state or local agency. Such signs shall not exceed 5 square feet in area.

Ground Maintenance

Topsoil shall not be removed. Grasses shall be maintained or established Grasses inside and outside the security fence shall not exceed 10 inches tall. The Board of Adjustment may waive this requirement if the developer can show this requirement will create an undue burden and an acceptable ground maintenance plan is submitted with the conditional use permit application.

Bond Requirements

A surety bond shall be issued by a Kentucky licensed business to McCracken County Fiscal Court for 1% of the total construction cost to cover removal and remediation at the end of life of a Level 2 SES."

Section 3. Amendment to McCracken County Zoning Ordinance – Amendment of Section 150.151(B) "Conditional Uses" in Agricultural District (AG).

Commensurate with the enactment in Section 2 above, and as necessary to reflect the operation and implementation of the same, Section 150.151(B) "Conditional Uses" shall be hereby amended to provide for the conditional use of Solar Energy Systems in an Agricultural District (AG) a follows:

"(B) *Conditional uses.* Conditional uses for the AG Agricultural District that may be permitted by the Board of Zoning Adjustment are shown as. Follow. The Board shall follow the provisions of § 150.034 of this chapter when considering applications for conditional uses.

(5) Solar Energy Systems in compliance with the provisions of § 150.040."

Section 4. Incorporation into McCracken County Zoning Ordinance Compilation.

The amendments reflected herein shall be incorporated into the standalone McCracken County Zoning Ordinance compilation and said amended document shall be transmitted to American Legal Publishing for the generation of a new Section 150.040, and to reflect the amended nature of Section 150.151(B) as such items are set forth herein for inclusion in the McCracken County Ordinance Compilation.

Section 5. Compliance with Open Meetings Laws.

The McCracken County Fiscal Court hereby finds and determines that all formal actions relative to the adoption of this Ordinance were taken in an open meeting of said legislative body in full compliance with the Kentucky Open Meetings Act as modified by Section 8(b) of 2020 Senate Bill 150 and clarified in application by the published Advisory of the Kentucky Attorney General dated March 31, 2020. All deliberations of the Fiscal court, if any, which resulted in formal action, were in meetings open to the public, in full compliance with the aforesaid legal requirements and all others germane to conduct of public meetings within the Commonwealth of Kentucky.

Section 4. Severability.

If any section, subsection, or clause of this Ordinance shall be deemed to be unconstitutional or otherwise invalid, the validity of the remaining sections, subsections, and clauses shall not be affected.

Section 5. Conflicts.

All ordinances, resolutions, orders or parts thereof in conflict with the provisions of this Ordinance are, to the extent of such conflict, hereby repealed and the provisions of this Ordinance shall prevail and be given effect.

Section 6. Effective Date.

This Ordinance shall be read on two separate days, published pursuant to KRS Chapter 242, and become effective on March 8, 2021.

MCCRACKEN COUNTY FISCAL COURT

BY: _____

Craig Z. Clymer
McCracken County Judge Executive

ATTEST:

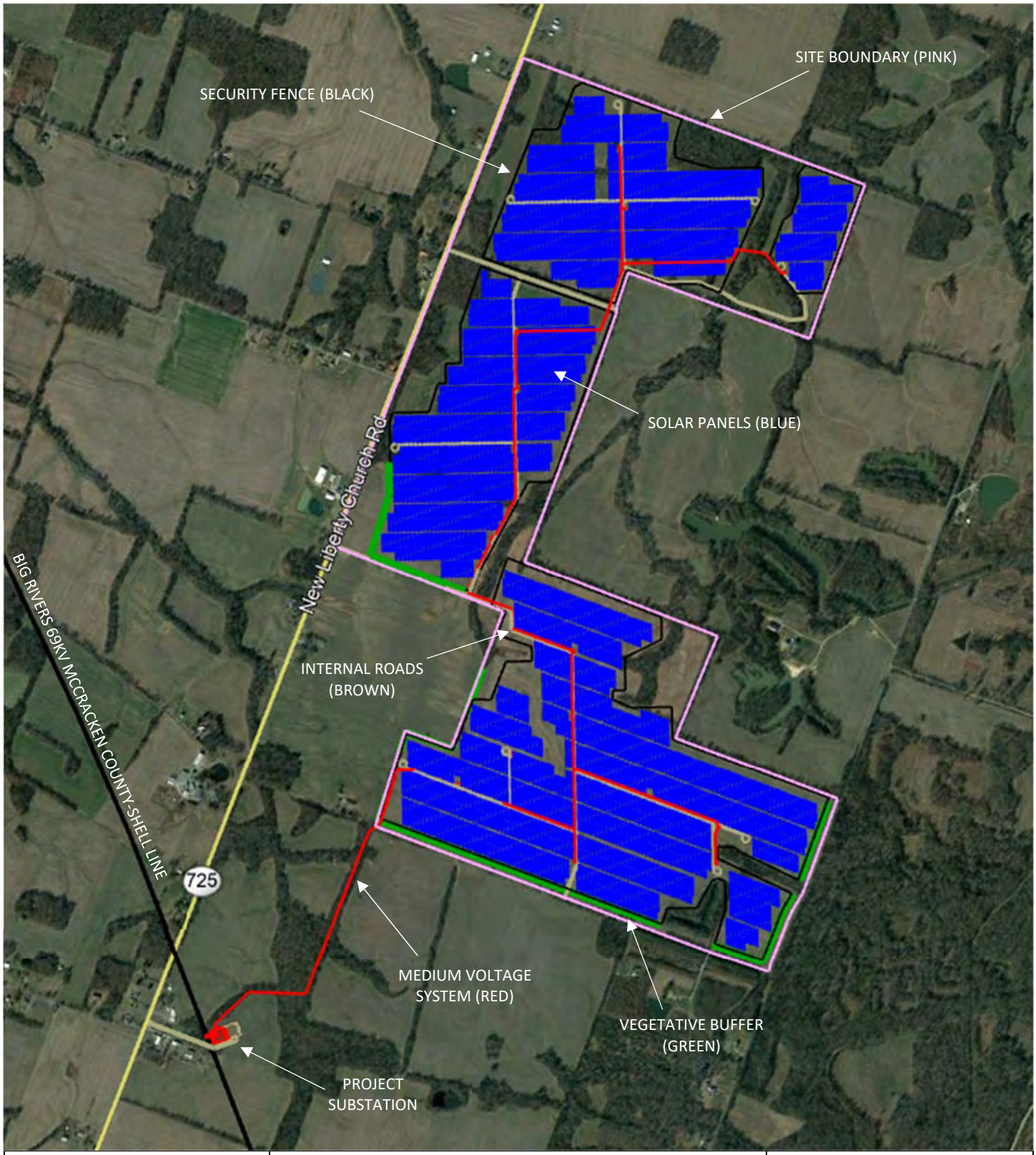
Julie Griggs
McCracken County Clerk

Introduced and publically read on 2-22-21.

Publically read and adopted on 3-8-21.

Recorded by County Clerk on 3-9-21.

Published by *The Paducah Sun* on 3-12-21.



COMMUNITY ENERGY®

COMMUNITY ENERGY SOLAR, LLC

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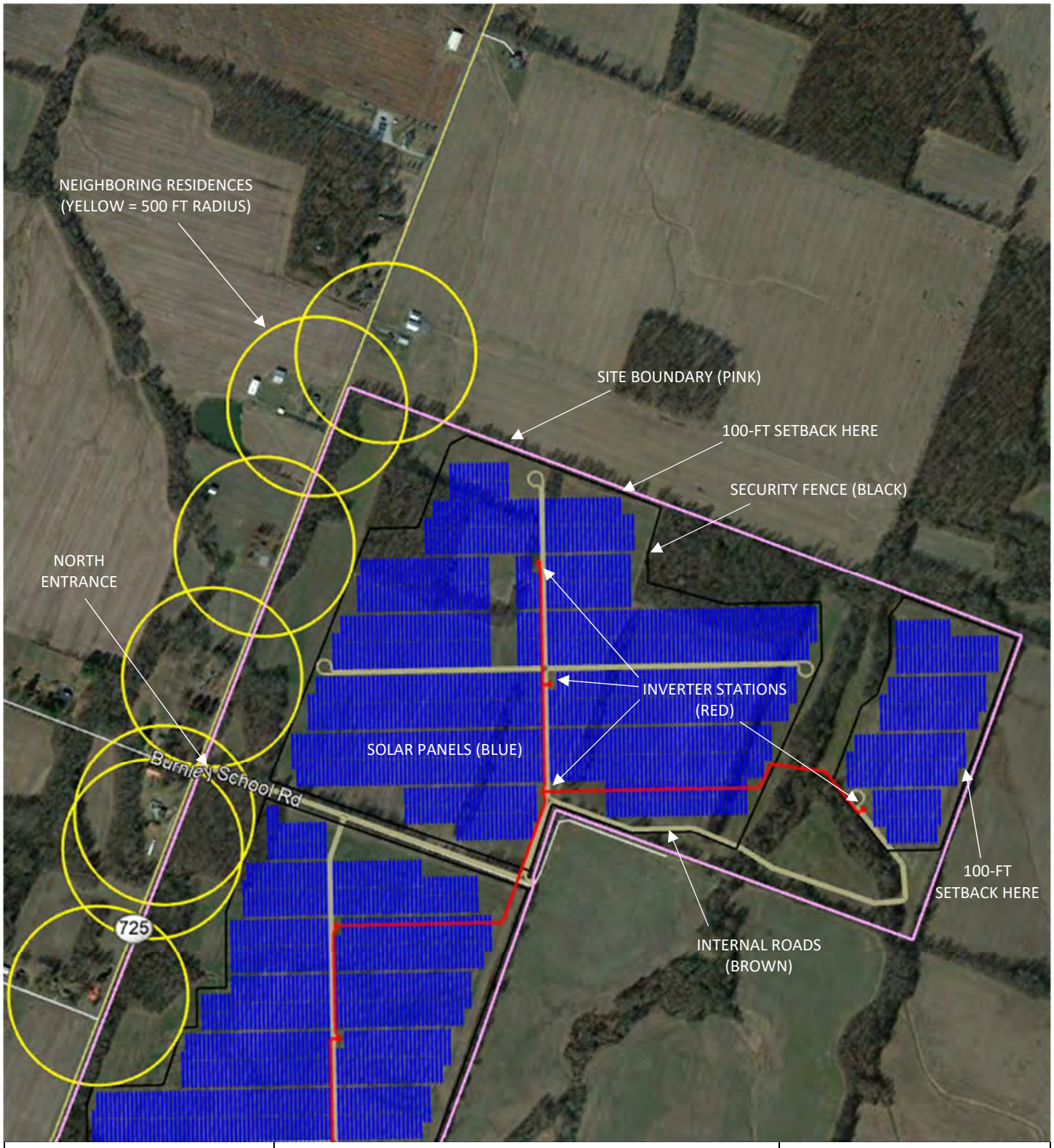
100 MATSONFORD RD.
RADNOR, PA 19087
(866) 946-3123

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: 5.3.2021

SITE PLAN OVERVIEW



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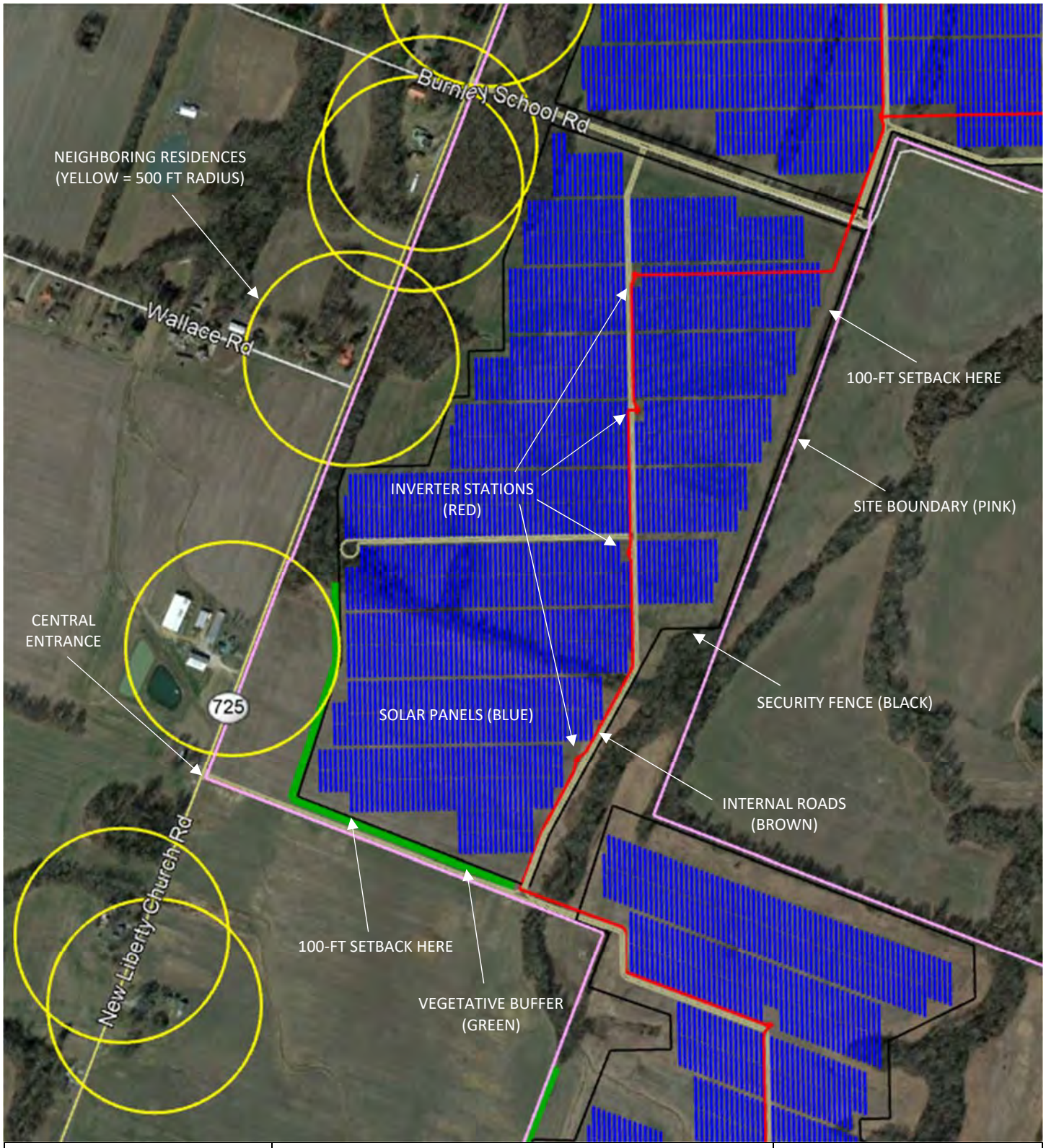
NEW LIBERTY CHURCH RD, KEVIL, KY 42053
LAT/LONG: 37.12 N / 88.86 W
DATE: 5.3.2021

SITE PLAN
DETAIL
NORTH SECTION



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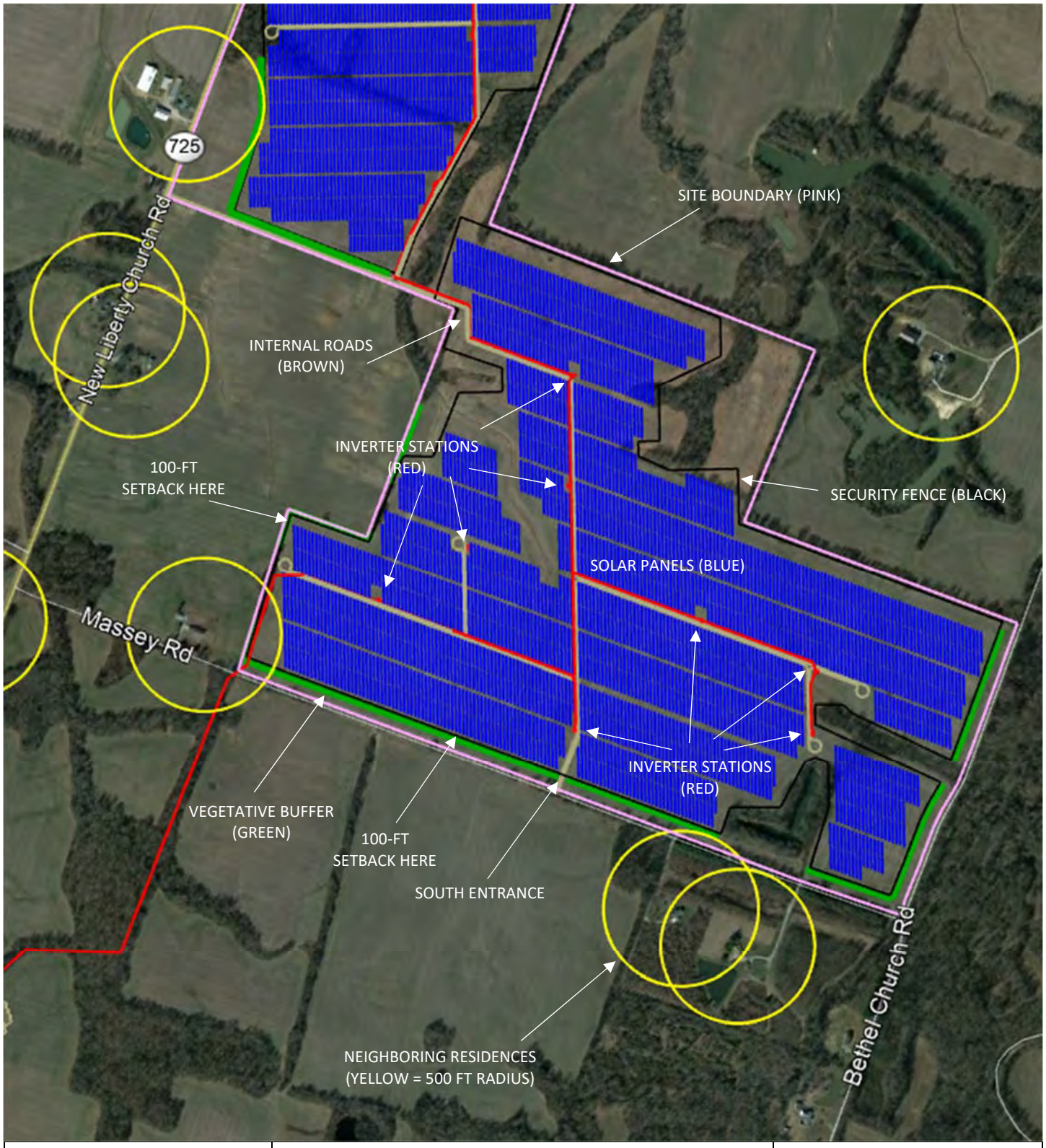
NEW LIBERTY CHURCH RD, KEVIL, KY 42053
LAT/LONG: 37.12 N / 88.86 W
DATE: 5.3.2021

SITE PLAN
DETAIL
CENTRAL SECTION



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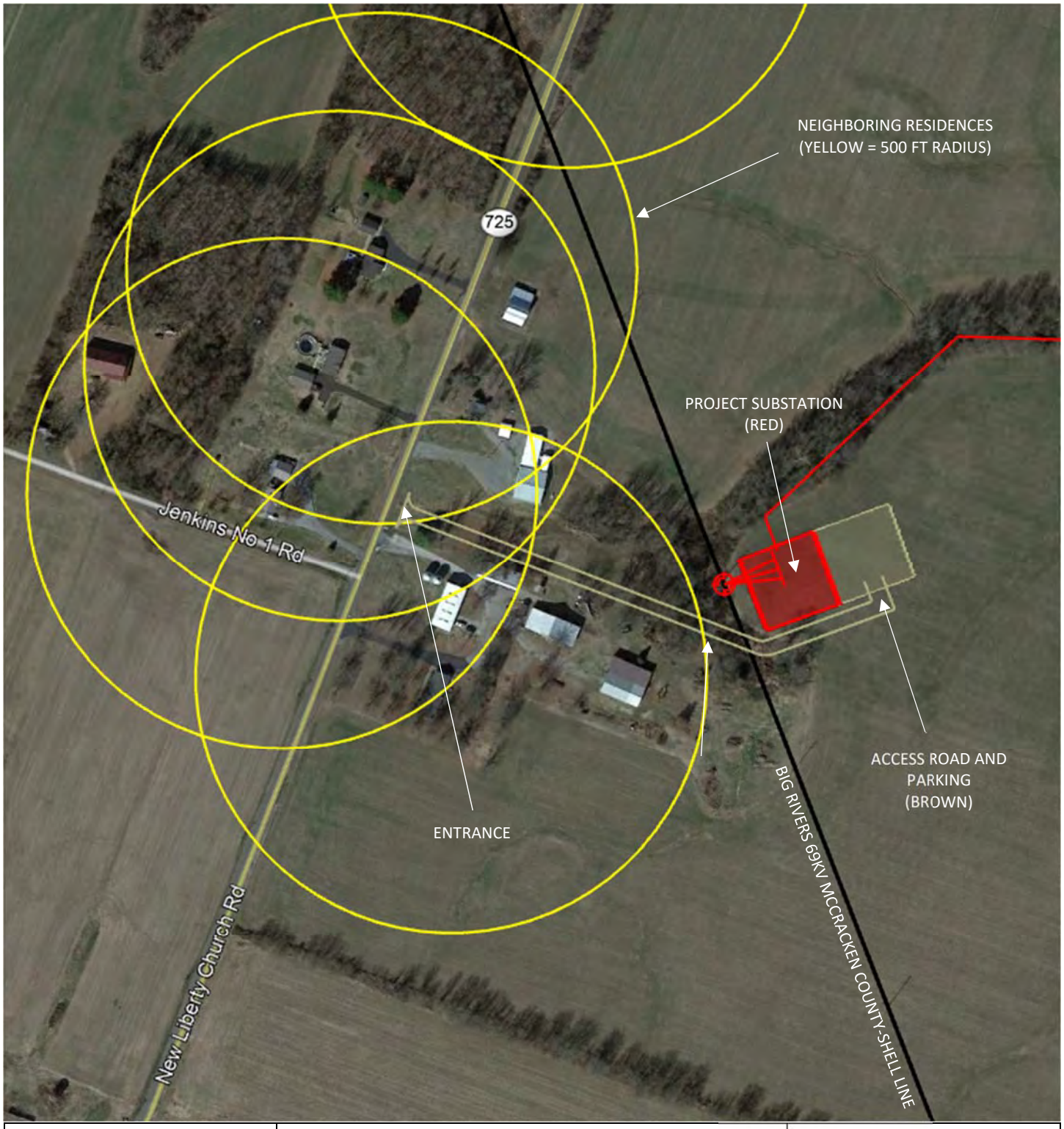
MCCRACKEN COUNTY, KY

N

NEW LIBERTY CHURCH RD, KEVIL, KY 42053
LAT/LONG: 37.12 N / 88.86 W
DATE: 5.3.2021

SITE PLAN
DETAIL
SOUTH SECTION



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(866) 946-3123

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

N

NEW LIBERTY CHURCH RD, KEVIL, KY 42053
LAT/LONG: 37.11 N / 88.87 W
DATE: 5.3.2021

SITE PLAN
DETAIL
PROJECT SUBSTATION

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 6
Volume 1, Tab 6

Filing Requirement: KRS 278.706(2)(f)

A complete report of the applicant's public involvement program activities undertaken prior to the filing of the application, including: 1. The scheduling and conducting of a public meeting in the county or counties in which the proposed facility will be constructed at least ninety (90) days prior to the filing of an application, for the purpose of informing the public of the project being considered and receiving comment on it; 2. Evidence that notice of the time, subject, and location of the meeting was published in the newspaper of general circulation in the county, and that individual notice was mailed to all owners of property adjoining the proposed project at least two (2) weeks prior to the meeting; and 3. Any use of media coverage, direct mailing, fliers, newsletters, additional public meetings, establishment of a community advisory group, and any other efforts to obtain local involvement in the siting process

Respondent: Chris Killenberg

Pursuant to the Order of the Kentucky State Board on Electric Generation and Transmission Siting in Case No. 2020-00392 dated December 18, 2020, the Applicant conducted the following Public Involvement Activities which fulfilled the statutory requirement for a public meeting in the county in which the proposed facility will be constructed at least ninety (90) days prior to the filing of the application, for the purpose of informing the public of the project and receiving comment:

Project Website

On December 30, 2020 the Applicant launched a Project Website, accessible to the public, containing the following key information:

- An introduction of Community Energy, Inc., and a link to obtaining more information about the company;
- A PowerPoint presentation providing general information on the McCracken County Solar Project;
- The date, time, and location of In-Person Office Hours for dissemination of relevant information to the public regarding the solar project;
- The date, time, and other details of a subsequent Virtual Public Information Meeting;
- A map showing the solar project area, facility layout, aerial imagery, and parcel information for all participating properties in McCracken County;
- Information pertaining to state and county permitting processes;

- Contact information and instructions for submitting questions and comments regarding the solar project;
- A summary of frequently asked questions and responses; and
- Instructions on how to request more information, including paper copies of the PowerPoint presentation.

The address of the Project Website is:
https://www.communityenergyinc.com/mccrackencountysolar

A screen shot of the website, the frequently asked questions and PowerPoint presentation are attached as Exhibit 6 Attachment 6.1.

In-Person Office Hours

On December 30, 2020, the Applicant published notice on the Project Website, and sent letters to thirty (30) adjacent landowners, providing information about specific hours for in-person discussion opportunities in McCracken County, for the purpose of providing any member of the public an opportunity to ask questions about the solar project and obtain further information.

On Wednesday January 13, 2021 from 7:00am – 9:00pm Central Time (CT) and on Thursday January 14, 2021 from 7:00am – 9:00pm CT the Applicant conducted the In-Person Office Hours at the Country Inn and Suites, 145 McBride Lane, Paducah, Kentucky 42001.

One interested party attended the In-Person Office Hours:

- On January 13, 2021, Chris Killenberg, representing the Applicant, met with Patrick Bouldry and his son. Mr. Bouldry is the owner of land adjacent to the proposed project site, where he also resides. Mr. Bouldry had previously contemplated the lease of a portion of his property to be used for the proposed project. Ultimately, the Applicant decided not to pursue a lease with Mr. Bouldry. Mr. Bouldry expressed that he was in favor of solar power. He inquired as to the proximity of planned solar panels to his property line, and whether the existing natural vegetative buffer would remain intact. Mr. Killenberg confirmed that the Applicant intended to retain the existing natural vegetative buffer. Mr. Bouldry inquired about the possibility of providing landscaping and other services to the project. Mr. Killenberg pledged to make Mr. Bouldry aware of any related bid opportunities.

Virtual Public Information Meeting

On December 30, 2020, the Applicant published notice on the Project Website, and sent letters to all adjacent landowners, providing information about a live presentation of the solar project with a question-and-answer session, accessible to the public either by the internet or by telephone.

On December 30, 2020, the Applicant published notice in the Paducah Sun, providing information about a live presentation of the solar project with a question-and-answer session, accessible to the public either by the internet or by telephone.

On Wednesday January 20, from 7:00pm – 8:30pm Central Time (CT) the Applicant conducted a Virtual Public Information Meeting featuring a presentation of the Proposed Project from McCracken County Solar representatives, and providing an opportunity for the public to ask any questions related to the solar project. The meeting was conducted on a web-based platform accessible to the public and capable of hosting up to 1,000 participants, and the meeting was accessible by telephone. The individuals present at the public meeting representing McCracken County Solar available to answer questions from attendees included:

- Chris Killenberg, Regional Development Director, Community Energy Solar, LLC
- Rich C Kirkland, Jr., MAI, Kirkland Appraisals, LLC
- Marty Marchaterre, Senior Environmental Planner, Copperhead Environmental Consulting, Inc.

Two interested parties attended the Virtual Public Information Meeting. A recording of the Virtual Public Information Meeting is accessible via the Project Website at https://www.communityenergyinc.com/mccrackencountysolar.

Notice of the time, subject, and location of the In-Person Office Hours held on January 13 and 14, 2021, and the Virtual Public Information Meeting conducted on January 20, 2021, as well as the web address of the project website, was mailed to all owners of property adjoining the proposed project on December 30, 2020, and was published in the Paducah Sun on December 30, 2020.

A copy of the template notice that was mailed to all thirty (30) adjacent landowners, along with a list of all adjacent landowners and addresses to which the notice was sent, is provided in Exhibit 6 Attachment 6.2.

The Affidavit of Publication, including the text of the notice that was published in the Paducah Sun, is provided in Exhibit 6 Attachment 6.3.

Media coverage, direct mailing, fliers, newsletters, additional public meetings, establishment of a community advisory group, and any other efforts to obtain local involvement in the siting process includes the following:

Media Coverage

On February 23, 2021, the Paducah Sun reported the 1st reading of a proposed solar ordinance for McCracken County, referencing an "undisclosed company… developing a solar farm in west McCracken County" that "could be as large of an energy footprint as 60 megawatts covering 500 to 600 acres."

On March 12, 2021, a notice was published in the Paducah Sun announcing the enactment of a new ordinance pertaining to solar energy systems, and providing contact information to any person desiring to inspect or receive a copy of the same.

Follow Up Calls to Adjacent Landowner Mailing

On December 30, 2020, the Applicant mailed to thirty (30) adjacent landowners a package which included a site map, details about the project, the project website address, and details about opportunities to participate in the In-Person Office Hours and Virtual Public Information Meeting.

Between January 7th and January 15th, 2021, Chris Amsbary, representing the Applicant, called the subset of sixteen (16) landowners who own or reside in residences adjacent to the project site (as opposed to owners of undeveloped land). Chris Amsbary reached nine (9) of these landowners (or, in two (2) cases reached a care provider/family member). The other seven (7) landowners not reached were called a minimum of 3 times.

Of the nine (9) follow-up conversations:

- Seven (7) calls were brief, with the landowner thanking Applicant for the follow-up call and indicating they were not interested in any further discussions or action and have no issue with the project.
- Two (2) of the calls (Evans, Sullivan) led to a follow up discussion about details of the project (primarily screening and access around the site). Both ultimately led to the landowner being satisfied the project won't impact them and ended with them not planning any further discussion or action.
- Three (3) of the calls (Nobo, Evans, Liner), resulted in the landowner expressing interest in work opportunities created by the project.
- The call with Patrick Bouldry resulted in his attendance at the In-Person Office Hours discussed above.

A list of the sixteen (16) adjacent residing landowners who received follow-up calls from the Applicant is provided in Exhibit 6 Attachment 6.4.

Private Meetings or Conversations with Adjacent Landowners

Rice Estate (Charlotte Benton)

- On July 10, 2019, Chris Amsbary met in person with Mrs. Benton at her home for a discussion of the project and the potential for leasing acreage or securing an easement for the project. At that time, there was no interest in a lease, as Mrs. Benton's son was then farming the land. Chris Amsbary subsequently spoke to Mrs. Benton and her son over a period of months. In May 2020 the Bentons ultimately decided they were not interested in participating in the project.

Jeff Sullivan

- On July 10, 2019, Chris Amsbary met in person with Mr. Sullivan at his home office for a discussion of the project. Mr. Sullivan stated that he was not interested in leasing much land for solar. He would consider a few acres, or an easement. He stated that he was not interested in participating broadly in the project, but would not oppose it. Chris Amsbary had additional telephone conversations with Mr. Sullivan over the ensuing months, primarily pertaining to a possible utility easement across Mr. Sullivan's land.
- On Sept 15, 2020, Chris Killenberg met in person with Mr. Sullivan at one of his farm fields to discuss the status of the project. Mr. Sullivan expressed his doubt as to whether the project was "real" and likely to get constructed. After further discussion, Mr. Sullivan agreed to consider a utility easement across his land. The Applicant subsequently sent a proposal for such an easement, but Mr. Sullivan decided not to participate.

Simmons family

- On May 5, 2020, Chris Amsbary contacted Daryl Simmons and Susan Wright by telephone to discuss the project. A conference call with 4 of the 5 family landowners was held the following week. Over the ensuing 3-month period, several emails and calls were exchanged, including a draft lease for a portion of the Simmons family property. In August 2020, the family decided not to participate in the solar project by granting a land lease.
- On Sept 15, 2020, Chris Killenberg met in person with Mr. Simmons at his farm to discuss the status of the project and the possibility of a utility easement across the family's property. Mr. Simmons agreed to consider such an easement. Ultimately, however, the Simmons family decided not to participate in the solar project by granting a utility easement.

Terry Gibson

- On May 6, 2020, Chris Amsbary contacted Mr. Gibson by telephone to discuss the project. On September 22, 2020, Mr. Gibson signed a lease with the Applicant for 132 acres of land to be included in the project. However, in December 2020 the Applicant informed Mr. Gibson that his land would not be included in the final footprint of the project.

Patrick Bouldry

- On May 6th, 2020, Chris Amsbary contacted Mr. Bouldry to discuss the project. Mr. Bouldry is the owner of land adjacent to the proposed project site, where he also resides. In September 2020, subsequent to three additional conversations, and in response to Mr. Bouldry's expression of interest, Chris Amsbary sent Mr. Bouldry a Site Control Agreement to review. Ultimately, the Applicant decided not to pursue a formal agreement with Mr. Bouldry.
- On January 13, 2021, Chris Killenberg, representing the Applicant, met with Patrick Bouldry and his son during the 'In-Person Office Hours.' Mr. Bouldry expressed that he was in favor of solar power. He inquired as to the proximity of planned solar panels to his property line, and whether the existing natural vegetative buffer will remain

intact. Mr. Killenberg confirmed that the Applicant intended to retain the existing natural vegetative buffer. Mr. Bouldry inquired about the possibility of providing landscaping and other services to the project. Mr. Killenberg pledged to make Mr. Bouldry aware of any related bid opportunities.

Derek Warford

- On May 25, 2020, Chris Amsbary contacted Mr. Warford by telephone to discuss the project. On August 27, 2020, Mr. Warford signed a Site Control Agreement for the purpose of evaluating his land for inclusion in the project. Ultimately, the Applicant decided not to pursue a lease with Mr. Warford.

Wayne Tisdal

- On Oct. 19, 2020, Chris Amsbary contacted Mr. Tisdal by telephone to discuss the project, and the possibility of securing a utility easement across Mr. Tisdal's land. The Applicant subsequently provided a draft agreement for Mr. Tisdal's review. In December 2020, the Applicant informed Mr. Tisdal that it had decided not to pursue a utility easement with Mr. Tisdal.

Larry Dowdy

- On November 5, 2020, Chris Amsbary contacted Mr. Dowdy by telephone to discuss the project, and the possibility of securing a utility easement across Mr. Dowdy's land. Mr. Dowdy was not interested in participating in the solar project.

<u>Private Meetings or Conversations with Nearby Landowners</u>

Cara Alexander

- On Aug 21, 2020, Chris Amsbary contacted Mrs. Alexander by telephone to discuss the project.
- On September 14, 2020, Chris Killenberg met in person with Mrs. Alexander and her husband at their home to further discuss the project.
- On October 7, 2020, Mrs. Alexander signed a Site Control Agreement for the purpose of evaluating her land for inclusion in the project. Ultimately, the Applicant decided not to pursue a lease with Mrs. Alexander.

Mike McNelly

- On June 21, 2020, Chris Amsbary contacted Mr. McNelly by telephone to discuss the project. Mr. McNelly expressed interest in potentially leasing his land. In August 2020, the Applicant informed Mr. McNelly that it had decided not to pursue a lease.

Cheryl Scott

- On May 12, 2020, Chris Amsbary contacted Mrs. Scott by telephone to discuss the project. Subsequent phone conversations over the next few weeks resulted in the execution of a lease on September 4, 2020 for a portion of Mrs. Scott's property.

- On September 15, 2020 Chris Killenberg met in person with Mrs. Scott's son, who resides on the property.
- In January 2021, the Applicant informed Mrs. Scott that her property would not be included in the final footprint of the project. On Feb. 27, 2021, the Applicant terminated the lease with Mrs. Scott.

Ray Harris

- On Jan 13, 2021, Chris Killenberg spoke by telephone to Ray Harris who currently farms a portion of the proposed project site (part of the Padon tract). Mr. Harris was sorry to no longer farm the land, but supportive of the Padon's decision. Mr. Harris asked about opportunities to provide "rock trucks", mowing, driveway maintenance, and other services to the project. Mr. Killenberg pledged to make Mr. Harris aware of any related bid opportunities.

<u>Outreach to Public Officials</u>

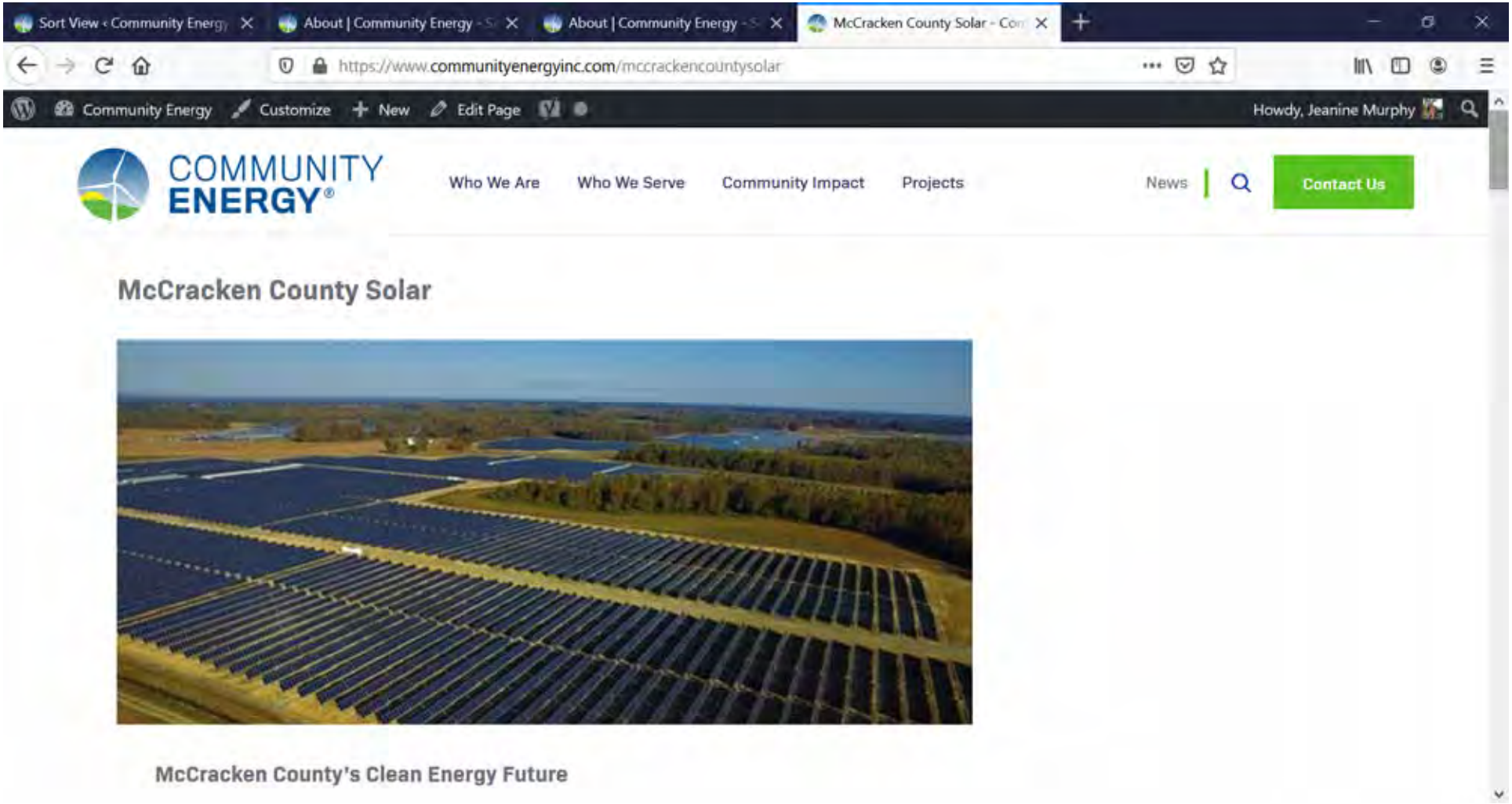
- On September 15, 2020, Chris Killenberg met in person with McCracken County officials to introduce the proposed project. Those officials were:
  - Craig Clymer – Judge Executive
  - Steve Doolittle – Deputy Judge Executive
  - Steve Ervin – Community Development
  - Greg Cannon – Planning & Zoning
- On October 20, 2020, Chris Killenberg met in person in Selmer, TN with the four County officials listed above to lead a tour of three operating large-scale solar farms. The tour was arranged by the Applicant and provided for the purpose of helping McCracken County officials envision a large-scale solar farm in aid to their drafting of a new solar ordinance.
- On December 30th, 2020, the Applicant mailed and e-mailed a copy of the adjacent landowner package to the following McCracken County public officials:
  - Craig Clymer – Judge Executive
  - Steve Doolittle – Deputy Judge Executive
  - Steve Ervin – Community Development
  - Greg Cannon – Planning & Zoning
  - Wayne Elliot – Chairman, Planning Commission
  - Edwin Jones – Commissioner, 3rd District
    - Replied to email saying "looks great."
  - Danny Carroll – State Sentator
    - Replied to email saying "thank you."
  - Randy Bridges - State Representative
  - Bradley Pickett – Fire Chief, Kevil Rural Fire Department
    - On January 25, 2021, Chris Amsbary spoke to Mr. Pickett about the site, access, safety etc., offering to provide construction plans to Mr. Pickett when they become available for review.

Attendance at Public Meetings

- On January 27, 2021, Chris Killenberg addressed the McCracken County Planning Commission in support of the proposed solar ordinance.

EXHIBIT 6
ATTACHMENT 6.1

McCracken County Solar on Community Energy Website – 01.27.21



In May 2020, Community Energy and Big Rivers Electric Corporation announced an agreement for the supply of 100 megawatts of new solar power to Big Rivers' energy portfolio for the benefit of their Member-Owners. Sixty megawatts (60MW) will be generated and delivered to Big Rivers' transmission system by a new solar farm under development by Community Energy in McCracken County, Kentucky. 'McCracken County Solar' is scheduled to be constructed and commence operations in 2022.

You're Invited

Community Energy is conducting two public information events designed to provide an opportunity for you to learn about the project, ask questions, and provide comments.

In-Person Office Hours:
We're hosting in-person "office hours" in Paducah, KY to provide interested parties with a one-on-one opportunity to seek more information. These meetings will be held in a large conference room, limited to one individual or one family at a time. Face masks and social distancing will be required.

The In-Person Office Hours will be held at the Country Inn and Suites, 145 McBride Lane, Paducah, KY 42001 (at the intersection of Hwy 60 and Interstate 24). The dates and available times are:
Wednesday — January 13, 2021 from 7:00am – 9:00pm Central Time (CT)
Thursday — January 14, 2021 from 7:00am – 9:00pm Central Time (CT)

To accommodate as many interested parties as possible, the individual/family meetings will be limited to one hour. To sign up for a 1-hour block, please see send us an email at mccrackencountysolar@communityenergyinc.com, or call our toll-free number at (866) 946-3123.

Virtual Public Information Meeting:
We will hold a live web-based presentation of the project, followed by a live question-and-answer session. The live presentation will be also be accessible by telephone. The presentation will be recorded, and available afterward on this website.

The Virtual Public Information Meeting will be held on:

Wednesday — January 20, 2021 from 7:00pm – 8:30pm Central Time (CT)

You can join the Virtual Public Information Meeting via the web link:
www.bigmarker.com/McCracken-County-Solar-Public-Meeting.
Please access the link in advance, to sign up for the meeting.

Or, you can call-in (toll free): **(888) 241-9901**
Enter ID Number: 386643 and Passcode Number: 3336

About the Project

The proposed 'McCracken County Solar' project is a 60 MW solar farm to be located in western McCracken County along New Liberty Church Rd., about 2 ½ miles north of the town of Kevil, Kentucky. The project site includes approximately 615 acres of land. The solar farm will sell 100% of the electricity it generates to Big Rivers Electric Corporation. This facility is expected to produce 140 million kilowatt-hours of electricity per year – roughly ½ the amount of electricity consumed by all the households in McCracken County.

Already, environmental studies have been conducted to help design and position the solar farm in a way that avoids impacts to wetlands, wildlife, and cultural resources. The proposed system layout will also exceed typical setback requirements for solar farms. In addition to being a safe, reliable, and sustainable supplier of power to Big Rivers, McCracken County Solar seeks to be a good neighbor and a contributing member of the business community. 'McCracken County Solar' is scheduled to be constructed and begin operations in 2022.

For a PowerPoint presentation of the project, click this link: **McCracken County Solar PowerPoint**

For maps of the project site, click this link: **McCracken County Solar Maps**

Project Benefits

Solar farms do more than generate low-cost electricity. They also generate economic growth. The McCracken County Solar project will impact the local economy in multiple ways:

- **Construction Jobs for local workers:** +/- 150 jobs during the 6-9 month construction of the project.
- **Construction Contracts for local businesses:** Electrical, Site Work, Landscape, etc.
- **Local Economic Stimulus during construction:** Hotels, Restaurants, Shops, Entertainment, etc.
- **Long-term Tax Revenue:** The solar farm will pay substantial taxes over 20+ years, without increased pressure on community services such as roads, schools, libraries, and first responders.
- **Full-Time Operations and Maintenance Jobs:** 2-3 full-time equivalent O&M jobs.

County Permitting Process

Community Energy will seek a Conditional Use Permit for the McCracken County Solar project from the McCracken County Planning Commission in the spring of 2021. Public notices announcing related meetings and public hearings will be published in *The Paducah Sun*.

State Permitting Process

Community Energy will seek a Construction Certificate for the McCracken County Solar project from the Kentucky State Board on Electric Generation and Transmission Siting (the "Siting Board") in 2021. Public notices announcing related meetings and public hearings will be published on this website, and in *The Paducah Sun*.

The Siting Board will review the proposed solar farm, with a focus on three areas:

- **Environmental matters**
- **Economic impacts**
- **Impact on the electric transmission grid**

Find more information about the Siting Board process click this link: **Guide to KY Siting Board Process**

About Community Energy

Community Energy is a leading renewable energy developer with over 20 years of experience and developed many of the first and largest wind and solar projects in the United States. This includes over 1,300 MW of solar farms similar to our proposed McCracken County Solar project. Community Energy is headquartered in Radnor, Pennsylvania with offices in Boulder, Colorado, and Chapel Hill, North Carolina.

For more information about Community Energy, please visit https://www.communityenergyinc.com

Frequently Asked Questions (FAQs)

For a list of Frequently Asked Questions, please visit: **McCracken County Solar FAQs**

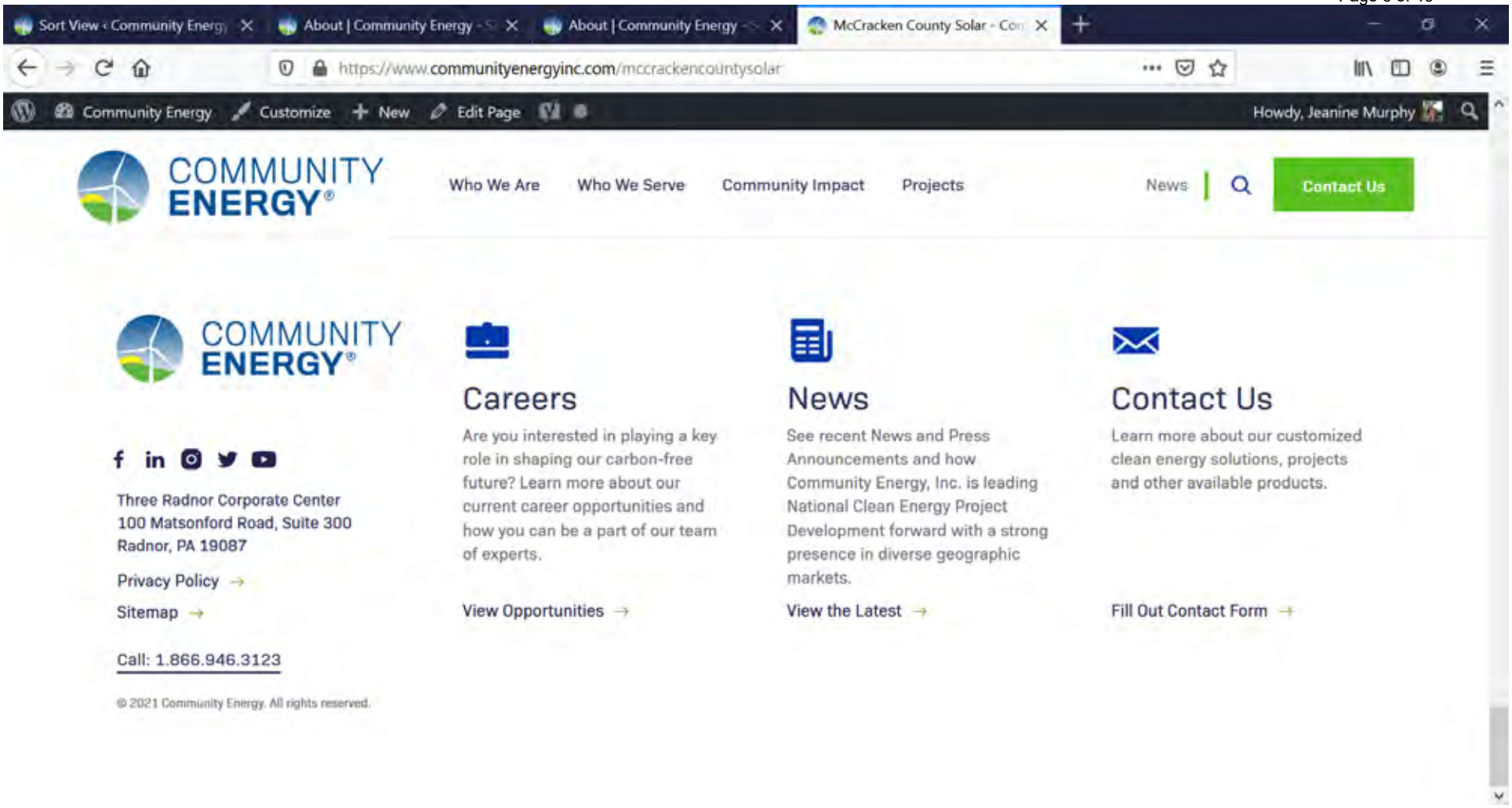
To submit new questions about the proposed solar farm, please send an email to mccrackencountysolar@communityenergyinc.com or mail your questions to P.O. Box 17236, Chapel Hill, NC 27516.

Contact Information

For more information, please contact us:

Email: mccrackencountysolar@communityenergyinc.com

Toll Free Number: (866) 946-3123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https://www.communityenergyinc.com/mccrackencountysolar
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Learn more about our customized clean energy solutions, projects and other available products.
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McCracken County Solar
Frequently Asked Questions

Describe the Project

McCracken County Solar is a proposed 60-megawatt (60 MW) solar farm in McCracken County, Kentucky. It will sell 100% of its output to Big Rivers Electric Corporation.

The project site will consist of approximately 615 acres along New Liberty Church Road, 2½ miles northeast of the town of Kevil, KY. The solar farm will consist of approximately 156,000 solar panels, ground-mounted on a racking system that will rotate to follow the sun. Dispersed throughout the solar farm will be electrical equipment that will gather the electricity we generate and feed power lines to a new substation that will be built for the interconnection of the solar farm to the Big Rivers transmission line in that area. The proposed solar farm is expected to produce 140 million kilowatt-hours of electricity per year - roughly ½ the amount of electricity consumed by all the households in McCracken County. 'McCracken County Solar' is scheduled to be constructed and begin operations in 2022.

Who are Community Energy and McCracken County Solar LLC?

Community Energy is one of the leading renewable energy development companies in the U.S. We've been in business for 21 years, developing many of the first and largest wind and solar projects in the country. This includes over 1,300 megawatts of solar farms similar to our proposed McCracken County Solar project. Community Energy is headquartered in Radnor, Pennsylvania with additional offices in Boulder, Colorado, and Chapel Hill, North Carolina.

In our role as a solar developer, we identify good markets for solar power, we find appropriate sites for solar projects, then we obtain the necessary leases, studies, permits, surveys, etc. to create a "shovel-ready" solar project. In parallel, we line up an investor who will finance the project and become the long-term owner-operator.

For each of the projects we develop, we create a separate project company that holds all of the assets of the project. For this project, we created McCracken County Solar LLC. Today, Community Energy owns 100% of McCracken County Solar LLC. Once the project is shovel-ready, an investor will become the new owner. But McCracken County Solar LLC, and all its rights and responsibilities, will endure that transition.

Why McCracken County?

Last year, Big Rivers Electric Corporation conducted a competitive bid process, seeking to buy solar power under a long-term fixed-price contract. Community Energy's proposal for a solar farm in McCracken County was one of the bids selected. The result will be low-cost locally-produced solar power.

Are you leasing or buying the land?

McCracken County Solar LLC has entered into a number of long-term leases and easement agreements with local landowners. Our leases allow for 30 years of operation, with the option to extend for an additional 10 years.

Will you remove the equipment and restore the land at the end of the project?

Yes. Our leases require us to remove our equipment and restore the land at the end of the lease. In addition, our leases require us to establish and maintain resources that will pay for the cost of removal, net of any salvage value. Typically, counties also require provisions for the removal of the solar equipment. We anticipate that McCracken County will establish such a requirement in their upcoming solar ordinance.

What permits will the project require?

During the development stage, two key permits will be required:

A *Construction Certificate* will be required from the Kentucky State Board on Electric Generation and Transmission Siting (the "Siting Board"). The Siting Board is organized by the Kentucky Public Service Commission.

The Siting Board will be composed of seven (7) members: the (3) members of the Public Service Commission, two (2) members of state government (the Secretary of the Kentucky Cabinet for Energy and Environment or her designee, and the Secretary of the Kentucky Cabinet for Economic Development or his designee) and two (2) members of local government (the Chairman of the McCracken County Planning Commission, and a resident of the County appointed by the Governor).

Over the course of a roughly nine-month period, the Siting Board will review the proposed project, with a focus on three areas: 1) environmental matters such as noise and visual impacts, 2) economic impacts, and 3) the impact of the proposed facility on Kentucky's electric transmission grid.

More information can be found at https://psc.ky.gov/Home/EGTSB

A *Conditional Use Permit* will also be required from the McCracken County Planning Commission. Review and approval of the Conditional Use Permit will be subject to the parameters of an upcoming solar ordinance. Our development to date reflects our adherence to typical requirements established in solar ordinances in other jurisdictions in Kentucky.

Prior to construction, additional permits will be required including an erosion control permit, stormwater management permit, driveway permit, and a building/electrical permit.

How will the project impact the environment?

As part of the development process, we have already conducted multiple studies to identify sensitive features of our proposed project site. These include:

- A delineation of any wetlands and streams
- A search for any hazardous materials on site
- An assessment of the cultural resources on site (archeological and architectural)
- An identification of any threatened and endangered wildlife habitat on site

By identifying these resources at the front end, we can design our facility in a way that avoids any impacts. That's our plan; stay away from any sensitive features on the site.

The construction of the solar farm is also low impact. Unlike housing or commercial development, a solar farm does not require brick-and-mortar buildings or paved parking lots. The "foundation" of a solar farm is a steel post, driven into the ground. The racking system is bolted to the posts, and the solar panels are bolted to the racking system. When the project is at its end, this process is reversed, and the site can easily be returned to open land.

Underneath the solar panels, we will plant a slow and low-growing grass to manage any runoff or erosion. The land will essentially lay fallow for the 30-year project period.

During operations, there will be no emissions of any kind. To the contrary, the electricity we will produce will offset emissions at "traditional" power plants. We believe our local environmental impact will be neutral, while our broader environmental impact will be positive.

Do the solar panels contain hazardous materials?

There are no hazardous materials in modern solar photovoltaic panels. The panels we use are the same as those installed on rooftops of houses. They are solid state, much like a semi-conductor, and contain no liquids. If a panel is damaged, there is nothing to spill onto the ground. There are no special requirements for disposal of solar panels. There are now tens of thousands of acres of ground-mounted solar projects in the U.S, with no track record of any release of hazardous materials from those panels.

How about project security?

No part of the solar farm will be accessible to the public. The equipment will be surrounded by a security fence, typically a 6-foot-high chain link fence. Some jurisdictions require a higher fence; some require barbed wire on top. We will abide by the security fencing that is required under the upcoming McCracken County solar ordinance.

Within the solar farm, all solar equipment will be grounded and touch-safe, fully compliant with all applicable codes and accessible only to qualified personnel, with the exception of guided tours. When the amperage or voltage accumulates to a dangerous level, those wires will be buried in conduit underground. Any wires outside of our security fence will either be buried or placed on poles to the same standard of safety required by the local utility.

Prior to commencing operations, we will provide an orientation to local first responders to educate them about the project, the equipment, access, and procedures in case of unexpected events. Contact information for our monitoring and response center will be posted on the project fence to ensure the public can easily reach project representatives.

Will the solar farm be an eyesore?

Because of substantial existing natural vegetation around the perimeter of most of the site, the view of the project from neighboring houses and nearby public roads should be relatively limited. We are also planning to set our equipment back at least 500 feet from any neighboring houses. Where a natural buffer does not exist, we plan to install a double offset row of evergreen plantings that will grow to at least 6 feet in height. We will also reach out to any nearby landowners with a potential view of the solar farm, to collaborate on any additional measures we can take. Our goal is to be a good neighbor and to work in good faith to address any concerns.

Will the solar farm be noisy, or cause glare, or heat?

The solar farm will not be noisy. There are only a few pieces of solar equipment that make any sound. These are electrical devices equipped with cooling fans. These pieces of equipment will be generally located toward the middle of the solar farm, such that you cannot hear them from the periphery. And the periphery will be at least 500 feet from any neighboring house, with existing vegetation or a planted buffer in-between. Our analysis estimates that any sound emanating from the solar farm will be at a level no higher than that of a “rural area at night.”

The solar farm should not produce regular, significant glare. Solar panels are designed to absorb light, not reflect it, and are treated with an anti-reflection coating. Nevertheless, sometimes the sun can hit the solar panels at just the right angle to create glare. This is an infrequent and momentary occurrence, and typically does not have a significant adverse effect on neighboring houses. The occurrence should be even more rare due to the substantial natural buffer surrounding most of the solar farm.

Solar farms do not produce enough heat to be noticeable to adjacent properties.

What positive benefits can the solar farm bring?

The proposed solar farm will generate a number of positive benefits:

Jobs – There will be about 150 jobs created during the 6-9 month construction period. Most of these jobs don’t require experience or a specific skill set, so they’re accessible to anyone. Once operational, the solar farm will require 2-3 full-time employees. These will likely be local hires.

Contracts – Typically, a number of contracts are awarded to certain local trades during construction. This includes electrical work, earthmoving, fencing, landscaping, and security.

Spending – During the construction period, a significant amount of local spending will occur. This will be for items such as gas, food, lodging, clothes, entertainment, tools, and other sundries.

Taxes – The solar farm will pay hundreds of thousands of dollars of taxes on land that is currently paying less than $10,000 a year. Unlike residential or commercial development, this tax revenue will not be offset by an increase in County expenses for schools, water, sewer, etc.

Low-cost electricity – McCracken County Solar will sell 100% of its output to Big Rivers at a price that was the result of a highly-competitive bid process. This is not expensive “green” energy. It’s simply electricity, provided at a price competitive with any other source, and locked-in under a long-term contract.

Additional Questions

Do you have additional questions? Email them to us at mccrackencountysolar@communityenergyinc.com or call us at (866) 946-3123.

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McCracken County Solar

Presentation Outline

- **Introduction**
- **Description**
  - Why McCracken County?
  - What is a Solar Farm?
- **Project Site**
  - Project Site
  - Project Layout
  - Environmental Studies
  - Impact Studies
- **Permits**
  - County Permitting
  - State Permitting
- **Operations**
  - Construction
  - Operations and Maintenance
  - Output
  - Community Benefits
- **Summary**

About McCracken County Solar

McCracken County Solar is a proposed:

- 60 megawatt (60MW) solar farm
- Located on 615 acres near Kevil
- Selling 100% of its output to Big Rivers Electric Corporation
- Under development by Community Energy

About Community Energy

- In business for 21 years
- A leader in the development of renewable energy projects (especially in new markets)
- Headquarters in Radnor, PA
  - Additional offices in Colorado and North Carolina
- **Successful, experienced, and trusted**

Why McCracken County?

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Last year, Big Rivers Electric Corporation conducted a competitive bid process, seeking to buy solar power under a long-term fixed-price contract.

Community Energy's proposal for a solar farm in McCracken County was one of the bids selected.

The result will be low-cost locally-produced solar power.

Big Rivers ELECTRIC CORPORATION

What is a 'Solar Farm'?

A '**solar farm**' is essentially a power plant that converts sunlight to electricity.

The basic building block of a solar farm is a solar panel.

Solar panels are rectangular, about 3 ft wide and 5 ft tall. They're black or dark blue, with glass on top.

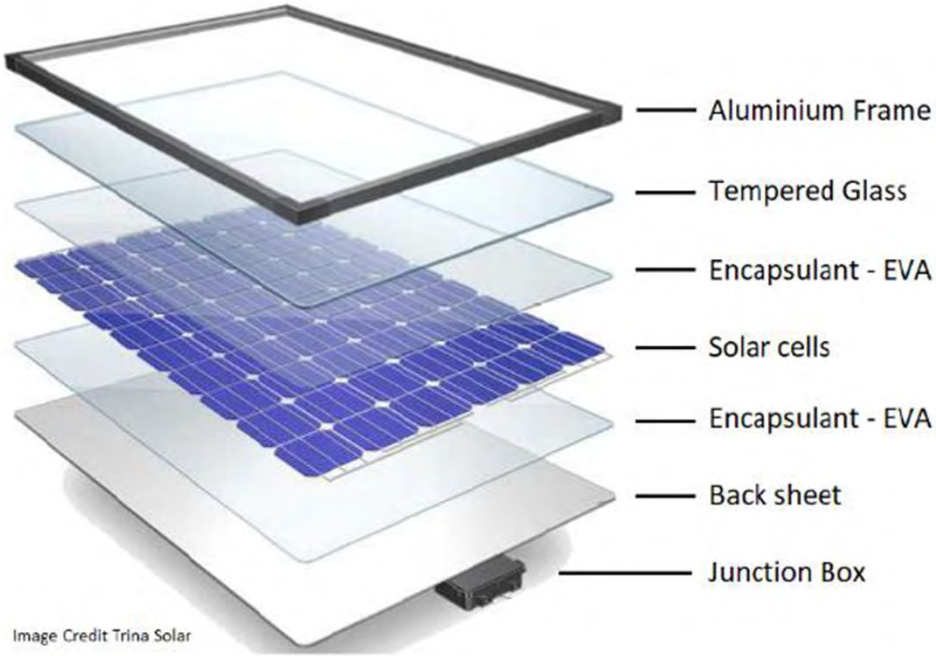
A solar farm is just a whole lot of solar panels, bolted to a racking system, and placed in a field.

Solar Panels

Solar panels are made of simple materials, including:

- Glass (+/- 85%)
- Aluminum (+/- 8%)
- Silicon (+/- 6%)
- Wiring (+/- 1%)
  - Wiring is typically made of copper, silver, and zinc

The proposed solar farm will utilize 156,000 solar panels.



Racking

The proposed solar farm will utilize a '**Single-Axis Tracking System**' – a rotating racking system that will follow the sun from east to west.

- First, a post is driven into the ground
- Then, the racking system is bolted to the posts
- Then, the solar panels are attached to the racks

Inverters

Solar panels produce ‘DC’ power (the same as in a car battery).

An ‘Inverter’ changes the power from ‘DC’ power to ‘AC’ power (the same as you use in your home).

Inverter stations will be located throughout the solar farm.

Transformers

Solar panels produce low-voltage electricity.

Transformers are used to increase the voltage to a usable level.

“Step-up Transformers” within the solar farm increase the voltage to a level similar to the typical voltage in the power lines that run along roads.

A “Main Transformer” at the project substation increases the voltage again, to the level in the transmission line.

Substation

To connect the solar farm to Big Rivers' transmission line, a substation will be built.

The substation will be a square area surrounded by a security fence, with electrical equipment inside.

A power line will connect the substation to the transmission line at a new 'tap' into the line.

The location of the tap is called the 'Point of Interconnection.'

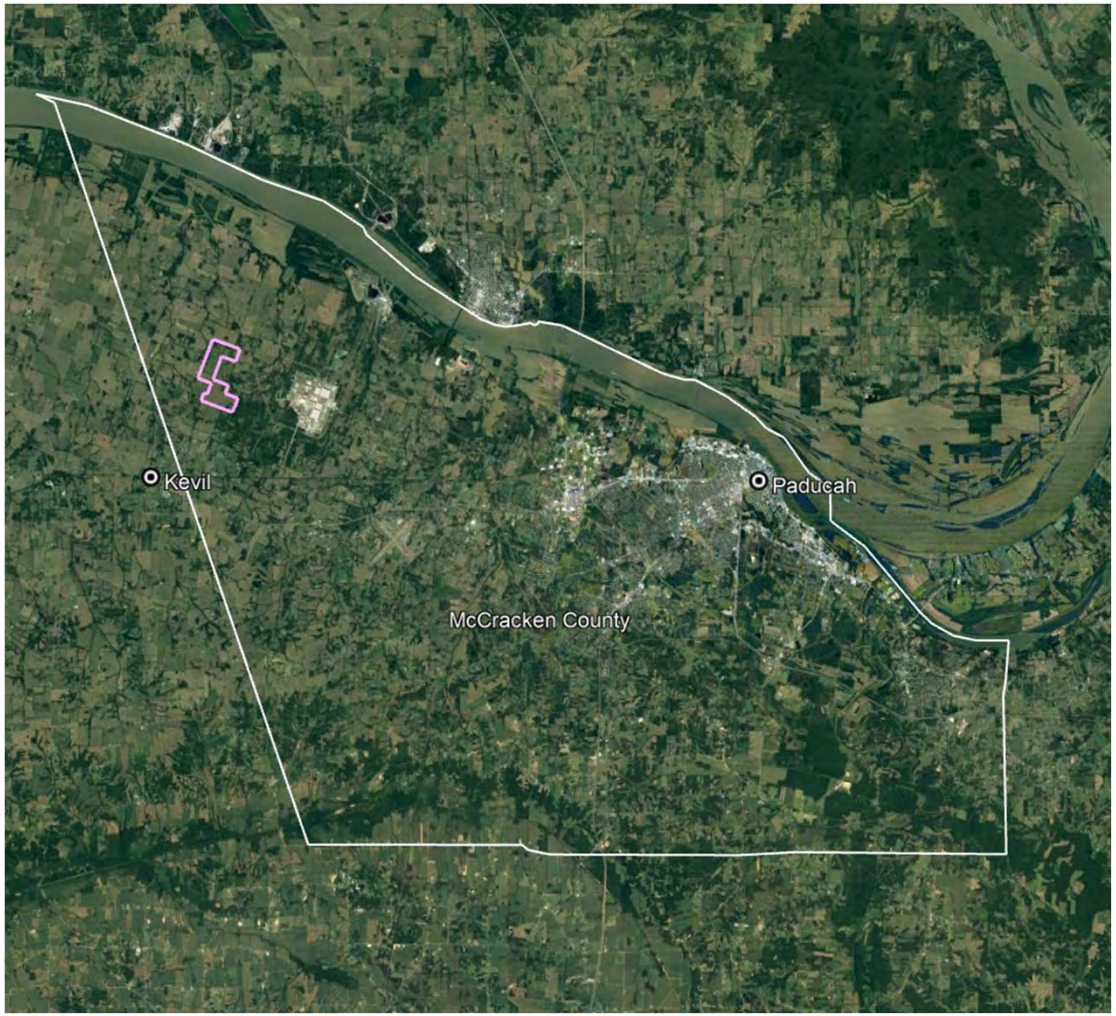
Security Fence

The solar farm will be built in a number of sections. Each section of the solar farm will be surrounded by a security fence, typically a six-foot tall chain link fence, sometimes topped with barbed wire (depending on local regulations).

Project Location

The project will be located in western McCracken County, approximately 2½ miles northeast of Kevil, KY.

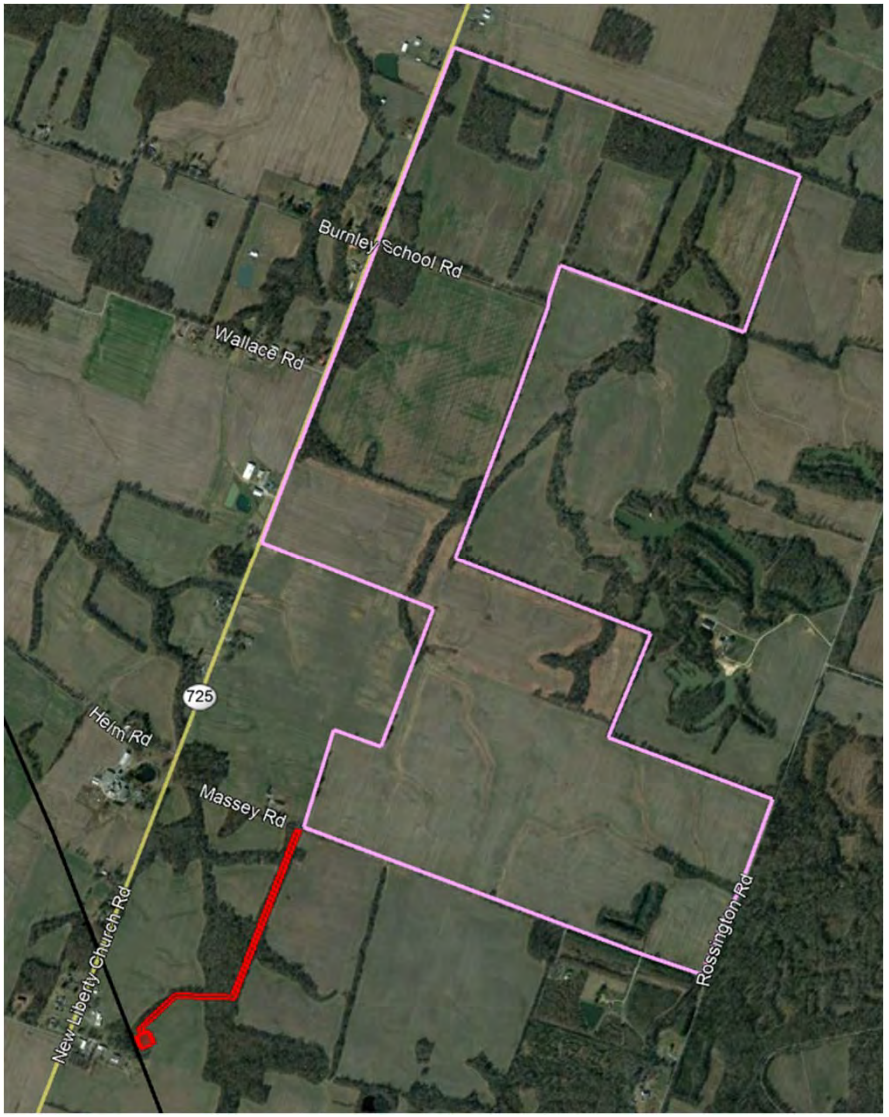
The project site is adjacent to the West Kentucky Wildlife Management Area, and near the Paducah Gaseous Diffusion Plant.



Project Site

The project site includes approximately 615 acres of land along New Liberty Church Road.

Most of the project site is currently open land used for row-cropping.

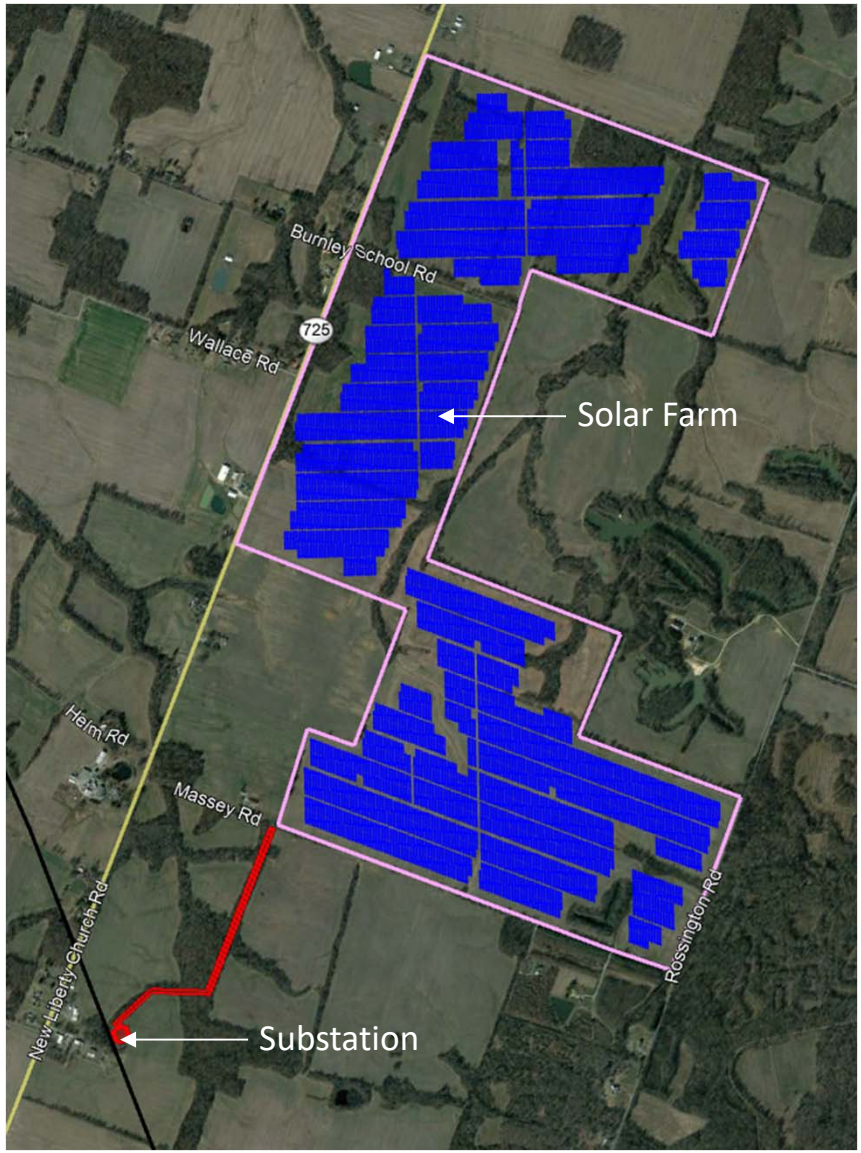


Project Layout

The solar farm will cover approximately 400 acres of the project site.

The solar panels will be set back from neighboring residences by at least 500 feet.

The natural vegetative buffer 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.



Project Layout – Northern Section

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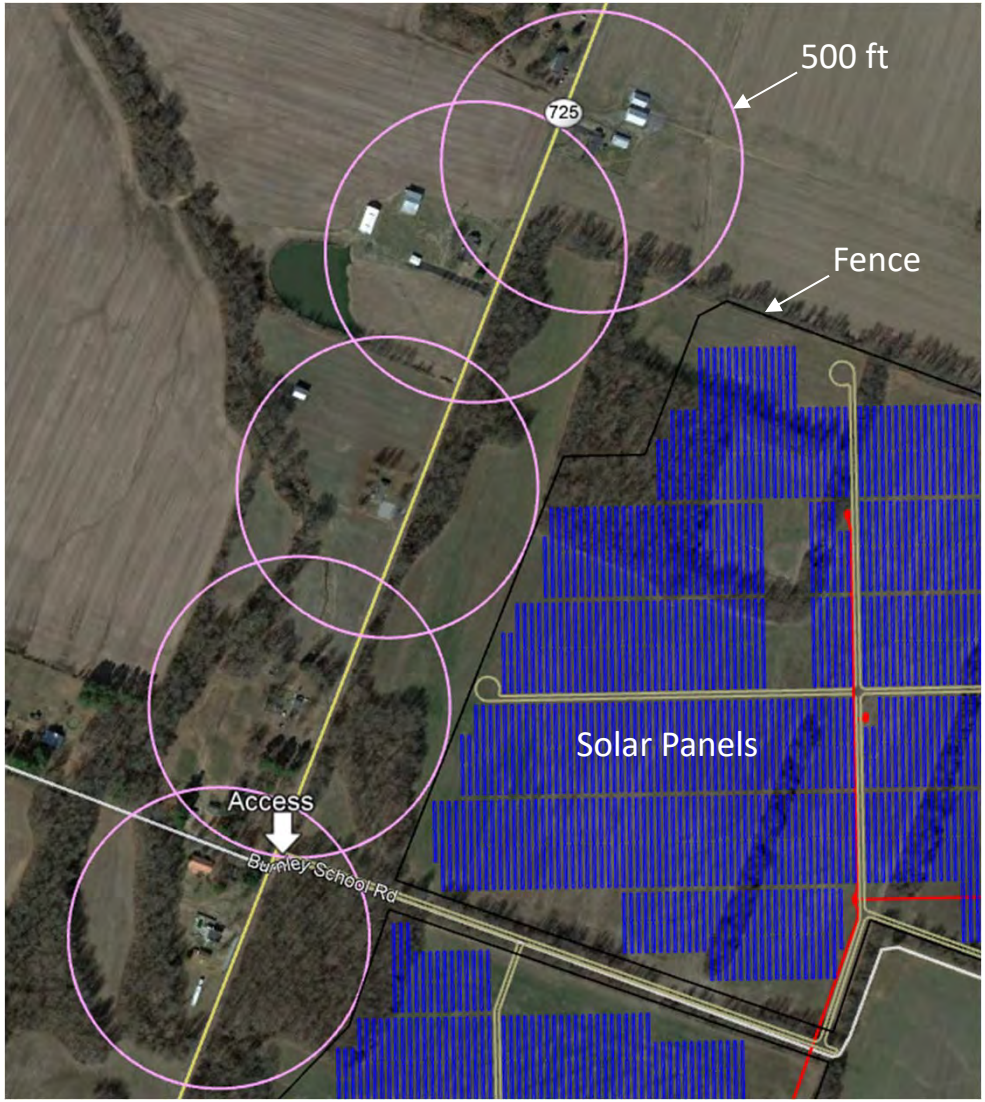
This close-up of the northern section of the solar farm illustrates the setbacks from neighboring houses.

This section of the solar farm benefits from a mature existing natural buffer along New Liberty Church Road. This buffer will be retained.

Access to this section will be from ‘Taylor Lane’ – a dirt road that will remain open, preserving access to the adjacent farm fields.

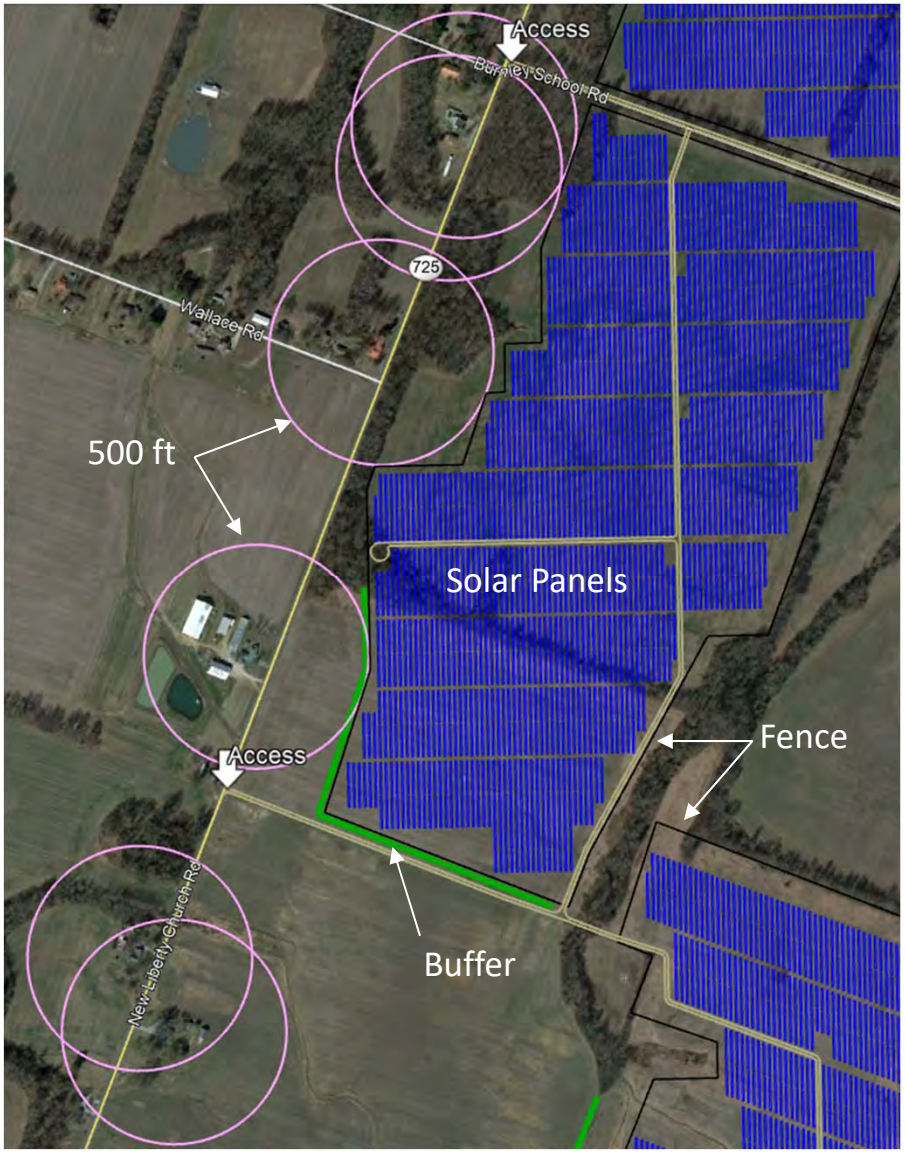


Project Layout – Central Section

This close-up of the central section of the solar farm illustrates the setbacks from neighboring houses.

A 2nd access road to this section will be from a new dirt lane along New Liberty Church Road.

A double-row of evergreen plantings will be installed along the southwest corner of this section of the solar farm to provide a visual buffer to neighbors and passing cars.



Project Layout – Southern Section

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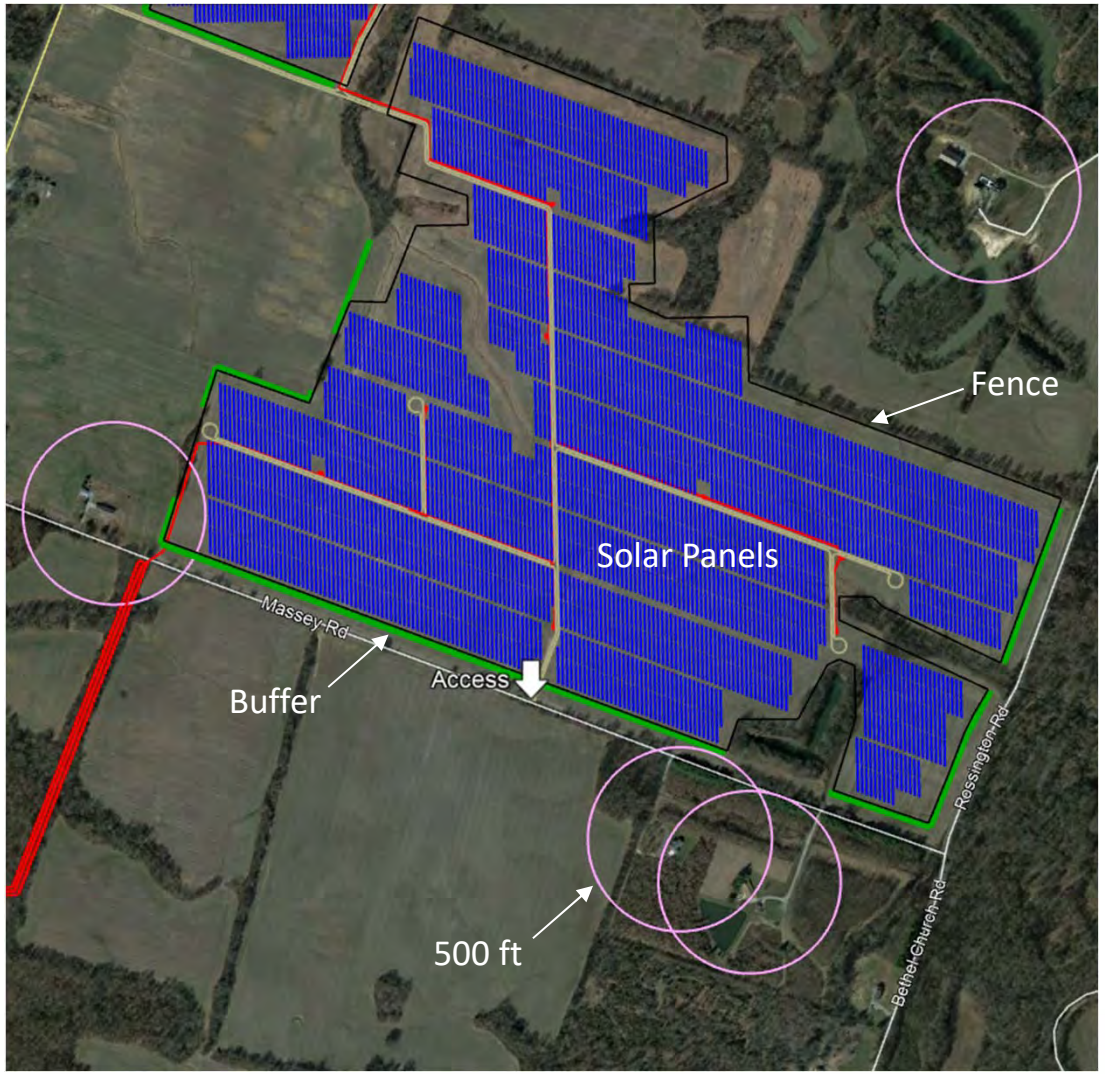
This close-up of the southern section of the solar farm illustrates the setbacks from neighboring houses.

Access to this section will be from an existing farm path along Massey Road.

A double-row of evergreen plantings will be installed around the perimeter of this section, filling the gaps where natural vegetation does not exist.



Project Layout – Substation

Power lines will run from the southern section of the solar farm to a new substation that will connect the solar farm to the Big Rivers transmission line.

The setback between the new substation and the nearest house is in excess of 500 feet.

The natural vegetative buffer at the substation location will be retained.

Interconnection Studies

The solar farm will connect to a Big Rivers transmission line which is part of a regional transmission network managed by the 'Midcontinent Independent System Operator' (MISO).

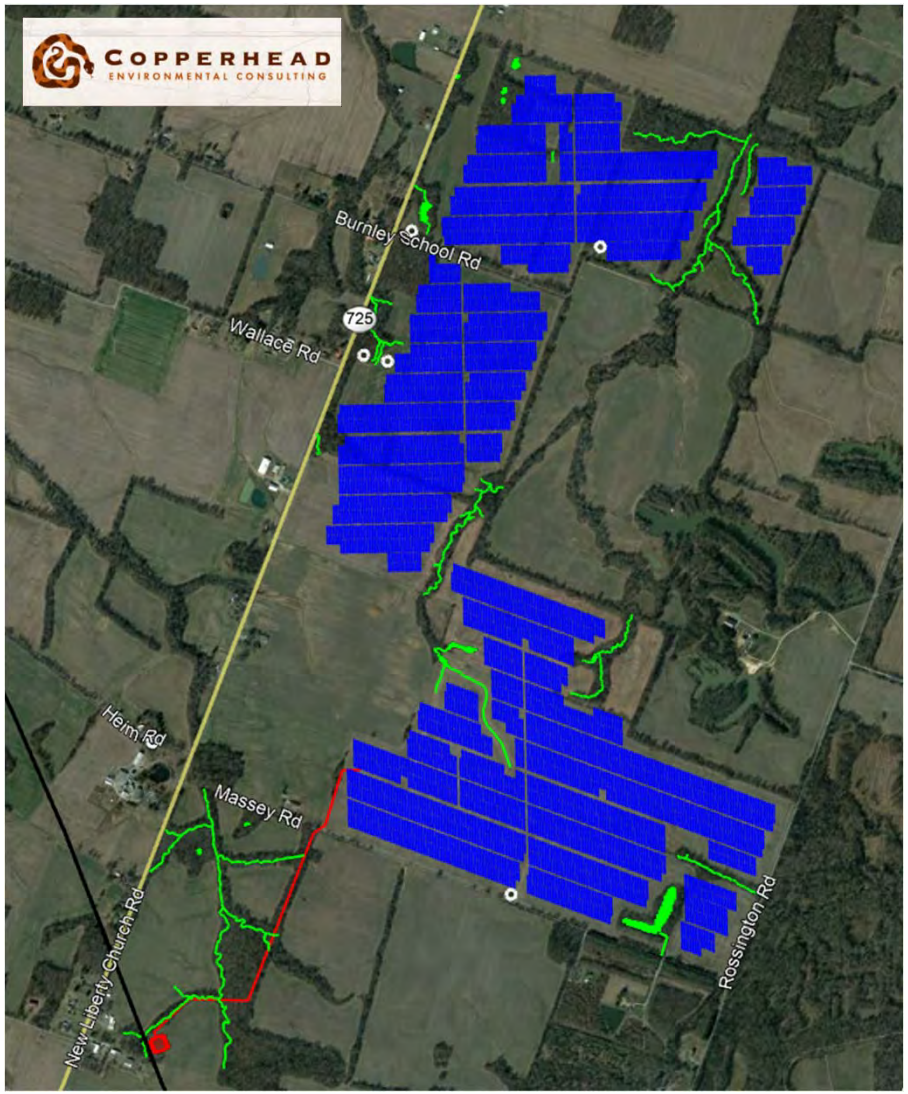
MISO will study the proposed facility, to determine whether the existing transmission lines in the area can absorb this additional power, or if they need to be upgraded.

Any required upgrades will be paid for by the project.

Environmental Studies

Multiple environmental studies have already been conducted:

- Wetlands and streams eligible for protection have been identified. Any required setbacks or buffers will be observed.
- Cultural resources eligible for protection have been identified. Any required setbacks or buffers will be observed.
- Threatened and endangered wildlife habitat has been identified (bats). Any required avoidance will be observed.



Impact Study

A 'Property Value Impact Study' has been conducted to determine whether the proposed solar farm will likely have a negative impact on local property values.

The most common areas for impact on adjoining property values are, in order of importance:

1. Hazardous materials
2. Odor
3. Noise
4. Traffic
5. Stigma
6. Appearance

- The Study reported no hazardous materials or odors associated with solar farms.
- The Study reported no instances of audible sounds at the periphery of the solar farms it inspected.
- The Study estimated that the anticipated 2-3 fulltime workers at the solar farm would not significantly impact traffic.
- The Study reported no negative stigma against solar farms as a neighboring use.
- Based on the enhanced setbacks and buffers from neighboring residences, the Study anticipated no negative visual impact from the solar farm.
- The Study concluded that the proposed solar farm would not likely have negative impact on local property values.

Acoustical Analysis

COMMUNITY ENERGY®

An 'Acoustical Analysis' has been conducted to determine whether the proposed solar farm will likely increase noise levels in the area.

The study concluded that the enhanced setback distances between the solar farm and neighboring residences are anticipated to diminish sounds from the solar farm to a level below 40 decibels – lower than the existing daytime noise level in the area.

Table 1. Sound Levels of Common Activities/Situations.

Activity/Event	dBA
Lowest audible sound to person with average hearing	0
Quiet rural, nighttime	25
Crickets, distant frogs	30
Birds, distant dog bark	40
Quiet urban, nighttime	45
Large business office	60
Normal speech at 3 feet	60-70
Noisy urban area, daytime	75
Food blender at 3 feet	85
Gas lawn mower at 3 feet	100
Jet flyover at 1,000 feet	110

County Permitting

McCracken County Solar will be seeking a **Conditional Use Permit** from McCracken County.

The Conditional Use Permit will be decided by the McCracken County **Planning Commission**.

The approval process will involve public meetings, where County residents can ask questions and provide comment.

The dates for any public meetings are TBD.

Solar Ordinance

McCracken County will be adopting a solar ordinance to regulate solar farms.

Typical regulations include:

- **Setbacks**
  - Minimum distance of solar panels from residences, church, schools
- **Screening**
  - Adding vegetative buffers where no natural buffer exists
- **Decommissioning**
  - Plans for removal of the solar farm at the end of its life

For more information, contact:

Greg Cannon
Planning and Zoning Administrator

gcannon@mccrackencountyky.gov

(270) 448-0125

State Permitting

COMMUNITY ENERGY®

McCracken County Solar will be seeking a **Construction Certificate** from the Kentucky Public Service Commission

Kentucky Public Service Commission

The Construction Certificate will be issued by the Kentucky State Board on Electric Generation and Transmission Siting (the "**Siting Board"**).

The Siting Board review focuses on three areas:

- Environmental matters such as noise and visual impacts
- Economic impacts
- Impact of the proposed facility on Kentucky's electric transmission grid

Commonwealth of Kentucky
Kentucky State Board on Electric Generation and Transmission Siting

Siting Board Members

The Siting Board will be composed of seven (7) members:

- The **(3) members of the Public Service Commission**
  - Chairman (Michael J. Schmitt)
  - Vice Chairman (Kent A. Chandler)
  - Commissioner (Talina R. Mathews)

- Two **(2) members of state government**
  - The Secretary of the Kentucky Cabinet for Energy and Environment (Rebecca Goodman), or her designee
  - The Secretary of the Kentucky Cabinet for Economic Development (Larry Hayes, Interim Secretary), or his designee

- Two **(2) members of local government**
  - The Chairman of the McCracken County Planning Commission (Wayne Elliott)
  - A resident of the County (appointed by the Governor)

Siting Board Process

The Siting Board review takes approximately nine (9) months

Key steps include:

- **Public Meeting**
  - January 20, 2021
- **Application**
  - April 20, 2021
- **Evidentiary Hearing**
  - *Optional - TBD*
- **Local Hearing**
  - *Optional - TBD*
- **Decision**
  - Anticipated Q4 2021
- **Appeal**
  - If filed within 30 days of decision

For more information on the Siting Board:

https://psc.ky.gov/Home/EGTSB

To see Public Service Commission filings related to this project:

https://psc.ky.gov/PSC_WebNet/ViewCaseFilings.aspx?Case=2020-00392

Case No. 2020-00392

Construction

If the Construction Certificate is approved:

- Construction will start in 2022
- Construction period will be 6-9 months
- Approximately 150 construction jobs
  - Mostly no experience required
- Hiring of local trades
  - Electric
  - Surveying
  - Earthmoving
  - Fencing
  - Landscaping

Operations and Maintenance

Typical operations and maintenance duties include:

- Preventive Maintenance
- Repair
- Mowing

McCracken County Solar will require 2-3 full-time employees for operations and maintenance.

Output

McCracken County Solar will produce **140,000,000** kWh of electricity per year

Roughly equivalent to the electric consumption of **½ of all the households** in McCracken County

100% of the solar power we produce will be delivered and sold to Big Rivers Electric Corporation.

Economic Benefits

Solar farms do more than generate clean, low-cost electricity. They also generate economic growth.

The McCracken County Solar project will impact the local economy in multiple ways:

- **Construction Jobs** for local workers: 150+ jobs during the 6-9 month construction of the project
- **Construction Contracts** for local businesses: Electrical, Site Work, Landscape, etc.
- **Local Spending** during construction: Hotels, Restaurants, Shops, Entertainment, etc.
- **Long-term Tax Revenue**: The solar farm will pay substantial taxes over 30 years, without increased pressure on community services such as roads, schools, libraries, and first responders.
- **Full-Time Jobs**: 2-3 full-time operations and maintenance jobs

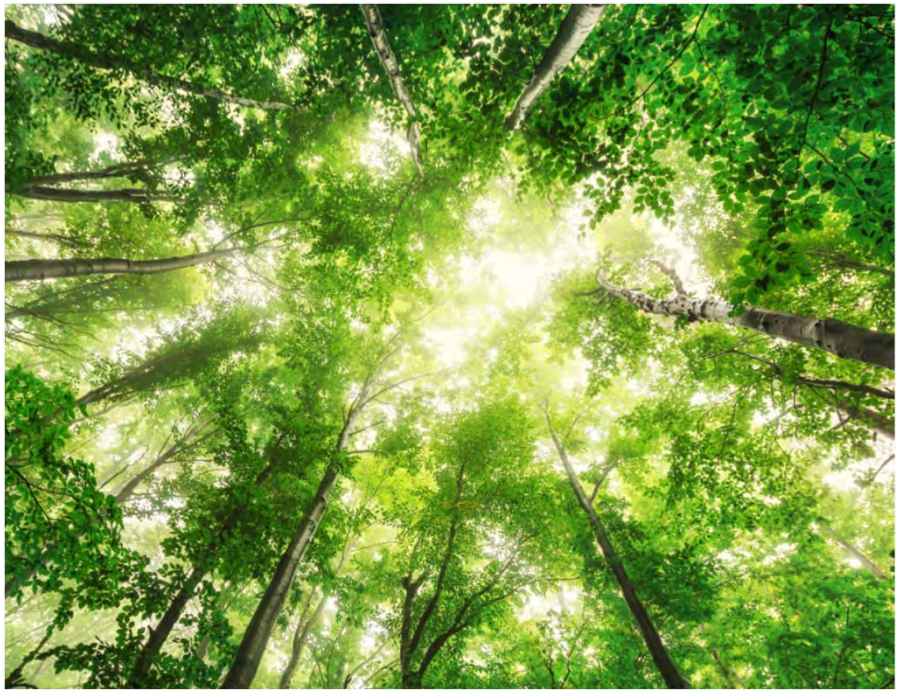
Summary

In a single hour, the amount of solar power that strikes the Earth is more than the entire world consumes in a year.

McCracken County Solar proposes to capture some of that solar power, convert it to usable electricity, and deliver it to the local community at a competitive price.

We seek to develop a solar project that is respectful of our neighbors, and delivers multiple benefits to the greater McCracken County community.

We invite your questions, comments, and feedback.



Contact Info

COMMUNITY ENERGY®

For more information, or to receive a printed version of this presentation:

Email us at
mccrackencountysolar@communityenergyinc.com

or call us at (866) 946-3123

COMMUNITY ENERGY®

Thank you

EXHIBIT 6
ATTACHMENT 6.2

December 30, 2020

[Name]
[Address]
[City, ST Zip]

Subject: McCracken County Solar Farm

Dear [Name],

Community Energy is developing a large-scale solar farm to be located along New Liberty Church Road in McCracken County. We are writing today to invite you, as a landowner of property near the proposed project site, to participate in a series of public information events. These events are designed to provide an opportunity for you to learn about the project, ask questions, and provide comments.

The proposed project site includes approximately 615 acres of land on the east side of New Liberty Church Road. Please see the enclosed map. The solar farm will have a capacity of 60 megawatts and will sell 100% of the electricity it generates to Big Rivers Electric Corporation. This facility is expected to produce 140 million kilowatt-hours of electricity per year - roughly ½ the amount of electricity consumed by all the households in McCracken County. 'McCracken County Solar' is scheduled to be constructed and begin operations in 2022.

Community Energy is one of the leading renewable energy development companies in the U.S. We've been in business for 21 years, developing many of the first and largest wind and solar projects in the country. This includes over 1,300 megawatts of solar farms similar to our proposed McCracken County Solar project. Community Energy is headquartered in Radnor, Pennsylvania with offices in Boulder, Colorado, and Chapel Hill, North Carolina.

We look forward to the opportunity to speak with you, to introduce the project, and to answer any questions you may have.

Sincerely,

Chris Killenberg
Regional Development Director
chris.killenberg@communityenergyinc.com

Chris Amsbary
Project Developer
chris.amsbary@communityenergyinc.com

Christene Tashjian
Assistant Project Developer
christene.tashjain@communityenergyinc.com

McCracken County Solar - Information and Public Participation

In compliance with restrictions on public gatherings related to the COVID-19 crisis, the presentation of information about the project and the gathering of public comment will be facilitated by a combination of online resources, one-on-one conversations, and a virtual public meeting. Details are as follows:

Website

We've created a website where you will find maps of the project, a PowerPoint presentation describing the project, a list of Frequently Asked Questions and responses, a schedule of upcoming live events, contact information, and instructions for submitting questions and comments. The website can be accessed at:

www.communityenergyinc.com/mccrackencountysolar

In-Person Office Hours

We're hosting in-person "office hours" in Paducah to provide interested parties with a one-on-one opportunity to seek more information. These meetings will be held in a large conference room, limited to one individual or one family at a time. Face masks and social distancing will be required. The In-Person Office Hours will be held at the Country Inn and Suites, 145 McBride Lane, Paducah, KY 42001 (at the intersection of Hwy 60 and Interstate 24). The dates and available times are:

- Wednesday January 13, 2021 from 7:00am – 9:00pm Central Time (CT)
- Thursday January 14, 2021 from 7:00am – 9:00pm CT

To accommodate as many interested parties as possible, the individual/family meetings will be limited to one hour. To schedule a 1-hour in-person meeting, please send an email to mccrackencountysolar@communityenergyinc.com, or call our toll-free number at (866) 946-3123.

Virtual Public Information Meeting

We will hold a live web-based presentation of the project, followed by a live question-and-answer session. The presentation will be also be accessible by telephone. The presentation will be recorded, and available afterward on the website.

The Virtual Public Information Meeting will be held on:

- Wednesday January 20, 2021 from 7:00pm – 8:30pm CT

You can join the Virtual Public Information Meeting via web link at:

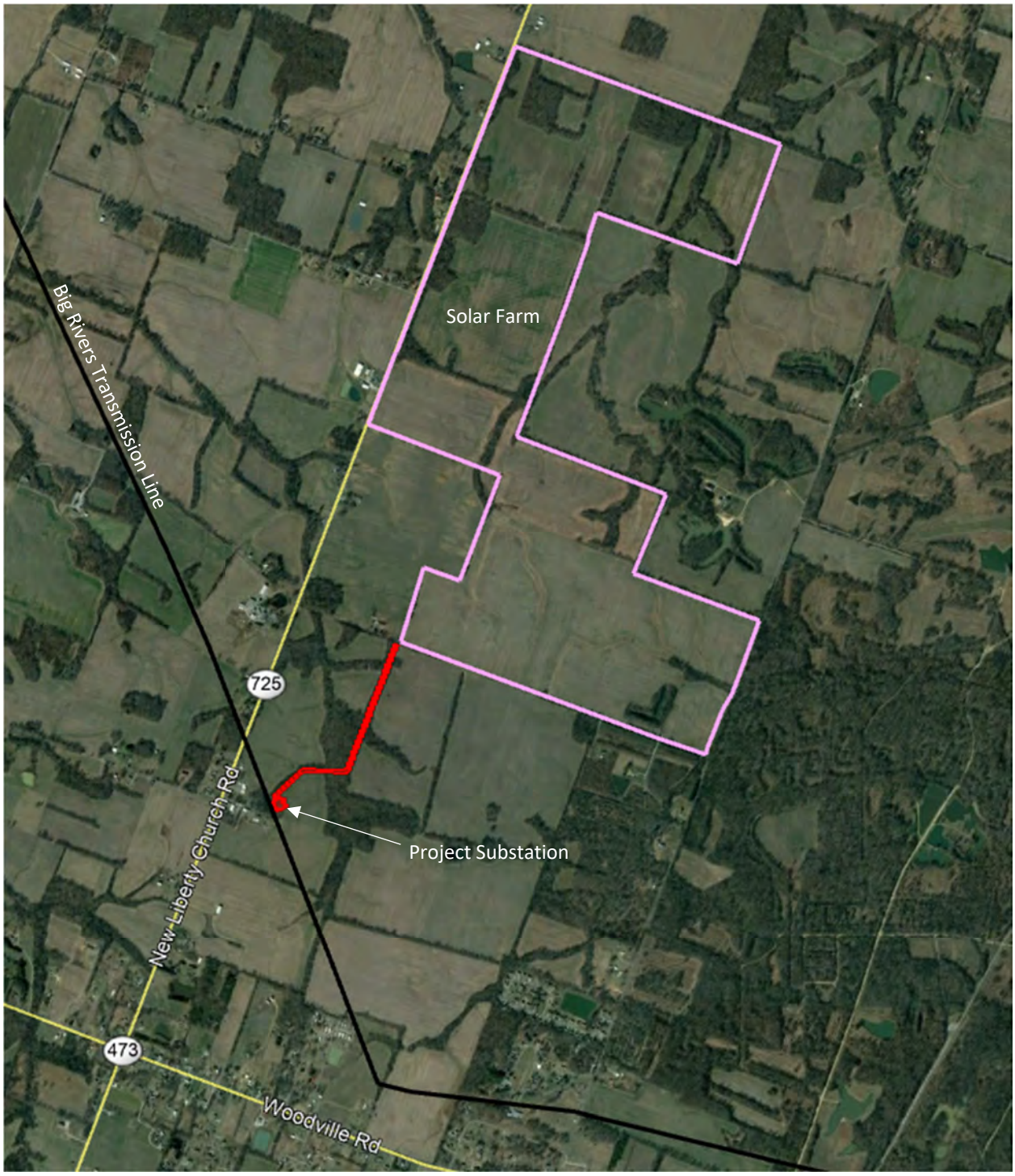
www.bigmarker.com/McCracken-County-Solar-Public-Meeting
(Please access the link in advance, to sign up for the meeting)

Or, you can call-in (toll free) at:

(888) 241-9901
(Enter ID Number 386643 and Passcode Number 3336)

We encourage you to access the information provided and attend the events if you're able.

McCracken County Solar
Proposed 60MW Solar Farm Project Site



Parcel Number	Owner Name	Mailing Street1	Mailing Street2	Mailing City	Mailing State	Mailing Zip	Acreage	Parcel Address
	Adjacent Landowners							
013-00-00-023	[redacted]	10765 Ogden Landing Road		Kevil	KY	42053	65.3	5706 New Liberty Church Road
020-00-00-018.01	[redacted]	10839 Ogden Landing Road		Kevil	KY	42053	77	6155 Bethel Church Road
012-00-00-017	[redacted]	11510 US Highway 60 West		Kevil	KY	42053	0.7	5905 New Liberty Church Road
012-00-00-014	[redacted]	11920 Burnley School Road		Kevil	KY	42053	39	11920 Burnley School Road
021-00-00-008	[redacted]	12100 Massey Road		Kevil	KY	42053	24.8	12100 Massey Road
021-00-00-008.02	[redacted]	12190 Massey Road		Kevil	KY	42053	10.3	12190 Massey Road
013-00-00-029.01	[redacted]	12620 Massey Road		Kevil	KY	42053	10	12620 Massey Road
013-00-00-013	[redacted]	1790 S. Irvington		Indianapolis	IN	46203	2	5025 New Liberty Church Road
013-00-00-035	[redacted]	3705 Apperson Road		Kevil	KY	42053	266.6	12450 Massey Road
020-00-00-020.07	[redacted]	4598 Broadwell Circle		Flowery Branch	GA	30542	26.7	6381 Bethel Church Road
013-00-00-033	[redacted]	4860 New Liberty Church Road		Kevil	KY	42053	37.2	4860 New Liberty Church Road
013-00-00-012	[redacted]	4905 New Liberty Church Road		Kevil	KY	42053	1.9	4905 New Liberty Church Road
013-00-00-012.02	[redacted]	4925 New Liberty Church Road		Kevil	KY	42053	2	4925 New Liberty Church Road
013-00-00-012.01	[redacted]	4955 New Liberty Church Road		Kevil	KY	42053	1.9	4955 New Liberty Church Road
013-00-00-014	[redacted]	499 SW Namott Place		Port St. Lucie	FL	34983	2	5045 New Liberty Church Road
013-00-00-015.01	[redacted]	5055 New Liberty Church Road		Kevil	KY	42053	2.2	5055 New Liberty Church Road
013-00-00-015	[redacted]	5115 New Liberty Church Road		Kevil	KY	42053	1.3	5075 New Liberty Church Road
013-00-00-022	[redacted]	5255 New Liberty Church Road		Kevil	KY	42053	54	5525 New Liberty Church Road
053-00-00-001.02	[redacted]	5600 Hobbs Road		Paducah	KY	42001	3422	5600 Hobbs Road
021-00-00-006	[redacted]	5701 Bethel Church Road		Kevil	KY	42053	140.7	5701 Bethel Church Road
012-00-00-047	[redacted]	6065 New Liberty Church Road		Kevil	KY	42053	1.2	6115 New Liberty Church Road
012-00-00-014.01	[redacted]	6065 New Liberty Church Road		Kevil	KY	42053	1.3	6065 New Liberty Church Road
012-00-00-046	[redacted]	6145 New Liberty Church Road		Kevil	KY	42053	2	6145 New Liberty Church Road
020-00-00-020.06	[redacted]	6150 Bethel Church Road		Kevil	KY	42053	27.1	6365 Bethel Church Road
012-00-00-043	[redacted]	6315 New Liberty Church Road		Kevil	KY	42053	82.3	6315 New Liberty Church Road
020-00-00-020.05	[redacted]	6345 Bethel Church Road		Kevil	KY	42053	26.7	6355 Bethel Church Road
020-00-00-020.04	[redacted]	6515 Bethel Church Road		Kevil	KY	42053	23	6485 Bethel Church Road
020-00-00-020	[redacted]	8512 Axis Drive		Austin	TX	78749	26.7	6405 Bethel Church Road
013-00-00-029	[redacted]	PO Box 307		Kevil	KY	42053	48	5300 New Liberty Church Road
020-00-00-016	[redacted]	209 Springheaven Drive		Evansville	IN	47710	150.7	6370 New Liberty Church Road
	Participating Landowners							
013-00-00-032.01	[redacted]	PO Box 910467		Lexington	KY	40591	100.36	4900 New Liberty Church Road
013-00-00-030	[redacted]	2714 State Route 1181		Bardwell	KY	42023	215.52	12455 Massey Road
013-00-00-026	[redacted]	5215 County Line Road		Kevil	KY	42053	109.8	5700 New Liberty Church Road
020-00-00-017	[redacted]	2426 Pardale Avenue		Louisville	KY	40222	299.65	6200 New Liberty Church Road
020-00-00-016	[redacted]	209 Springheaven Drive		Evansville	IN	47710	150.65	6370 New Liberty Church Road
	Public Officials							**Title**
	Steve Ervin	300 Clarence Gaines Street		Paducah	KY	42003		Community Development Project Manager
	Steve Doolittle	300 Clarence Gaines Street		Paducah	KY	42003		Deputy Judge Executive
	Craig Clymer	300 Clarence Gaines Street		Paducah	KY	42003		Judge Executive
	Greg Cannon	300 Clarence Gaines Street		Paducah	KY	42003		Planning and Zoning Administrator
	Wayne Elliot	300 Clarence Gaines Street		Paducah	KY	42003		Chairman, Planning Commission
	Edwin Jones	300 Clarence Gaines Street		Paducah	KY	42003		Third District Commissioner
	Danny Carroll	[redacted]		Paducah	KY	42001		State Senator
	Randy Bridges	[redacted]		Paducah	KY	42003		State Representative
	Bradley Pickett	[redacted]		Kevil	KY	42053		Fire Chief, Kevil Rural Fire Department

EXHIBIT 6
ATTACHMENT 6.3

AFFP

NOTICE OF PUBLIC MEETING

Affidavit of Publication

STATE OF KENTUCKY }
COUNTY OF MCCRACKEN } SS

Patricia Ware, being duly sworn, says:

That she is Accounting Clerk of the Paducah Sun, a daily newspaper of general circulation, printed and published in Paducah, McCracken County, Kentucky; that the publication, a copy of which is attached hereto, was published in the said newspaper on the following dates:

December 30, 2020

That said newspaper was regularly issued and circulated on those dates.
SIGNED:

Patricia Ware

Accounting Clerk

Subscribed to and sworn to me this 30th day of December 2020.

Tina Scott

Tina Scott, Notary Public, ID 604477, McCracken County, Kentucky
My commission expires: July 10, 2022

TINA SCOTT NOTARY ID # 604477 My Commission Expires July 10, 2022 PUBLIC STATE AT LARGE, KENTUCKY

20061306 20328693

Christene Tashjian
Community Energy Solar. LLC
3 Radnor Corp, Ctr, Ste. 300
100 Matsonford Rd.
Radnor, PA 19087-4645

NOTICE OF PUBLIC MEETING

McCracken County Solar LLC, a subsidiary of Community Energy, is proposing to develop and construct an approximately 60-megawatt solar electric generating facility to be located along New Liberty Church Road in McCracken County, Kentucky. The public is invited to learn more about the project through a project website, In-Person Office Hours and a Virtual Public Information Meeting.

The project website includes maps of the project, a PowerPoint presentation describing the project, a list of Frequently Asked Questions and responses, a schedule of upcoming live events, contact information, and instructions for submitting questions and comments. The website can be accessed at: www.communityenergyinc.com/mccrackencountysolar

In-Person Office Hours will be conducted to provide interested parties with a one-on-one opportunity to seek more information. These meetings will be restricted to individuals or single family units, and will comply with any social distancing and public gathering requirements in effect at that time. The In-Person Office Hours will be held at the Country Inn and Suites, 145 McBride Lane, Paducah, KY 42001 on Wednesday January 13, 2021 from 7:00am – 9:00pm Central Time (CT) and on Thursday January 14, 2021 from 7:00am – 9:00pm CT. To sign up, please see the In-Person Office Hours sign-up tab on the website, send an email to info@communityenergyinc.com, or call our toll-free number at (866) 946-3123.

A Virtual Public Information Meeting will be held to provide a live presentation of the project, followed by a live question-and-answer session. The Virtual Public Information Meeting will be accessible via the internet, and also by telephone. The presentation will be recorded, and available afterward on the website. The Virtual Public Meeting will be held on Wednesday January 20, 2021 from 7:00pm – 8:30pm CT. To register for this event, please see the Virtual Public Information Meeting registration tab on the website, send an email to info@communityenergyinc.com, or call our toll-free number at (866) 946-3123.

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EXHIBIT 6
ATTACHMENT 6.4

Log of follow-up calls for In-Person Office Hours

Parcel Number	Parcel Address	Acreage	Owner Name	Contact Notes:
013-00-00-023	5706 New Liberty Church Road	65.3	[redacted]	Spoke w Daryl. They've all seen letter (cousin is our surveyor). Very little interest. Moved on.
020-00-00-018.01	6155 Bethel Church Road	77	[redacted]	Spoke about project. He's good, does not want to meet.
012-00-00-017	5905 New Liberty Church Road	0.7		Spoke w Tex (63) Owns local auto repair biz, has his small solar farm. In favor of the project, no issues. No need to meet.
012-00-00-014	11920 Burnley School Road	39	[redacted]	Spoke to Wayne. Not interested in meeting. No issues.
021-00-00-008	12100 Massey Road	24.8		Several messages, no reply.
021-00-00-008.02	12190 Massey Road	10.3		Spoke to Hayden. Works for TVA (coal side). Talked about site location, distance to house, screening, etc. No issues, mainly curious. Said they might want to meet, but no response to my last call, 1-13-20
013-00-00-029.01	12620 Massey Road	10	[redacted]	Spoke to Michael (49), very few questions. No issues. Interested in the landscaping work.
013-00-00-013	5025 New Liberty Church Road	2	[redacted]	Several messages, no reply.
013-00-00-033	4860 New Liberty Church Road	37.2		Everthing goes thru Jeff, their son, who we are already speaking with.
013-00-00-012.01	4955 New Liberty Church Road	1.9	[redacted]	Left two messages for Terry (71) & Charlotte (71)
013-00-00-015.01	5055 New Liberty Church Road	2.2		Spoke to Mike (49). Said thanks for contacting, really not interested in meeting.
013-00-00-015	5075 New Liberty Church Road	1.3	[redacted]	Left two messages with Kimberly (46)
013-00-00-022	5525 New Liberty Church Road	54		Spoke to Jeff - biggest concern is access to their farm (parcel # 021-00-00-001, 154 ac). CK spoke with Jeff, explained site. No known issues.
021-00-00-006	5701 Bethel Church Road	140.7	[redacted]	Meeting scheduled, 6pm Wednesay
012-00-00-046	6145 New Liberty Church Road	2		Spoke to Bill (62). No issues with project. Is interested in job. Disabled truck driver.
012-00-00-043	6315 New Liberty Church Road	82.3	[redacted]	Ruth (92). Spoke to her care provider. Left message that Ruth or her kids can call me.

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 7
Volume 1, Tab 7

Filing Requirement: KRS 278.706(2)(g)

A summary of the efforts made by the applicant to locate the proposed facility on a site where existing electric generating facilities are located.

Respondent: Chris Killenberg

McCracken County Solar investigated the feasibility of locating the proposed facility on a site where existing electric generating facilities were located. However, no such location in McCracken County was identified.

Case No. 2020-00392
Application - Exhibit 7
No Attachment

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 8
Volume 1, Tab 8

Filing Requirement: KRS 278.706(2)(h)

Proof of service of a copy of the application upon the chief executive officer of each county and municipal corporation in which the proposed facility is to be located, and upon the chief officer of each public agency charged with the duty of planning land use in the jurisdiction in which the facility is proposed to be located.

Respondent: Chris Killenberg

As shown in the Application's Certificate of Service, a copy of the Application was both electronically transmitted and mailed by regular U.S. mail to Craig Z. Clymer, McCracken County, Kentucky, County Judge-Executive, and to Wayne Elliott, Chairman, McCracken County, Kentucky, Planning and Zoning Commission, on the date of the Application's electronic filing with the Kentucky State Board on Electric Generation and Transmission Siting via the Kentucky Public Service Commission's website.

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 9
Volume 1, Tab 9

Filing Requirement: KRS 278.706(2)(i)

An analysis of the proposed facility's projected effect on the electricity transmission system in Kentucky

Respondent: Chris Killenberg

The Applicant believes that the proposed facility's effect on the electricity transmission system of Kentucky will be minimal. Further, the Applicant anticipates that any costs related to upgrades to the electricity transmission system of Kentucky, directly related to the proposed facility and required for its interconnection and operation, will be borne by the Applicant.

The information supporting the expectation of minimal effects on the electricity transmission system, and the steps underway to confirm such effects, are as follows:

- In April 2020, during the due diligence period for the Project, the Applicant contacted Big Rivers to inquire about the capacity of the 69kV McCracken County-Shell transmission line – the proposed point of interconnection for the Project. Big Rivers reported at that time that the line was rated at 52 MVA, the rating could potentially be increased to 62 MVA with a minor upgrade, and could be further increased to 72 MVA with a major upgrade. These MVA ratings map to generation levels of approximately 50 megawatts ("50 MW"), 60 MW, and 70 MW respectively. Big Rivers estimated that the minor upgrade required to accommodate 60 MW (increasing the line rating from 52 MVA to 62 MVA) would cost approximately $50,000. On this basis, the Applicant chose to plan for a 60 MW solar project.

  The related email string between the Applicant and Big Rivers is attached as Exhibit 9 Attachment 9.1.

- In June 2020, the Applicant submitted an Interconnection Request for a Generating Facility ("IR") to the Midcontinent Independent System Operator (MISO), the regional transmission system operator governing the 69kV McCracken County-Shell transmission line. MISO validated the IR and assigned the proposed Project interconnection queue number J1649. The Applicant subsequently provided MISO with sufficient evidence of site control, participated in a project Scoping Call, and signed the initial MISO study agreements. The Applicant's IR for queue number J1649 is in good standing, and the proposed Project is included for study in MISO's Definitive Planning Phase for IRs received in 2020 ("DPP 2020 Cycle").

The MISO IR is attached as Exhibit 9 Attachment 9.2.

- On March 15, 2021, MISO kicked off the DPP 2020 Cycle initial studies. The first study results are expected in late July 2020. At that time, the Applicant will receive the first information from MISO regarding any potential system upgrades required to accommodate the proposed generation capacity of 60 MW. The Applicant will share those study results with the Siting Board once received.

- In April 2021, in order to provide additional information regarding the proposed facility's projected effect on the electricity transmission system, the Applicant engaged a third-party engineering consultant to determine the ability of the transmission grid to accommodate the export of up to 60 MW from the Project when interconnecting to the 69kV McCracken County–Shell transmission line. The consultant, Electric Power Engineers ("EPE") performed load flow calculations using the MISO 2025 Summer Peak model, updated by including higher-queued generation projects in the model. Export potential was calculated for the Project's proposed point of interconnection, based on thermal overloads under system-intact conditions (N-0) and contingency conditions (N-1). The scope of the EPE study was designed to mirror the anticipated scope of MISO's study.

  The conclusions of the EPE study generally align with the initial information provided to the Applicant by Big Rivers. EPE's analysis indicates that the 69kV McCracken County–Shell transmission line will allow the Project to export up to 49 MW without any transmission upgrades. Alternatively, in order to allow the export of the full desired 60 MW, the portion of the 69kV transmission line between the Project's point of interconnection and the McCracken County substation will need to be upgraded. This portion of the 69kV McCracken County–Shell transmission line is identified as the limiting element in EPE's study.

  The Transmission Analysis performed by EPE is attached as Exhibit 9 Attachment 9.3.

- Subsequent to receiving the EPE study, the Applicant reached back out to Big Rivers to confirm EPE's analysis. Big Rivers agreed with EPE's conclusion that an upgrade to the portion of the 69kV transmission line between the Project's point of interconnection and the McCracken County substation will be required to accommodate 60 MW of export by the Project. Big Rivers further characterized the required upgrade as raising the height of one or two structures supporting that portion of the transmission line. Given the passage of time since the initial information was provided, and a change of personnel within Big Rivers' transmission group, Big Rivers proposed to conduct an additional study of the anticipated upgrades. The Applicant has agreed to fund that study, which will commence shortly.

  The related email string between the Applicant and Big Rivers is attached as Exhibit 9 Attachment 9.4.

In summary, the Applicant believes that the proposed facility's generation and export of up to 60 MW will have a minimal effect on the electricity transmission system of Kentucky, which can be mitigated by a minor system upgrade to be funded by the Applicant. The Applicant anticipates that ongoing studies, to be provided to the Siting Board when complete, will confirm this analysis.

EXHIBIT 9
ATTACHMENT 9.1

Chris Killenberg

From: Bradley, Chris <Chris.Bradley@bigrivers.com>
Sent: Tuesday, April 21, 2020 1:31 PM
To: Chris Killenberg
Subject: RE: McCracken County 69kV conductor MVA ratings

Chris,

We believe the Shell line can be upgraded to 60 MW for approximately $50,000.

Chris

From: Bradley, Chris <Chris.Bradley@bigrivers.com>
Sent: Friday, April 17, 2020 5:11 PM
To: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Cc: Pogue, Russ <Russ.Pogue@bigrivers.com>; Eacret, Mark <Mark.Eacret@bigrivers.com>
Subject: Re: McCracken County 69kV conductor MVA ratings

I will try to get a general sense of the upgrade cost to increase the rating to 60 MW. However, I'm not sure how quickly I can get an answer.

Chris

Sent from my iPhone

> On Apr 17, 2020, at 4:57 PM, Chris Killenberg <chris.killenberg@communityenergyinc.com> wrote:
>
> Thanks. So maybe we could size the McCracken County project:
> - 50MW as is
> - 60MW with minor upgrades
> - 70MW with a reconductor project (probably cost-proibitive)
>
> ?
>
> Chris
>
> ---
>
> **From:** Bradley, Chris <Chris.Bradley@bigrivers.com>
> **Sent:** Friday, April 17, 2020 5:49 PM
> **To:** Chris Killenberg <chris.killenberg@communityenergyinc.com>
> **Cc:** Pogue, Russ <Russ.Pogue@bigrivers.com>; Eacret, Mark <Mark.Eacret@bigrivers.com>
> **Subject:** RE: McCracken County 69kV conductor MVA ratings
>
> Chris,
>
> The line is currently rated at 52 MVA. It is 336 ACSR, so it may be possible to upgrade the circuit without replacing the conductor to allow operation at approximately 62 MVA. With a reconductor project, it

may be possible to increase the rating to 72 MVA. We will need to review the circuit in more detail to know for sure what we can do.

Chris

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Friday, April 17, 2020 4:30 PM
To: Bradley, Chris <Chris.Bradley@bigrivers.com>
Cc: Pogue, Russ <Russ.Pogue@bigrivers.com>; Eacret, Mark <Mark.Eacret@bigrivers.com>
Subject: McCracken County 69kV conductor MVA ratings

Hi Chris,

If you have a moment before the end of your workday today, are you able to tell me what the MVA rating is on the McCracken-Shell 69kV line?

Thanks,

Chris

Chris Killenberg | Regional Development Director
Community Energy
151 E. Rosemary St., Suite 202
Chapel Hill, North Carolina 27514
O: 919.967.7063 | M: 919.360.9792
chris.killenberg@communityenergyinc.com

EXHIBIT 9
ATTACHMENT 9.2

Facility Information

Project Name	McCracken County Solar

PROJECT TYPE

Interconnection Request	Proposed new Generating Facility
Interconnection Service Type	Network Resource Interconnection Service

FACILITY LOCATION

Address	New Liberty Church Rd.
City	Kevil
State	KY
Zip Code	42053
Latitude	37.122497
Longitude	-88.861236

State	KY
County	McCracken
Study Group	Central

Site Map **view**

INSTALLED GENERATING FACILITY CAPACITY

Summer (MW)	61.32
Summer (MVAR)	20.24
Winter (MW)	61.32
Winter (MVAR)	20.24

NET OUTPUT AS MEASURED AT POI

Summer (MW)	60
Summer (MVAR)	19.8
Winter (MW)	60
Winter (MVAR)	19.8
Deposit Calculations	Summer
Summer (MW)	0.1
Summer (MVAR)	0.05
Winter (MW)	0.1
Winter (MVAR)	0.05

POINT OF INTERCONNECTION

Type of Interconnection	Transmission Line
Transmission Line	McCracken County Sub to Shell
Distance from Endpoint A (miles)	7
Distance from Endpoint B (miles)	4.5
County	McCracken
Zip Code	42053
Latitude	37.109456
Longitude	-88.870831

Contact Information

CONTACT INFORMATION

Copy Info From:	
First Name	Chris
LastName	Killenberg
Title	Regional Development Director
Company	Community Energy Solar, LLC
Address	151 E. Rosemary St.
Address2	Suite 202
City	Chapel Hill
State	NC
Zip Code	27514
Phone	(919) 360-9792
Alt Phone	(919) 967-7063
Email	chris.killenberg@communityenergyinc.com

AGENT INFORMATION

Designated Agent	No

APPLICANT COMPANY

Copy Info From:	
Company	McCracken County Solar
Parent Company	Community Energy Solar, LLC
Agent (Developer)	Chris Killenberg
Address 1	151 E. Rosemary St.
Address 2	Suite 202
City	Chapel Hill
State	NC
Zip Code	27514
Phone	(919) 967-7063

Documentation and Legal Information

STATE OR FEDERAL TAX FORM

W-9 Form	**view**

OPERATING AGREEMENTS

Operating Agreements 1	**view**
Operating Agreements 2	**view**
Operating Agreements 3	**view**
Operating Agreements 4	**view**
Operating Agreement 5	**view**

SITE CONTROL

Site Control	Will be provided
Site Control Date	2021-01-20

Facility Data

EQUIPMENT DESCRIPTION

Description of entire Generating Facility	60MW solar generation project consisting of 14 -TMEIC PVU-L0840GR Solar Ware Ninja inverters connected to a step up collection substation with 2-34.5kV UG feeders. The solar plant will interconnect to the local 69kV Big Rivers Electric system via a 1200amp, 69kV breaker and a 40/53/66MVA, 69kV/34.5kV main transformer. There is also a proposed 12MVAR Cap Bank on the 34.5kV bus.
Commercial Operation Date	2022-12-31
Synchronization Date	2022-11-30
Interconnection Facilities required In-Service Date	2022-10-31

FUEL SOURCE

Fuel Source	Solar
Configuration of Fuel Source	60MW solar generation project consisting of 14 -TMEIC PVU-L0840GR Solar Ware Ninja inverters connected to a step up collection substation with 2-34.5kV UG feeders. The solar plant will interconnect to the local 69kV Big Rivers Electric system via a 1200amp, 69kV breaker and a 40/53/66MVA, 69kV/34.5kV main transformer. There is also a proposed 12MVAR Cap Bank on the 34.5kV bus.
Generator Type	Photovoltaic

Application Summary

TermsAndConditions	I agree to the terms and conditions.

Section A

A. UNIT RATINGS

Number of Generator Types	1
Total Generator Rated Output (MW)	60
Rated MVA	63.1

Number of Generating Units	1
Individual Generator Rated Output (MW)	4.28
Individual Generator Rated MVA	4.66
Manufacturer & Model	TMEIC PVU-L0800GR
KnowYear	No
Nominal Terminal Voltage (kV)	0.63
Minimum Short Circuit Ratio	1.25
Rated Power Factor	0.95
Voltage Regulation Minimum	0.95
Voltage Regulation Maximum	0.95

Power Factor Regulation Minimum	0.95
Power Factor Regulation Maximum	0.95
Minimum state of charge (p.u.)	0
Maximum state of charge (p.u.)	0
Type	Induction
Connection	Delta

A-1. GENERATOR SHORT CIRCUIT INFORMATION

Positive sequence sub transient reactance X1 (p.u.)	0.8
Negative sequence reactance X2 (p.u.)	0.8

Zero sequence reactance X0 (p.u.)	99999
Generator Grounding	Grounded through Impedance
Impedance R (p.u.)	10
Impedance X (p.u.)	10

A-2. MAIN GENERATOR STEP-UP (GSU) TRANSFORMER

Number of Transformers	1

Self Cooled Capacity (kVA)	40000
Maximum Nameplate Capacity (kVA)	66000
Generator Side Voltage (kV)	34.5
System Side Voltage Ratio (kV)	69
GSUTertiary	Yes
Tertiary Voltage Ratio (kV)	13.8
Low Winding Connections	Wye
High Winding Connections	Wye
Tertiary Winding Connections	Delta

Fixed Taps	Yes
Present Tap Setting	C
Positive Z1	6.99
Positive Z1 (on self-cooled kVA rating) (X/R)	30
Zero Z0 (on self-cooled kVA rating) (%)	5.6
Zero Z0 (on self-cooled kVA rating) (X/R)	30

A-3. PAD MOUNT TRANSFORMER

Num Of Transformers	9

Self Cooled Capacity (kVA)	5000
Maximum Nameplate Capacity (kVA)	5000
Generator Side Voltage (kV)	0.63
System Side Voltage Ratio (kV)	34.5
PMTertiary	No
Low Voltage Winding	Wye
High Voltage Winding	Delta

Fixed Taps	Yes
Present Tap	B - 1.025
Positive Z1 (%)	5.5
Positive Z1 (X/R)	10
Zero Z0 Percent (%)	100
Zero Z0 (X/R)	10

A-4. TIE LINE INFORMATION

SYSTEM EQUIVALENCE IMPEDANCE DATA FOR WIND/PHOTOVOLTAIC PLANTS

Nominal Voltage (kV)	34.5
Summer Line ratings in amperes	1673
Positive Resistance (R) for entire length (in p.u)	0.008
Positive Reactance (X) for entire length (in p.u.)	0.0088
Zero Resistance (R0) for entire length (in p.u.)	0.064
Zero Reactance (X0) for entire length (in p.u.)	0.0039
LineCharging (B/2) (in p.u.)	0.0036

A-5. DYNAMIC MODELING INFORMATION

Generator Model	view
Excitation System Model	view
Turbine-Governor Model	view
Power System Stabilizer Model	view
Reactive Line Drop Compensation Model	view

A-6. ONE-LINE & MODEL INFORMATION

One Line Diagram	view
PSS/E file	view

Section B

SYNCHRONOUS GENERATOR INFORMATION

Number of Generator Units	
Generator Reactive Capability Curves	view
Plot of Generator Terminal Voltage	view

B-1. EXCITATION SYSTEM INFORMATION

Number of Excitation Systems	
Excitation System Diagram	view

B-2. TURBINE GOVERNOR INFORMATION

Number of Generator Models	

B-3. INDUCTION GENERATOR INFORMATION

Motoring Power (kW)	
Neutral Grounding Resistor	
Heating Time Constant (I22t or K)	
Rotor Resistance	
Stator Resistance	
Rotor Reactance	
Stator Reactance	
Magnetizing Reactance	
Short Circuit Reactance	
Exciting Current	
Temperature Rise	
Frame Size	
Design Letter	
Reactive Power (No Load)	
Reactive Power (Full Load)	
Total Rotating Inertia (H) (Per Unit on KVA Base)	

Section C

What type of Non-Synchronous Generator do you have?	Type 4

C-2. INVERTER-BASED PARAMATERS (E.G. SOLAR, STORAGE TYPE 4 WIND TURBINES)

Number of inverters	14
Manufacturer	TMEIC
Model	Solar Ware Ninja
Model Number	PVU-L0840GR
Version	Unknown at this point
List of set points	Over/under voltage & frequency
Maximum design fault contribution current	5500
Harmonics	Meet IEEE 519
Start-up requirements	None
PSCAD	view

Payment Information

PAYMENT TYPE

Payment Type	ACH/Wire Payment
Bank Name	[redacted]
Account Name	Community Energy Solar, LLC
ABA/Routing Number	[redacted]
Account	[redacted]
Contact Email	[redacted]

PAYMENT CALCULATION

Application Fee (D1)	5000
Study Deposit (D2)	270000
DPP Entry Milestone (M2)	240000.0
Payment Calculation	515000.0

BANKING INFORMATION

Copy Info From:	
Company	McCracken County Solar LLC
Tax Reporting Name	Community Energy Solar, LLC
Tax ID	[redacted]
Address 1	3 Radnor Corporate Center, Suite 300
Address 2	100 Matsonford Road
City	Radnor
State	PA
Zip Code	19087
Accounting Phone	(484) 654-1861
Accounting Email	[redacted]

Non Disclosure

First Name	Chris
Last Name	Killenberg
Title	Development Director
Email	chris.killenberg@communityenergyinc.com
Program	Merchant/Market
First Name	Brent
Last Name	Beerley
Title	President
Email	brent.beerley@communityenergyinc.com
Program	Merchant/Market
First Name	Gabriel
Last Name	Loos
Title	Senior Development Analyst
Email	gabe.loos@communityenergyinc.com
Program	Merchant/Market
First Name	William
Last Name	Pyle
Title	Interconnections Manager
Email	bpyle@communityenergyinc.com
Program	Merchant/Market
First Name	Joel
Last Name	Thomas
Title	Vice President of Development - East
Email	joel.thomas@communityenergyinc.com
Program	Merchant/Market

EXHIBIT 9
ATTACHMENT 9.3

Community Energy Solar LLC

J1649 MCCRACKEN COUNTY SOLAR PROJECT TRANSMISSION ANALYSIS

The seal on this document
Authorized by
Hugo E. Mena, P.E.
On April 09, 2021

Registration # 3386

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Table of Contents

Executive Summary

Introduction

Community Energy Solar LLC (Community) requested Electric Power Engineers, Inc. (EPE) to perform a transmission export analysis study for their proposed McCracken County Solar project (J1649), located in Kentucky state within the service territory of the Midcontinent Independent Systems Operator (MISO). The purpose of this study is to determine the ability of the transmission grid to allow the injection of up to 60 MW from the project under study when interconnecting to the 69 kV McCracken County – Shell line.

Load flow calculations were run on a linearized model to approximate the Available Transfer Capability (ATC) from the Point of Interconnection (POI) studied in this report using the MISO 2025 Summer peak (SUM) model. The base case model was updated by modeling higher queued generation projects as described in the section titled "**Generation Dispatch**".

Export potential was calculated for the POI under study, based on thermal overloads under system-intact (N-0) and contingency (N-1) conditions. An N-0 condition is the condition where there are no transmission elements out of service. A contingency condition is the loss of transmission elements (lines or transformers) on the grid due to planned or forced outages. Please refer to the section titled "**Assumptions**" for more details on the assumptions adopted in this study.

Results of this study are a snapshot in time and largely depend on the generation dispatch and transmission system configuration. Any change in the assumptions underlying this study may greatly impact the findings in this report.

Findings and Conclusion

This analysis aimed to identify the thermal limitations of exporting power up to 60 MW from the POI under study. Table 1 below summarizes the first export MW capacity available without any transmission upgrades. For detailed results, please refer to the section titled "**Transmission Export Analysis Results**".

Table 1 - First Available Export Capacity

Project Number	Project Name	Point of Interconnection	First Export Capacity (NRIS[1] & ERIS[2])
J1649	McCracken County Solar	69 kV McCracken County – Shell line	49 MW

Notes:

1- *Assuming a request for Network Resource Interconnection Service (NRIS), a thermal limitation was assumed to be triggered for any facility shown to exceed 100% of its rated capacity when the Transfer Distribution Factor (TDF) for this facility is greater than 5% under both N-0 and N-1 conditions.*

2- *Assuming a request for Energy Resource Interconnection Service (ERIS), a thermal limitation was assumed to be triggered for any facility shown to exceed 100% of its rated capacity when the TDF for this facility is greater than 5% under N-0 conditions and greater than 20% under N-1 conditions.*

The results of this analysis showed that interconnecting to the 69 kV McCracken County – Shell line will allow the McCracken County Solar project to export up to 49 MW without any transmission upgrades assuming an NRIS or ERIS request.

In order to avoid the risk of being allocated transmission upgrade cost, the project size may be reduced to less than 49 MW. Alternatively, in order to allow the export of the full desired 60 MW, the 69 kV J1649 POI – McCracken County line (52 MW) will need to be upgraded assuming an NRIS or ERIS request.

It is to be noted that in the MISO base case, the 34.5/0.63 kV J1649 transformer is rated 45 MVA which will not allow the export of the desired 60 MW.

Transmission Export Analysis Results

Load-flow calculations were run on a linearized model to approximate the ATC from the POI under study using the latest MISO 2025 summer peak model, per the assumptions detailed in the section titled "**Assumptions**".

Export Potential

Table 2 and Table 3 summarize the available export potential from the POI under study under N-0 and N-1 contingency conditions, respectively.

When the first export level is below 60 MW, the next limitations for up to the targeted size are also tabulated. The upgrade of a listed limiting element may allow the next export limitation to be reached.

Table 2 - Interconnection Results – N-0 Conditions (NRIS & ERIS)

POI	System-Intact Conditions		
	Export Capacity	Limiting Element	Shift Factor
69 kV McCracken County – Shell line	54 MW	The 69 kV J1649 POI – McCracken County line, 52 MW	100%
	284 MW	The 161/69 kV McCracken County transformer Ckt 1, 112 MVA	50%

Table 3 - Interconnection Results – N-1 Contingency Conditions (NRIS & ERIS)

POI	Single Contingency Conditions			
	Export Capacity	Limiting Element	Limiting Contingency	Shift Factor
69 kV McCracken County – Shell line	49 MW	The 69 kV J1649 POI – McCracken County line, 52 MW	The 69 kV J1649 POI – Shell line	100%
	172 MW	The 161/69 kV McCracken County transformer Ckt 1, 112 MVA	The 161/69 kV McCracken County transformer Ckt 2	100%

The results of the load-flow analysis for the POI under study are embedded in Table 4.

Table 4 - ATC Results

ATC Results
 ATC - J1649 Project - 69 kV McCracken Cou

Generation Dispatch

The MISO 2025 summer peak case was re-dispatched to account for the existing and proposed generation projects at higher dispatch level than what was modeled initially in the base case as follows:

- The nearby active planned generation projects not modeled in the case were re-dispatched at 100% of their nameplate capacity.
- All other existing generators were left as dispatched by MISO in the base case.

Since typically the impact of a generator on the loading of lines is reduced for elements remote from the project under consideration, and in order to capture the worst-case scenario, EPE re-dispatched higher queued generation projects that are nearest (electrically close) to the project under study.

Please refer to the spreadsheet embedded in Table 5 below for the list of generation projects modeled in this analysis as per the methodology described above.

Table 5 – Generation Projects

Generation Projects
 Generation Dispatch List_J1649 McCracken

Assumptions

- This study used the MISO 2025 summer peak model available from MISO.
- The calculations in this report evaluated the ATC on a linearized model under N-0 and N-1 conditions, using the PowerWorld Simulator program.
- Export limits were based on thermal overloads above 100% of Rating A of each transmission element rated at 60 kV or higher for N-0 conditions, and on thermal overloads above 100% of Rating B for N-1 conditions. Rating A is the limit on equipment rating and Rating B is the conductor rating for most transmission elements.
- Single-line contingencies defined for the base case model used for this analysis by MISO were evaluated. Additionally, all single lines and transformers in the nearby vicinity of the POI under study were added.
- Thermal overloads were monitored for every transmission element in MISO.
- An overloaded line was considered to be restrictive for an NRIS request only if the power transfer from the project interconnection point affects power-flow change on that element by 5% under both N-0 and N-1 conditions. An overloaded line was considered to be restrictive for an ERIS request only if the power transfer from the project interconnection point affects power-flow change on that element by 5% under N-0 and by 20% under N-1 conditions. This is measured by the Power Transfer Distribution Factor (PTDF) or Line Outage Distribution Factor (OTDF) values available from PowerWorld.
- Setup-up transformers are ignored as limiting constraints.
- The calculations underlying this report are a snapshot in time, and are based on the load-flow model available from MISO. Any changes in the configuration of the transmission system, or in the load or generation dispatched in the model will have an effect on the results of this study, and new load-flow calculations will have to be run for the new configuration.

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Hugo E. Mena, P.E.

Summary of Qualifications

Hugo Mena is an electrical engineer with over 12 years of extensive experience in renewable energy integration, grid code development and grid compliance of renewables projects, as well as experienced in the design of wind, solar and energy storage systems. Throughout his career, he has worked with renewable energy developers supporting generation interconnections, project grid compliance as well as experience supporting in the construction, commission, and testing of generation projects. During his professional career, Hugo has also contributed to regulatory work related to power systems planning and operation, renewable energy, energy storage, microgrids and metering in Latin America and the Middle East. Furthermore, Mr. Mena has been the Chair & Vice-Chair of the Emerging's Technologies Working Group at the Electric Reliability Council of Texas (ERCOT) where he worked with stakeholders to improve the current grid codes to allow for the integration of renewables and energy storage systems at the distribution level.

Mr. Mena is a Professional Engineer in 17+ different states in the Unites States.

Employment History (Most recent first, in reverse chronological order)

VP of Business Development, Electric Power Engineers, Inc., Austin, TX, USA, Jan 2016 – Present
Chief Operating Officer, Electric Power Engineers, Inc., Austin, TX, USA, Jan 2014 – Jan 2016
Chief Engineer, Electric Power Engineers, Inc., Austin, TX, USA, Jan 2010 – Jan 2014
Power Systems Engineer, Electric Power Engineers, Inc., Austin, TX, USA, Jan 2009 – Jan 2010

- Significant experience as part of successful markets that integrated renewables, and deep understanding of the mechanisms through applying them as part of consulting to clients integrating resources in these markets
- Extensive experience developing grid codes as well a grid compliance testing and commissioning procedures for the integration of renewable energy projects in international markets
- Experience is training and capacity building in Transmission & Distribution code implementation in Jordan as well as the Caribbean
- Worked within the ERCOT Market Participants on protocols revisions through being involved in workgroups and meetings, and chairing some of those workgroups
- Provided electrical engineering design on renewable energy projects during development, detailed design, construction, and commissioning
- Provide Owner's Engineer support for designing and commissioning generation projects in different grid markets
- Complete substations and main power transformers specification documents and Request for Proposals (RFPs), bid evaluation and recommendation for generation projects
- Working with several grid operators and generation projects on SCADA and communications requirements for the successful interconnection of generation projects
- Experience with the distributed energy market regulations that are taking place in ERCOT, CAISO, and other markets through represented clients in accompanying the regulation development to ensure that these regulations are fair and healthy to project their project development efforts
- Review of generation specifications and capabilities to determine generator compliance with different grid markets
- Conduct short circuit studies of generation projects using Aspen, ETAP, and Powerworld

- Design solar plant layout based on project location and size; analyze solar placement technologies to determine the most feasible for the specific project as well as design DC and AC collection systems for utility-scale solar power plants
- Design of wind generation facilities and other renewable energy generation projects, ranging from 1 MW to 800 MW
- Review and provide comments on transmission provider's system impact studies for the interconnection of generation projects
- Provide expertise and feedback to clients regarding renewable energy project operation and transmission expansion
- Provided expertise for day to day renewable energy project operational question and transmission expansion questions for clients
- Performed thermal resistivity analysis to design and size the underground distribution system of different wind projects using geotechnical report about the type of soil in different projects

Manufacturing Engineer II, Applied Materials, Inc., Austin, TX, USA, Oct 2007 – Jan 2009

- Implemented and maintained methods, operation sequences and processes in the fabrication of parts, components, sub-assemblies, and final assemblies.
- Determined time standards and made recommendations for tooling and process requirements.
- Interfaced between operations and design engineering to implement most feasible designs and solutions.
- Worked with test engineers on the design and development of text fixtures and test recipes.
- Gathered operational and test data and evaluated results to determine corrective actions.
- Used Statistical Process Control (SPC) to analyze all test data to take corrective actions to improve manufacturing process.
- Determined root cause analysis for issues that arise during assembly and/or test of systems and provide failure analysis report as required.
- Worked with Synexis design team on robot bearing issues related to VHP vacuum robots bearing issues.
- Worked closely with supplier to address all SPS submitted and implement corrective action.
- Worked in an ISO 9001 and 14001 certified and OHSAS 18001 certified manufacturing environment.

Education and Training

- M.S. in Electrical Engineering, Power Electronics, Texas A&M University – College Station, TX
- B.S. in Electrical Engineering, Power Systems, Texas A&M University – College Station, TX
- Business Management Certificate for Engineers, Texas A&M University – College Station, TX

Languages

- English – Fluent
- Spanish – Fluent

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References (You may not include any references from your current company)

Client Name & Location	Year	Detailed Description of the Work Performed or Advisory Services Provided Relevant to the SOW
A USAID-funded activity implemented by Deloitte ESCB Project for NEPCO regarding large-scale renewable power projects interconnecting to the transmission grid (Task Order No. AID-278-TO-13-00003)	2015-2016	Lead the development of the NEPCO Intermittent Renewable Resources (IRR) Testing, Commissioning and Certification Procedures as well as supported the testing and commissioning of the first wind project to interconnect to the NEPCO transmission grid. This project was a 117 MW wind project using Vestas turbines. Contributed to the development of the NEPCO Intermittent Renewable Resources Operating Protocols as well as worked with the NEPCO team to identify any SCADA requirements for future renewable projects integrating to the NEPCO grid.
Escalante 240 MW PV Solar Project Enterprise 80 MW PV Solar Project	2015-2016	Engineer of record for the completion of the system studies for two (2) proposed solar projects in Utah, namely 80 MW Enterprise PV project and 240 MW Escalante PV project. These studies listed below were run, separately for each project, based on detailed project's design model in ETAP and PSCAD software. The studies were written to demonstrate and provided recommendations for the proposed electrical system design and the selected protective equipment to accommodate the projects sizes as well as to meet the applicable IEEE requirements as well as the transmission provider's requirements. • Load flow Study • Short Circuit Analysis • Power Factor Analysis • Grounding Study • Transient Over-Voltage (TOV) Study • Insulation Coordination Study • Harmonic Analysis • Protection Coordination Study • Arc Flash Hazard Analysis
Spinning Spur I, II and III engineering support (322 MW,	2015	Lead the engineering team providing support services for the Spinning Spur I, II and III projects to guide EDF Renewable Energy in their endeavors to develop wind projects in Texas. The engineering services covered are as follows:

160.95 MW and 194 MW)		• Completed a project reactive power compensation compliance review • Completed the necessary documentation to register and interconnect the wind plant to the transmission network • Complete the wind plant model • Supported the client in the completion of a commissioning plan • Provided on site assistance to conduct a reactive power test • Provided on site assistance to conduct a primary frequency response test • Provided on site assistance to conduct an AVR test procedure and test support
Distribution Studies Review and Distribution Transfer Switch Scheme Support	2015	Lead the reviewed of the interconnection studies completed by the distribution provider for 11 generating projects interconnecting at the distribution level. I was the main lead engineer providing the Client with a summary of all the assumptions as well as the findings and conclusions of the studies. Additionally, I represented the client in meetings and discussions with the distribution provider. During this work, I provided support in evaluating the use of a Transfer Trip Scheme to mitigate any islanding risk for eight (8) to nine (9) distribution projects. This included detailed investigation and recommendations of the type of equipment, wiring configuration and trip scheme operation as well as any necessary tools and scopes the Client may need to procure for an adequate anti-islanding solution.

EXHIBIT 9
ATTACHMENT 9.4

Chris Killenberg

From: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Sent: Monday, May 3, 2021 12:43 PM
To: Chris Killenberg; Thomas, Jerrod
Subject: RE: McCracken County 69kV conductor MVA ratings

Chris,

Yes. Based on our normal ratings practice, I don't believe it will be necessary to reconductor the line.

Chris Bradley
Big Rivers Electric Corporation

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Monday, May 3, 2021 10:11 AM
To: Bradley, Chris <Christopher.Bradley@bigrivers.com>; Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Hi Chris,

To confirm: it's your expectation that the upgrade required to accommodate 60MW generation on the 69kV McCracken County-Shell transmission line will more likely be to raise structures as needed to maintain clearances, not to reconductor the line segment. Correct?

Chris

Chris Killenberg | Regional Development Director
Community Energy
P.O. Box 17236
Chapel Hill, North Carolina 27516
M: 919.360.9792
chris.killenberg@communityenergyinc.com

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From: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Sent: Thursday, April 29, 2021 10:42 AM
To: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Cc: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Jerrod,

Please provide our compete ratings criteria to the consultant. A proposal to determine the upgrades required to provide the follow is needed:

- Operation of the McCracken Co. – Shell 69 kV line with an MOT of 100 degree C/212 degree F.

- The results are needed by June 15, 2021.
- Note: the Big Rivers ratings criteria for normal conditions with 336 ACSR results in a summer rating of approx. 65 MVA (assumes 2 foot/sec wind).

Since the PPA states that connect costs are the responsibility of the Seller, a separate agreement for the reimbursement of these costs is not needed. Instead, the following is proposed:

- Community Energy will agree to reimburse Big Rivers for the study costs (via MOU or email).
- The costs will be included the facilities study to be performed as part of the MISO process.
- The facility study is funded by the interconnection customer. Therefore Big Rivers will be reimbursed in the future as part of the facility study.

Chris Bradley
Big Rivers Electric Corporation

From: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Sent: Thursday, April 29, 2021 8:29 AM
To: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Cc: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Chris,

I received the questions below about the proposal for added capacity we were asking for and needed clarity from the planning group on how to proceed with the proposal…

- *Is BREC's goal to keep the existing conductors (allowing them to heat up to 212F) and raise structures as needed to maintain clearances?*
    - *60MW would just about max out the capacity of the existing 336 ACSR on an average day (ambient temps of 60F, light wind, moderate solar radiation)*
    - *But if a mid-summer day is considered (ambient temps of 100 deg F, no wind, high solar radiation), the 336 ACSR does not have the required capacity. The line would be limited to around 50MW under these conditions.*
- *Or is BREC considering reconductoring the line segment with ACSS conductors?*

Do you have any answers to the questions above or should I pass them to someone else?

-Jerrod Thomas

From: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Sent: Thursday, April 29, 2021 7:19 AM
To: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Cc: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Chris,

I attempted to contact you earlier this week – feel free to call today if desired.

Jerrod, did you receive a quote for the study work?

Chris Bradley
Big Rivers Electric Corporation

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Friday, April 23, 2021 12:09 PM
To: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Cc: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Hi Chris,

Following up on my email below. Is there a time on Monday that works for a call? Please let me know.

Thanks,

Chris

From: Chris Killenberg
Sent: Tuesday, April 20, 2021 1:18 PM
To: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Cc: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Chris,

You mentioned having a third-party engineer study those structures on the McCracken County-Shell line that would need to be raised to accommodate our 60MW injection from the solar farm. We'd like to go ahead and do that, please. Ideally, we'd like to get that study back by June 15th, which would allows us to include it in a scheduled response to the Siting Board. What needs to be done to get that study contracted? As discussed, Community Energy is happy to pay for it. Please let me know our next steps.

Thanks,

Chris

Chris Killenberg | Regional Development Director
Community Energy
P.O. Box 17236
Chapel Hill, North Carolina 27516
M: 919.360.9792
chris.killenberg@communityenergyinc.com

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From: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Sent: Wednesday, April 14, 2021 4:09 PM
To: Chris Killenberg <chris.killenberg@communityenergyinc.com>

Cc: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Chris,

The engineer that provided the estimate has also retired. I do know that the anticipated work involved raising a structure or two. We would need some time to provide more specifics. I will be available by phone tomorrow before 9:00 or after 2:00.

Thank you,

Chris Bradley
Big Rivers Electric Corporation

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Monday, April 12, 2021 8:07 AM
To: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Cc: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Hi Chris,

Got it. Thanks. If sometime this week is possible, please, that would be ideal. I may need some info from you for our Siting Board application for the project, which we currently plan to submit next week.

Chris

From: Bradley, Chris <Christopher.Bradley@bigrivers.com>
Sent: Monday, April 12, 2021 9:01 AM
To: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Cc: Thomas, Jerrod <Jerrod.Thomas@bigrivers.com>
Subject: RE: McCracken County 69kV conductor MVA ratings

Chris,

Bob Warren recently retired. Jerrod Thomas is now the Director of Engineering. I will check my records and review the upgrade requirements and get Jerrod up to speed. Once Jerrod and I have a chance to review the project, we will reach out to schedule a call.

Thank you,

Chris Bradley
Big Rivers Electric Corporation

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Monday, April 12, 2021 7:53 AM
To: Bradley, Chris <Christopher.Bradley@bigrivers.com>; Warren, Bob <Robert.Warren@bigrivers.com>
Subject: FW: McCracken County 69kV conductor MVA ratings

Chris, Bob,

Following up on my email below. Do you have time in the next few days for a short call? Please let me know what works for you.

Thanks,

Chris

From: Chris Killenberg
Sent: Wednesday, April 7, 2021 12:06 PM
To: Bradley, Chris <Chris.Bradley@bigrivers.com>; Warren, Bob <Bob.Warren@bigrivers.com>
Subject: FW: McCracken County 69kV conductor MVA ratings

Chris, Bob,

We are preparing the application for our state permit for the McCracken County project. It would be helpful to get some more information around the upgrade Chris referenced below. Is there a time today/tomorrow when we could schedule a quick call to discuss? Please let me know.

Thanks,

Chris

Chris Killenberg | Regional Development Director
Community Energy
P.O. Box 17236
Chapel Hill, North Carolina 27516
M: 919.360.9792
chris.killenberg@communityenergyinc.com

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 10
Volume 1, Tab 10

Filing Requirement: KRS 278.706(2)(j)

An analysis of the proposed facility's economic impact on the affected region and the state.

Respondent: Chris Killenberg

The proposed facility has been analyzed to determine its economic impact on the affected region (McCracken County) and state as a whole (Kentucky). The areas of economic impact include:

- Direct Impacts
  - Wages paid to workers employed during the construction and operation of the Project
- Indirect Impacts
  - Purchases of materials and supplies associated with the construction and operation of the Project
- Induced Impacts
  - Purchases of goods and services made by workers spending a portion of their Project-related wages at local businesses
- Local Occupational License Taxes
- State Income Taxes
- State Sales Taxes
- Output
  - The value of goods and services produced
- Real Property Taxes
- Tangible Property Taxes

Direct, Indirect, and Induced Impacts

To estimate the Direct, Indirect, and Induced Impacts of the proposed Project on the economies of the affected region and state, the Applicant commissioned an economic impact study which was conducted by the Center for Business and Economic Research (CBER) at the Gatton College of Business and Economics at the University of Kentucky.

CBER utilized the Impact Analysis for Planning (IMPLAN) model to estimate temporary economic impacts during the construction of the proposed Project (the "Construction Phase") and long-term economic impacts during operation of the proposed Project (the "Operation Phase").

During the Construction Phase of the Project, the Applicant anticipates employing approximately 150 full-time equivalent workers for a 6-9 month construction period.

CBER estimates the economic impact of the Construction Phase on McCracken County to be:

Direct Impacts	$6,783,000
Indirect Impacts	$1,402,000
Induced Impacts	$ 939,000
Total Impacts	$9,124,000

CBER estimates the additional economic impacts on the State of Kentucky (outside of McCracken County) during the Construction Phase to be:

Direct Impacts	$ 0
Indirect Impacts	$ 148,000
Induced Impacts	$ 465,000
Total Impacts	$ 613,000

In total, the economic impact on the State of Kentucky (including McCracken County) during the **Construction Phase** is estimated to be:

Direct Impacts	$6,783,000
Indirect Impacts	$1,415,000
Induced Impacts	$1,539,000
Total Impacts	**$9,737,000**

During the Operation Phase of the Project, the Applicant anticipates employing 2-3 full-time equivalent workers. The length of the Operation Phase is anticipated to be at least 30 years. Accordingly, CBER estimated the economic impact for both the first year of operation, and as the net present value of 30 years of operation. CBER's McCracken County estimates have been netted against the economic activity that will be displaced by a conversion of the site from its current agricultural use to its proposed solar electricity generation use.

CBER estimates the net economic impact of the Operation Phase on McCracken County to be:

	Year 1	30-year (NPV)
Direct Impacts	$130,000 - $187,000	$2,908,000 - $4,209,000
Indirect Impacts	$168,000 - $244,000	$3,772,000 - $5,459,000
Induced Impacts	$ 40,000 - $ 58,000	$ 895,000 - $1,296,000
less	*($61,000)*	*(1,356,000)*
Total Impacts	$277,000 - $428,000	$6,219,000 - $9,608,000

CBER estimates the additional economic impacts on the State of Kentucky (outside of McCracken County) during the Operation Phase to be:

	Year 1	30-year (NPV)
Direct Impacts	$ 0	$ 0
Indirect Impacts	$ 11,000 - $ 17,000	$ 255,000 - $ 386,000
Induced Impacts	$ 21,000 - $ 32,000	$ 471,000 - $ 704,000
Total Impacts	$ 32,000 - $ 49,000	$ 726,000 - $1,090,000

In total, the net economic impact on the State of Kentucky (including McCracken County) during the **Operation Phase** is estimated to be:

	Year 1	30-year (NPV)
Direct Impacts	$130,000 - $187,000	$2,908,000 - $4,209,000
Indirect Impacts	$179,000 - $261,000	$4,027,000 - $5,845,000
Induced Impacts	$ 61,000 - $ 90,000	$1,366,000 - $2,000,000
less	*($61,000)*	*(1,356,000)*
Total Impacts	**$309,000 - $477,000**	**$6,945,000 - $10,698,000**

Occupational License Taxes, State Income Tax, State Sales Tax

During the **Construction Phase**, CBER estimates the following Project-related taxes will be collected:

McCracken County	
Occupational License Tax	$ 91,000
State of Kentucky	
State Income Tax	$409,000
State Sales Tax	$292,000

During the **Operation Phase**, CBER estimates the following Project-related taxes will be collected:

	Year 1	30-year (NPV)
McCracken County		
Occupational License Tax	$ 2,770 - $ 4,290	$ 62,000 - $ 96,000
State of Kentucky		
State Income Tax	$13,000 - $20,000	$292,000 - $462,000
State Sales Tax	$ 9,000 - $15,000	$208,000 - $330,000

Output

CBER also calculated a comparison of output from the proposed Project site under its current use versus the proposed use. Output refers to the value of goods and services produced. Though the proposed Project is anticipated to operate for at least 30 years, the initial contract for the sale of the electricity the Project will generate is for 20-years. Accordingly, output was compared over a 20-year period.

Under its current agricultural use, output from the proposed Project site is estimated to be $242,316 in Year 1. The net present value of agricultural output over a 20-year period is estimated to be $3,962,200.

Under the proposed use for solar electricity generation, output from the proposed Project site is estimated to be $3,832,210 in Year 1. The net present value of solar electricity output over a 20-year period is estimated to be $62,662,100.

A copy of the economic impact study conducted by CBER is attached as Exhibit 10 Attachment 10.1.

Property Taxes

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

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

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

To determine the proper calculation of the Real Property Taxes and Tangible Property Taxes that will be paid by the proposed Project over its 30-year operating period, the Applicant consulted with Mike Grim, JD, Tax Partner, State & Local Tax Services Team Leader, MCM CPAs & Advisors, Louisville, KY. Mr. Grim also contacted Darrell Young, Department of Revenue, Compliance Section Supervisor, Office of Property Valuation, Kentucky Department of Revenue (KY DOR).

Based on the methodology provided by MCM CPAs and KY DOR, the Applicant estimates the following property taxes will be levied on the proposed Project:

	Year 1	30-year (NPV)
Real Property Taxes	$ 33,906	$ 997,244
Tangible Property Taxes	$258,357	$3,513,392
Total Property Taxes	$292,263	$4,510,636

By comparison, the Applicant estimates the following property taxes would be levied on the underlying land if it were to remain in its current agricultural use:

	Actual 2020	Est. 30-year (NPV)
Real Property Taxes	$ 3,150	$ 92,578
Tangible Property Taxes	$ 0	$ 0
Total Property Taxes	$ 3,150	$ 92,578

Accordingly, the Applicant estimates the following **net increase in property tax revenue** as a result of the proposed Project:

	Year 1	30-year (NPV)
Real Property Taxes	$ 30,756	$ 904,666
Tangible Property Taxes	$258,357	$3,513,392
Total Property Taxes	**$289,113**	**$4,418,058**

Detailed property tax calculations, including email correspondence with MCM and KY DOR, are attached as Exhibit 10 Attachment 10.2.

EXHIBIT 10
ATTACHMENT 10.1

Gatton College of Business and Economics

Economic Impact of a 60 MW Solar Project in McCracken County, Kentucky

Prepared by
Center for Business and Economic Research
Gatton College of Business and Economics
University of Kentucky

April 29, 2021

Center for Business and Economic Research
Gatton College of Business and Economics
University of Kentucky

Dr. Michael Clark, Director
Dr. Bethany Paris, Senior Economic Analyst
Brian Redding, Graduate Research Assistant

McCracken County Solar Project

Community Energy Solar, LLC has proposed building a 60 MW photovoltaic system in McCracken County, Kentucky. The McCracken County Solar Project (the "Project") is expected to include the installation of solar panels on 615 acres and will consist of two phases: the Construction Phase and the Operation Phase.

The Construction Phase is estimated to last approximately 6 to 9 months. This phase will involve preparing the site, installing equipment, and connecting the panels to the grid. Community Energy anticipates the hiring of 150 full-time equivalent workers for the Construction Phase.

The Operation Phase will consist of regular operations, maintenance, and upkeep of the solar panels, other equipment, and site over a 30-year period. Community Energy anticipates the hiring of 2-3 full-time equivalent workers for the Operation Phase.

The proposed Project will affect the state and local economies by bringing new employment, spending, and taxes to the area. The Construction Phase will provide a temporary increase in economic activity as contractors and workers are hired to construct the facility. While the economic impact will be concentrated in the construction sector, other sectors will also be affected as contractors purchase supplies and materials from businesses in the area and workers spend a portion of their incomes at local businesses. The Operation Phase will provide a long-term increase in economic activity. During the Operation Phase, the project will employ workers to operate and maintain the facility. Spending related to operations will also affect several business sectors in the area.

Economic Impact

The following analysis examines the economic impact of the Construction Phase and the Operation Phase on the economies of two geographic areas: McCracken County and the State of Kentucky.

It is important to note that only new spending related to the project that **occurs in the area** will affect the economies of these two areas. Much of the total expenditures for this project are expected to be spent outside of these areas. These expenditures include the actual solar panels and other major equipment. Because this equipment is typically manufactured outside of Kentucky, spending on the equipment is not expected to directly affect the economies of McCracken County or the State of Kentucky. However, spending on the construction and operation of the solar project does have direct, indirect, and induced impacts on the state and local economies.

The direct impact refers to the employment and wages associated with the project. For the Construction Phase, the direct impact occurs primarily in the construction sector but may also include spending on professional business services such as engineering and equipment testing if these activities occur in the area. The direct impact for the Operation Phase includes employees and services hired to operate and maintain the facility.

The indirect impact refers to employment and wages that occur at businesses that provide inputs to support the facility's construction and operations. For the Construction Phase this would typically be materials and supplies that the construction crews need to complete their work. For the Operation Phase, this would include various supplies and tools needed to maintain the site.

The induced impact refers to employment and wages related to the provision of goods and services purchased by the workers employed directly and indirectly by the project. As workers are paid, they will spend a portion of their incomes at local businesses such as restaurants, retail establishments, and health care providers. These impacts can occur across a wide range of sectors.

These three types of impacts are typically measured using models of the local economy. For this analysis, impacts were estimated using the IMPLAN model, which is widely used for this type of analysis. For this analysis, an IMPLAN model was designed to simulate the economies of McCracken County and Kentucky.

An additional area of economic impact is employment-related taxes. McCracken County will collect a 1% occupational license tax on wages and salaries paid for Project-related work occurring in the county. The State of Kentucky will collect state income taxes on labor income associated with the Project. The effective income tax rate is estimated to be 4.2%. In addition, to the extent any Project-related income is spent on taxable goods and services, that spending will be subject to a 6% Kentucky state sales tax.

The Project will also pay real property taxes and business personal property taxes to the county and state. An estimate of these taxes was not included in the scope of this analysis.

Finally, an estimate can be made of the output associated with the proposed Project. Output refers to the total amount of goods and services produced.

Analysis

Construction Phase

During the Construction Phase of the Project, Community Energy anticipates employing approximately 150 full-time equivalent workers for a 6 to 9 month construction period. Community Energy anticipates that most of the construction workers and contractors will be hired from within the county or surrounding counties. However, approximately 20% of the labor will consist of specialty workers who come from outside the area. While these workers are working on the project in McCracken County, they will contribute to the county's total employment and wages. In addition, their wages would likely be subject to state income taxes and local occupational license fees. However, because they live outside the region, their wages will have a smaller induced impact on the local economy as most of their income will be spent in their home communities.

Including the direct, indirect, and induced impacts modeled by IMPLAN, the Construction Phase is estimated to increase employment in the McCracken County area by 193 jobs and increase labor income by approximately $9.1 million. An additional 15 jobs and approximately $613,000 in labor income would be created elsewhere in the State of Kentucky. See Table 1.

Table 1: Economic Impact of Construction Phase (6-9 months)

McCracken County		
Impact	Resulting Employment	Labor Income
Direct	150	$6,783,000
Indirect	22	$1,402,000
Induced	21	$939,000
Total	**193**	**$9,124,000**

State of Kentucky (outside of McCracken County area)		
Impact	Resulting Employment	Labor Income
Indirect	3	$148,000
Induced	12	$465,000
Total	**15**	**$613,000**

During the Construction Phase, McCracken County is estimated to collect $91,000 in occupational license taxes on Project-related wages. The State of Kentucky is estimated to collect $409,000 in state income taxes on Project-related labor income. The State of Kentucky is also estimated to collect $292,000 in sales taxes on Project-driven expenditures. See Table 2.

Table 2: Tax Revenue during the Construction Phase (6-9 months)

McCracken County	
Tax	Amount
Occupational License Tax	$91,000
Total	**$91,000**

State of Kentucky	
Tax	Amount
State Income Tax	$409,000
State Sales Tax	$292,000
Total	**$701,000**

In summary, the economic impact of the **Construction Phase** of the proposed Project on McCracken County is expected to total approximately **$9.1 million** in direct, indirect, and induced impacts on labor income and contribute $91,000 in county taxes. The economic impact on the State of Kentucky (including McCracken County) is expected to total approximately **$9.7 million** in direct, indirect, and induced impacts on labor income, and generate $701,000 in state taxes.

Operation Phase

During the Operation Phase of the Project, Community Energy anticipates employing 2 to 3 full-time workers. Including the direct, indirect, and induced impacts modeled by IMPLAN, the Operation Phase is expected to generate area employment of 4.8 to 7.1 jobs, and labor income of $338,000 to $490,000 per year. Over the 30-year life of the Project, the present value of this labor income would total between $7.6 million to $11 million (present value). This assumes a discount rate of 2%.

The estimates described above provide the gross economic impacts associated with the Project. However, these figures need to be adjusted to account for the loss of economic impacts that would have occurred if the land remained in its current use. The proposed site is currently being used for agricultural production, providing income for landowners and farm workers. If the solar project is developed, the economic impacts would shift from agricultural production to solar generation. The net economic impact to the area is, therefore, the difference between the level of economic activity associated with agricultural production and the level of economic activity associated with solar energy production.

Including the direct, indirect, and induced impacts, the reduced farm activity at the proposed Project site would reduce area labor income by $61,000 per year. Over the 30-year life of the Project, this would result in reduced area labor income of $1.4 million (present value). Accordingly, the net combined direct, indirect, and induced impacts of the proposed Project on the McCracken County area during the Operation Phase is estimated to be $277,000 to $429,000 per year, or $6.2 million to $9.6 million over 30 years (present value). Additional indirect, and induced impacts would be felt elsewhere in Kentucky during the Operation Phase. These additional impacts are estimated to be $32,000 to $49,000 per year, or $726,000 to $1,090,000 over 30 years (present value). See Table 3.

Table 3: Net Economic Impact of Operation Phase (30 years)

McCracken County			
Impact	Resulting Employment	Labor Income/yr	Present Value Labor Income/30 yrs
Direct	2.0 to 3.0	$130,000 to $188,000	$2,908,000 to $4,209,000
Indirect	1.9 to 2.8	$168,000 to $244,000	$3,772,000 to $5,459,000
Induced	0.9 to 1.3	$40,000 to $58,000	$895,000 to $1,296,000
Subtotal	**4.8 to 7.1**	**$338,000 to $490,000**	**$7,575,000 to $10,964,000**
less		***($61,000)***	***($1,356,000)***
Total		**$277,000 to $429,000**	**$6,219,000 to $9,608,000**

State of Kentucky (outside of McCracken County area)			
Impact	Resulting Employment	Labor Income	Labor Income/30 yrs
Indirect	0.2 to 0.3	$11,000 to $17,000	$255,000 to $386,000
Induced	0.5 to 0.7	$21,000 to $32,000	$471,000 to $704,000
Total	**0.7 to 1**	**$32,000 to $49,000**	**$726,000 to $1,090,000**

During the Operation Phase, McCracken County is estimated to collect $2,770 to $4,290 in occupational license taxes per year on Project-related wages; $62,000 to $96,000 over 30 years (present value). The State of Kentucky is estimated to collect state income taxes in the amount of approximately $13,000 to $20,000 per year; $292,000 to $462,000 over 30 years (present value). The State of Kentucky is estimated to collect state sales tax in the amount of approximately $9,000 to $15,000 per year; $208,000 to $330,000 over 30 years (present value). See Table 4.

Table 4: Tax Revenue during the Operation Phase (30 years)

McCracken County		
Tax	Amount/year	Amount/30 yrs
Occupational License Tax	$2,770 to $4,290	$62,000 to $96,000
Total	**$2,770 to $4,290**	**$62,000 to $96,000**

State of Kentucky		
Tax	Amount	
State Income Tax	$13,000 to $20,000	$292,000 to $462,000
State Sales Tax	$9,000 to $15,000	$208,000 to $330,000
Total	**$22,000 to $35,000**	**$500,000 to $792,000**

In summary, the net economic impact of the **Operation Phase** of the proposed Project on McCracken County, comprised of direct, indirect, and induced impacts on labor income is expected to total approximately **$277,000 to $429,000** per year; **$6.2 million to $9.6 million** over 30 years (present value). This increase in labor income would increase county taxes by $2,770 to $4,290 per year; $62,000 to $96,000 over 30 years (present value). The net economic impact on the State of Kentucky (including McCracken County), comprised of direct, indirect, and induced impacts plus state taxes is expected to total approximately **$309,000 to $478,000** per year; **$6.9 million to $10.7 million** over 30 years (present value). This would increase state taxes by $22,000 to $35,000 per year; $500,000 to $792,000 over 30 years (present value).

Property Tax

The project would affect state and local property taxes in two main ways. First, the 615 acres would be assessed at its commercial value rather than agricultural value. Second, the project would add a considerable amount of equipment that would be subject to state and local tangible property taxes. An analysis conducted by Community Energy provides estimates of the property tax associated with the project and is provided separately.

Comparison of Output

Output refers to the total amount of goods and services produced. If the project site were to remain in agricultural production, output would be measured in the value of the crops produced. Based on the data from the 2017 Census of Agriculture, sales of agricultural commodities from

farms located in McCracken County average $477 per acre.[1] Currently, 508 acres of the proposed Project site is under cultivation. The estimated output of the site if it remained in agricultural use would be **$242,316** per year.

For the proposed Project, output would be measured in the value of the electricity that will be produced. Community Energy estimates total electricity production in Year 1 of the Operation Phase to be 140,374 megawatt-hours (MWh). Community Energy is under contract with Big Rivers Electric Corporation to sell 100% of this output at a fixed price of $27.30 per MWh. Therefore, the estimated output of the site if it converts to solar use would be **$3,832,210 in Year 1**. The initial term of the contract between Community Energy and Big Rivers is 20 years. Over the 20-year contract, total output from the Project is estimated to be approximately **$62,662,100**. By comparison, total output of the Project site if it were to remain in agricultural use over the same 20-year period would be **$3,962,200** (present value).

The net output of the proposed Project could be lower if the Project effectively offsets electricity that would otherwise be generated in the county or the state. There is a certain level of demand for electricity. Without the Project, this demand might otherwise be met by keeping existing generating units online longer, developing other new sources of generation, or by purchasing electricity from the wholesale market. Community Energy anticipates that the electricity generated by the Project will offset electricity Big Rivers would otherwise purchase from the wholesale market. This electricity would likely be generated by power generators outside the state, and the Project would be unlikely to reduce electricity generation in McCracken County or Kentucky.

Conclusions

The Project proposed by Community Energy Solar, LLC is estimated to increase employment, labor income, tax collections, and output in McCracken County and Kentucky. During the 6 to 9 month Construction Phase of the Project, the range of economic impact is estimated to be **$9.1 million to $9.7 million**. During the 30-year Operation Phase of the Project, the range of net economic impact is estimated to be **$6.2 million to $9.6 million**. In addition, Output from the proposed Project site is estimated to increase from **$4.0 million to $62.7 million** over the first 20 years of the Project life.

[1] Sales estimates from the 2017 Census of Agriculture were adjusted for inflation using the Consumer Price Index for all Urban Consumers (CPI). The CPI was used because crop prices have been volatile. For example, average soybean prices for 2020 were lower than in 2017. However, prices during the first three months of 2021 were significantly higher. Should crop prices increase faster than general prices levels, estimates of the lost agricultural output could understate the true output lost. Likewise, should crop prices increase slower than general price levels, the estimate could overstate the value of lost agricultural output. In either case, it appears likely the labor income and output associated with the solar project would exceed the losses from reduced agricultural production in McCracken County.

Michael W. Clark

Department of Economics
Gatton College of Business and Economics
University of Kentucky
Lexington KY 40506
859 257 6226

mwclar00@uky.edu

January 2021

Experience:

July 2020 - Present	Director, Center for Business and Economic Research, University of Kentucky, Lexington, Kentucky
July 2019 – June 2020	Interim Director, Center for Business and Economic Research, University of Kentucky, Lexington, Kentucky
August 2016 – June 2019	Associate Director, Center for Business and Economic Research, University of Kentucky, Lexington, Kentucky
November 2002 – July 2016	Chief Economist, Legislative Research Commission, Frankfort, Kentucky
July 1996 – November 2002	Economist, Legislative Research Commission, Frankfort, Kentucky
October 1994 – June 1996	Financial Analyst, Forecasting and Research Department, Kentucky Utilities, Lexington, Kentucky

Other Experience:

2012 - 2013 VERA Institute of Justice, Cost-Benefit Methods Working Group

Teaching

- Cost Benefit Analysis (2017-2020)
- Capstone Advisor for MPA Students (2011)
- Decision Analysis (2009-2010)
- Public Financial Management (2009), co-taught

Education: Ph.D., Economics, University of Kentucky, 1996
Dissertation: "Search and Employer-Employee Match Formation"

Concentration: Labor Economics, Economic Theory, Industrial Organization

M.S., Economics, University of Kentucky, 1993

B.S., Management and Marketing, University of Kentucky, 1991

Reports, Briefs, and Publications:

Childress, Michael, & Michael Clark. "Communicating with Policymakers in a Pandemic." *Communicating Science in Times of Crisis: Coronavirus,* Forthcoming.

Clark, Michael. "Why did Kentucky's Unemployment Rate Fall?" Kentucky Center for Statistics. *Kentucky Labor Force Update*. October 2020.

Clark, Michael, Jenny Minier, Charles Courtemanche, Bethany Paris, and Michael Childress. "The Effects of Opioids on Kentucky's Workforce." Prepared for the Kentucky Department of Public Health, September 2019.

Clark, Michael, Jenny Minier, Charles Courtemanche, Bethany Paris, and Michael Childress. "The Effects of Smoking on Kentucky's Workforce." Prepared for the Kentucky Department of Public Health, September 2019.

Clark, Michael, Jenny Minier, Charles Courtemanche, Bethany Paris, and Michael Childress. "The Economic Impact of Diabetes in Kentucky." Prepared for the Kentucky Department of Public Health, June 2019.

Clark, Michael, and Kenneth Tester. "An Evaluation of How Repealing West Virginia's Prevailing Wage Law Affected the Cost of Public Construction" Prepared for the West Virginia Chapter of the Associated Builders and Contractors, August 2018.

Bollinger, Christopher, and Michael Clark. "County Attorney Child Support Enforcement Funding Formula." October 2017. Prepared for the Kentucky Department of Income Support.

Bollinger, Christopher, William Hoyt, Michael Clark, and Xiaozhou Ding "The Economics of Land Use Policies in Lexington, Kentucky." March 2017. Prepared for the Lexington-Bluegrass Association of REALTORS.

Clark, Michael, and Meredith Shores "Comparison of Salaries Paid to State Executive Branch Supervisory and Nonsupervisory Employees and to School Administrators and Teachers." September 2015.

Clark, Michael, Tosha Fraley and Bethany Paris. "How Kentucky's Prevailing Wage Laws Affect Public Construction." Legislative Research Commission, December 2014.

Hall, Christopher, Michael Clark, Tosha Fraley, and Jean Ann Myatt. "Kentucky Department of Fish and Wildlife Resources." Legislative Research Commission, August 2013.

Roenker, Jonathan, Michael Clark, and Jean Ann Myatt. "Economic Contribution of the Kentucky Coal Industry." Legislative Research Commission, August 2012.

Nutt, Perry. Michael Clark, Rick Graycarek, Christopher Hall, and Jonathan Roenker. "The Kentucky Thoroughbred Breeding Industry and State Programs That Assist the Equine Industry." Legislative Research Commission, November 2011.

Spurlock, Emily, Michael Clark, Rick Graycarek. "How School Construction Could Affect Employment in Kentucky." Legislative Research Commission, September 2011.

Roenker, Jonathan, Emily Spurlock, and Michael Clark. "The Impact of Industrial Revenue Bonds on Property Taxes and School Funding." Legislative Research Commission, November 2010.

Clark, Michael, Lisa Cave, and Christopher Hall. "The Costs of College and High School Textbooks in Kentucky." Legislative Research Commission, August 2008.

Kennedy, Colleen, Rhia Rhrib, Michael Clark and Greg Hager "Drug Courts." Legislative Research Commission, September 2007.

Clark, Michael, Colleen Kennedy and Jon Roenker "Pollution Cap and Trade Programs in Kentucky." Legislative Research Commission, May 2007.

Clark, Michael, Greg Hager and Nadezda Nikolova. "School Size and Student Outcomes in Kentucky's Public Schools." Legislative Research Commission, June 2006.

Boardman, Barry, Michael Clark, Kara Daniels, Greg Hager, Dan Jacovitch, Erin McNees, John Perry, Jon Roenker, and Ginny Wilson "An Analysis of the Commonwealth Accountability Testing System." Legislative Research Commission, July 2005.

Clark, Michael. "The Effects of Prevailing Wage Laws: A Comparison of Individual Workers' Wages Earned On and Off Prevailing Wage Construction Projects." *Journal of Labor Research*, 26:4 (2005): 725-737.

Perry, John, and Michael Clark. "Who is Your New Kentucky Neighbor and Where Did Your Old One Go?" University of Kentucky, Center for Business and Economic Research, Kentucky Annual Economic Report 2004, January 2004.

Nutt, Perry, Michael Clark, Lynn Aubrey, and Tanya Monsanto. "The Competitiveness of Kentucky's Coal Industry." Legislative Research Commission, January 2004.

Clark, Michael, and Judy Fritz. "The Cost of Medical Malpractice Insurance and Its Effect on Health Care." Legislative Research Commission, June 2003.

Nutt, Nutt, Michael Clark, Lynn Aubrey, Barry Boardman, Kevin Mason, and Greg Hager "The Costs, Benefits, and Monitoring of Kentucky's Enterprise Zones." Legislative Research Commission, December 2002, with.

Wilson, Ginny, Michael Clark, Greg Hager, Cindy Upton, Betty Davis, Barry Boardman, and Tom Hewlett. "An Analysis of Kentucky's Prevailing Wage Laws and Procedures." Legislative Research Commission, December 2001. *Received the 2002 National Legislative Program Evaluation Society's Excellence in Research Methods Award.*

Clark, Michael. "Status of the Health Insurance Market in Kentucky, 1998." Legislative Research Commission, January 2000.

Wilson, Ginny, and Michael Clark. "Market Responses to Kentucky Health Insurance Reforms." Center for Business and Economic Research, Kentucky Annual Economic Report 1999.

Wilson, Ginny, and Michael Clark. "Status of the Health Insurance Market in Kentucky." Legislative Research Commission, January 1998.

Wilson, Ginny, Dan Jacovitch, and Michael Clark. "Number and Characteristics of the Individually Insured, Small-Group Insured, and Uninsured in Kentucky." March 1997.

Presentations:

"The COVID-19 Recession: How has the Pandemic Affected Kentucky's Economy" Lexington Employee Benefits Council, December 2020.

"How COVID-19 Screwed Up Everything: The Challenges of Economic Forecasting During the Pandemic" Panel participant, 2020 Kentucky Economics Association Conference, October 2020.

"The COVID-19 Recession" Rotary Club of Louisville, October 2020.

"The COVID-19 Recession: How has the Pandemic Affected Kentucky's Economy" Kentucky Chamber of Commerce, October 2020.

"The COVID-19 Recession: How has the Pandemic Affected Kentucky's Economy" University of Kentucky Market Cancer Center Affiliate Network, 2020 Cancer Care Conference September 2020.

"Kentucky's Economy and Budget" Prichard Committee's Lunch & Learn, September 2020.

"Kentucky's Economy" Commerce Lexington, Bluegrass Region's 2020 Federal Policy Forum, September 2020

"Understanding Kentucky's Unemployment Data" Kentucky Workforce Investment Board, August 2020.

"Economics in the Time of COVID-19" Panel participant, University of Kentucky Alumni Association, Great Teachers on Great Challenges, June 2020.

"The Economic Impact of COVID-19" UK Market Cancer Center Affiliate Network COVID-19 Web Series, May 2020.

Forecasting Local Tax Revenues in the COVID-19 Era. Panel participant, Kentucky City/County Management Association, April 2020.

Trade Policy Forecast for 2020, Panel participant, World Trade Center Kentucky, January 2020.

"LFUCG Occupational License Tax Forecast FY 2020 & 2021" Lexington/Fayette Urban County Government; Budget, Finance, and Economic Development Committee, January 2020.

"Understanding Kentucky's Employment Statistics." Kentucky Center for Education and Workforce Statistics Data Conference, September 2019.

"LFUCG Occupational License Tax Forecast FY 2019 & 2020" Lexington/Fayette Urban County Government; Budget, Finance, and Economic Development Committee, April 2019.

"Kentucky's Motor Fuel Taxes" Kentucky Association of Counties Conference, November 2018.

"Kentucky Labor Force Participation" Kentucky Center for Education and Workforce Statistics Data Conference, August 2017.

"Cost-Benefit Analysis and Justice Policy: An Introduction for Budget and Finance Staff" webinar sponsored by the VERA Institute of Justice, July 2012.

"Overview of Medicaid" to the Medicaid Cost Containment Taskforce, August 2010

"Summary of Proposed Economic Stimulus" to the Senate and House Appropriations and Revenue Committees, January 2009.

"Potential Revenue from Expanded Gaming in Kentucky" to the House Special Subcommittee on Expanded Gambling, January 2008.

"Avoiding Bias in Policy Research" to the National Conference of State Legislatures, Research and Committee Staff Section Fall Seminar, September 2007.

"Comparison of State and Local Tax Burdens and Government Benefits for Low-Income Families" to Subcommittee on Tax Policy Issues, November 2001.

External Funding:

"Lexington Economic Trends" Lexington/Fayette Urban County Government, Jan 2021, $4,200.

"LFUCG Occupational License Tax Forecast FY 2020 & 2021" Lexington/Fayette Urban County Government, Jan 2021, $10,000.

"Kentucky Quarterly Economic Newsletter" Kentucky Chamber of Commerce, Dec 2020, $15,000.

"Labor Force Statistics Analysis and Consulting" Kentucky Education and Workforce Development Cabinet, July 2020-June 2022, $256,000.

"LFUCG Occupational License Tax Forecast FY 2019 & 2020" Lexington/Fayette Urban County Government, April 2019, $10,000.

"The Importance of Access to Health for Rural Economic Development." National Institute of Food and Agriculture, with Alison F. Davis, Jennifer L. Hunter, Jenny Minier, Ernie Scott, and Christina R. Studts, 2019-2022, $499,725.

"Health Care Provider Tax Model" Balanced Health Kentucky, 2018, $11,800.

"Evaluation of the Workforce and Fiscal Impacts of Health Conditions and Treatment Programs in Kentucky" Kentucky Department for Public Health, September 2018-June 2019, $134,000.

"Labor Force Statistics Analysis and Consulting" Kentucky Education and Workforce Development Cabinet, July 2019-June 2021, $247,000.

"Analyze the Impact of Repealing West Virginia's Prevailing Wage Law on the Cost of Public Construction" Associated Builders and Contractors, Inc. West Virginia Chapter, December 2017-June 2018, $21,000.

"Estimate Fiscal Impacts of Changes to Kentucky's Health Care Provider Tax" Kentucky Hospital Association, $55,000.

"Funding Formula to Distribute Child Support Enforcement Funds" Department of Income Support, $51,000.

"Labor Force Statistics Analysis and Consulting" Kentucky Education and Workforce Development Cabinet, March 2016-June 2018, $209,000.

"The Economic Impacts of Land Use Policies in Lexington, Kentucky" Lexington-Bluegrass Association of REALTORS, May 2016 – December 2016, $65,000.

BETHANY L. PARIS

EDUCATION

University of Kentucky, Lexington, KY

Doctor of Philosophy, Public Policy and Administration, Martin School of Public Policy and Administration (August 2013)

Master of Public Administration, Martin School of Public Policy and Administration (December 2012)

University of Kentucky, Lexington, KY

Bachelor of Arts Communication, College of Communication and Information Studies (December 2005)

Concentration: Health Care Communication

Minor: Biological Sciences

EXPERIENCE

Economic Analyst

Center for Business and Economic Research (CBER), University of Kentucky July 2015 to Present

- Grants and budget management for CBER; reconciling monthly ledgers against account balances.
- Managing student schedules in conjunction with meeting project deadlines for grants based projects.
- Coordinating marketing for CBER with the College of Business and Economics (e.g. website, news, press releases, etc.).
- Generate original research studies on grant based projects for dissemination on the CBER website and University.

Data and Analytics Advisor

Monitoring and Evaluation Unit, Nuru International, Palo Alto, CA (Telecommute) August 2014 to June 2015

- Research and recommend appropriate evaluation design, data collection, and analytical methods to measure program impact for all programs in both Kenya and Ethiopia.
- Collaborate on quarterly and annual impact reports that align with the Nuru brand and are accessible to a broader audience.
- Collaborate with the M&E team on design of an integrated impact measurement system in Ethiopia.
- Conduct due-diligence on potential technical partners and support the negotiation process and partnership agreements for the Salesforce centralized database system.
- Lead M&E team members in developing clearly documented and replicable procedures for collecting quality data and summarizing for program monitoring.
- Lead and promote regular and systematic data driven feedback loops between M&E and programs using monitoring data.

Staff Economist

Legislative Research Commission, Kentucky General Assembly, Frankfort, KY March 2014 to August 2014

- Provided economic analysis and research support to all members of the General Assembly for the long and short legislative sessions.
- During the interim, assisted the Chief Economist and staff in assembling supplemental reports for committee review on topics such as prevailing wage law, unemployment, educational attainment, etc.

Visiting Professor

Martin School of Public Policy and Administration, University of Kentucky
Lexington, KY August 2013 to May 2014

- Provided instruction in the accelerated and regular MPA programs in Public Program Evaluation (PA 622 – Fall II quarter and Spring 2014 Semester), Decision Analysis (PA 623 – Fall II quarter), and Cost Benefit Analysis (PA 680 – Spring Semester) for the 2013-2014 academic year.
- Served as a consulting faculty advisor and Stata Lab instructor for the capstone projects during the Spring 2014 semester (Chair of two committees; reviewed six total capstone papers).
- Served as Chair of the Communications Committee for the Martin School.

Graduate Research Assistant
Martin School of Public Policy and Administration, University of Kentucky
Lexington, KY August 2011 to August 2013

- Supported faculty members in assembling information and basic empirical analysis for the NASPAA self-study and accreditation process, which included qualitative surveys of faculty members, budget analysis of the department, and compilation of all materials for submission during the self-study year.
- Assisted in the coordination of a NSF grant application, including management of the budget assembly and analysis of all grant partners across multiple colleges/departments in the University under the supervision of Dr. Eugenia F. Toma.
- Managed the Martin School's website re-launch during the summer of 2013.
- Provided team support for Commonwealth Council on Developmental Disabilities (CCDD), researching the background of best practices and created a comprehensive review of literature.
- Taught interactive lab course for Master's students in applied statistics using Stata.

Intern
United Nations Conference on Trade and Development (ALDC Division)
Geneva, Switzerland May 2012 to August 2012

- Assisted in the execution of a research project on migration, brain circulation, and diaspora networks of the Least Developed Countries (LDCs), by carrying out statistical data collection, tabulation, and regression analysis in Stata for presentation in the LDC Report (2012).
- Performed regression analysis, directly applying the methodology of gravity modeling to the migration data set compiled for the ALDC division.
- Collected qualitative and bibliographic information on the situation and education of migrants from LDCs in destination countries.
- Formulated and drafted conclusions based on statistical, bibliographic, and qualitative searches performed.
- Performed research on the economic and societal role played by skilled returnees in LDCs.

Graduate Research Assistant
Creative and Technical Services, College of Arts and Sciences, University of Kentucky
Office of Funding and Recruitment, The Graduate School, University of Kentucky
Lexington, KY August 2008 to August 2011

- Assisted faculty and students with information technology issues, including trouble shooting computer issues, web migration, and Blackboard support.
- Conducted bibliographic research on the best practices of residential learning communities, university budgeting practices and management.
- Supervised student workers and purchased equipment for the technical services team.
- Maintained website and assisted in the migration to a Sharepoint interface.
- Provided support to GS staff in the assembly and dissemination of material for annual faculty and student awards.
- Assisted the Dean and Associate Provost in the planning of University Commencement Events, including student registration, event coordination, and venue management.
- Performed analysis and management of National Research Commission (NRC) data regarding the national ranking of University of Kentucky graduate programs for the Dean of the Graduate School (Jeannine Blackwell).

PUBLICATIONS AND PRESENTATIONS

Paris, B.L. (2013). *Institutional Lending Models, Mission Drift, and Microfinance Institutions.* (Doctoral Dissertation). http://uknowledge.uky.edu/msppa_etds/9/

Clark, M., T. Fraley, and B. Paris (December 2014) "How Kentucky's Prevailing Wage Laws Affect Public Construction." Legislative Research Commission.

Bollinger, C.R. and B.L. Paris (2015). "Crime and Punishment and Education." *Issue Brief on Topics Affecting Kentucky's Ecconomy*. http://uknowledge.uky.edu/cber_issuebriefs/17/

Paris, B.L. Forthcoming (Nov. 2016). "Mission Statements and Non-Profit Management: A Mixed Methods Analysis of Mission Drift in Microfinance Institutions." Association for Research on Nonprofit Organizations and Volunteer Action (ARNOVA).

Brian Redding

Lexington, KY
Tel: (616) 970-2417
Email: bredding899@gmail.com

EDUCATION

University of Kentucky, Lexington, KY
Ph.D. in Economics – expected May 2023

- Teaching Assistant:
  - Providing instruction to students during office hours, classroom recitation

Central Michigan University, Mt. Pleasant, MI
Master of Arts in Economics – May 2018

- Graduate Assistant:
  - Assisted with faculty research project on history of state and local laws

Thomas M. Cooley Law School, Lansing, MI
Juris Doctor, cum laude

- *Thomas M. Cooley Law Review*, Associate Editor
- Certificates of Merit: Evidence and Labor Law

Grand Valley State University, Allendale, MI
Bachelor of Arts in Economics

- Minor in Russian

EXPERIENCE

State Representative Bob Constan, Lansing, MI
Legislative Assistant, May 2009 – December 2012

- Researched and wrote legal memoranda on various issues of state law
- Performed administrative and clerical duties
- Communicated with and assisted constituents
- Collaborated with state agencies and private entities
- Assisted in political campaign management

Private Practice Attorney, Michigan (State Bar P#73203)
Solo Practice, January 2013 – August 2016

- Represented indigent criminal defendants in Ingham County
- Created complete estate plans, including wills, trusts, powers of attorney
- Drafted contracts for small businesses, including sales agreements and transfer of ownership

EXHIBIT 10
ATTACHMENT 10.2

Property Tax Calculations

Current Real Property Taxes

Parcel	Owner	Acres	Assessment	Assess/Acre	Rate/$100	Tax
020-00-00-017	Padon	299.65	$124,988	$417	0.91887	$1,148
013-00-00-026	Davis	109.8	$71,830	$654	0.91887	$660
013-00-00-030	Kelley	215.52	$146,084	$678	0.91887	$1,342
Total						$3,151

See Tax Cards below. No Tangible Property Tax is currently collected on these parcels.

Estimated Real Property Taxes – Year 1

Applicant estimates that McCracken County will re-assess the land underlying the proposed Project at a rate of at least $6,000 per acre. This is a conservative estimate. Other jurisdictions across the southeastern US have re-assessed 'solar land' at values ranging from $6,000 per acre to $15,000 per acre.

Assuming the low end of this range, resulting real property taxes would be:

Parcel	Owner	Acres*	Assess (est)	Assess/Acre	Rate/$100	Tax
020-00-00-017	Padon	299.65	$1,797,900	$6,000	0.91887	$16,520
013-00-00-026	Davis	109.8	$658,800	$6,000	0.91887	$6,054
013-00-00-030	Kelley	215.52	$1,293,120	$6,000	0.91887	$11,882
Total						$34,456

* This acreage is as-listed by the McCracken County PVA, and slightly higher than surveyed. As a result, a slightly lower tax estimate has been presented in the Application.

Net present value for the 30-year real property tax revenue stream has been calculated assuming an average 2% increase in land values per year, and a 2% discount rate.

Estimated Tangible Property Taxes

Weighting of tangible property tax rates is based on guidance from Mike Grim, JD, Tax Partner, State & Local Tax Services Team Leader, MCM CPAs & Advisors, Louisville, KY and Darrell Young, Department of Revenue, Compliance Section Supervisor, Office of Property Valuation, Kentucky Department of Revenue and from the Solar Farm Assessment Recommended Guidelines_2_April 2020 from the Kentucky Department of Revenue Office of Property Valuation, Division of State Valuation. See email and table below.

Estimated Tangible Property Taxes are based on an original cost for Plant and Equipment of $63,258,000. See table below.

qPublic.net™ McCracken County, KY PVA

HOMESTEAD EXEMPTION

Homeowners 65 or older or totally disabled can reduce their property tax bill by $372 to $612 with the homestead exemption. Click here for more details or to apply online.

Summary

Property Address	Assessment	District
6200 NEW LIBERTY CHURCH ROAD	$124,988	01-Outside Fire

Summary

Parcel Number	020-00-00-017
Location Address	6200 NEW LIBERTY CHURCH ROAD
Description	20-7-40 299.65 AC KOW TR 23 & 25 (Note: Not to be used on legal documents)
Class	FARM (20)
Tax District	01-Outside Fire
2019 Rate Per Hundred	0.91887

View Map

Historical Plat

Historical Plat Record (PDF)

Map

Owner

PADON GREGORY L & WATKINS KIMBERLY MARIE C/O WC'S FIELDS LLC
2426 PARKDALE AVENUE
LOUISVILLE, KY 40220

Value Information

		2021 Tax Roll Value	2020 Certified Value
+	Land Value	$124,988	$124,988
+	Improvement Value	$0	$0
=	Total Taxable Value	**$124,988**	**$124,988**
-	Exemption Value	$0	$0
=	Net Taxable Value	**$124,988**	**$124,988**
+	Land FCV	$500,000	$500,000
+	Improvement FCV	$0	$0
=	Total FCV	**$500,000**	**$500,000**
	Exemption	Homestead: No	Homestead: No

Tax Estimator

Land Information

Condition	None	**Topography**	Not Used
Plat Book/Page		**Drainage**	None
Subdivision		**Flood Hazard**	
Lot		**Zoning**	Residential
Block		**Electric**	No
Acres	299.65	**Water**	No
Front	0	**Gas**	No
Depth	0	**Sewer**	No
Lot Size	0x0	**Road**	
Lot Sq Ft	13052754	**Sidewalks**	No
Shape	None	**Information Source**	

Property Record Card

020-00-00-017 (PDF)

Sales Information

Sale Date	Sale Price
1/4/2021	$500,000
12/8/2015	$500,000
12/10/2002	$60,000

Recent Sales

Sale date range:

From: 04 / 19 / 2019 **To:** 04 / 19 / 2021

Sales by Parcel Group

1500 Feet Sales by Distance

No data available for the following modules: Improvements, Photos, Sketches.

Developed by Schneider GEOSPATIAL

Last Data Upload: 4/16/2021, 9:08:21 PM

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qPublic.net™ McCracken County, KY PVA

Summary

Property Address	Assessment	District
5700 NEW LIBERTY CHURCH ROAD	$71,830	01-Outside Fire

Summary

Parcel Number	013-00-00-026
Location Address	5700 NEW LIBERTY CHURCH ROAD
Description	20-7-47 109.8 AC NEW LIBERTY CHURCH RD (Note: Not to be used on legal documents)
Class	FARM (20)
Tax District	01-Outside Fire
2019 Rate Per Hundred	0.91887

View Map

Historical Plat

Historical Plat Record (PDF)

Map

Owner

DAVIS ROY LEE
5215 COUNTY LINE ROAD
KEVIL, KY 42053

Value Information

		2021 Tax Roll Value	2020 Certified Value
+	Land Value	$71,830	$71,830
+	Improvement Value	$0	$0
=	Total Taxable Value	**$71,830**	**$71,830**
-	Exemption Value	$0	$0
=	Net Taxable Value	**$71,830**	**$71,830**
+	Land FCV	$274,500	$274,500
+	Improvement FCV	$0	$0
=	Total FCV	**$274,500**	**$274,500**
	Exemption	Homestead: No	Homestead: No

Tax Estimator

Land Information

Condition	None	**Topography**	Not Used
Plat Book/Page		**Drainage**	None
Subdivision		**Flood Hazard**	
Lot		**Zoning**	Residential
Block		**Electric**	No
Acres	109.80	**Water**	No
Front	0	**Gas**	No
Depth	0	**Sewer**	No
Lot Size	0x0	**Road**	
Lot Sq Ft	4782888	**Sidewalks**	No
Shape	None	**Information Source**	

Property Record Card

013-00-00-026 (PDF)

Sales Information

Sale Date	Sale Price
5/1/1984	$10,000

Recent Sales

Sale date range:

From: 04 / 19 / 2019 **To:** 04 / 19 / 2021

Sales by Parcel Group

1500 Feet Sales by Distance

No data available for the following modules: Improvements, Photos, Sketches.

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qPublic.net™ McCracken County, KY PVA

HOMESTEAD EXEMPTION

Homeowners 65 or older or totally disabled can reduce their property tax bill by $372 to $612 with the homestead exemption. Click here for more details or to apply online.

Summary

Property Address	Assessment	District
12455 MASSEY ROAD	$146,084	01-Outside Fire

Summary

Parcel Number	013-00-00-030
Location Address	12455 MASSEY ROAD
Description	20-7-50,51 215.52 AC MASSEY RD (Note: Not to be used on legal documents)
Class	FARM (20)
Tax District	01-Outside Fire
2019 Rate Per Hundred	0.91887

View Map

Historical Plat

Historical Plat Record (PDF)

Map

Owner

KELLEY STEPHEN J & MELANIE W
2714 SR 1181
BARDWELL, KY 42023

Value Information

		2021 Tax Roll Value	2020 Certified Value
+	Land Value	$146,084	$146,084
+	Improvement Value	$0	$0
=	Total Taxable Value	**$146,084**	**$146,084**
-	Exemption Value	$0	$0
=	Net Taxable Value	**$146,084**	**$146,084**
+	Land FCV	$982,090	$982,090
+	Improvement FCV	$0	$0
=	Total FCV	**$982,090**	**$982,090**
	Exemption	Homestead: No	Homestead: No

Tax Estimator

Land Information

Condition	None	**Topography**	Not Used
Plat Book/Page		**Drainage**	None
Subdivision		**Flood Hazard**	
Lot		**Zoning**	Residential
Block		**Electric**	No
Acres	215.52	**Water**	No
Front	0	**Gas**	No
Depth	0	**Sewer**	No
Lot Size	0x0	**Road**	
Lot Sq Ft	9388051	**Sidewalks**	No
Shape	None	**Information Source**	

Property Record Card

013-00-00-030 (PDF)

Sales Information

Sale Date	Sale Price
1/14/2015	$982,090
11/7/2014	$977,290

Recent Sales

Sale date range:

From: 04 / 19 / 2019 **To:** 04 / 19 / 2021

Sales by Parcel Group

1500 Feet Sales by Distance

No data available for the following modules: Improvements, Photos, Sketches.

Developed by Schneider GEOSPATIAL

Last Data Upload: 4/16/2021, 9:08:21 PM

Version 2.3.117

Chris Killenberg

From: Mike Grim <Mike.Grim@mcmcpa.com>
Sent: Monday, May 3, 2021 6:00 PM
To: Chris Killenberg
Subject: RE: KY Business Personal Property Taxation - Solar Farms

Yes, Chris I would agree the trackers are manufacturing equipment subject to the $.15 rate and also the blended rate looks correct.

Mike Grim, JD
Tax Partner, State & Local Tax Services Team Leader
Phone: 502.882.4510
Fax: 502.749.1930

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Monday, May 3, 2021 1:13 PM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: RE: KY Business Personal Property Taxation - Solar Farms
Importance: High

Mike,

Returning to the spreadsheet…

The attached memo from KY DOR categorizes the tracking system (the motorized system that rotates the panels) as machinery, not tangible property. Therefore, the rate should be $0.15 per hundred state-only. Do you agree? And do you then confirm the blended rate of $0.42 per hundred looks correct?

Chris

Chris Killenberg | Regional Development Director
Community Energy
P.O. Box 17236
Chapel Hill, North Carolina 27516
M: 919.360.9792
chris.killenberg@communityenergyinc.com

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From: Mike Grim <Mike.Grim@mcmcpa.com>
Sent: Monday, May 3, 2021 9:53 AM

To: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Subject: RE: KY Business Personal Property Taxation - Solar Farms

Sorry Chris. Must've overlooked this response. Yes, the weighted average seems correct.

Mike Grim, JD
Tax Partner, State & Local Tax Services Team Leader
Phone: 502.882.4510
Fax: 502.749.1930

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Friday, April 30, 2021 3:57 PM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: RE: KY Business Personal Property Taxation - Solar Farms

Mike,

So if I carry the weighted average to the 2nd sheet (.6686%), do those taxes look right now?

Chris

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Friday, April 30, 2021 2:44 PM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: Re: KY Business Personal Property Taxation - Solar Farms

Thanks Mike. Just out on an errand. I'll look at this when I get back and let you know if I have any questions.

Get Outlook for Android

From: Mike Grim <Mike.Grim@mcmcpa.com>
Sent: Friday, April 30, 2021 2:32:42 PM
To: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Subject: RE: KY Business Personal Property Taxation - Solar Farms

Chris:

Here's the updated rates. It looks like the original bill was paid early, so a 2% discount was applied. The 2020 real estate tax rate was actually .918880, consisting of state (.122), county (.242870), McCracken County School (.5380) and Paducah Jr College – Co (.016). The tangible rate would be 1.36848, consisting of state (.45), county (.364483), McCracken County School (.5380), and Paducah Jr College – Co (.016).

See attached changes in yellow.

Mike Grim, JD
Tax Partner, State & Local Tax Services Team Leader
Phone: 502.882.4510
Fax: 502.749.1930

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Friday, April 30, 2021 2:03 PM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: FW: KY Business Personal Property Taxation - Solar Farms

Here's the tax bill for that parcel. Looks to be at 0.9188%.

Chris

From: Chris Killenberg
Sent: Friday, April 30, 2021 1:59 PM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: RE: KY Business Personal Property Taxation - Solar Farms

Hi Mike,

We're outside any city limits. Here's a tax card that shows the fire district. Let me see if I can get hold of a tax bill.

Chris

From: Mike Grim <Mike.Grim@mcmcpa.com>
Sent: Friday, April 30, 2021 1:51 PM
To: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Subject: RE: KY Business Personal Property Taxation - Solar Farms

Chris:

The local rates are too low for the non-manufacturing equipment and real estate. The city rate for real property is .2670 and tangible is .39. The school district rate for real and tangible depends on which school district the property falls within: Paducah School Board is .8640 and McCracken County is .5380. The county rate is .242870 for real estate and .364483 for tangible. Lastly, if there is a special fire district, then the rate can vary between .016 to .075.

If you have the most recent (i.e., 2020 real property tax bill), then we should be able to narrow down the rate. But the amounts currently listed as local are understated. Perhaps you can forward me the real property tax bill and see if we can determine which taxing districts (see the attached chart for details).

Best regards,
Mike

Mike Grim, JD
Tax Partner, State & Local Tax Services Team Leader
Phone: 502.882.4510
Fax: 502.749.1930

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Friday, April 30, 2021 10:42 AM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: FW: KY Business Personal Property Taxation - Solar Farms

Hi Mike,

Following up. Do you expect to have a review of the attached today? Please let me know.

Thanks,

Chris

From: Chris Killenberg
Sent: Tuesday, April 27, 2021 3:23 PM
To: mike.grim@mcmcpa.com
Subject: RE: KY Business Personal Property Taxation - Solar Farms

Mike,

Thanks for the call.

Attached is our estimate of the real property taxes and tangible property taxes for our McCracken County solar project.

For the real property taxes, we pay all the taxes on the land we lease. We're leasing 615 acres of farmland. Currently, that land is in agricultural use and is assessed at a value of approximately $557 per acre. Based on our experience, we anticipate this land will be re-assessed once it converts to use for a solar farm at a value of at least $6000 per acre. To be conservative, we're basing our real property tax estimates on an assessment of $6,000 per acre x 615 acres x the McCracken County tax rate of .91187 per hundred.

For the tangible property taxes we used the 2020 guidelines from DOR, and our knowledge of individual costs per watt, to come up with a weighted average tangible property tax rate that would be easier to model. We then applied that to our original cost, less depreciation, to come up with our total tangible property tax estimate.

See the attached spreadsheet.

Please let me know if this looks generally correct to you, or if you have any questions or concerns.

Thanks,

Chris

Chris Killenberg | Regional Development Director
Community Energy
P.O. Box 17236
Chapel Hill, North Carolina 27516
M: 919.360.9792
chris.killenberg@communityenergyinc.com

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From: Chris Killenberg
Sent: Friday, April 23, 2021 1:07 PM
To: mike.grim@mcmcpa.com
Subject: KY Business Personal Property Taxation - Solar Farms

Mike,

About a year and a half ago, you advised us on the business personal property taxation of solar farm assets (see below). We'd like to engage you again in support of some projects we're now developing that are about to go before the Public Service Commission for a state permit.

Are you available on Monday for a short call to discuss? Please let me know if there's a time that works for you.

Thanks,

Chris

Chris Killenberg | Regional Development Director
Community Energy
P.O. Box 17236
Chapel Hill, North Carolina 27516
M: 919.360.9792
chris.killenberg@communityenergyinc.com

COMMUNITY ENERGY®

From: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Sent: Friday, July 24, 2020 9:32 AM
To: Chris Killenberg <chris.killenberg@communityenergyinc.com>
Subject: KY Business Personal Property Taxation

From: Young, Darrell (DOR) <Darrell.Young@ky.gov>
Sent: Monday, September 30, 2019 9:54 AM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: RE: Solar energy panels

Mike,

All commercial solar farms would be classified as public service companies (PSC), titled as an Electric Power Company, subject to central taxation by the DOR as directed by KRS 136.120.
Solar farms should only start filing the form 61A200 after the farm goes online and begins selling electricity to customers. Prior to being operational, the land would be picked up by the PVA as real estate and any construction work in progress on the solar farm would be filed on the tangible personal property return, form 62A500.

The main criteria used to differentiate a public service company from all other types of solar operating systems:

1.) The PSC owner has a business profit motivation.
2.) The primary intent of the PSC owner is to sell the majority of electric power directly to other electric companies (KU, LGE, TVA, Kentucky Power, RECC's, etc.) via the grid.
3.) The primary intent of the PSC owner is to sell the majority of electric power directly to consumers (industrial plants, commercial businesses, homeowners, etc.) via the grid.
4.) The PSC owner's intent is not to use the electricity for their personal home use, farming use, and/or private business use.
5.) The PSC owner's intent is not to gain energy credits on their personal and/or business electric bill.

For public service companies, the solar electric equipment would be classified as follows:

1.) Solar Panels – Manufacturing machinery, 15¢ per $100 state rate only
2.) Inverters & Converters – Manufacturing machinery, 15¢ per $100 state rate only
3.) Transformers – Manufacturing machinery, 15¢ per $100 state rate only
4.) Trackers – Tangible personal, 45¢ per $100 state rate & full local rates
5.) Batteries – Tangible personal, 45¢ per $100 state rate & full local rates
6.) Mounting Racks, Stands, Frames, & Hardware – Manufacturing machinery, 15¢ per $100 state rate only
7.) Wiring, Cable, Poles, Power Lines – Tangible personal, 45¢ per $100 state rate & full local rates
8.) Meters, Breakers, Control Switches – Tangible personal, 45¢ per $100 state rate & full local rates
9.) Land used for the Solar Panels – Real property, 12.2¢ per $100 state rate & full local rates
10.) Right-of-ways, Conduits, Buildings, Shelters, Huts, Fencing – Real property, 12.2¢ per $100 state rate & full local rates

Solar farms will need to file a form 61A200 with the Department of Revenue

Solar farms will need to file a form 61A200 with the Department of Revenue every year. The deadline is April 30 of each year. Extensions may be granted for 30 days in the extension is requested in writing before April 30 and includes a report detailing any increases or decreases in property of $50,000 or more in any taxing jurisdiction (KRS 136.130). Incomplete extension requests will be denied and a penalty may apply. No extension will be granted beyond May 30.
In addition to form 61A200, electric power companies are also required to file Schedules A, B, C, D, D1, I, J, K, K2, L, N1 – N3, R, S, U, CI, Z. These can all be found with the form 61A200 on the Department of Revenue website, https://revenue.ky.gov.
If a property owner has solar panels on a residence or business, the panels may or may not add a significant contributory value to the property. The PVA should estimate the cost information or obtain the cost information from the property owner, and determine a value to be added to the assessment.

Any questions regarding solar farms should be directed to Robert Carbin with the Public Service Branch, 502-564-7148.

Thanks,

Darrell Young, Department of Revenue
Compliance Section Supervisor, Office of Property Valuation

From: Mike Grim <Mike.Grim@mcmcpa.com>
Sent: Monday, September 30, 2019 9:35 AM
To: Young, Darrell (DOR) <Darrell.Young@ky.gov>
Subject: RE: Solar energy panels

Darrell:

This is a large-scale solar farm, installed for the purpose of selling power to the local utility for their re-sale. 50-100 Mega Watts. They would be doing so on leased land for a 30 year duration, at which time they will remove our equipment and return the land to the owner.

Mike

Mike Grim, JD
Tax Partner, State & Local Tax Services Team Leader
Phone: 502.882.4510
Fax: 502.749.1930

From: Young, Darrell (DOR) <Darrell.Young@ky.gov>
Sent: Monday, September 30, 2019 8:57 AM
To: Mike Grim <Mike.Grim@mcmcpa.com>
Subject: RE: Solar energy panels

Mike,

I am going to assume that this question is regarding a business taxpayer. I need a little more information before I can provide complete and accurate answers to the reporting requirements for solar panels. What is the intended use of the solar energy? Is this for the taxpayer's personal use, or is there intent to sell energy? It doesn't sound like we are talking about a solar farm. Please provide me some more information so I can better provide an accurate answer.

If a property owner has solar panels on a residence or business, the panels may or may not add a significant contributory value to the property. The PVA should estimate the cost information or obtain the cost information from the property owner, and determine a value to be added to the assessment.

Thanks,

Darrell Young, Department of Revenue
Compliance Section Supervisor, Office of Property Valuation

From: Mike Grim <Mike.Grim@mcmcpa.com>
Sent: Friday, September 27, 2019 2:12 PM

To: Young, Darrell (DOR) <Darrell.Young@ky.gov>
Subject: Solar energy panels

Darrell:

I have a question regarding solar energy panels and property tax. I have a client that is going to install some solar panels for energy production and the local PVA is telling them the panels will be considered an improvement to real property, subject to real property tax rates, as opposed to tangible personal property. Is there someone at the Office of Property Valuation that could address whether such items are improvements to real estate or rather remain tangible personal property after installation?

It was my understanding, similar to for example cellphone towers, that such installations remain tangible property and do not become realty just because they are attached to real estate.

I appreciate your time and assistance.

Best regards,
Mike

Mike Grim, JD
Tax Partner, State & Local Tax Services Team Leader
Phone: 502.882.4510
Fax: 502.749.1930

CPAs & ADVISORS
P 502.749.1900
F 502.749.1930
2600 Meidinger Tower
462 South Fourth Street
Louisville, KY 40202
www.mcmcpa.com | 888.587.1719

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Solar Farm Assessment Recommended Guidelines

All commercial solar farms would be classified as public service companies (PSC), titled as an Electric Power Company, subject to central taxation by the DOR as directed by KRS 136.120.

Solar farms should only start filing the form 61A200 after the farm goes online and begins selling electricity to customers. Prior to being operational, the land would be picked up by the PVA as real estate and any construction work in progress on the solar farm would be filed on the tangible personal property return, form 62A500.

The main criteria used to differentiate a public service company from all other types of solar operating systems:

- The PSC owner has a business profit motivation.
- The primary intent of the PSC owner is to sell the majority of electric power directly to other electric companies (KU, LGE, TVA, KY Power, RECC's, etc.) via the grid.
- The primary intent of the PSC owner is to sell the majority of electric power directly to consumers (industrial plants, commercial businesses, homeowners, etc.) via the grid.
- The PSC owner's intent is not to use the electricity for their personal home use, farming use, and/or private business use.
- The PSC owner's intent is not to gain energy credits on their personal and/or business electric bill.

April 2020

For public service companies, the solar electric equipment would be classified as follows:

Manufacturing machinery, 15¢ per $100 state rate only

- Solar Panel
- Inverters & Converters, Transformers,Trackers, Batteries
- Mounting racks, stands, frames & hardware
- DC meters, junction/combiner boxes, solar strings, breakers, control switches, regulators
- DC Above Ground & Underground Cables & Connectors

Tangible personal, 45¢ per $100 state rate & full local rates

- Above ground transmission power lines/wires/poles and related equipment
- AC switchgears, Meters, Breakers, Control Switches, Regulators
- AC Above Ground & Underground Cables & Connectors
- Security Systems,Communication Equipment
- Computer systems, monitor & control systems and SCADA systems

Real property, 12.2¢ per $100 state rate & full local rates

- Land used for the Solar Panels
- Right-of-ways, Conduits, Buildings, Shelters, Huts, Fencing

Solar farms will need to file a form 61A200 with the Department of Revenue every year. The deadline is April 30 of each year. **Extensions may be granted for 30 days if the extension is requested in writing before April 30 and includes a report detailing any increases or decreases in property of $50,000 or more in any taxing jurisdiction (KRS 136.130).** Incomplete extension requests will be denied and a penalty may apply. No extension will be granted beyond May 30.

In addition to form 61A200, electric power companies are also required to file Schedules A, B, C, D, D1, I, J, K, K2, L, N1 – N3, R, S, U, CI, Z. These can all be found with the form 61A200 on the Department of Revenue website, https://revenue.ky.gov.

If a property owner has solar panels on a residence or business, the panels may or may not add a significant contributory value to the property. The PVA should estimate the cost information or obtain the cost information from the property owner, and determine a value to be added to the assessment.

Any questions regarding solar farms should be directed to Robert Carbin with the Public Service Branch, 502-564-7148.

Kentucky Department of Revenue
Office of Property Valuation
Division of State Valuation
502-564-8175

*** SOURCE: Solar Farm Assessment Recommended Guidelines_2_April 2020. Kentucky Department of Revenue Office of Property Valuation Division of State Valuation**

Labor and Indirects	0.31
Indirects	$0.093
Materials	$0.501
Total EPC w/out Indirects	$0.811

CATEGORY	State (cents/$100)	Local (cents/$)	Total (cents/$)	Percentage	$/Wattdc	Direct Labor	% Age	Indirects	Total:	Weighted Rate
1) Solar Panels – Manufacturing machinery, 15¢ per $100 state rate only	15		15	0.15%	**$0.260**	**$0.020**	51.90%	$0.048	$0.328	0.0607%
2) Inverters & Converters – Manufacturing machinery, 15¢ per $100 state rate only	15		15	0.15%	**$0.035**	**$0.012**	6.99%	$0.006	$0.053	0.0099%
3) Transformers – Manufacturing machinery, 15¢ per $100 state rate only	15		15	0.15%	**$0.025**	**$0.023**	4.99%	$0.005	$0.053	0.0097%
4) Trackers – Machinery, 15¢ per $100 state rate only	15		15	0.15%	**$0.105**	**$0.040**	20.96%	$0.019	$0.164	0.0304%
5) Batteries – Tangible personal, 45¢ per $100 state rate & full local rates	45	91.8483	136.8483	1.37%						
6) Mounting Racks, Stands, Frames, & Hardware – Manufacturing machinery, 15¢ per $100 state rate only	15		15	0.15%	**$0.013**	**$0.016**	2.59%	$0.002	$0.031	0.0058%
7) Wiring, Cable, Poles, Power Lines – Tangible personal, 45¢ per $100 state rate & full local rates	45	91.8483	136.8483	1.37%	**$0.060**	**$0.100**	11.98%	$0.011	$0.171	0.2888%
8) Meters, Breakers, Control Switches – Tangible personal, 45¢ per $100 state rate & full local rates	45	91.8483	136.8483	1.37%	**$0.003**	**$0.006**	0.60%	$0.001	$0.010	0.0161%
9) Land used for the Solar Panels – Real property, 12.2¢ per $100 state rate & full local rates	12.2	79.687	91.887	0.92%						
10) Right-of-ways, Conduits, Buildings, Shelters, Huts, Fencing – Real property, 12.2¢ per $100 state rate & full local rates	12.2	79.687	91.887	0.92%						
TOTAL					$0.310	$0.217		$0.093	$0.811	**0.4215%**

McCracken County Solar	
Site Area (Acres)	**615**
Current Assessment ($/Acre)	**$557**
Solar Assessment ($/Acre)	**$6,000**
Yearly Land Appreciation Rate	**2%**
Real Property Tax Rate	**0.91887%**
Solar Equipment (Watt-ac)	**60,000,000**
Solar Equipment (Watt-dc)	**78,000,000**
Equipment Cost ($/Watt-dc)	**$0.811**
Tangible Property Tax Abatement	**$0.00**
Weighted Tangible Property Tax Rate	**0.42%**

	Real Property Tax				Tangible Property Tax				Total Tax
Year	Current Land Value	Estimated Real Property Tax (Current)	Solar Land Value	Estimated Real Property Tax (Solar)	Original Value of Solar Equipment	KY Depreciation (Class VI -18 yr life)	Assessed Value of Solar Equipment	Tangible Property Tax	Total Property Tax
1	$342,555	$3,148	$3,690,000	$33,906	$63,258,000	96.90%	$61,297,002	$258,357	$292,263
2	$349,406	$3,211	$3,763,800	$34,584	$63,258,000	95.70%	$60,537,906	$255,157	$289,742
3	$356,394	$3,275	$3,839,076	$35,276	$63,258,000	94.40%	$59,715,552	$251,691	$286,967
4	$363,522	$3,340	$3,915,858	$35,982	$63,258,000	92.90%	$58,766,682	$247,692	$283,674
5	$370,793	$3,407	$3,994,175	$36,701	$63,258,000	89.60%	$56,679,168	$238,893	$275,595
6	$378,208	$3,475	$4,074,058	$37,435	$63,258,000	84.70%	$53,579,526	$225,829	$263,264
7	$385,773	$3,545	$4,155,539	$38,184	$63,258,000	82.30%	$52,061,334	$219,430	$257,614
8	$393,488	$3,616	$4,238,650	$38,948	$63,258,000	78.90%	$49,910,562	$210,365	$249,313
9	$401,358	$3,688	$4,323,423	$39,727	$63,258,000	75.50%	$47,759,790	$201,300	$241,026
10	$409,385	$3,762	$4,409,892	$40,521	$63,258,000	74.20%	$46,937,436	$197,834	$238,355
11	$417,573	$3,837	$4,498,089	$41,332	$63,258,000	71.30%	$45,102,954	$190,102	$231,433
12	$425,924	$3,914	$4,588,051	$42,158	$63,258,000	65.00%	$41,117,700	$173,304	$215,463
13	$434,443	$3,992	$4,679,812	$43,001	$63,258,000	64.50%	$40,801,410	$171,971	$214,973
14	$443,131	$4,072	$4,773,408	$43,861	$63,258,000	61.90%	$39,156,702	$165,039	$208,901
15	$451,994	$4,153	$4,868,877	$44,739	$63,258,000	60.70%	$38,397,606	$161,840	$206,578
16	$461,034	$4,236	$4,966,254	$45,633	$63,258,000	58.20%	$36,816,156	$155,174	$200,808
17	$470,255	$4,321	$5,065,579	$46,546	$63,258,000	56.90%	$35,993,802	$151,708	$198,254
18	$479,660	$4,407	$5,166,891	$47,477	$63,258,000	52.10%	$32,957,418	$138,910	$186,387
19	$489,253	$4,496	$5,270,229	$48,427	$63,258,000	47.00%	$29,731,260	$125,312	$173,739
20	$499,038	$4,586	$5,375,633	$49,395	$63,258,000	41.20%	$26,062,296	$109,848	$159,243
21	$509,019	$4,677	$5,483,146	$50,383	$63,258,000	36.00%	$22,772,880	$95,984	$146,367
22	$519,199	$4,771	$5,592,809	$51,391	$63,258,000	30.30%	$19,167,174	$80,787	$132,177
23	$529,583	$4,866	$5,704,665	$52,418	$63,258,000	24.30%	$15,371,694	$64,789	$117,208
24	$540,175	$4,964	$5,818,758	$53,467	$63,258,000	18.50%	$11,702,730	$49,325	$102,792
25	$550,978	$5,063	$5,935,133	$54,536	$63,258,000	12.50%	$7,907,250	$33,328	$87,864
26	$561,998	$5,164	$6,053,836	$55,627	$63,258,000	10.00%	$6,325,800	$26,662	$82,289
27	$573,238	$5,267	$6,174,913	$56,739	$63,258,000	10.00%	$6,325,800	$26,662	$83,402
28	$584,702	$5,373	$6,298,411	$57,874	$63,258,000	10.00%	$6,325,800	$26,662	$84,536
29	$596,397	$5,480	$6,424,379	$59,032	$63,258,000	10.00%	$6,325,800	$26,662	$85,694
30	$608,324	$5,590	$6,552,867	$60,212	$63,258,000	10.00%	$6,325,800	$26,662	$86,875
NPV (2%)		$92,578		$997,244				$3,513,392	$4,510,636

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 11
Volume 1, Tab 11

Filing Requirement: KRS 278.706(2)(k)

A detailed listing of all violations by it, or any person with an ownership interest, of federal or state environmental laws, rules, or administrative regulations, whether judicial or administrative, where violations have resulted in criminal convictions or civil or administrative fines exceeding five thousand dollars ($5,000). The status of any pending action, whether judicial or administrative.

Respondent: Chris Killenberg

Neither McCracken County Solar LLC, nor any person or entity with an ownership interest in McCracken County Solar LLC, has violated any state or federal environmental laws or regulations. There are no known actions, whether judicial or administrative, pending against McCracken County Solar LLC, nor any person or entity with an ownership interest in McCracken County Solar LLC.

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 12
Volume 1, Tab 12

Filing Requirement: KRS 278.706(2)(l)

A site assessment report as specified in KRS 278.708, to be prepared by the applicant or designee.

(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.

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.

Respondent: Chris Killenberg

Applicant has prepared and hereby submits the required site assessment report by specific compliance with each element of KRS 278.708(3)(a)-(e) and KRS 278.708(4).

Case No. 2020-00392
Application - Exhibit 12
Includes seven Attachments
(12.1 - 5 pages, 12.2 - 1 page, 12.3 - 6 pages, 12.4-– 5 pages, 12.5 - 93 pages,12.6 - 121 pages and 12.7 - 19 pages)

KRS 278.708(3)(a): A completed site assessment report shall include:

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

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.

(a) 1. ***Surrounding land uses*** *for residential, commercial, agricultural, and recreational purposes*

Surrounding Land Uses

The current uses of the land surrounding the proposed Project site are agricultural, residential, and recreational.

The majority of the land surrounding the proposed Project site is currently in agricultural production. This includes the cultivation of corn, soybeans, and wheat.

There are three areas of residential development adjacent to the proposed Project site. To the northwest of the site and across New Liberty Church Road are a number of residences. To the southwest of the site, along Massey Road, is a single residence. To the south of the site, also along Massey Road, there are two additional residences.

To the southeast of the proposed Project site is a recreational area known as the West Kentucky State Wildlife Management Area (WMA). This land is across Bethel Church Road/Rossington Road from the proposed Project site.

A map indicating the surrounding land uses is provided as Exhibit 12 Attachment 12.2.

*(a) 2. The **legal boundaries** of the proposed site*

Legal Boundaries of the Proposed Project Site

The proposed Project site is located entirely in McCracken County, Kentucky. The legal descriptions of the land to be utilized as the Main Project Site, the Substation Site, and Utility Easement are provided as Exhibit 12 Attachment 12.3.

*(a) 3. Proposed **access control to the site***

Site Control

Site Control of the proposed Project site is provided via long-term leases and an easement agreement between the Applicant and multiple private individual landowners.

The main body of the Project site, comprising approximately 615 acres, is constituted of three (3) individual parcels. The Applicant has secured leases for the entirety of each of these parcels. The term of each lease includes a 2-year Development Feasibility Term followed by a 35-year Commercial Term. The McCracken County Property Valuation Administrator's parcel numbers, the surveyed acreage, parcel address, and current owners of these three parcels are as follows:

Parcel 020-00-00-017
297.55 acres
6200 New Liberty Church Rd., Kevil, KY 42053
Padon, Gregory L. and Watkins, Kimberley M.

Parcel 013-00-00-026
105.33 acres
New Liberty Church Rd., Kevil, KY 42053
Davis, Roy Lee

Parcel 013-00-00-030
215.50 acres
Massey Rd., Kevil, KY 42053
Kelley, Stephen J. and Melanie W.

The point of interconnection of the Project to Big Rivers' 69kV 'McCracken County-Shell' transmission line (the "POI") will be located on a separate parcel, adjacent to the main body of the Project site. The Applicant has secured an access and utility easement for a portion of this parcel. The term of this easement is for the construction and operating period of the Project. The easement terminates upon the cessation of the Project's operations. The McCracken County Property Valuation Administrator's parcel number, parcel address, and current owner of the easement parcel are as follows:

Parcel 013-00-00-032.01
New Liberty Church Rd., Kevil, KY 42053
Davis, Roy Lee and Davis, Thomas L. and Carrie A.

(a) 4. The location of ***facility buildings, transmission lines, and other structures***

Facility Buildings

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

Transmission Lines

The main body of the Project will connect to the Project POI via a new 34.5kV circuit, mounted overhead on traditional wooden power poles, and located within the utility easement referenced above. This circuit will connect to the project substation, which will connect to the adjacent 69kV Big Rivers transmission line. No additional transmission lines will be installed.

Other Structures

No structures will be constructed as part of the main body of the Project. Within the project substation, typical wooden and steel structures will be required for the mounting of overhead power lines entering the project substation from the main body of the Project and leaving the project substation to connect to the 69kV Big Rivers transmission line.

(a) 5. *Location and use of* ***access ways, internal roads, and railways***

Site Access Ways

There are four proposed access points to the Project from public roadways:

- KY 725 / New Liberty Church Rd., directly across from Burnley School Rd.
  - Turning east into the Project site from New Liberty Church Rd.
  - Located at an existing farm road that connects to New Liberty Church Rd.
  - To be used for access to the northern portion of the Project site

- KY 725 / New Liberty Church Rd., 0.51 miles north of Massey Rd.
    - Turning east into the Project site from New Liberty Church Rd.
    - Located at an existing farm path that connects to New Liberty Church Rd.
    - To be used for access to the central portion of the Project site
- Massey Rd., 0.71 miles east of KY 725 / New Liberty Church Rd.
    - Turning north into the Project site from Massey Rd.
    - Located at an existing farm path that connects to Massey Rd.
    - To be used for access to the southern portion of the Project site
- KY 725 / New Liberty Church Rd., 150 feet north of Jenkins No. 1 Rd.
    - Turning east into the project substation site from New Liberty Church Rd.
    - Proposed new connection to New Liberty Church Rd.
    - To be used for access to the project substation and POI

Internal Roads

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

Railways

No railways are located on the Project site, nor will any local railways be used or impacted by the proposed Project.

(a) 6. ***Existing or proposed utilities*** *to service the facility*

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.

(a) 8. ***Compliance with applicable setback requirements*** *as provided under KRS 278.704(2), (3), (4), or (5)*

Project Setback Requirements

KRS 278.704(3) reads:

> "If the merchant electric generating facility is proposed to be located in a county or a municipality with planning and zoning, then setback requirements from a property boundary, residential neighborhood, school, hospital, or nursing home facility may be established by the planning and zoning commission. Any setback established by a planning and zoning commission for a facility in an area over which it has jurisdiction shall:
>
> (a) Have primacy over the setback requirement in subsections (2) and (5) of this section; and
>
> (b) Not be subject to modification or waiver by the board through a request for deviation by the applicant, as provided in subsection (4) of this section."

The proposed Project is to be located in McCracken County. The McCracken County Planning and Zoning Commission recommended, and the McCracken County Fiscal Court approved, Ordinance 2021-03 amending the McCracken County Zoning Code and establishing regulations relating to solar energy systems (the "Solar Ordinance").

The Solar Ordinance defines a 'Level 2 Solar Energy System (SES)' as a ground-mounted system greater than one-half acre in size for the commercial production of electricity and transmission to a public utility. The proposed Project would meet McCracken County's definition of a Level 2 SES.

The Solar Ordinance establishes the following setback requirements for a Level 2 SES:

"Level 2 SES are required to be setback 100 feet from all exterior property lines. SES that extends across multiple parcels do not have to follow setback requirements (zero lot lines) for property lines located within the security fencing."

A copy of the Solar Ordinance is provided as Exhibit 12 Attachment 12.4.

The proposed Site Plan adheres to all provisions of the Solar Ordinance, including the observance of 100-foot setbacks from all exterior property lines.

*(a) 8. Evaluation of the **noise levels** expected to be produced by the facility*

Noise Levels Produced by the Facility

An Acoustical Analysis for the proposed Project site was performed by Copperhead Environmental Consulting, Inc., 471 Main St., Paint Lick, KY 40461.

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.
  - 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).
  - 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).
  - 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.
  - 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.
  - Typical riding mowers will produce a sound level of 102 dBA at a distance of 1 foot.
  - At the nearest residence, 515 feet away, this sound level will have attenuated to a level of 48 dBA.
- Traffic
  - 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.
  - 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.

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.

(b) An evaluation of the ***compatibility of the facility with 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.

(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*

Potential Impact on Adjacent Property Values and Land Use

A Property Value Impact Study for the proposed Project site was performed by Richard C. Kirkland, Jr., MAI, of Kirkland Appraisals, LLC, 9408 Northfield Court, Raleigh, North Carolina 27603. Mr. Kirkland is a Kentucky State Certified General Appraiser.

The Property Value Impact Study utilized matched pair analysis to determine whether there has been an impact to property values resulting from other solar development on abutting or adjoining land. The study methodology included researching and visiting existing and proposed solar farms in Kentucky as well as in other states across the southeast. Mr. Kirkland also researched articles through the Appraisal Institute and discussed the likely impact with other real estate professionals.

Mr. Kirkland concludes:

> "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 criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all indicate that a solar farm is a compatible use for rural/residential transition areas and that it would function in a harmonious manner with this area."
>
> "Data from the university studies, broker commentary, and other appraisal studies support a finding of no impact on property value adjoining a solar farm with proper setbacks and landscaped buffers."
>
> "Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting properties and that the proposed use is in harmony with the area in which it is located."

A copy of the Property Value Impact Study is provided as Exhibit 12 Attachment 12.6.

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

Peak and Average Noise Levels Associated with Construction And Operation

An Acoustical Analysis for the proposed Project site was performed by Copperhead Environmental Consulting, Inc., 471 Main St., Paint Lick, KY 40461.

The Acoustical Analysis identified the following sources of peak noise levels that will be produced during **construction** of the proposed facility:

- Pile Drivers
    - The construction of the solar facility would use equipment typical for site development, including backhoes, generators, pile drivers, and flatbed trucks. The equipment that will produce the greatest sound levels is the pile driver, used to embed steel support posts in the ground.
    - Specialty pile drivers used for solar panel installation (e.g., Vermeer Pile Driver - PD 10) produce a sound level of 84 dBA at a distance of 50 feet.
    - At the nearest residence, 515 feet away, this sound level will have attenuated to a level of 63.74 dBA.
- Concrete Trucks
    - The transformer base at the project substation will likely be poured concrete. If so, a concrete pump truck will be needed.
    - A concrete pump truck typically generates a sound level of approximately 82 dBA at a distance of 50 feet.
    - At the nearest residence to the substation, over 600 feet away, the sound level is estimated to peak at 64 dBA intermittently for a day or two.
- Ditch Witch
    - Underground electrical lines will be installed on site. A ditch trencher ("Ditch Witch") will be used to dig trenches for burying these cables.
    - A typical Ditch Witch produces a sound level of 74 dBA at a distance of 50 feet.
    - At the nearest residence, 515 feet away, this sound level will have attenuated to a level of 53.76 dBA.
- Roadway Sound During Construction
    - During construction, a temporary increase in traffic volume associated with travel of construction workers (up to 150 workers), delivery of construction equipment and material, and 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, and light passenger cars and trucks, falls within acceptable ranges because the sound is of short duration.

A noise level of 65 (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities such as construction.

In regard to peak construction noise, the Acoustical Analysis concludes:

> "The Project would result in minor temporary sound impacts during construction, with a maximum momentary sound level at the nearest receptor below 65 dBA."

The Acoustical Analysis identified the following source of peak noise that will be produced during **operation and maintenance** of the proposed facility:

- Mowing
  - It is anticipated that the proposed project site will be mowed 20-30 times per year.
  - Typical riding mowers will produce a sound level of 102 dBA at a distance of 1 foot.
  - At the nearest residence, 515 feet away, this sound level will have attenuated to a level of 48 dBA.

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.

In regard to peak operation and maintenance noise, 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.

*(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.*

A Traffic Study for the proposed Project site was performed by Tim Choate, PE, PLS of Bacon Farmer Workman Engineering & Testing, Inc., 500 South 17st Street, Paducah, KY 42003. Mr. Choate is a Professional Engineer, licensed in the State of Kentucky.

Road Traffic, Dust, and Anticipated Road Degradation

The Traffic Study examined the road network in the area of the proposed Project site, measured current traffic levels on those roads, calculated the potential number and direction of vehicle arrivals and departures from the Project site during construction and operation, and made recommendations for the mitigation of congestion and dust.

In regard to traffic during construction of the proposed facility, the Traffic Study concludes:

> "During construction of this facility, traffic is anticipated to increase with morning and evening peaks for daily workers and deliveries being made to the site periodically. All

necessary safety precautions, including signing and flagmen, will be taken to best ensure collisions are prevented on the surrounding roads. Other than increased wear, damages to the existing road infrastructure are not anticipated. All affected highway segments are anticipated to continue at an acceptable level of service (LOS) during both the morning and afternoon peaks."

In regard to traffic during operation of the proposed facility, the Traffic Study concludes:

> "Operation of the facility is not expected to cause significant impact to the local traffic as the additional expected traffic contributed to the area will be similar to that of a typical single-family home. During the construction and operation of the facility, there will be no adverse effects on traffic operations in and around the project site."

In regard to fugitive dust, the Traffic Study concludes:

> "Due to the low-density housing and rural character near the site, and the large size of the site, minor fugitive dust 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."

Rail Traffic

The proposed Project site is not located near an existing railway. The Project will not use railways for any construction or operational activities. Therefore, construction or operation of the proposed facility will have no impact on rail traffic.

A copy of the Traffic Study is provided as Exhibit 12 Attachment 12.7.

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.*

Route Cards and Ride Sharing

To mitigate the possibility of end-of-day traffic congestion, when the majority of vehicles leaving from the area of the project will face left-hand turns onto local roadways (therefore crossing a lane of traffic), the Applicant proposes the assignment of 'Route Cards' to each construction employee. These Route Cards will assign a route of egress to each employee. This will allow for the more even distribution of vehicles across the multiple routes of egress, with a focus on directing vehicles to intersections where traffic lights will enable efficient and safe left-hand turns onto local roadways. Employee ride sharing will also be encouraged in order to reduce the number of vehicles entering and exiting the project site during a typical construction day.

Construction Hours

To mitigate the effects of construction noise on the area of the project, the Applicant proposes to limit construction to the hours of 7am CT to 7pm CT, Monday through Saturday. No construction will be conducted on Sundays.

Construction "Neigbor Zones"

To mitigate the effect of construction noise on residences closest to the project site, the Applicant proposes to designate certain portions of the site as "Neighbor Zones." Within these Neighbor Zones, construction activities that create a higher level of noise will be limited to the hours of 9am CT to 5pm CT Monday through Friday. This will be particularly helpful to mitigate the impact of the noise associated with driving the posts to which the system is mounted. The restriction of this noisier construction activity within the Neighbor Zones to 9-5/Mon-Fri should help mitigate the effect of this noise, as adjacent residents are more likely to be out of the home during these hours - at work, running errands, etc. The Applicant will communicate the Neighbor Zone plan to affected neighbors in advance of construction and will collaborate with those neighbors on any refinements to this approach.

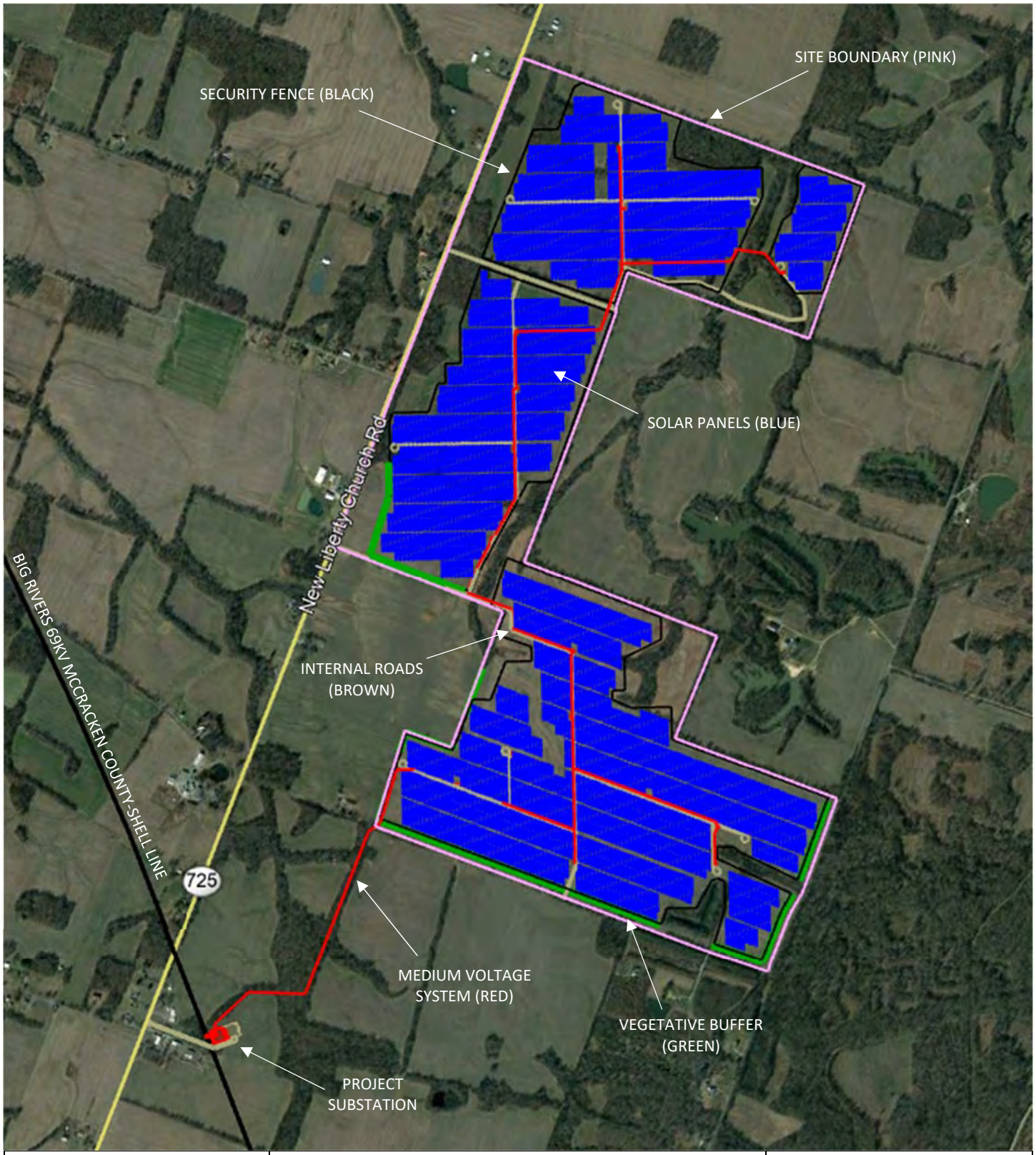
Inverter Locations

To mitigate the sound levels associated with the proposed facility's operation, the Applicant plans to strategically position the project's inverters at central locations within the system layout. The purpose of the inverters is to convert DC power (produced by the solar panels) to AC power (the form in which the electricity will be delivered to Big Rivers). These inverters require a cooling fan. The cooling fan produces a sound level that is similar to a residential window air-conditioner unit. This sound dissipates over distance. To provide for sufficient dissipation of this sound before it reaches adjacent residences, the Applicant plans to locate the inverter stations at a minimum of 1000 feet from the nearest residence. This will assure that, once operational, the proposed facility will be quiet, with facility-generated noise levels at the periphery of the project site at or below ambient levels.

Enhanced Setbacks

To mitigate the visual impact of the proposed facility, the Applicant plans to enhance the setback distance between the solar panels and adjacent residences. The proposed setback will be a minimum of 500 feet between any solar panel and any adjacent residences.

EXHIBIT 12
ATTACHMENT 12.1



COMMUNITY ENERGY®

COMMUNITY ENERGY SOLAR, LLC

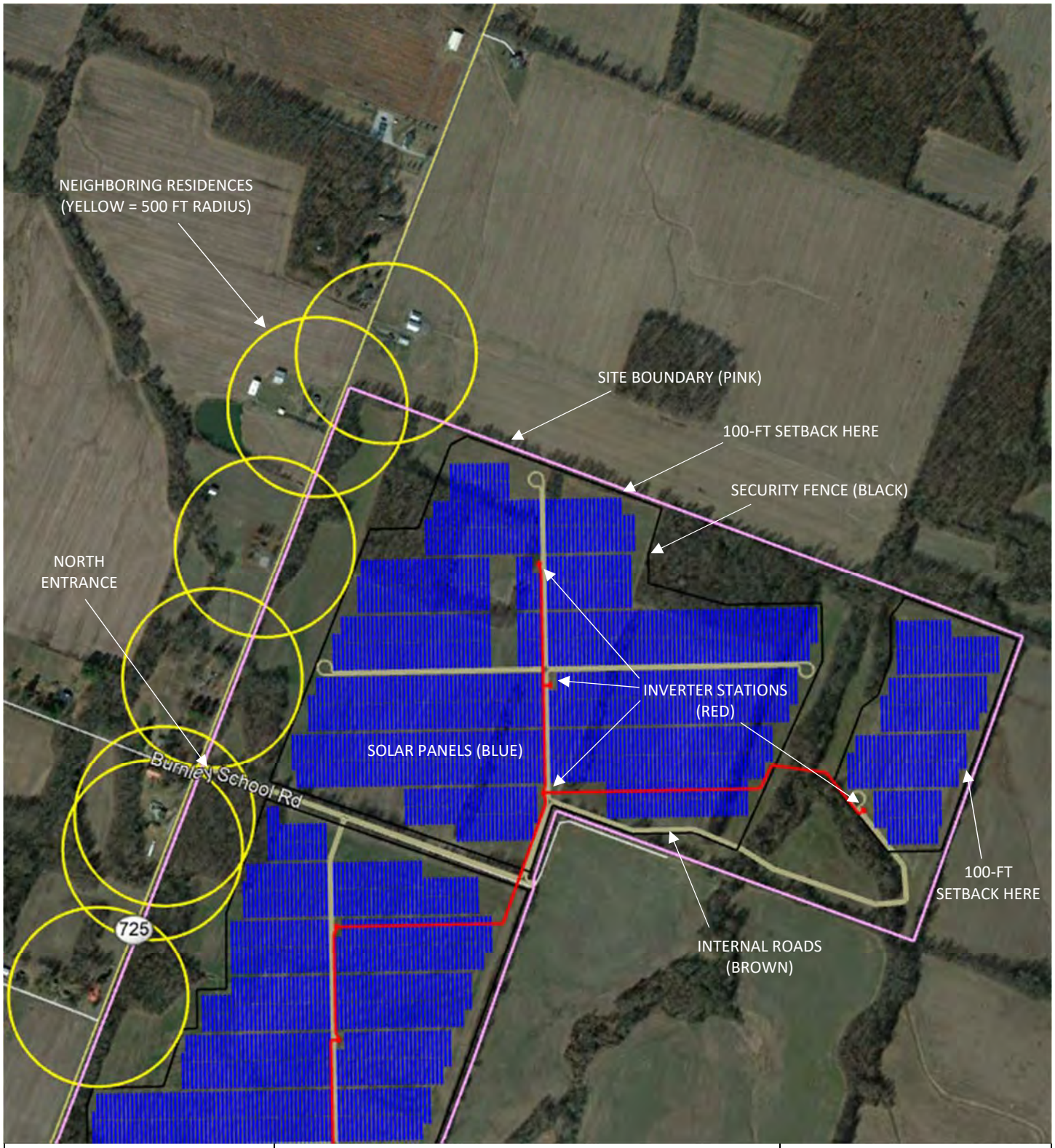
3 RADNOR CORP CENTER, SUITE 300
100 MATSONFORD RD.
RADNOR, PA 19087
(866) 946-3123

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: 5.3.2021

SITE PLAN OVERVIEW



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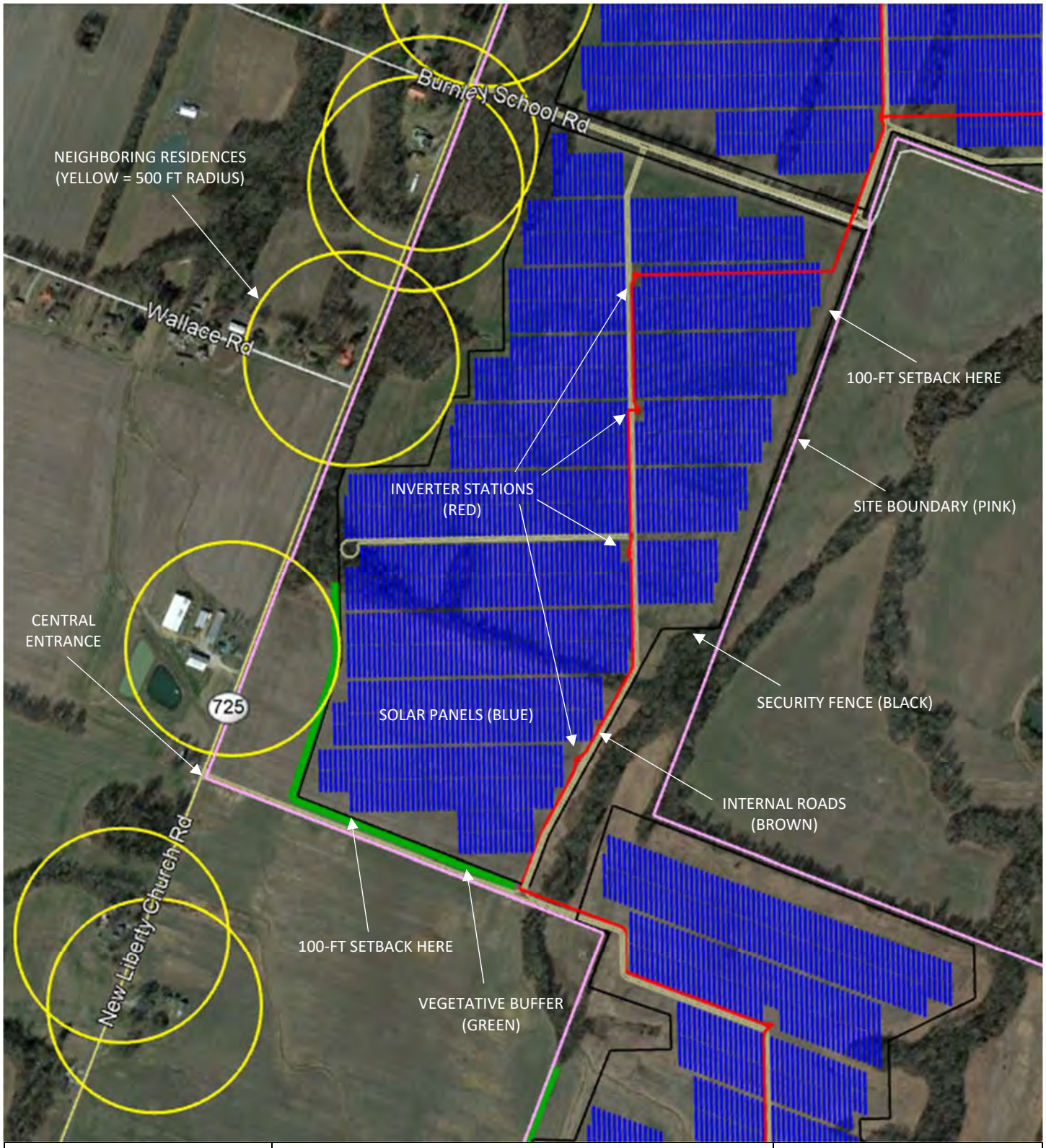
MCCRACKEN COUNTY, KY

N

NEW LIBERTY CHURCH RD, KEVIL, KY 42053
LAT/LONG: 37.12 N / 88.86 W
DATE: 5.3.2021

SITE PLAN
DETAIL
NORTH SECTION



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100 MATSONFORD RD.
RADNOR, PA 19087
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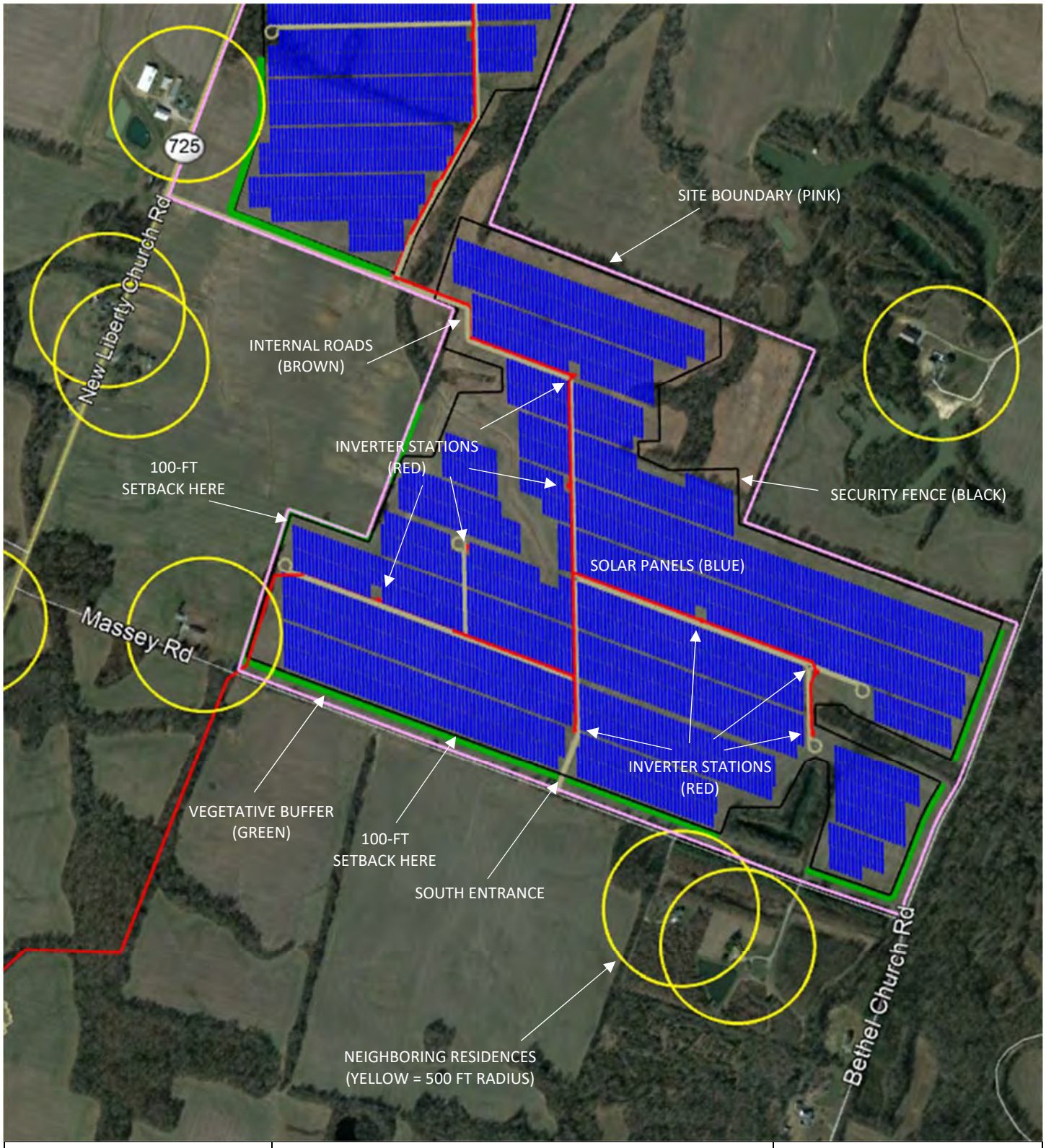
MCCRACKEN COUNTY SOLAR - 60MW SOLAR PROJECT
MCCRACKEN COUNTY, KY

N

NEW LIBERTY CHURCH RD, KEVIL, KY 42053
LAT/LONG: 37.12 N / 88.86 W
DATE: 5.3.2021

SITE PLAN
DETAIL
CENTRAL SECTION



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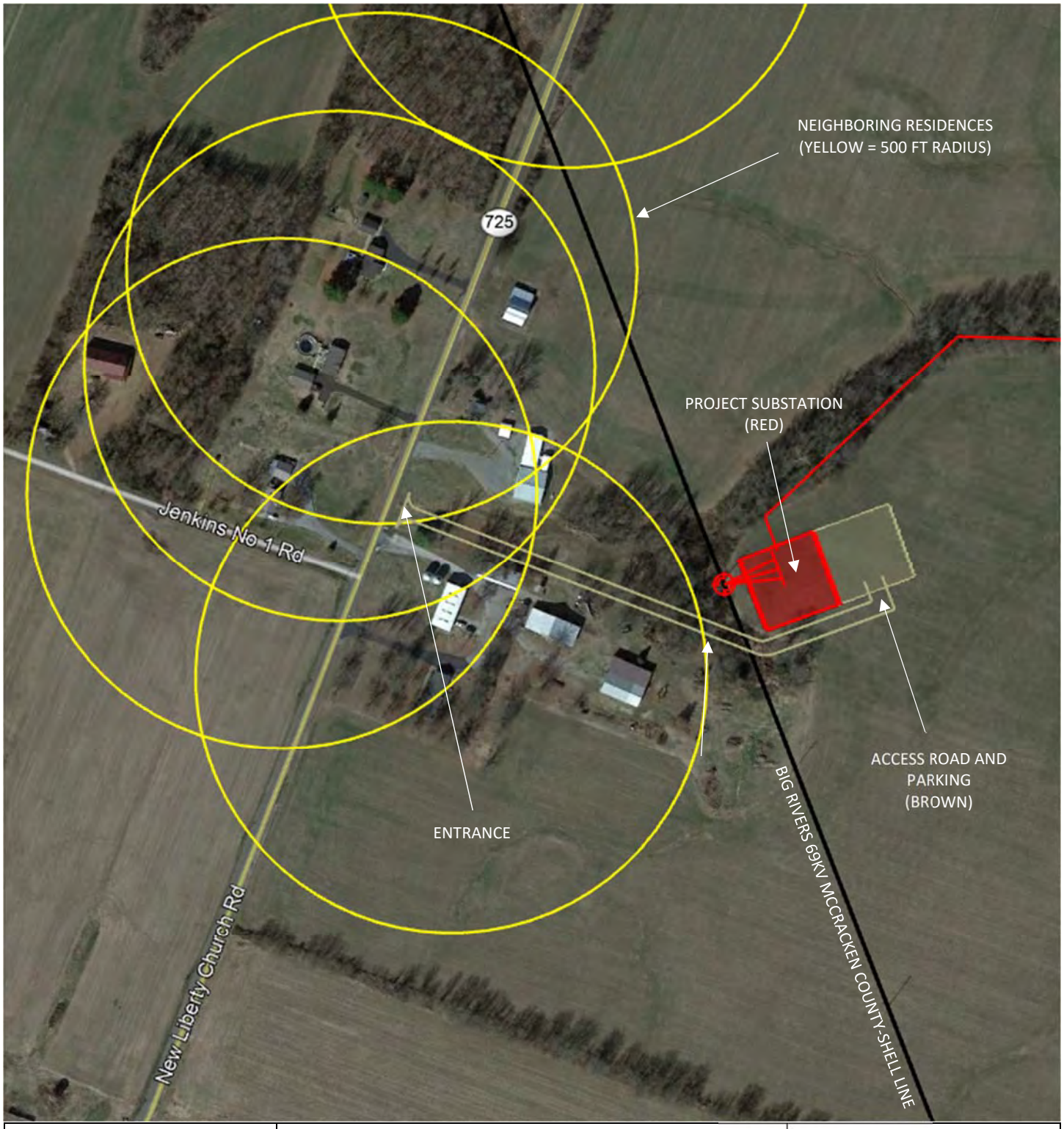
COMMUNITY ENERGY SOLAR, LLC
3 RADNOR CORP CENTER, SUITE 300
100 MATSONFORD RD.
RADNOR, PA 19087
(866) 946-3123

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: 5.3.2021

SITE PLAN
DETAIL
SOUTH SECTION



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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: 37.11 N / 88.87 W
DATE: 5.3.2021

SITE PLAN
DETAIL
PROJECT SUBSTATION

EXHIBIT 12
ATTACHMENT 12.2

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 CURRENT USES OF THE LAND SURROUNDING THE PROPOSED PROJECT SITE

EXHIBIT 12
ATTACHMENT 12.3

MCCRACKEN COUNTY SOLAR
LEGAL DESCRIPTION
UTILITY EASEMENT

A 50 FOOT WIDE EASEMENT LOCATED ON THE SOUTH SIDE OF MASSEY ROAD, LYING UPON THE PROPERTY CONVEYED TO THOMAS DAVIS, et al OF RECORD IN DEED BOOK 1407, PAGE 702 IN THE McCRACKEN COUNTY COURT CLERK'S OFFICE, 25 FEET ON EACH SIDE OF CENTERLINE WITH THE CENTERLINE DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT LOCATED ON THE SOUTH RIGHT-OF-WAY LINE OF MASSEY ROAD, 25 FEET FROM THE CENTERLINE THEREOF, AND BEING N 67º18'31" W, 25.00 FEET FROM THE NORTHEAST CORNER OF THE AFORESAID MASSEY PROPERTY;

THENCE 25 FEET FROM AND PARALLEL WITH THE EAST LINE OF SAID MASSEY PROPERTY, S 23º09'20" W, 1941.57 FEET, MORE OR LESS;

THENCE LEAVING SAID EAST LINE, N 86º49'00" W, 598.50 FEET, MORE OR LESS;

THENCE S 48º44'00" W, 514.00 FEET, MORE OR LESS;

THENCE S 19º19'00" E, 56.00 FEET, MORE OR LESS, TO A SUBSTATION SITE.

MCCRACKEN COUNTY SOLAR
LEGAL DESCRIPTION
SUBSTATION SITE

A 150 FEET BY 150 FEET EASEMENT LYING UPON THE PROPERTY CONVEYED TO THOMAS DAVIS, et al OF RECORD IN DEED BOOK 1407, PAGE 702 IN THE McCRACKEN COUNTY COURT CLERK'S OFFICE, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT LOCATED ON THE SOUTH RIGHT-OF-WAY LINE OF MASSEY ROAD, 25 FEET FROM THE CENTERLINE THEREOF, AND BEING N 67º18'31" W, 25.00 FEET FROM THE NORTHEAST CORNER OF THE AFORESAID MASSEY PROPERTY;

THENCE 25 FEET FROM AND PARALLEL WITH THE EAST LINE OF SAID MASSEY PROPERTY, S 23º09'20" W, 1941.57 FEET, MORE OR LESS;

THENCE LEAVING SAID EAST LINE, N 86º49'00" W, 598.50 FEET, MORE OR LESS;

THENCE S 48º44'00" W, 514.00 FEET, MORE OR LESS;

THENCE S 19º19'00" E, 56.00 FEET, MORE OR LESS, TO THE POINT OF BEGINNING OF THE PROPERTY HEREIN DESCRIBED:

THENCE FROM SAID POINT OF BEGINNING, N 70º41'00" E, 75.00 FEET;
THENCE S 19º19'00" E, 150.00 FEET;

THENCE S 70º41'00" W, 150.00 FEET;

THENCE N 19º19'00" W, 150.00 FEET;

THENCE N 70º41'00" E, 75.00 FEET TO THE POINT OF BEGINNING.

MCCRACKEN COUNTY SOLAR
LEGAL DESCRIPTION
MAIN PROJECT SITE

A TRACT OF LAND LOCATED NORTH OF MASSEY ROAD, WEST OF BETHEL CHURCH ROAD AND EAST OF KENTUCKY HIGHWAY 725 (a/k/a NEW LIBERTY CHURCH ROAD), SITUATED IN McCRACKEN COUNTY, KENTUCKY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT AN EXISTING ½" REBAR WITH PLASTIC CAP (3289) LOCATED AT THE NORTHWEST RIGHT-OF-WAY INTERSECTION OF MASSEY ROAD AND BETHEL CHURCH ROAD;

THENCE FROM THE POINT OF BEGINNING AND ALONG THE NORTH RIGHT-OF-WAY LINE OF MASSEY ROAD, 25 FEET FROM AND PARALLEL WITH THE CENTERLINE THEREOF, THE FOLLOWING THREE CALLS:
N 69º17'20" W, 970.47 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET;
N 66º22'12" W, 313.15 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET;
N 67º44'17" W, 3304.52 FEET TO AN EXISTING ½" REBAR WITH PLASTIC CAP (1645);

THENCE LEAVING SAID NORTH RIGHT-OF WAY LINE OF MASSEY ROAD AND ALONG A COMMON LINE WITH ANDREW AND NICHOLE BOBO (DEED BOOK 938, PAGE 369), N 19º12'39" E, 418.56 FEET TO AN EXISTING ½" REBAR WITH DESTROYED CAP LOCATED AT A COMMON CORNER WITH JOHN AND BEVERLY BOBO (DEED BOOK 1233, PAGE 315);

THENCE ALONG A COMMON LINE WITH SAID JOHN AND BEVERLY BOBO THE FOLLOWING THREE CALLS:
N 19º12'10" E, 685.31 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET;
S 68º31'58" E, 549.10 FEET TO AN EXISTING ½" REBAR WITH PLASTIC CAP (3289);
N 22º50'48" E, 456.70 FEET TO AN EXISTING ½" REBAR WITH DESTROYED CAP LOCATED AT A COMMON CORNER WITH JEFFERY AND MARSHA SULLIVAN LIVING TRUST (DEED BOOK 1244, PAGE 613);

THENCE ALONG A COMMON LINE WITH SAID SULLIVAN LIVING TRUST THE FOLLOWING THREE CALLS:
N 22º55'58" E, 634.52 FEET TO AN EXISTING ½" REBAR WITH PLASTIC CAP (3289);
N 22º42'05" E, 497.05 FEET TO AN EXISTING ½" REBAR WITH PLASTIC CAP (3289);
N 66º58'47" W, 2023.65 FEET TO AN EXISTING 3" SQUARE PIPE LOCATED ON THE EAST RIGHT-OF-WAY LINE OF KENTUCKY HIGHWAY 725 (a/k/a NEW LIBERTY CHURCH ROAD);

THENCE ALONG THE EAST RIGHT-OF-WAY LINE OF KENTUCKY HIGHWAY 725 (NEW LIBERTY CHURCH ROAD), 25 FEET FROM AND PARALLEL WITH THE CENTERLINE THEREOF, THE FOLLOWING 4 CALLS:
N 22º57'36" E, 1073.06 FEET TO AN EXISTING 3" SQUARE PIPE;
N 22º57'36" E, 1084.73 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET, PASSING WALLACE ROAD ON THE WEST SIDE OF KENTUCKY HIGHWAY 725 AT APPROXIMATELY 875 FEET;
N 23º55'36" E, 821.09 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET;
N 23º08'29" E, 2734.72 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET AT A COMMON CORNER WITH TERRY AND PATRICIA GIBSON REVOCABLE TRUST (DEED BOOK 1330, PAGE 208), PASSING BURNLEY SCHOOL ROAD ON THE WEST SIDE OF KENTUCKY HIGHWAY 725 AT APPROXIMATELY 440 FEET;

THENCE LEAVING SAID EAST RIGHT-OF-WAY LINE OF KENTUCKY HIGHWAY 725 AND ALONG A COMMON LINE WITH SAID GIBSON REVOCABLE TRUST, S 68º09'22" E, 3144.39 FEET TO A POINT IN THE CENTER OF A DEEP DITCH, BEING A COMMON CORNER WITH PATRICIA GATLIN (DEED BOOK 1236, PAGE 310);

THENCE ALONG A COMMON LINE WITH SAID GATLIN, S 67º44'31" E, 50.00 FEET TO A WITNESS MONUMENT SET AND CONTINUING S 67º44'31" E, 803.44 FEET FOR A TOTAL DISTANCE OF 853.44 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET AT A COMMON CORNER WITH DEREK AND LEIGH WARFORD (DEED BOOK 1036, PAGE 508);

THENCE ALONG A COMMON LINE WITH SAID WARFORD, S 21º50'46" W, 1823.72 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET AT A COMMON CORNER WITH WAYNE AND PHYLLIS SULLIVAN, et al, (DEED BOOK 1096, PAGE 266);

THENCE ALONG A COMMON LINE WITH SAID SULLIVAN, et al, THE FOLLOWING THREE CALLS:
N 67º58'46" W, 2079.84 FEET TO A ½" REBAR WITH PLASTIC CAP (3732) SET;
S 22º05'18" W, 2840.93 FEET TO AN EXISTING 3" SQUARE PIPE;
S 22º39'15" W, 502.61 FEET TO AN EXISTING 3" SQUARE FEET;

THENCE CONTINUING ALONG A COMMON LINE WITH SAID SULLIVAN, et al AND ALONG A COMMON LINE WITH THE BOLDRY REVOCABLE TRUST (DEED BOOK 1319, PAGE 311, TRACT 1), S 67º05'12" E, 2260.40 FEET TO AN EXISTING REBAR WITH PLASTIC CAP (3289) LOCATED AT A COMMON CORNER WITH SAID BOLDRY REVOCABLE TRUST, TRACT 2;

THENCE ALONG A COMMON LINE WITH SAID BOLDRY REVOCABLE TRUST, TRACT 2 THE FOLLOWING THREE CALLS:
S 24º22'16" W, 1056.93 FEET TO AN EXISTING DISTURBED ½" REBAR;

S 22º54’06” W, 144.84 FEET TO AN EXISTING ½” REBAR WITH PLASTIC CAP (3289);
S 67º49’29” E, 1909.61 FEET TO AN EXISTING ½” REBAR WITH PLASTIC CAP (3289) LOCATED ON THE WEST RIGHT-OF-WAY LINE OF BETHEL CHURCH ROAD;

THENCE ALONG THE WEST RIGHT-OF-WAY LINE OF BETHEL CHURCH ROAD, 25 FEET FROM AND PARALLEL WITH THE CENTERLINE THEREOF, THE FOLLOWING SEVEN CALLS:
S 22º05’12” W, 982.48 FEET TO A ½” REBAR WITH PLASTIC CAP (3732) SET;
ALONG THE ARC OF A CURVE, 237.03 FEET TO A ½” REBAR WITH PLASTIC CAP (3732) SET, SAID CURVE HAVING A RADIUS OF 1175.00 FEET, A CHORD DISTANCE OF 236.63 FEET AND A CHORD BEARING OF S 27º51’57” W;
S 33º38’41” W, 60.33 FEET TO A ½” REBAR WITH PLASTIC CAP (3732) SET;
ALONG THE ARC OF A CURVE 165.81 FEET TO A ½” REBAR WITH PLASTIC CAP (3732) SET), SAID CURVE HAVING A RADIUS OF 958.00 FEET, A CHORD DISTANCE OF 165.61 FEET AND A CHORD BEARING OF S 28º41’11” W;
S 23º43’40” W, 424.65 FEET TO A ½” REBAR WITH PLASTIC CAP (3732) SET;
ALONG THE ARC OF A CURVE 147.77 FEET TO A ½” REBAR WITH PLASTIC CAP (3732) SET, SAID CURVE HAVING A RADIUS OF 1145.00 FEET, A CHORD DISTANCE OF 147.67 FEET AND A CHORD BEARING OF S 20º01’50” W;
S 16º20’01” W, 28.47 FEET TO THE POINT OF BEGINNING.

CONTAINING 618.37 ACRES.

BEING THE SAME PROPERTY CONVEYED TO STEPHEN J. KELLEY AND MELANIE W. KELLEY ON JANUARY 14, 2015 AND FILED FOR RECORD ON JANUARY 14, 2015 IN DEED BOOK 1293, PAGE 473 IN THE McCRACKEN COUNTY COURT CLERK’S OFFICE.
ALSO BEING THE SAME PROPERTY CONVEYED TO ROY LEE DAVIS ON MAY 7, 1984 AND FILED FOR RECORD ON MAY 8, 1984 IN DEED BOOK 664, PAGE 91 IN THE McCRACKEN COUNTY COURT CLERK’S OFFICE.
ALSO BEING THE SAME PROPERTY CONVEYED TO GREGORY L. PARDON AND KIMBERLY MARIE WATKINS ON DECEMBER 8, 2015 AND FILED FOR RECORD ON DECEMBER 18, 2015 IN DEED BOOK 1313, PAGE 608 IN THE McCRACKEN COUNTY COURT CLERK’S OFFICE.

BEARINGS IN THE ABOVE DESCRIPTION ARE BASED ON KENTUCKY SOUTH ZONE – 1602, NAD 83.

SUBJECT TO ANY EXISTING EASEMENTS, EITHER RECORDED OR OTHERWISE.

SUBJECT TO AN EXISTING GRAVEL ROAD COMMONLY KNOWN AS TAYLOR ROAD, GENERALLY LOCATED AS FOLLOWS: BEGINNING APPROXIMATELY 55 FEET NORTH OF THE INTERSECTION OF BURNLEY SCHOOL ROAD AND KENTUCKY HIGHWAY 725; THENCE EASTERLY TO THE WEST LINE OF AFORESAID SULLIVAN,

et al PROPERTY; THENCE NORTHERLY TO THE NORTHWEST CORNER OF SAID SULLIVAN, et al PROPERTY; THENCE EASTERLY ALONG THE NORTH LINE OF SAID SULLIVAN, et al PROPERTY TO THE AFORESAID WARFORD PROPERTY.

THIS DESCRIPTION IS PREPARED BY SITEWORX SURVEY AND DESIGN, LLC, 124 SOUTH 31st STREET, PADUCAH, KENTUCKY 42001.

EXHIBIT 12
ATTACHMENT 12.4

COMMONWEALTH OF KENTUCKY
MCCRACKEN COUNTY FISCAL COURT
ORDINANCE NO. 2021-03

AN ORDINANCE AMENDING THE MCCRACKEN ZONING CODE AS SET FORTH IN MCCRACKEN COUNTY ORDINANCE NO. 2017-07, AS AMENDED, BY ENACTING A NEW SECTION THERETO RECOGNIZING TWO TYPES OFSOLAR ENERGY SYSTEMS AND ESTABLISHING THE REGULATIONS RELATING TO THE USE, INSTALLATION AND MAINTENANCE OF THE SAME.

WHEREAS, Kentucky Revised Statutes, Chapter 100, provides for the adoption of zoning text, specific provisions and regulations related to and facilitating the implementation thereof and provides for amendments thereto; and

WHEREAS, the McCracken County Fiscal Court and the McCracken County Planning Commission have recognized the need for zoning regulation in McCracken County for the purpose of promoting the health, safety, welfare and general prosperity of the County and to ensure that development takes place in a manner compatible with adjacent land uses, is consistent with and appropriate to existing or proposed infrastructure and is adequately served by necessary and essential services; and

WHEREAS, in order to better address and regulate the evolving nature of land use land use issues and to ensure compliance with developing law, it was proposed that the present amendments and revisions to the McCracken County Zoning Ordinance and Subdivision Regulations be adopted; and

WHEREAS, a public hearing was conducted before the McCracken County Planning Commission regarding the amendment proposed herein and such measure was approved on January 27, 2012.

NOW THEREFORE, BE IT ORDAINED BY THE FISCAL COURT OF MCCRACKEN COUNTY, COMMONWEALTH OF KENTUCKY, AS FOLLOWS:

The presently existing McCracken County Zoning Ordinance set forth and published in McCracken County Ordinance 2017-07, as amended, is hereby amended and revised as follows:

Section 1. Planning Commission Approval.

The McCracken County Planning Commission conducted a public hearing related to the proposal of the amendment herein and approved the same on January 27, 2021, and recommended that such amendment be adopted by the McCracken County Fiscal Court.

Section 2. Amendment to McCracken County Zoning Ordinance – Enactment of a New Section Entitled "Section 150.040 – Solar Energy Systems".

There shall hereby be enacted a new section of the McCracken County Zoning Ordinance entitled "Section 150.040 – Solar Energy Systems" appearing in its entirety as set forth herein:

"SECTION 150.040 – SOLAR ENERGY SYSTEMS

Definition

Solar Energy Systems (SES) are the components and subsystems required to convert solar energy into electric energy.

Levels of SES

a. Level 1 – systems designed to provide power to the structures on a parcel. Level 1 systems include roof mounted systems (panels, solar shingles, etc.) and ground mounted systems larger than sixty (60) square feet but covering less than one-half (1/2) acre. Level 1 systems are considered accessory structures; and

b. Level 2 – ground mounted systems greater than one-half (1/2) acre or greater in size for the commercial production of electricity and transmission to a public utility.

Conditional Use

Level 2 SES are a conditional use in the AG zone. Level 2 SES are not permitted in RR, UR, C, ML, or MH zones.

The conditional use application shall include a detailed plan regarding the decommissioning of the SES.

Level 1 SES are permitted in all zones.

Setbacks

Level 1 SES which are ground mounted are not permitted in front or side yards. In rear yards, ground mounted systems shall be a minimum of fifty (50) feet from any principal structure on an adjoining property.

Level 2 SES are required to be setback 100 feet from all exterior property lines. SES that extends across multiple parcels do not have to follow setback requirements (zero lot lines) for property lines located within the security fencing.

Screening

All perimeter tree lines shall be left in place to serve as a visual buffer. Where tree lines do not exist or are removed, a natural screen of a double row of staggered evergreens (minimum eight-foot height at planting and maturing to a minimum of fifteen (15) feet tall) planted fifteen (15) feet on center from any public right-of-way or adjacent residential use shall be used. Screening shall remain 90% visually solid year-round. Visual buffers shall be placed on the exterior of the security fence.

Level 1 SES are exempt from screening requirements excluding ground mounted systems which shall be screened from adjacent residential uses located within 200 feet of the ground mounted system. Screening shall be a six (6) foot high fence that is 90% visually solid or six (6) foot tall shrubs and/or evergreen trees that remain 90% visually solid year-round.

Security Fencing

A security fence shall surround all Level 2 SES and be at least 7 feet tall or 6 feet tall with 3 strands of barbed wire. Level 1 SES are exempt from security fencing requirements.

Signage

There shall be no signs permitted except those displaying emergency information, owner contact information, warning or safety instructions or signs that are required by a federal, state or local agency. Such signs shall not exceed 5 square feet in area.

Ground Maintenance

Topsoil shall not be removed. Grasses shall be maintained or established Grasses inside and outside the security fence shall not exceed 10 inches tall. The Board of Adjustment may waive this requirement if the developer can show this requirement will create an undue burden and an acceptable ground maintenance plan is submitted with the conditional use permit application.

Bond Requirements

A surety bond shall be issued by a Kentucky licensed business to McCracken County Fiscal Court for 1% of the total construction cost to cover removal and remediation at the end of life of a Level 2 SES."

Section 3. Amendment to McCracken County Zoning Ordinance – Amendment of Section 150.151(B) "Conditional Uses" in Agricultural District (AG).

Commensurate with the enactment in Section 2 above, and as necessary to reflect the operation and implementation of the same, Section 150.151(B) "Conditional Uses" shall be hereby amended to provide for the conditional use of Solar Energy Systems in an Agricultural District (AG) a follows:

"(B) *Conditional uses.* Conditional uses for the AG Agricultural District that may be permitted by the Board of Zoning Adjustment are shown as. Follow. The Board shall follow the provisions of § 150.034 of this chapter when considering applications for conditional uses.

(5) Solar Energy Systems in compliance with the provisions of § 150.040."

Section 4. Incorporation into McCracken County Zoning Ordinance Compilation.

The amendments reflected herein shall be incorporated into the standalone McCracken County Zoning Ordinance compilation and said amended document shall be transmitted to American Legal Publishing for the generation of a new Section 150.040, and to reflect the amended nature of Section 150.151(B) as such items are set forth herein for inclusion in the McCracken County Ordinance Compilation.

Section 5. Compliance with Open Meetings Laws.

The McCracken County Fiscal Court hereby finds and determines that all formal actions relative to the adoption of this Ordinance were taken in an open meeting of said legislative body in full compliance with the Kentucky Open Meetings Act as modified by Section 8(b) of 2020 Senate Bill 150 and clarified in application by the published Advisory of the Kentucky Attorney General dated March 31, 2020. All deliberations of the Fiscal court, if any, which resulted in formal action, were in meetings open to the public, in full compliance with the aforesaid legal requirements and all others germane to conduct of public meetings within the Commonwealth of Kentucky.

Section 4. Severability.

If any section, subsection, or clause of this Ordinance shall be deemed to be unconstitutional or otherwise invalid, the validity of the remaining sections, subsections, and clauses shall not be affected.

Section 5. Conflicts.

All ordinances, resolutions, orders or parts thereof in conflict with the provisions of this Ordinance are, to the extent of such conflict, hereby repealed and the provisions of this Ordinance shall prevail and be given effect.

Section 6. Effective Date.

This Ordinance shall be read on two separate days, published pursuant to KRS Chapter 242, and become effective on March 8, 2021.

MCCRACKEN COUNTY FISCAL COURT

BY: _____

Craig Z. Clymer
McCracken County Judge Executive

ATTEST:

Julie Griggs
McCracken County Clerk

Introduced and publically read on 2-22-21.

Publically read and adopted on 3-8-21.

Recorded by County Clerk on 3-9-21.

Published by *The Paducah Sun* on 3-12-21.

EXHIBIT 12
ATTACHMENT 12.5

COPPERHEAD
ENVIRONMENTAL CONSULTING

Acoustical Analysis

McCracken County Solar LLC Project

McCracken County, Kentucky

Prepared for:

McCracken County Solar LLC

30 April 2021

COPPERHEAD ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 73 ■ 471 MAIN STREET ■ PAINT LICK, KENTUCKY 40461
(859) 925-9012 OFFICE (859) 925-9816 FAX

www.copperheadconsulting.com

COPPERHEAD
ENVIRONMENTAL CONSULTING

Acoustical Analysis

McCracken County Solar LLC Project

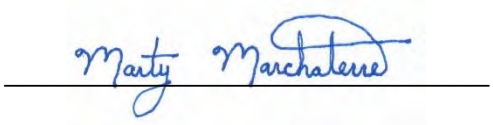
McCracken County, Kentucky

Prepared for

McCracken County Solar LLC
C/O Community Energy
PO Box 17236
Chapel Hill, NC 27516

By:

Copperhead Environmental Consulting, Inc.
PO Box 73
471 Main Street
Paint Lick, KY 40461



Marty Marchaterre
Senior Environmental Planner

April 30, 2021

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INTRODUCTION

McCracken County Solar LLC, contracted Copperhead Environmental Consulting, Inc. (Copperhead) to conduct an acoustical analysis for the proposed McCracken County Solar LLC Project (Project) near Kevil in McCracken County, Kentucky (Figure 1). The Project Study Area (PSA) consists of approximately 714 acres, and has reference coordinates of 37.12683° N, 88.85978° W.

The Project is a proposed solar farm that would generate electricity through the use of photovoltaic solar panels. It would include a utility interconnection substation, a storage/maintenance container, inverter boxes, transformers, and overhead and underground electrical conveyance lines. The power generated by the proposed solar facility would be connected to the existing power grid using the transmission line currently traversing the PSA.

EXISTING LAND USE AND SITE CONDITIONS

According to the National Land Cover Database (NLCD) for McCracken County, the PSA currently consists of agricultural fields/cultivated crops, pasture, forest/wooded land, and developed/residential land (Figure 2). Historically, the PSA has been primarily used for agricultural land use. Narrow strips of trees exist along some fence rows and streams. Nine wetlands totaling 1.02 acres, three ponds totaling 1.49 acres, and 41 perennial, intermittent, and ephemeral streams occur within the PSA.

Land uses on adjacent properties include agricultural lands, scattered wood lots, and rural residences. The terrain is fairly level with slopes less than 2 percent.

EXISTING ACOUSTIC CONDITIONS

Nearest Receptor Sites

Sound-sensitive receptors generally are defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Typically, sound-sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature preserves, recreational areas, and parks. Receptors adjacent to the PSA are nearby residences primarily along New Liberty Church Road on the west side of the PSA and two residences along Massey Road on the southeast side of the PSA (Figure 3). The two closest receptors to any Project structure would be a residence on New Liberty Church Road, approximately 515 feet from the nearest solar panel and approximately 1,175 feet from the nearest inverter pad; and a residence on Massey Road, approximately 560 feet from the nearest solar panel and approximately 1,325 feet from the nearest inverter pad. The transformer would be

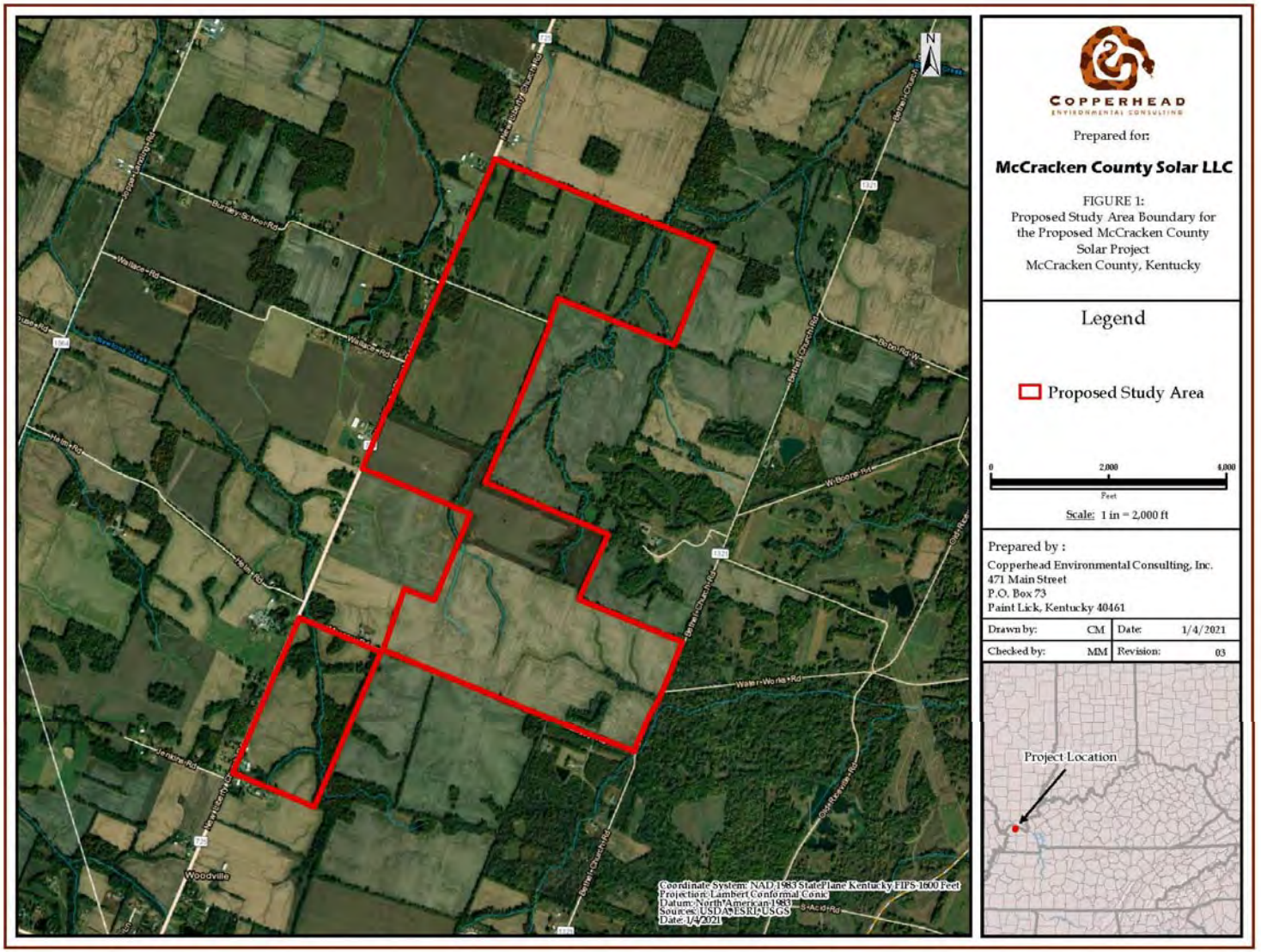

Figure 1. Project location

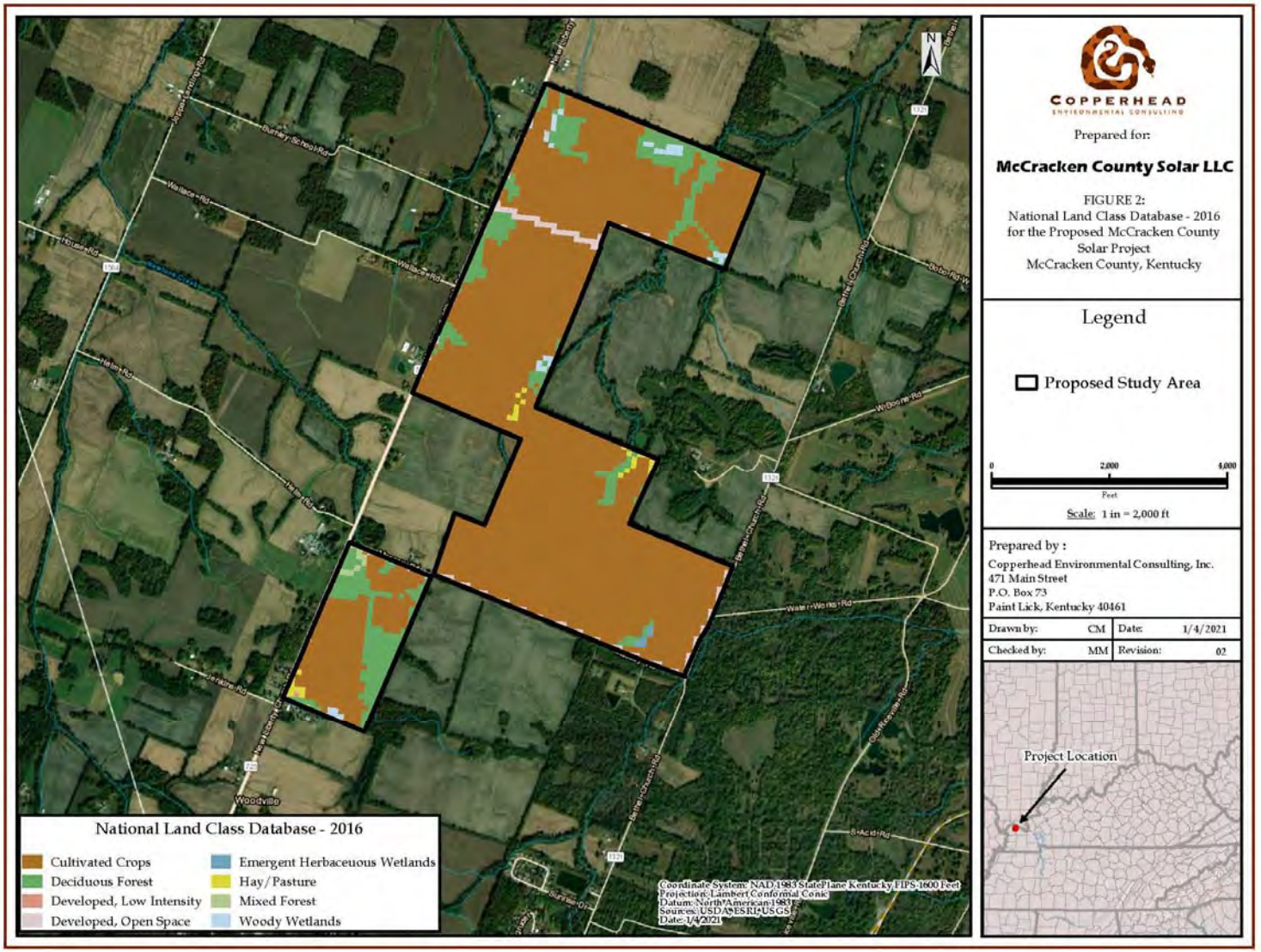

Figure 2. Land Use

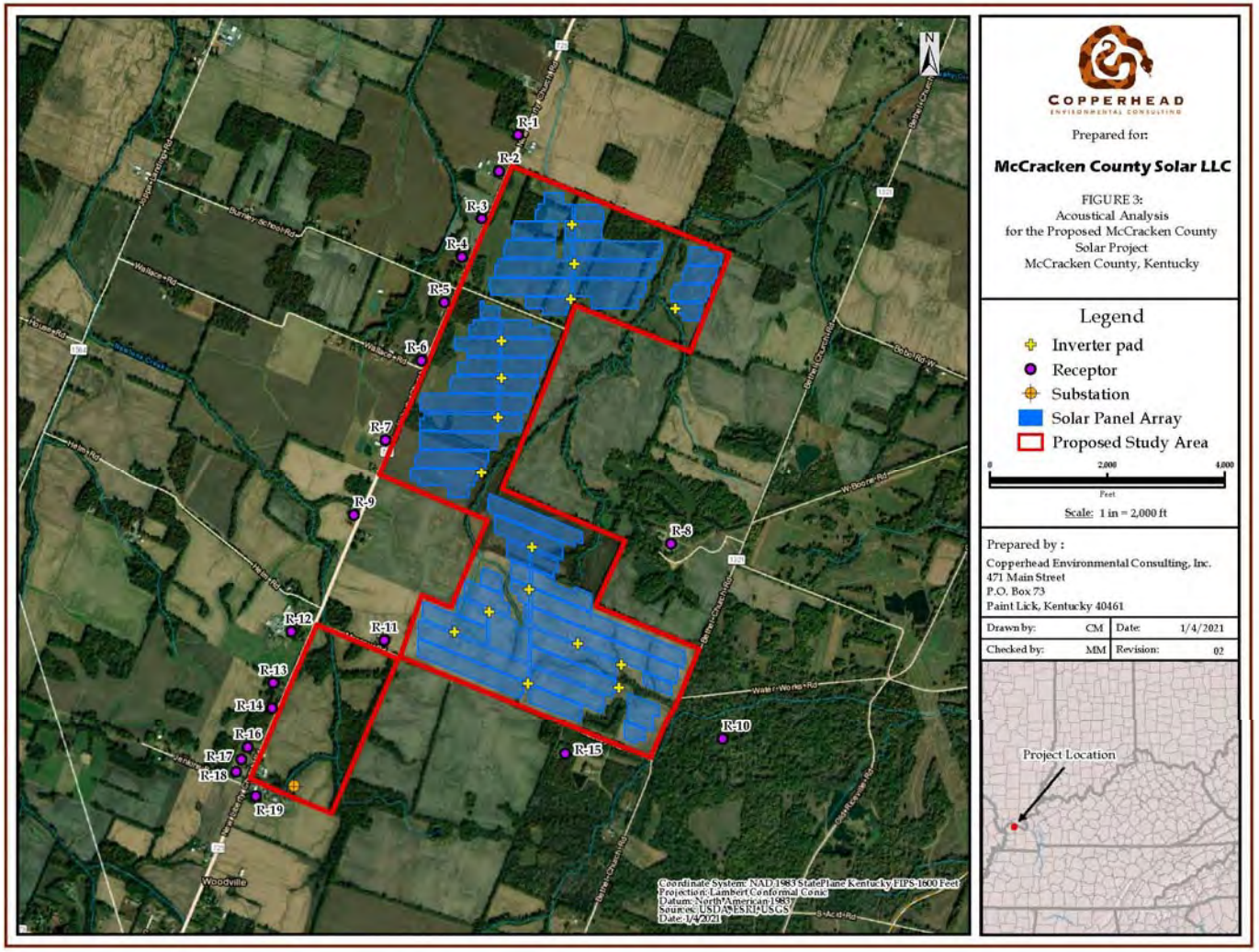

Figure 3. Sensitive Sound Receptors

approximately 600 feet to the nearest receptor. Another receptor, the West Kentucky Wildlife Management Area (WMA), is a recreational area located east of the PSA across Rossington Road. The West Kentucky WMA allows hunting, picnicking, hiking, fishing, horseback riding, skeet shooting, and archery. The West Kentucky WMA surrounds the United States Enrichment Corporation (former Paducah Gaseous Diffusion Plant) and was created out of the original Paducah Gaseous Diffusion Plant property. The nearest solar panel is approximately 185 feet from the West Kentucky WMA boundary and the nearest inverter is approximately 1,034 feet from the West Kentucky WMA boundary.

Existing Sound from Surrounding Areas

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (Ldn). Ldn is the community noise metric recommended by the US Environmental Protection Agency (USEPA) and has been adopted by most federal agencies (USEPA 1974). A Ldn of 65 A-weighted decibels (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities such as construction. The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving a strong correlation with how people perceive acceptable and unacceptable sound levels.

Areas exposed to a Ldn above 65 dBA are generally not considered suitable for residential use. A Ldn of 55 dBA was identified by USEPA as a level below which there is no adverse impact (USEPA 1974). For reference, approximate sound levels (measured in dBA) of common activities/situations are provided in Table 1.

Table 1. Sound Levels of Common Activities/Situations.

Activity/Event	dBA
Lowest audible sound to person with average hearing	0
Quiet rural, nighttime	25
Crickets, distant frogs	30
Birds, distant dog bark	40
Quiet urban, nighttime	45
Large business office	60
Normal speech at 3 feet	60-70
Noisy urban area, daytime	75
Food blender at 3 feet	85
Gas lawn mower at 3 feet	100
Jet flyover at 1,000 feet	110

Source: Caltrans 2013.

Local conditions such as traffic, topography, and winds characteristic of the region can alter background sound conditions. In general, the Ldn sound levels for outdoor quiet rural nighttime range is approximately 25 dBA (EPA 1974). Sound levels attenuate (or diminish) at a rate of approximately 6 dBA per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves.

Existing On-Site Sound

The PSA is within an agricultural, rural-residential, and undeveloped area of McCracken County. Ambient sound at the PSA consists mainly of agricultural sounds, such as noise from farm machinery; natural sounds, such as from wind and wildlife; and moderate traffic sounds. Sound levels of these types generally range from 45 to 55 dBA (USDOT 2015).

Typical sounds produced from farming and agriculture activities in the PSA include trucks, all-terrain vehicles (ATVs), tractors, and other farming equipment used for raising corn, soybeans, and occasionally winter wheat (Table 2). The adjacent farms produce sound similar to those within the PSA.

Table 2. Typical Sound Levels from Farm Activities.

Activity/Event	dBA
Chicken coop	70
All-terrain vehicle (ATV), push mower	90-100
Tractor/combine (with cab), grain auger	92
Air compressor/shop vacuum/weed eater	95
Pig squealing/power tools	100
Riding mower	102
Tractor (no cab)	105

Source: Great Plains Center for Agricultural Health. 2016.

Existing traffic contributes to sound within the PSA. The PSA is bounded by two-lane roadways that receive local traffic typical of a rural farming community (i.e., cars, trucks, and tractor trucks with trailering equipment). Based on Kentucky Transportation Cabinet traffic data, the average annual daily traffic (AADT) along New Liberty Church Road (KY 725) is 243 vehicles along the west side of the PSA and 1,649 AADT along Woodville Road (KY 473) south of the PSA. These noises typically range from 70 to 80 dBA at approximately 50 feet and peak during normal business hours.

Approximately one mile east of the PSA is the United States Enrichment Corporation industrial site (former Paducah Gaseous Diffusion Plant) and approximately 3.5 miles northeast of the PSA is the Tennessee Valley Authority Shawnee Fossil Fuel Plant (coal-fired power plant). Sounds from these facilities contribute to background sound levels in the PSA.

PROPOSED CONSTRUCTION SOUND CONDITIONS

Construction would occur only during daylight hours, so the Project would not affect ambient noise levels at night. 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.

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
Pickup Truck	55
Pile Driver	90-95
Pneumatic Tool	85
Pump	76
Roller	74
Scraper	89
Shovel	82
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.

PROPOSED OPERATIONAL SOUND CONDITIONS

Sound power levels for the Project equipment were obtained from vendor/manufacturer data and based on preliminary design.

Solar Panel Array

The solar panel array associated with the Project includes single-axis tracking panels distributed evenly across the site. Tracking systems involve the panels being driven by small, 24-volt brushless DC motors to track the arc of the sun to maximize each panel's potential for solar absorption. Panels would turn no more than five degrees every 15 minutes and would operate no more than one minute out of every 15-minute period. These tracking motors are a potential source of mechanical sound and are included in this assessment. The tracking motor generates approximately as much sound as a refrigerator.

The sound typically produced by panel tracking motors (NexTracker or equivalent) is approximately 78 dBA at one foot. At 150 feet, it estimated to be approximately 34.48 dBA. At the closest residential receptor, the predicted sound level would be approximately 23.7 dBA.

At the closest non-residential receptor, West Kentucky WMA, the sound from the solar panel array would be approximately 33 dBA at the WMA boundary. Within the West Kentucky WMA, trees and shrubs may attenuate/reduce sound from the solar panel array because trees and shrubs can reduce sound by five to ten dBA for every 100 feet of width of woodland, especially sharp tones, and this reduces sound to the human ear by approximately 50 percent (Dobson and Ryan 2000). Approximately 500 to 800 feet of wooded areas exist between the edge of the West Kentucky WMA boundary and areas used for recreation. Therefore, it is predicted that sound levels would be attenuated prior to reaching recreational areas. In addition, because solar panel arrays produce power only when the sun is shining, the trackers would be silent at night.

Inverters

The solar facility would employ approximately 14 photovoltaic inverter pads across the project site. Each inverter pad would contain six inverters. The inverter pads are located at least 1,000 feet from any residence. The inverters are expected to be TMEIC Solar Ware Ninja inverters. According to the manufacturer's specifications, the sound emission produced by an inverter is less than 80 dBA at a distance of approximately 3.28 feet. At each inverter pad, the sound emission for multiple inverters is a combined 87.78 dBA using a conservative sound emission estimate of 80 dBA per inverter. The sound produced by an inverter is described as a hum and has roughly the same output of a household air-conditioning unit. The sound from an inverter pad would be less than 38 dBA at any residential receptor site or at the boundary of the West Kentucky WMA. 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).

Transformer

The main transformer at the substation is anticipated to be a 69kV/34.5kV 40/53/66 MVA transformer. Per National Electronic Manufacturers Association (NEMA) ST-20 standards, it is estimated that the transformer at a substation would generate sound levels of approximately 50 dBA at 3.28 feet (Schneider Electric 2020). The sound from transformer is characterized as a discrete low frequency hum. The sound from transformers is produced by alternating current flux in the core that causes it to vibrate. Sound from the transformer operating at full power would be 4.75 dBA at the closest sensitive receptor (600 feet away).

SITE OPERATION AND MAINTENANCE

Vehicular Traffic

Project operations are expected to require 2 to 3 workers on site. These workers would drive in and out, Monday through Friday. In addition, work may be conducted at night up to 50 days a year. While workers are not anticipated onsite on most weekends, it remains a possibility in the event of the need for timely repairs, or groundskeeping dictated by weather. Employees are anticipated to use mid- or full-sized trucks and would contribute less to traffic noise than a typical single-family home.

Maintenance Activities

Typical maintenance activities would include minor repair and maintenance on the solar panels, tracking systems, electrical wiring, or maintenance/inspections of the inverters/transformer. Grounds maintenance would be performed through an integrated land management approach, to include biological and mechanical control of vegetation, with herbicide applications as appropriate to control regulated noxious weeds per local, state, and federal regulations. It is anticipated that trimming and mowing would likely be performed approximately 20-30 times per

year depending on growth rate, to maintain a height no greater than 10 inches (per County Ordinance). Mowing would introduce temporary sound levels of up to 48 dBA at the nearest residential receptor. The periodic mowing of the site to manage the height of vegetation would produce sound levels comparable to roadway traffic in the surrounding area although at less frequent intervals.

CONCLUSION

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

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 solar panels would produce sound levels comparable to those of agricultural operations in the PSA. Consequently, the Project would have minimal effects on sound levels as a result of normal continuous operation.

Overall, the Project would result in minor temporary sound impacts during construction, with a maximum momentary sound level at the nearest receptor below 65 dBA. 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.

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Appendix A

Equipment Specifications

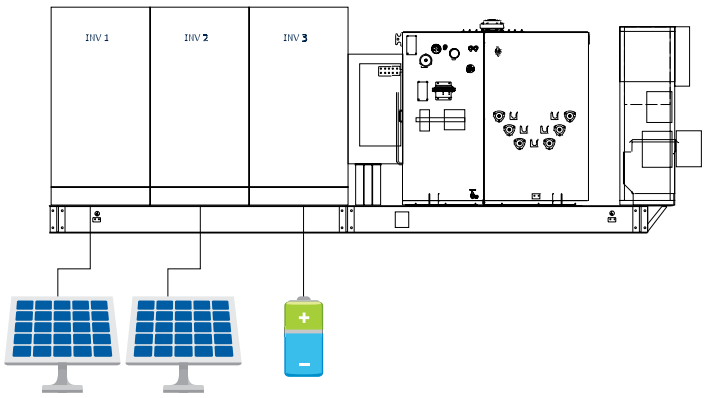
Solar Ware Ninja™

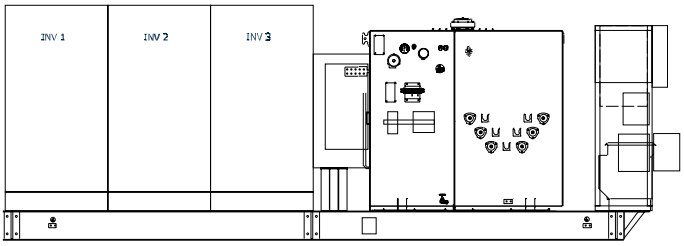
TMEIC
We drive industry

Multiple Configurations for Maximum Flexibility

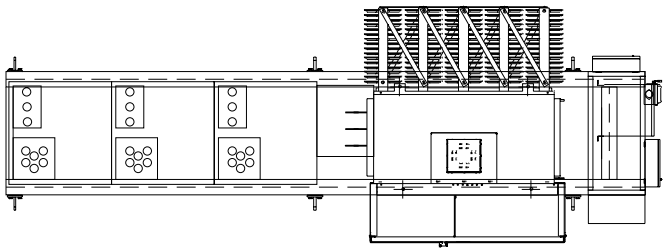
TMEIC's Solar Ware Ninja is the latest evolution of the highly successful Solar Ware family of inverters, joining over 20GW of TMEIC's globally installed photovoltaic inverters. Continuing the legacy of high efficiency, cutting-edge features, and unmatched reliability, the new Ninja modular inverter system is the culmination of input from utilities, developers, and technicians.

The Ninja is a global product, performing the duties of both generation and energy storage. The modular system introduces multiple layers of flexibility to allow designers an almost unlimited number of options for every project. The advanced controls system is packed with features to meet not only today's smart inverter requirements, but also new requirements as they are introduced. Like the award-winning Samurai series of inverters, the Ninja utilizes the same highly reliable IGBT based power conversion system.





SKID SIDE VIEW


PLAN VIEW PRELIMINARY CONCEPT

Customizable Block

Up to 6 Ninja units on the same skid. Able to combine PV and ESS inverters in the same lineup. A skid controller will manage output of the Ninja power station.

- Fully Modular design means:
  - Completely independent inverters for increased availability
  - Individual MPPT for greater energy yield
  - Latest generation of Smart Inverter controls platform
  - Multiple output options with various MPPT ranges
- DC Zone monitoring is standard
- UL or IEC certified global design
- PV or Energy Storage (bi-directional)
- Outdoor rated enclosure

TMEIC is Bankable

- Stable, with multi billion $USD revenue
- Diversified, with decades of power electronics experience in a variety of heavy industries, including metals, oil & gas, mining, and container cranes industries
- Manufacturing in the US and several other locations

TMEIC is Reliable

- Over 20GW of PV and ESS inverters globally
- Own exclusive use of Mitsubishi Electric's 3 level NPS technology
- Industry leading fleet availability

TMEIC is Support

- Award winning service
- 24/7 US based hot line
- Over 30 years PV inverter manufacturing and R&D experience
- Comprehensive customer training programs
- Authorized Service Provider program available

Solar Ware Ninja™

		PV-PCS				ESS-PCS		
Type		PVU-L0800GR	PVU-L0840GR	PVU-L0880GR	PVU-L0920GR	BSU-L0640GR	BSU-L0800GR	BSU-L0840GR
Output side (AC)	Rated Power@25°C	800kW	840kW	880kW	920kW	640kW	800kW	840kW
	Rated Power@50°C	730kW	765kW	800kW	840kW	570kW	730kW	765kW
	Rated Voltage	600V +10%, -12%	630V +10%, -12%	660V +10%, -12%	690V +10%, -12%	480VAC	600VAC	630VAC
	Rated Frequency	50Hz / 60Hz (+0.5Hz, -0.7Hz)						
	Rated Power Factor	>0.99						
	Reactive Capability	±421 kVAR	±442 kVAR	±464 kVAR	±485 kVAR	-512 to +640 kVAR	-640 to +800 kVAR	-672 to +840 kVAR
	Rated Current	702 Arms @50 °C						
	Maxium Current	770 Arms @25 °C						
	Maximum Efficiency	98.9% *Tentative						
	CEC Efficiency	98.5% *Tentative						
Input side (DC)	Maximum Voltage	1500 Vdc						
	MPPT Operation Range	875-1300VDC	915-1300VDC	960-1300VDC	1005–1300VDC	710-1300VDC	875-1300VDC	915-1300VDC
Environ. Conditions	Ingress Protection Ratings	IP54 / NEMA3R						
	Installation	Outdoor						
	Ambient Temperature Range	-25° to 50°C						
	Maximum Altitude	>2000 m power derating (Max. 4000m)						
Protective Functions	Input (DC) Side	DC Protection: Fuses Ground Fault, DC Reverse Current, Over Voltage, Over Current						
	Grid (AC) Side	AC Protection: MCCB and Fuse, Anti-islanding, Over/Under Voltage, Over/Under Frequency, Over Current						
	Grid Assistance	Reactive/Active Power Control, Power Factor Control, Fault Ride Through (optional)						
Harmonic Distortion of AC Current		≦ 3% THD (at rated power)				≦ 5% THD (at rated power)		
Communication		Modbus/TCP						
Fault Analysis		Fault Event Log, Waveform Acquisition via memory card						
Compliance		UL1741, UL174SA / IEEE1547 / NEC2017 / IEC62109-1,2 / IEC61000-6-2,4 / IEC61727, IEC62116 / IEC61400, BDEW / IEC61683 / IEC60068						
Cooling Method		Forced Air Cooling						
Number of Inputs		Standard 6 inputs for PV (maximum 8 per inverter)				1 per Inverter		
Standard Control Power Supply		Control Power Supply from Inverter output and Capacitor backup circuit (3 sec. compensation)						
Weight		<1000kgs *Tentative						
Dimensions (H x W x D)		1100 X 1100 X 1900 mm (L x W x H)						
Floor Space		1875.5 sq. in. (1.21 m^2)						
Color		Cabinet: Sand White #Dic583						

Note: Standard configuration not limited configuration. Contact TMEIC for detailed information.

WWW.TMEIC.COM

TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Sound Level Report – Ninja

With Production Vent Hoods

Inverter Model:	PVU-0840GR
Inverters Tested:	PVU-0840GR
Project:	Sound Level Report
Location:	TMEIC UL Lab - Roanoke 2060 Cook Drive, Salem, VA 24153
Dates of tests:	January 27, 2020
Report By:	Bryan Hardman
Last revision:	28 JAN 2020
Tested By:	Bryan Hardman, Bryan Young

Overview:

The Sound Level of the Model PVU-0840GR with production vent hoods is to be verified.
Testing conducted according to methods detailed in ISO 3744 – 2010.

Results:

The installation of the vent hoods reduced the sound level to below 80dB @ 1 meter.

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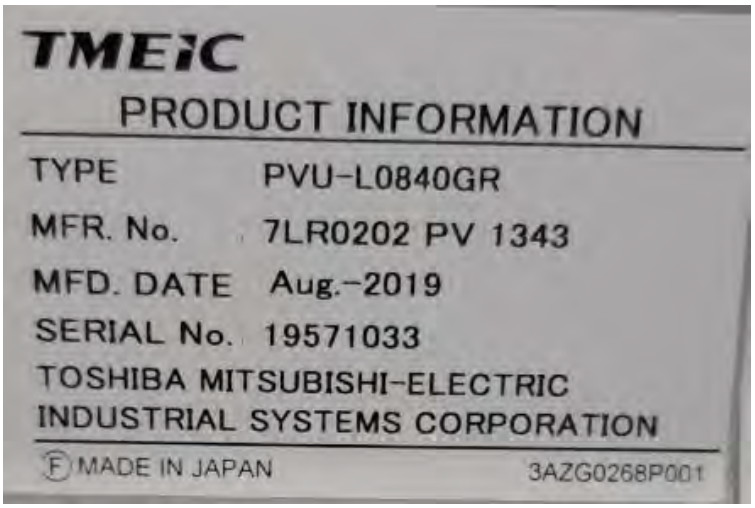
Unit Tested (Equipment Under Test, or EUT):

Fig. 1:



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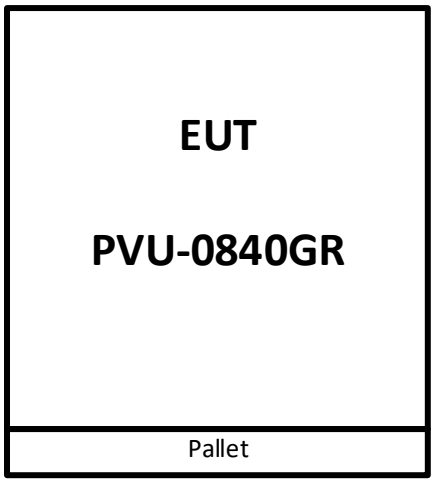
Set-Up

In order to reduce ambient sounds as much as practical, the EUT was set-up in a warehouse. The dimensions of the surroundings:

- Warehouse floor to ceiling: 8.24 meters
- EUT Left side to closest wall: 8.0 meters
- EUT Front side to closest object (Guardian) : 3.34 meters
- EUT Right side to closest object (bags of limestone): 4.89 meters
- EUT Rear side to closest object (Inverter in storage): 3.75 meters

- EUT dimensions:
  - 1.1 meter wide
  - 1.2 meter deep.
- EUT on a pallet:
  - 0.14 meter high



The EUT was situated in the warehouse as shown in Fig. 2 below.

- Each of the 8 positions was located 1 meter from the EUT surface.
- Sound meter situated on a tripod and set 1.14 meter from the floor in order to adjust the location to 1 meter above the bottom of the EUT.

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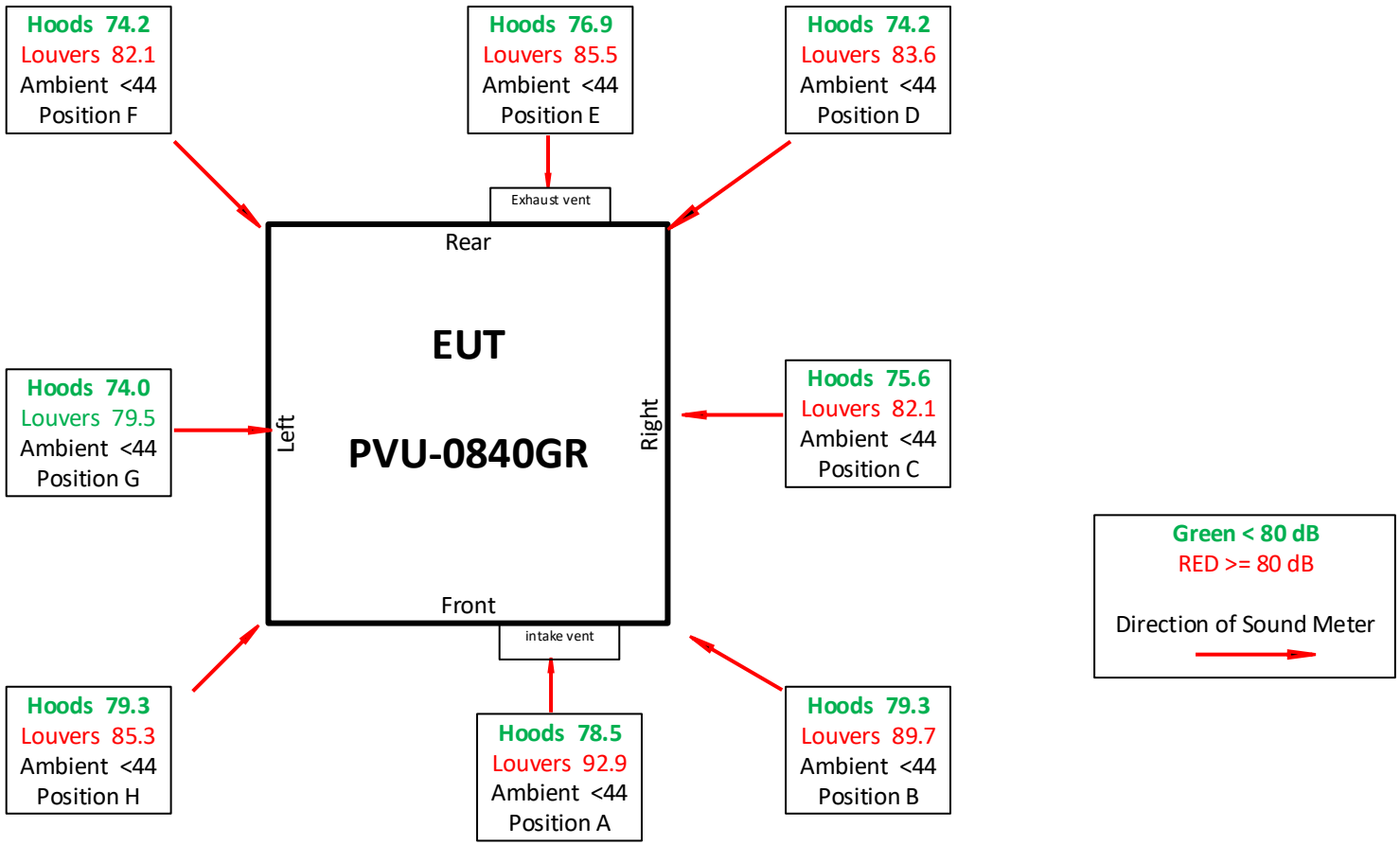
Set-Up

Fig. 2:



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Set-up Photos:

Front of EUT in place

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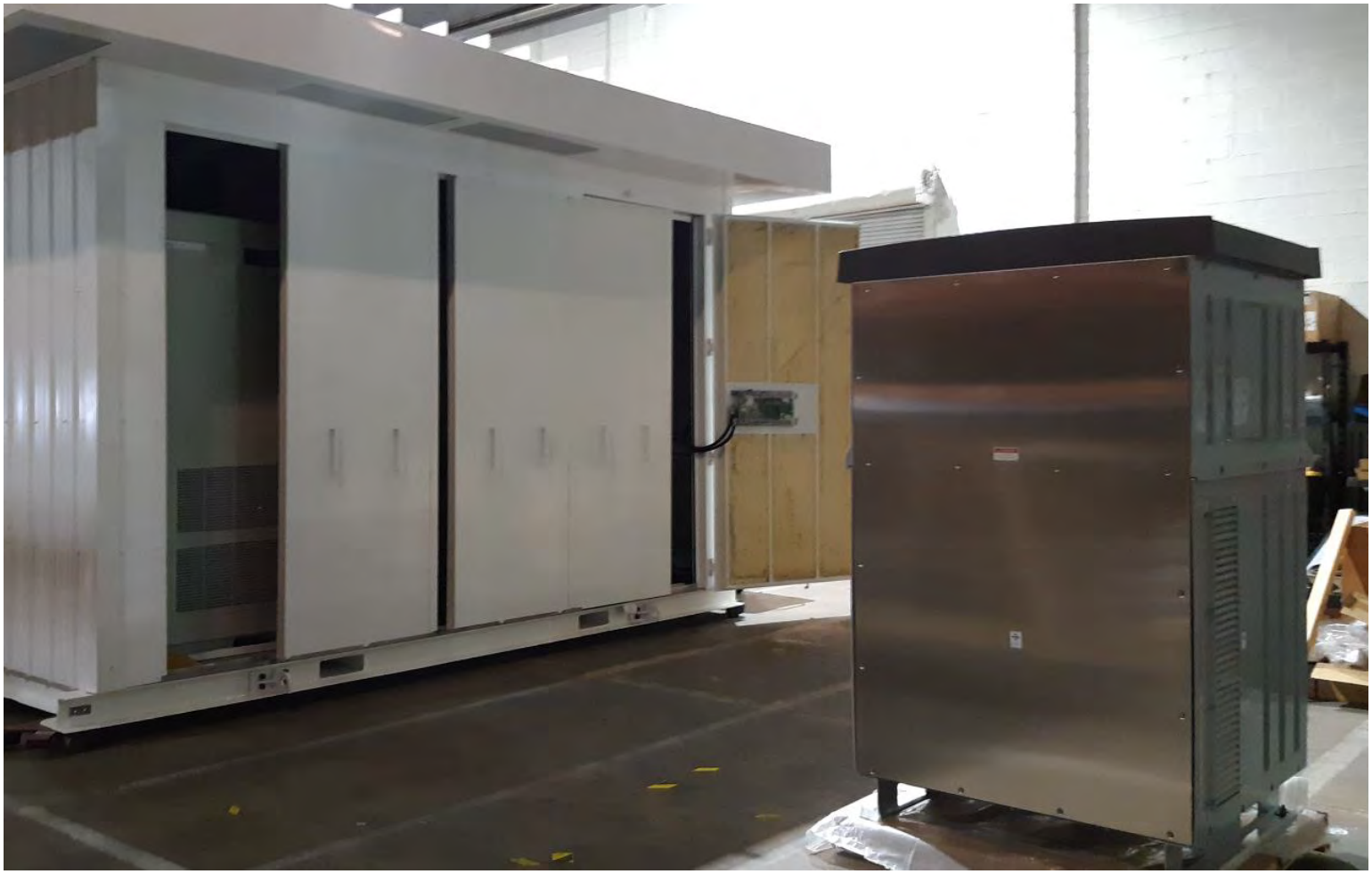
Rear of EUT in place



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Front with Louvers

Rear with Louvers

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Front with vent hood

Rear with vent hood

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Sound Meter calibration

DC power supply for fans

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Test Method

Sound Data-Logger settings:
The Sound Meter also performs data logging in csv format. The settings for data logging are:
A-weighted measurement type.
Sampling rate = 2 seconds.
Averaging set to Slow.

Procedure
Immediately after datalogging, the Sound Level Meter reading is verified with a Calibrator (94dB @ 1000 Hz).
Sound Level data logged in this method:

- Log data at Location A for 2 minutes.
- Pause data logging.
- Move Sound Meter to Location B.
- Log data for 2 minutes.
- Continue in this manner for all 8 Locations.

Operating Mode:

- EUT fans running
    - data was logged from each location
    - Ambient measurements were >15dB below operating measurements and are not material to the measurements according to ISO 3744 – 2010.

*Data collected with an Extech Sound Level Meter, Model SDL600.
Calibrator is Extech Model ND9.

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Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Data Summary:

Two-minute data collection averaged into a single value.

Location	with Louvers	With Vent Ducts on Input and Output
A	92.9	78.5
B	89.7	79.3
C	82.1	75.6
D	83.6	74.2
E	85.5	76.9
F	82.1	74.2
G	79.5	74.0
H	85.3	79.3
Average	**85.1**	**76.5**

Data:

Raw data files are on file but not provided in this Report.

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Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Sound Level Report – Ninja

Effectiveness of Hoods

Inverter Model:	PVU-0840GR
Inverters Tested:	PVU-0840GR; 4 per skid, 5 skids
Project:	Sound Level Report
Location:	In-Situ
Dates of tests:	August 25, and September 1, 2020
Report By:	Bryan Hardman
Last revision:	11 September 2020
Tested By:	Bryan Hardman

Overview:

The effectiveness of the sound reducing hoods for the Ninja Inverter was to be verified by In Situ testing.
The Sound Level of the Model PVU-0840GR inverters, configured in 4 units per skid was to be measured first with factory louvers installed, then measured again with retro-fitted factory Sound reducing hoods installed.

Testing was conducted according to the methods detailed in ISO 3744 – 2010, only modified to accommodate In-Situ testing at 1 meter.

Results:

The installation of the vent hoods reduced the sound level as detailed in this Report.

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Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Summary of Findings

Location	Before (with Louvers)	After (with Hoods)
Skid 1	93.2	83.0
Skid 2	95.0	83.3
Skid 3	93.4	83.6
Skid 4	92.5	84.6
Skid 5	92.7	84.6
Residence	49.8	47.1

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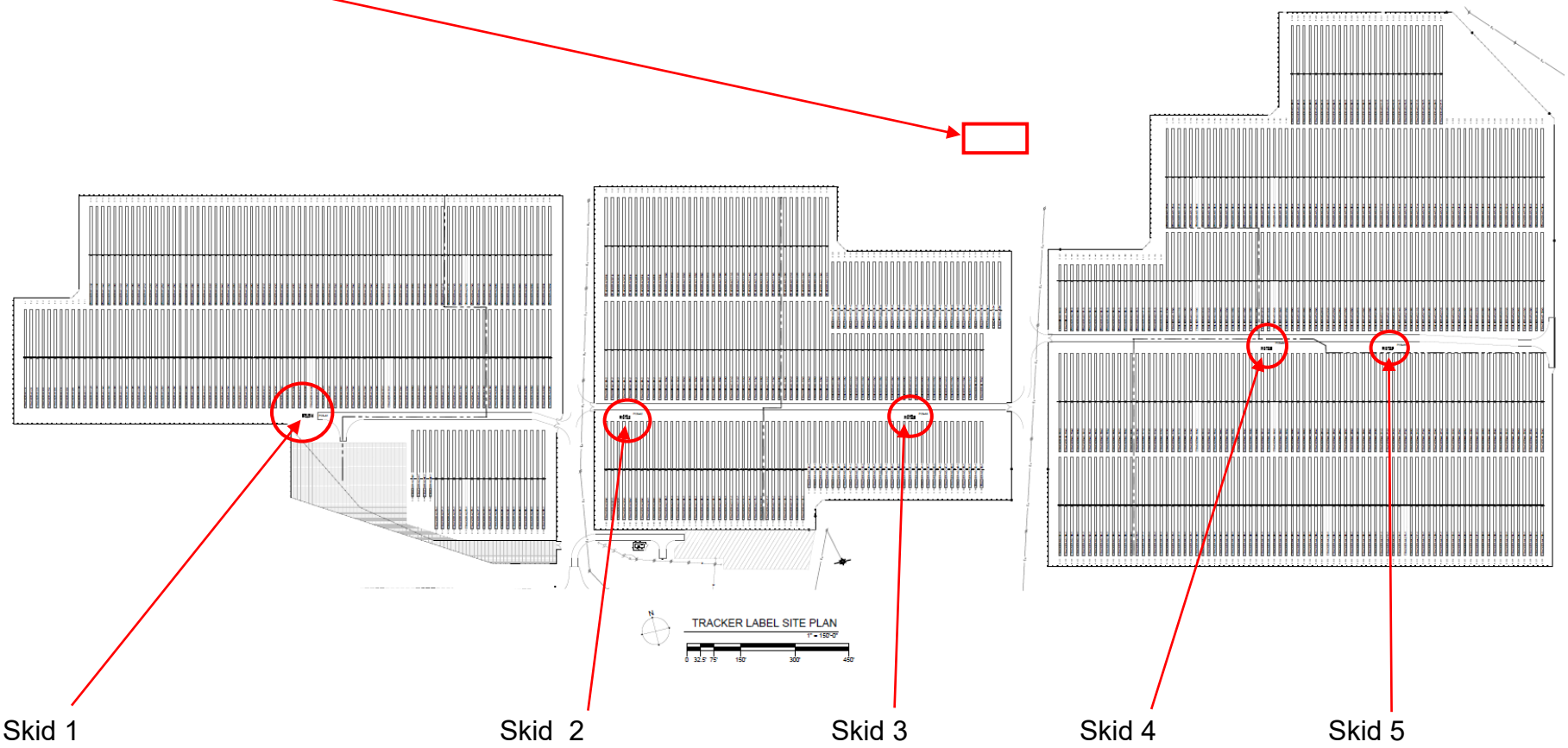
General Site Layout

Residence House – relative location to the Plant



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Skid configuration (typical of all 5) with Factory installed Louvers

Fig. 1:

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Skid configuration (typical of all 5) with Sound Reducing Hoods installed (retro-fitted)

Fig. 2:

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Set-Up

All measurements were made In-Situ. The Sound Meter was positioned 1 meter high and 1 meter from the Intake or Exhaust of each unit, or the end of skid or Transformer.

Fig. 3

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Data:

SKID 1

LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS
93.4	81.8	91.8	81.7	82.6	75.8	90.0	81.5	88.9	80.7
meter position 11		meter position 10		meter position 9		meter position 8		meter position 7	
Inverter 1		Inverter 2		Transformer		Inverter 3		Inverter 4	
meter postion 1		meter position 2		meter position 3		meter position 4		meter position 5	
LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS
97.1	85.5	97.0	86.6	85.1	79.7	95.7	86.3	97.0	85.7

Aux Rack

meter position 12	
LOUVERS	HOODS
76.2	74.8

meter position 6	
LOUVERS	HOODS
81.4	75.6

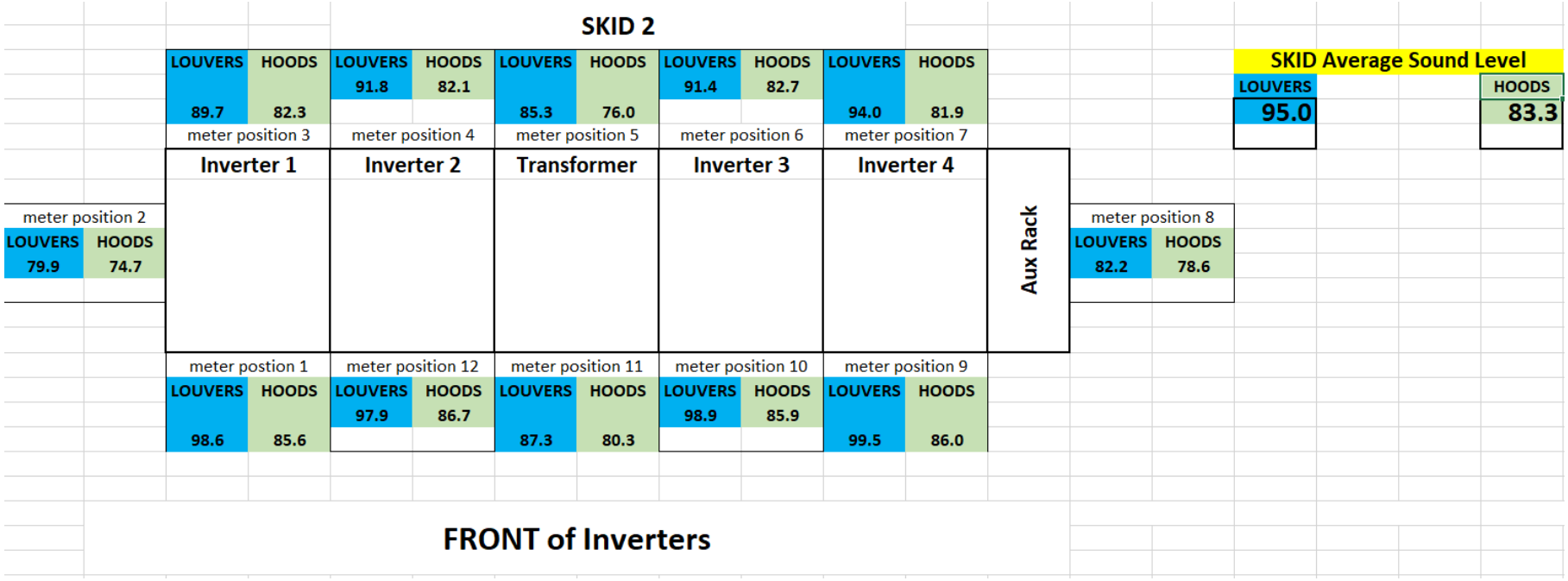
SKID Average Sound Level

LOUVERS	HOODS
93.2	83.0

FRONT of Inverters

TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Data:



TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Data:

SKID 3

meter position 4	meter position 5	meter position 6	meter position 7	meter position 8
LOUVERS 89.0 / HOODS 81.7	LOUVERS 90.9 / HOODS 82.5	LOUVERS 85.0 / HOODS 75.5	LOUVERS 90.3 / HOODS 82.7	LOUVERS 89.2 / HOODS 84.1
Inverter 1	**Inverter 2**	**Transformer**	**Inverter 3**	**Inverter 4**
meter postion 2	meter position 1	meter position 12	meter position 11	meter position 10
LOUVERS 96.9 / HOODS 85.8	LOUVERS 96.8 / HOODS 86.7	LOUVERS 88.5 / HOODS 80.4	LOUVERS 96.2 / HOODS 86.4	LOUVERS 98.5 / HOODS 86.7

meter position 3: LOUVERS 78.6 / HOODS 74.9

Aux Rack

meter position 9: LOUVERS 82.2 / HOODS 77.9

SKID Average Sound Level

LOUVERS	HOODS
93.4	83.6

FRONT of Inverters

TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Data:

SKID 4

meter position 2		meter postion 1		meter position 12		meter position 11		meter position 10		meter position 9		meter position 8	
LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS
79.2	74.7	94.5	85.9	97.0	87.7	88.5	81.0	96.8	88.7	96.2	87.9	82.7	81.0

meter position 3		meter position 4		meter position 5		meter position 6		meter position 7	
LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS	LOUVERS	HOODS
90.2	82.1	89.3	82.9	83.9	76.5	89.6	83.3	88.9	83.8

Inverter 1	Inverter 2	Transformer	Inverter 3	Inverter 4	Aux Rack

SKID Average Sound Level	
LOUVERS	HOODS
92.5	84.6

FRONT of Inverters

TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Data:

SKID 5

meter position 2	meter position 3	meter position 4	meter position 5	meter position 6	meter position 7		meter position 8
	Inverter 1	Inverter 2	Transformer	Inverter 3	Inverter 4	Aux Rack	
LOUVERS 79.2 / HOODS 75.1	LOUVERS 88.2 / HOODS 83.2	LOUVERS 89.3 / HOODS 82.7	LOUVERS 83.9 / HOODS 75.4	LOUVERS 88.6 / HOODS 84.0	LOUVERS 88.7 / HOODS 84.0		LOUVERS 83.7 / HOODS 79.8
	meter postion 1	meter position 12	meter position 11	meter position 10	meter position 9		
	LOUVERS 96.2 / HOODS 86.4	LOUVERS 95.4 / HOODS 87.6	LOUVERS 89.0 / HOODS 80.2	LOUVERS 97.5 / HOODS 88.3	LOUVERS 96.7 / HOODS 87.8		

FRONT of Inverters

SKID Average Sound Level	
LOUVERS	HOODS
92.7	84.6

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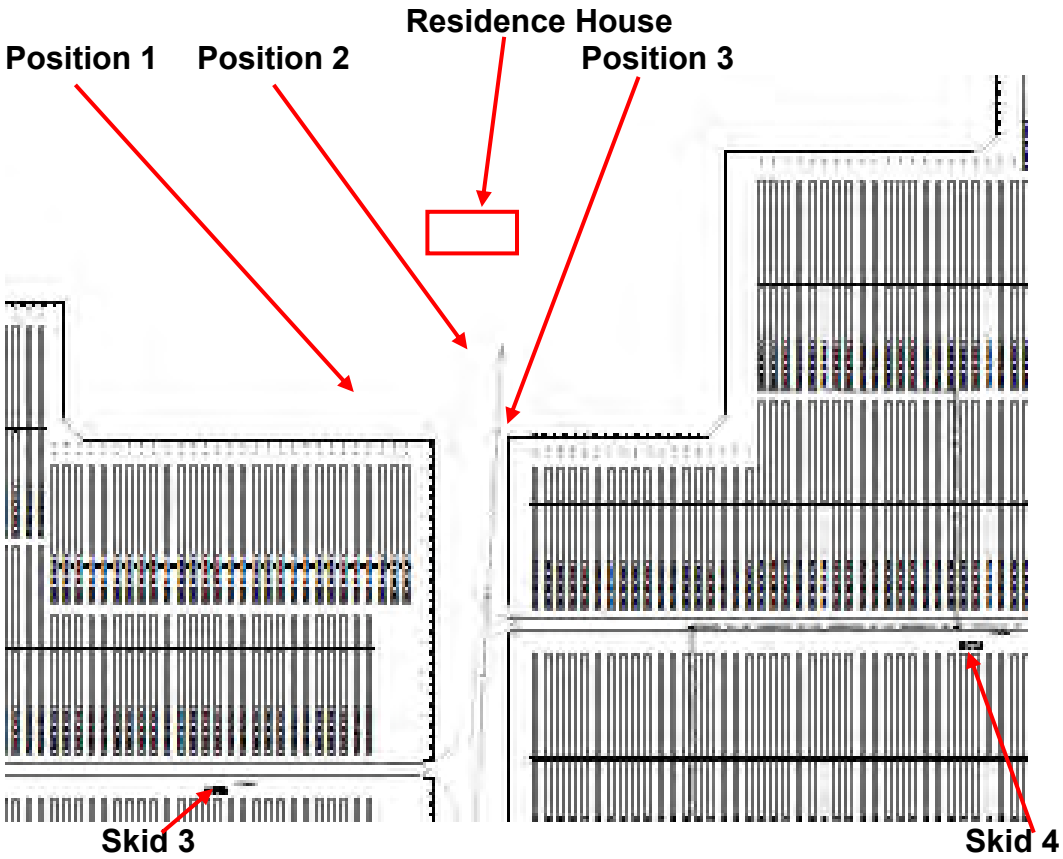
General position of testing close to Residence House:



Position 1 At property flag facing SW, toward skid 3
Position 2 In road to house – facing SW, toward skid 3
Position 3 At fence facing SE, toward skid 4

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Data – Residence House:

Overall sound level at Residence House

With Louvers	With Hoods
49.8 dB	**47.1 dB**

Sound level at each location by Residence House

Location	With Louvers	With Hoods
Position 1 At property line flag – facing SW toward Skids 2 and 3	49.4	47.0
Position 2 In road to property – facing SW toward Skids 2 and 3	49.3	47.6
Position 3 At property line fence – facing SE toward Skids 4 and 5	50.5	46.6

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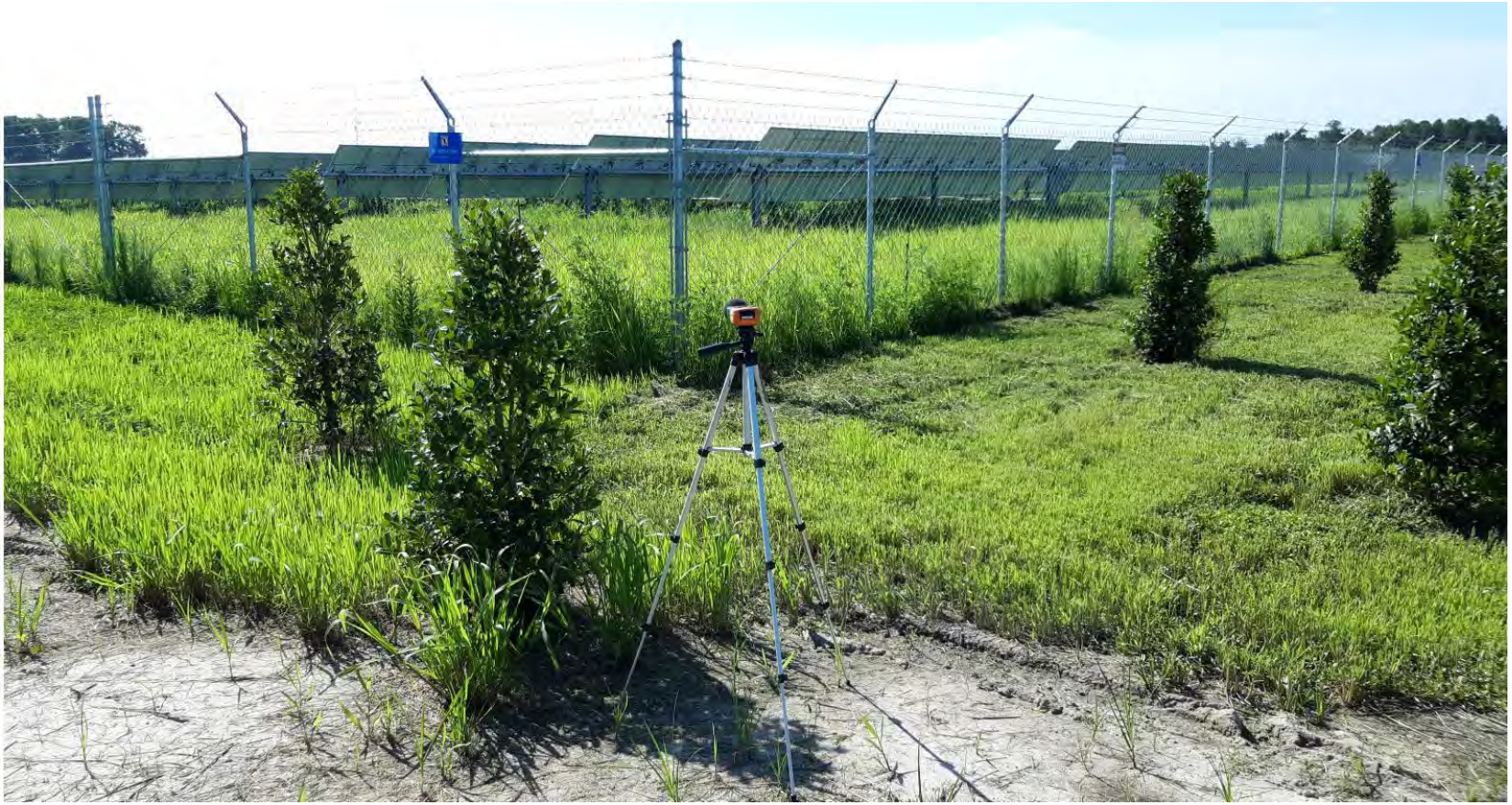
Set-up of Sound Meter facing SE toward Skids 4 and 5:



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Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Test Method

Sound Data-Logger settings:
The Sound Meter also performs data logging in csv format. The settings for data logging are:
A-weighted measurement type.
Sampling rate = 2 seconds.
Averaging set to Slow.

Procedure
Immediately prior to datalogging, the Sound Level Meter reading is verified with a Calibrator (94dB @ 1000 Hz).
Sound Level data logged in this method:

- Log data at first position for 2 minutes.
- Pause data logging.
- Move Sound Meter to second position.
- Log data for 2 minutes.
- Continue in this manner for all positions.

Operating Mode:

- All inverters were operating at full Rated Output.

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Data Summary Method:

Method for a single Skid (or the Residence House):

- Data is recorded at each Position for 2 minutes, at a rate of one sample every 2 seconds.
- The first 55 recorded values at each measurement Position is then Averaged into a single value.
- Each of these Position values are entered into Equation 12 from ISO 3744 – 2010:

Equation (12):

$$\overline{L'_{p(\mathrm{ST})}} = 10 \lg \left[\frac{1}{N_{\mathrm{M}}} \sum_{i=1}^{N_{\mathrm{M}}} 10^{0{,}1\, L'_{pi(\mathrm{ST})}} \right] \mathrm{dB}$$

where

$L'_{pi(\mathrm{ST})}$ is the frequency-band or A-weighted time-averaged sound pressure level measured at the ith microphone position or ith microphone traverse with the noise source under test (ST) in operation, in decibels;

N_{M} is the number of microphone positions or individual microphone traverses.

- The result is the Averaged Sound Level for each Skid (or Residence House).

TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Appendix A – Test Equipment:

- Extech Sound Level Meter, Model SDL600.
- Calibrator Extech Model ND9.

TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Appendix B – Calibration Certificate for Sound Meter:

Instrument Calibration

Certificate Number 2020006567

Calibration Certificate

TMEIC - Salem
2060 Cook Drive
Salem, VA 24153

ID	343282	**Procedure Name**	Sound Level
Description	Sound Level Meter	**Tolerance**	±1.4 dB
Manufacturer	EXTECH	**Temperature**	69
Model Number	SDL600	**Humidity**	42
Serial Number	343282	**Received**	In Tolerance
Service Date	7/20/2020	**Returned**	Pass
Due Date	7/20/2021		
On Site Calibration	No		

Work Order Notes: Adjusted unit to improve accuracy. Accuracy verified to be within Manufacturer's specifications.

See attached data sheet(s) for measurement data

Standards Used

Description	Service Date	Due Date	ID
Calibrator, Sound Level	7/24/2018	7/31/2021	IC-10658
Recorder, Temperature, Humidity	3/5/2020	3/31/2021	IC-11611

This calibration was performed in compliance with the ICTS Quality System, ISO9001:2015, ANSI/NCSL Z540-1-1994 and the specific requirements of the customer's order. The measurement standards used are traceable to the National Institute of Standards and Technology (NIST), fundamental or natural physical constants, National Standards of other countries which are correlated with U.S. National Standards, ratio type or self calibrating techniques, or comparison to consensus standards. A Test Uncertainty Ratio of 4:1 was maintained unless specified. This certificate may not be reproduced, except in full, without the approval of ICTS, Inc.

Calibration Technician: Brian Hood

QA Approval: Rebecca Hood

Instrument Calibration & Technical Services
5312 Peters Creek Rd., Suite E
Roanoke, VA 24019
Roanoke, VA 24019

Page 1

QA 3

7/20/2020

TMEIC Corporation
Office: 1325 Electric Road, Suite 200, Roanoke, VA 24018 USA
Mailing Address: 2060 Cook Drive, Salem, VA 24153 USA

Instrument Calibration & Technical services

DATA SHEET

CUSTOMER: TMEIC

ID#: 343282
WORK ORDER #: 2020006567
MANUFACTURER: Extech
MODEL: SDL600
DESCRIPTION: Sound Level Meter
SERIAL NO: 343282

Reviewed By: Brian Hood

Date: 7/20/2020

Function/Range	Nominal	Minimum	As Found	Maximum	As Left
dB/Auto	94	92.6	95.1	95.4	93.9
Mode - Slow	114	112.6	115.2	115.4	114.2
Weighting - A					

Manufacturer's Specified Accuracy: ±1.4 dB
All readings are within specifications unless otherwise indicated in
Unless otherwise indicated, As Left reading is As Found.
Adjusted to improve.

ID# 343282 - Extech SDL600 Page 2 of 2

NEMA Standards Publication TR 1-2013 (R2019)

Transformers, Step Voltage Regulators and Reactors

Published by:

National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, VA 22209

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FOREWORD

This foreword is not part of NEMA TR1-2013 Transformers, Step Voltage Regulators, and Reactors.

The Standards appearing in this publication have been developed by the Transformer Section and have been approved for publication by the National Electrical Manufacturers Association. They are used by the electrical industry to promote production economies and to assist users in the proper selection of transformers.

The Transformer Section is working actively with the IEEE Committee, C57 on Transformers, Regulators, and Reactors, in the development, correlation, and maintenance of national Standards for transformers. This Committee operates under the procedures both the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE).

It is the policy of the NEMA Transformer Section to remove material from the NEMA Standards publication as it is adopted and published in the IEEE C57 series Standards. The NEMA Standards publication for Transformers, Regulators, and Reactors references these and other American National Standards applying to transformers and is intended to supplement without duplication both the American National and IEEE Standards.

The NEMA Standards publication for transformers, regulators, and reactors contains a provision for the following:

a. IEEE and American National Standards adopted by reference and applicable exceptions approved by NEMA if any.

b. NEMA Official Standards Proposals—These are official drafts of proposed Standards developed within NEMA or in cooperation with other interested organizations, for consideration by ANSI and IEEE. They have a maximum life of ten years, during which time they must be revised as American National Standards, IEEE Standards, or adopted as NEMA Standards, or rescinded.

c. Manufacturing Standards—These are NEMA Standards which are primarily of interest to the manufacturers of transformers and which are not yet included in an American National or IEEE Standards.

d. Standards Which Are Controversial—These are NEMA Standards, on which there is a difference of opinion within Committee C57. The NEMA version will be included in the NEMA Standards publication until such time as the differences between ANSI, IEEE, and NEMA are resolved.

NEMA Standards publications are subject to periodic review and take into consideration user input. They are being revised constantly to meet changing economic conditions and technical progress. Users should secure the latest editions. Proposed or recommended revisions should be submitted to:

Megan Hayes, Technical Director, Operations
National Electrical Manufacturers Association
1700 13th Street, Suite 900
Rosslyn, VA 22209

This Standards publication was developed by the Transformer Products Section of the National Electrical Manufacturers Association. Section Approval of the Standard does not necessarily imply that all section members voted for its approval or participated in its development. At the time it was approved, the Section was composed of the following members:

ABB, Inc.	Raleigh, NC
Eaton Power Systems	Cleveland, OH
Emerson	St. Luois, MO
Federal Pacific	Bristol, VA
Hammond Power Solutions, Inc.	Guelph, Ontario
Hubbell Acme	Memononsee Falls, WI
Jinpan International USA	Carlstadt, NJ
MGM Transformer Company	Commerce, CA
Mitsubishi Electric Power Products	Warrenville, PA
PDI - ONYX Power Inc.	Santa Ana, CA
R.E. Uptegraff	Scottsdale, PA
Schneider Electric	Palatine, IL
Siemens Industry	Norcross, GA
SPX Transformers	Waukesha, WI
VanTran Industries	Waco, TX
WEG Electric Corp.	Duluth, GA
Xignux Corporativo	San Pedro Garza Garcia, Mexico

Scope

This Standards publication applies to single phase and polyphase power and distribution transformers (including step-voltage regulators and reactors). This Standard excludes dry type transformers covered by NEMA ST20. This publication provides a reference list of applicable ANSI and IEEE C57 Standards.

In addition, this publication includes certain NEMA Standard test methods, test codes, properties, etc. of liquid-immersed transformers, step-voltage regulators, and reactors that are not IEEE Standards.

CONTENTS

Part 0
General

The following IEEE and 10 CFR Standards are applicable references and should be inserted in this part:

IEEE Std. C57.12.00-2010	*IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers*
IEEE Std. C57.12.01	*IEEE Standard General Requirements for Dry-Type Distribution and Power Transformers including those with Solid-Cast and/or Resin-Encapsulated windings*
IEEE Std. C57.12.10	*IEEE Standard Requirement for Liquid-Immersed Power Transformers*
IEEE Std. C57.12.70	*IEEE Standard for Standard Terminal Markings and Connections for Distribution and Power Transformers*
IEEE Std. C57.12.90	*IEEE Standard Test Code for Liquid-immersed Distribution, Power & Regulating Transformers*
IEEE Std. C57.12.90	*IEEE Standard Test Code for Dry-Type Distribution and Power Transformers*
IEEE Std. C57.19.00	*IEEE Standard General Requirements and Test Procedure for Power Apparatus Bushings*
IEEE Std. C57.19.01	*IEEE Standard Performance Characteristics & Dimensions for Outdoor Apparatus Bushings*
IEEE Std. C57.91	*IEEE Guide for Loading Mineral-oil-immersed Transformers and Step-Voltage Regulators*
10 CFR 429	*Part 429-Certification, Compliance, and Enforcement for Consumer Products and Commercial and Industrial Equipment*
10 CFR 431	*Part 431- Energy Efficiency Program for Certain Commercial and Industrial Equipment*

The NEMA Standards TR 1-0.01 through TR 1-0.03 on the following pages (see Part 0, Pages 2-3) also generally apply to transformers.

0.01 Preferred Voltage Ratings

Preferred system voltages and corresponding transformer voltage ratings are given in the American National Standard for Electric Power Systems and Equipment-Voltage Ratings (60 Hz); C84.1. It is recommended that these ratings be used as a guide in the purchase and operation of transformers.

0.02 Preferred Forced-Air and Forced-Liquid Ratings

Preferred forced-air and forced-liquid ratings are given in section 4 Table 1 of IEEE Std. C57.12.00-2010. It is recommended that these ratings be used as a guide in the purchase and operation of transformers.

0.03 Audible Sound Levels

Transformers shall be so designed that the average sound level will not exceed the values given in Tables 0-1 through 0-2 when measured at the factory in accordance with the conditions outlined in IEEE Std. C57.12.90.

The guaranteed sound levels should continue to be per Tables 1 through 2 until such time as enough data on measured noise power levels becomes available.

Sound pressure levels are established and published in this document. Sound power may be calculated from sound pressure using the method described in C57.12.90.

Rectifier, railway, furnace, grounding, mobile, and mobile unit substation transformers are not covered by the tables. The tables do not apply during operation “of” on load tap changers in power transformers and step-voltage regulators.

For audible sound levels of dry-type transformers 15000-Volt nominal system voltage and below the tables listed in the IEEE C57.12.01 Standard are applicable references.

Table 1
Audible Sound Levels for Oil-Immersed Power Transformers

Average Sound Level tt. Decibels	Equivalent Two-Winding Rating*																	
	350 kV BIL and Below			450, 550, 650 kV BIL			750 and 825 kV BIL			900 and 1050 kV BIL			1175 kV BIL			1300 kV BIL. and Above		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
57	700																	
58	1000																	
59				700														
60	1500			1000														
61	2000																	
62	2500			1500														
63	3000			2000														
64	4000			2500														
65	5000			3000														
66	6000			4000			3000											
67	7500	6250▲▲		5000	3750▲▲		4000	3125▲▲										
68	10000	7500		6000	5000		5000	3750										
69	12500	9375		7500	6250		6000	5000										
70	15000	12500		10000	7500		7500	6250										
71	20000	16667		12500	9375		10000	7500										
72	25000	20000	20800	15000	12500		12500	9375										
73	30000	26667	25000	20000	16667		15000	12500		12500								
74	40000	33333	33333	25000	20000	20800	20000	16667		15000			12500					
75	50000	40000	41687	30000	26667	25000	25000	20000	20800	20000	16667		15000			12500		
76	60000	53333	50000	40000	33333	33333	30000	26667	25000	25000	20000	20800	20000	16667		15000		
77	80000	66687	66667	50000	40000	41667	40000	33333	33333	30000	26667	25000	25000	20000	20800	20000	16667	
78	100000	80000	83333	60000	53333	50000	50000	40000	41667	40000	33333	33333	30000	26667	25000	25000	20000	20800
79		106667	100000	80000	66667	66667	60000	53333	50000	50000	40000	41667	40000	33333	33333	30000	26667	25000
80		133333	133333	100000	80000	83333	80000	66667	66667	60000	53333	50000	50000	40000	41667	40000	33333	33333
81			166667		106667	100000	100000	80000	83333	80000	66667	66667	60000	53333	50000	50000	40000	41667
82			200000		133333	133333		106867	100000	100000	80000	83333	80000	66667	66667	60000	53333	50000
83			250000			166667		133333	133333		10686	100000	100000	80000	83333	80000	66667	68667
84			300000			200000			166667		13333	133333		106667	100000	100000	80000	83333
85			400000			250000			200000			166667		133333	133333		106667	100000
86						300000			250000			200000			166667		133333	133333
87						400000			300000			250000			200000			168667
88									400000			300000			250000			200000
89												400000			300000			250000
90															400000			300000
91																		400000

Column 1 • Class*ONAN. ONWN and OFWF Rating*

Column 2 • Class* ONAF and ODAF First stage Auxiliary Cooling"t
Column 3 • Straight OFAF Ratings, ONAF * and ODAF * Second stage Auxiliary Cooling"t'
Classes of cooling, see section 5.1 IEEE Std. C57.12-2010

"First- and second stage auxiliary cooling, see section 4 Table 1 of IEEE Std. C57-12-2010
f For column 2 and 3 ratings, the sound levels are with the auxiliary cooling equipment in operation.
tf For intermediate kVA ratings, use the average sound level of the next larger kVA rating.
▲The equivalent two-winding 55ºC or 65ºC rating is defined as one-half the sum of the kVA rating of all windings
▲▲ Sixtv-seven decibels for all kVA ratings equal to this or smaller.

Table 2
Audible Sound Levels for Liquid-Immersed
Network Transformers and Step-Voltage Regulators

Equivalent Two-Winding kVA	Average Sound Level Decibels
0-50	48
51-100	51
101-300	55
301-500	56
501-750	57
751-1000	58
1001-1500	60
1501-2000	61
2001-2500	62
2501-3000	63

Part 1
Power Transformers

The IEEE Std. C57.12.10 is an applicable reference Standard for power transformers and should be inserted in this Part 1.

The IEEE Std. C57.91 is an applicable reference Standard and should be inserted in this Part 1.

The following other parts of this edition of NEMA TR 1 shall also apply for power transformers.

a. Part 0 General
b. Part 9 Terminology
c. Part 10 Test Code

Part 2
Substation And Distribution Step-Voltage Regulators

The following IEEE Standards are applicable references for substation and distribution step-voltage regulators and should be inserted in this Part 2:

IEEE Std. C57.15	*IEEE Standard Requirements, Terminology, and Test Code for Step-Voltage Regulators*
IEEE Std. C37.90-1	*IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus*
IEEE Std. C37.90.2	*IEEE Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers*
IEEE Std. C37.90.3	*IEEE Standard Electrostatic Discharge Tests for Protective Relays*
IEEE Std. C57.12.31	*IEEE Standard for Pole-Mounted Equipment--Enclosure Integrity*
IEEE Std C57.91	*IEEE Guide for Loading Mineral-Oil-Immersed Transformers and Step-Voltage Regulators*
IEEE Std. C57.98	*IEEE Guide for Transformer Impulse Tests*
IEEE Std. C57.131	*IEEE Standard Requirements for Tap Changers*

Part 3
Distribution Transformers

The following IEEE Standards are applicable references for distribution transformers and should be inserted in this Part 3:

IEEE Std. C57.12.20	*IEEE Standard for Overhead-Type Distribution Transformers, 500 kVA and Smaller: High Voltage, 34500 Volts, and Below; Low Voltage, 7970/13800Y Volts, and Below*
IEEE Std. C57.12.23	*IEEE Standard for Submersible Single-Phase Transformers: 167 kVA and Smaller, High-Voltage 25000 V and Below; Low-Voltage 600 V and Below*
IEEE Std. C57.12.24	*IEEE Standard for Submersible, Three-Phase Transformers, 3750 kVA and Smaller: High Voltage, 34500 GrdY/19920 Volts, and Below; Low Voltage, 600 Volts, and Below*
IEEE Std. C57.12.29™	*IEEE Standard for Pad-Mounted Equipment-Enclosure Integrity for Coastal Environments*
IEEE Std. C57.12.30™	*IEEE Standard for Pole-Mounted Equipment-Enclosure Integrity for Coastal Environments*
IEEE Std. C57.12.31™	*IEEE Standard for Pole-Mounted Equipment-Enclosure Integrity*
IEEE Std. C57.12.32™	*IEEE Standard for Submersible Equipment- Enclosure Integrity*
(	
IEEE Std. C57.12.34™	*IEEE Standard for Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers, 5 MVA and Smaller; High Voltage, 34.5 kV Nominal System Voltage and Below; Low Voltage, 15 kV Nominal System Voltage and Below.*
IEEE Std. C57.12.35™	*IEEE Standard for Bar Coding for Distribution Transformers and Step-Voltage Regulators*
IEEE Std. C57.12.36™	*IEEE Standard Requirements for Liquid-Immersed Distribution Substation Transformers*
IEEE Std. C57.12.38™	*IEEE Standard for Pad-Mounted-Type, Self-Cooled, Single-Phase Distribution Transformers; High Voltage, 34 500 GrdY/19 920 V and below, Low Voltage, 240/120 V; 167 kVA and smaller*
IEEE Std. C57.105™	*IEEE Guide for Application of Transformer Connections in Three-Phase Distribution Systems*

The following other parts of this edition of NEMA TR 1 shall apply for distribution transformers:

a. Part 0 General
b. Part 9 Terminology
c. Part 10 Test Code

3.01 Design Test for Enclosure Security of Padmounted Compartmental Transformers

The following IEEE Standards provide a means for evaluating the security of enclosures for transformers.

IEEE Std. C57.12.28™	*IEEE Standard for Pad-Mounted Equipment - Enclosure Integrity*
IEEE Std. C57.12.34™	*IEEE Standard for Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers, 5 MVA and Smaller; High Voltage, 34.5 kV Nominal System Voltage and Below; Low Voltage, 15 kV Nominal System Voltage and Below.*
IEEE Std. C57.12.38™	*IEEE Standard for Pad-Mounted-Type, Self-Cooled, Single-Phase Distribution Transformers; High Voltage, 34 500 GrdY/19 920 V and Below, Low Voltage, 240/120 V; 167 kVA and Smaller*

Part 4
Secondary Network Transformers

The American National Standard Requirements for C57.12.40 *Secondary Network Transformers, Subway and Vault Types (Liquid Immersed)*, (with the exception of paragraphs 5.5.4 and 11.5.2 on finishes) is an applicable reference for secondary network transformers and should be inserted in this Part 4.

The following other parts of this edition of NEMA TR 1 shall also apply for secondary network transformers.

a. Part 0 General
b. Part 9 Terminology
c. Part 10 Test Code

Part 5
Dry-Type Transformers

The following IEEE/NEMA Standards are applicable references for dry-type transformers and should be inserted in this Part 5:

IEEE Std. C57.12.01	*IEEE Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin-Encapsulated Windings*
IEEE Std. C57.12.91	*IEEE Standard Test Code for Dry-Type Distribution and Power Transformers*
IEEE Std. C57.12.50	*Requirements for Ventilated Dry-Type Distribution Transformers, 1 to 500 kVA, Single-Phase; and 15 to 500 kVA, Three-Phase; With High-Voltage 601-34500 Volts, Low-Voltage 120-600 Volts*
IEEE Std. C57.12.51	*IEEE Standard for Ventilated Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, With High-Voltage 601-34500 Volts, Low-Voltage 208Y/120V to 4160V-General Requirements*
IEEE Std. C57.12.52	*IEEE Standard for Sealed Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, With High-Voltage 601-34500 Volts, Low-Voltage 208Y/120V to 4160V-General Requirements*
IEEE Std. C57.94	*IEEE Recommended Practices for Installation, Application, Operation and Maintenance of Dry-Type General Purpose Distribution and Power Transformers*
IEEE Std. C57.96	*Guide for Loading Dry-Type Distribution and Power Transformers*
NEMA ST 20	*Dry Type Transformers for General Applications*

Part 6
Substation Transformers

The following other parts of this edition of NEMA TR 1 shall also apply for substation transformers.

a. Part 0 General
b. Part 9 Terminology
c. Part 10 Test Code

Part 7
Arc Furnace Transformers

The following other parts of this edition of NEMA TR 1 shall also apply for arc furnace transformers.

a. Part 0 General
b. Part 9 Terminology
c. Part 10 Test Code

Part 8
Shunt Reactors

The IEEE Std. C57.21 is an applicable reference and should be inserted in this Part 8.

To facilitate safe and effective operation and consistency of reporting for all shunt reactor transformers, it is recommended that the information listed this IEEE Standard be included in the test report for every shunt reactor transformer.

Part 9

Terminology

The ANSI/IEEE Std. C57.12.80- is an applicable reference for terminology and should be inserted in this Part 9.

Part 10
Test Code

The following IEEE Standards are applicable references for transformer test codes and should be inserted in this Part 10:

IEEE Std. C57.12.90™	*IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers*
IEEE Std. C57.12.91	*IEEE Standard Test Code for Dry-Type Distribution and Power Transformers*
IEEE Std. C57.13™	*IEEE Standard Requirements for Instrument Transformers*
IEEE Std. C57.98™	*IEEE Guide for Transformer Impulse Tests*

To facilitate safe and effective operation and consistency of reporting for all power and distribution transformers, it is recommended that the information listed in the IEEE Std. C57.12.00-2010, section 8.7 be included in the test report for every transformer.

§

NX Horizon

Smart Solar Tracking System

Serving as the backbone on over 35 gigawatts of solar power plants around the world, the NX Horizon™ smart solar tracker system combines best-in-class hardware and software to help EPCs and asset owners maximize performance and minimize operational costs.

Flexible and Resilient by Design

With its self-aligning module rails and vibration-proof fasteners, NX Horizon can be easily and rapidly installed. The self-powered, decentralized architecture allows each row to be commissioned in advance of site power, and is designed to withstand high winds and other adverse weather conditions. On a recent 838 megawatt project in Villanueva, Mexico, these design features allowed for the project to go online nine months ahead of schedule.

TrueCapture and Bifacial Enabled

Incorporating the most promising innovations in utility scale solar, NX Horizon with TrueCapture™ smart control system can add additional energy production by up to six percent. Further unlocking the advantages of independent-row architecture and the data collected from thousands of sensors across its built-in wireless network, the software continuously optimizes the tracking algorithm of each row in response to site terrain and changing weather conditions. NX Horizon can also be paired with bifacial PV module technology, which can provide even more energy harvest and performance. With bifacial technology, NX Horizon outperforms conventional tracking systems with over 1% more annual energy.

Quality and Reliability from Day One

Quality and reliability are designed and tested into every NX Horizon component and system across our supply chain and manufacturing operations. Nextracker is the leader in dynamic wind analysis and safety stowing, delivering major benefits in uptime and long-term durability NX Horizon is certified to UL 2703 and UL 3703 standards, underscoring Nextracker's commitment to safety, reliability and quality.

Features and Benefits

5 years in a row
Global Market Share Leader (2015-18)

35 GW
Delivered on 5 Continents

Best-in Class
Software Ecosystem and Global Services

Up to 6%
Using TrueCapture Smart Control System

GENERAL AND MECHANICAL

Tracking type	Horizontal single-axis, independent row.
String voltage	1,500 V_{DC} or 1,000 V_{DC}
Typical row size	78-90 modules, depending on module string length.
Drive type	Non-backdriving, high accuracy slew gear.
Motor type	24 V brushless DC motor
Array height	Rotation axis elevation 1.3 to 1.8 m / 4'3" to 5'10"
Ground coverage ratio (GCR)	Configurable. Typical range 28-50%.
Modules supported	Mounting options available for virtually all utility-scale crystalline modules, First Solar Series 6 and First Solar Series 4.
Bifacial features	High-rise mounting rails, bearing + driveline gaps and round torque tube.
Tracking range of motion	Options for ±60° or ±50°
Operating temperature range	SELF POWERED: -30°C to 55°C (-22°F to 131°F) AC POWERED: -40°C to 55°C (-40°F to 131°F)
Module configuration	1 in portrait. 3 x 1,500 V or 4 x 1,000 V strings per standard tracker. Partial length trackers available.
Module attachment	Self-grounding, electric tool-actuated fasteners.
Materials	Galvanized steel
Allowable wind speed	Configurable up to 225 kph (140 mph) 3-second gust
Wind protection	Intelligent wind stowing with symmetric dampers for maximum array stability in all wind conditions
Foundations	Standard W6 section foundation posts

ELECTRONICS AND CONTROLS

Solar tracking method	Astronomical algorithm with backtracking. TrueCapture™ upgrades available for terrain adaptive backtracking and diffuse tracking mode
Control electronics	NX tracker controller with inbuilt inclinometer and backup battery
Communications	Zigbee wireless communications to all tracker rows and weather stations via network control units (NCUs)
Nighttime stow	Yes
Power supply	SELF POWERED: NX provided 30 or 60W Smart Panel AC POWERED: Customer-provided 120-240 V_{AC} circut

INSTALLATION, OPERATIONS AND SERVICE

PE stamped structural calculations and drawings	Included
Onsite training and system commissioning	Included
Installation requirements	Simple assembly using swaged fasteners and bolted connections. No field cutting, drilling or welding.
Monitoring	NX Data Hub™ centralized data aggregation and monitoring
Module cleaning compatibility	Compatible with NX qualified cleaning systems
Warranty	10-year structural, 5-year drive and control components.
Codes and standards	UL 3703 / UL 2703 / IEC 62817

COPPERHEAD
ENVIRONMENTAL CONSULTING

MARTY MARCHATERRE
SENIOR ENVIRONMENTAL PLANNER

Regulatory Expertise
- NEPA
- CWA
- RCRA
- NHPA
- ESA
- CAA

Industry/Agency Clientele
- Solar
- Pipelines
- Utilities/Traditional Energy Sources
- US Air Force
- National Guard
- US Fish and Wildlife Service
- Forest Service
- Nuclear Regulatory Commission
- Corresponding State Agencies
- FHWA & State DOTs
- FRA
- FTA
- TVA
- Academic Institutions & NGOs

Qualifications/Registrations
- Virginia Bar Association, Environmental Law Section
- District of Columbia Bar Association, Environmental, Energy and Natural Resources Section
- Lexington Environmental Commission
- Lexington Community Land Trust
- Town Branch Trail, Inc.
- Paint Lick Watershed Alliance

Trainings
- NEPA and the Transportation Decision-Making Process
- Public Involvement in Transportation Decision-Making
- Conducting Quality Cumulative Impact Analysis
- Context Sensitive Design
- Land Use Planning
- Environmental Justice
- Watershed-Based Planning
- ODOT Noise Analysis
- Federal Energy Regulatory Commission Environmental Review and Compliance for Natural Gas Facilities
- Regulatory Issues and Renewable Energy Facilities

Qualifications and Background
Mr. Marchaterre has significant environmental, regulatory, and permitting experience, and has overseen development of NEPA environmental documentation and supporting studies. He has been involved in more than 80 EISs, EAs, and CEs. Mr. Marchaterre has managed permitting, air quality studies, noise analyses, socioeconomic baseline studies, land use analyses, conservation and historic preservation analyses, community impact assessments, Phase I hazardous materials site assessments, biological assessments, wetlands delineations, environmental justice, cumulative impacts, and public involvement activities. For the U.S. Environmental Protection Agency, he provided support to the National Environmental Justice Advisory Committee for two years.

Education
- **J.D. 1988**, College of William and Mary, Williamsburg, Virginia
- **B.A. History and Political Science**, 1985, Williams College, Williamstown, Massachusetts
- Williams-Mystic American Maritime Program, 1985

Selected Project Experience

Tennessee Valley Authority

Wilson Dam Bridge Deck Refurbishment EA. Tennessee Valley Authority, Alabama.
Project manager for an environmental assessment analyzing the potential impacts resulting from refurbishment of the Wilson Dam bridge Deck spanning Pickwick Reservoir and connecting Colbert and Lauderdale counties, Alabama. Authored multiple resource sections and coordinated directly with TVA NEPA and project management team.

Kingston Fossil Plant Wastewater Treatment Facility EA. Tennessee Valley Authority, Tennessee.
Assistant Project Manager for an environmental assessment addressing installation of new wet flue gas desulfurization wastewater treatment facilities and modification of existing processes at Kingston Fossil Plant to enhance wastewater quality. Authoring resource sections and responsible for senior-level NEPA support and QA/QC.

Natural Resource Plan Supplemental EIS. Tennessee Valley Authority, Tennessee.
Assistant Project Manager for a supplemental EIS analyzing the implementation of a revised Natural Resource Plan covering 293,000 acres of TVA reservoir land. TVA manages 154 natural areas and conducts specific management activities compatible with the goals for each area. Providing technical review of draft resource sections, working with subject matter experts, and reviewing drafts of the Supplemental EIS.

Riverton Development Project EA. Tennessee Valley Authority, TN. Assistant project manager for an EA analyzing issuance of a shoreline construction permit associated with the proposed Riverton mixed-use development in Chattanooga, Tennessee. The permit would be issued under Section 26(a) of the TVA Act to allow Riverton to install floating residential boat docks and place riprap along the shoreline of the Nickajack Reservoir. Key issues included floodplain alteration, cultural and tribal resources, potential impacts on the NRHP-listed Chickamauga Dam Reservation, and conversion of a natural setting to one with mixed residential and commercial uses.

Chickamauga Law Enforcement Training Center Easement EA. Tennessee Valley Authority, TN. Assistant project manager for an EA analyzing issuance of an easement and land use permit for development of a law enforcement training center on TVA land near Chattanooga, Tennessee. Key issues include avoidance of cultural resources and federally listed species, potential impacts on the NRHP-listed Chickamauga Dam Reservation, and impacts on transportation and noise. Required close coordination with TVA archaeologist and botanist.

Clean Water Act Section 401 Permitting Tool for TVA Natural Resources Group, Tennessee. Assistant project manager responsible for developing a new tool to ensure TVA Section 26(a) permitting is consistent with state requirements for Clean Water Act Section 401 water quality certifications and U.S. Army Corps of Engineers Section 404 permits. Required clear and accurate identification of differing permitting processes across seven states (Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia) and three Corps districts (Nashville, Savannah, and Memphis).

TVA Programmatic EIS for Closure of Ash Impoundments in Alabama, Kentucky, and Tennessee.
For TVA, helped prepare the EIS for the closure of ash impoundments as a result of new US EPA coal combustion residuals requirements and TVA's goal to close wet ash storage facilities. The EIS evaluated the potential effects of multiple closure alternatives. Prepared scoping report and participated in five public meetings held at different power plants. Supported public involvement and developed materials and posters for the public meetings. Drafted text for the programmatic component as well as the site-specific analysis for closing ten ash impoundments at six different fossil fuel plants. Prepared comment response document and Record of Decision.

TVA Multiple Reservoir Land Management Plan EIS, Alabama, Kentucky and Tennessee.
For TVA, helped prepare the EIS for multiple reservoir land management plans (RLMPs) for 138,000 acres of TVA-managed public land on eight reservoirs. The updated RLMPs are needed to consider changes to land uses over time, to make land planning decisions on these eight reservoirs consistent with the TVA Land Policy and the Comprehensive Valleywide Land Plan and to incorporate TVA's goals for managing natural resources on public lands. Developed air quality, recreation, and cultural resource sections of the EIS, as well as provided technical review.

EA/FONSI, Ash Dewatering Facility at Shawnee Fossil Plant, Tennessee Valley Authority, McCracken County, Kentucky.
Supported development of EA/FONSI for a bottom ash dewatering facility to help TVA convert from wet ash storage to dry storage. Evaluated project affects to parks and nearby wildlife management areas and water use. Potential visual impacts on historic resources were a concern.

EIS for TVA Bull Run Fossil Plant Landfill, TN.
EIS Author and Technical Reviewer for preparation of an EIS to address the storage of coal combustion residuals (ash) generated at Bull Run Fossil Plant. Helped prepare draft sections of the EIS including hazardous materials and cultural resources components, as well as provided technical review of draft documents.

TVA Muscle Shoals Reservation EA, Colbert County, AL.
Supported the environmental assessment on the proposed relocation and realignment of essential operations at the Muscle Shoals Reservation. The EA evaluated three alternatives: 1) no action; 2) construct a new facility on a Greenfield site; or 3) modify an existing facility on the Reservation to house the relocated essential operations. Developed text for the EA and provided technical review.

Solar
Site Characterization Study for Solar Energy Development. Confidential Client. Breckinridge County, Kentucky. Assistant Project Manager for a site characterization study analyzing a property in Breckinridge County, Kentucky, for possible development as a solar energy generating facility. The study included a desktop review of federal and state data pertaining to sensitive resources such as listed species, wetlands or other surface waters, prime farmland, karst topography, and public and protected lands. Copperhead staff then performed a one-day field verification to characterize vegetative communities, possible bat habitat, and the presence of jurisdictional waters. A summary report was provided to the client which outlined potential environmental concerns and presented a permitting matrix delineated by issuing agency, trigger, and timeline.

Site Characterization Study for a Proposed Solar Energy Project. Confidential Client. Kentucky.
Managed a site characterization study to identify potential environmental constraints associated with land cover/use, soils, wetlands and watercourses, farmland, threatened and endangered species, and other considerations. The study included a desktop assessment using publicly available databases and a field reconnaissance survey of the subject property.

Biological Assessment for Indiana Bats, Northern Long-eared Bats, and Bog Turtle. Confidential Client, New York. Managing the development of a biological assessment with adverse effects to bat habitat. Consultation with United States Fish and Wildlife to develop mitigation alternatives.

Site Characterization Study, Wetland Delineations, Phase I ESA, and Cultural Resources Overview for a Proposed Solar Project. Confidential Client. Kentucky. Managed site characterization studies, aquatic resources delineation, Phase I ESA, and cultural resources overview for solar project on an approximately

800-acre parcel in Garrard County, KY. The study included a desktop review of federal and state data pertaining to sensitive resources such as listed species, wetlands or other surface waters, prime farmland, karst topography, and public and protected lands. A wetland delineation identified and demarcated aquatic features that may be jurisdictional waters of the U.S. or isolated waters of the state.

Site Characterization Study, Wetland Delineations, Phase I ESA, and Cultural Resources Overview for a Proposed Solar Project. Confidential Client. Kentucky. Managed site characterization studies, aquatic resources delineation, Phase I ESA, and cultural resources overview for solar project on an approximately 800-acre parcel in Metcalfe County, KY. The study included a desktop review of federal and state data pertaining to sensitive resources such as listed species, wetlands or other surface waters, prime farmland, karst topography, and public and protected lands. A wetland delineation identified and demarcated aquatic features that may be jurisdictional waters of the U.S. or isolated waters of the state.

Three Solar Projects - Site Characterization Study, Wetland Delineations, Phase I ESA, and Cultural Resources Overview. Confidential Client. Kentucky. Managed desktop review and field studies to support development of site characterization studies, wetland delineations, Phase I ESAs, acoustical analyses, and cultural resource overviews. A site reconnaissance identified potential habitat for federally listed and state-listed at-risk species and identified areas of potential concern, such as cemeteries..

Acoustic Analysis for Multiple Solar Projects. Confidential Clients. Kentucky. Managed acoustical analyses for multiple projects. Described existing sound levels from the project site and surrounding areas as well as potential impacts from construction, operation, and maintenance activities. Provided a report of the findings of the acoustical analysis. The report will contain a summary of the project, describe existing sound conditions, identify potential sensitive receptors (e.g., residences), and evaluate potential construction and operation sound levels.

Critical Issues Analysis (CIA) for a Solar Facility. Confidential Client. Tennessee. Assistant project manager for development of a CIA. The CIA's goal is to gain a better understanding of the environmental issues that could potentially affect project development. Some of the resource areas Copperhead collected information on include vegetation communities and general wildlife, threatened and endangered species, migratory birds nests, soil types, and historic and cultural resources. The wetland/stream mapping's goal is to estimate how much of the Project Area may be wetlands as opposed to uplands and to identify anticipated buffer setbacks. The information gathered helps to inform Copperhead and the client about what regulations will need to be adhered to and what permits will need to be acquired.

Critical Issues Analysis (CIA) for a Solar Facility. Confidential Client. Mississippi. Assistant project manager for development of a CIA. The CIA's goal is to gain a better understanding of the environmental issues that could potentially affect project development. Some of the resource areas Copperhead collected information on include vegetation communities and general wildlife, threatened and endangered species, migratory birds nests, soil types, and historic and cultural resources. The wetland/stream mapping's goal is to estimate how much of the Project Area may be wetlands as opposed to uplands and to identify anticipated buffer setbacks. The information gathered helps to inform Copperhead and the client about what regulations will need to be adhered to and what permits will need to be acquired.

Multiple Studies for Solar Facility. Confidential Client. Kentucky. Project manager for a site characterization study, a wetlands delineation, an Approved Jurisdictional Determination (JD) from the US Army Corps of Engineers (USACE) Louisville District, a Phase I Environmental Site Assessment (ESA), cultural resource assessments, a threatened and endangered species habitat assessment, a preliminary geotechnical site characterization, and prepare an acoustical analysis.

Bat Conservation Plans for Solar Projects. Confidential Client. Virginia. Technical reviewer for multiple bat conservation plans to reduce potential impacts from solar projects on bat roosting, foraging, and commuting habitat.

Transportation

Threatened and Endangered Species Habitat Assessments and Surveys, Bridging Kentucky Program, Kentucky Transportation Cabinet. Project Manager. Throughout Kentucky, Copperhead as subconsultant is tasked with providing environmental services including coordination for Threatened and Endangered Species (TES), assessment of potential habitat, preparation of biological assessments, programmatic agreement comments, and NEPA permit assistance (including Section 401/404 and U.S. Coast Guard Section 10) for the program to rehabilitate or replace over 1,000 bridges in the next six years. Screened over 400 bridges for environmental concerns and potential TES habitat. Conducting habitat assessments, mussel and fish surveys, and preparing permits, biological assessments, and no effect documentation.

EA/FONSI, US 68, Bourbon-Nicholas Counties, Kentucky. Item No. 7-310.00.
Prepared an EA and individual Section 4(f) evaluation as well as baseline studies for this 13.3-mile project. Section 106 issues were a critical component due to over 50 historic sites and 2 historic districts. Seventeen alternates were considered to avoid or minimize impacts to historic sites and prime farmland. Section 401/404 and floodplain construction permits and stream mitigation required due to 10,000 feet of channel change. Developed a public involvement plan and participated in public meetings, a public hearing, and Section 106 consulting party meetings.

EA/FONSI, East Nicholasville Bypass, Jessamine County, Kentucky.
Prepared an EA and managed the development of the FONSI for this 7-mile project. Managed the historic and archaeological studies of several farm sites. Due to potential impacts to a historic site, avoidance alternates were developed. Prepared socioeconomic, traffic noise and hazardous materials/underground storage tank studies and oversaw the other environmental base studies and addenda. Helped address concerns about economic impacts of developing the bypass and visual/noise concerns for residents. Supported citizen advisory committee meetings, public information meetings and the public hearing. Participated in the biological assessment for running buffalo clover, Indiana bat and gray bat.

EA/FONSI, US 60 Tennessee River Crossing, McCracken-Livingston Counties, Kentucky.
Managed preparation of the EA and Section 4(f) evaluation for the replacement of the historic George Rogers Clark Memorial Bridge and approaches. Oversaw minimization and mitigation efforts for wetlands, floodplains, historic bridge, and relocations.

EA/FONSI, US 119 (Partridge to Whitesburg), KYTC, Letcher County, Kentucky.
Project Manager. Managed preparation of two EAs and baseline studies for two connecting projects (14.8 miles in length). Managed public involvement activities (Pine Mountain Crossing Task Force, public meetings, and public hearings), and oversaw minimization and mitigation efforts for wetland, stream, floodplain, historic and relocation impacts. Due to numerous crossings of the Poor Fork of the Cumberland River and potential impacts to the Bad Branch Nature Preserve, Pine Mountain Wildlife Management Area, and a historic site, this project evaluated Section 4(f) impacts, numerous alternates, the potential impacts of 20 bridges, a 4.2-mile tunnel, and several waste areas. Managed the biological assessment for the Indiana bat, gray bat, and blackside dace. Participated in the Section 401 and 404 permitting process for wetland and stream impacts.

Categorical Exclusion 2, Town Branch Trail Phase 6, Fayette County, Kentucky. Item No. 7-7310.00.
Project Manager for Town Branch Trail Phase 6 Categorical Exclusion. Conducted environmental studies and prepared environmental documents for the multi-use trail between McConnell Springs Drive on Old Frankfort Pike to Oliver Lewis Way. Participated in project and public meetings on the proposed trail and developed Section 4(f) evaluation of potential impacts on historic James McConnell House as well as dry laid retaining walls along Town Branch.

Mitigation Support. Newtown Pike Extension, Fayette County. Kentucky. Item No. 7-593.00.
For the Community Land Trust, providing environmental justice advocacy for a low-income, minority neighborhood concerning EIS commitments and mitigation due to the Newtown Pike Extension. Reviewed environmental justice commitments, oversaw streetscape design work, examined traffic calming measures and plans for adjacent park, bike lanes, and bus transit facilities.

Categorical Exclusion and Programmatic Section 4(f), US 25 (Williamstown), Grant County, Kentucky. Item No. 6-1049.00.
Prepared the CE and Programmatic Section 4(f) evaluation concerning a bridge replacement / road improvement project. Historic sites, traffic noise, a senior citizen home, mobile home park relocation, business relocations, a railroad line, and park access were concerns. Worked with KY Department of Local Government to avoid Section 6(f) impacts due to a new park access.

Environmental Documentation for All Aboard Florida High Speed Rail, Florida.
For All Aboard Florida, developed technical baseline documents and provided technical review of methodology, existing environment, and environmental consequences sections for an approximately 128-mile section of a high-speed rail project from West Palm Beach to Miami, Florida. Involved in cultural resources, transportation, public utilities, and aesthetic components. Reviewed cultural resource report prepared by a subconsultant. Potential impacts to historic districts and resources were a concern. For All Aboard Florida, helped to review the DEIS prepared by a Third Party for Federal Railroad Administration.

Heartland Parkway Planning Study, Adair, Green, Taylor, Marion, Nelson, and Washington Counties, Kentucky.
Managed the environmental evaluation of the 68-mile corridor scoping study. Helped identify project needs and potential environmental concerns (historic battlefield, parks, conservation areas, endangered species, and cave/karst terrain). Identified the regional needs for improving/supporting economic development, tourism, higher education, and the agricultural sector. Participated in extensive public involvement activities. Managed the archaeological overview and Phase I archaeological survey for the 23-mile design project in Taylor and Adair Counties.

Environmental Assessment, KY 313, Hardin and Meade Counties, Kentucky.
Prepared an EA and FONSI for this 14-mile project. Managed the preparation of environmental baseline studies. Prepared a purpose and need statement to help justify the project. Helped evaluate potential cave and karst impacts. Managed the biological field studies that captured a federally endangered gray bat in the project area and helped evaluate mitigation options. Supported public meetings and the public hearing and coordinated with federal and state resource agencies.

Environmental Assessment, KY 40 (Inez to Warfield), Martin County, Kentucky.
Responsible for the EA for this 8.5-mile project. Relocations, strip mines, cemeteries, a historic site, and stream channel changes were environmental concerns. A separate waste disposal area and industrial development site were later evaluated. Managed review of environmental impacts of the roadway segment crossing into West Virginia. Supported KYTC in coordinating with the West Virginia Department of Highways and other West Virginia resource agencies. Supported the historic consultant in

evaluating methods to minimize potential indirect visual impacts of the proposed roadway and bridge on a historic site. Participated in stream mitigation and permitting activities.

Categorical Exclusion and Programmatic Section 4(f), US 25 (Williamstown), Grant County, Kentucky. Prepared the CE and Programmatic Section 4(f) and managed the environmental studies concerning a bridge replacement and road improvement project. Historic sites, traffic noise, a senior citizen home, a mobile home park, business relocations, a railroad line, and a park were issues. Worked with the KY Department of Local Government to avoid a Section 6(f) impact during the development of new access to a park.

Environmental Assessment/US 68 (Columbia to Greensburg), Green and Adair Counties, Kentucky. Prepared an EA for this 16-mile project. Managed the preparation of environmental overviews and baseline environmental studies, including wetlands, noise, air quality, Phase I ESA, socioeconomic, and threatened and endangered speices. Oversaw the development of a cultural historic overview and survey and an archaeological overview, an archaeological high probability study, and a Phase I archaeological survey. Supported the citizen advisory committee, public meetings, and a Section 106 consulting party meeting. Aided the roadway designers in developing alternates to avoid impacts to a historic farm and in evaluating a land bridge over a historic railroad tunnel rather than imploding the tunnel. Worked with the cultural historian to analyze the potential indirect visual and vibration impacts of the land bridge on the tunnel.

Environmental Assessment for the Leslie, Knott, Letcher Perry County Community Action Council for Intermodal Transit Facility and Parking Structure, Hindman, Kentucky.
Managed the EA and environmental studies to secure federal funding for the rehabilitation of a 46-year old former jail building to be an intermodal transit facility and creation of a street level 150-space parking structure. Potential floodplain impacts, environmental justice concerns, archaeological sites, and historic viewshed effects were evaluated. Worked closely with Community Action Council and design firm to avoid and minimize impacts.

Documented CEs and EAs for Transit Projects, Christian, Clay, Franklin, Jefferson, and Knott Counties, Kentucky.
Managed successful preparation of Documented CEs and EAs for transit facilities, maintenance facilities, bus wash, and parking structures with the KYTC Office of Transportation Delivery. For a proposed City of Frankfort Transit bus wash/maintenance facility, a documented CE was completed within one month to meet a funding deadline. Mr. Marchaterre participated in all aspects of this project including desktop environmental analysis, site reconnaissance, agency coordination, and report preparation.

Environmental Studies and Categorical Exclusion for Clays Mill Road, Fayette County, Kentucky. Project Manager responsible for the categorical exclusion and supporting studies for a 3.7-mile project in Lexington, KY. Prepared the HazMat/UST baseline study and assisted with the traffic noise modeling. Managed the sampling of streams, fish and macroinvertebrates to determine water quality. Groundwater in the project area is hydrologically sensitive due to the karst topography. Participated in citizen advisory committee and public meetings.

Environmental Assessment for Memphis Regional Intermodal Facility, Private Client, Rossville, TN. Technical Reviewer and Author for a complex EA for a 650-acre intermodal facility. Conducted technical review of EA and baseline studies including Stream Assessment Report, Ecology Study Report, Noise Assessment Report, Cultural Resources, and Phase I archaeological Survey, and Viewshed Analysis. The intermodal facility will improve freight transportation capacity in the region and used Tiger Grant funds. FHWA is the lead federal agency with TDOT as lead state agency. Twenty-one out of 29 federal, state, and local agencies requested to participate in the NEPA process. To adequately involve the public, both a

public information meeting and a public hearing were conducted in the local area. Completed the NEPA process in approximately one year, fastest for TDOT.

Federal Railroad Administration Categorical Exclusion for TIGER Grant for Railroad Bridge Replacement, IN.
Prepared Categorical Exclusion for historic bridge replacement partially funded from a TIGER grant. Categorical Exclusion was prepared for a private railroad for submission to the Federal Railroad Administration. A Memorandum of Agreement was developed between the US Army Corps of Engineers, State Historic Preservation Office, and the railroad to document the replacement of the historic bridge.

140-Mile Virginia Rail Expansion (VRE) Project, Virginia.
Managed cultural resources and environmental constraints analysis for proposed 140-mile expansion project. Oversaw archival and field studies to identify historic and ecological resources within areas of potential effect. Identified NEPA categorical exclusions that could apply to sections of the project area to speed the permitting process.

Third Party Review of Tier I EIS Process for Empire Corridor High Speed Rail Corridor, New York.
For a private railroad company, reviewed Tier I EIS process for the 463-mile Empire Corridor for High Speed Rail from New York City to Niagara Falls. Provided recommendations and position paper on Draft Tier I EIS process and opportunities for the railroad company to participate in the NEPA process both formally and informally. Evaluated potential impacts to railroad operations of an additional track for high speed rail.

Third Party Review of Tier II EIS for Southeast High-Speed Rail Corridor, Richmond, VA to Raleigh, NC.
For a private railroad company, reviewed Draft Tier II EIS for the Southeast High-Speed Rail Corridor and provided recommendations and comments on Draft Tier II EIS document and potential impacts to railroad operations.

Environmental Studies and Categorical Exclusion for KY 32, Kentucky Transportation Cabinet, Lawrence County, Kentucky.
Project Manager for the environmental studies for KY 32 in Lawrence County, KY. Prepared a Categorical Exclusion and Programmatic Section 4(f) evaluation for minor impacts to two historic sites. Identified potential onsite mitigation opportunities for approximately 3,000 feet of stream channel changes. Historic sites, a cemetery, and residential relocations were concerns.

Third Party Review of Tier I EIS for Atlanta BeltLine Project, GA.
For a private freight railroad company, reviewed Draft Tier I EIS for the proposed Atlanta Beltline Project for potential impacts to railroad operations. Concerns exist that a new transit line, trails, crossings, and designation of the railway line as a historic district would affect existing and future expansions of freight operations and safety. Prepared comments on the Draft Tier I EIS document. Participated in public involvement process, such as attending public meetings and workgroup meetings.

EA / FONSI, US 60 Bypass, Daviess County, Kentucky. Item No. 2-287.00.
Managed preparation of an EA and FONSI as well as baseline studies for this 5.2-mile project. A Citizen Advisory Committee met five times to express area citizen and business views. Wetland, stream, and archaeological site impacts were concerns.

Categorical Exclusion for I-75/I-71 Auxiliary Lanes, Boone County, Kentucky.
For Kentucky Transportation Cabinet, prepared a Categorical Exclusion 3 for adding auxiliary lanes for I-71/I-75 in Boone County. Conducted ecological, air, noise, hazardous materials, and socioeconomic studies. Conducted noise studies and supported preparation of noise analysis. Noise analyses, noise abatement modeling, and noise barrier public meetings were critical to success of project. Noise barriers were determined to be appropriate mitigation for project.

I-69 Strategic Corridor Planning Study (Eddyville to Henderson), Lyon, Caldwell, Hopkins, Webster, and Henderson Counties, Kentucky.
Managed and helped prepare the environmental component for evaluating the 80-mile corridor for an I-69 segment. Identified potential environmental concerns (relocations, environmental justice, conservation areas, and endangered species). Managed aquatic / terrestrial, socioeconomic, hazardous materials / underground storage tank, and air and traffic noise analysis. Identified the regional needs for improving / supporting economic development.

Third Party Review of Socioeconomic Study for I-66 Project (London to Somerset), Pulaski County, Kentucky.
Provided a third-party review for the KYTC for the I-66 socioeconomic study. Evaluated economic and community impacts, potential residential and commercial relocations, environmental justice concerns, land use changes, and farmland impacts for a 40-mile highway project. Identified gaps in the socioeconomic analysis and provided recommendations on how to improve the study. Information from the revised study was incorporated into the EIS.

Technical Reviewer for Bus Maintenance Facility Categorical Exclusion (CE), Transit Authority of River City (TARC), Jefferson County, Kentucky.
Provides quality assurance/quality control for ongoing projects by TARC. For a bus maintenance facility annex on a former Louisville & Nashville Railroad site, analyzed traffic information, bus emission reductions, land use, historic resources, environmental justice concerns, and the potential for hazardous materials/UST contamination. Determined that a CE was appropriate and prepared the documentation which was quickly approved by the FTA.

Environmental Assessment, KY 55 (Heartland Parkway), Adair and Taylor Counties, Kentucky. Item No. 4-124.00.
Technical reviewer for preparation of EA for this 23-mile project. Managed cultural resource studies (archaeological and historic architectural surveys), Section 106 consultation, and Section 4(f) evaluation. Identified sensitive areas such as Tebbs Bend Civil War Battlefield area, Native American mounds, and potential historic sites.

East Market Street Streetscape Categorical Exclusion, Louisville, Kentucky.
For Louisville Downtown Development and Louisville Metro, prepared a categorical exclusion for the East Market Streetscape project. Potential impacts to historic structures in several historic districts were potential concerns that were addressed with coordination with the Kentucky Heritage Council.

Statewide Programmatic Agreement for Historic Timber Railroad Bridges, Georgia.
For a private client, worked with United States Army Corps of Engineers and State Historic Preservation Office to develop a statewide programmatic agreement for the replacement and repair of historic timber railroad bridges throughout Georgia. The programmatic agreement covered more than 300 bridges across the state.

United States Fish and Wildlife
Multi-State NiSource Habitat Conservation Plan Environmental Impact Statement, United States Fish and Wildlife Service and United States Forest Service, 14 States.
Supported development of an EIS for a habitat conservation plan and incidental take permit to cover 15,000 miles of pipeline in 14 states for the USFWS, USFS, FERC, USACE, and NPS. The EIS addressed unique subject matter and legal and regulatory concerns due to the large area covered and 43 threatened and endangered species considered. The Project crossed Kentucky, Louisiana, Mississippi, Tennessee, Virginia and West Virginia. Supported technical reviews, socioeconomic analysis, cumulative impacts, consultation, and participated in public involvement activities.

Department of Defense
Environmental Assessment for an Army Aviation Support Facility, Boone National Guard Center, Frankfort, Kentucky.
For the Kentucky Army National Guard, prepared an environmental assessment for a 30-acre proposed replacement site for the army aviation support facility which included maintenance facilities and a wash station. Evaluated potential noise impacts of helicopters taking off and landing at the facility and the cumulative noise impacts due to adjacent airport. Adjusted EA analysis to constantly changing project location. The site was in a karst area so potential impacts from subsidence and groundwater contamination were considered.

Environmental Assessment for Multi-Purpose Machine Gun Range, Indiana Army National Guard, Camp Atterbury, Indiana.
At the Camp Atterbury Joint Maneuver Training Center in Indiana (approximately 33,100 acres), Preparing an environmental assessment for a multipurpose machine gun range. Assessed potential environmental impacts, including cumulative impacts, of short-range site plans and long-range plans for developing and managing the installation. Reviewed existing site studies and worked closely with facility staff to analyze plans and potential effects. Worked closely with client and design team to minimize impacts to forested wetlands, streams, and floodplains. Evaluated socioeconomic and land use impacts from creation of new training areas on the facility and nearby communities. Coordinated with federal and state resource agencies.

Environmental Assessment and Public Involvement, Muscatatuck Urban Training Center, Indiana. At the Muscatatuck Urban Training Center, supported the development of an environmental assessment for a new urban warfare and homeland security training center. Responsible for preparing portions of the Affected Environment and Environmental Impact sections for the EA. The Muscatatuck Urban Training Center (MUTC) would provide a new center for required urban assault and homeland security training at the former Muscatatuck State Development Center in Butlerville, Indiana. The MUTC would provide an urban training center to serve the wartime mission and combat readiness goals of military units as well as civilian homeland security and natural disaster response training needs. Natural resources on the proposed site include Pleasant Run, North Vernon Muscatatuck River, the Brush Creek Reservoir, and forested and non-forested lands. Preservation of historic structures was a significant concern. Prepared outreach materials and participated in public meetings.

Statewide Integrated Wildland Fire Management Plans (IWFMPs), Indiana, Kentucky, North Carolina, and West Virginia.
For the National Guard, managed preparation of statewide IWFMPs for training sites in multiple states. The IWFMPs developed programs to reduce wildfire potential; protect and enhance natural and cultural resources; preserve infrastructure and facilities; and promote safety. The IWFMPs examined the historical role of fire within and in the vicinity of installations; identified current ignition and fuel sources; and addressed fire training requirements and safety considerations including unexploded ordinance (UXO) and live fire areas. The IWFMPs recommended wildland fire prevention and

suppression measures, as well as prescribed burn management and site-specific burn plans. EAs were prepared for each IWFMP.

Integrated Natural Resources Management Plans (INRMPs) at Wendell H. Ford Regional Training Center (WHFRTC), Disney Training Center (DTC), and Hidden Valley Training Site (HVTS) and an Environmental Assessment (EA) for Training Operations at WHFRTC, Kentucky.
Managed two Environmental Assessments, three INRMPs, three Forest Management Plans (FMPs), and a state-wide Integrated Wildland Fire Management Plan (IWFMP) for three training sites. Worked closely with the KYARNG, the U.S. Fish and Wildlife Service (USFWS), and the Kentucky Department of Fish and Wildlife Resources (KDFWR) as well as other federal, state, and local agencies with an interest in the management of natural resources. Also, evaluated approximately 3,000 acres of new maneuver training areas added to the Training Center for potential impacts to the environment of planned training activities.

NEPA and Planning Support to West Virginia Army National Guard, West Virginia.
Project Manager for environmental assessments for the West Virginia Army National Guard related to training areas, firing ranges, urban training centers, demolition ranges, readiness centers/armories, and army aviation facilities. Managed preparation of environmental assessments, land use plans, integrated natural resource management plans, forest management plans and endangered species management plans.

Indiana Bat Programmatic Biological Assessment, Camp Atterbury Joint Maneuver Training Center, Indiana Army National Guard, Edinburgh, Indiana.
Oversaw the preparation of a programmatic Biological Assessment (BA) and associated formal consultation process with the US Fish & Wildlife Services regarding effects on Indiana Bats with respect to future routine training and land management activities and upcoming development projects at the approximately 33,132-acre Camp Atterbury Joint Maneuver Training Center. The BA was prepared in close coordination with the USFWS Bloomington Field Office. The programmatic BA will streamline the consultation process and reduce administrative costs for the INARNG and USFWS.

Programmatic Biological Assessment for the Indiana Bat, Northern Long-eared Bat, and Gray Bat, U.S. Air Force Arnold Air Force Base, Tennessee.
Managed development of a programmatic biological assessment of routine training, land management, and Elk River Dam operations at the 39,000-acre Arnold Air Force Base in Tennessee. Potential adverse effects could result from timber management, prescribed fire, tree clearing during summer roadside maintenance activities, hazardous tree removal, range operations, wildfires, or emergency repairs/inspections at the dam. The proposed action may affect, and is likely to adversely affect Indiana bats, northern long-eared bats, and gray bats that use habitat within/near the Arnold Air Force Base.

Training Site Master Plan, Camp Dawson, West Virginia. Managed preparation of a conceptual master plan for the Camp Dawson Cantonment Area and the Volkstone Training Area. The conceptual master plan assisted in setting strategic goals for the mission and vision of the base, and is the starting point for a more detailed Training Facility Master Plan (TFMP) that is underway. The TFMP provides a foundation for the future development of Camp Dawson. Helped identify current conditions, facility and site constraints, and opportunities for enhanced opportunities.

Design, Mitigation, and Geotechnical Services for Modified Record Firing Range, Camp Dawson, West Virginia.
Managed some of the design components of the modified record firing range. Provided technical review of the EA. Helped evaluate alternatives to minimize impacts to stream and wetlands. Managed development of erosion and sedimentation controls and coordination with state and Federal agencies on

mitigation and permitting issues. Oversaw optimization of target elevations to minimize required earthwork and geotechnical evaluations of the access road and range control facilities locations.

EA/FONSI for Armed Forces Reserve Center (AFRC), Buckhannon, West Virginia.
Managing the EA for the Buckhannon AFRC. Conducted a site visit and record search to evaluate potential environmental constraints, such as 100-year floodplains along Brushy Fork Creek. Developed a pdEA that evaluates environmental impacts on a 49-acre site and potential mitigation options for the proposed AFRC. The AFRC will replace a 48-year old armory and provide needed training facilities.

Environmental Assessment and Phase I Environmental Site Assessment for Armed Forces Reserve Center, Elkins, West Virginia.
Managed the preparation of a Phase I Site Assessment and an environmental assessment for an armed forces reserve center on a 112-acre site. The site was a former farm and strip mine site. The Phase I ESA did not identify any evidence of spills or contamination at the site based on a review of historic records, field reconnaissance, and a review of Federal and state databases. Cultural resources, wetlands, and roadway access were concerns.

Ripley Joint Armed Forces Reserve Center (JAFRC) Planning Charrette, Ripley, West Virginia.
Managed a three-day planning charrette for the proposed Ripley JAFRC. The purpose of the planning charrette was to conduct a fact-finding mission and to have discussions on the project details with key installation stake holders and to review the 1391 construction cost estimate. The planning report outlined the findings of the charrette and outlined next steps for the project.

Briery Mountain Range Development Plan EA, Camp Dawson, West Virginia.
Managed the EA for three proposed Briery Mountain Training Area ranges which include a Live Fire Breach Facility (LFBF), Hand Grenade Familiarization Range, and an Urban Assault Course (UAC). Coordinated with WVARNG to evaluate potential constraints, such as stream impacts, and to avoid and minimize environmental impacts.

Water Resources Management Plan, Camp Dawson, West Virginia.
Project Manager. Managed the preparation of a water resources management plan for the West Virginia Army National Guard for Camp Dawson (approximately 3,797 acres). Assessed current availability of data regarding Camp Dawson water resources including the Cheat River, streams and numerous tributaries. Conducted site visits and recommended management goals for surface water, wetlands, floodplains, and groundwater resources.

Environmental Assessment for Integrated Natural Resources Management Plan (INRMP) Updates, Marseilles Training Area (MTA), Illinois.
Managed EA for 2,850-acre MTA INRMP. Worked closely with Illinois Army National Guard and Illinois Department of Natural Resources, joint owners of the MTA. The EA evaluated potential environmental impacts of the plans for managing land, forest, aquatic and terrestrial habitat, special areas, fish and wildlife, rare species, pest control, and fire. The project allowed the ILARNG to remain in compliance with Army policy and other federal, state, and local laws and regulations, and to provide for no net loss in the capability of lands to support the military mission. Also, evaluated training plan for the construction and operation of ranges and other training facilities. Covered 15 proposed projects including range expansions, new ranges, live-fire breach facility, anti-tank range, grenade launcher range relocation, live fire shoot house, training support facility development projects, and training area maintenance projects.

Integrated Natural Resource Management Plans (INRMPs), Environmental Assessments and an Endangered Species Management Plan (ESMP), Camp Crowder and Camp Clark Training Sites, MOARNG, Newton and Vernon Counties, Missouri.
Assistant Project Manager. Responsible for preparing two INRMPs and EAs for Camp Crowder and Camp Clark, which are comprised of 4,300 acres and 1,287 acres, respectively. Management Plans revised in this INRMP included land use, forest, aquatic and terrestrial species, special natural areas, fish and wildlife, rare species, pests, and fire.

Joint Land Use Study (JLUS), Camp Atterbury and Muscatatuck Urban Training Center (MUTC) | Bartholomew, Brown, Jennings, and Johnson Counties, Indiana.
Author and Technical Reviewer. Helped prepare the Camp Atterbury and MUTC JLUS, which is a cooperative land use planning effort by communities and military installations to jointly ensure future compatible development. The JLUS involved four south-central Indiana counties; several cities/towns, such as Columbus, Edinburgh, and North Vernon; economic development and regulatory agencies; and the two military installations. After extensive public involvement activities, the JLUS identified compatible land use and growth management guidelines and recommendations, which are now being implemented.

Recreation
Environmental Assessment for Sports Park, Elizabethtown, Kentucky.
For the City of Elizabethtown, conducted environmental studies and prepared permit applications for a proposed 200-acre sports complex that includes soccer fields, baseball fields, basketball courts, tennis courts, and hiking trails. Worked with the designer to minimize impacts to environmental resources by shifting trails and parking areas. Managed wetlands delineations, archaeological surveys, Phase I environmental site assessment, and a threatened and endangered species habitat survey. Worked with the USFWS on mitigation for potential impacts to the federally endangered Indiana bat.

Noise Studies for World Shooting and Recreational Complex, Sparta, Illinois – For the Illinois Department of Natural Resources, managed the preparation of noise studies for the development of a 1,600 acre shooting complex in Sparta, Illinois. Environmental assessment was prepared on an expedited schedule so that the Grand American Trapshooting Championships could be held at the complex opening. Evaluated potential noise impacts on adjacent property owners and recommended use of berms to minimize impacts. The site includes 120 trap shooting fields covering 3.5 miles, 24 skeet fields, 2 courses for sporting clays, and archery fields.

Town Branch Trail Environmental Education Sign Project – Using a Kentucky Fish and Wildlife Resources grant, prepared environmental education signs and booklet on fourteen topics associated with Town Branch Creek and its environmental context. The role of water in the environment is a main focus of the project, along with raising awareness about human impacts on ecosystems and ways to reduce those impacts. An exhibit and outreach materials were developed. The environmental sign project exhibit was on display at the state wildlife center for two months. The exhibit has also been displayed at libraries, schools, and the Children's science center. Environmental education signs have been fabricated and placed along the completed sections of the Town Branch Trail.

Environmental Studies for Isaac Murphy Park Development, Lexington, KY. Provided technical oversight of the environmental and cultural resource studies for the Isaac Murphy Memorial Art Garden Project in downtown Lexington. Participated in public archaeology events to promote park and understanding of neighbourhood history. Due to minority and low-income neighbourhoods, environmental justice was a concern.

Southwest Jefferson County Greenways, Louisville Metro Parks Department, Louisville. Supported Louisville Metro Parks Department develop a master plan to create greenways in southwest Jefferson County which will include shared use trails. The study area covers approximately 97 square miles or a quarter of Jefferson County. Identified ways to include cultural resources into the planning process such as historic properties to be destinations or waypoints for the education and benefit of trail users or archaeological sites to avoid. Provided technical review of draft documents and outreach materials.

Pipelines

206-Mile Lobos CO2 Pipeline Project, Kinder Morgan, New Mexico and Arizona.
Assistant ecological team lead supporting wetland and waters of the U.S. delineation, threatened and endangered species studies, and vegetation / habitat assessments in support of permitting for a proposed 206-mile CO2 pipeline to be used in enhanced oil recovery process. Technical reviewer of draft Bureau of Land Management (BLM) plan of development and supporting ecological and cultural documents. Agency coordination includes the BLM, USACE, USFWS, Native American Nations, and state and local regulatory agencies from Arizona and New Mexico.

Cortez Loop Pipeline Extension, Kinder Morgan, New Mexico.
Assistant ecological team lead for 40-mile pipeline extension, four new pump stations and other associated facilities. Ecological, paleontological resources, and cultural resource studies were undertaken for this proposed pipeline extension. Access roads and potential compressor stations and temporary storage areas were evaluated. Agency coordination included the Bureau of Land Management, United States Army Corps of Engineers, United States Fish and Wildlife Service, and state and local regulatory agencies.

Supplemental Environmental Assessment for Relocation of a Petroleum Products Pipeline, CSX Transportation, Virginia.
Project manager for developing a supplemental environmental assessment for relocation of a 24-inch petroleum product pipeline due to the addition of 11 miles of a third railroad track. Approximately 3.0 miles of horizontal directional drilling occurred to reduce potential construction impacts to utilities, roads, water bodies and wetlands. Permitting, endangered species and floodplain issues were concerns, and required coordination with local, state, and federal regulatory agencies.

Sparrows Point Liquified Natural Gas (LNG) Terminal and Pipeline Project, Maryland and Pennsylvania.
Technical reviewer of cultural resource sections for FERC EIS for LNG facility and 88-mile pipeline. Acted as the third-party consultant to FERC for the preparation of National Environmental Policy Act (NEPA) compliant documents (the Draft Environmental Impact Statement [DEIS] and the Final EIS) for the LNG facility and related pipelines. The terminal is proposed for Sparrows Point, southeast of Baltimore in Baltimore County, MD and will can unload LNG ships, storing up to 480,000 cubic meters of LNG, vaporizing the LNG, and sending out the natural gas.

Environmental Documentation for Water Pipeline, Bowling Green, Kentucky.
Project Manager for environmental studies and documentation for a 10-mile water pipeline for the Transpark Industrial Development. Oversaw cultural resources, wetlands, socioeconomic, hazardous materials, karst, and threatened and endangered species investigations. Cumulative impacts were an issue because of potential impacts of future industrial growth in the area and karst terrain. Permitting and mitigation were concerns due to potential impacts to Mammoth Caves National Park. Public involvement was a key component due to citizen advocacy groups.

Dams and Levees

NRCS Upper Walnut Creek FRD No. 6 and FRD No. 21, Butler County, Kansas.
NEPA Manager for two dam rehabilitation projects, prepared environmental assessments. The projects purposes are to rehabilitate FRD 6 and FRD 21 to meet safety and performance standards for high hazard dams and provide flood water protection to downstream areas. The EAs included the NRCS environmental evaluation worksheet and discussions of threatened and endangered species, wetlands, environmental justice, economic and social conditions, and cultural resources.

NRCS Pine Creek Dam Rehabilitation EA, Oneida, Tennessee.
Technical Reviewer. Supported Pine Creek Dam rehabilitation EA and archaeological and architectural historic surveys. The EA included the NRCS environmental evaluation worksheet and discussions of threatened and endangered species, wetlands, environmental justice, economic and social conditions, and cultural resources. This multi-purpose dam and reservoir project serves as flood control and as the town's primary water supply.

Environmental Impact Statements (EISs) for Two Flood Damage Reduction Projects (Levisa Fork Watershed Section 202 Program), Floyd and Pike Counties, KY.
For the USACE-Huntington District, Project Manager for the preparation of sections for the structural and nonstructural flood damage reduction measures EISs in Floyd and Pike Counties, KY. Major issues included community impacts, environmental justice, cultural resources and terrestrial and aquatic mitigation. Identified concerns about the potential for residential and business relocation, impacts to property values, loss of community cohesion, the potential for induced flooding, hardships from raising residences, impacts to habitat for the Indiana bat, potential loss of tributary streams, and the potential impact of floodwall construction on the riparian corridor. Extensive agency coordination required.

EIS for Flood Damage Reduction, Pike County, Kentucky, Levisa Fork Watershed Section 202 Program. Supported development of Draft EIS assessing impacts of flood damage reduction alternatives within the Levisa Fork Watershed in Pike County, Kentucky for the USACE, Huntington District. Project alternatives include structural and non-structural components. Reviewed Habitat Assessment Procedure (HEP) analysis for terrestrial impacts and a stream assessment for tributaries. Major issues included community impacts, cultural resources, and terrestrial and aquatic mitigation. Project required extensive coordination with U.S. Fish and Wildlife.

Muddy Fork Conservancy District Supplemental EIS, Borden, Indiana.
A Supplemental EIS is being prepared for a new dam to provide additional municipal water supplies, control flooding, and create recreational opportunities. Early steps including reviewing technical and environmental studies to determine data gaps and areas for update. A review of the 1992 FEIS determined that a Supplemental EIS is necessary. Water supply studies were evaluated and revised in coordination with the water utility. The purpose and need section was expanded to include recreational opportunities for the reservoir.

Transmission Lines

Herleman to Meredosia Transmission Line, Ameren, Illinois.
Provided environmental planning support for the proposed 48-mile 345-kV overhead electric transmission line which crosses several named streams including the Illinois River. The Herleman to Meredosia line is part of Ameren's 330-mile Illinois Rivers Transmission Line initiative stretching from Palmyra, Missouri to the Illinois/Indiana state line. Supporting the development of a Conservation Plan in accordance with the Illinois Department of Natural Resources (IDNR) requirements for state-listed threatened and endangered species.

Meredosia to IpavaTransmission Line, Ameren, Illinois.
Provided environmental planning support for the Meredosia to Ipava Transmission Line, Ameren, Illinois. The Meredosia to Ipava line is part of Ameren's 330-mile Illinois Rivers Transmission Line initiative stretching from Palmyra, Missouri to the Illinois/Indiana state line. Supporting the development of a Conservation Plan in accordance with the Illinois Department of Natural Resources (IDNR) requirements for state-listed T&E species.

Maywood to Herleman Transmission Line, Ameren, Missouri and Illinois.
Provided environmental planning support for a proposed 345-kV electric transmission line crossing of the Mississippi River on federal property near Quincy, Illinois. The Maywood to Herlemen line is part of Ameren's 330-mile Illinois Rivers Transmission Line initiative stretching from Palmyra, Missouri to the Illinois/Indiana state line. Supporting the development of a Conservation Plan in accordance with the Illinois Department of Natural Resources (IDNR) requirements for state-listed threatened and endangered species.

United States Nuclear Regulatory Commission
Nuclear Reactor Operator Examination and Licensing Study, Multiple States. For the U.S. Nuclear Regulatory Commission, conducted a study of the reactor operator examination and licensing function. Reviewed information collected from 300 written questionnaires. Conducted personal interviews with reactor operators, senior reactor operators, training managers, and plant technical managers at multiple nuclear power facilities, and NRC regional offices.

Bell Bend Nuclear Power Plant Third Party EIS for Nuclear Regulatory Commission, Pennsylvania.
As a Senior Planner, prepared Third Party EIS sections for the Nuclear Regulatory Commission on land use, transmission lines, cultural resources, cooling tower, and cumulative impacts for a new reactor at the Bell Bend Nuclear Power Plant. Conducted site visits and interviews to evaluate existing and changes in land use resulting from the addition of a new reactor and changes to transmission lines. Reviewed the Environmental Report and prepared requests for additional information (RAIs) concerning potential data gaps.

Victoria Station Nuclear Power Plant Third Party EIS for Nuclear Regulatory Commission, Texas.
Senior planner developing land use, transmission line, cultural resource, and cumulative impact sections of a Third Party EIS for the proposed Victoria Station Nuclear Power Plant Project. Evaluated sections of the ER and prepared RAIs. Evaluated existing and changes in land use resulting from the facility and transmission lines.

Environmental Report, Confidential Client, Nuclear License Application Project, Michigan.
Technical reviewer of Socioeconomic sections of the ER for a new medical isotope production facility in the central US. This work is in accordance with the provisions of NUREG 1537 and related laws and regulations and entails the documentation of all socioeconomic baseline characteristics of the project site and vicinity.

Utilities
Electric Power Industry Waste Reduction Activities – For USEPA's WasteWise program, analyzed waste reduction activities at utility generating stations, distribution and transmission facilities, and recovery and warehouse operations, including PG&E facilities. Worked with the Edison Electric Institute to select utilities to profile for waste reduction and recycling activities. Conducted site visits to power plants in 6 states. Profiled PG&E's waste reduction activities at generating stations and distribution facilities; Investment Recovery and Warehouse locations, Fleet Maintenance; and General Office facilities. Life cycle cost analysis, solid waste consulting, employee and public education activities, and measurement

criteria were considered. Developed the Waste Reduction Activities of Selected WasteWise Partners: Electric Power Industry report.

Report to Congress on Fossil Fuel Combustion Waste – Supported USEPA in developing a Report to Congress on Fossil Fuel Combustion Waste. Worked on the technical studies concerning waste characterization, potential damage cases, risk analysis, and groundwater impacts. Evaluated existing federal and state regulatory requirements and cross media impacts of fossil fuel combustion wastes.

Guide for Industrial Nonhazardous Waste Management – For USEPA, helped develop the guide for the management of industrial nonhazardous waste management. The guidance applied to waste managed in surface impoundments, landfills, and land application areas. Worked with the Edison Electric Institute and the Electric Power Research Institute (EPRI) to consider impacts of the guidance on the electric utility industry.

United States Housing and Urban Development

United States Housing and Urban Development Task Force Report on Lead-Based Paint (LBP) Hazard Reduction and Financing. Washington, D.C. For the United States Department of Housing and Urban Development and the United States Environmental Protection Agency, provided support to the Task Force concerning the impacts of liability on LBP hazard reduction and victim compensation. Helped to draft a report and recommendations on reducing LBP hazards to children. Evaluated state requirements for LBP hazard reduction, management of lead-based paint contaminated debris, and state liability standards.

Draft Environmental Assessment for the Museum Plaza High-Rise and Parking Garage, Louisville, Kentucky. Project manager overseeing environmental studies and preparation of an environmental assessment for the proposed Museum Plaza, a new multi-use development in downtown Louisville. The proposed project would consist of a 1.5-million-square-foot, 62-story building containing residential units, office space, a non-profit contemporary art museum, two hotels, and the University of Louisville Master of Fine Arts program, as well as a portion of the university's graduate business school. Floodplain and cultural resource issues were potential concerns. A Housing and Urban Development (HUD) grant is anticipated to help support this project and the National Environmental Policy Act (NEPA) documentation is being prepared to comply with HUD's requirements under 24 Code of Federal Regulations (CFR) 58.

Other Private Clients

Assessment of Visual, Auditory, and Lighting Effects of RiverPark Place Development on Cultural Resources, Private Client, Louisville, Kentucky.

On an accelerated schedule for a private developer, managed the assessment of potential visual, auditory, and lighting impacts from the waterfront development project on cultural historic resources. The project covered a one-mile Area of Potential Effect (APE) in Kentucky and Indiana. The development will include two 16-story structures surrounded by four 5-story structures for residential/commercial use. Two historic sites and part of a historic district will be adversely visually impacted by the proposed construction. Two historic sites also will be adversely affected by temporary construction noise and noise associated with increased vehicular or watercraft traffic. Worked with Kentucky Heritage Council to prepare an MOA for the project.

Environmental Overview and Phase I ESA for a Proposed Commercial Development, Frankfort, KY.

For a private developer, managed the preparation of a Phase I ESA, environmental overview, wetlands delineation, and an archaeological overview of a 100-acre site near I-64. The site contained an auto body shop and farmland that were evaluated for potential recognized environmental conditions. Coordinated with the Kentucky Transportation Cabinet concerning developing a new access point on US127. Held discussions with City of Frankfort planners concerning requirements for site development.

Jefferson Commons, Outer Loop, Louisville, Kentucky.
For a private client, successfully obtained a Section 404 permit on a fast time schedule and managed the wetlands delineation and Phase I archaeological investigation for a development project along the Outer Loop in Louisville, Kentucky. Due to wetland and stream impacts, credits were obtained from a wetlands bank.

Fisherman's Energy Atlantic City Windfarm, New Jersey. Technical reviewer for cultural resource concerns related to National Historic Landmark Lucy the Elephant. Helped evaluate potential visual impacts of offshore wind turbines on listed National Register of Historic Resource. Helped coordinate with New Jersey State Historic Preservation Office (SHPO) on study needed to determine project would not adversely affect historic resources.

Electric Power Research Institute Bat Mitigation Alternative Manual, Nationwide. For the Electric Power Research Institute, developing a manual to evaluate mitigation alternatives, such as habitat enhancements, artificial roosts, conservation areas and banks, in lieu fee programs, and wetland creation for threatened and endangered bat species affected by utility operations, maintenance, and project activities. Evaluated information from government, non-profit, and commercial resources to identify compensatory mitigation alternatives. Analyzed peer-reviewed literature, data from bat working groups, and communications with regulators and other bat experts. The manual will quickly inform utilities about bat mitigation opportunities using graphic summaries, tables, decision trees, and case studies. As part of the project, developed user-friendly bat fact sheets for distribution to utility clients.

EXHIBIT 12
ATTACHMENT 12.6

Kirkland Appraisals, LLC

Richard C. Kirkland, Jr., MAI
9408 Northfield Court
Raleigh, North Carolina 27603
Phone (919) 414-8142
rkirkland2@gmail.com
www.kirklandappraisals.com

April 11, 2021

Mr. Chris Killenberg
Regional Development Director
Community Energy Solar, LLC
P.O. Box 17236
Chapel Hill, NC 27516

RE: McCracken County Solar Project – Property Value Impact Study

Mr. Killenberg

At your request, I have considered the impact of a solar farm proposed to be constructed on approximately 615 acres of land located along New Liberty Church Road, Grahamville, McCracken County, Kentucky. Specifically, I have been asked to give my professional opinion on whether the proposed solar farm will have any impact on adjoining property value.

To form an opinion on these issues, I have researched and visited existing and 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. I have not been asked to assign any value to any specific property.

This letter is a limited report of a real property appraisal consulting assignment and subject to the limiting conditions attached to this letter. My client is Community Energy Solar, LLC, represented to me by Mr. Chris Killenberg. The effective date of this consultation is April 11, 2021.

While based in NC, I am also a Kentucky State Certified General Appraiser #5522.

Conclusion

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 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 criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all indicate that a solar farm is a compatible use for rural/residential transition areas and that it would function in a harmonious manner with this area.

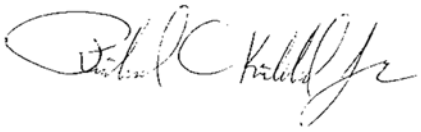
Data from the university studies, broker commentary, and other appraisal studies support a finding of no impact on property value adjoining a solar farm with proper setbacks and landscaped buffers.

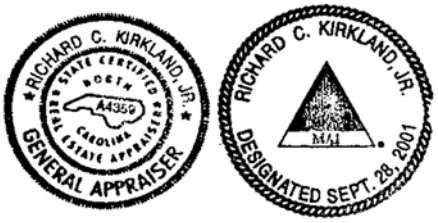
Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial negative effect to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved with adjoining agricultural uses, schools, churches, and residential developments.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting properties and that the proposed use is in harmony with the area in which it is located. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it's quiet, and there is minimal traffic.

If you have any further questions please contact me.

Sincerely,





Richard C. Kirkland, Jr., MAI
Kentucky Certified General Appraiser #5522

I. Proposed Project and Adjoining Uses

Proposed Use Description

This solar farm is proposed to be constructed on 615 acres of land located along New Liberty Church Road, Grahamville, McCracken County, Kentucky. Adjoining land is a mix of residential and agricultural uses, which is very typical of solar farm sites as well as a large industrial site, which is atypical. This large industrial site is operated by United States Enrichment Corporation (USEC) which contracts with the United States Department of Energy to produce enriched uranium for use in nuclear power plants. This tract is oversized compared to the other tracts in the area at 3,981 acres. Other than that use, the area is mostly agricultural and residential.

Adjoining Properties

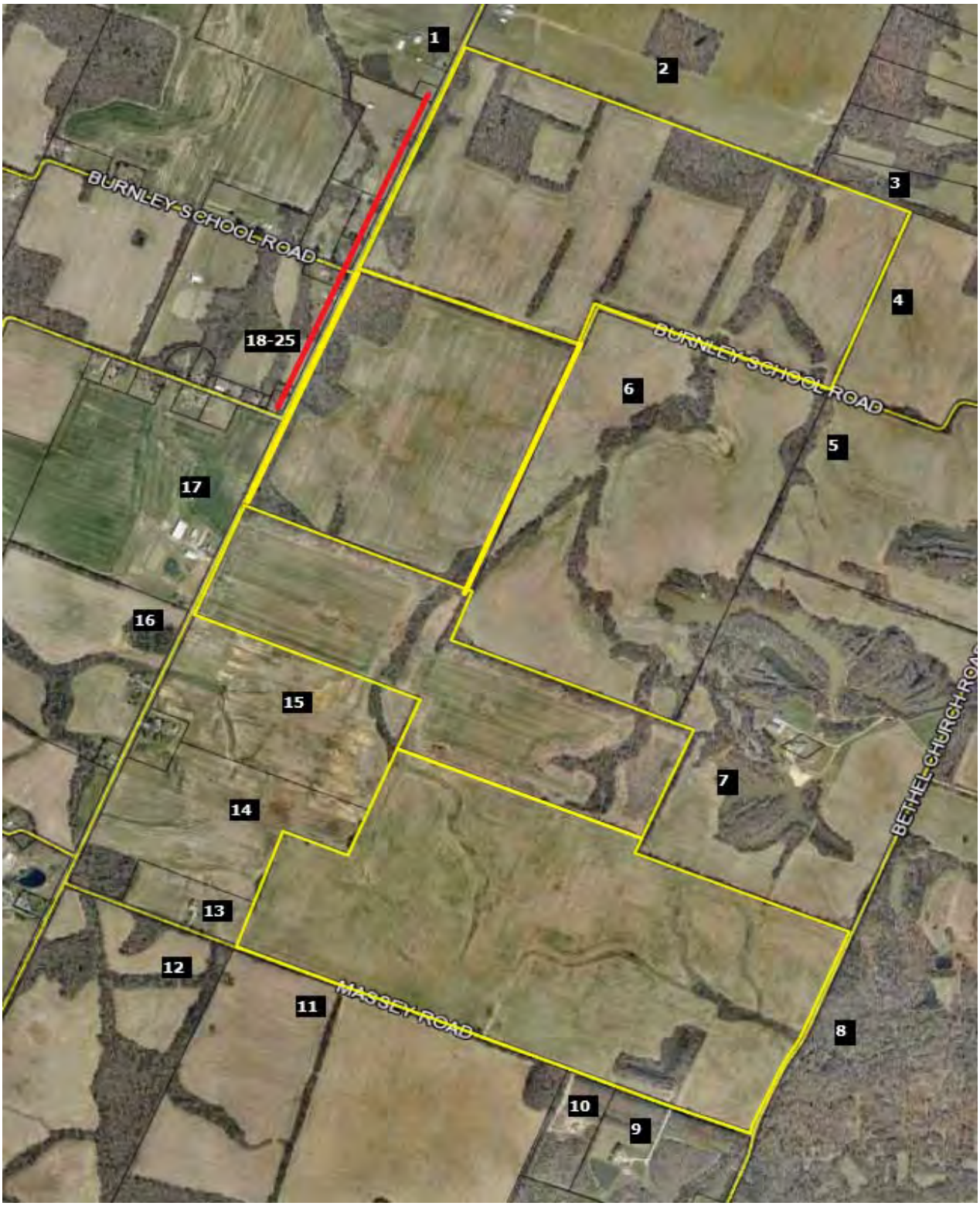
I have considered adjoining uses and included a map to identify each parcel's location. The closest adjoining home will be 530 feet from the closest solar panel and the average distance to adjoining homes will be 860 feet to the nearest solar panel. Matched pair data presented later in this report shows no impact on home values as close as 105 feet when reasonable visual buffers are provided.

The breakdown of those uses by acreage and number of parcels is summarized below. The impact of the one oversized industrial facility is shown in the difference in percentage of adjoining uses by acre and by parcel.

Adjoining Use Breakdown

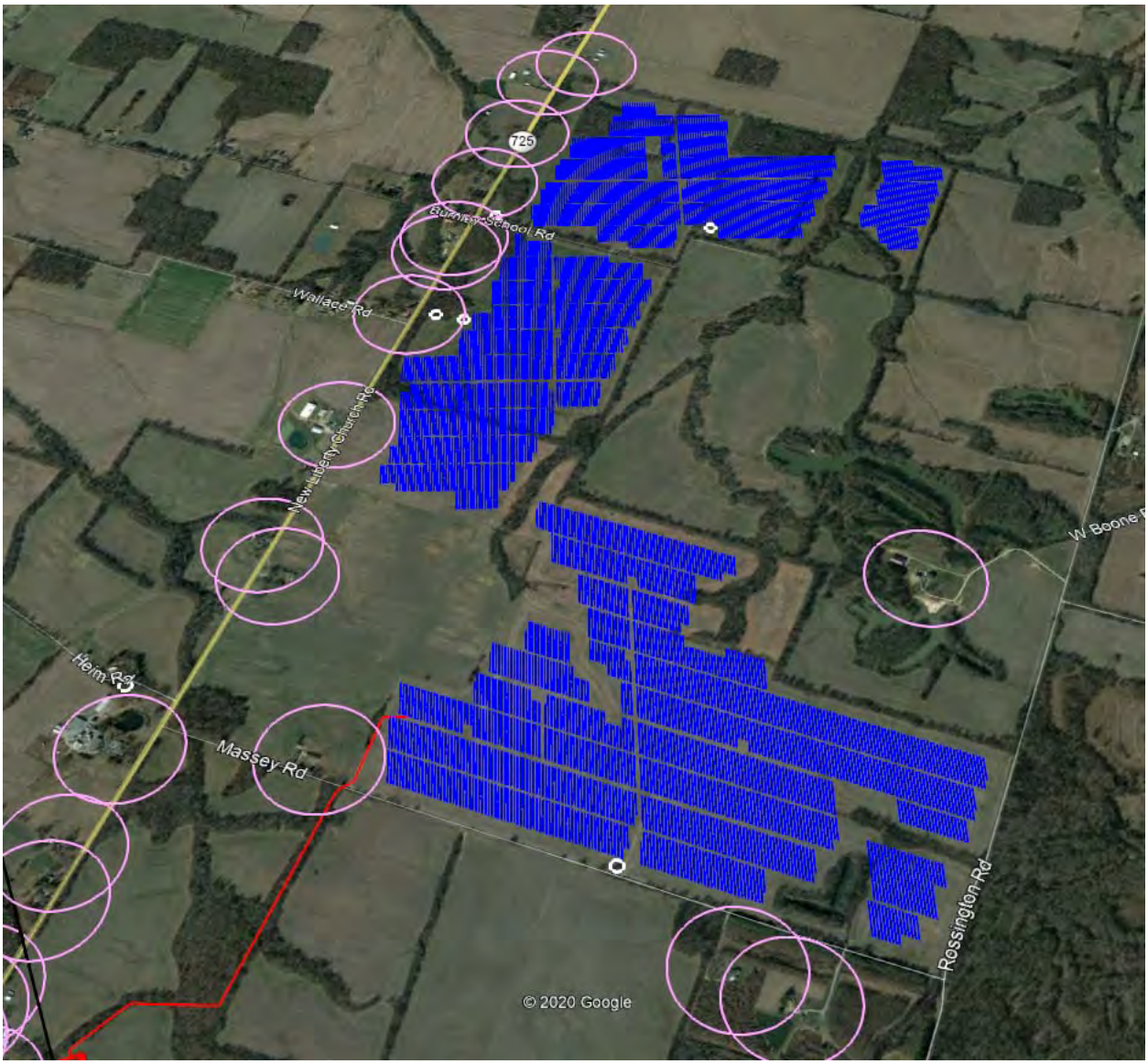
	Acreage	**Parcels**
Residential	0.73%	36.00%
Agricultural	12.77%	24.00%
Agri/Res	12.63%	36.00%
Industrial	73.88%	4.00%
Total	**100.00%**	**100.00%**

Tax Parcel Map



Maximum Potential Layout of Panels Shown in Blue

Adjoining Homes Shown with 500 ft Radius with No Panels that Close



Surrounding Uses

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	Distance (ft) Home/Panel
1	012-00-00-043	Burnett	82.65	Agri/Res	1.53%	4.00%	815
2	020-00-00-016	Gibson	150.65	Agri/Res	2.80%	4.00%	715
3	020-00-00-020.06	Unknown	26.70	Agricultural	0.50%	4.00%	N/A
4	020-00-00-018.01	Warford	77.00	Agri/Res	1.43%	4.00%	N/A
5	021-00-00-002	Boldry Trust	86.60	Agri/Res	1.61%	4.00%	N/A
6	021-00-00-001	Sullivan	154.79	Agricultural	2.87%	4.00%	N/A
7	021-00-00-006	Boldry Trust	140.74	Agricultural	2.61%	4.00%	N/A
8	053-00-00-001.02	Dept of Energy	3981.00	Industrial	73.88%	4.00%	N/A
9	021-00-00-008	Robinson	24.84	Agri/Res	0.46%	4.00%	770
10	021-00-00-008.02	Evans	10.32	Residential	0.19%	4.00%	660
11	013-00-00-035	Rice	266.60	Agricultural	4.95%	4.00%	N/A
12	013-00-00-032.01	Davis	100.36	Agri/Res	1.86%	4.00%	3,260
13	013-00-00-029.01	Bobo	10.01	Residential	0.19%	4.00%	530
14	013-00-00-029	Bobo	48.11	Agricultural	0.89%	4.00%	N/A
15	013-00-00-027	Sullivan	50.95	Agricultural	0.95%	4.00%	N/A
16	013-00-00-022	Sullivan	54.00	Agri/Res	1.00%	4.00%	1,130
17	013-00-00-023	Simmons	65.36	Agri/Res	1.21%	4.00%	535
18	012-00-00-017	Lampkin	0.66	Residential	0.01%	4.00%	530
19	012-00-00-015	Lampkin	0.25	Residential	0.00%	4.00%	N/A
20	012-00-00-014	Tisdale	39.00	Agri/Res	0.72%	4.00%	530
21	012-00-00-014.01	Liner	1.25	Residential	0.02%	4.00%	630
22	012-00-00-047	Liner	1.18	Residential	0.02%	4.00%	N/A
23	012-00-00-046	Liner	2.04	Residential	0.04%	4.00%	540
24	012-00-00-045	Sullivan	12.80	Residential	0.24%	4.00%	540
25	012-00-00-044	Burnett	0.60	Residential	0.01%	4.00%	N/A
		Total	**5388.458**		**100.00%**	**100.00%**	860

II. Methodology and Discussion of Issues

Standards and Methodology

I conducted this analysis using the standards and practices established by the Appraisal Institute and that conform to the Uniform Standards of Professional Appraisal Practice. The analyses and methodologies contained in this report are accepted by all major lending institutions, and they are used in Kentucky and across the country as the industry standard by certified appraisers conducting appraisals, market analyses, or impact studies and are considered adequate to form an opinion of the impact of a land use on neighboring properties. These standards and practices have also been accepted by the courts at the trial and appellate levels and by federal courts throughout the country as adequate to reach conclusions about the likely impact a use will have on adjoining or abutting properties.

The aforementioned standards compare property uses in the same market and generally within the same calendar year so that fluctuating markets do not alter study results. Although these standards do not require a linear study that examines adjoining property values before and after a new use (e.g. a solar farm) is developed, some of these studies do in fact employ this type of analysis. Comparative studies, as used in this report, are considered an industry standard.

The type of analysis employed is a Matched Pair Analysis or Paired Sales Analysis. This methodology is outlined in **The Appraisal of Real Estate**, Twelfth Edition by the Appraisal Institute pages 438-439. It is further detailed in **Real Estate Damages**, Third Edition, pages 33-36 by Randall Bell PhD, MAI. Paired sales analysis is used to support adjustments in appraisal work for factors ranging from the impact of having a garage, golf course view, or additional bedrooms. It is an 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. Dr. Bell describes it as comparing a test area to control areas. In the example provided by Dr. Bell he shows five paired sales in the test area compared to 1 to 3 sales in the control areas to determine a difference. I have used 3 sales in the control areas in my analysis for each sale developed into a matched pair.

Determining what is an External Obsolescence

An external obsolescence is a use of property that, because of its characteristics, might have a negative impact on the value of adjacent or nearby properties because of identifiable impacts. Determining whether a use would be considered an external obsolescence requires a study that isolates that use, eliminates any other causing factors, and then studies the sales of nearby versus distant comparable properties. The presence of one or a combination of key factors does not mean the use will be an external obsolescence, but a combination of these factors tend to be present when market data reflects that a use is an external obsolescence.

External obsolescence is evaluated by appraisers based on several factors. These factors include but are not limited to:

1) Traffic. Solar Farms are not traffic generators.

2) Odor. Solar farms do not produce odor.

3) Noise. Solar farms generate no noise concerns and are silent at night.

4) Environmental. Solar farms do not produce toxic or hazardous waste. Grass is maintained underneath the panels so there is minimal impervious surface area.

5) Appearance/Viewshed. This is the 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. Furthermore, any consideration of appearance of viewshed impacts has to be considered in comparison with currently allowed uses on that site. For example if a residential subdivision is already an allowed use, the question becomes in what way does the appearance impact adjoining property owners above and beyond the appearance of that allowed subdivision or other similar allowed uses.

6) Other factors. I have observed and studied many solar farms and have never observed any characteristic about such facilities that prevents or impedes neighbors from fully using their homes or farms or businesses for the use intended.

Relative Solar Farm Sizes

Solar farms have been increasing in size in recent years. Much of the data collected is from existing, older solar farms of smaller size, but there are numerous examples of sales adjoining 75 to 80 MW facilities that show a similar trend as the smaller solar farms. This is understandable given that the primary concern relative to a solar farm is the appearance or view of the solar farm, which is typically addressed through setbacks and landscaping buffers. The relevance of data from smaller solar farms to larger solar farms is due to the primary question being one of appearance. IF the solar farm is properly screened, then little of the solar farm would be seen from adjoining property regardless of how many acres are involved.

Larger solar farms are often set up in sections where any adjoining owner would only be able to see a small section of the project even if there were no landscaping screen. Once a landscaping screen is in place, the primary view is effectively the same whether you adjoining a 5 MW, 20 MW or 100 MW facility.

I have split out the data for the matched pairs adjoining larger solar farms only to illustrate the similarities later in this report.

Steps Involved in the Analysis

The paired sales analysis employed in this report follows the following process:

1. Identify sales of property adjoining existing solar farms.
2. Compare those sales to similar property that does not adjoin an existing solar farm.
3. Confirmation of sales are noted in the analysis write ups.
4. Distances from the homes to panels are included as a measure of the setbacks.
5. Topographic differences across the solar farms themselves are likewise noted along with demographic data for comparing similar areas.

There are a number of Sale/Resale comparables included in the write ups, but most of the data shown is for sales of homes after a solar farm has been announced (where noted) or after a solar farm has been constructed.

III. Research on Solar Farms

A. Appraisal Market Studies

I have also considered a number of impact studies completed by other appraisers as detailed below.

CohnReznick – Property Value Impact Study: Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Facilities

Patricia McGarr, MAI, CRE, FRICS, CRA and Andrew R. Lines, MAI with CohnReznick completed an impact study for a proposed solar farm in Cheboygan County, Michigan completed on June 10, 2020. I am familiar with this study as well as a number of similar such studies completed by CohnReznick. I have not included all of these studies but I submit this one as representative of those studies.

This study addresses impacts on value from eight different solar farms in Michgian, Minnesota, Indina, Illinois, Virginia and North Carolina. These solar farms are 19.6 MW, 100 MW, 11.9 MW, 23 MW, 71 MW, 61 MW, 40 MW, and 19 MW for a range from 11.9 MW to 100 MW with an average of 31 MW and a median of 31.5 MW. 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.

The conclusion of this study is 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.

Christian P. Kaila & Associates – Property Impact Analysis – Proposed Solar Power Plant Guthrie Road, Stuarts Draft, Augusta County, Virginia

Christian P. Kaila, MAI, SRA and George J. Finley, MAI developed an impact study as referenced above dated June 16, 2020. This was for a proposed 83 MW facility on 886 acres.

Mr. Kaila interviewed appraisers who had conducted studies and reviewed university studies and discussed the comparable impacts of other development that was allowed in the area for a comparative analysis of other impacts that could impact viewshed based on existing allowed uses for the site. He also discussed in detail the various other impacts that could cause a negative impact and how solar farms do not have such characteristics.

Mr. Kaila also interviewed County Planners and Real Estate Assessor's in eight different Virginia counties with none of the assessor's identifying any negative impacts observed for existing solar projects.

Mr. Kaila concludes on a finding of no impact on property values adjoining the indicated solar farm.

Fred Beck, MAI, CCIM – Impact Analysis in Lincoln County 2013

Mr. Fred Beck, MAI, CCIM completed an impact analysis in 2013 for a proposed solar farm that concluded on a negative impact on value. That report relied on a single cancelled contract for an adjoining parcel where the contracted buyers indicated that the solar farm was the reason for the cancellation. It also relied on the activities of an assessment impact that was applied in a nearby county.

Mr. Beck was interviewed as part of the Christian Kalia study noted above. From that I quote "Mr. Beck concluded on no effect on moderate priced homes, and only a 5% change in his limited research of higher priced homes. His one sale that fell through is hardly a reliable sample. It also was misleading on Mr. Beck's part to report the lower re-assessments since the primary cause of the

re-assesments were based on the County Official, who lived adjacent to the solar farm, appeal to the assessor for reductions with his own home." In that Clay County Case study the noted lack of lot sales after announcement of the solar farm also coincided with the recession in 2008/2009 and lack of lot sales effectively defined that area during that time.

I further note, that I was present at the hearing where Mr. Beck presented these findings and the predominance of his argument before the Lincoln County Board of Commissioner's was based on the one cancelled sale as well as a matched pair analysis of high-end homes adjoining a four-story call center. He hypothesized that a similar impact from that example could be compared to being adjacent solar farm without explaining the significant difference in view, setbacks, landscaping, traffic, light, and noise. Furthermore, Mr. Beck did have matched pairs adjoining a solar farm in his study that he put in the back of his report and then ignored as they showed no impact on property value.

Also noted in the Christian Kalia interview notes is a response from Mr. Beck indicating that in his opinion "the homes were higher priced homes and had full view of the solar farm." Based on a description of screening so that "the solar farm would not be in full view to adjoining property owners. Mr. Beck said in that case, he would not see any drop in property value."

NorthStar Appraisal Company – Impact Analysis for Nichomus Run Solar, Pilesgrove, NJ, September 16, 2020

Mr. William J. Sapio, MAI with NorthStar Appraisal Company considered a matched pair analysis for the potential impact on adjoining property values to this proposed 150 MW solar farm. Mr. Sapio considered sales activity in a subdivision known as Point of Woods in South Brunswick Township and identified two recent new homes that were constructed and sold adjoining a 13 MW solar farm and compared them to similar homes in that subdivision that did not adjoin the solar farm. These homes sold in the $1,290,450 to $1,336,613 price range and these homes were roughly 200 feet from the closest solar panel.

Based on this analysis, he concluded that the adjoining solar farm had no impact on adjoining property value.

Conclusion of Impact Studies

Of the four studies noted two included actual sales data to derive an opinion of no impact on value. The only study to conclude on a negative impact was the Fred Beck study based on no actual sales data, and he has since indicated that with landscaping screens he would not conclude on a negative impact.

I have relied on these studies as additional support for the findings in this impact analysis.

B. Articles

I have also considered a number of articles on this subject as well as conclusions and analysis as noted below.

Farm Journal Guest Editor, March 22, 2021 – Solar's Impact on Rural Property Values

Andy Ames, ASFMRA (American Society of Farm Managers and Rural Appraisers) published this article that includes a discussion of his survey of appraisers and studies on the question of property value related to solar farms. He discusses the university studies that I have cited as well as Patricia McGarr, MAI.

He also discusses the findings of Donald A. Fisher, ARA, who served six years at the Chair of the ASFMRA's National Appraisal Review Committee. He is also the Executive Vice President of the CNY

Pomeroy Appraiser and has conducted several market studies on solar farms and property impact. He is quoted in the article as saying, "Most of the locations were in either suburban or rural areas, and all of those studies found either a neutral impact, or ironically, a positive impact, where values on properties after installation of solar farms went up higher than time trends."

Howard Halderman, AFM, President and CEO of Halderman Real Estate and Farm Management attended the ASFMRA solar talk hosted by the Indiana Chapter of the ASFMRA and he concludes that other rural properties would likely see no impact and farmers and landowners shown even consider possible benefits. "In some cases, farmers who rent land to a solar company will insure the viability of their farming operation for a longer time period. This makes them better long-term tenants or land buyers so one can argue that higher rents and land values will follow due to the positive impact the solar leases offer."

National Renewable Energy Laboratory – Top Five Large-Scale Solar Myths, February 3, 2016

Megan Day reports form NREL regarding a number of concerns neighbors often express. Myth #4 regarding property value impacts addresses specifically the numerous studies on wind farms that show no impact on property value and that solar farms have a significantly reduced visual impact from wind farms. She highlights that the appearance can be addressed through mitigation measures to reduce visual impacts of solar farms through vegetative screening. Such mitigations are not available to wind farms given the height of the windmills and again, those studies show no impact on value adjoining wind farms.

North Carolina State University: NC Clean Energy Technology Center White Paper: Balancing Agricultural Productivity with Ground-Based Solar Photovoltaic (PV) Development (Version 2), May 2019

Tommy Cleveland and David Sarkisian wrote a white paper for NCSU NC Clean Energy Technology Center regarding the potential impacts to agricultural productivity from a solar farm use. I have interviewed Tommy Cleveland on numerous occasions and I have also heard him speak on these issues at length as well. He addresses many of the common questions regarding how solar farms work and a detailed explanation of how solar farms do not cause significant impacts on the soils, erosion and other such concerns. This is a heavily researched paper with the references included.

North Carolina State University: NC Clean Energy Technology Center White Paper: Health and Safety Impacts of Solar Photovoltaics, May 2017

Tommy Cleveland wrote a white paper for NCSU NC Clean Energy Technology Center regarding the health and safety impacts to address common questions and concerns related to solar farms. This is a heavily researched white paper addressing questions ranging from EMFs, fire safety, as well as vegetation control and the breakdown of how a solar farm works.

C. Broker Commentary

In the process of working up the matched pairs used later in this report, I have collected comments from brokers who have actually sold homes adjoining solar farms indicating that the solar farm had no impact on the marketing, timing, or sales price for the adjoining homes. I have comments from 12 such brokers within this report including brokers from Kentucky, Virginia, Tennessee, and North Carolina.

I have additional commentary from other states including New Jersey and Michigan that provide the same conclusion.

IV. University Studies

I have also considered the following studies completed by four different universities related to solar farms and impacts on property values.

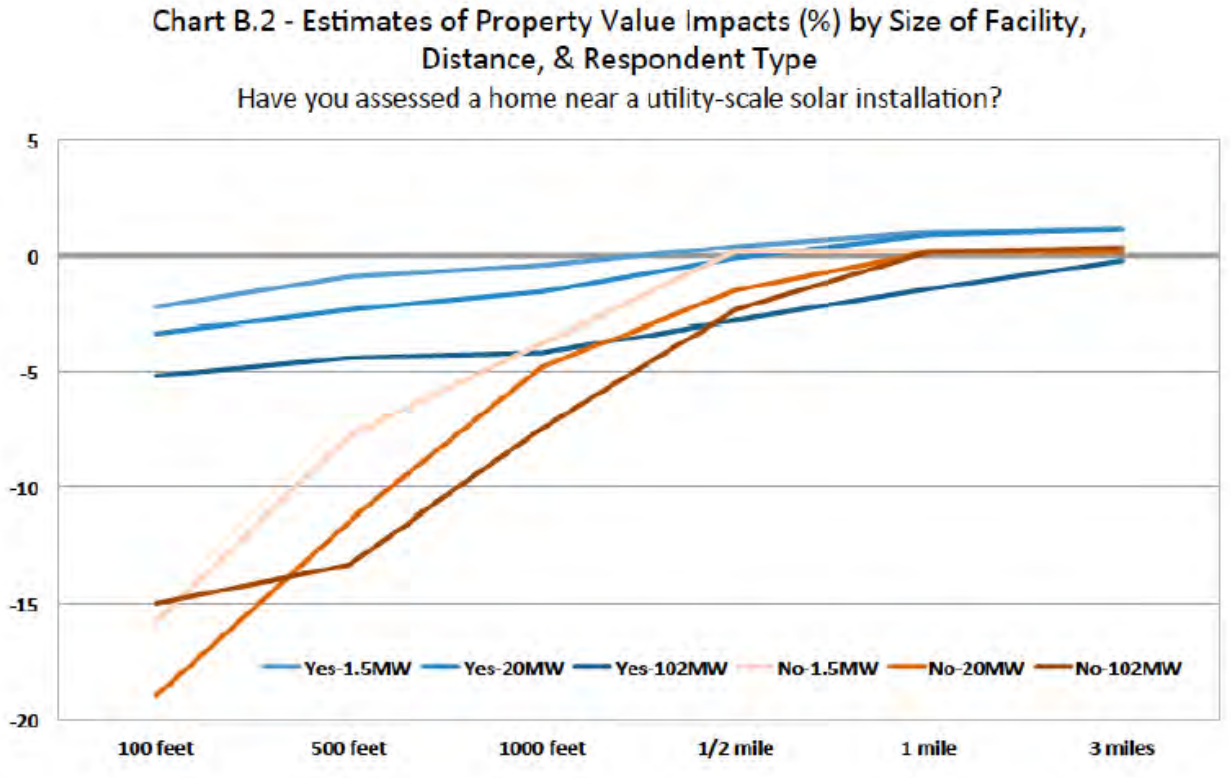
A. University of Texas at Austin, May 2018

An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations

This study considers solar farms from two angles. First it looks at where solar farms are being located and concludes that they are being located primarily in low density residential areas where there are fewer homes than in urban or suburban areas.

The second part is more applicable in that they conducted a survey of appraisers/assessors on their opinions of the possible impacts of proximity to a solar farm. They consider the question in terms of size of the adjoining solar farm and how close the adjoining home is to the solar farm. I am very familiar with this part of the study as I was interviewed by the researchers multiple times as they were developing this. One very important question that they ask within the survey is very illustrative. They asked if the appraiser being surveyed had ever appraised a property next to a solar farm. There is a very noticeable divide in the answers provided by appraisers who have experience appraising property next to a solar farm versus appraisers who self-identify as having no experience or knowledge related to that use.

On Page 16 of that study they have a chart showing the responses from appraisers related to proximity to a facility and size of the facility, but they separate the answers as shown below with appraisers with experience in appraising properties next to a solar farm shown in blue and those inexperienced shown in brown. Even within 100 feet of a 102 MW facility the response from experienced appraisers were -5% at most on impact. While inexperienced appraisers came up with significantly higher impacts. This chart clearly shows that an uninformed response widely diverges from the sales data available on this subject.



Furthermore, the question cited above does not consider any mitigating factors such as landscaping buffers or screens which would presumably reduce the minor impacts noted by experienced appraisers on this subject.

The conclusion of the researchers is shown on Page 23 indicated that "Results from our survey of residential home assessors show that the majority of respondents believe that proximity to a solar installation has either no impact or a positive impact on home values."

This analysis supports the conclusion of this report that the data supports no impact on adjoining property values.

B. University of Rhode Island, September 2020

Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island

The University of Rhode Island published a study entitled **Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island** on September 29, 2020 with lead researchers being Vasundhara Gaur and Corey Lang. I have read that study and interviewed Mr. Corey Lang related to that study. This study is often cited by opponents of solar farms but the findings of that study have some very specific caveats according to the report itself as well as Mr. Lang from the interview.

While that 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. On Pages 16-18 of that study under Section 5.3 Heterogeneity in treatment effect they indicate that the impact that they found was limited to non-rural locations with the impact in rural locations effectively being zero. For the study they defined "rural" as a municipality/township with less than 850 population per square mile.

They further tested the robustness of that finding and even in areas up to 2,000 population per square mile they found no statistically significant data to suggest a negative impact. They have not specifically defined a point at which they found negative impacts to begin, as the sensitivity study stopped checking at the 2,000 population dataset.

Where they did find negative impacts was in high population density areas that was largely a factor of running the study in Massachusetts and Rhode Island which the study specifically cites as being the 2nd and 3rd most population dense states in the USA. Mr. Lang in conversation as well as in recorded presentations has indicated that 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 of that site might have a similar impact on property value.

So based on this study I have checked the population for the Grahamville-Heath CCD as shown below has a population density of 79 population per square mile which puts this well below the threshold indicated by the Rhode Island Study.

I therefore conclude that the Rhode Island Study supports the indication of no impact on adjoining properties for the proposed solar farm project.

Grahamville-Heath Division Data & Demographics (As of July 1, 2020)

More Tools and Resources:

1. For information about **schools** and **school attendance zones**, use the **HTL Address Tool**
2. Our new **HTL Neighborhood Explorer** provides lots of detail about any neighborhood.
3. The new **2-Minute Introduction and Concise Guide to Big Data** which will help you make the most effective use of HomeTownLocator Tools.
4. See the **References & Data Sources** page for more information about methodology and sources of data.
5. See the **Kentucky COVID-19 Data** and **US COVID-19 Data** for more information on the spread of the novel coronavirus.

POPULATION	
Total Population	6,653
Population in Households	6,653
Population in Familes	5,667
Population in Group Qrtrs	0
Population Density	79
Diversity Index[1]	15

HOUSING	
Total HU (Housing Units)	2,947 (100%)
Owner Occupied HU	2,192 (74.4%)
Renter Occupied HU	502 (17.0%)
Vacant Housing Units	253 (8.6%)
Median Home Value	$163,810
Average Home Value	$218,351
Housing Affordability Index[2]	224

INCOME	
Median Household Income	$62,712
Average Household Income	$81,794
% of Income for Mortgage	11%
Per Capita Income	$33,121
Wealth Index[4]	88

HOUSEHOLDS	
Total Households	2,694
Average Household Size	2.47
Family Households	1,964
Average Family Size	3

C. Master's Thesis: ECU by Zachary Dickerson July 2018

A Solar Farm in *My* Backyard? Resident Perspectives of Utility-Scale Solar in Eastern North Carolina

This study was completed as part of a Master of Science in Geography Master's Thesis by Zachary Dickerson in July 2018. This study sets out to address three questions:

1. Are there different aspects that affect resident satisfaction regarding solar farms?

2. Are there variations in satisfaction for residents among different geographic settings, e.g. neighborhoods adjacent to the solar farms or distances from the solar farms?

3. How can insight from both the utility and planning sectors, combined with knowledge gained from residents, fill gaps in communication and policy writing in regard to solar farms?

This was done through survey and interview with adjacent and nearby neighbors of existing solar farms. The positive to neutral comments regarding the solar farms were significantly higher than negative. The researcher specifically indicates on Page 46 "The results show that respondents generally do not believe the solar farms pose a threat to their property values."

The most negative comments regarding the solar farms were about the lack of information about the approval process and the solar farm project prior to construction.

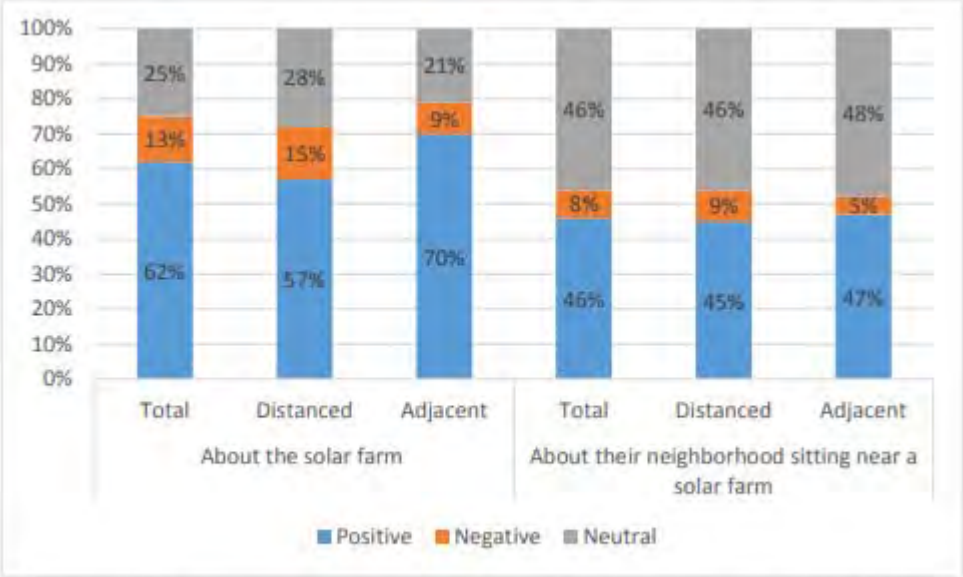


Figure 11: Residents' positive/negative word choices by geographic setting for both questions

D. Ernest Orlando Lawrence Berkeley National Laboratory, December, 2019

The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis

This study addresses wind farms and not solar farms but it is a reasonable consideration. The activity on a wind farm is significantly different in terms of the mechanics and more particularly on the appearance or viewshed as wind farms cannot be screened from adjoining property owners. This study was commissioned by the Department of Energy and not by any developer. This study examined 7,500 home sales between 1996 and 2007 in order to track sales prices both before and after a wind energy facility was announced or built. This study specifically looked into possible stigma, nuisance, and scenic vista.

On page 17 of that study they conclude "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 too infrequent to result in any widespread, statistically observable impact."

Given that solar farms are a similar use, but with a lower profile and therefore a lower viewshed than the wind farms, it is reasonable to translate these findings of no impact to solar farms.

V. Summary of Solar Projects in Kentucky

I have researched the solar projects in Kentucky. I identified the solar farms through the Solar Energy Industries Association (SEIA) Major Projects List and then excluded the roof mounted facilities. This leaves only six solar farms in Kentucky for analysis at this time.

One of these six solar farms has limited analysis potential: E.W. Brown near Harrodsburg in Mercer County. The E. W. Brown 10 MW solar farm was built in 2014 and adjoins three coal-fired units. Given that research studies that I have read regarding fossil fuel power plants including "The Effect of Power Plants on Local Housing Values and Rents" by Lucas W. Davis and published May 2010, it would not be appropriate to use any data from this solar farm due to the influence of the coal-fired power plant that could have an impact on up to a one-mile radius. I note that the closest home to a solar panel at this site is 565 feet and the average distance is 1,026 feet. The homes are primarily clustered at the Herrington Lake frontage. Recent sales in this area range from $164,000 to $212,000 for these waterfront homes. Again, no usable data can be derived from this solar farm due to the adjoining coal fired plant.

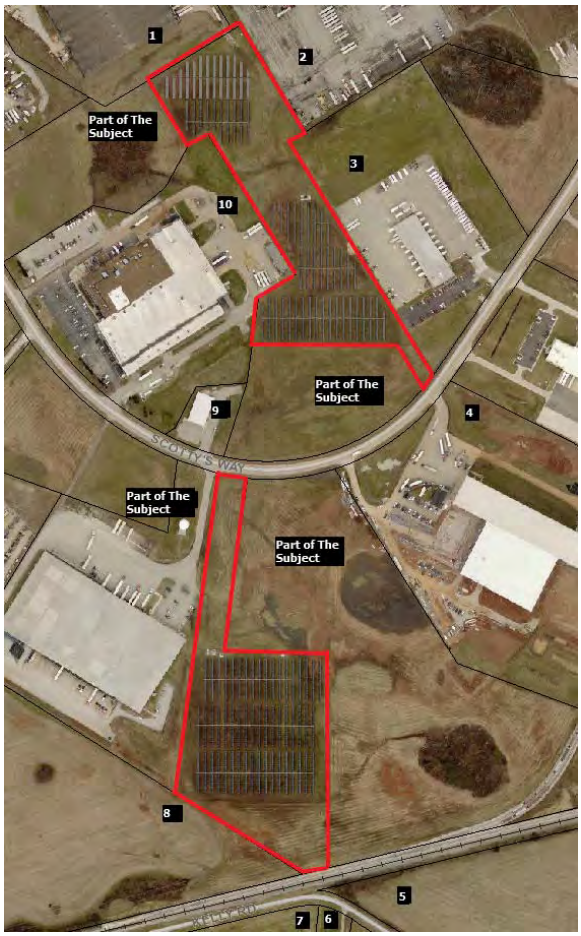
Furthermore, the Cooperative solar farm in Shelby County is a 0.5 MW facility on 35 acres built in 2020 that is proposed to eventually be 4 MW. This project is too new and there have been no home sales adjoining this facility. I also cannot determine how close the nearby homes are to the adjoining solar panels as the aerial imagery does not yet show these panels.

I have provided a summary of projects below and additional detailed information on the projects on the following pages. I specifically note the similarity in most of the sites in Kentucky in terms of mix of adjoining uses, topography, and distances to adjoining homes.

The number of solar farms currently in Kentucky is low compared to a number of other states and North Carolina in particular. I have looked at solar farms in Kentucky for sales activity, but the small number of sites coupled with the relatively short period of time these solar farms have been in place has not provided as many examples of sales adjoining a solar farm as I am able to pull from other places. I have therefore also considered sales in other states, but I have shown in the summary how the demographics around the solar farms in other locations relate to the demographics around the proposed solar farm to show that generally similar locations are being considered. 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 a similar lack of significant impacts at the subject site.

Parcel #	State	County	City	Name	Output (MW)	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre					Adjoining Use by Number				
										Res	Agri	Agri/Res	Com		Reside	Agricul	Comm/Ind	%	
610	KY	Warren	Bowling Green	Bowling Green	2	17.36	17.36	720	720	1%	64%	0%	36%	100%	10%	30%	60%	100%	
611	KY	Clark	Winchester	Cooperative Solar I	8.5	181.47	63	2,110	2,040	0%	96%	3%	0%	100%	22%	78%	0%	100%	
612	KY	Kenton	Walton	Walton 2	2	58.03	58.03	891	120	21%	0%	60%	19%	100%	65%	0%	35%	100%	
613	KY	Grant	Crittenden	Crittenden	2.7	181.7	34.1	1,035	345	22%	27%	51%	0%	100%	96%	4%	0%	100%	
617	KY	Metcalfe	Summer Shade	Glover Creek		968.2	322.4	1,731	375	6%	25%	69%	0%	100%	83%	17%	0%	100%	
618	KY	Garrard	Lancaster	Turkey Creek		752.8	297.1	976	240	8%	36%	51%	5%	100%	73%	12%	15%	100%	
		Total Number of Solar Farms			6														
				Average	3.80	359.9	132.0	1244	640	9%	41%	39%	10%		58%	24%	18%		
				Median	2.35	181.6	60.5	1006	360	7%	32%	51%	3%		69%	14%	7%		
				High	8.50	968.2	322.4	2110	2040	22%	96%	69%	36%		96%	78%	60%		
				Low	2.00	17.4	17.4	720	120	0%	0%	0%	0%		3%	0%	0%		

610: Bowling Green Solar, Bowling Green, KY



This project was built in 2011 and located on 17.36 acres for a 2 MW project on Scotty's Way with the adjoining uses being primarily industrial. The closest dwelling is 720 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	0.58%	10.00%
Agricultural	63.89%	30.00%
Industrial	35.53%	60.00%
Total	**100.00%**	**100.00%**

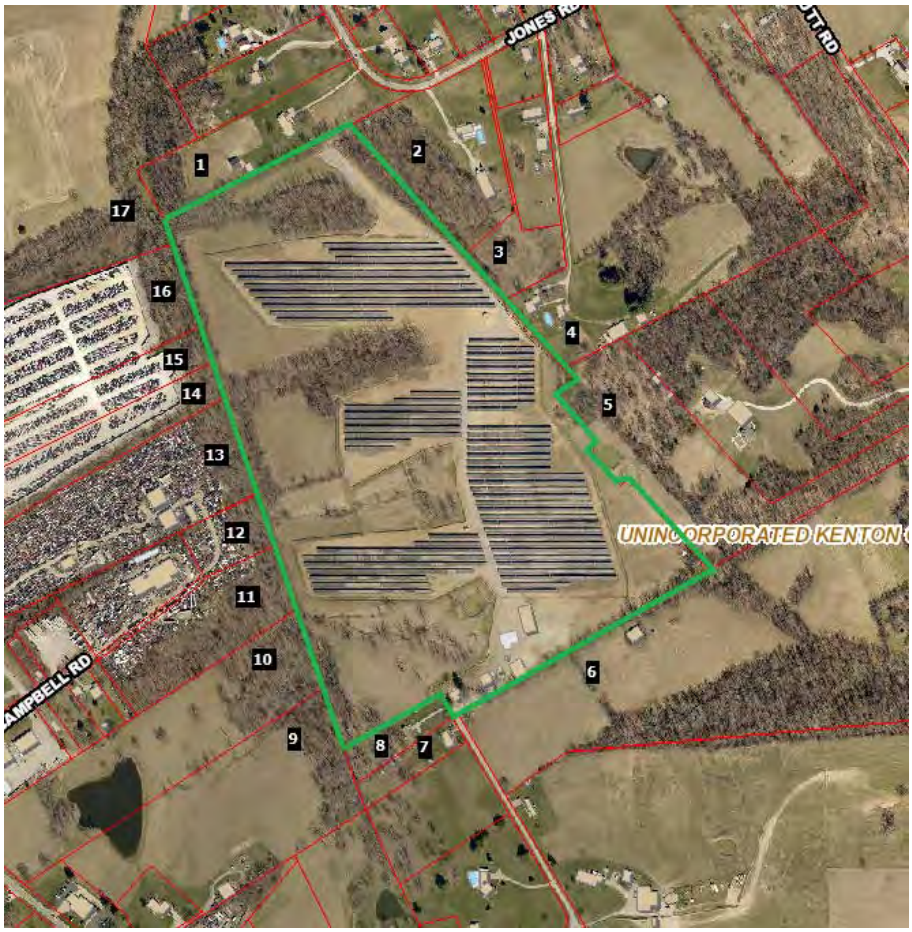
611: Cooperative Solar I, Winchester, KY

This project was built in 2017 on 63 acres of a 181.47-acre parent tract for an 8.5 MW project with the closest home at 2,040 feet from the closest solar panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	0.15%	11.11%
Agricultural	96.46%	77.78%
Agri/Res	3.38%	11.11%
Total	**100.00%**	**100.00%**

612: Walton 2 Solar, Walton, KY



This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	20.84%	47.06%
Agri/Res	59.92%	17.65%
Commercial	19.25%	35.29%
Total	**100.00%**	**100.00%**

613: Crittenden Solar, Crittenden, KY

This project was built in late 2017 on 34.10 acres out of a 181.70-acre tract for a 2.7 MW project where the closest home is 345 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	1.65%	32.08%
Agricultural	73.39%	39.62%
Agri/Res	23.05%	11.32%
Commercial	0.64%	9.43%
Industrial	0.19%	3.77%
Airport	0.93%	1.89%
Substation	0.15%	1.89%
Total	**100.00%**	**100.00%**

659: Cooperative Shelby Solar, Simpsonville, KY

This project was built in 2020 on 35 acres for a 0.5 MW project that is approved for expansion up to 4 MW.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	6.04%	44.44%
Agricultural	10.64%	11.11%
Agri/Res	31.69%	33.33%
Institutional	51.62%	11.11%
Total	**100.00%**	**100.00%**

660: E.W. Brown Solar, Harrodsburg, KY

This project was built in 2016 on 50 acres for a 10 MW project. This solar facility adjoins three coal-fired units, which makes analysis of these nearby home sales problematic as it is impossible to extract the impact of the coal plant on the nearby homes especially given the lake frontage of the homes shown.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	2.77%	77.27%
Agricultural	43.92%	9.09%
Agri/Res	28.56%	9.09%
Industrial	24.75%	4.55%
Total	**100.00%**	**100.00%**

VI. Market Analysis of the Impact on Value from Solar Farms

I have researched hundreds of solar farms in numerous states to determine the impact of these facilities on the value of adjoining properties. This research has primarily been in North Carolina, but I have also conducted market impact analyses in Virginia, South Carolina, Tennessee, Texas, Oregon, Mississippi, Maryland, New York, California, Missouri, Florida, Montana, Georgia, Kentucky, and New Jersey.

I have derived a breakdown of the adjoining uses to show where solar farms are located. A summary showing the results of compiling that data over hundreds of solar farms is shown later in the Scope of Research section of this report.

I also consider whether the properties adjoining a solar farm in one location have characteristics similar to the properties abutting or adjoining the proposed site so that I can make an assessment of market impact on each proposed site. Notably, in most cases solar farms are placed in areas very similar to the site in question, which is surrounded by low density residential and agricultural uses. In my over 700 studies, I have found a striking repetition of that same typical adjoining property use mix in over 90% of the solar farms I have looked at. Matched pair results in multiple states are strikingly similar, and all indicate that solar farms – which generate very little traffic, and do not generate noise, dust or have other harmful effects – do not negatively impact the value of adjoining or abutting properties.

I have previously been asked by the Kentucky Siting Board about how the solar farms and the matched pair sets were chosen. This is the total of all the usable home and land sales adjoining the 750+ solar farms that I have looked at over the last 10 years. Most of the solar farms that I have looked at are only a few years old and have not been in place long enough for home or land sales to occur next to them for me to analyze. There is nothing unusual about this given the relatively rural locations of most of the solar farms where home and land sales occur much less frequently than they do in urban and suburban areas and the number of adjoining homes is relatively small.

I review the solar farms that I have looked at periodically to see if there are any new sales. If there is a sale I have to be sure it is not an inhouse sale or to a related family member. A great many of the rural sales that I find are from one family member to another, which makes analysis impossible given that these are not "arm's length" transactions. There are also numerous examples of sales that are "arm's length" but are still not usable due to other factors such as adjoining significant negative factors such as a coal fired plant or at a landfill or prison. I have looked at homes that require a driveway crossing a railroad spur, homes in close proximity to large industrial uses, as well as homes adjoining large state parks, or homes that are over 100 years old with multiple renovations. Such sales are not usable as they have multiple factors impacting the value that are tangled together. You can't isolate the impact of the coal fired plant, the industrial building, or the railroad unless you are comparing that sale to a similar property with similar impacts. Matched pair analysis requires that you isolate properties that only have one differential to test for, which is why the type of sales noted above is not appropriate for analysis.

After my review of all sales and elimination of the family transactions and those sales with multiple differentials, I am left with the matched pairs shown in this report to analyze. I do have additional matched pair data in other areas of the United States that were not included in this report due to being states less comparable to Kentucky than those shown. The only other sales that I have eliminated from the analysis are home sales under $100,000, which there haven't been many such examples, but at that price range it is difficult to identify any impacts through matched pair analysis. I have not cherry picked the data to include just the sales that support one direction in value, but I have included all of them both positive and negative with a preponderance of the evidence supporting no impact to mild positive impacts.

A. Kentucky and Adjoining States Data

1. Matched Pair – Crittenden Solar, Crittenden, KY

This solar farm was built in December 2017 on a 181.70-acre tract but utilizing only 34.10 acres. This is a 2.7 MW facility with residential subdivisions to the north and south.

I have identified five home sales to the north of this solar farm on Clairborne Drive and one home sale to the south on Eagle Ridge Drive since the completion of this solar farm. The home sale on Eagle Drive is for a $75,000 home and all of the homes along that street are similar in size and price range. According to local broker Steve Glacken with Cutler Real Estate these are the lowest price range/style home in the market. I have not analyzed that sale as it would unlikely provide significant data to other homes in the area.

Mr. Glacken is currently selling lots at the west end of Clairborne for new home construction. He indicated that the solar farm near the entrance of the development has been a complete non-factor and none of the home sales are showing any concern over the solar farm. Most of the homes are in the $250,000 to $280,000 price range. The vacant residential lots are being marketed for $28,000 to $29,000. The landscaping buffer is considered light, but the rolling terrain allows for distant views of the panels from the adjoining homes along Clairborne Drive.

The first home considered is a bit of an anomaly for this subdivision in that it is the only manufactured home that was allowed in the community. It sold on January 3, 2019. I compared that sale to three other manufactured home sales in the area making minor adjustments as shown on the next page to account for the differences. After all other factors are considered the adjustments show a -1% to +13% impact due to the adjacency of the solar farm. The best indicator is 1250 Cason, which shows a 3% impact. A 3% impact is within the normal static of real estate transactions and therefore not considered indicative of a positive impact on the property, but it strongly supports an indication of no negative impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	250 Claiborne	0.96	1/3/2019	$120,000	2000	2,016	$59.52	3/2	Drive	Manuf	
	Not	1250 Cason	1.40	4/18/2018	$95,000	1994	1,500	$63.33	3/2	2-Det	Manuf	Carport
	Not	410 Reeves	1.02	11/27/2018	$80,000	2000	1,456	$54.95	3/2	Drive	Manuf	
	Not	315 N Fork	1.09	5/4/2019	$107,000	1992	1,792	$59.71	3/2	Drive	Manuf	

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne								$120,000			373
Not	1250 Cason	$2,081		$2,850	$26,144		-$5,000	-$5,000	$116,075	3%		
Not	410 Reeves	$249		$0	$24,615				$104,865	13%		
Not	315 N Fork	-$1,091		$4,280	$10,700				$120,889	-1%		
											5%	

I also looked at three other home sales on this street as shown below. These are stick-built homes and show a higher price range.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	300 Claiborne	1.08	9/20/2018	$212,720	2003	1,568	$135.66	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	Ranch	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne								$213,000			488
Not	460 Claiborne	-$2,026		-$4,580	$15,457	$5,000			$242,850	-14%		
Not	2160 Sherman	-$5,672		-$2,650	-$20,406				$236,272	-11%		
Not	215 Lexington	$1,072		$3,468	-$2,559	-$5,000			$228,180	-7%		
											-11%	

This set of matched pairs shows a minor negative impact for this property. I was unable to confirm the sales price or conditions of this sale. The best indication of value is based on 215 Lexington, which required the least adjusting and supports a -7% impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	350 Claiborne	1.00	7/20/2018	$245,000	2002	1,688	$145.14	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	350 Claiborne								$245,000			720
Not	460 Claiborne	-$3,223		-$5,725	$30,660	$5,000			$255,712	-4%		
Not	2160 Sherman	-$7,057		-$3,975	-$5,743				$248,225	-1%		
Not	215 Lexington	-$136		$2,312	$11,400	-$5,000			$239,776	2%		
											-1%	

The following photograph shows the light landscaping buffer and the distant view of panels that was included as part of the marketing package for this property. The panels are visible somewhat on the left and somewhat through the trees in the center of the photograph. The first photograph is from the home, with the second photograph showing the view near the rear of the lot.

This set of matched pairs shows a no negative impact for this property. The range of adjusted impacts is -4% to +2%. The best indication is -1%, which as described above is within the typical market static and supports no impact on adjoining property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	370 Claiborne	1.06	8/22/2019	$273,000	2005	1,570	$173.89	4/3	2-Car	2-Story	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	2290 Dry	1.53	5/2/2019	$239,400	1988	1,400	$171.00	3/2.5	2-Car	R/FBsmt	Brick
	Not	125 Lexington	1.20	4/17/2018	$240,000	2001	1,569	$152.96	3/3	2-Car	Split	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	370 Claiborne								$273,000			930
Not	2160 Sherman	$1,831		$0	-$20,161				$246,670	10%		
Not	2290 Dry	$2,260		$20,349	$23,256	$2,500			$287,765	-5%		
Not	125 Lexington	$9,951		$4,800					$254,751	7%		
											4%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -5% to +10%. The best indication is +7%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship.

The photograph from the listing shows panels visible between the home and the trampoline shown in the picture.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	330 Claiborne	1.00	12/10/2019	$282,500	2003	1,768	$159.79	3/3	2-Car	Ranch	Brick/pool
Not	895 Osborne	1.70	9/16/2019	$249,900	2002	1,705	$146.57	3/2	2-Car	Ranch	Brick/pool
Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

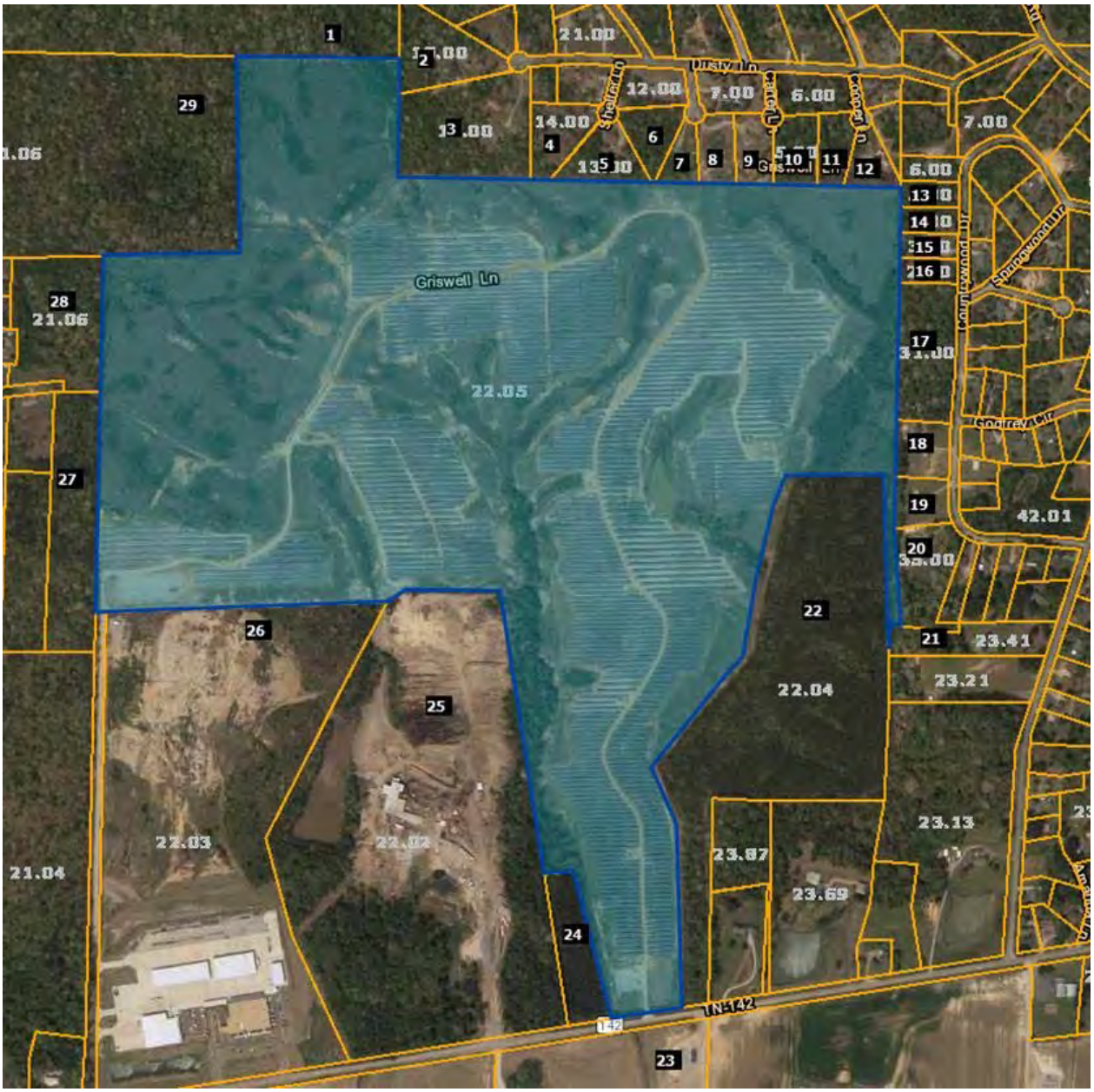
Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	330 Claiborne								$282,500			665
Not	895 Osborne	$1,790		$1,250	$7,387	$5,000		$0	$265,327	6%		
Not	2160 Sherman	$4,288		-$2,650	$4,032			$20,000	$290,670	-3%		
Not	215 Lexington	$9,761		$3,468	$20,706	-$5,000		$20,000	$280,135	1%		
											1%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -3% to +6%. The best indication is +6%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship. The landscaping buffer on these is considered light with a fair visibility of the panels from most of these comparables and only thin landscaping buffers separating the homes from the solar panels.

The five matched pairs considered in this analysis includes two that show no impact on value, one that shows a negative impact on value, and two that show a positive impact. The negative indication supported by one matched pair is -7% and the positive impacts are +6% and +7%. The two neutral indications show impacts of -1% and +3%. The average indicated impact is +0% when all five of these indicators are blended.

Furthermore, the comments of the local real estate broker strongly support the data that shows no negative impact on value due to the proximity to the solar farm. This is further supported by the national data that is shown on the following pages.

2. Matched Pair – Mulberry, Selmer, TN



This 16 MW solar farm was built in 2014 on 208.89 acres with the closest home being 480 feet.

This solar farm adjoins two subdivisions with Central Hills having a mix of existing and new construction homes. Lots in this development have been marketed for $15,000 each with discounts offered for multiple lots being used for a single home site. I spoke with the agent with Rhonda Wheeler and Becky Hearnsberger with United County Farm & Home Realty who noted that they have seen no impact on lot or home sales due to the solar farm in this community.

I have included a map below as well as data on recent sales activity on lots that adjoin the solar farm or are near the solar farm in this subdivision both before and after the announced plan for this solar farm facility. I note that using the same method I used to breakdown the adjoining uses at the subject property I show that the predominant adjoining uses are residential and agricultural, which is consistent with the location of most solar farms.

Adjoining Use Breakdown

	Acreage	Parcels
Commercial	3.40%	0.034
Residential	12.84%	79.31%
Agri/Res	10.39%	3.45%
Agricultural	73.37%	13.79%
Total	**100.00%**	**100.00%**

I have run a number of direct matched comparisons on the sales adjoining this solar farm as shown below. These direct matched pairs include some of those shown above as well as additional more recent sales in this community. In each of these I have compared the one sale adjoining the solar farm to multiple similar homes nearby that do not adjoin a solar farm to look for any potential impact from the solar farm.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
3	Adjoins	491 Dusty	6.86	10/28/2016	$176,000	2009	1,801	$97.72	3/2	2-Gar	Ranch	
	Not	820 Lake Trail	1.00	6/8/2018	$168,000	2013	1,869	$89.89	4/2	2-Gar	Ranch	
	Not	262 Country	1.00	1/17/2018	$145,000	2000	1,860	$77.96	3/2	2-Gar	Ranch	
	Not	35 April	1.15	8/16/2016	$185,000	2016	1,980	$93.43	3/2	2-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
3	Adjoins	491 Dusty							$176,000		480
	Not	820 Lake Trail	-$8,324	$12,000	-$3,360	-$4,890			$163,426	7%	
	Not	262 Country	-$5,450	$12,000	$6,525	-$3,680			$154,396	12%	
	Not	35 April	$1,138	$12,000	-$6,475	-$13,380			$178,283	-1%	
									Average	6%	

The best matched pair is 35 April Loop, which required the least adjustment and indicates a -1% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
12	Adjoins	57 Cooper	1.20	2/26/2019	$163,000	2011	1,586	$102.77	3/2	2-Gar	1.5 Story	Pool
	Not	191 Amelia	1.00	8/3/2018	$132,000	2005	1,534	$86.05	3/2	Drive	Ranch	
	Not	75 April	0.85	3/17/2017	$134,000	2012	1,588	$84.38	3/2	2-Crprt	Ranch	
	Not	345 Woodland	1.15	12/29/2016	$131,000	2002	1,410	$92.91	3/2	1-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
12	Adjoins	57 Cooper	$163,000							$163,000		685
	Not	191 Amelia	$132,000	$2,303		$3,960	$2,685	$10,000	$5,000	$155,947	4%	
	Not	75 April	$134,000	$8,029	$4,000	-$670	-$135	$5,000	$5,000	$155,224	5%	
	Not	345 Woodland	$131,000	$8,710		$5,895	$9,811		$5,000	$160,416	2%	
										Average	4%	

The best matched pair is 191 Amelia, which was most similar in time frame of sale and indicates a +4% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
15	Adjoins	297 Country	1.00	9/30/2016	$150,000	2002	1,596	$93.98	3/2	4-Gar	Ranch	
	Not	185 Dusty	1.85	8/17/2015	$126,040	2009	1,463	$86.15	3/2	2-Gar	Ranch	
	Not	53 Glen	1.13	3/9/2017	$126,000	1999	1,475	$85.42	3/2	2-Gar	Ranch	Brick

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
15	Adjoins	297 Country	$150,000							$150,000		650
	Not	185 Dusty	$126,040	$4,355		-$4,411	$9,167	$10,000		$145,150	3%	
	Not	53 Glen	$126,000	-$1,699		$1,890	$8,269	$10,000		$144,460	4%	
										Average	3%	

The best matched pair is 53 Glen, which was most similar in time frame of sale and required less adjustment. It indicates a +4% increase in value due to the solar farm adjacency.

The average indicated impact from these three sets of matched pairs is +4%, which suggests a mild positive relationship due to adjacency to the solar farm. The landscaping buffer for this project is mostly natural tree growth that was retained as part of the development but much of the trees separating the panels from homes are actually on the lots for the homes themselves. I therefore consider the landscaping buffer to be thin to moderate for these adjoining homes.

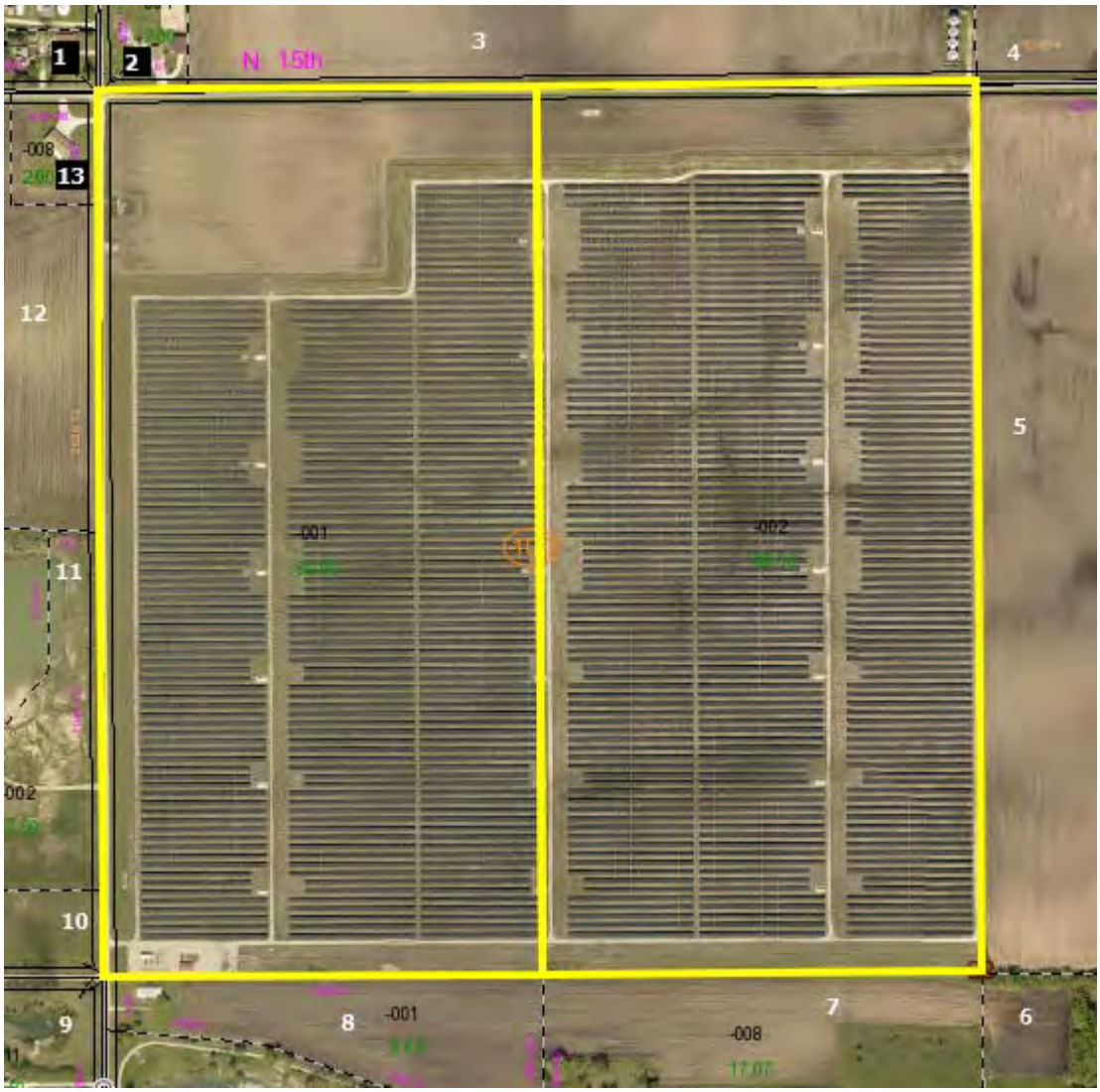
I have also looked at several lot sales in this subdivision as shown below.

These are all lots within the same community and the highest prices paid are for lots one parcel off from the existing solar farm. These prices are fairly inconsistent, though they do suggest about a $3,000 loss in the lots adjoining the solar farm. This is an atypical finding and additional details suggest there is more going on in these sales than the data crunching shows. First of all Parcel 4 was purchased by the owner of the adjoining home and therefore an atypical buyer seeking to expand a lot and the site is not being purchased for home development. Moreover, using the SiteToDoBusiness demographic tools, I found that the 1-mile radius around this development is expecting a total population increase over the next 5 years of 3 people. This lack of growing demand for lots is largely explained in that context. Furthermore, the fact that finished home sales as shown above are showing no sign of a negative impact on property value makes this data unreliable and inconsistent with the data shown in sales to an end user. I therefore place little weight on this outlier data.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	4/18/2019 Adj for Time	$/AC	4/18/2019 Adj for Time
4	Adjoins	Shelter	2.05	10/25/2017	$16,000	$16,728	$7,805	$8,160
10	Adjoins	Carter	1.70	8/2/2018	$14,000	$14,306	$8,235	$8,415
11	Adjoins	Cooper	1.28	9/17/2018	$12,000	$12,215	$9,375	$9,543
	Not	75 Dusty	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976
	Not	Lake Trl	1.47	11/7/2018	$13,000	$13,177	$8,844	$8,964
	Not	Lake Trl	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976

	Adjoins	Per Acre	Not Adjoins	Per Acre	% DIF/Lot	% DIF/AC
Average	$14,416	$8,706	$17,726	$10,972	19%	21%
Median	$14,306	$8,415	$20,000	$11,976	28%	30%
High	$16,728	$9,543	$20,000	$11,976	16%	20%
Low	$12,215	$8,160	$13,177	$8,964	7%	9%

3. Matched Pair – Grand Ridge Solar, Streator, IL



This solar farm has a 20 MW output and is located on a 160-acre tract. The project was built in 2012.

I have considered the recent sale of Parcel 13 shown above, which sold in October 2016 after the solar farm was built. I have compared that sale to a number of nearby residential sales not in proximity to the solar farm as shown below. Parcel 13 is 480 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
13	34-21-237-000	2	Oct-16	$186,000	1997	2,328	$79.90

Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
712 Columbus Rd	32-39-134-005	1.26	Jun-16	$166,000	1950	2,100	$79.05
504 N 2782 Rd	18-13-115-000	2.68	Oct-12	$154,000	1980	2,800	$55.00
7720 S Dwight Rd	11-09-300-004	1.14	Nov-16	$191,000	1919	2,772	$68.90
701 N 2050th Rd	26-20-105-000	1.97	Aug-13	$200,000	2000	2,200	$90.91
9955 E 1600th St	04-13-200-007	1.98	May-13	$181,858	1991	2,600	$69.95

TAX ID	Date Sold	Adjustments Time	Adjustments Total	$/Sf
34-21-237-000	Oct-16		$186,000	$79.90
32-39-134-005	Jun-16		$166,000	$79.05
18-13-115-000	Oct-12	$12,320	$166,320	$59.40
11-09-300-004	Nov-16		$191,000	$68.90
26-20-105-000	Aug-13	$12,000	$212,000	$96.36
04-13-200-007	May-13	$10,911	$192,769	$74.14

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$79.90	$79.90	$75.57	$74.14
GBA	2,328	2,328	2,494	2,600

Based on the matched pairs I find no indication of negative impact due to proximity to the solar farm.

The most similar comparable is the home on Columbus that sold for $79.05 per square foot. This is higher than the median rate for all of the comparables. Applying that price per square foot to the subject property square footage indicates a value of $184,000.

There is minimal landscaping separating this solar farm from nearby properties and is therefore considered light.

4. Matched Pair – Portage Solar, Portage, IN

This solar farm has a 2 MW output and is located on a portion of a 56-acre tract. The project was built in 2012.

I have considered the recent sale of Parcels 5 and 12. Parcel 5 is an undeveloped tract, while Parcel 12 is a residential home. I have compared each to a set of comparable sales to determine if there was any impact due to the adjoining solar farm. This home is 1,320 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
12	64-06-19-326-007.000-015	1.00	Sep-13	$149,800	1964	1,776	$84.35

Nearby Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2501 Architect Dr	64-04-32-202-004.000-021	1.31	Nov-15	$191,500	1959	2,064	$92.78
336 E 1050 N	64-07-09-326-003.000-005	1.07	Jan-13	$155,000	1980	1,908	$81.24
2572 Pryor Rd	64-05-14-204-006.000-016	1.00	Jan-16	$216,000	1960	2,348	$91.99

Adjoining Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
5	64-06-19-200-003.000-015	18.70	Feb-14	$149,600	$8,000

Nearby Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
	64-07-22-401-001.000-005	74.35	Jun-17	$520,450	$7,000
	64-15-08-200-010.000-001	15.02	Jan-17	$115,000	$7,658

Residential Sale Adjustment Chart

		Adjustments		
TAX ID	Date Sold	Time	Total	$/Sf
64-06-19-326-007.000-015	Sep-13	$8,988	$158,788	$89.41
64-04-32-202-004.000-021	Nov-15	$3,830	$195,330	$94.64
64-07-09-326-003.000-005	Jan-13	$9,300	$164,300	$86.11
64-05-14-204-006.000-016	Jan-16		$216,000	$91.99

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$89.41	$89.41	$90.91	$91.99
GBA	1,776	1,776	2,107	2,064

After adjusting the price per square foot is 2.88% less for the home adjoining the solar farm versus those not adjoining the solar farm. This is within the typical range of variation to be anticipated in any real estate transaction and indicates no impact on property value.

Applying the price per square foot for the 336 E 1050 N sale, which is the most similar to the Parcel 12 sale, the adjusted price at $81.24 per square foot applied to the Parcel 12 square footage yields a value of $144,282.

The landscaping separating this solar farm from the homes is considered light.

Land Sale Adjustment Chart

TAX ID	Date Sold	Adjustments Time	Total	$/Acre
64-06-19-200-003.000-015	Feb-14	$8,976	$158,576	$8,480
64-07-22-401-001.000-005	Jun-17		$520,450	$7,000
64-15-08-200-010.000-001	Jan-17		$115,000	$7,658

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/Ac	$8,480	$8,480	$7,329	$7,329
Acres	18.70	18.70	44.68	44.68

After adjusting the price per acre is higher for the property adjoining the solar farm, but the average and median size considered is higher which suggests a slight discount. This set of matched pair supports no indication of negative impact due to the adjoining solar farm.

Alternatively, adjusting the 2017 sales back to 2014 I derive an indicated price per acre for the comparables at $6,580 per acre to $7,198 per acre, which I compare to the unadjusted subject property sale at $8,000 per acre.

5. Matched Pair – Dominion Indy III, Indianapolis, IN

This solar farm has an 8.6 MW output and is located on a portion of a 134-acre tract. The project was built in 2013.

There are a number of homes on small lots located along the northern boundary and I have considered several sales of these homes. I have compared those homes to a set of nearby not adjoining home sales as shown below. The adjoining homes that sold range from 380 to 420 feet from the nearest solar panel, with an average of 400 feet. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2	2013249	0.38	12/9/2015	$140,000	2006	2,412	$58.04
4	2013251	0.23	9/6/2017	$160,000	2006	2,412	$66.33
5	2013252	0.23	5/10/2017	$147,000	2009	2,028	$72.49
11	2013258	0.23	12/9/2015	$131,750	2011	2,190	$60.16
13	2013260	0.23	3/4/2015	$127,000	2005	2,080	$61.06
14	2013261	0.23	2/3/2014	$120,000	2010	2,136	$56.18

Nearby Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
5836 Sable Dr	2013277	0.14	Jun-16	$141,000	2005	2,280	$61.84
5928 Mosaic Pl	2013845	0.17	Sep-15	$145,000	2007	2,280	$63.60
5904 Minden Dr	2012912	0.16	May-16	$130,000	2004	2,252	$57.73
5910 Mosaic Pl	2000178	0.15	Aug-16	$146,000	2009	2,360	$61.86
5723 Minden Dr	2012866	0.26	Nov-16	$139,900	2005	2,492	$56.14

		Adjustments		
TAX ID	Date Sold	Time	Total	$/Sf
2013249	12/9/2015	$5,600	$145,600	$60.36
2013251	9/6/2017		$160,000	$66.33
2013252	5/10/2017		$147,000	$72.49
2013258	12/9/2015	$5,270	$137,020	$62.57
2013260	3/4/2015	$5,080	$132,080	$63.50
2013261	2/3/2014	$7,200	$127,200	$59.55
2013277	6/1/2016	$2,820	$143,820	$63.08
2013845	9/1/2015	$5,800	$150,800	$66.14
2012912	5/1/2016	$2,600	$132,600	$58.88
2000178	8/1/2016	$2,920	$148,920	$63.10
2012866	11/1/2016	$2,798	$142,698	$57.26

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$64.13	$63.03	$61.69	$63.08
GBA	2,210	2,163	2,333	2,280

This set of homes provides very strong indication of no impact due to the adjacency to the solar farm and includes a large selection of homes both adjoining and not adjoining in the analysis.

The landscaping screen is considered light in relation to the homes considered above.

6. Matched Pair – Clarke County Solar, Clarke County, VA

This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered a recent sale or Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction.

I've compared this home sale to a number of similar rural homes on similar parcels as shown below. I have used multiple sales that bracket the subject property in terms of sale date, year built, gross living area, bedrooms and bathrooms. Bracketing the parameters insures that all factors are well balanced out in the adjustments. The trend for these sales shows a positive value for the adjacency to the solar farm.

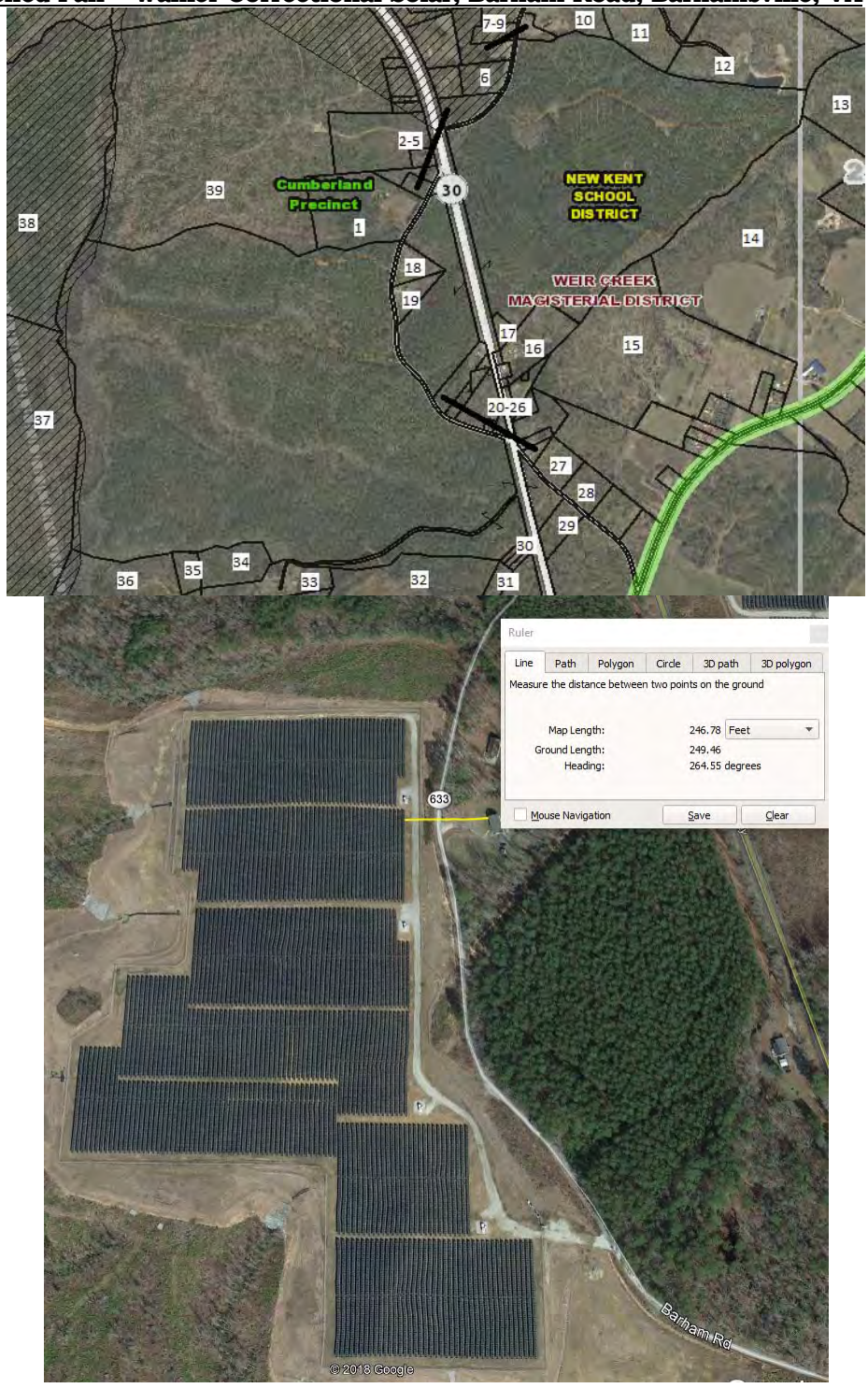
Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	Unfin bsmt
Not	85 Ashby	5.09	9/11/2017	$315,000	1982	2,333	$135.02	3/2	2 Gar	Ranch	
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	1986	3,157	$117.20	4/4	2 Gar	2 story	
Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	3 Gar	2 story	
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Drive	Ranch	

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	Address	Acres	Date Sold	Sales Price	Time	Acres	YB	GLA	BR/BA	Park	Other	Total	% Diff
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000								$295,000	
Not	85 Ashby	5.09	9/11/2017	$315,000	-$6,300		-$6,615	-$38,116		-$7,000	$15,000	$271,969	8%
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	-$18,500		-$18,130	-$62,057		-$7,000	$15,000	$279,313	5%
Not	4174 Rockland	5.06	1/2/2017	$300,000			-$23,100	-$15,782		-$12,000	$15,000	$264,118	10%
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	-$9,000	$43,000	$5,040	$20,571	$10,000	$3,000	$15,000	$267,611	9%
											Average		8%

The landscaping screen is primarily a newly planted buffer with a row of existing trees being maintained near the northern boundary and considered light.

7. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, VA



This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A limited buffering remains along the road with natural growth being encouraged, but currently the panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA

confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

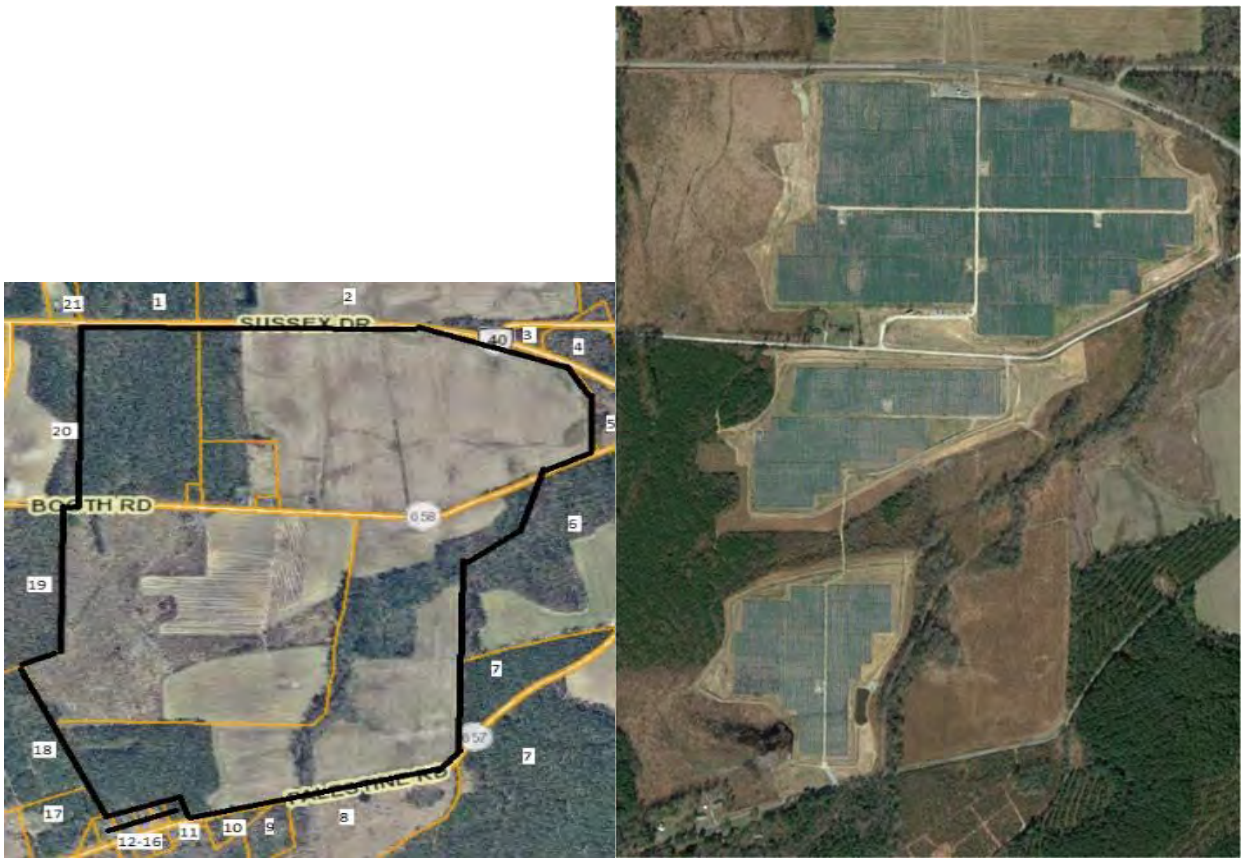
Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
								Average Diff		0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property as it was such a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

8. Matched Pair – Sappony Solar, Sussex County, VA



This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

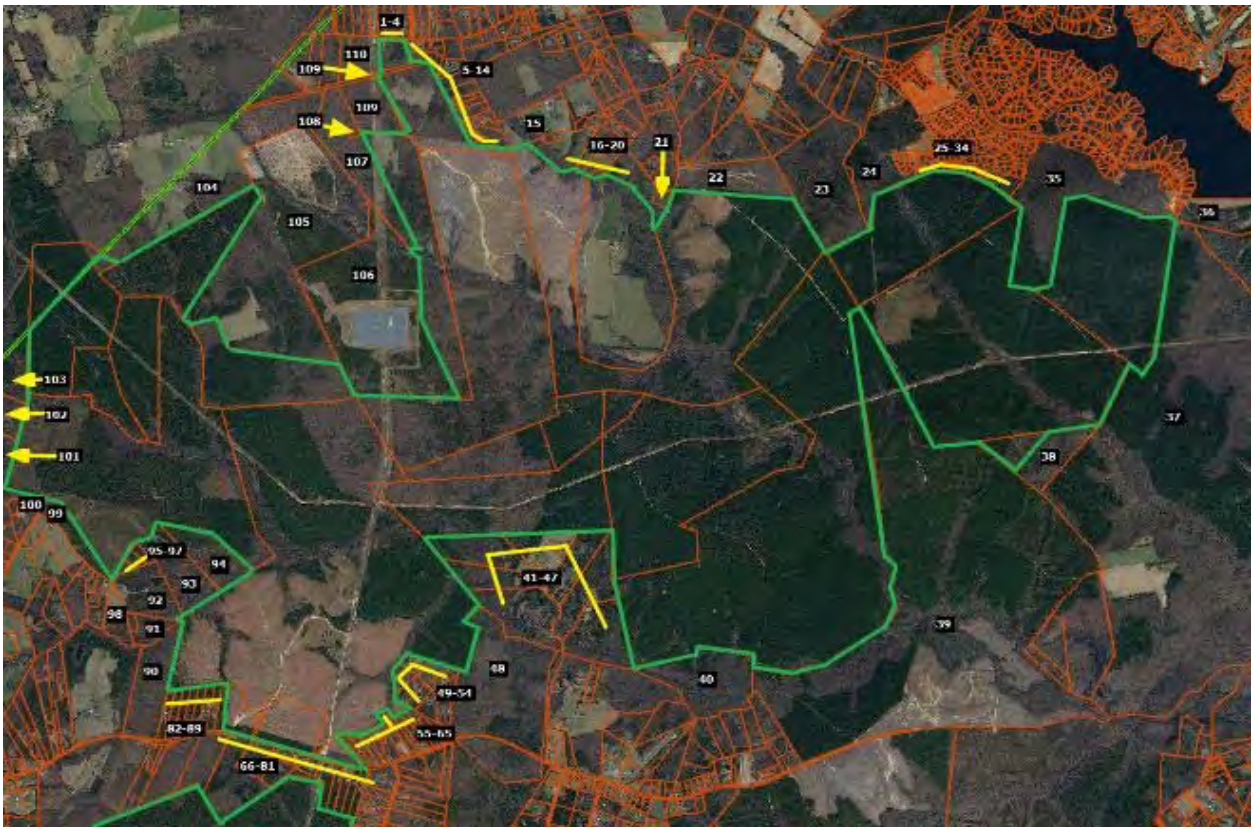
I have considered the 2018 sale of Parcel 17 as shown below. From Parcel 17 the retained trees and setbacks are a light to medium landscaped buffer.

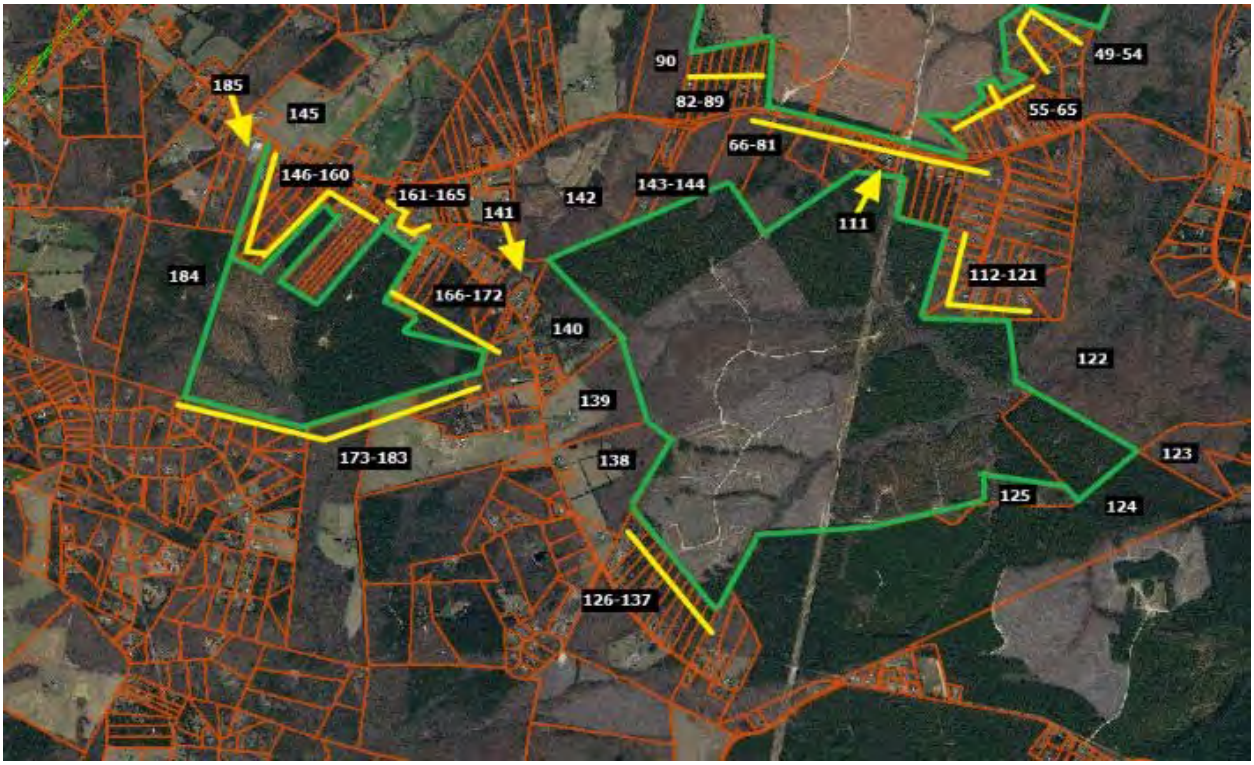
Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

9. Matched Pair – Spotsylvania Solar, Paytes, VA





This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
							Average Diff		4%	

I contacted Keith Snider to confirm this sale. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
							Average Diff		2%	

I contacted Annette Roberts with ReMax about this transaction. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
							Average Diff		-4%	

I contacted Joy Pearson with CTI Real Estate about this transaction. This is considered to have a heavy landscaping screen.

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 show no indication of any impact on property value.

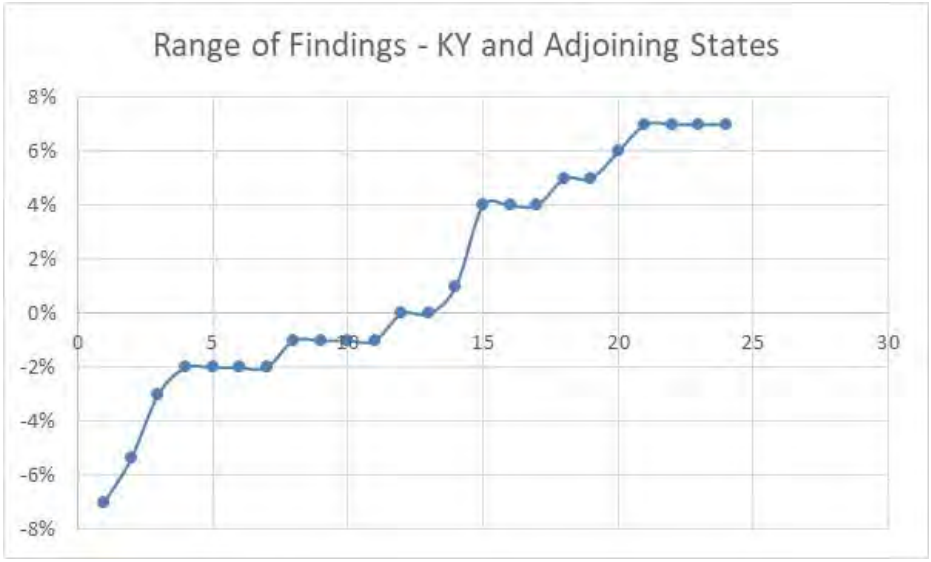
Conclusion

The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in far more urban areas. The median income for the population within 1 mile of a solar farm among this subset of matched pairs is $65,695 with a median housing unit value of $186,463. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in other states over $1,000,000 in price adjoining large solar farms. The predominate adjoining uses are residential and agricultural. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Kentucky and adjoining states as well as the proposed subject property.

Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

Matched Pair Summary							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Popl.	Med. Income	Avg. Housing Unit	Veg. Buffer
1	Crittenden	Crittenden	KY	34	2.70	40	22%	51%	27%	0%	1,419	$60,198	$178,643	Light
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
3	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037	Light
4	Portage	Portage	IN	56	2.00	0	19%	81%	0%	0%	6,642	$65,695	$186,463	Light
5	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515	Light
6	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
7	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
8	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Medium
9	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Med to Hvy
	Average			565	79.48	50	14%	72%	13%	0%	1,481	$70,241	$247,164	
	Median			160	20.00	40	13%	73%	10%	0%	467	$65,695	$186,463	
	High			3,500	617.00	160	37%	98%	46%	3%	6,642	$120,861	$483,333	
	Low			34	2.00	0	2%	39%	0%	0%	74	$40,936	$155,208	

On the following page is a summary of the matched pairs for all of the solar farms noted above. They show a pattern of results from -7% to +7%. As can be seen in the chart of those results below, most of the data points are between -2% and +5%. This variability is common with real estate and consistent with market "static." I therefore conclude that these results strongly support an indication of no impact on property value due to the adjacent solar farm.



Residential Dwelling Matched Pairs Adjoining Solar Farms

Pair	Solar Farm	City	State	MW	Approx Distance	Tax ID/Address	Date	Sale Price	Adj. Sale Price	% Diff	Veg. Buffer
1	Crittenden	Crittenden	KY	2.7	373	250 Claiborne	Jan-19	$120,000			Light
						315 N Fork	May-19	$107,000	$120,889	-1%	
2	Crittenden	Crittenden	KY	2.7	488	300 Claiborne	Sep-18	$213,000			Light
						1795 Bay Valley	Dec-17	$231,200	$228,180	-7%	
3	Crittenden	Crittenden	KY	2.7	720	350 Claiborne	Jul-18	$245,000			Light
						2160 Sherman	Jun-19	$265,000	$248,225	-1%	
4	Crittenden	Crittenden	KY	2.7	930	370 Claiborne	Aug-19	$273,000			Light
						125 Lexington	Apr-18	$240,000	$254,751	7%	
5	Mulberry	Selmer	TN	5	400	0900A011	Jul-14	$130,000			Light
						099CA043	Feb-15	$148,900	$136,988	-5%	
6	Mulberry	Selmer	TN	5	400	099CA002	Jul-15	$130,000			Light
						0990NA040	Mar-15	$120,000	$121,200	7%	
7	Mulberry	Selmer	TN	5	480	491 Dusty	Oct-16	$176,000			Light
						35 April	Aug-16	$185,000	$178,283	-1%	
8	Mulberry	Selmer	TN	5	650	297 Country	Sep-16	$150,000			Medium
						53 Glen	Mar-17	$126,000	$144,460	4%	
9	Mulberry	Selmer	TN	5	685	57 Cooper	Feb-19	$163,000			Medium
						191 Amelia	Aug-18	$132,000	$155,947	4%	
10	Grand Ridge	Streator	IL	20	480	1497 E 21st	Oct-16	$186,000			Light
						712 Columbus	Jun-16	$166,000	$184,000	1%	
11	Dominion	Indianapolis	IN	8.6	400	2013249 (Tax ID)	Dec-15	$140,000			Light
						5723 Minden	Nov-16	$139,900	$132,700	5%	
12	Dominion	Indianapolis	IN	8.6	400	2013251 (Tax ID)	Sep-17	$160,000			Light
						5910 Mosaic	Aug-16	$146,000	$152,190	5%	
13	Dominion	Indianapolis	IN	8.6	400	2013252 (Tax ID)	May-17	$147,000			Light
						5836 Sable	Jun-16	$141,000	$136,165	7%	
14	Dominion	Indianapolis	IN	8.6	400	2013258 (Tax ID)	Dec-15	$131,750			Light
						5904 Minden	May-16	$130,000	$134,068	-2%	
15	Dominion	Indianapolis	IN	8.6	400	2013260 (Tax ID)	Mar-15	$127,000			Light
						5904 Minden	May-16	$130,000	$128,957	-2%	
16	Dominion	Indianapolis	IN	8.6	400	2013261 (Tax ID)	Feb-14	$120,000			Light
						5904 Minden	May-16	$130,000	$121,930	-2%	
17	Clarke Cnty	White Post	VA	20	1230	833 Nations Spr	Jan-17	$295,000			Light
						6801 Middle	Dec-17	$249,999	$296,157	0%	
18	Walker	Barhamsville	VA	20	250	5241 Barham	Oct-18	$264,000			Light
						9252 Ordinary	Jun-19	$277,000	$246,581	7%	
19	Clarke Cnty	White Post	VA	20	1230	833 Nations Spr	Aug-19	$385,000			Light
						2393 Old Chapel	Aug-20	$330,000	$389,286	-1%	
20	Sappony	Stony Creek	VA	20	1425	12511 Palestine	Jul-18	$128,400			Medium
						6494 Rocky Branch	Nov-18	$100,000	$131,842	-3%	
21	Spotsylvania	Paytes	VA	617	1270	12901 Orange Plnk	Aug-20	$319,900			Medium
						12717 Flintlock	Dec-20	$290,000	$326,767	-2%	
22	Spotsylvania	Paytes	VA	617	1950	9641 Nottoway	May-20	$449,900			Medium
						11626 Forest	Aug-20	$489,900	$430,246	4%	
23	Spotsylvania	Paytes	VA	617	1171	13353 Post Oak	Sep-20	$300,000			Heavy
						12810 Catharpin	Jan-20	$280,000	$299,008	0%	

	MW	Avg. Distance
	106.72	738
	8.60	480
	617.00	1,950
	5.00	250

	Indicated Impact
Average	1%
Median	0%
High	7%
Low	-5%

I have further broken down these results based on the MWs, Landscaping, and distance from panel to show the following range of findings for these different categories.

This breakdown shows no homes between 100-200 homes. Solar farms up to 75 MW show homes between 201 and 500 feet with no impact on value. Most of the findings are for homes between 201 and 500 feet.

Light landscaping screens are showing no impact on value at any distances, though solar farms over 75.1 MW only show Medium and Heavy landscaping screens in the 3 examples identified.

MW Range 4.4 to 10									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	0	11	2	0	0	2	0	0	0
Average	N/A	1%	N/A	N/A	N/A	4%	N/A	N/A	N/A
Median	N/A	-1%	N/A	N/A	N/A	4%	N/A	N/A	N/A
High	N/A	7%	N/A	N/A	N/A	4%	N/A	N/A	N/A
Low	N/A	-5%	N/A	N/A	N/A	4%	N/A	N/A	N/A

10.1 to 30									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	0	2	2	0	0	1	0	0	0
Average	N/A	4%	-1%	N/A	N/A	-3%	N/A	N/A	N/A
Median	N/A	4%	-1%	N/A	N/A	-3%	N/A	N/A	N/A
High	N/A	7%	0%	N/A	N/A	-3%	N/A	N/A	N/A
Low	N/A	1%	-1%	N/A	N/A	-3%	N/A	N/A	N/A

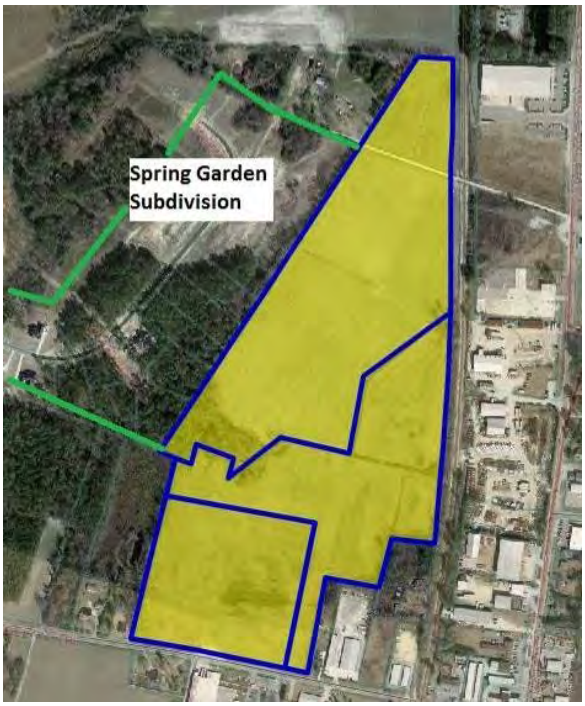
30.1 to 75									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	0	0	0	0	0	0	0	0	0
Average	N/A	1%	0%	N/A	N/A	0%	N/A	N/A	N/A
Median	N/A	1%	0%	N/A	N/A	0%	N/A	N/A	N/A
High	N/A	2%	2%	N/A	N/A	9%	N/A	N/A	N/A
Low	N/A	1%	-2%	N/A	N/A	-7%	N/A	N/A	N/A

75.1+									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	0	0	0	0	0	2	0	0	1
Average	N/A	N/A	N/A	N/A	N/A	1%	N/A	N/A	0%
Median	N/A	N/A	N/A	N/A	N/A	1%	N/A	N/A	0%
High	N/A	N/A	N/A	N/A	N/A	4%	N/A	N/A	0%
Low	N/A	N/A	N/A	N/A	N/A	-2%	N/A	N/A	0%

B. Southeastern USA Data – Over 5 MW

I note that there is necessarily some overlap in the Regional data shown on the following pages and the data presented in Kentucky and the adjoining states. I have reshown the redundant solar farms just for consistency.

1. Matched Pair – AM Best Solar Farm, Goldsboro, NC



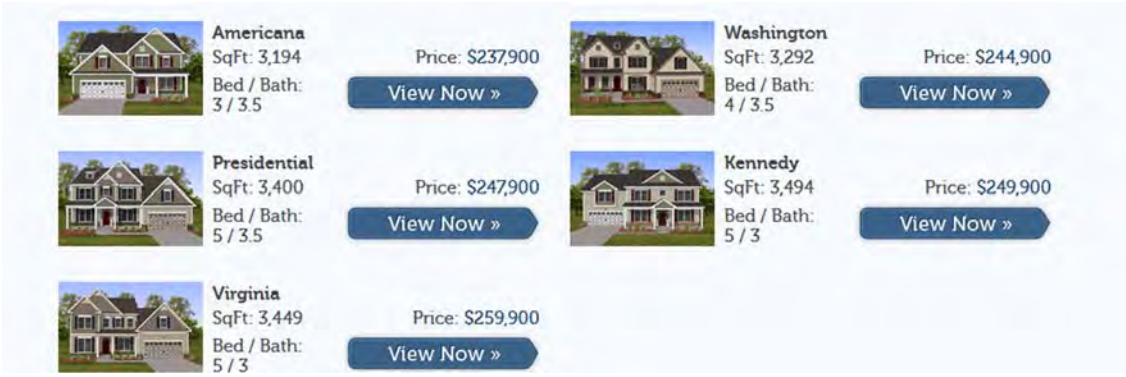
This 5 MW solar farm adjoins Spring Garden Subdivision which had new homes and lots available for new construction during the approval and construction of the solar farm. The recent home sales have ranged from $200,000 to $250,000. This subdivision sold out the last homes in late 2014. The solar farm is clearly visible particularly along the north end of this street where there is only a thin line of trees separating the solar farm from the single-family homes.

Homes backing up to the solar farm are selling at the same price for the same floor plan as the homes that do not back up to the solar farm in this subdivision. According to the builder, the solar farm has been a complete non-factor. Not only do the sales show no difference in the price paid for the various homes adjoining the solar farm versus not adjoining the solar farm, but there are actually more recent sales along the solar farm than not. There is no impact on the sellout rate, or time to sell for the homes adjoining the solar farm.

I spoke with a number of owners who adjoin the solar farm and none of them expressed any concern over the solar farm impacting their property value.

The data presented on the following page shows multiple homes that have sold in 2013 and 2014 adjoining the solar farm at prices similar to those not along the solar farm. These series of sales indicate that the solar farm has no impact on the adjoining residential use.

The homes that were marketed at Spring Garden are shown below.



The homes adjoining the solar farm are considered to have a light landscaping screen as it is a narrow row of existing pine trees supplemented with evergreen plantings.

Matched Pairs
As of Date: 9/3/2014

Adjoining Sales After Solar Farm Completed

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600195570	Helm	0.76	Sep-13	$250,000	2013	3,292	$75.94	2 Story
3600195361	Leak	1.49	Sep-13	$260,000	2013	3,652	$71.19	2 Story
3600199891	McBrayer	2.24	Jul-14	$250,000	2014	3,292	$75.94	2 Story
3600198632	Foresman	1.13	Aug-14	$253,000	2014	3,400	$74.41	2 Story
3600196656	Hinson	0.75	Dec-13	$255,000	2013	3,453	$73.85	2 Story
	Average	1.27		$253,600	2013.4	3,418	$74.27	
	Median	1.13		$253,000	2013	3,400	$74.41	

Adjoining Sales After Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
0	Feddersen	1.56	Feb-13	$247,000	2012	3,427	$72.07	Ranch
0	Gentry	1.42	Apr-13	$245,000	2013	3,400	$72.06	2 Story
	Average	1.49		$246,000	2012.5	3,414	$72.07	
	Median	1.49		$246,000	2012.5	3,414	$72.07	

Adjoining Sales Before Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600183905	Carter	1.57	Dec-12	$240,000	2012	3,347	$71.71	1.5 Story
3600193097	Kelly	1.61	Sep-12	$198,000	2012	2,532	$78.20	2 Story
3600194189	Hadwan	1.55	Nov-12	$240,000	2012	3,433	$69.91	1.5 Story
	Average	1.59		$219,000	2012	2,940	$74.95	
	Median	1.59		$219,000	2012	2,940	$74.95	

Nearby Sales After Solar Farm Completed

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600193710	Barnes	1.12	Oct-13	$248,000	2013	3,400	$72.94	2 Story
3601105180	Nackley	0.95	Dec-13	$253,000	2013	3,400	$74.41	2 Story
3600192528	Mattheis	1.12	Oct-13	$238,000	2013	3,194	$74.51	2 Story
3600198928	Beckman	0.93	Mar-14	$250,000	2014	3,292	$75.94	2 Story
3600196965	Hough	0.81	Jun-14	$224,000	2014	2,434	$92.03	2 Story
3600193914	Preskitt	0.67	Jun-14	$242,000	2014	2,825	$85.66	2 Story
3600194813	Bordner	0.91	Apr-14	$258,000	2014	3,511	$73.48	2 Story
3601104147	Shaffer	0.73	Apr-14	$255,000	2014	3,453	$73.85	2 Story
	Average	0.91		$246,000	2013.625	3,189	$77.85	
	Median	0.92		$249,000	2014	3,346	$74.46	

Nearby Sales Before Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600191437	Thomas	1.12	Sep-12	$225,000	2012	3,276	$68.68	2 Story
3600087968	Lilley	1.15	Jan-13	$238,000	2012	3,421	$69.57	1.5 Story
3600087654	Burke	1.26	Sep-12	$240,000	2012	3,543	$67.74	2 Story
3600088796	Hobbs	0.73	Sep-12	$228,000	2012	3,254	$70.07	2 Story
	Average	1.07		$232,750	2012	3,374	$69.01	
	Median	1.14		$233,000	2012	3,349	$69.13	

Matched Pair Summary

	Adjoins Solar Farm		Nearby Solar Farm	
	Average	**Median**	**Average**	**Median**
Sales Price	$253,600	$253,000	$246,000	$249,000
Year Built	2013	2013	2014	2014
Size	3,418	3,400	3,189	3,346
Price/SF	$74.27	$74.41	$77.85	$74.46

Percentage Differences

Median Price	-2%
Median Size	-2%
Median Price/SF	0%

I note that 2308 Granville Drive sold again in November 2015 for $267,500, or $7,500 more than when it was purchased new from the builder two years earlier (Tax ID 3600195361, Owner: Leak). The neighborhood is clearly showing appreciation for homes adjoining the solar farm.

The Median Price is the best indicator to follow in any analysis as it avoids outlying samples that would otherwise skew the results. The median sizes and median prices are all consistent throughout the sales both before and after the solar farm whether you look at sites adjoining or nearby to the solar farm. The average size for the homes nearby the solar farm shows a smaller building size and a higher price per square foot. This reflects a common occurrence in real estate where the price per square foot goes up as the size goes down. So even comparing averages the indication is for no impact, but I rely on the median rates as the most reliable indication for any such analysis.

I have also considered four more recent resales of homes in this community as shown on the following page. These comparable sales adjoin the solar farm at distances ranging from 315 to 400 feet. The matched pairs show a range from -9% to +6%. The range of the average difference is -2% to +1% with an average of 0% and a median of +0.5%. These comparable sales support a finding of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	103 Granville Pl	1.42	7/27/2018	$265,000	2013	3,292	$80.50	4/3.5	2-Car	2-Story		385
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	103 Granville Pl								$265,000		-2%
Not	2219 Granville	$4,382		$1,300	$0				$265,682	0%	
Not	634 Friendly	-$8,303		-$6,675	$16,721	-$10,000			$258,744	2%	
Not	2403 Granville	-$6,029		-$1,325	$31,356				$289,001	-9%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	104 Erin	2.24	6/19/2017	$280,000	2014	3,549	$78.90	5/3.5	2-Car	2-Story		315
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	104 Erin								$280,000		0%
Not	2219 Granville	-$4,448		$2,600	$16,238				$274,390	2%	
Not	634 Friendly	-$17,370		-$5,340	$34,702	-$10,000			$268,992	4%	
Not	2403 Granville	-$15,029		$0	$48,285				$298,256	-7%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	2312 Granville	0.75	5/1/2018	$284,900	2013	3,453	$82.51	5/3.5	2-Car	2-Story		400
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2312 Granville								$284,900		1%
Not	2219 Granville	$2,476		$1,300	$10,173				$273,948	4%	
Not	634 Friendly	-$10,260		-$6,675	$27,986	-$10,000			$268,051	6%	
Not	2403 Granville	-$7,972		-$1,325	$47,956				$303,659	-7%	

Adjoining Residential Sales After Solar Farm Approved

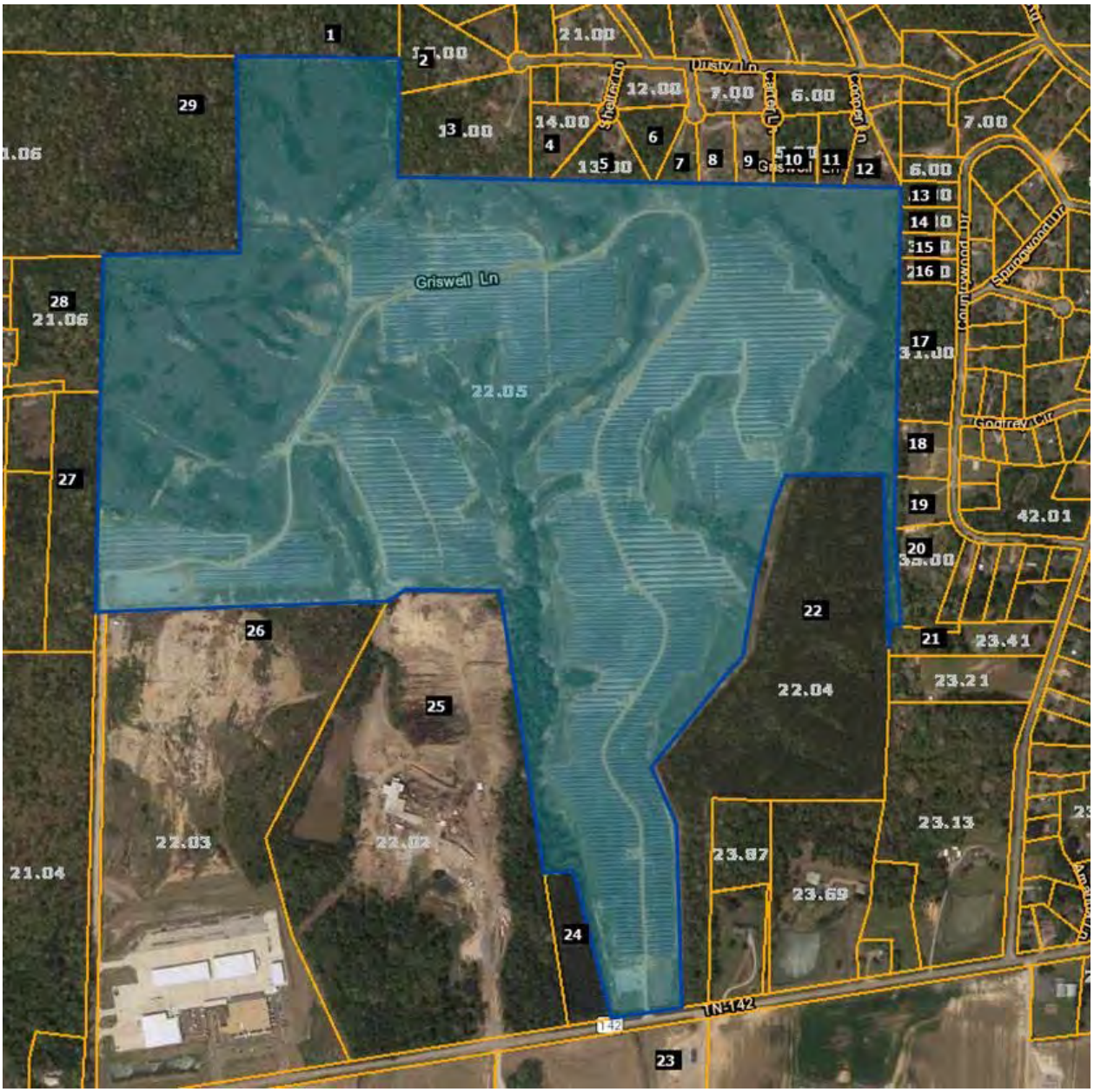
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	2310 Granville	0.76	5/14/2019	$280,000	2013	3,292	$85.05	5/3.5	2-Car	2-Story		400
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2310 Granville								$280,000		1%
Not	2219 Granville	$10,758		$1,300	$0				$272,058	3%	
Not	634 Friendly	-$1,755		-$6,675	$16,721	-$10,000			$265,291	5%	
Not	2403 Granville	$469		-$1,325	$31,356				$295,500	-6%	

I have also considered the original sales prices in this subdivision relative to the recent resale values as shown in the chart below. This rate of appreciation is right at 2.5% over the last 6 years. Zillow indicates that the average home value within the 27530 zip code as of January 2014 was $101,300 and as of January 2020 that average is $118,100. This indicates an average increase in the market of 2.37%. I conclude that the appreciation of the homes adjoining the solar farm are not impacted by the presence of the solar farm based on this data.

	Address	Initial Sale Date	Price	Second Sale Date	Price	Year Diff	Apprec.	% Apprec.	Apprec. %/Year
1	103 Granville Pl	4/1/2013	$245,000	7/27/2018	$265,000	5.32	$20,000	8.16%	1.53%
2	105 Erin	7/1/2014	$250,000	6/19/2017	$280,000	2.97	$30,000	12.00%	4.04%
3	2312 Granville	12/1/2013	$255,000	5/1/2015	$262,000	1.41	$7,000	2.75%	1.94%
4	2312 Granville	5/1/2015	$262,000	5/1/2018	$284,900	3.00	$22,900	8.74%	2.91%
5	2310 Granville	8/1/2013	$250,000	5/14/2019	$280,000	5.79	$30,000	12.00%	2.07%
6	2308 Granville	9/1/2013	$260,000	11/12/2015	$267,500	2.20	$7,500	2.88%	1.31%
7	2304 Granville	9/1/2012	$198,000	6/1/2017	$225,000	4.75	$27,000	13.64%	2.87%
8	102 Erin	8/1/2014	$253,000	11/1/2016	$270,000	2.25	$17,000	6.72%	2.98%
								Average	2.46%
								Median	2.47%

2. Matched Pair – Mulberry, Selmer, TN



This 16 MW solar farm was built in 2014 on 208.89 acres with the closest home being 480 feet.

This solar farm adjoins two subdivisions with Central Hills having a mix of existing and new construction homes. Lots in this development have been marketed for $15,000 each with discounts offered for multiple lots being used for a single home site. I spoke with the agent with Rhonda Wheeler and Becky Hearnsberger with United County Farm & Home Realty who noted that they have seen no impact on lot or home sales due to the solar farm in this community.

I have included a map below as well as data on recent sales activity on lots that adjoin the solar farm or are near the solar farm in this subdivision both before and after the announced plan for this solar farm facility. I note that using the same method I used to breakdown the adjoining uses at the subject property I show that the predominant adjoining uses are residential and agricultural, which is consistent with the location of most solar farms.

Adjoining Use Breakdown

	Acreage	Parcels
Commercial	3.40%	0.034
Residential	12.84%	79.31%
Agri/Res	10.39%	3.45%
Agricultural	73.37%	13.79%
Total	**100.00%**	**100.00%**

I have run a number of direct matched comparisons on the sales adjoining this solar farm as shown below. These direct matched pairs include some of those shown above as well as additional more recent sales in this community. In each of these I have compared the one sale adjoining the solar farm to multiple similar homes nearby that do not adjoin a solar farm to look for any potential impact from the solar farm.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
3	Adjoins	491 Dusty	6.86	10/28/2016	$176,000	2009	1,801	$97.72	3/2	2-Gar	Ranch	
	Not	820 Lake Trail	1.00	6/8/2018	$168,000	2013	1,869	$89.89	4/2	2-Gar	Ranch	
	Not	262 Country	1.00	1/17/2018	$145,000	2000	1,860	$77.96	3/2	2-Gar	Ranch	
	Not	35 April	1.15	8/16/2016	$185,000	2016	1,980	$93.43	3/2	2-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
3	Adjoins	491 Dusty							$176,000		480
	Not	820 Lake Trail	-$8,324	$12,000	-$3,360	-$4,890			$163,426	7%	
	Not	262 Country	-$5,450	$12,000	$6,525	-$3,680			$154,396	12%	
	Not	35 April	$1,138	$12,000	-$6,475	-$13,380			$178,283	-1%	
									Average	6%	

The best matched pair is 35 April Loop, which required the least adjustment and indicates a -1% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
12	Adjoins	57 Cooper	1.20	2/26/2019	$163,000	2011	1,586	$102.77	3/2	2-Gar	1.5 Story	Pool
	Not	191 Amelia	1.00	8/3/2018	$132,000	2005	1,534	$86.05	3/2	Drive	Ranch	
	Not	75 April	0.85	3/17/2017	$134,000	2012	1,588	$84.38	3/2	2-Crprt	Ranch	
	Not	345 Woodland	1.15	12/29/2016	$131,000	2002	1,410	$92.91	3/2	1-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
12	Adjoins	57 Cooper	$163,000							$163,000		685
	Not	191 Amelia	$132,000	$2,303		$3,960	$2,685	$10,000	$5,000	$155,947	4%	
	Not	75 April	$134,000	$8,029	$4,000	-$670	-$135	$5,000	$5,000	$155,224	5%	
	Not	345 Woodland	$131,000	$8,710		$5,895	$9,811		$5,000	$160,416	2%	
										Average	4%	

The best matched pair is 191 Amelia, which was most similar in time frame of sale and indicates a +4% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
15	Adjoins	297 Country	1.00	9/30/2016	$150,000	2002	1,596	$93.98	3/2	4-Gar	Ranch	
	Not	185 Dusty	1.85	8/17/2015	$126,040	2009	1,463	$86.15	3/2	2-Gar	Ranch	
	Not	53 Glen	1.13	3/9/2017	$126,000	1999	1,475	$85.42	3/2	2-Gar	Ranch	Brick

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
15	Adjoins	297 Country	$150,000							$150,000		650
	Not	185 Dusty	$126,040	$4,355		-$4,411	$9,167	$10,000		$145,150	3%	
	Not	53 Glen	$126,000	-$1,699		$1,890	$8,269	$10,000		$144,460	4%	
										Average	3%	

The best matched pair is 53 Glen, which was most similar in time frame of sale and required less adjustment. It indicates a +4% increase in value due to the solar farm adjacency.

The average indicated impact from these three sets of matched pairs is +4%, which suggests a mild positive relationship due to adjacency to the solar farm. The landscaping buffer for this project is mostly natural tree growth that was retained as part of the development but much of the trees separating the panels from homes are actually on the lots for the homes themselves. I therefore consider the landscaping buffer to be thin to moderate for these adjoining homes.

I have also looked at several lot sales in this subdivision as shown below.

These are all lots within the same community and the highest prices paid are for lots one parcel off from the existing solar farm. These prices are fairly inconsistent, though they do suggest about a $3,000 loss in the lots adjoining the solar farm. This is an atypical finding and additional details suggest there is more going on in these sales than the data crunching shows. First of all Parcel 4 was purchased by the owner of the adjoining home and therefore an atypical buyer seeking to expand a lot and the site is not being purchased for home development. Moreover, using the SiteToDoBusiness demographic tools, I found that the 1-mile radius around this development is expecting a total population increase over the next 5 years of 3 people. This lack of growing demand for lots is largely explained in that context. Furthermore, the fact that finished home sales as shown above are showing no sign of a negative impact on property value makes this data unreliable and inconsistent with the data shown in sales to an end user. I therefore place little weight on this outlier data.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	4/18/2019 Adj for Time	$/AC	4/18/2019 Adj for Time
4	Adjoins	Shelter	2.05	10/25/2017	$16,000	$16,728	$7,805	$8,160
10	Adjoins	Carter	1.70	8/2/2018	$14,000	$14,306	$8,235	$8,415
11	Adjoins	Cooper	1.28	9/17/2018	$12,000	$12,215	$9,375	$9,543
	Not	75 Dusty	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976
	Not	Lake Trl	1.47	11/7/2018	$13,000	$13,177	$8,844	$8,964
	Not	Lake Trl	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976

	Adjoins	Per Acre	Not Adjoins	Per Acre	% DIF/Lot	% DIF/AC
Average	$14,416	$8,706	$17,726	$10,972	19%	21%
Median	$14,306	$8,415	$20,000	$11,976	28%	30%
High	$16,728	$9,543	$20,000	$11,976	16%	20%
Low	$12,215	$8,160	$13,177	$8,964	7%	9%

3. Matched Pair – Leonard Road Solar Farm, Hughesville, MD

This 5 MW solar farm is located on 47 acres and mostly adjoins agricultural and residential uses to the west, south and east as shown above. The property also adjoins retail uses and a church. I looked at a 2016 sale of an adjoining home with a positive impact on value adjoining the solar farm of 2.90%. This is within typical market friction and supports an indication of no impact on property value.

I have shown this data below. The landscaping buffer is considered heavy.

Leonardtown Road Solar Farm, Hughesville, MD

Nearby Residential Sale After Solar Farm Construction

Address	Solar Farm	Acres	Date Sold	Sales Price*	Built	GBA	$/GBA	Style	BR/BA	Bsmt	Park	Upgrades	Other
14595 Box Elder Ct	Adjoins	3.00	2/12/2016	$291,000	1991	2,174	$133.85	Colonial	5/2.5	No	2 Car Att	N/A	Deck
15313 Bassford Rd	Not	3.32	7/20/2016	$329,800	1990	2,520	$130.87	Colonial	3/2.5	Finished	2 Car Att	Custom	Scr Por/Patio

*$9,000 concession deducted from sale price for Box Elder and $10,200 deducted from Bassford

Adjoining Sales Adjusted			Adjustments					
Address	Date Sold	Sales Price	Time	GLA	Bsmt	Upgrades	Other	Total
14595 Box Elder Ct	2/12/2016	$291,000						$291,000
15313 Bassford Rd	7/20/2016	$329,800	-$3,400	-$13,840	-$10,000	-$15,000	-$5,000	$282,560

Difference Attributable to Location $8,440
2.90%

This is within typical market friction and supports an indication of no impact on property value.

4. Matched Pair – Gastonia SC Solar, Gastonia, NC

This 5 MW project is located on the south side of Neal Hawkins Road just outside of Gastonia. The property identified above as Parcel 4 was listed for sale while this solar farm project was going

through the approval process. The property was put under contract during the permitting process with the permit being approved while the due diligence period was still ongoing. After the permit was approved the property closed with no concerns from the buyer. I spoke with Jennifer Bouvier, the broker listing the property and she indicated that the solar farm had no impact at all on the sales price. She considered some nearby sales to set the price and the closing price was very similar to the asking price within the typical range for the market. The buyer was aware that the solar farm was coming and they had no concerns.

This two-story brick dwelling was sold on March 20, 2017 for $270,000 for a 3,437 square foot dwelling built in 1934 in average condition on 1.42 acres. The property has four bedrooms and two bathrooms. The landscaping screen is light for this adjoining home due to it being a new planted landscaping buffer.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	609 Neal Hawkins	1.42	3/20/2017	$270,000	1934	3,427	$78.79	4/2	Open	2-Brick	
Not	1418 N Modena	4.81	4/17/2018	$225,000	1930	2,906	$77.43	3/3	2-Crprt	2-Brick	
Not	363 Dallas Bess	2.90	11/29/2018	$265,500	1968	2,964	$89.57	3/3	Open	FinBsmt	
Not	1612 Dallas Chry	2.74	9/17/2018	$245,000	1951	3,443	$71.16	3/2	Open	2-Brick	Unfin bath

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
609 Neal Hawkins								$270,000			225
1418 N Modena	$7,319		$2,700	$32,271		-$10,000		$257,290	5%		
363 Dallas Bess	$746		-$27,081	$33,179	-$10,000		$53,100	$262,456	3%		
1612 Dallas Chry	$4,110		-$12,495	-$911			$10,000	$235,704	13%		
										7%	

I also considered the newer adjoining home identified as Parcel 5 that sold later in 2017 and it likewise shows no negative impact on property value. This is also considered a light landscaping buffer.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style
Adjoins	611 Neal Hawkins	0.78	7/6/2017	$288,000	1991	2,256	$127.66	5/3	2-Gar	1.5 Brick
Not	1211 Still Frst	0.51	7/30/2018	$280,000	1989	2,249	$124.50	3/3	2-Gar	Br Rnch
Not	2867 Colony Wds	0.52	8/14/2018	$242,000	1990	2,006	$120.64	3/3	2-Gar	Br Rnch
Not	1010 Strawberry	1.00	10/4/2018	$315,000	2002	2,330	$135.19	3/2.5	2-Gar	1.5 Brick

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
611 Neal Hawkins								$288,000			145
1211 Still Frst	$1,341		$2,800	$697				$284,838	1%		
2867 Colony Wds	$7,714		$1,210	$24,128				$275,052	4%		
1010 Strawberry	-$4,555		-$17,325	-$8,003	$5,000			$290,116	-1%		
										2%	

5. Matched Pair – Summit/Ranchlands Solar, Moyock, NC

This project is located at 1374 Caritoke Highway, Moyock, NC. This is an 80 MW facility on a parent tract of 2,034 acres. Parcels Number 48 and 53 as shown in the map above were sold in 2016. The project was under construction during the time period of the first of the matched pair sales and the permit was approved well prior to that in 2015.

I looked at multiple sales of adjoining and nearby homes and compared each to multiple comparables to show a range of impacts from -10% up to +11% with an average of +2% and a median of +3%. These ranges are well within typical real estate variation and supports an indication of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
48	Adjoins	129 Pinto	4.29	4/15/2016	$170,000	1985	1,559	$109.04	3/2	Drive	MFG		1,060
	Not	102 Timber	1.30	4/1/2016	$175,500	2009	1,352	$129.81	3/2	Drive	MFG		
	Not	120 Ranchland	0.99	10/1/2014	$170,000	2002	1,501	$113.26	3/2	Drive	MFG		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	129 Pinto								$170,000		-3%
Not	102 Timber	$276	$10,000	-$29,484	$18,809				$175,101	-3%	
Not	120 Ranchland	$10,735	$10,000	-$20,230	$4,598				$175,103	-3%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	105 Pinto	4.99	12/16/2016	$206,000	1978	1,484	$138.81	3/2	Det G	Ranch	
Not	111 Spur	1.15	2/1/2016	$193,000	1985	2,013	$95.88	4/2	Gar	Ranch	
Not	103 Marshall	1.07	3/29/2017	$196,000	2003	1,620	$120.99	3/2	Drive	Ranch	
Not	127 Ranchland	0.00	6/9/2015	$219,900	1988	1,910	$115.13	3/2	Gar/3Det	Ranch	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
105 Pinto								$206,000			980
111 Spur	$6,747	$10,000	-$6,755	-$25,359				$177,633	14%		
103 Marshall	-$2,212	$10,000	-$24,500	-$8,227		$5,000		$176,212	14%		
127 Ranchland	$13,399	$10,000	-$10,995	-$24,523		-$10,000		$197,781	4%		
										11%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
15	Adjoins	318 Green View	0.44	9/15/2019	$357,000	2005	3,460	$103.18	4/4	2-Car	1.5 Brick		570
	Not	195 St Andrews	0.55	6/17/2018	$314,000	2002	3,561	$88.18	5/3	2-Car	2.0 Brick		
	Not	336 Green View	0.64	1/13/2019	$365,000	2006	3,790	$96.31	6/4	3-Car	2.0 Brick		
	Not	275 Green View	0.36	8/15/2019	$312,000	2003	3,100	$100.65	5/3	2-Car	2.0 Brick		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	318 Green View								$357,000		4%
Not	195 St Andrews	$12,040		$4,710	-$7,125	$10,000			$333,625	7%	
Not	336 Green View	$7,536		-$1,825	-$25,425			-$5,000	$340,286	5%	
Not	275 Green View	$815		$3,120	$28,986	$10,000			$354,921	1%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
29	Adjoins	164 Ranchland	1.01	4/30/2019	$169,000	1999	2,052	$82.36	4/2	Gar	MFG		440
	Not	150 Pinto	0.94	3/27/2018	$168,000	2017	1,920	$87.50	4/2	Drive	MFG		
	Not	105 Longhorn	1.90	10/10/2017	$184,500	2002	1,944	$94.91	3/2	Drive	MFG		
	Not	112 Pinto	1.00	7/27/2018	$180,000	2002	1,836	$98.04	3/2	Drive	MFG	Fenced	

	Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
	Adjoins	164 Ranchland								$169,000		-10%
	Not	150 Pinto	$5,649		-$21,168	$8,085			$5,000	$165,566	2%	
	Not	105 Longhorn	$8,816	-$10,000	-$3,875	$7,175			$5,000	$191,616	-13%	
	Not	112 Pinto	$4,202		-$3,780	$14,824			$5,000	$200,245	-18%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	358 Oxford	10.03	9/16/2019	$478,000	2008	2,726	$175.35	3/3	2 Gar	Ranch		635
	Not	276 Summit	10.01	12/20/2017	$355,000	2006	1,985	$178.84	3/2	2 Gar	Ranch		
	Not	176 Providence	6.19	5/6/2019	$425,000	1990	2,549	$166.73	3/3	4 Gar	Ranch	Brick	
	Not	1601 B Caratoke	12.20	9/26/2019	$440,000	2016	3,100	$141.94	4/3.5	5 Gar	Ranch	Pool	

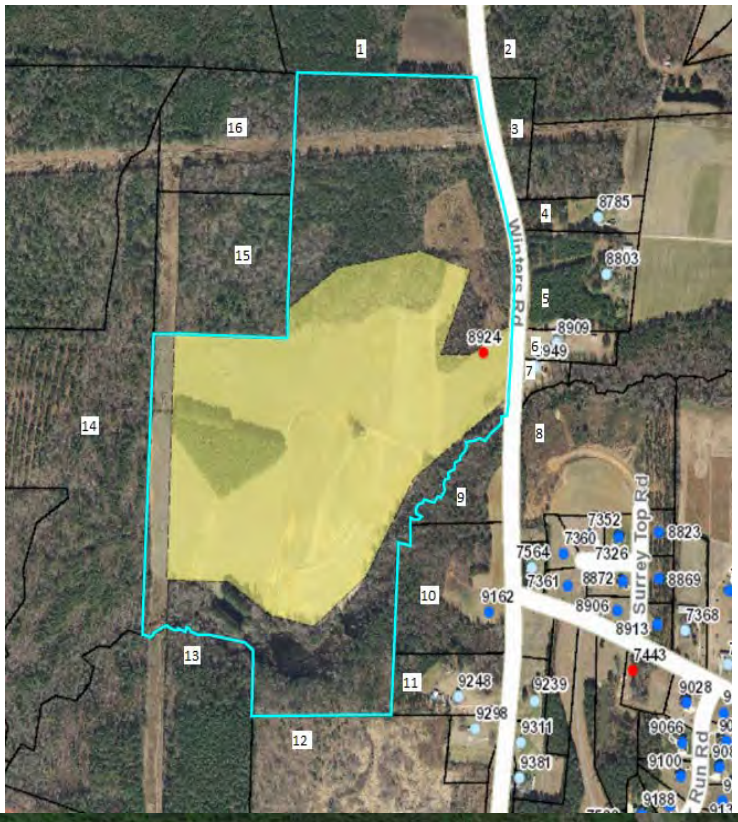
	Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
	Adjoins	358 Oxford								$478,000		5%
	Not	276 Summit	$18,996		$3,550	$106,017	$10,000			$493,564	-3%	
	Not	176 Providence	$4,763		$38,250	$23,609		-$10,000	-$25,000	$456,623	4%	
	Not	1601 B Caratoke	-$371	$50,000	-$17,600	-$42,467	-$5,000	-$10,000		$414,562	13%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Nearby	343 Oxford	10.01	3/9/2017	$490,000	2016	3,753	$130.56	3/3	2 Gar	1.5 Story	Pool	970
	Not	287 Oxford	10.01	9/4/2017	$600,000	2013	4,341	$138.22	5/4.5	8-Gar	1.5 Story	Pool	
	Not	301 Oxford	10.00	4/23/2018	$434,000	2013	3,393	$127.91	5/3	2 Gar	1.5 Story		
	Not	218 Oxford	10.01	4/4/2017	$525,000	2006	4,215	$124.56	4/3	4 Gar	1.5 Story	VG Barn	

	Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
	Adjoins	343 Oxford								$490,000		3%
	Not	287 Oxford	-$9,051		$9,000	-$65,017	-$15,000	-$25,000		$494,932	-1%	
	Not	301 Oxford	-$14,995	-$10,000	$6,510	$36,838				$452,353	8%	
	Not	218 Oxford	-$1,150		$26,250	-$46,036		-$10,000	-$10,000	$484,064	1%	

6. Matched Pair – Tracy Solar, Bailey, NC



This project is located in rural Nash County on Winters Road with a 5 MW facility that was built in 2016 on 50 acres. A local builder acquired parcels 9 and 10 following construction as shown below

at rates comparable to other tracts in the area. They then built a custom home for an owner and sold that at a price similar to other nearby homes as shown in the matched pair data below. The retained woods provide a heavy landscaped buffer for this homesite.

Adjoining Land Sales After Solar Farm Completed

#	Solar Farm	TAX ID	Grantor	Grantee	Address	Acres	Date Sold	Sales Price	$/AC	Other
9 &10	Adjoins	316003 & 316004	Cozart	Kingsmill	9162 Winters	13.22	7/21/2016	$70,000	$5,295	
	Not	6056	Billingsly		427 Young	41	10/21/2016	$164,000	$4,000	
	Not	33211	Fulcher	Weikel	10533 Cone	23.46	7/18/2017	$137,000	$5,840	Doublewide, structures
	Not	106807	Perry	Gardner	Claude Lewis	11.22	8/10/2017	$79,000	$7,041	Gravel drive for sub, cleared
	Not	3437	Vaughan	N/A	11354 Old Lewis Sch	18.73	Listing	$79,900	$4,266	Small cemetery,wooded

Adjoining Sales Adjusted

Time	Acres	Location	Other	Adj $/Ac	% Diff
				$5,295	
$0	$400	$0	$0	$4,400	17%
-$292	$292	$0	-$500	$5,340	-1%
-$352	$0	$0	-$1,000	$5,689	-7%
-$213	$0	$0	$213	$4,266	19%
				Average	7%

Adjoining Residential Sales After Solar Farm Completed

#	Solar Farm	n	Address	Acres	Date Sold	Sales Price	Built	GLA	$/GLA	BR/BA	Style	Other
9 &10	Adjoins	gs	9162 Winters	13.22	1/5/2017	$255,000	2016	1,616	$157.80	3/2	Ranch	1296 sf wrkshp
	Not	w	7352 Red Fox	0.93	6/30/2016	$176,000	2010	1,529	$115.11	3/2	2-story	

Adjoining Sales Adjusted

Time	Acres	YB	GLA	Style	Other	Total	% Diff
						$255,000	
$0	$44,000	$7,392	$5,007	$5,000	$15,000	$252,399	1%

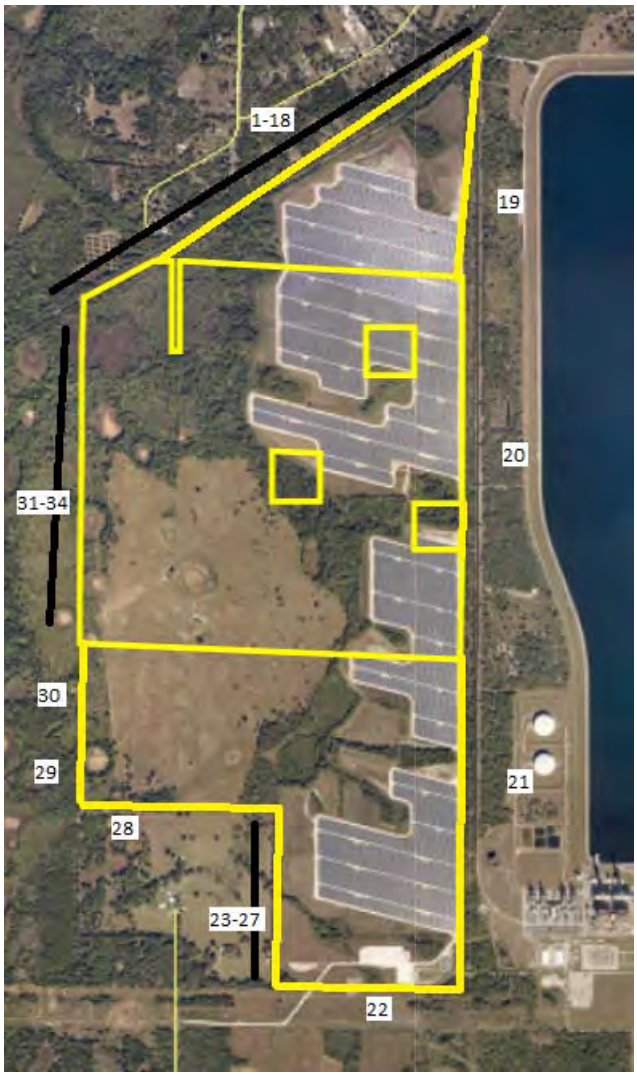
The comparables for the land show either a significant positive relationship or a mild negative relationship to having and adjoining solar farm, but when averaged together they show no negative impact. The wild divergence is due to the difficulty in comping out this tract of land and the wide variety of comparables used. The two comparables that show mild negative influences include a property that was partly developed as a residential subdivision and the other included a doublewide with some value and accessory agricultural structures. The tax assessed value on the improvements were valued at $60,000. So both of those comparables have some limitations for comparison. The two that show significant enhancement due to adjacency includes a property with a cemetery located in the middle and the other is a tract almost twice as large. Still that larger tract after adjustment provides the best matched pair as it required the least adjustment. I therefore conclude that there is no negative impact due to adjacency to the solar farm shown by this matched pair.

The dwelling that was built on the site was a build-to-suit and was compared to a nearby homesale of a property on a smaller parcel of land. I adjusted for that differenced based on a $25,000 value for a 1-acre home site versus the $70,000 purchase price of the larger subject tract. The other adjustments are typical and show no impact due to the adjacency to the solar farm.

The closest solar panel to the home is 780 feet away.

I note that the representative for Kingsmill Homes indicated that the solar farm was never a concern in purchasing the land or selling the home. He also indicated that they had built a number of nearby homes across the street and it had never come up as an issue.

7. Matched Pair – Manatee Solar Farm, Parrish, FL



This solar farm is located near Seminole Trail, Parrish, FL. The solar farm has a 74.50 MW output and is located on a 1,180.38 acre tract and was built in 2016. The tract is owned by Florida Power & Light Company.

I have considered the recent sale of 13670 Highland Road, Wimauma, Florida. This one-story, concrete block home is located just north of the solar farm and separated from the solar farm by a railroad corridor. This home is a 3 BR, 3 BA 1,512 s.f. home with a carport and workshop. The property includes new custom cabinets, granite counter tops, brand new stainless steel appliances, updated bathrooms and new carpet in the bedrooms. The home is sitting on 5 acres. The home was built in 1997.

I have compared this sale to several nearby homesales as part of this matched pair analysis as shown below. The landscaping separating the home from the solar farm is considered heavy.

Solar	TAX ID/Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Note
Adjoins	13670 Highland	5.00	8/21/2017	$255,000	1997	1,512	$168.65	3/3	Carport/Wrkshp	Ranch	Renov.
Not	2901 Arrowsmith	1.91	1/31/2018	$225,000	1979	1,636	$137.53	3/2	2 Garage/Wrkshp	Ranch	
Not	602 Butch Cassidy	1.00	5/5/2017	$220,000	2001	1,560	$141.03	3/2	N/A	Ranch	Renov.
Not	2908 Wild West	1.23	7/12/2017	$254,000	2003	1,554	$163.45	3/2	2 Garage/Wrkshp	Ranch	Renov.
Not	13851 Highland	5.00	9/13/2017	$240,000	1978	1,636	$146.70	4/2	3 Garage	Ranch	Renov.

		Adjoining Sales Adjusted								
Solar	**TAX ID/Address**	**Time**	**Acres**	**YB**	**GLA**	**BR/BA**	**Park**	**Note**	**Total**	**% Diff**
Adjoins	13670 Highland								$255,000	
Not	2901 Arrowsmith	$2,250	$10,000	$28,350	-$8,527	$5,000	-$10,000	$10,000	$262,073	-3%
Not	602 Butch Cassidy	-$2,200	$10,000	-$6,160	-$3,385	$5,000	$2,000		$225,255	12%
Not	2908 Wild West	$0	$10,000	-$10,668	-$3,432	$5,000	-$10,000		$244,900	4%
Not	13851 Highland	$0	$0	$31,920	-$9,095	$3,000	-$10,000		$255,825	0%
									Average	3%

The sales prices of the comparables before adjustments range from $220,000 to $254,000. After adjustments they range from $225,255 to $262,073. The comparables range from no impact to a strong positive impact. The comparables showing -3% and +4% impact on value are considered within a typical range of value and therefore not indicative of any impact on property value.

This set of matched pair data falls in line with the data seen in other states. The closest solar panel to the home at 13670 Highland is 1,180 feet. There is a wooded buffer between these two properties.

I have included a map showing the relative location of these properties below.

8. Matched Pair – McBride Place Solar Farm, Midland, NC

This project is located on Mount Pleasant Road, Midland, North Carolina. The property is on 627 acres on an assemblage of 974.59 acres. The solar farm was approved in early 2017 for a 74.9 MW facility.

I have considered the sale of 4380 Joyner Road which adjoins the proposed solar farm near the northwest section. This property was appraised in April of 2017 for a value of $317,000 with no consideration of any impact due to the solar farm in that figure. The property sold in November

2018 for $325,000 with the buyer fully aware of the proposed solar farm. The landscaping buffer relative to Joyner Road, Hayden Way, Chanel Court and Kristi Lane is considered medium, while the landscaping for the home at the north end of Chanel Court is considered very light.

I have considered the following matched pairs to the subject property.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	4380 Joyner	12.00	11/22/2017	$325,000	1979	1,598	$203.38	3/2	2xGar	Ranch	Outbldg
Not	3870 Elkwood	5.50	8/24/2016	$250,000	1986	1,551	$161.19	3/2.5	Det 2xGar	Craft	
Not	8121 Lower Rocky	18.00	2/8/2017	$355,000	1977	1,274	$278.65	2/2	2xCarprt	Ranch	Eq. Fac.
Not	13531 Cabarrus	7.89	5/20/2016	$267,750	1981	2,300	$116.41	3/2	2xGar	Ranch	

Adjoining Sales Adjusted

Time	Acres	YB	Condition	GLA	BR/BA	Park	Other	Total	% Diff
								$325,000	
$7,500	$52,000	-$12,250	$10,000	$2,273	-$2,000	$2,500	$7,500	$317,523	2%
$7,100	-$48,000	$4,970		$23,156	$0	$3,000	-$15,000	$330,226	-2%
$8,033	$33,000	-$3,749	$20,000	-$35,832	$0	$0	$7,500	$296,702	9%
								Average	3%

The home at 4380 Joyner Road is 275 feet from the closest solar panel.

I also considered the recent sale of a lot at 5800 Kristi Lane that is on the east side of the proposed solar farm. This 4.22-acre lot sold in December 2017 for $94,000. A home was built on this lot in 2019 with the closest point from home to panel at 689 feet. The home site is heavily wooded and their remains a wooded buffer between the solar panels and the home. I spoke with the broker, Margaret Dabbs, who indicated that the solar farm was considered a positive by both buyer and seller as it insures no subdivision will be happening in that area. Buyers in this market are looking for privacy and seclusion.

The breakdown of recent lot sales on Kristi are shown below with the lowest price paid for the lot with no solar farm exposure, though that lot has exposure to Mt Pleasant Road South. Still the older lot sales have exposure to the solar farm and sold for higher prices than the front lot and adjusting for time would only increase that difference.

Adjoining Lot Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	$/AC	$/Lot
	Adjoins	5811 Kristi	3.74	5/1/2018	$100,000	$26,738	$100,000
	Adjoins	5800 Kristi	4.22	12/1/2017	$94,000	$22,275	$94,000
	Not	5822 Kristi	3.43	2/24/2020	$90,000	$26,239	$90,000

The lot at 5811 Kristi Lane sold in May 2018 for $100,000 for a 3.74-acre lot. The home that was built later in 2018 is 505 feet to the closest solar panel. This home then sold to a homeowner for $530,000 in April 2020. I have compared this home sale to other properties in the area as shown below.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5811 Kristi	3.74	3/31/2020	$530,000	2018	3,858	$137.38	5/3.5	2 Gar	2-story	Cement Ext
Not	3915 Tania	1.68	12/9/2019	$495,000	2007	3,919	$126.31	3/3.5	2 Gar	2-story	3Det Gar
Not	6782 Manatee	1.33	3/8/2020	$460,000	1998	3,776	$121.82	4/2/2h	2 Gar	2-story	Water
Not	314 Old Hickory	1.24	9/20/2019	$492,500	2017	3,903	$126.18	6/4.5	2 Gar	2-story	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	5811 Kristi								$530,000		5%
Not	3915 Tania	$6,285		$27,225	-$3,852		-$20,000		$504,657	5%	
Not	6782 Manatee	$1,189		$46,000	$4,995	$5,000			$517,183	2%	
Not	314 Old Hickory	$10,680		$2,463	-$2,839	-$10,000			$492,803	7%	

After adjusting the comparables, I found that the average adjusted value shows a slight increase in value for the subject property adjoining a solar farm. As in the other cases, this is a mild positive impact on value but within the typical range of real estate transactions.

I also looked at 5833 Kristi Lane that sold on 9/14/2020 for $625,000. This home is 470 feet from the closest panel.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Nearby	5833 Kristi	4.05	9/14/2020	$625,000	2008	4,373	$142.92	5/4	3-Car	2-Brick	
Not	4055 Dakeita	4.90	12/30/2020	$629,000	2005	4,427	$142.08	4/4	4-Car	2-Brick	4DetGar/Stable
Not	9615 Bales	2.16	6/30/2020	$620,000	2007	4,139	$149.79	4/5	3-Car	2-Stone	2DetGar
Not	9522 Bales	1.47	6/18/2020	$600,000	2007	4,014	$149.48	4/4.5	3-Car	2-Stone	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
5833 Kristi								$625,000			470
4055 Dakeita	-$9,220		$5,661	-$6,138		-$25,000		$594,303	5%		
9615 Bales	$6,455		$1,860	$28,042	-$10,000	-$15,000		$631,356	-1%		
9522 Bales	$7,233		$1,800	$42,930	-$5,000			$646,963	-4%		
										0%	

The average difference is 0% impact and the differences are all within a close range with this set of comparables and supports a finding of no impact on property value.

I have also looked at 4504 Chanel Court. This home sold on January 1, 2020 for $393,500 for this 3,010 square foot home built in 2004 with 3 bedroooms, 3.5 bathrooms, and a 3-car garage. This home includes a full partially finished basement that significantly complicates comparing this to other sales. This home previously sold on January 23, 2017 for $399,000. This was during the time that the solar farm was a known factor as the solar farm was approved in early 2017 and public discussions had already commenced. I spoke with Rachelle Killman with Real Estate Realty, LLC the buyer's agent for this transaction and she indicated that the solar farm was not a factor or consideration for the buyer. She noted that you could see the panels sort of through the trees, but it wasn't a concern for the buyer. She was not familiar with the earlier 2017 sale, but indicated that it was likely too high. This again goes back to the partially finished basement issue. The basement has a fireplace, and an installed 3/4 bathroom but otherwise bare studs and concrete floors with different buyers assigning varying value to that partly finished space. I also reached out to Don Gomez with Don Anthony Realty, LLC as he was the listing agent.

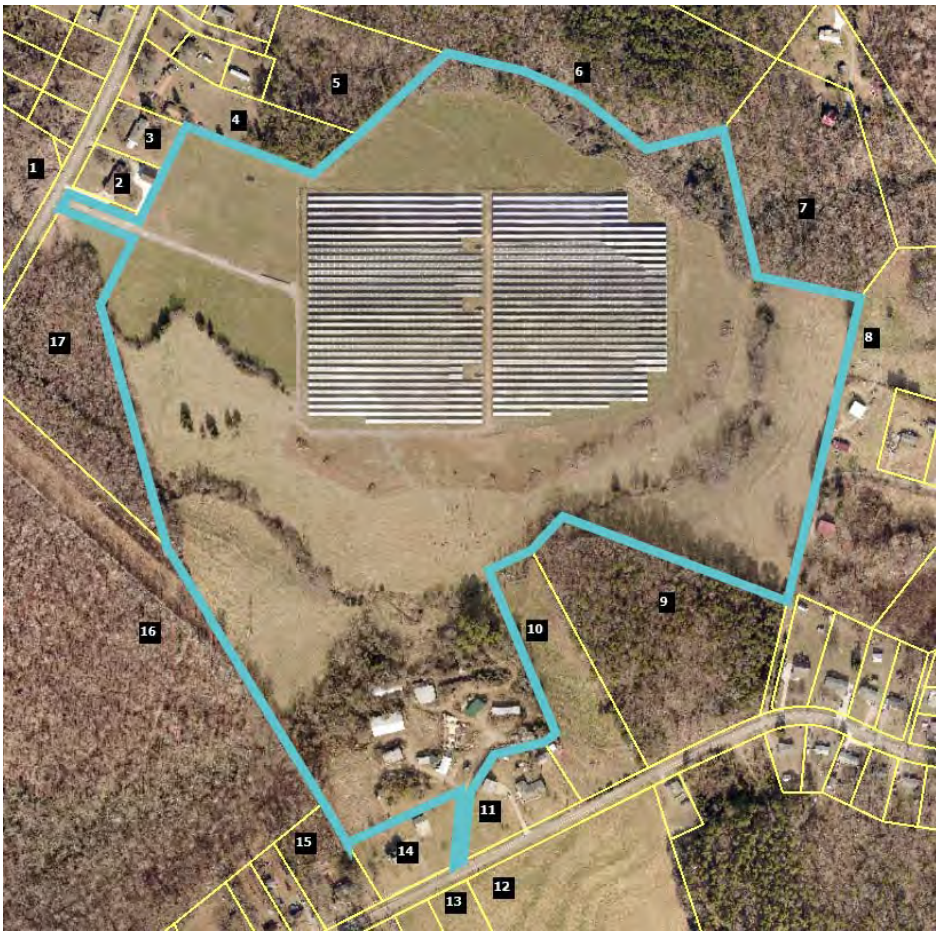
I also looked at the recent sale of 4599 Chanel Court. This home is within 310 feet of solar panels but notably does not have a good landscaping screen in place as shown in the photo below. The plantings appear to be less than 3-feet in height and only a narrow, limited screen of existing hardwoods were kept. The photograph is from the listing.

According to Scott David with Better Homes and Gardens Paracle Realty, this property was under contract for $550,000 contingent on the buyer being able to sell their former home. The former home was apparently overpriced and did not sell and the contract stretched out over 2.5 months.

The seller was in a bind as they had a home they were trying to buy contingent on this closing and were about to lose that opportunity. A cash buyer offered them a quick close at $500,000 and the seller accepted that offer in order to not lose the home they were trying to buy. According to Mr. David, the original contracted buyer and the actual cash buyer never considered the solar farm as a negative. In fact Mr. David noted that the actual buyer saw it as a great opportunity to purchase a home where a new subdivision could not be built behind his house. I therefore conclude that this property supports a finding of no impact on adjoining property, even where the landscaping screen still requires time to grow in for a year-round screen.

I also considered a sale/resale analysis on this property. This same home sold on September 15, 2015 for $462,000. Adjusting this upward by 5% per year for the five years between these sales dates suggests a value of $577,500. Comparing that to the $550,000 contract that suggests a 5% downward impact, which is within a typical market variation. Given that the broker noted no negative impact from the solar farm and the analysis above, I conclude this sale supports a finding of no impact on value.

9. Matched Pair – Mariposa Solar, Gaston County, NC



This project is a 5 MW facility located on 35.80 acres out of a parent tract of 87.61 acres at 517 Blacksnake Road, Stanley that was built in 2016.

I have considered a number of recent sales around this facility as shown below.

The first is identified in the map above as Parcel 1, which is 215 Mariposa Road. This is an older dwelling on large acreage with only one bathroom. I've compared it to similar nearby homes as shown below. The landscaping buffer for this home is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style
Adjoins	215 Mariposa	17.74	12/12/2017	$249,000	1958	1,551	$160.54	3/1	Garage	Br/Rnch
Not	249 Mariposa	0.48	3/1/2019	$153,000	1974	1,792	$85.38	4/2	Garage	Br/Rnch
Not	110 Airport	0.83	5/10/2016	$166,000	1962	2,165	$76.67	3/2	Crprt	Br/Rnch
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	1980	2,156	$112.48	3/2	Drive	1.5
Not	1201 Abernathy	27.00	5/3/2018	$390,000	1970	2,190	$178.08	3/2	Crprt	Br/Rnch

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Time**	**YB**	**Acres**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**
Adjoins	215 Mariposa	17.74	12/12/2017	$249,000								$249,000	
Not	249 Mariposa	0.48	3/1/2019	$153,000	-$5,583	-$17,136	$129,450	-$20,576	-$10,000			$229,154	8%
Not	110 Airport	0.83	5/10/2016	$166,000	$7,927	-$4,648	$126,825	-$47,078	-$10,000			$239,026	4%
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	-$5,621	-$37,345	$95,475	-$68,048	-$10,000	$5,000		$221,961	11%
Not	1201 Abernathy	27.00	5/3/2018	$390,000	-$4,552	-$32,760	-$69,450	-$60,705	-$10,000			$212,533	15%
											Average		9%

The average difference after adjusting for all factors is +9% on average, which suggests an enhancement due to the solar farm across the street. Given the large adjustments for acreage and size, I will focus on the low end of the adjusted range at 4%, which is within the typical deviation and therefore suggests no impact on value.

I have also considered Parcel 4 that sold after the solar farm was approved but before it had been constructed in 2016. The landscaping buffer for this parcel is considered light.

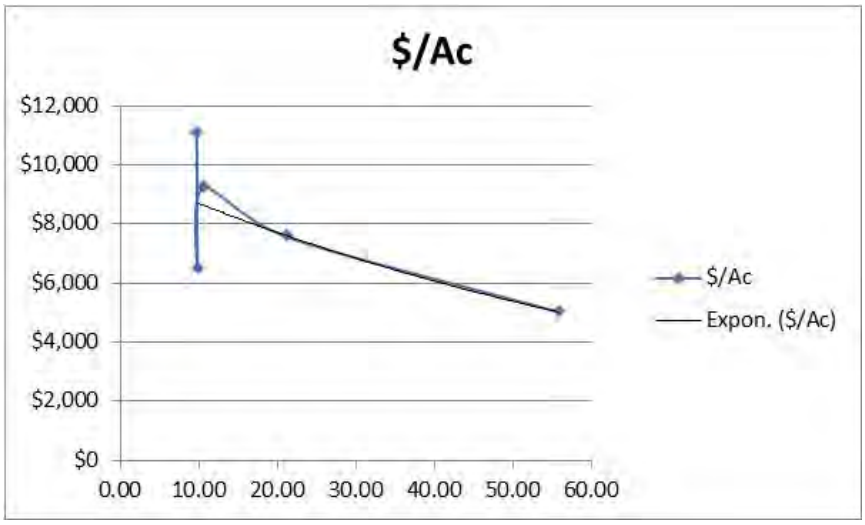
Adjoining Residential Sales After Solar Farm Approved											
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Built**	**GBA**	**$/GBA**	**BR/BA**	**Park**	**Style**	**Other**
Adjoins	242 Mariposa	2.91	9/21/2015	$180,000	1962	1,880	$95.74	3/2	Carport	Br/Rnch	Det Wrkshop
Not	249 Mariposa	0.48	3/1/2019	$153,000	1974	1,792	$85.38	4/2	Garage	Br/Rnch	
Not	110 Airport	0.83	5/10/2016	$166,000	1962	2,165	$76.67	3/2	Crprt	Br/Rnch	
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	1980	2,156	$112.48	3/2	Drive	1.5	

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Time**	**YB**	**Acres**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**
Adjoins	242 Mariposa	2.91	9/21/2015	$180,000								$180,000	
Not	249 Mariposa	0.48	3/1/2019	$153,000	-$15,807	-$12,852	$18,468	$7,513		-$3,000	$25,000	$172,322	4%
Not	110 Airport	0.83	5/10/2016	$166,000	-$3,165	$0	$15,808	-$28,600			$25,000	$175,043	3%
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	-$21,825	-$30,555	-$15,960	-$40,942		$2,000	$25,000	$160,218	11%
											Average		6%

The average difference after adjusting for all factors is +6%, which is again suggests a mild increase in value due to the adjoining solar farm use. The median is a 4% adjustment, which is within a standard deviation and suggests no impact on property value.

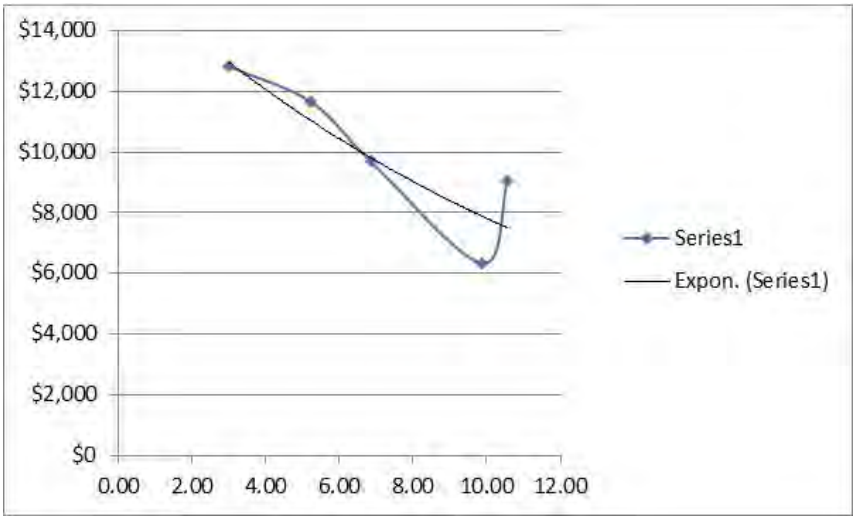
I have also considered the recent sale of Parcel 13 that is located on Blacksnake Road south of the project. I was unable to find good land sales in the same 20-acre range, so I have considered sales of larger and smaller acreage. I adjusted each of those land sales for time. I then applied the price per acre to a trendline to show where the expected price per acre would be for 20 acres. As can be seen in the chart below, this lines up exactly with the purchase of the subject property. I therefore conclude that there is no impact on Parcel 13 due to proximity to the solar farm.

Adjoining Residential Land Sales After Solar Farm Approved						Adjoining Sales Adjusted	
Solar	**Tax/Street**	**Acres**	**Date Sold**	**Sales Price**	**$/Ac**	**Time**	**$/Ac**
Adjoins	174339/Blacksnake	21.15	6/29/2018	$160,000	$7,565		$7,565
Not	227852/Abernathy	10.57	5/9/2018	$97,000	$9,177	$38	$9,215
Not	17443/Legion	9.87	9/7/2018	$64,000	$6,484	-$37	$6,447
Not	164243/Alexis	9.75	2/1/2019	$110,000	$11,282	-$201	$11,081
Not	176884/Bowden	55.77	6/13/2018	$280,000	$5,021	$7	$5,027



Finally, I have considered the recent sale of Parcel 17 that sold as vacant land. I was unable to find good land sales in the same 7 acre range, so I have considered sales of larger and smaller acreage. I adjusted each of those land sales for time. I then applied the price per acre to a trendline to show where the expected price per acre would be for 7 acres. As can be seen in the chart below, this lines up with the trendline running right through the purchase price for the subject property. I therefore conclude that there is no impact on Parcel 13 due to proximity to the solar farm. I note that this property was improved with a 3,196 square foot ranch built in 2018 following the land purchase, which shows that development near the solar farm was unimpeded.

Adjoining Residential Land Sales After Solar Farm Approved						**Adjoining Sales Adjusted**		
Solar	**Tax/Street**	**Acres**	**Date Sold**	**Sales Price**	**$/Ac**	**Time**	**Location**	**$/Ac**
Adjoins	227039/Mariposa	6.86	12/6/2017	$66,500	$9,694			$9,694
Not	227852/Abernathy	10.57	5/9/2018	$97,000	$9,177	-$116		$9,061
Not	17443/Legion	9.87	9/7/2018	$64,000	$6,484	-$147		$6,338
Not	177322/Robinson	5.23	5/12/2017	$66,500	$12,715	$217	-$1,272	$11,661
Not	203386/Carousel	2.99	7/13/2018	$43,500	$14,548	-$262	-$1,455	$12,832



10. Matched Pair – Clarke County Solar, Clarke County, VA

This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered two recent sales of Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction. This home sold in January 2017 for $295,000 and again in August 2019 for $385,000. I show each sale below and compare those to similar home sales in each time frame. The significant increase in price between 2017 and 2019 is due to a major kitchen remodel, new roof, and related upgrades as well as improvement in the market in general. The sale and later resale of the home with updates and improvements speaks to pride of ownership and increasing overall value as properties perceived as diminished are less likely to be renovated and sold for profit.

I note that 102 Tilthammer includes a number of barns that I did not attribute any value in the analysis. The market would typically give some value for those barns but even without that adjustment there is an indication of a positive impact on value due to the solar farm. The landscaping buffer from this home is considered light.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
3	Adjoins	833 Nations Spr	5.13	8/18/2019	$385,000	1979	1,392	$276.58	3/2	Det Gar	Ranch	UnBsmt
	Not	167 Leslie	5.00	8/19/2020	$429,000	1980	1,665	$257.66	3/2	Det2Gar	Ranch	
	Not	2393 Old Chapel	2.47	8/10/2020	$330,000	1974	1,500	$220.00	3/1.5	Det Gar	Ranch	
	Not	102 Tilthammer	6.70	5/7/2019	$372,000	1970	1,548	$240.31	3/1.5	Det Gar	Ranch	UnBsmt

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$385,000			1230
-$13,268		-$2,145	-$56,272		-$5,000	$50,000	$402,315	-4%		
-$9,956	$25,000	$8,250	-$19,008	$5,000		$50,000	$389,286	-1%		
$3,229		$16,740	-$29,991	$5,000			$366,978	5%		
									0%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
3	Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	UnBsmt
	Not	6801 Middle	2.00	12/12/2017	$249,999	1981	1,584	$157.83	3/2	Open	Ranch	
	Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	2 Gar	2-story	
	Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Open	Ranch	

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$295,000			1230
-$7,100	$25,000	-$2,500	-$24,242		$5,000	$50,000	$296,157	0%		
$177		-$16,500	-$42,085		-$10,000	$50,000	$281,592	5%		
-$7,797		$3,600	$54,857	$10,000	$5,000	$50,000	$295,661	0%		
									1%	

11. Matched Pair – Simon Solar, Social Circle, GA

This 30 MW solar farm is located off Hawkins Academy Road and Social Circle Fairplay Road. I identified three adjoining sales to this tract after development of the solar farm. However, one of those is shown as Parcel 12 in the map above and includes a powerline easement encumbering over a third of the 5 acres and adjoins a large substation as well. It would be difficult to isolate those impacts from any potential solar farm impact and therefore I have excluded that sale. I also excluded the recent sale of Parcel 17, which is a farm with conservation restrictions on it that similarly would require a detailed examination of those conservation restrictions in order to see if there was any impact related to the solar farm. I therefore focused on the recent sale of Parcel 7 and the adjoining parcel to the south of that. They are technically not adjoining due to the access road for the flag-shaped lot to the east. Furthermore, there is an apparent access easement serving the two rear lots that encumber these two parcels which is a further limitation on these sales. This analysis assumes that the access easement does not negatively impact the subject property, though it may.

The landscaping buffer relative to this parcel is considered medium.

Adjoining Land Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	$/AC	Type	Other
7+	Adjoins	4514 Hawkins	36.86	3/31/2016	$180,000	$4,883	Pasture	Esmts
	Not	HD Atha	69.95	12/20/2016	$357,500	$5,111	Wooded	N/A
	Not	Pannell	66.94	11/8/2016	$322,851	$4,823	Mixed	*
	Not	1402 Roy	123.36	9/29/2016	$479,302	$3,885	Mixed	**

* Adjoining 1 acre purchased by same buyer in same deed. Allocation assigned on the County Tax Record.
** Dwelling built in 1996 with a 2016 tax assessed value of $75,800 deducted from sales price to reflect land value

Adjoining Sales Adjusted						Avg
Time	Size	Type	Other	Total/Ac	% Diff	% Diff
				$4,883		
$89	$256			$5,455	-12%	
-$90	$241			$4,974	-2%	
-$60	$389			$4,214	14%	
						0%

The range of impact identified by these matched pairs are -12% to +14%, with an average of 0% impact due to the solar farm. The best matched pair with the least adjustment supports a -2% impact due to the solar farm. I note again that this analysis considers no impact for the existing access easements that meander through this property and it may be having an impact. 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%.

12. Matched Pair – Candace Solar, Princeton, NC

This 5 MW solar farm is located at 4839 US 70 Highway just east of Herring Road. This solar farm was completed on October 25, 2016.

I identified three adjoining sales to this tract after development of the solar farm with frontage on US 70. I did not attempt to analyze those sales as they have exposure to an adjacent highway and railroad track. Those homes are therefore problematic for a matched pair analysis unless I have similar homes fronting on a similar corridor.

I did consider a land sale and a home sale on adjoining parcels without those complications.

The lot at 499 Herring Road sold to Paradise Homes of Johnston County of NC, Inc. for $30,000 in May 2017 and a modular home was placed there and sold to Karen and Jason Toole on September 29, 2017. I considered the lot sale first as shown below and then the home sale that followed. The landscaping buffer relative to this parcel is considered medium.

Adjoining Land Sales After Solar Farm Approved							**Adjoining Sales Adjusted**				
Parcel	**Solar**	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Other**	**Time**	**Site**	**Other**	**Total**	**% Diff**
16	Adjoins	499 Herring	2.03	5/1/2017	$30,000					$30,000	
	Not	37 Becky	0.87	7/23/2019	$24,500	Sub/Pwr	-$1,679	$4,900		$27,721	8%
	Not	5858 Bizzell	0.88	8/17/2016	$18,000		$390	$3,600		$21,990	27%
	Not	488 Herring	2.13	12/20/2016	$35,000		$389			$35,389	-18%
										Average	5%

Following the land purchase, the modular home was placed on the site and sold. I have compared this modular home to the following sales to determine if the solar farm had any impact on the purchase price.

Adjoining Residential Sales After Solar Farm Approved

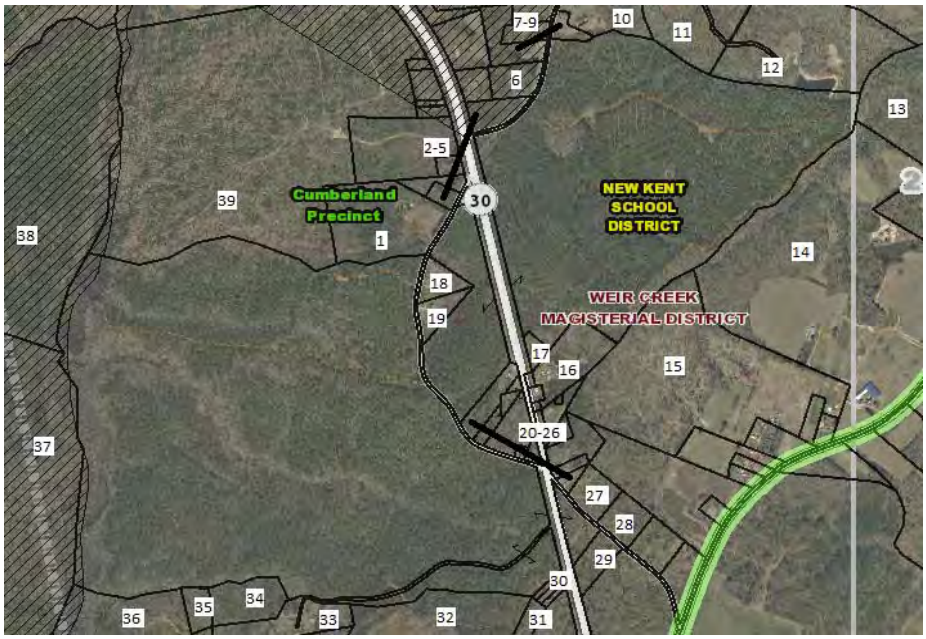
Parcel	**Solar**	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Built**	**GBA**	**$/GBA**	**BR/BA**	**Park**	**Style**	**Other**
16	Adjoins	499 Herring	2.03	9/27/2017	$215,000	2017	2,356	$91.26	4/3	Drive	Modular	
	Not	678 WC	6.32	3/8/2019	$226,000	1995	1,848	$122.29	3/2.5	Det Gar	Mobile	Ag bldgs
	Not	1810 Bay V	8.70	3/26/2018	$170,000	2003	2,356	$72.16	3/2	Drive	Mobile	Ag bldgs
	Not	1795 Bay V	1.78	12/1/2017	$194,000	2017	1,982	$97.88	4/3	Drive	Modular	

Adjoining Residential Sales Af			**Adjoining Sales Adjusted**									**Avg**	
Parcel	**Solar**	**Address**	**Time**	**Site**	**YB**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**	**% Diff**	**Distance**
16	Adjoins	499 Herring								$215,000			488
	Not	678 WC	-$10,037	-$25,000	$24,860	$37,275	-$5,000	-$7,500	-$20,000	$220,599	-3%		
	Not	1810 Bay V	-$2,579	-$20,000	$11,900	$0				$159,321	26%		
	Not	1795 Bay V	-$1,063		$0	$21,964				$214,902	0%		
												8%	

The best comparable is 1795 Bay Valley as it required the least adjustment and was therefore most similar, which shows a 0% impact. This signifies no impact related to the solar farm.

The range of impact identified by these matched pairs ranges are therefore -3% to +26% with an average of +8% for the home and an average of +4% for the lot, though the best indicator for the lot shows a $5,000 difference in the lot value due to the proximity to the solar farm or a -12% impact.

13. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, VA



This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A

limited buffering remains along the road with natural growth being encouraged, but currently the panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
								Average Diff		0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property since it is a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

14. Matched Pair – Innovative Solar 46, Roslin Farm Rd, Hope Mills, NC

This project was built in 2016 and located on 532 acres for a 78.5 MW solar farm with the closest home at 125 feet from the closest solar panel with an average distance of 423 feet.

I considered the recent sale of a home on Roslin Farm Road just north of Running Fox Road as shown below. This sale supports an indication of no impact on property value. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	6849 Roslin Farm	1.00	2/18/2019	$155,000	1967	1,610	$96.27	3/3	Drive	Ranch	Brick	435
Not	6592 Sim Canady	2.43	9/5/2017	$185,000	1974	2,195	$84.28	3/2	Gar	Ranch	Brick	
Not	1614 Joe Hall	1.63	9/3/2019	$145,000	1974	1,674	$86.62	3/2	Det Gar	Ranch	Brick	
Not	109 Bledsoe	0.68	1/17/2019	$150,000	1973	1,663	$90.20	3/2	Gar	Ranch	Brick	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	6849 Roslin Farm								$155,000		5%
Not	6592 Sim Canady	$8,278		-$6,475	-$39,444	$10,000	-$5,000		$152,359	2%	
Not	1614 Joe Hall	-$2,407		-$5,075	-$3,881	$10,000	-$2,500		$141,137	9%	
Not	109 Bledsoe	$404	$10,000	-$4,500	-$3,346		-$5,000		$147,558	5%	

15. Matched Pair – Innovative Solar 42, County Line Rd, Fayetteville, NC

This project was built in 2017 and located on 413.99 acres for a 71 MW with the closest home at 135 feet from the closest solar panel with an average distance of 375 feet.

I considered the recent sales identified on the map above as Parcels 2 and 3, which is directly across the street these homes are 330 and 340 feet away. Parcel 2 includes an older home built in 1976, while Parcel 3 is a new home built in 2019. So the presence of the solar farm had no impact on new construction in the area.

The matched pairs for each of these are shown below. The landscaping buffer relative to these parcels is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	2923 County Ln	8.98	2/28/2019	$385,000	1976	2,905	$132.53	3/3	2-Car	Ranch	Brick/Pond	340
Not	1928 Shaw Mill	17.00	7/3/2019	$290,000	1977	3,001	$96.63	4/4	2-Car	Ranch	Brick/Pond/Rental	
Not	2109 John McM.	7.78	4/25/2018	$320,000	1978	2,474	$129.35	3/2	Det Gar	Ranch	Vinyl/Pool,Stable	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2923 County Ln								$385,000		3%
Not	1928 Shaw Mill	-$3,055	$100,000	-$1,450	-$7,422	-$10,000			$368,074	4%	
Not	2109 John McM.	$8,333		-$3,200	$39,023	$10,000		$5,000	$379,156	2%	

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	2935 County Ln	1.19	6/18/2019	$266,000	2019	2,401	$110.79	4/3	Gar	2-Story		330
Not	3005 Hemingway	1.17	5/16/2019	$269,000	2018	2,601	$103.42	4/3	Gar	2-Story		
Not	7031 Glynn Mill	0.60	5/8/2018	$255,000	2017	2,423	$105.24	4/3	Gar	2-Story		
Not	5213 Bree Brdg	0.92	5/7/2019	$260,000	2018	2,400	$108.33	4/3	3-Gar	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2935 County Ln								$266,000		3%
Not	3005 Hemingway	$748		$1,345	-$16,547				$254,546	4%	
Not	7031 Glynn Mill	$8,724		$2,550	-$1,852				$264,422	1%	
Not	5213 Bree Brdg	$920		$1,300	$76			-$10,000	$252,296	5%	

Both of these matched pairs adjust to an average of +3% on impact for the adjoining solar farm, meaning there is a slight positive impact due to proximity to the solar farm. This is within the standard +/- of typical real estate transactions, which strongly suggests no impact on property value. I noted specifically that for 2923 County Line Road, the best comparable is 2109 John McMillan as it does not have the additional rental unit on it. I made no adjustment to the other sale for the value of that rental unit, which would have pushed the impact on that comparable downward – meaning there would have been a more significant positive impact.

16. Matched Pair – Sunfish Farm, Keenebec Rd, Willow Spring, NC

This project was built in 2015 and located on 49.6 acres (with an inset 11.25 acre parcel) for a 6.4 MW project with the closest home at 135 feet with an average distance of 105 feet.

I considered the 2017 sale identified on the map above, which is 205 feet away from the closest panel. The matched pairs for each of these are shown below followed by a more recent map showing the panels at this site. The average difference in the three comparables and the subject property is +3% after adjusting for differences in the sales date, year built, gross living area, and other minor differences. This data is supported by the comments from the broker Brian Schroepfer with Keller Williams that the solar farm had no impact on the purchase price. The landscaping screen is considered light.

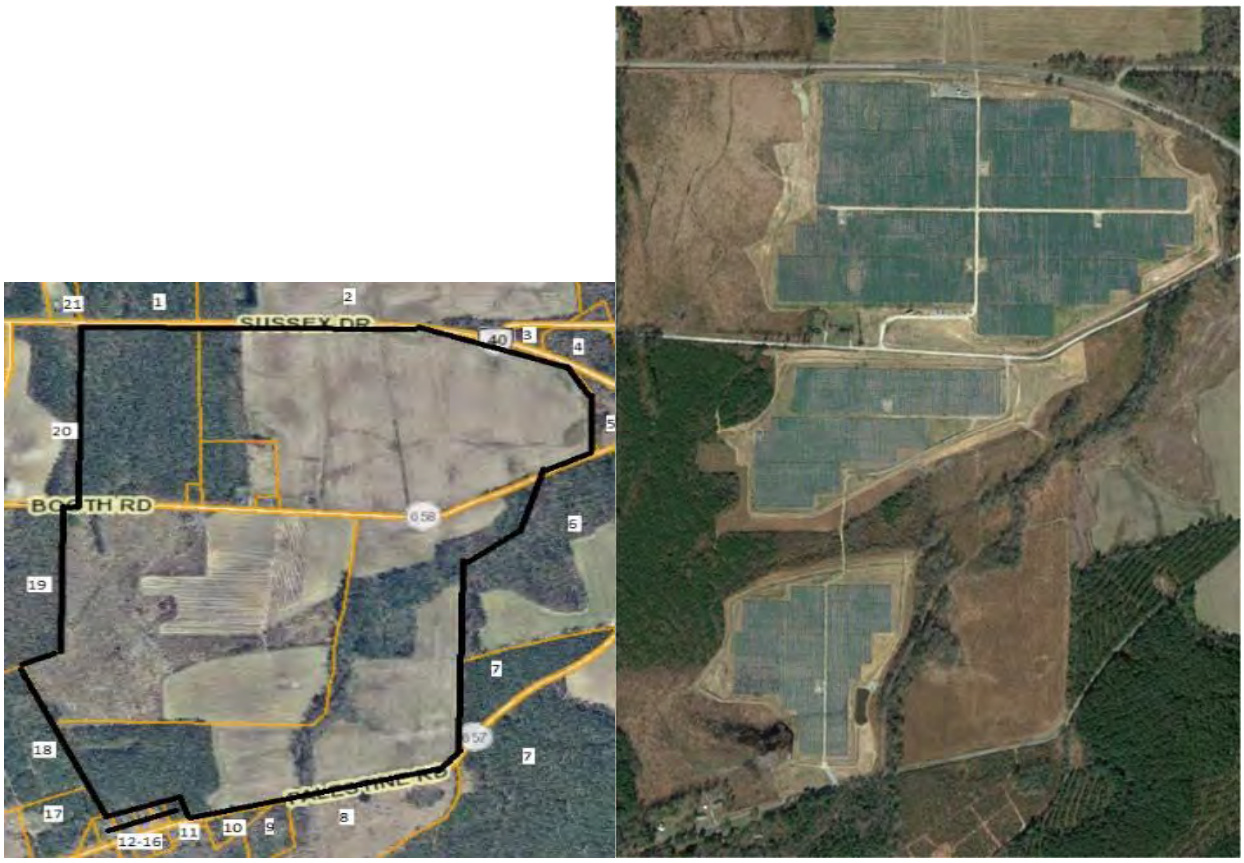
Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style
	Adjoins	7513 Glen Willow	0.79	9/1/2017	$185,000	1989	1,492	$123.99	3/2	Gar	BR/Rnch
	Not	2968 Tram	0.69	7/17/2017	$155,000	1984	1,323	$117.16	3/2	Drive	BR/Rnch
	Not	205 Pine Burr	0.97	12/29/2017	$191,000	1991	1,593	$119.90	3/2.5	Drive	BR/Rnch
	Not	1217 Old Honeycutt	1.00	12/15/2017	$176,000	1978	1,558	$112.97	3/2.5	2Carprt	VY/Rnch

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	7513 Glen Willow								$185,000		
Not	2968 Tram	$601		$3,875	$15,840		$10,000		$185,316	0%	
Not	205 Pine Burr	-$1,915		-$1,910	-$9,688	-$5,000			$172,487	7%	
Not	1217 Old Honeycutt	-$1,557		$9,680	-$5,965	-$5,000		$5,280	$178,438	4%	
											3%

17. Matched Pair – Sappony Solar, Sussex County, VA



This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

I have considered the 2018 sale of Parcel 17 as shown below. This was a 1,900 s.f. manufactured home on a 6.00-acre lot that sold in 2018. I have compared that to three other nearby manufactured homes as shown below. The range of impacts is within typical market variation with an average of -1%, which supports a conclusion of no impact on property value. The landscaping buffer is considered medium.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

18. Matched Pair – Camden Dam, Camden, NC

This 5 MW project was built in 2019 and located on a portion of 49.83 acres.

Parcel 1 noted above along with the home on the adjoining parcel to the north of that parcel sold in late 2018 after this solar farm was approved but prior to construction being completed in 2019. I have considered this sale as shown below. The landscaping screen is considered light.

The comparable at 548 Trotman is the most similar and required the least adjustment shows no impact on property value. The other two comparables were adjusted consistently with one showing significant enhancement and another as showing a mild negative. The best indication is the one requiring the least adjustment. The other two sales required significant site adjustments which make them less reliable. The best comparable and the average of these comparables support a finding of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	122 N Mill Dam	12.19	11/29/2018	$350,000	2005	2,334	$149.96	3/3.5	3-Gar	Ranch	
Not	548 Trotman	12.10	5/31/2018	$309,000	2007	1,960	$157.65	4/2	Det2G	Ranch	Wrkshp
Not	198 Sand Hills	2.00	12/22/2017	$235,000	2007	2,324	$101.12	4/3	Open	Ranch	
Not	140 Sleepy Hlw	2.05	8/12/2019	$330,000	2010	2,643	$124.86	4/3	1-Gar	1.5 Story	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
122 N Mill Dam								$350,000			342
548 Trotman	$6,163		-$3,090	$35,377	$5,000			$352,450	-1%		
198 Sand Hills	$8,808	$45,000	-$2,350	$607		$30,000		$317,064	9%		
140 Sleepy Hlw	-$9,258	$45,000	-$8,250	-$23,149	$5,000	$30,000		$369,343	-6%		
										1%	

19. Matched Pair – Grandy Solar, Grandy, NC

This 20 MW project was built in 2019 and located on a portion of 121 acres.

Parcels 40 and 50 have sold since construction began on this solar farm. I have considered both in matched pair analysis below. I note that the marketing for Parcel 40 (120 Par Four) identified the lack of homes behind the house as a feature in the listing. The marketing for Parcel 50 (269 Grandy) identified the property as "very private." Landscaping for both of these parcels is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	120 Par Four	0.92	8/17/2019	$315,000	2006	2,188	$143.97	4/3	2-Gar	1.5 Story	Pool
Not	102 Teague	0.69	1/5/2020	$300,000	2005	2,177	$137.80	3/2	Det 3G	Ranch	
Not	112 Meadow Lk	0.92	2/28/2019	$265,000	1992	2,301	$115.17	3/2	Gar	1.5 Story	
Not	116 Barefoot	0.78	9/29/2020	$290,000	2004	2,192	$132.30	4/3	2-Gar	2 Story	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
120 Par Four								$315,000			405
102 Teague	-$4,636		$1,500	$910	$10,000		$20,000	$327,774	-4%		
112 Meadow Lk	$4,937		$18,550	-$7,808	$10,000	$10,000	$20,000	$320,679	-2%		
116 Barefoot	-$12,998		$2,900	-$318			$20,000	$299,584	5%		
										0%	

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	269 Grandy	0.78	5/7/2019	$275,000	2019	1,535	$179.15	3/2.5	2-Gar	Ranch	
Not	307 Grandy	1.04	10/8/2018	$240,000	2002	1,634	$146.88	3/2	Gar	1.5 Story	
Not	103 Branch	0.95	4/22/2020	$230,000	2000	1,532	$150.13	4/2	2-Gar	1.5 Story	
Not	103 Spring Lf	1.07	8/14/2018	$270,000	2002	1,635	$165.14	3/2	2-Gar	Ranch	Pool

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
269 Grandy								$275,000			477
307 Grandy	$5,550		$20,400	-$8,725	$5,000	$10,000		$272,225	1%		
103 Branch	-$8,847		$21,850	$270				$243,273	12%		
103 Spring Lf	$7,871		$22,950	-$9,908	$5,000		-$20,000	$275,912	0%		
										4%	

Both of these matched pairs support a finding of no impact on value. This is reinforced by the listings for both properties identifying the privacy due to no housing in the rear of the property as part of the marketing for these homes.

20. Matched Pair – Champion Solar, Lexington County, SC

This project is a 10 MW facility located on a 366.04-acre tract that was built in 2017.

I have considered the 2020 sale of an adjoining home located off 517 Old Charleston Road. Landscaping is considered light.

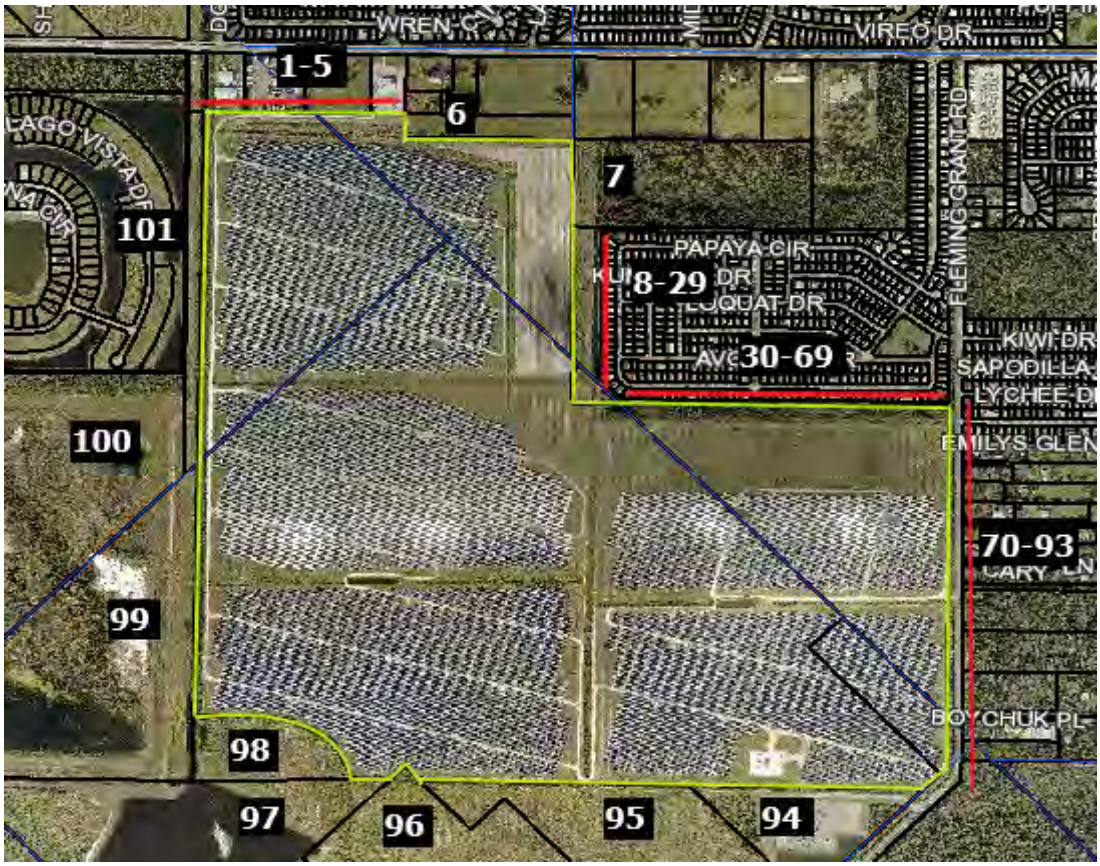
Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	517 Old Charleston	11.05	8/25/2020	$110,000	1962	925	$118.92	3/1	Crport	Br Rnch	
Not	133 Buena Vista	2.65	6/21/2020	$115,000	1979	1,104	$104.17	2/2	Crport	Br Rnch	
Not	214 Crystal Spr	2.13	6/10/2019	$102,500	1970	1,025	$100.00	3/2	Crport	Rnch	
Not	1429 Laurel	2.10	2/21/2019	$126,000	1960	1,250	$100.80	2/1.5	Open	Br Rnch	3 Gar/Brn

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
517 Old Charleston								$110,000			505
133 Buena Vista	$410	$17,000	-$9,775	-$14,917	-$10,000			$97,718	11%		
214 Crystal Spr	$2,482	$18,000	-$4,100	-$8,000	-$10,000		$10,000	$110,882	-1%		
1429 Laurel	$3,804	$18,000	$1,260	-$26,208	-$5,000	$5,000	-$15,000	$107,856	2%		
										4%	

21. Matched Pair – Barefoot Bay Solar Farm, Barefoot Bay, FL



This project is located on 504 acres for a 704.5 MW facility. Most of the adjoining uses are medium density residential with some lower density agricultural uses to the southwest. This project was built in 2018. There is a new subdivision under development to the west.

I have considered a number of recent home sales from the Barefoot Bay Golf Course in the Barefoot Bay Recreation District. There are a number of sales of these mobile/manufactured homes along the eastern boundary and the lower northern boundary. I have compared those home sales to other similar homes in the same community but without the exposure to the solar farm. Staying within the same community keeps location and amenity impacts consistent. I did avoid any comparison with home sales with golf course or lakefront views as that would introduce another variable.

The six manufactured/double wide homes shown below were each compared to three similar homes in the same community and are consistently showing no impact on the adjoining property values. Based on the photos from the listings, there is limited but some visibility of the solar farm to the east, but the canal and landscaping between are providing a good visual buffer and actually are commanding a premium over the non-canal homes.

Landscaping for these adjoining homes is considered light, though photographs from the listings show that those homes on Papaya that adjoin the solar farm from east/west have no visibility of the solar farm and is effectively medium density due to the height differential. The homes that adjoin the solar farm from north/south along Papaya have some filtered view of the solar farm through the trees.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
14	Adjoins	465 Papaya Cr	0.12	7/21/2019	$155,000	1993	1,104	$140.40	2/2	Drive	Manuf	Canal
	Not	1108 Navajo	0.14	2/27/2019	$129,000	1984	1,220	$105.74	2/2	Crprt	Manuf	Canal
	Not	1007 Barefoot	0.11	9/3/2020	$168,000	2005	1,052	$159.70	2/2	Crprt	Manuf	Canal
	Not	1132 Waterway	0.11	7/10/2020	$129,000	1982	1,012	$127.47	2/2	Crprt	Manuf	Canal

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
465 Papaya Cr							$155,000			765
1108 Navajo	$1,565	$5,805	-$9,812				$126,558	18%		
1007 Barefoot	-$5,804	-$10,080	$6,643				$158,759	-2%		
1132 Waterway	-$3,859	$7,095	$9,382				$141,618	9%		
									8%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
19	Adjoins	455 Papaya	0.12	9/1/2020	$183,500	2005	1,620	$113.27	3/2	Crprt	Manuf	Canal
	Not	938 Waterway	0.11	2/12/2020	$160,000	1986	1,705	$93.84	2/2	Crprt	Manuf	Canal
	Not	719 Barefoot	0.12	4/14/2020	$150,000	1996	1,635	$91.74	3/2	Crprt	Manuf	Canal
	Not	904 Fir	0.17	9/27/2020	$192,500	2010	1,626	$118.39	3/2	Crprt	Manuf	Canal

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
455 Papaya							$183,500			750
938 Waterway	$2,724	$15,200	-$6,381				$171,542	7%		
719 Barefoot	$1,770	$6,750	-$1,101				$157,419	14%		
904 Fir	-$422	-$4,813	-$568				$186,697	-2%		
									6%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
37	Adjoins	419 Papaya	0.09	7/16/2019	$127,500	1986	1,303	$97.85	2/2	Crprt	Manuf	Green
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	501 Papaya	0.10	6/15/2018	$109,000	1986	1,234	$88.33	2/2	Crprt	Manuf	
	Not	418 Papaya	0.09	8/28/2019	$110,000	1987	1,248	$88.14	2/2	Crprt	Manuf	

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
419 Papaya							$127,500			690
865 Tamarind	$1,828	-$6,026	-$5,090				$124,613	2%		
501 Papaya	$3,637	$0	$4,876			$5,000	$122,513	4%		
418 Papaya	-$399	-$550	$3,878			$5,000	$117,930	8%		
									5%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
39	Adjoins	413 Papaya	0.09	7/16/2020	$130,000	2001	918	$141.61	2/2	Crprt	Manuf	Grn/Upd
	Not	341 Loquat	0.09	2/3/2020	$118,000	1985	989	$119.31	2/2	Crprt	Manuf	Full Upd
	Not	1119 Pocatella	0.19	1/5/2021	$120,000	1993	999	$120.12	2/2	Crprt	Manuf	Green
	Not	1367 Barefoot	0.10	1/12/2021	$130,500	1987	902	$144.68	2/2	Crprt	Manuf	Green/Upd

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
413 Papaya							$130,000			690
341 Loquat	$1,631	$9,440	-$6,777				$122,294	6%		
1119 Pocatella	-$1,749	$4,800	-$7,784			$5,000	$120,267	7%		
1367 Barefoot	-$1,979	$9,135	$1,852				$139,507	-7%		
									2%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
48	Adjoins	343 Papaya	0.09	12/17/2019	$145,000	1986	1,508	$96.15	3/2	Crprt	Manuf	Gn/Fc/Upd
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	515 Papaya	0.09	3/22/2018	$145,000	2005	1,376	$105.38	3/2	Crprt	Manuf	Green
	Not	849 Tamarind	0.15	6/26/2019	$155,000	1997	1,716	$90.33	3/2	Crprt	Manuf	Grn/Fnce

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
343 Papaya							$145,000			690
865 Tamarind	$3,566	-$6,026	$10,963				$142,403	2%		
515 Papaya	$7,759	-$13,775	$11,128				$150,112	-4%		
849 Tamarind	$2,273	-$8,525	-$15,030			$5,000	$138,717	4%		
									1%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
52	Nearby	335 Papaya	0.09	4/17/2018	$110,000	1987	1,180	$93.22	2/2	Crprt	Manuf	Green
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	501 Papaya	0.10	6/15/2018	$109,000	1986	1,234	$88.33	2/2	Crprt	Manuf	
	Not	604 Puffin	0.09	10/23/2018	$110,000	1988	1,320	$83.33	2/2	Crprt	Manuf	

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
335 Papaya							$110,000			710
865 Tamarind	-$3,306	-$5,356	-$14,721			$0	$110,517	0%		
501 Papaya	-$542	$545	-$3,816			$5,000	$110,187	0%		
604 Puffin	-$1,752	-$550	-$9,333			$5,000	$103,365	6%		
									2%	

I also identified a new subdivision being developed just to the west of this solar farm called The Lakes at Sebastian Preserve. These are all canal-lot homes that are being built with homes starting at $271,000 based on the website and closed sales showing up to $342,000. According to Monique, the onsite broker with Holiday Builders, the solar farm is difficult to see from the lots that back up to that area and she does not anticipate any difficulty in selling those future homes or lots or any impact on the sales price. The closest home that will be built in this development will be approximately 340 feet from the nearest panel.

Based on the closed home prices in Barefoot Bay as well as the broker comments and activity at The Lakes at Sebastian Preserve, the data around this solar farm strongly indicates no negative impact on property value.

22. Matched Pair – Miami-Dade Solar Farm, Miami, FL

This project is located on 346.80 acres for a 74.5 MW facility. All of the adjoining uses are agricultural and residential. This project was built in 2019.

I considered the recent sale of Parcel 26 to the south that sold for over $1.6 million dollars. This home is located on 4.2 acres with additional value in the palm trees according to the listing. The comparables include similar homes nearby that are all actually on larger lots and several include avocado or palm tree income as well. All of the comparables are in similar proximity to the subject and all have similar proximity to the Miami-Dade Executive airport that is located 2.5 miles to the east.

These sales are showing no impact on the value of the property from the adjoining solar farm. The landscaping is considered light.

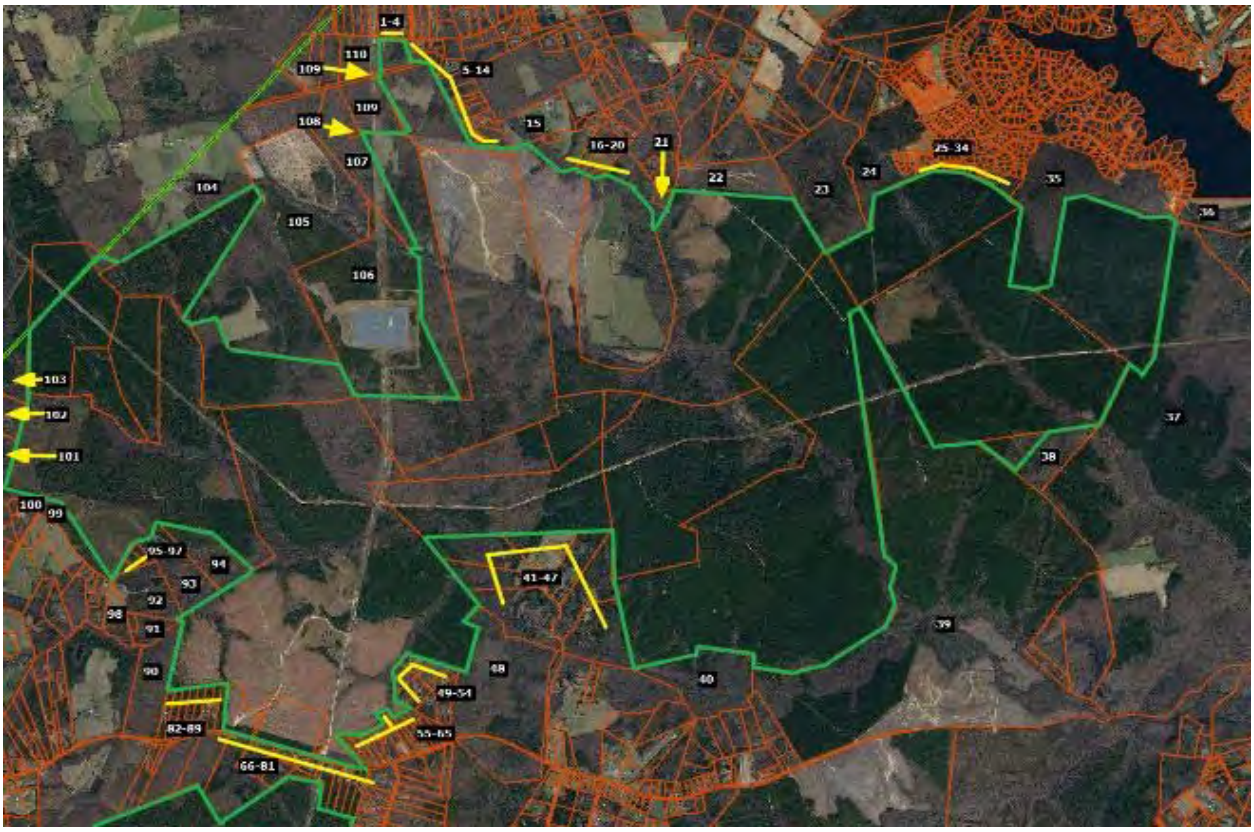
Adjoining Residential Sales After Solar Farm Approved

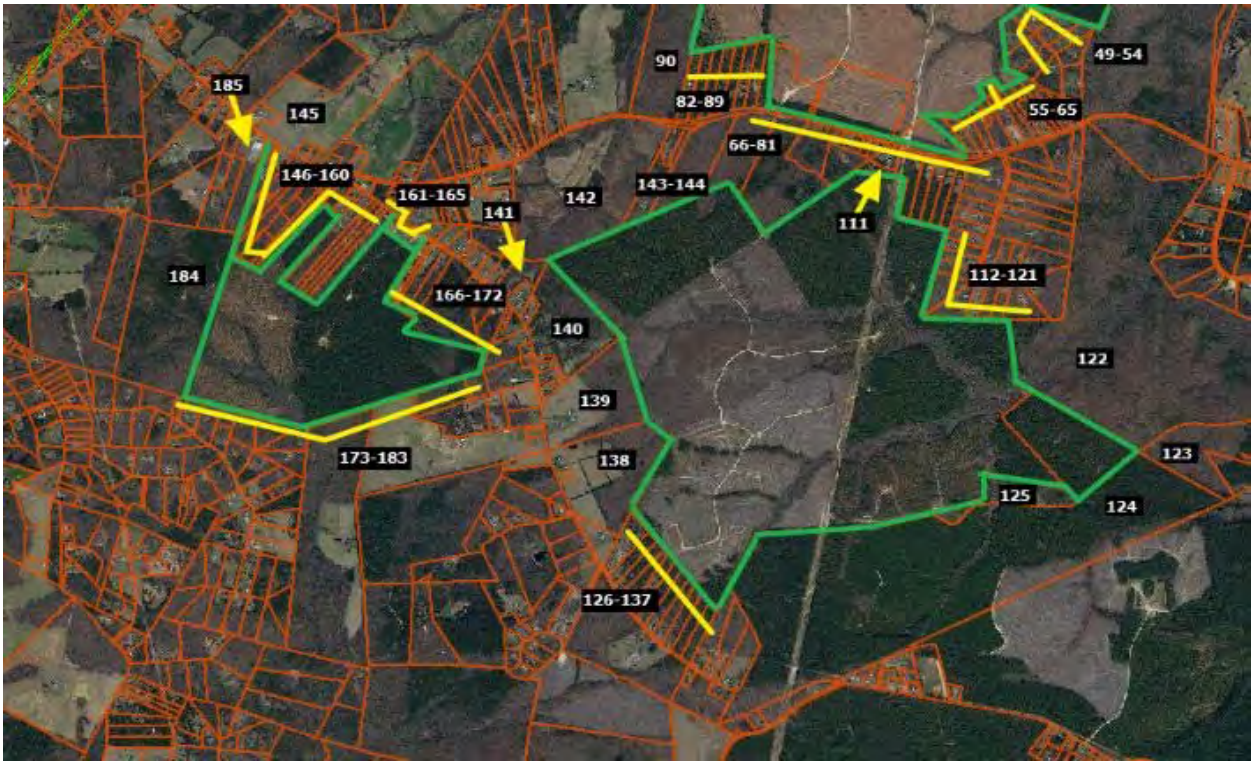
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
26	Adjoins	13600 SW 182nd	4.20	11/5/2020	$1,684,000	2008	6,427	$262.02	5/5.5	3 Gar	CBS Rnch	Pl/Guest
	Not	18090 SW 158th	5.73	10/8/2020	$1,050,000	1997	3,792	$276.90	5/4	3 Gar	CBS Rnch	
	Not	14311 SW 187th	4.70	10/22/2020	$1,100,000	2005	3,821	$287.88	6/5	3 Gar	CBS Rnch	Pool
	Not	17950 SW 158th	6.21	10/22/2020	$1,730,000	2000	6,917	$250.11	6/5.5	2 Gar	CBS Rnch	Pool

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
13600 SW 182nd								$1,684,000			1390
18090 SW 158th	$2,478		$57,750	$583,703	$30,000			$1,723,930	-2%		
14311 SW 187th	$1,298		$16,500	$600,178	$10,000			$1,727,976	-3%		
17950 SW 158th	$2,041		$69,200	-$98,043		$10,000		$1,713,199	-2%		
										-2%	

23. Matched Pair – Spotsylvania Solar, Paytes, VA





This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
							Average Diff		4%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
							Average Diff		2%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
							Average Diff		-4%	

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 show no indication of any impact on property value.

Conclusion – SouthEast Over 5 MW

Southeast USA Over 5 MW
Matched Pair Summary

							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Pop.	Med. Income	Avg. Housing Unit	Veg. Buffer
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375	Light
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000	Light
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562	Light
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219	Heavy
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
9	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884	Light
10	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
11	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922	Medium
12	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171	Medium
13	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
14	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
15	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
16	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138	Light
17	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Light
18	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288	Light
19	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408	Light
20	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939	Light
21	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
22	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
23	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Md to Hvy
	Average			485	57.04	38	24%	48%	22%	6%	923	$63,955	$237,700	
	Median			234	20.00	20	17%	59%	11%	0%	467	$60,037	$231,408	
	High			3,500	617.00	160	76%	98%	94%	44%	4,689	$120,861	$483,333	
	Low			35	5.00	0	1%	0%	0%	0%	48	$35,057	$99,219	

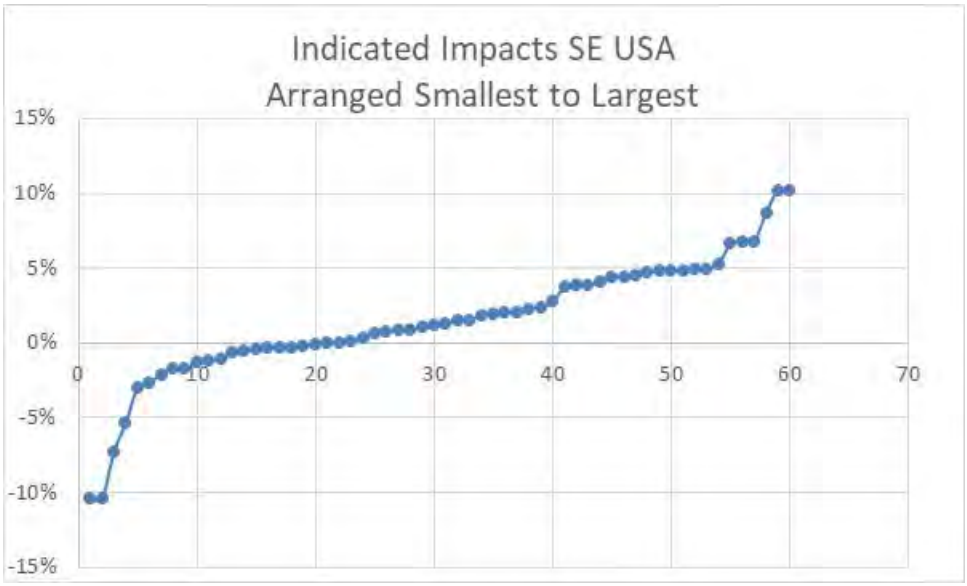
The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in farm more urban areas. The median income for the population within 1 mile of a solar farm is $60,037 with a median housing unit value of $231,408. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in multiple states over $1,000,000 adjoining solar farms. The adjoining uses show that residential and agricultural uses are the predominant adjoining uses. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Virginia and adjoining states as well as the proposed subject property.

Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

I have pulled 56 matched pairs from the above referenced solar farms to provide the following summary of home sale matched pairs and land sales next to solar farms. The summary shows that the range of differences is from -10% to +10% with an average of +1% and median of +1%. This means that the average and median impact is for a slight positive impact due to adjacency to a solar farm. However, this +1 to rate is within the typical variability I would expect from real estate. I therefore conclude that this data shows no negative or positive impact due to adjacency to a solar farm.

While the range is seemingly wide, the graph below clearly shows that the vast majority of the data falls between -5% and +5% and most of those are clearly in the 0 to +5% range. This data strongly supports an indication of no impact on adjoining residential uses to a solar farm.

I therefore conclude that these matched pairs support a finding of no impact on value at the subject property for the proposed project, which as proposed will include a landscaped buffer to screen adjoining residential properties.


Indicated Impacts SE USA
Arranged Smallest to Largest
15%
10%
5%
0%
-5%
-10%
-15%
0
10
20
30
40
50
60
70

Residential Dwelling Matched Pairs Adjoining Solar Farms

Pair	Solar Farm	City	State	MW	Approx Distance	Tax ID/Address	Date	Sale Price	Adj. Sale Price	% Diff	Veg. Buffer
1	AM Best	Goldsboro	NC	5	280	3600195570	Sep-13	$250,000			Light
						3600198928	Mar-14	$250,000	$250,000	0%	
2	AM Best	Goldsboro	NC	5	280	3600195361	Sep-13	$260,000			Light
						3600194813	Apr-14	$258,000	$258,000	1%	
3	AM Best	Goldsboro	NC	5	280	3600199891	Jul-14	$250,000			Light
						3600198928	Mar-14	$250,000	$250,000	0%	
4	AM Best	Goldsboro	NC	5	280	3600198632	Aug-14	$253,000			Light
						3600193710	Oct-13	$248,000	$248,000	2%	
5	AM Best	Goldsboro	NC	5	280	3600196656	Dec-13	$255,000			Light
						3601105180	Dec-13	$253,000	$253,000	1%	
6	AM Best	Goldsboro	NC	5	280	3600182511	Feb-13	$247,000			Light
						3600183905	Dec-12	$240,000	$245,000	1%	
7	AM Best	Goldsboro	NC	5	280	3600182784	Apr-13	$245,000			Light
						3600193710	Oct-13	$248,000	$248,000	-1%	
8	AM Best	Goldsboro	NC	5	280	3600195361	Nov-15	$267,500			Light
						3600195361	Sep-13	$260,000	$267,800	0%	
9	Mulberry	Selmer	TN	5	400	0900A011	Jul-14	$130,000			Light
						099CA043	Feb-15	$148,900	$136,988	-5%	
10	Mulberry	Selmer	TN	5	400	099CA002	Jul-15	$130,000			Light
						0990NA040	Mar-15	$120,000	$121,200	7%	
11	Mulberry	Selmer	TN	5	480	491 Dusty	Oct-16	$176,000			Light
						35 April	Aug-16	$185,000	$178,283	-1%	
12	Mulberry	Selmer	TN	5	650	297 Country	Sep-16	$150,000			Medium
						53 Glen	Mar-17	$126,000	$144,460	4%	
13	Mulberry	Selmer	TN	5	685	57 Cooper	Feb-19	$163,000			Medium
						191 Amelia	Aug-18	$132,000	$155,947	4%	
14	Leonard Rd	Hughesville	MD	5.5	230	14595 Box Elder	Feb-16	$291,000			Light
						15313 Bassford Rd	Jul-16	$329,800	$292,760	-1%	
15	Neal Hawkins	Gastonia	NC	5	225	609 Neal Hawkins	Mar-17	$270,000			Light
						1418 N Modena	Apr-18	$225,000	$242,520	10%	
16	Summit	Moyock	NC	80	1,060	129 Pinto	Apr-16	$170,000			Light
						102 Timber	Apr-16	$175,500	$175,101	-3%	
17	Summit	Moyock	NC	80	980	105 Pinto	Dec-16	$206,000			Light
						127 Ranchland	Jun-15	$219,900	$198,120	4%	
18	Tracy	Bailey	NC	5	780	9162 Winters	Jan-17	$255,000			Heavy
						7352 Red Fox	Jun-16	$176,000	$252,399	1%	
19	Manatee	Parrish	FL	75	1180	13670 Highland	Aug-18	$255,000			Heavy
						13851 Highland	Sep-18	$240,000	$255,825	0%	
20	McBride Place	Midland	NC	75	275	4380 Joyner	Nov-17	$325,000			Medium
						3870 Elkwood	Aug-16	$250,000	$317,523	2%	
21	McBride Place	Midland	NC	75	505	5811 Kristi	Mar-20	$530,000			Medium
						3915 Tania	Dec-19	$495,000	$504,657	5%	
22	Mariposa	Stanley	NC	5	1155	215 Mariposa	Dec-17	$249,000			Light
						110 Airport	May-16	$166,000	$239,026	4%	
23	Mariposa	Stanley	NC	5	570	242 Mariposa	Sep-15	$180,000			Light
						110 Airport	Apr-16	$166,000	$175,043	3%	
24	Clarke Cnty	White Post	VA	20	1230	833 Nations Spr	Jan-17	$295,000			Light
						6801 Middle	Dec-17	$249,999	$296,157	0%	
25	Candace	Princeton	NC	5	488	499 Herring	Sep-17	$215,000			Medium
						1795 Bay Valley	Dec-17	$194,000	$214,902	0%	
26	Walker	Barhamsville	VA	20	250	5241 Barham	Oct-18	$264,000			Light
						9252 Ordinary	Jun-19	$277,000	$246,581	7%	
27	AM Best	Goldsboro	NC	5	385	103 Granville Pl	Jul-18	$265,000			Light
						2219 Granville	Jan-18	$260,000	$265,682	0%	
28	AM Best	Goldsboro	NC	5	315	104 Erin	Jun-17	$280,000			Light
						2219 Granville	Jan-18	$265,000	$274,390	2%	
29	AM Best	Goldsboro	NC	5	400	2312 Granville	May-18	$284,900			Light
						2219 Granville	Jan-18	$265,000	$273,948	4%	

Residential Dwelling Matched Pairs Adjoining Solar Farms

Pair	Solar Farm	City	State	MW	Approx Distance	Tax ID/Address	Date	Sale Price	Adj. Sale Price	% Diff	Veg. Buffer
30	AM Best	Goldsboro	NC	5	400	2310 Granville	May-19	$280,000			Light
						634 Friendly	Jul-19	$267,000	$265,291	5%	
31	Summit	Moyock	NC	80	570	318 Green View	Sep-19	$357,000			Light
						336 Green View	Jan-19	$365,000	$340,286	5%	
32	Summit	Moyock	NC	80	440	164 Ranchland	Apr-19	$169,000			Light
						105 Longhorn	Oct-17	$184,500	$186,616	-10%	
33	Summit	Moyock	NC	80	635	358 Oxford	Sep-19	$478,000			Light
						176 Providence	Sep-19	$425,000	$456,623	4%	
34	Summit	Moyock	NC	80	970	343 Oxford	Mar-17	$490,000			Light
						218 Oxford	Apr-17	$525,000	$484,064	1%	
35	Innov 46	Hope Mills	NC	78.5	435	6849 Roslin Farm	Feb-19	$155,000			Light
						109 Bledsoe	Jan-19	$150,000	$147,558	5%	
36	Innov 42	Fayetteville	NC	71	340	2923 County Line	Feb-19	$385,000			Light
						2109 John McMillan	Apr-18	$320,000	$379,156	2%	
37	Innov 42	Fayetteville	NC	71	330	2935 County Line	Jun-19	$266,000			Light
						7031 Glynn Mill	May-18	$255,000	$264,422	1%	
38	Sunfish	Willow Sprng	NC	6.4	205	7513 Glen Willow	Sep-17	$185,000			Light
						205 Pine Burr	Dec-17	$191,000	$172,487	7%	
39	Neal Hawkins	Gastonia	NC	5	145	611 Neal Hawkins	Jun-17	$288,000			Light
						1211 Still Forrest	Jul-18	$280,000	$274,319	5%	
40	Clarke Cnty	White Post	VA	20	1230	833 Nations Spr	Aug-19	$385,000			Light
						2393 Old Chapel	Aug-20	$330,000	$389,286	-1%	
41	Sappony	Stony Creek	VA	20	1425	12511 Palestine	Jul-18	$128,400			Medium
						6494 Rocky Branch	Nov-18	$100,000	$131,842	-3%	
42	Camden Dam	Camden	NC	5	342	122 N Mill Dam	Nov-18	$350,000			Light
						548 Trotman	May-18	$309,000	$352,450	-1%	
43	Grandy	Grandy	NC	20	405	120 Par Four	Aug-19	$315,000			Light
						116 Barefoot	Sep-20	$290,000	$299,584	5%	
44	Grandy	Grandy	NC	20	477	269 Grandy	May-19	$275,000			Light
						103 Spring Leaf	Aug-18	$270,000	$275,912	0%	
45	Champion	Pelion	SC	10	505	517 Old Charleston	Aug-20	$110,000			Light
						1429 Laurel	Feb-19	$126,000	$107,856	2%	
46	Barefoot Bay	Barefoot Bay	FL	74.5	765	465 Papaya	Jul-19	$155,000			Medium
						1132 Waterway	Jul-20	$129,000	$141,618	9%	
47	Barefoot Bay	Barefoot Bay	FL	74.5	750	455 Papaya	Sep-20	$183,500			Medium
						904 Fir	Sep-20	$192,500	$186,697	-2%	
48	Barefoot Bay	Barefoot Bay	FL	74.5	690	419 Papaya	Jul-19	$127,500			Medium
						865 Tamarind	Feb-19	$133,900	$124,613	2%	
49	Barefoot Bay	Barefoot Bay	FL	74.5	690	413 Papaya	Jul-20	$130,000			Medium
						1367 Barefoot	Jan-21	$130,500	$139,507	-7%	
50	Barefoot Bay	Barefoot Bay	FL	74.5	690	343 Papaya	Dec-19	$145,000			Light
						865 Tamarind	Feb-19	$133,900	$142,403	2%	
51	Barefoot Bay	Barefoot Bay	FL	74.5	710	335 Papaya	Apr-18	$110,000			Light
						865 Tamarind	Feb-19	$133,900	$110,517	0%	
52	Miami-Dade	Miami	FL	74.5	1390	13600 SW 182nd	Nov-20	$1,684,000			Light
						17950 SW 158th	Oct-20	$1,730,000	$1,713,199	-2%	
53	Spotsylvania	Paytes	VA	617	1270	12901 Orange Plnk	Aug-20	$319,900			Medium
						12717 Flintlock	Dec-20	$290,000	$326,767	-2%	
54	Spotsylvania	Paytes	VA	617	1950	9641 Nottoway	May-20	$449,900			Medium
						11626 Forest	Aug-20	$489,900	$430,246	4%	
55	Spotsylvania	Paytes	VA	617	1171	13353 Post Oak	Sep-20	$300,000			Heavy
						12810 Catharpin	Jan-20	$280,000	$299,008	0%	
56	McBride Place	Midland	NC	75	470	5833 Kristi	Sep-20	$625,000			Light
						4055 Dakeita	Dec-20	$600,000	$594,303	5%	

MW	Avg. Distance
64.91	612
20.00	479
617.00	1,950
5.00	145

	Indicated Impact
Average	1%
Median	1%
High	10%
Low	-10%

I have further broken down these results based on the MWs, Landscaping, and distance from panel to show the following range of findings for these different categories.

Most of the findings are for homes between 201 and 500 feet. Most of the findings are for Light landscaping screens.

Light landscaping screens are showing no impact on value at any distances, including for solar farms over 75.1 MW.

MW Range 4.4 to 10									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	1	19	2	0	1	2	0	0	1
Average	5%	2%	3%	N/A	0%	4%	N/A	N/A	1%
Median	5%	1%	3%	N/A	0%	4%	N/A	N/A	1%
High	5%	10%	4%	N/A	0%	4%	N/A	N/A	1%
Low	5%	-5%	3%	N/A	0%	4%	N/A	N/A	1%

10.1 to 30									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	0	3	2	0	0	1	0	0	0
Average	N/A	4%	-1%	N/A	N/A	-3%	N/A	N/A	N/A
Median	N/A	5%	-1%	N/A	N/A	-3%	N/A	N/A	N/A
High	N/A	7%	0%	N/A	N/A	-3%	N/A	N/A	N/A
Low	N/A	0%	-1%	N/A	N/A	-3%	N/A	N/A	N/A

30.1 to 75									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	0	2	3	0	0	4	0	0	0
Average	N/A	1%	0%	N/A	N/A	0%	N/A	N/A	N/A
Median	N/A	1%	0%	N/A	N/A	0%	N/A	N/A	N/A
High	N/A	2%	2%	N/A	N/A	9%	N/A	N/A	N/A
Low	N/A	1%	-2%	N/A	N/A	-7%	N/A	N/A	N/A

75.1+									
Landscaping	**Light**	**Light**	**Light**	**Medium**	**Medium**	**Medium**	**Heavy**	**Heavy**	**Heavy**
Distance	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**	**100-200**	**201-500**	**500+**
#	0	2	5	0	0	2	0	0	1
Average	N/A	-3%	2%	N/A	N/A	1%	N/A	N/A	0%
Median	N/A	-3%	4%	N/A	N/A	1%	N/A	N/A	0%
High	N/A	5%	5%	N/A	N/A	4%	N/A	N/A	0%
Low	N/A	-10%	-3%	N/A	N/A	-2%	N/A	N/A	0%

C. Summary of National Data on Solar Farms

I have worked in 19 states related to solar farms and I have been tracking matched pairs in most of those states. On the following pages I provide a brief summary of those findings showing 37 solar farms over 5 MW studied with each one providing matched pair data supporting the findings of this report.

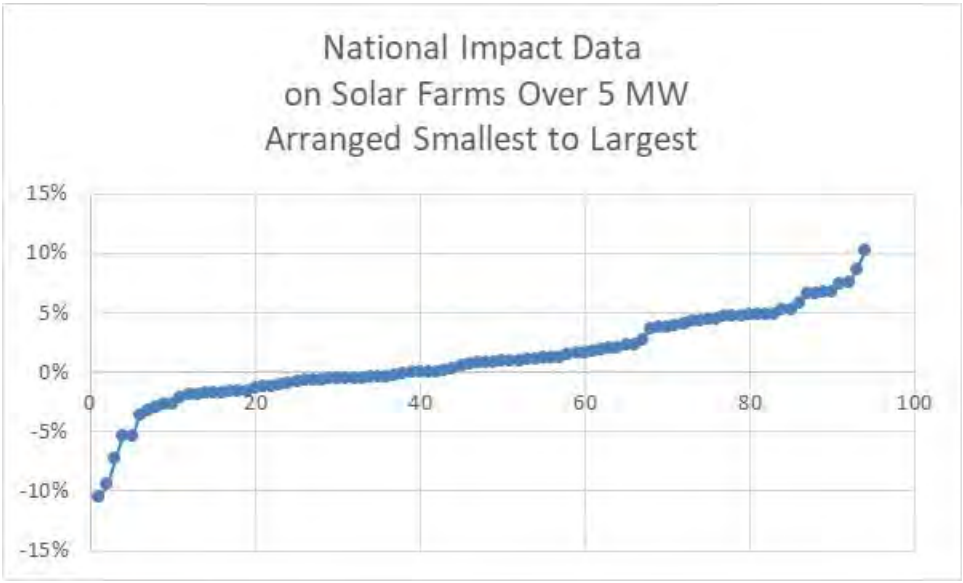
The solar farms summary is shown below with a summary of the matched pair data shown on the following page.

Matched Pair Summary							**Adj. Uses By Acreage**				**1 mile Radius (2010-2020 Data)**			
	Name	**City**	**State**	**Acres**	**MW**	**Topo Shift**	**Res**	**Ag**	**Ag/Res**	**Com/Ind**	**Popl.**	**Med. Income**	**Avg. Housing Unit**	**Veg. Buffer**
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375	Light
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000	Light
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562	Light
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
7	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219	Heavy
8	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
9	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
10	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037	Light
11	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515	Light
12	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884	Light
13	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
14	Flemington	Flemington	NJ	120	9.36	N/A	13%	50%	28%	8%	3,477	$105,714	$444,696	Lt to Med
15	Frenchtown	Frenchtown	NJ	139	7.90	N/A	37%	35%	29%	0%	457	$111,562	$515,399	Light
16	McGraw	East Windsor	NJ	95	14.00	N/A	27%	44%	0%	29%	7,684	$78,417	$362,428	Light
17	Tinton Falls	Tinton Falls	NJ	100	16.00	N/A	98%	0%	0%	2%	4,667	$92,346	$343,492	Light
18	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922	Medium
19	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171	Medium
20	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
21	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
22	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
23	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214	Light
24	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361	Light
25	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138	Light
26	Picture Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172	None
27	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308	None
28	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Medium
29	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288	Light
30	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408	Light
31	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939	Light
32	Eddy II	Eddy	TX	93	10.00	N/A	15%	25%	58%	2%	551	$59,627	$139,088	Light
33	Somerset	Somerset	TX	128	10.60	N/A	5%	95%	0%	0%	1,293	$41,574	$135,490	Light
34	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555	Light
45	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
36	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
37	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Med to Hvy
	Average			362	42.05	32	24%	52%	19%	6%	1,515	$66,292	$242,468	
	Median			150	17.80	10	16%	59%	7%	0%	560	$62,384	$230,848	
	High			3,500	617.00	160	98%	98%	94%	44%	7,684	$120,861	$515,399	
	Low			35	5.00	0	1%	0%	0%	0%	48	$35,057	$96,555	

From these 37 solar farms, I have derived 94 matched pairs. The matched pairs show no negative impact at distances as close as 105 feet between a solar panel and the nearest point on a home. The range of impacts is -10% to +10% with an average and median of +1%.

	MW	Avg. Distance		Indicated Impact
Average	44.80	569	**Average**	1%
Median	14.00	400	**Median**	1%
High	617.00	1,950	**High**	10%
Low	5.00	145	**Low**	-10%

While the range is broad, the two charts below show the data points in range from lowest to highest. There is only 3 data points out of 94 that show a negative impact. The rest support either a finding of no impact or 9 of the data points suggest a positive impact due to adjacency to a solar farm. As discussed earlier in this report, I consider this data to strongly support a finding of no impact on value as most of the findings are within typical market variation and even within that, most are mildly positive findings.



D. Larger Solar Farms

I have also considered larger solar farms to address impacts related to larger projects. Projects have been increasing in size and most of the projects between 100 and 1000 MW are newer with little time for adjoining sales. I have included a breakdown of solar farms with 20 MW to 80 MW facilities with one 617 MW facility.

Matched Pair Summary - @20 MW And Larger							Adj. Uses By Acreage				1 mile Radius (2010-2019 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Popl.	Med. Income	Avg. Housing Unit	Veg. Buffer
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
4	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037	Light
5	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
6	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922	Medium
7	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
8	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
9	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
10	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214	Light
11	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361	Light
12	Picure Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172	Light
13	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308	None
14	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	None
15	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408	Medium
16	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
17	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
18	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Med to Hvy
	Average			640	76.03		19%	64%	17%	4%	721	$69,501	$262,659	
	Median			335	29.20		12%	68%	2%	0%	293	$72,579	$273,135	
	High			3,500	617.00		75%	98%	94%	25%	2,446	$120,861	$483,333	
	Low			121	19.60		1%	0%	0%	0%	48	$36,737	$110,361	

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

I have included a breakdown of solar farms with 50 MW to 617 MW facilities adjoining.

Matched Pair Summary - @50 MW And Larger							Adj. Uses By Acreage				1 mile Radius (2010-2019 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Popl.	Med. Income	Avg. Housing Unit	Veg. Buffer
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
4	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
5	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
6	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
7	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
8	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Med to Hvy
	Average			1,142	143.19		19%	58%	23%	1%	786	$73,128	$289,964	
	Median			580	75.00		15%	67%	0%	0%	390	$69,339	$279,039	
	High			3,500	617.00		41%	97%	94%	3%	2,446	$120,861	$483,333	
	Low			347	71.00		2%	0%	0%	0%	48	$36,737	$143,320	

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

The data for these larger solar farms is shown in the SE USA and the National data breakdowns with similar landscaping, setbacks and range of impacts that fall mostly in the +/-5% range as can be seen earlier in this report.

On the following page I show 81 projects ranging in size from 50 MW up to 1,000 MW with an average size of 111.80 MW and a median of 80 MW. The average closest distance for an adjoining home is 263 feet, while the median distance is 188 feet. The closest distance is 57 feet. The mix of adjoining uses is similar with most of the adjoining uses remaining residential or agricultural in nature. This is the list of solar farms that I have researched for possible matched pairs and not a complete list of larger solar farms in those states.

Parcel #	State	City	Name	Output (MW)	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre			
									Res	Agri	Ag/R	Com
78	NC	Moyock	Summit/Ranchland	80	2034		674	360	4%	94%	0%	2%
133	MS	Hattiesburg	Hattiesburg	50	1129	479.6	650	315	35%	65%	0%	0%
179	SC	Ridgeland	Jasper	140	1600	1000	461	108	2%	85%	13%	0%
211	NC	Enfield	Chestnut	75	1428.1		1,429	210	4%	96%	0%	0%
222	VA	Chase City	Grasshopper	80	946.25				6%	87%	5%	1%
226	VA	Louisa	Belcher	88	1238.1			150	19%	53%	28%	0%
305	FL	Dade City	Mountain View	55	347.12		510	175	32%	39%	21%	8%
319	FL	Jasper	Hamilton	74.9	1268.9	537	3,596	240	5%	67%	28%	0%
336	FL	Parrish	Manatee	74.5	1180.4		1,079	625	2%	50%	1%	47%
337	FL	Arcadia	Citrus	74.5	640				0%	0%	100%	0%
338	FL	Port Charlotte	Babcock	74.5	422.61				0%	0%	100%	0%
353	VA	Oak Hall	Amazon East(ern sh	80	1000		645	135	8%	75%	17%	0%
364	VA	Stevensburg	Greenwood	100	2266.6	1800	788	200	8%	62%	29%	0%
368	NC	Warsaw	Warsaw	87.5	585.97	499	526	130	11%	66%	21%	3%
390	NC	Ellerbe	Innovative Solar 34	50	385.24	226	N/A	N/A	1%	99%	0%	0%
399	NC	Midland	McBride	74.9	974.59	627	1,425	140	12%	78%	9%	0%
400	FL	Mulberry	Alafia	51	420.35		490	105	7%	90%	3%	0%
406	VA	Clover	Foxhound	91	1311.8		885	185	5%	61%	17%	18%
410	FL	Trenton	Trenton	74.5	480		2,193	775	0%	26%	55%	19%
411	NC	Battleboro	Fern	100	1235.4	960.71	1,494	220	5%	76%	19%	0%
412	MD	Goldsboro	Cherrywood	202	1722.9	1073.7	429	200	10%	76%	13%	0%
434	NC	Conetoe	Conetoe	80	1389.9	910.6	1,152	120	5%	78%	17%	0%
440	FL	Debary	Debary	74.5	844.63		654	190	3%	27%	0%	70%
441	FL	Hawthorne	Horizon	74.5	684				3%	81%	16%	0%
484	VA	Newsoms	Southampton	100	3243.9		-	-	3%	78%	17%	3%
486	VA	Stuarts Draft	Augusta	125	3197.4	1147	588	165	16%	61%	16%	7%
491	NC	Misenheimer	Misenheimer 2018	80	740.2	687.2	504	130	11%	40%	22%	27%
494	VA	Shacklefords	Walnut	110	1700	1173	641	165	14%	72%	13%	1%
496	VA	Clover	Piney Creek	80	776.18	422	523	195	15%	62%	24%	0%
511	NC	Scotland Neck	American Beech	160	3255.2	1807.8	1,262	205	2%	58%	38%	3%
514	NC	Reidsville	Williamsburg	80	802.6	507	734	200	25%	12%	63%	0%
517	VA	Luray	Cape	100	566.53	461	519	110	42%	12%	46%	0%
518	VA	Emporia	Fountain Creek	80	798.3	595	862	300	6%	23%	71%	0%
525	NC	Plymouth	Macadamia	484	5578.7	4813.5	1,513	275	1%	90%	9%	0%
526	NC	Mooresboro	Broad River	50	759.8	365	419	70	29%	55%	16%	0%
555	FL	Mulberry	Durrance	74.5	463.57	324.65	438	140	3%	97%	0%	0%
560	NC	Yadkinville	Sugar	60	477	357	382	65	19%	39%	20%	22%
561	NC	Enfield	Halifax 80mw 2019	80	1007.6	1007.6	672	190	8%	73%	19%	0%
577	VA	Windsor	Windsor	85	564.1	564.1	572	160	9%	67%	24%	0%
579	VA	Paytes	Spotsylvania	500	6412	3500			9%	52%	11%	27%
582	NC	Salisbury	China Grove	65	428.66	324.26	438	85	58%	4%	38%	0%
583	NC	Walnut Cove	Lick Creek	50	1424	185.11	410	65	20%	64%	11%	5%
584	NC	Enfield	Sweetleaf	94	1956.3	1250	968	160	5%	63%	32%	0%
586	VA	Aylett	Sweet Sue	77	1262	576	1,617	680	7%	68%	25%	0%
593	NC	Windsor	Sumac	120	3360.6	1257.9	876	160	4%	90%	6%	0%
599	TN	Somerville	Yum Yum	147	4000	1500	1,862	330	3%	32%	64%	1%
602	GA	Waynesboro	White Oak	76.5	516.7	516.7	2,995	1,790	1%	34%	65%	0%
603	GA	Butler	Butler GA	103	2395.1	2395.1	1,534	255	2%	73%	23%	2%
604	GA	Butler	White Pine	101.2	505.94	505.94	1,044	100	1%	51%	48%	1%
605	GA	Metter	Live Oak	51	417.84	417.84	910	235	4%	72%	23%	0%
606	GA	Hazelhurst	Hazelhurst II	52.5	947.15	490.42	2,114	105	9%	64%	27%	0%
607	GA	Bainbridge	Decatur Parkway	80	781.5	781.5	1,123	450	2%	27%	22%	49%
608	GA	Leslie-DeSoto	Americus	1000	9661.2	4437	5,210	510	1%	63%	36%	0%
616	FL	Fort White	Fort White	74.5	570.5	457.2	828	220	12%	71%	17%	0%
621	VA	Spring Grove	Loblolly	150	2181.9	1000	1,860	110	7%	62%	31%	0%
622	VA	Scottsville	Woodridge	138	2260.9	1000	1,094	170	9%	63%	28%	0%
625	NC	Middlesex	Phobos	80	754.52	734	356	57	14%	75%	10%	0%
628	MI	Deerfield	Carroll Road	200	1694.8	1694.8	343	190	12%	86%	0%	2%
633	VA	Emporia	Brunswick	150.2	2076.4	1387.3	1,091	240	4%	85%	11%	0%
634	NC	Elkin	Partin	50	429.4	257.64	945	155	30%	25%	15%	30%

Parcel #	State	City	Name	Output (MW)	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre Res	Agri	Ag/R	Com
638	GA	Dry Branch	Twiggs	200	2132.7	2132.7	-	-	10%	55%	35%	0%
639	NC	Hope Mills	Innovative Solar 46	78.5	531.87	531.87	423	125	17%	83%	0%	0%
640	NC	Hope Mills	Innovative Solar 42	71	413.99	413.99	375	135	41%	59%	0%	0%
645	NC	Stanley	Hornet	75	1499.5	858.4	663	110	30%	40%	23%	6%
650	NC	Grifton	Grifton 2	56	681.59	297.6	363	235	1%	99%	0%	0%
651	NC	Grifton	Buckleberry	52.1	367.67	361.67	913	180	5%	54%	41%	0%
657	KY	Greensburg	Horseshoe Bend	60	585.65	395	1,394	63	3%	36%	61%	0%
658	KY	Campbellsville	Flat Run	55	429.76	429.76	408	115	13%	52%	35%	0%
666	FL	Archer	Archer	74.9	636.94	636.94	638	200	43%	57%	0%	0%
667	FL	New Smyrna Bea	Pioneer Trail	74.5	1202.8	900	1,162	225	14%	61%	21%	4%
668	FL	Lake City	Sunshine Gateway	74.5	904.29	472	1,233	890	11%	80%	8%	0%
669	FL	Florahome	Coral Farms	74.5	666.54	580	1,614	765	19%	75%	7%	0%
672	VA	Appomattox	Spout Spring	60	881.12	673.37	836	335	16%	30%	46%	8%
676	TX	Stamford	Alamo 7	106.4	1663.1	1050	-	-	6%	83%	0%	11%
677	TX	Fort Stockton	RE Roserock	160	1738.2	1500	-	-	0%	100%	0%	0%
678	TX	Lamesa	Lamesa	102	914.5	655	921	170	4%	41%	11%	44%
679	TX	Lamesa	Ivory	50	706	570	716	460	0%	87%	2%	12%
680	TX	Uvalde	Alamo 5	95	830.35	800	925	740	1%	93%	6%	0%
684	NC	Waco	Brookcliff	50	671.03	671.03	560	150	7%	21%	15%	57%
689	AZ	Arlington	Mesquite	320.8	3774.5	2617	1,670	525	8%	92%	0%	0%
692	AZ	Tucson	Avalon	51	479.21	352	-	-	0%	100%	0%	0%
				81								
			Average	111.80	1422.4	968.4	1031	263	10%	62%	22%	6%
			Median	80.00	914.5	646.0	836	188	7%	64%	17%	0%
			High	1000.00	9661.2	4813.5	5210	1790	58%	100%	100%	70%
			Low	50.00	347.1	185.1	343	57	0%	0%	0%	0%

VII. Distance Between Homes and Panels

I have measured distances at matched pairs as close as 105 feet between panel and home to show no impact on value. This measurement goes from the closest point on the home to the closest solar panel. This is a strong indication that at this distance there is no impact on adjoining homes.

However, in tracking other approved solar farms across Kentucky, North Carolina and other states, I have found that it is common for there to be homes within 100 to 150 feet of solar panels. Given the visual barriers in the form of privacy fencing or landscaping, there is no sign of negative impact.

I have also tracked a number of locations where solar panels are between 50 and 100 feet of single-family homes. In these cases the landscaping is typically a double row of more mature evergreens at time of planting. There are many examples of solar farms with one or two homes closer than 100-feet, but most of the adjoining homes are further than that distance.

VIII. Topography

As shown on the summary charts for the solar farms, I have been identifying the topographic shifts across the solar farms considered. Differences in topography can impact visibility of the panels, though typically this results in distant views of panels as opposed to up close views. The topography noted for solar farms showing no impact on adjoining home values range from as much as 160-foot shifts across the project. Given that appearance is the only factor of concern and that distance plus landscape buffering typically addresses up close views, this leaves a number of potentially distant views of panels. I specifically note that in Crittenden in KY there are distant views of panels from the adjoining homes that showed no impact on value.

General rolling terrain with some distant solar panel views are showing no impact on adjoining property value.

IX. Potential Impacts During Construction

I have previously been asked by the Kentucky Siting Board about potential impacts during construction. This is not a typical question I get as any development of a site will have a certain amount of construction, whether it is for a commercial agricultural use such as large-scale poultry operations or a new residential subdivision. Construction will be temporary and consistent with other development uses of the land and in fact dust from the construction will likely be less than most other construction projects given the minimal grading. I would not anticipate any impacts on property value due to construction on the site.

I note that in the matched pairs that I have included there have been a number of home sales that happened after a solar farm was approved but before the solar farm was built showing no impact on property value. Therefore the anticipated construction had no impact as shown by that data.

X. Scope of Research

I have researched over 750 solar farms and sites on which solar farms are existing and proposed in Kentucky, Illinois, Tennessee, North Carolina, Virginia as well as other states to determine what uses are typically found in proximity with a solar farm. The data I have collected and provide in this report strongly supports the assertion that solar farms are having no negative consequences on adjoining agricultural and residential values.

Beyond these references, I have quantified the adjoining uses for a number of solar farm comparables to derive a breakdown of the adjoining uses for each solar farm. The chart below shows the breakdown of adjoining or abutting uses by total acreage.

Percentage By Adjoining Acreage

	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	19%	53%	20%	2%	6%	887	344	91%	8%
Median	11%	56%	11%	0%	0%	708	218	100%	0%
High	100%	100%	100%	93%	98%	5,210	4,670	100%	98%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

I have also included a breakdown of each solar farm by number of adjoining parcels to the solar farm rather than based on adjoining acreage. Using both factors provides a more complete picture of the neighboring properties.

Percentage By Number of Parcels Adjoining

	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	61%	24%	9%	2%	4%	887	344	93%	6%
Median	65%	19%	5%	0%	0%	708	218	100%	0%
High	100%	100%	100%	60%	78%	5,210	4,670	105%	78%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

Both of the above charts show a marked residential and agricultural adjoining use for most solar farms. Every single solar farm considered included an adjoining residential or residential/agricultural use.

XI. Specific Factors Related To Impacts on Value

I have completed a number of Impact Studies related to a variety of uses and I have found that the most common areas for impact on adjoining values typically follow a hierarchy with descending levels of potential impact. I will discuss each of these categories and how they relate to a solar farm.

1. Hazardous material
2. Odor
3. Noise
4. Traffic
5. Stigma
6. Appearance

1. Hazardous material

A solar farm presents no potential hazardous waste byproduct as part of normal operation. Any fertilizer, weed control, vehicular traffic, or construction will be significantly less than typically applied in a residential development and even most agricultural uses.

The various solar farms that I have inspected and identified in the addenda have no known environmental impacts associated with the development and operation.

2. Odor

The various solar farms that I have inspected produced no odor.

3. Noise

Whether discussing passive fixed solar panels, or single-axis trackers, there is no negative impact associated with noise from a solar farm. The transformer reportedly has a hum similar to an HVAC that can only be heard in close proximity to this transformer and the buffers on the property are sufficient to make emitted sounds inaudible from the adjoining properties. No sound is emitted from the facility at night.

The various solar farms that I have inspected were inaudible from the roadways.

4. Traffic

The solar farm will have no onsite employee's or staff. The site requires only minimal maintenance. Relative to other potential uses of the site (such as a residential subdivision), the additional traffic generated by a solar farm use on this site is insignificant.

5. Stigma

There is no stigma associated with solar farms and solar farms and people generally respond favorably towards such a use. While an individual may express concerns about proximity to a solar farm, there is no specific stigma associated with a solar farm. Stigma generally refers to things such as adult establishments, prisons, rehabilitation facilities, and so forth.

Solar panels have no associated stigma and in smaller collections are found in yards and roofs in many residential communities. Solar farms are adjoining elementary, middle and high schools as well as churches and subdivisions. I note that one of the solar farms in this report not only adjoins a church, but is actually located on land owned by the church. Solar panels on a roof are often cited as an enhancement to the property in marketing brochures.

I see no basis for an impact from stigma due to a solar farm.

6. Appearance/Viewshed

I note that larger solar farms using fixed or tracking panels are a passive use of the land that is in keeping with a rural/residential area. As shown below, solar farms are comparable to larger greenhouses. This is not surprising given that a greenhouse is essentially another method for collecting passive solar energy. The greenhouse use is well received in residential/rural areas and has a similar visual impact as a solar farm.

The solar panels are all less than 15 feet high, which means that the visual impact of the solar panels will be similar in height to a typical greenhouse and lower than a single story residential dwelling. Were the subject property developed with single family housing, that development would have a much greater visual impact on the surrounding area given that a two-story home with attic could be three to four times as high as these proposed panels.

Whenever you consider the impact of a proposed project on viewshed or what the adjoining owners may see from their property it is important to distinguish whether or not they have a protected viewshed or not. Enhancements for scenic vistas are often measured when considering properties that adjoin preserved open space and parks. However, adjoining land with a preferred view today conveys no guarantee that the property will continue in the current use. Any consideration of the impact of the appearance requires a consideration of the wide variety of other uses a property already has the right to be put to, which for solar farms often includes subdivision development, agricultural business buildings such as poultry, or large greenhouses and the like.

Dr. Randall Bell, MAI, PhD, and author of the book **Real Estate Damages**, Third Edition, on Page 146 "Views of bodies of water, city lights, natural settings, parks, golf courses, and other amenities are considered desirable features, particularly for residential properties." Dr. Bell continues on Page 147 that "View amenities may or may not be protected by law or regulation. It is sometimes argued that views have value only if they are protected by a view easement, a zoning ordinance, or covenants, conditions, and restrictions (CC&Rs), although such protections are relatively

uncommon as a practical matter. The market often assigns significant value to desirable views irrespective of whether or not such views are protected by law."

Dr. Bell concludes that a view enhances adjacent property, even if the adjacent property has no legal right to that view. He then discusses a "borrowed" view where a home may enjoy a good view of vacant land or property beyond with a reasonable expectation that the view might be partly or completely obstructed upon development of the adjoining land. He follows that with "This same concept applies to potentially undesirable views of a new development when the development conforms to applicable zoning and other regulations. Arguing value diminution in such cases is difficult, since the possible development of the offending property should have been known." In other words, if there is an allowable development on the site then arguing value diminution with such a development would be difficult. This further extends to developing the site with alternative uses that are less impactful on the view than currently allowed uses.

This gets back to the point that if a property has development rights and could currently be developed in such a way that removes the viewshed such as a residential subdivision, then a less intrusive use such as a solar farm that is easily screened by landscaping would not have a greater impact on the viewshed of any perceived value adjoining properties claim for viewshed. Essentially, if there are more impactful uses currently allowed, then how can you claim damages for a less impactful use.

7. Conclusion

On the basis of the factors described above, it is my professional opinion that the proposed solar farm will not negatively impact adjoining property values. The only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers. The matched pair data supports that conclusion.

XII. Conclusion

The matched pair analysis shows no negative 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. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all support a finding of no impact on property value.

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.

I have found no difference in the mix of adjoining uses or proximity to adjoining homes based on the size of a solar farm and I have found no significant difference in the matched pair data adjoining larger solar farms versus smaller solar farms. The data in the SouthEast is consistent with the larger set of data that I have nationally, as is the more specific data located in and around Kentucky.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no negative impact on the value of adjoining or abutting property. 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.

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Kirkland Appraisals, LLC

Richard C. Kirkland, Jr., MAI
9408 Northfield Court
Raleigh, North Carolina 27603
Mobile (919) 414-8142
rkirkland2@gmail.com
www.kirklandappraisals.com

Professional Experience

Kirkland Appraisals, LLC, Raleigh, N.C. — 2003 – Present
Commercial appraiser

Hester & Company, Raleigh, N.C.
Commercial appraiser — 1996 – 2003

Professional Affiliations

MAI (Member, Appraisal Institute) designation #11796 — 2001
NC State Certified General Appraiser # A4359 — 1999
VA State Certified General Appraiser # 4001017291
SC State Certified General Appraiser # 6209
FL State Certified General Appraiser # RZ3950
IL State Certified General Appraiser # 553.002633
KY State Certified General Appraiser # 5522

Education

Bachelor of Arts in English, University of North Carolina, Chapel Hill — 1993

Continuing Education

Florida Appraisal Laws and Regulations	2020
Michigan Appraisal Law	2020
Uniform Standards of Professional Appraisal Practice Update	2020
Uniform Appraisal Standards for Federal Land Acquisitions (Yellow Book)	2019
The Cost Approach	2019
Income Approach Case Studies for Commercial Appraisers	2018
Introduction to Expert Witness Testimony for Appraisers	2018
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Uniform Standards of Professional Appraisal Practice Update	2004
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Supporting Capitalization Rates	2004
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Wells and Septic Systems and Wastewater Irrigation Systems	2002
Appraisals 2002	2002
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Appraisal of Nonconforming Uses	2000
Advanced Applications	2000
Highest and Best Use and Market Analysis	1999
Advanced Sales Comparison and Cost Approaches	1999
Advanced Income Capitalization	1998
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Report Writing and Valuation Analysis	1999
Property Tax Values and Appeals	1997
Uniform Standards of Professional Appraisal Practice, A & B	1997
Basic Income Capitalization	1996

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EXHIBIT 12
ATTACHMENT 12.7

BACON | FARMER | WORKMAN
ENGINEERING & TESTING, INC.

TRAFFIC STUDY

McCracken County Solar Farm
New Liberty Church Rd./Massey Rd.
Kevil, KY

Submitted to:

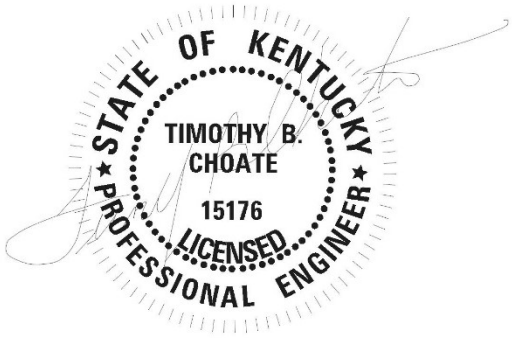
Community Energy

c/o: Mr. Chris Killenberg

Regional Development Director

P.O. Box 17236

Chapel Hill, North Carolina 27516



4–21–2021

Submittal Date:

April 21, 2021

PROPOSED McCRACKEN COUNTY SOLAR FARM

1 INTRODUCTION

Community Energy Solar, LLC ("Community Energy") engaged Bacon Farmer Workman Engineering & Testing, Inc. (BFW) to study and report on the impact of a proposed solar electric generating facility's operation on road and rail traffic to and within the facility, including anticipated levels of fugitive dust created by traffic, and any anticipated degradation of roads and lands in its vicinity.

The proposed solar electric generating facility will be located in western McCracken County, Kentucky, and is to be constructed and operated by McCracken County Solar LLC (the "Project"). The Project would generate electricity employing photovoltaic solar panels. It will be constructed on approximately 615 acres located about 2½ miles northeast of Kevil, Kentucky. The Project site is bordered by New Liberty Church Road on the west, Massey Road on the south, and Bethel Church Road on the east.

Community Energy anticipates a construction period of 6-9 months, involving up to 150 construction workers. Once operational, the project would require 2-3 full-time employees.

This Traffic Study examines existing traffic patterns and road conditions in the vicinity of the Project, anticipated routes and projected traffic considerations related to the introduction of both Project construction and operations workers in the area, potential traffic congestion and mitigation measures, potential dust associated with traffic entering and exiting the project site, and potential impacts on local rail traffic.

2 TRAFFIC STUDY

2.1 Existing Road Network and Traffic Conditions

The anticipated routes for construction equipment, materials deliveries, and construction and operation crews to access the Project site consist of the existing roads that are adjacent to the site and the existing roads that would be used to access the McCracken County Site. The major roads to be used to access the facility from the north and south are anticipated to be I-24, I-57, and US 60. I-24 would provide access to the site from St. Louis and Nashville. I-57 would provide access to the site from Memphis. US 60 is expected to provide westerly access to the site from Wickliffe KY and easterly access to the site from I-24.

On US 60, the site would be accessed via KY 996, KY 1154, KY 358, KY 473, and KY 725. KY 996, KY 1154, KY 473 and KY 725 are existing 2-lane roads generally running in a north / south direction connecting US 60 with the site. KY 725 (Woodville Rd) and KY 358 are existing 2-lane roads generally running in an east / west direction connecting KY 996 and KY 1154 with the site. From KY 725, Massey Road would be used to access the site's southern-most property line. The Local Site Access Road Information Table below provides further details on each local road that was considered to access the facility.

Local Site Access Road Information

Roadway	Road Classification	Average Daily Traffic	Year Counted
US 60	Principal Arterial (NHS)	7187	2017
KY 996 Metropolis Lake Rd	Minor Collector	2364	2017
KY 1154 Hobbs Rd	Minor Collector	1615	2018
KY 473 New Liberty Ch Rd	Minor Collector	1649	2018
KY 725 Woodville Rd	Minor Collector	1685	2017
KY 725 Bethel Church Rd	Minor Collector	243	2017
KY 358 Ogden Landing Rd	Major Collector	996	2019
Massey Rd	Local Rural	Not Available	

2.2 Traffic Projections and Intersection Analysis

Although numerous local County and State maintained roads exist near the site area, this study analysis assumed US 60 would generate the majority of worker and material delivery traffic entering and leaving the site. Assumptions for this resulted in 90% of the traffic coming from US 60 East and 10% coming from US 60 West.

Based on the assumed 90 / 10 directional traffic split, the existing unsignalized US 60 intersection at KY 473 in Kevil, KY. and the existing 4-WAY stop intersection at KY 473 / KY 725 were analyzed for both the current and peak-hour Level of Service (LOS) that would be generated during the construction period of the facility.

INTERSECTION	CURRENT LOS	PEAK-HOUR LOS
US 60 / KY 473 (AM)	C (PHF 0.75)	C (PHF 0.75)
US 60 / KY 473 (PM)	C (PHF 0.75)	C (PHF 0.75)
KY 473 / KY 725 (AM)	A (PHF 0.75)	B (PHF 0.75)
KY 473 / KY 725 (PM)	A (PHF 0.75)	A (PHF 0.75)

Based on assumed traffic count projections and peak-time intervals, HCS7 software was used for analyzing flow rates, queue lengths, delays, traffic capacity, and determine the LOS for each intersection. The detailed report below summarizes the results. (see TRAFFIC REPORT below)


SITE
LEGEND
25
(AM TRAVEL WAY APPROX TOTAL TRIPS)
25
(PM TRAVEL WAY APPROX TOTAL TRIPS)
350 (20) AADT (YEAR)
ASSUME
90% TRAFFIC
GENERATED FROM
US 60 EAST
10% US 60 WEST
SOLAR FARM
TRAFFIC ROUTES TO
BALANCE PEAK CONGESTION
(CONSTUCTION WORK FORCE)
Rossington
Ingleside
Cimota City
Bayou Church
Future City
4-WAY STOP
TO WICKLIFFE
TO PADUCAH
STOP

HCS7 Two-Way Stop-Control Report

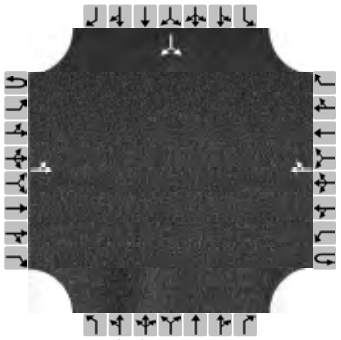
General Information

Analyst	
Agency/Co.	BFW Engineering
Date Performed	4/12/2021
Analysis Year	2021
Time Analyzed	
Intersection Orientation	East-West
Project Description	Existing 1a

Site Information

Intersection	US 60 / KY 473
Jurisdiction	
East/West Street	US 60
North/South Street	KY 473
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		24	302				302	58						58		24
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32													109	
Capacity, c (veh/h)		1077													346	
v/c Ratio		0.03													0.32	
95% Queue Length, Q_{95} (veh)		0.1													1.3	
Control Delay (s/veh)		8.4													20.2	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)		0.9												20.2		
Approach LOS														C		

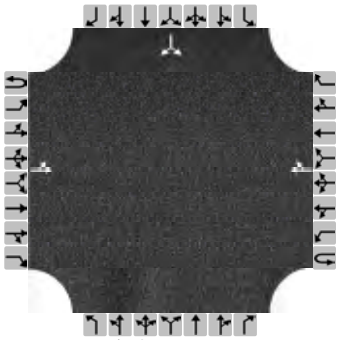
General Information

Analyst	
Agency/Co.	BFW Engineering
Date Performed	4/17/2021
Analysis Year	2021
Time Analyzed	AM
Intersection Orientation	East-West
Project Description	Proposed 1a

Site Information

Intersection	US 60 / KY 473
Jurisdiction	
East/West Street	US 60
North/South Street	KY 473
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		39	302				302	152						58		24
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		52													109	
Capacity, c (veh/h)		968													295	
v/c Ratio		0.05													0.37	
95% Queue Length, Q_{95} (veh)		0.2													1.7	
Control Delay (s/veh)		8.9													24.2	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	1.6												24.2			
Approach LOS													C			

HCS7 Two-Way Stop-Control Report

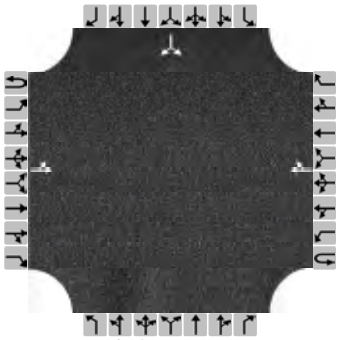
General Information

Analyst	
Agency/Co.	BFW Engineering
Date Performed	4/12/2021
Analysis Year	2021
Time Analyzed	
Intersection Orientation	East-West
Project Description	Proposed 3

Site Information

Intersection	US 60 / KY 473
Jurisdiction	
East/West Street	US 60
North/South Street	KY 473
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		24	302				302	58						86		39
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32													167	
Capacity, c (veh/h)		1077													350	
v/c Ratio		0.03													0.48	
95% Queue Length, Q_{95} (veh)		0.1													2.5	
Control Delay (s/veh)		8.4													24.3	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)		0.9												24.3		
Approach LOS														C		

HCS7 All-Way Stop Control Report

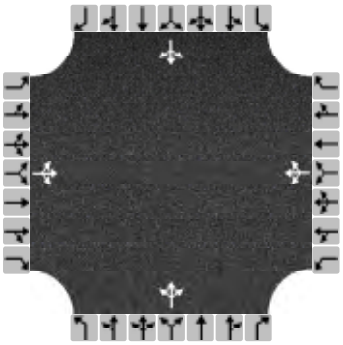
General Information

Analyst	
Agency/Co.	BFW Engineering
Date Performed	4/10/2021
Analysis Year	2021
Analysis Time Period (hrs)	0.25
Time Analyzed	
Project Description	Existing 1

Site Information

Intersection	KY 725 / KY 473
Jurisdiction	
East/West Street	KY 725
North/South Street	KY 473
Peak Hour Factor	0.50

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	4	16	20	62	20	2	12	8	62	2	8	2
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	80			168			164			24		
Percent Heavy Vehicles	2			2			2			2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.071			0.149			0.146			0.021		
Final Departure Headway, hd (s)	4.27			4.57			4.12			4.63		
Final Degree of Utilization, x	0.095			0.213			0.188			0.031		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.27			2.57			2.12			2.63		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	80			168			164			24		
Capacity	843			787			874			777		
95% Queue Length, Q_{95} (veh)	0.3			0.8			0.7			0.1		
Control Delay (s/veh)	7.7			8.8			8.1			7.8		
Level of Service, LOS	A			A			A			A		
Approach Delay (s/veh)	7.7			8.8			8.1			7.8		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	8.3						A					

HCS7 All-Way Stop Control Report

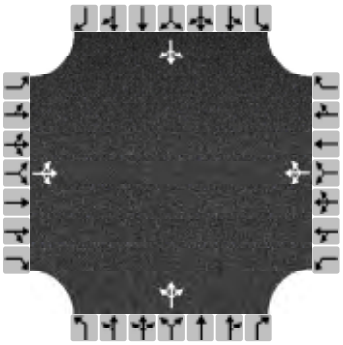
General Information

Analyst	
Agency/Co.	BFW Engineering
Date Performed	4/10/2021
Analysis Year	2021
Analysis Time Period (hrs)	0.25
Time Analyzed	
Project Description	Proposed 1

Site Information

Intersection	KY 725 / KY 473
Jurisdiction	
East/West Street	KY 725
North/South Street	KY 473
Peak Hour Factor	0.50

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	4	16	20	62	20	77	12	83	62	2	8	2
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	80			318			314			24		
Percent Heavy Vehicles	2			2			2			2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.071			0.283			0.279			0.021		
Final Departure Headway, hd (s)	4.92			4.68			4.72			5.29		
Final Degree of Utilization, x	0.109			0.413			0.412			0.035		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.92			2.68			2.72			3.29		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	80			318			314			24		
Capacity	732			770			763			681		
95% Queue Length, Q_{95} (veh)	0.4			2.0			2.0			0.1		
Control Delay (s/veh)	8.5			10.9			11.0			8.5		
Level of Service, LOS	A			B			B			A		
Approach Delay (s/veh)	8.5			10.9			11.0			8.5		
Approach LOS	A			B			B			A		
Intersection Delay, s/veh | LOS	10.6						B					

HCS7 All-Way Stop Control Report

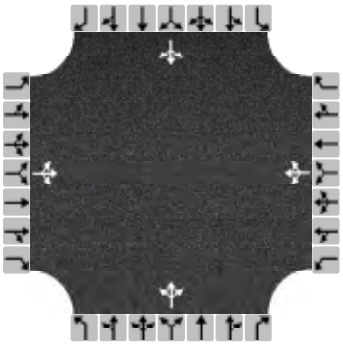
General Information

Analyst	
Agency/Co.	BFW Engineering
Date Performed	4/17/2021
Analysis Year	2021
Analysis Time Period (hrs)	0.25
Time Analyzed	PM
Project Description	Proposed 1a

Site Information

Intersection	KY 725 / KY 473
Jurisdiction	
East/West Street	KY 725
North/South Street	KY 473
Peak Hour Factor	0.75

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	4	16	20	62	20	23	12	8	62	42	51	2
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	53			140			109			127		
Percent Heavy Vehicles	2			2			2			2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.047			0.124			0.097			0.113		
Final Departure Headway, hd (s)	4.36			4.52			4.12			4.58		
Final Degree of Utilization, x	0.065			0.176			0.125			0.161		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.36			2.52			2.12			2.58		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	53			140			109			127		
Capacity	825			796			875			785		
95% Queue Length, Q_{95} (veh)	0.2			0.6			0.4			0.6		
Control Delay (s/veh)	7.7			8.5			7.7			8.5		
Level of Service, LOS	A			A			A			A		
Approach Delay (s/veh)	7.7			8.5			7.7			8.5		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	8.2						A					

2.3 Operational and Maintenance Traffic

Entrances to the west side of the facility would likely be on KY 725. Entrances to the south side of the facility would be on Massey Road. Each of these roads are adjacent to the site. These potential access points are identified on EXHIBIT 2.3-1. Traffic is expected to increase during construction, with a morning and afternoon peak due to workers entering and leaving the site as well as deliveries occurring throughout the day.

From on-site field observations, the proposed access locations into the sites appear to provide an adequate decision time (foot per second) period for the ingress /egress traffic along the local roads. The proposed access intersection locations appear to have unobstructed views allowing sufficient sight-line visibility for on-coming traffic. The existing vertical grade(s) at the proposed access locations appear to allow sufficient gradients for proper deceleration and acceleration along the existing local roads. (See EXHIBIT 2.3-1 Figures 1-6)

The construction of the proposed solar facility is expected to take approximately six to nine months for completion. During construction, a temporary increase in traffic volume associated with travel of construction laborers (150 total at any given time), delivery of construction equipment and material, delivery of solar panel components and equipment is anticipated. Laborer commutes with passenger vehicles and trucks will occur daily with two traffic peaks (i.e., morning peak and afternoon peak), whereas deliveries of equipment will occur on trailers, flatbeds, or other large vehicles periodically throughout the construction process at various times of day. A summary of anticipated construction vehicle trips per day shown below.

Summary of Anticipated Construction Vehicle Trips

Construction Vehicle Type	Vehicle Trips Per Day (Avg.)
Employee Passenger	150
Heavy-Duty Truck	5
Water Truck	4

2.4 Traffic Congestion Mitigation Consideration

In an attempt to reduce traffic congestion at intersections and along the local roads, authorized solar farm representatives may issue “route cards” indicating the time and route individual workers and deliveries must follow to enter and leave the site. If necessary, the solar farm may implement enforcement measures to ensure workers and deliveries comply with the route cards.

Ride-sharing for employees working during the construction phase will be encouraged in order to reduce the daily traffic count to / from the project site during the morning and afternoon peaks.

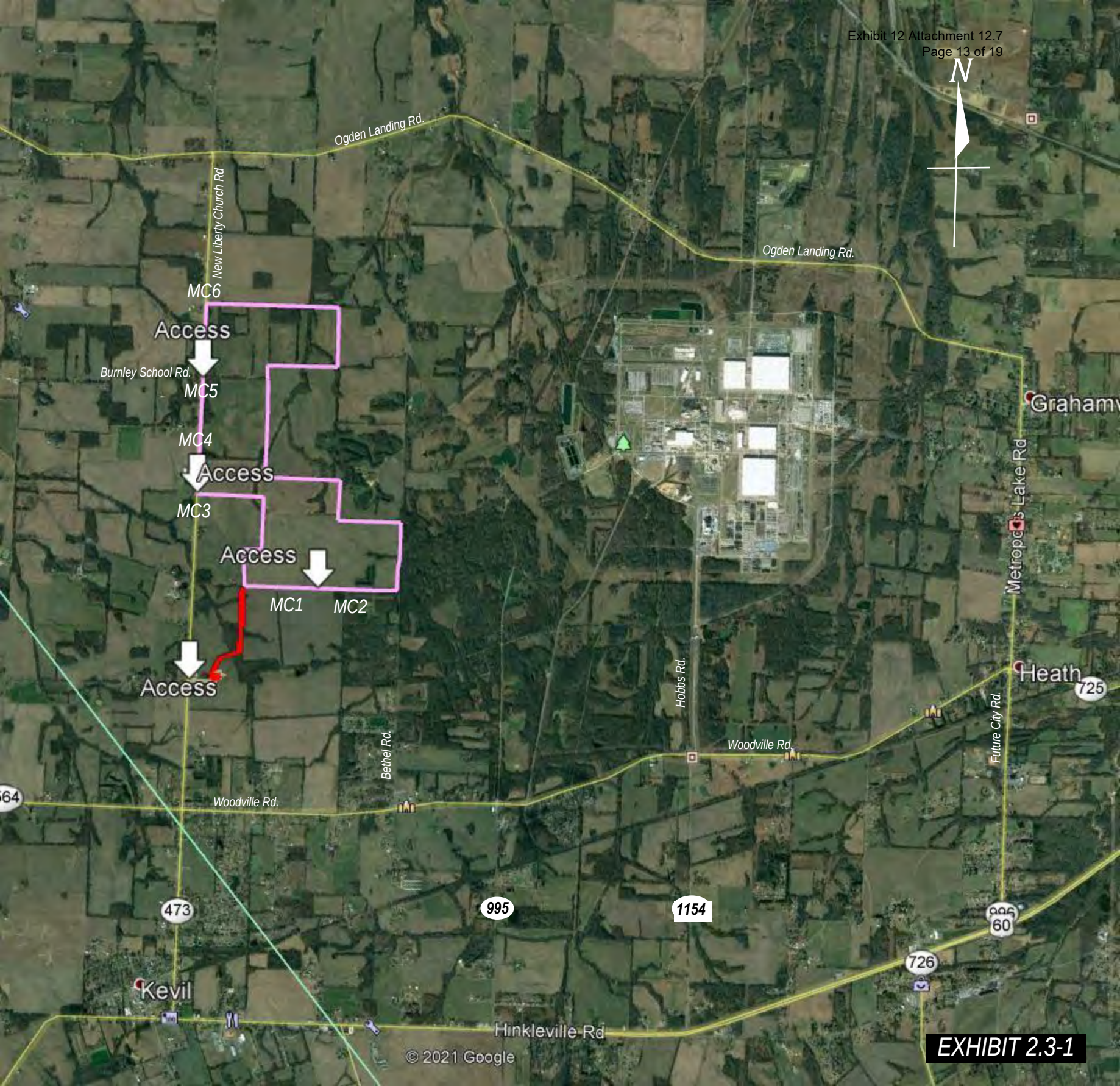

N
Ogden Landing Rd.
New Liberty Church Rd
Ogden Landing Rd.
MC6
Access
Burnley School Rd.
MC5
MC4
Access
MC3
Access
MC1
MC2
Access
Graham
Metropolis Lake Rd
Heath
725
Hobbs Rd.
Future City Rd.
Woodville Rd.
Bethel Rd.
Woodville Rd.
564
473
995
1154
60
726
Kevil
Hinkleville Rd
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EXHIBIT 2.3-1

Figure 1 (MC 1) Assess on Massey Rd (Looking West)

Figure 2 (MC 2) Access on Massey Rd (Looking East)

Figure 3 (MC 3) Access on KY 725 (Looking South)

Figure 4 (MC 4) Access on KY 725 (Looking North)

Figure 5 (MC 5) Access on KY 725 at Burney School Road (Looking South)

Figure 6 (MC 6) Access on KY 725 at Burney School Road (Looking North)

2.5 Traffic Safety Precautions

Permanent road or lane closures are not anticipated for the construction of the solar facility. Construction of the facility is not expected to impact roads, but safety precautions including signage, signaling, flagmen, and temporary lane closures may be utilized as needed. For example, during a delivery, flagmen may be used to temporarily stop traffic to allow the delivery driver to turn into the facility safely, with signage used to warn oncoming traffic of the lane closure.

2.6 Impact on Road Infrastructure

Construction of the facility is not expected to have any significant impact on the existing road infrastructure other than increased wear due to increased traffic on KY 473, KY 725, and Massey Road.

The existing bridge on KY 725, between the site's westerly access locations, has a posted 11 TON weight limit. All crossing equipment and transported materials needed during construction will not be allowed to exceed the posted limit.

Any impact to the roads or bridge due to construction of the facility will be repaired at the expense of the solar farm.

Access drives and internal roads will be constructed or improved as needed to accommodate appropriate vehicles and equipment to construct the proposed solar facility. Internal roads will be compacted gravel, which may result in an increase in airborne dust particles. During construction, water may be applied to the internal road system to reduce dust generation.

2.7 Operational and Maintenance Traffic

The facility will be manned during normal business operation with 2-3 people on staff, working normal business hours, but will change shifts as needed to perform some planned maintenance at night. There will also be an On-Call schedule to respond to any corrective maintenance that is impacting production. It is anticipated that workers making site visits will be in mid-to full-size trucks, accounting for less vehicle traffic than an average single-family home. During operation, workers are not anticipated to create significant impact on the local traffic and will generally be entering and leaving on normal weekdays during daylight hours.

During construction, an estimated 2 acre parking area is anticipated to provide sufficient space for workers, deliveries, and material staging. The "southern-most" Access Point on KY 725 (see EXHIBIT 2.3-1) has been identified as a potential location for parking. An approved surfacing material will be used for stabilization and minimize soil erosion at the parking area.

2.8 Traffic Summary and Conclusions

CONSTRUCTION : During construction of this facility, traffic is anticipated to increase with morning and evening peaks for daily workers and deliveries being made to the site periodically.

All necessary safety precautions, including signing and flagmen, will be taken to best ensure collisions are prevented on the surrounding roads. Other than increased wear, damages to the existing road infrastructure are not anticipated. All affected highway segments are anticipated to continue at an acceptable level of service (LOS) during both the morning and afternoon peaks.

OPERATION : Operation of the facility is not expected to cause significant impact to the local traffic as the additional expected traffic contributed to the area will be similar to that of a typical single-family home.

During the construction and operation of the facility, there will be no adverse effects on traffic operations in and around the project site.

3 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, minor fugitive dust 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 the facility construction is authorized as a non-stormwater discharge activity. The McCracken County facility will apply best management practices (BMP) for dust mitigation.

4 IMPACTS TO RAIL

The proposed McCracken County Site is not located near an existing railway. The Project will not use railways for any construction or operational activities. Therefore, construction or operations of the proposed solar facility will have no impact on the rail facilities.

Tim Choate, PE, PLS
Transportation Engineer

BACON | FARMER | WORKMAN
ENGINEERING & TESTING, INC.

Professional Practice:

Mr. Choate has over thirty-five years of experience in the transportation/surveying/civil engineering field. He joined Bacon Farmer Workman Engineering & Testing, Inc. after retiring from the Kentucky Transportation Cabinet in 2011. Tim started his career with the Cabinet as the Design Engineer for District One in Paducah. He served as Branch Manager for Operations for three years and finished his career as Branch Manager for Project Development in the District. Tim held that position for twelve and was responsible for implementing the Highway Plan for District One and managing the planning, design, right of way and utility staff within District One. He served as Project Manager on the majority of the Consultant Projects within District One during his tenure as well as monitoring in-house design projects. Currently Tim serves as a project manager for the Transportation Department at BFW.

Skills and Experience:

- Corridor Layout
- Intersection Design
- Transportation Planning
- Traffic Studies
- Roadway Realignment
- Roadway Drainage Improvement
- Federal Aid Highway Program Guidance, FHWA
- Floodplain Management
- Phase II Environmental Site Assessment
- Understanding of Required Permits
- Extensive background in local, state and federal funding process
- Pedestrian and Bicycle Facilities Planning & Design

Education & Experience:

University of Kentucky
Bachelor of Science in Civil Engineering, 1985

Murray State University
Bachelor of Civil Engineering Technology, 1979

State of Kentucky Professional Engineer #15176

State of Kentucky Professional Land Surveyor #2737

Relevant Project Experience:

US 60, Entrance for McCracken County High School, Turning lanes and Traffic Signal Installation, McCracken County, Kentucky: This project consisted of breaking the control of access at MP 7.9 on US 60 in McCracken County and providing the main entrance to the new campus of McCracken County High School. Anticipated enrollment at this consolidated county school was approximately 2200 students. Unique aspects of this project involved the co-ordination of the relocation of an entrance opposite the proposed school entrance so that the new traffic signal could serve the school as well as a large sports complex and future developments. Traffic on US 60 at this location is approximately 13,000 vehicles per day. The design included dual left lanes into the school. The posted speed on this section of US 60 is 55 mph. Weaving analysis was also performed on the project to transition from dual lefts to a single lane on the school property. Auxiliary right turn lanes were also provided for both entrances/approaches.

US 62 Widening: Marshall County, Kentucky (KYTC) Project Manager: The project begins at I-24 (MP 8.810) and extends to MP 10.88 at KY Dam Village State Park. Project included Landscaping, Multi-Use Path, Pavement and Shoulder widening, Upgrading guardrail, Access management of existing entrances, and traffic analysis, Bridge rehabilitation with the upgrade of bridge railings.

Reconstruction US 68/KY 80, Marshall, Trigg: (KYTC), Project Manager. 7.5 miles section included Preliminary Engineering and Environmental, Phase I and Phase II design of reconstruction and widening of existing 2 lane roadway to a 4 lane (40 ft. depressed) roadway with context sensitive design and major bifurcated sections.

Kentucky State Board on Electric Generation and Transmission Siting
McCracken County Solar, LLC – Case No. 2020-00392
Application – Exhibit 13
Volume 1, Tab 13

Filing Requirement: KRS 224.10-280

No person shall commence to construct a facility to be used for the generation of electricity unless the person:

(a) submits a cumulative environmental assessment to the cabinet

The cumulative environmental assessment shall contain a description, with appropriate analytical support, of:

(a) For air pollutants:
- *1. Types and quantities of air pollutants that will be emitted from the facility; and*
- *2. A description of the methods to be used to control those emissions;*

(b) For water pollutants:
- *1. Types and quantities of water pollutants that will be discharged from the facility into the waters of the Commonwealth; and*
- *2. A description of the methods to be used to control those discharges;*

c) For wastes:
- *1. Types and quantities of wastes that will be generated by the facility; and*
- *2. A description of the methods to be used to manage and dispose of such wastes; and*

(d) For water withdrawal:
- *1. Identification of the source and volume of anticipated water withdrawal needed to support facility construction and operations; and*
- *2. A description of the methods to be used for managing water usage and withdrawal.*

Respondent: Chris Killenberg

The Cumulative Environmental Assessment dated May 6, 2021, and prepared by Copperhead Environmental Consulting, Inc., is attached as Exhibit 13 Attachment. This Cumulative Environmental Assessment was tendered to the Kentucky Energy and Environment Cabinet also on May 6, 2021.

EXHIBIT 13
ATTACHMENT

COPPERHEAD
ENVIRONMENTAL CONSULTING

6 May 2021

Rebecca Goodman
Cabinet Secretary
Kentucky Energy and Environment Cabinet
300 Sower Blvd
Frankfort, KY 40601

RE: Cumulative Environmental Assessment for Proposed McCracken County Solar LLC Project, McCracken County, Kentucky

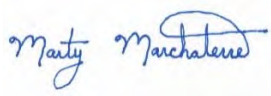
Secretary Goodman,

McCracken County Solar LLC ("McCracken County Solar") is submitting the attached cumulative environmental assessment ("CEA") for the proposed McCracken County Solar LLC Project ("Project") in McCracken County, Kentucky. McCracken County Solar is applying for a construction certificate to construct a merchant electric generating facility with the Kentucky State Board on Electric Generation and Transmission Siting ("Siting Board"). The Project will be capable of generating approximately 60 megawatts of electricity from a solar array.

Pursuant KRS 224.10-280, McCracken County Solar is submitting a CEA that analyzes potential air pollutants, water pollutants, wastes, and water withdrawal associated with its proposed solar project. The CEA also will be submitted to the Siting Board.

Please do not hesitate to contact me with any questions or if clarifications are needed.

Sincerely,



Marty Marchaterre
Senior Environmental Planner
(859) 684-9387
mmarchaterre@copperheadconsulting.com

cc: Anthony R. Hatton, Commissioner, Department of Environmental Protection

attachment

COPPERHEAD
ENVIRONMENTAL CONSULTING

Cumulative Environmental Assessment for Proposed McCracken County Solar LLC Project McCracken County, Kentucky

Prepared for:

McCracken County Solar LLC

Marty Marchaterre
Senior Environmental Planner
Copperhead Environmental Consulting, Inc.

6 May 2021

COPPERHEAD ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 73 ■ 471 MAIN STREET ■ PAINT LICK, KENTUCKY 40461
(859) 925-9012 OFFICE (859) 925-9816 FAX

www.copperheadconsulting.com

COPPERHEAD
ENVIRONMENTAL CONSULTING

Cumulative Environmental Assessment for Proposed McCracken County Solar LLC Project McCracken County, Kentucky

Prepared for

McCracken County Solar LLC
C/O Community Energy
PO Box 17236
Chapel Hill, NC 27516

By:

Copperhead Environmental Consulting, Inc.
PO Box 73
471 Main Street
Paint Lick, KY 40461

Marty Marchaterre
Senior Environmental Planner

6 May 2021

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Introduction

KRS 224.10-280 provides that no person shall commence to construct a facility to be used for the generation of electricity unless that person submits a cumulative environmental assessment (CEA) to the Kentucky Energy and Environment Cabinet with the permit application.[1] The McCracken County Solar LLC Project (McCracken County Solar or Project) is a proposed solar farm sited on approximately 400 acres that will generate electricity through the use of photovoltaic (PV) solar panels (Figure 1). It will include a utility interconnection substation, storage/maintenance building, inverter boxes, transformers, and overhead and underground electrical conveyance lines. The power generated will be sold to the Big Rivers Electric Corporation using an existing transmission line located near the project area.

The Project is located northeast of Kevil in McCracken County. The proposed project site is currently farmland primarily used for row crops.

Upon researching the statute and accompanying regulations, McCracken County Solar is unaware of any regulations that have been promulgated regarding CEAs. To comply with KRS 224.10-280, the CEA assessment will evaluate project impacts to four areas:

1) Air Pollutants
2) Water Pollutants
3) Wastes
4) Water Withdrawal

[1] KRS 224.10-280 Cumulative environmental assessment and fee required before construction of facility for generating electricity -- Conditions imposed by cabinet -- Administrative regulations.

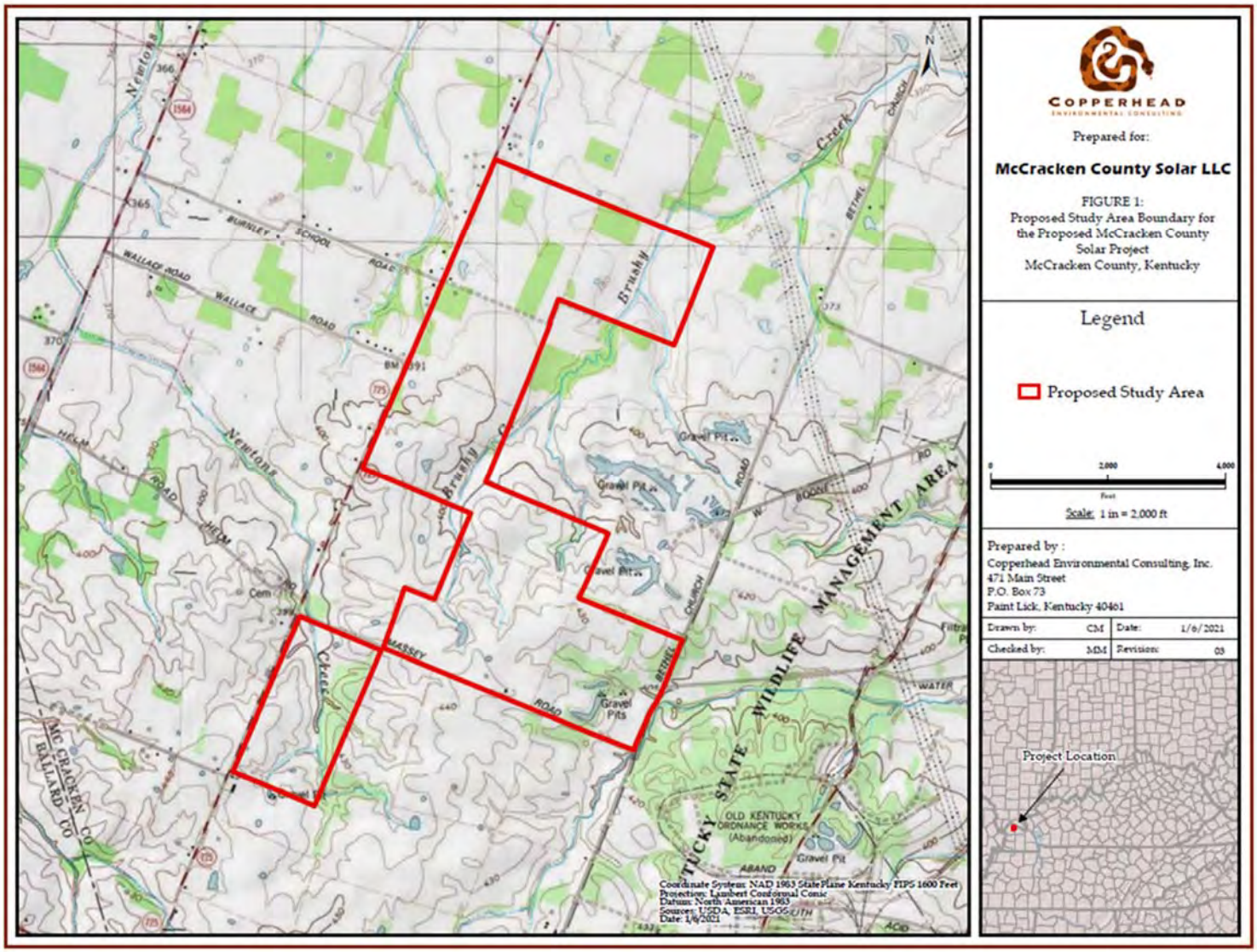

Figure 1. Project Location

Air Pollutants

The Clean Air Act regulates the emission of air pollutants and, through its implementing regulations, establishes National Ambient Air Quality Standards (NAAQS) for several "criteria" pollutants that are designed to protect the public health and welfare with an ample margin of safety. The criteria pollutants are ozone, particulate matter (PM), carbon monoxide (CO), nitrous oxides (NOx), sulfur dioxide (SO2), and lead.

Specified geographic areas are designated as attainment, nonattainment, or unclassifiable for specific NAAQS. Areas with ambient concentrations of criteria pollutants exceeding the NAAQS are designated as nonattainment areas and new emissions sources in or near these areas are subject to more stringent air permitting requirements.

McCracken County and all surrounding counties (Ballard, Carlisle, Graves, Livingston, and Marshall in Kentucky; Massac and Pulaski in Illinois) are in attainment for all criteria pollutants (EPA 2021). McCracken County is also protected by Kentucky Air Quality Regulations found in Title 401, Chapters 50–68 of the Kentucky Administrative Regulations (KAR).

The Project will generate transient air pollutant emissions during construction and operation activities. Air quality impacts will primarily result from the staging and operation of construction vehicles, equipment, supplies, and worker personnel vehicles. The daily workforce for the Project during construction will vary depending on specific construction activities occurring on individual days. It is estimated that the work force will comprise up to 150 workers onsite at any time during the 6- to 9-month construction period. Construction and operation equipment will include, but not be limited to, backhoes, generators, pile drivers, and flatbed trucks.

Combustion of gasoline and diesel fuels by internal combustion engines will generate local emissions of PM, NOx, CO, volatile organic compounds (VOCs), and SO_2. Emissions associated with these vehicles and equipment are expected to result in minor impacts to air quality because the sizes, number of vehicles, and hours each piece of equipment will operate will be small. For example, combustion emissions from a 200–horsepower diesel truck operating eight hours every day for three months will include less than one ton each of NOx, CO, and PM. Emissions of SO_2 will be negligible because of the ultralow sulfur diesel fuel available on the market.

Tree clearing or vegetative debris is anticipated to be limited as much of the land planned to be used for the Project is open as it is used for cultivated crops. Tree clearing or vegetative debris will either be burned onsite in accordance with Kentucky's Open Burning regulations (401 KAR 63:005) and applicable local regulations, or will be chipped, ground, and composted on-site or managed offsite at a permitted facility.

Construction activities will result in temporary fugitive air pollutant emissions (e.g., small particles suspended in the air or dust). Vehicles and construction equipment traveling over unpaved roads and the construction site will result in the emission of fugitive dust. A large fraction of fugitive emissions from vehicle traffic in unpaved areas will also be deposited near the unpaved areas. To

minimize air impacts, the Project will require all contractors to keep construction equipment properly maintained and to use best management practices (BMPs), such as covered loads and wet dust suppression if needed, which can reduce fugitive dust emissions by as much as 95 percent.

Air quality impacts from construction activities will be temporary and will depend on both man-made factors (intensity of activity, control measures, etc.) and natural factors such as wind speed and direction, soil moisture, and other factors. However, even under unusually adverse conditions, these emissions will have, at most, a minor transient impact on off-site air quality and will be well below the applicable ambient air quality standard. The effects to air quality from construction–associated activities will be temporary and localized. Overall, the potential impacts to air quality from construction-related activities for the Project will be minor.

During operation, the solar panels produce zero emissions, and therefore, the solar facility is not expected to emit any of the following criteria pollutants: PM, CO, SO_2, NOx, VOCs, or lead. Similarly, the facility is also not expected to emit Hazardous Air Pollutants (HAPs).

The solar facility will only generate air emissions from worker vehicles and equipment for maintenance activities, such as mowers to control growth of vegetation. Project operations are expected to require 2 to 3 workers on site. These workers will drive in and out, Monday through Friday during business hours. Employees are anticipated to use mid- or full-sized trucks. The Project will be monitored offsite 24/7, and maintenance workers will be sent to the site if any changes in production or equipment errors are detected remotely. Inspections will include identifying any physical damage to panels, wiring, inverters, pad mount transformers, and interconnection equipment.

Additionally, grounds maintenance will be performed through an integrated land management approach, to include biological and mechanical control of vegetation, with herbicide applications as appropriate to control regulated noxious weeds per local, state, and federal regulations. It is anticipated that trimming and mowing will likely be performed periodically, approximately 20-30 times per year depending on growth rate, to maintain an approximate height of 12 inches to avoid shading the panels.

It is anticipated that there will also be benefits to air quality because the solar panels produce zero emissions while generating electricity. This benefit to local and regional air quality will occur over the life of the Project. No air quality permit is required for construction or ancillary operation activities.

Water Pollutants

Surface water

The Project is located within the Bayou Creek-Ohio River subwatershed (Hydrologic Unit Codes 051402060701), which drains to the Ohio River. The terrain is generally fairly level with slopes less than 2% and the prominent site elevation about 400 feet. No waterways in or adjacent to the

Project are designated as Outstanding State Resource Waters or other Special Use Waters as defined by the Kentucky Division of Water (KDOW).

Wetlands, ponds, and streams are present within the Project Site. During construction activities, stormwater erosion and sedimentation may affect onsite surface water features (i.e., streams and wetlands). The Project will work with the existing landscape (e.g., slope, drainage, utilization of existing roads) where feasible and minimize or eliminate grading work to the extent possible. Typically, land that has been previously farmed for row crops does not require grading and posts can usually be installed onto these areas of the Project Site without earth disturbance. Any required grading activities will be performed with portable earthmoving equipment and will result in a consistent slope to the local land.

McCracken County Solar expects the Project to result in the discharge of stormwater during construction. McCracken County Solar intends to comply with the KDOW's Construction Storm Water Discharge General Permit for those construction activities that disturb one acre or more. McCracken County Solar will submit a Notice of Intent to KDOW at least seven days prior to the commencement of construction and KDOW will review the notice of intent and provide notification of authorization to discharge. When construction is completed, McCracken County Solar will provide a notice of termination upon completion.

To manage stormwater, use of BMPs, including silt fences, on-site temporary sediment basins, sediment traps, and/or buffer zones (e.g., 25 feet) surrounding jurisdictional streams and wetlands will be implemented. A site-specific stormwater pollution prevention plan (SWPPP) will be prepared and a copy will be kept available on site. These stormwater BMPs will minimize sediment from entering Waters of the Commonwealth and sediment migration off site during construction, prior to achievement of final vegetative stabilization.

Disturbed areas will be seeded after construction using a mixture of certified weed-free, low-growing grass and herbaceous plant seed obtained from a reputable seed dealer. Erosion control measures will be inspected and maintained until vegetation in the disturbed areas has returned to the preconstruction conditions or the Project Site is stable. Water may be used for soil compaction and dust control during construction.

Following the establishment of vegetation on disturbed areas and to minimize potential for water impacts, only USEPA-registered and approved herbicides will be used in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts. All herbicides will be applied by Kentucky licensed and certified commercial pesticide applicators. Most vegetation control on solar farms is performed mechanically (i.e., mowing); however, limited amounts of herbicides are used around posts or in areas that are not able to be mowed.

Approximately 10-15 acres of the Project Site will be used as construction assembly areas (also called staging or laydown areas) for worker assembly, vehicle parking, and material storage

during construction. Some of these areas will be staged within the areas proposed for the solar or PV arrays. The laydown areas will be on site for the duration of construction. Temporary construction trailers intended for material storage and office space will be parked on site. Following completion of construction activities, trailers, unused materials, and construction debris will be removed from the Project Site. An operations and maintenance building will remain on site during the life of the Project.

The operations and maintenance of the solar facility will have little impact on surface water, and BMPs will be used during any maintenance activities that have the potential to cause runoff of sediment and pollutants. Beneficial indirect impacts to surface water are anticipated due to reduction in fertilizer and pesticide use compared with current agricultural use.

Groundwater

Groundwater is water located beneath the ground surface, within soils and subsurface formations known as hydrogeological units, or aquifers (USGS 1995). Aquifers have sufficient permeability to conduct groundwater and to allow economically significant quantities of water to be produced by man-made water wells and natural springs. Kentucky Geological Survey (KGS) water well records indicate groundwater depths ranging from 15 to 105 feet deep with 20 to 40 feet being more common in McCracken County. Groundwater levels fluctuate with seasonal and cyclical climatic variations in precipitation and may be either higher or lower at other times.

During the geotechnical survey, 14 borings were conducted that ranged from 16 to 20.5 feet in depth on the Project Site. Groundwater was encountered in only one boring, where groundwater was encountered on drilling tools at about 6 feet. The shallow groundwater encountered in the one boring may be an isolated pocket of perched groundwater which may drain for a period of a few days. Groundwater levels are expected to be deeper than the proposed constructions depths.

No direct adverse impacts to groundwater will be anticipated as a result of the Project. The PV panels will have a relatively minor effect on groundwater infiltration and surface water runoff because the panels will not include a runoff collection system. Rainwater will drain off the panels to the adjacent vegetated ground.

Hazardous materials that could potentially contaminate groundwater will be stored on the Project Site during construction. The minimal use of petroleum fuels, lubricants, and hydraulic fluids during construction and by maintenance vehicles will result in the potential for small on-site spills. However, the use of a spill prevention, control and countermeasure (SPCC) plan will reduce leaks and spills and minimize the potential for adverse impacts to groundwater.

Fertilizers and herbicides will be used sparingly and in accordance with the manufacturer's recommendations to avoid contamination of groundwater. Additionally, beneficial indirect impacts to groundwater could result from the change in land use from agricultural uses due to reduction in fertilizer and herbicide use.

No direct adverse impacts are anticipated as a result of project development due to the use of a SPCC plan; there will be minor beneficial indirect impacts to groundwater due to the reduction in fertilizer and herbicide use as land use changes from agriculture to solar energy generation.

Waste

Waste will be generated during construction and operation of the solar facility and will be handled and disposed of in accordance with local, state, and federal regulations. Construction activities will generate solid waste consisting of construction debris and general trash, including wooden crates, pallets, flattened cardboard module boxes, plastic packaging, and excess electrical wiring. To the extent feasible and practicable, construction waste will be recycled and material that cannot be recycled will be disposed of offsite at a permitted facility to be determined by the designated contractor(s). No waste will be disposed of on the Project Site. Designated construction contractor and subcontractor personnel will be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced. Disposal containers such as dumpsters or roll-off containers will be obtained from a proper waste disposal contractor and will be located in the on-site staging area or other areas, as appropriate. Records of the amounts generated will be maintained by McCracken County Solar.

During construction of the proposed solar facility, materials will be stored on site in storage tanks, vessels, or other appropriate containers specifically designed for the characteristics of these materials. The storage facilities will include secondary containment in case of tank or vessel failure. Construction-related materials stored on site will primarily be liquids such as used oil, diesel fuel, gasoline, hydraulic fluid, and other lubricants associated with construction equipment. Safety Data Sheets for all applicable materials present on site will be made readily available to on-site personnel.

Construction activities will involve use of machinery (e.g., backhoes, generators, pile drivers, and flatbed trucks) fueled by petroleum products. Fueling of some construction vehicles will occur in the construction area. Other mobile equipment will return to the on-site laydown areas for refueling. Construction contractors will be responsible for preventing spills by implementing proper storage and handling procedures. Special procedures will be identified to minimize the potential for fuel spills, and spill control kits will be carried on all refueling vehicles for activities such as refueling, vehicle or equipment maintenance procedures, waste removal, and tank clean-out.

Small quantities (less than 55 gallons, 500 pounds or 200 cubic feet) of janitorial supplies, paint, degreasers, herbicides, pesticides, air conditioning fluids (chlorofluorocarbons [CFCs]), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets may also be stored and used at the facility. Due to the small quantities involved and the controlled environment, a spill could be cleaned up without significant environmental consequences.

Facility personnel will be supplied with appropriate personal protective equipment (PPE) and will be properly trained in the use of PPE as well as the handling, use, and cleanup of hazardous materials used at the facility and the procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials will be stored on site.

Waste generation during operation will be minimal and will mainly result from the maintenance and/or replacement of worn or broken equipment and defective or broken electrical materials. All wastes will be managed by designated waste management company(ies) and disposed of in accordance with applicable federal and state requirements to minimize health and safety effects.

Portable chemical toilets will be provided for construction workers during Project development. Sewage will be pumped out by a licensed contractor and the sewage waste will be disposed at the Paducah Wastewater Treatment Plant or other regulated wastewater treatment plant. No adverse effects are anticipated from wastewater treatment and disposal. Due to the size of the facility, no additional or permanent bathroom facilities are anticipated.

Based on a review of Project waste generation activities, no adverse effects from waste are anticipated.

Water Withdrawal

No water supply wells were identified on the Project Site. However, numerous water supply wells were identified on adjacent properties to the west and south. Aquifers beneath the Project have sufficient permeability to conduct groundwater and to allow economically significant quantities of water to be produced by man-made water wells. Water needed for construction and operation will be brought in, obtained from nearby existing wells, or provided by developing a new water supply well.

Construction-related water use will support site preparation (including dust control) and grading activities. During earthwork for the grading of access roads, foundations, equipment pads, and other components, the primary use of water will be for compaction and dust control. Smaller quantities will be required for preparation of the equipment pads, equipment washing, and other minor uses. The SWPPP will include requirements for using water to clean equipment and appropriately disposing of this wastewater. The expected water volume needed for construction activities is not expected to adversely affect local or regional water resources.

The internal access roads will not be heavily traveled during normal operation, and consequently, water use for dust control is not expected. Equipment washing and any potential dust control discharges will be handled in accordance with BMPs described in the SWPPP for water-only cleaning.

Operation of solar electricity generating facilities is not water-use intensive. Precipitation in the region is adequate to remove dust and other debris from the PV panels while maintaining energy production; therefore, manual panel washing with water or any other substance is likely not part

of regular solar project maintenance. Additionally, rain will contribute to ongoing vegetation management. Some water will be needed for vegetation management, including: during screening vegetation installation and during prolonged times of drought.

RESUME

COPPERHEAD
ENVIRONMENTAL CONSULTING

MARTY MARCHATERRE
SENIOR ENVIRONMENTAL PLANNER

Regulatory Expertise
- NEPA
- CWA
- RCRA
- NHPA
- ESA
- CAA

Industry/Agency Clientele
- Solar
- Pipelines
- Utilities/Traditional Energy Sources
- US Air Force
- National Guard
- US Fish and Wildlife Service
- Forest Service
- Nuclear Regulatory Commission
- Corresponding State Agencies
- FHWA & State DOTs
- FRA
- FTA
- TVA
- Academic Institutions & NGOs

Qualifications/Registrations
- Virginia Bar Association, Environmental Law Section
- District of Columbia Bar Association, Environmental, Energy and Natural Resources Section
- Lexington Environmental Commission
- Lexington Community Land Trust
- Town Branch Trail, Inc.
- Paint Lick Watershed Alliance

Trainings
- NEPA and the Transportation Decision-Making Process
- Public Involvement in Transportation Decision-Making
- Conducting Quality Cumulative Impact Analysis
- Context Sensitive Design
- Land Use Planning
- Environmental Justice
- Watershed-Based Planning
- ODOT Noise Analysis
- Federal Energy Regulatory Commission Environmental Review and Compliance for Natural Gas Facilities
- Regulatory Issues and Renewable Energy Facilities

Qualifications and Background
Mr. Marchaterre has significant environmental, regulatory, and permitting experience, and has overseen development of NEPA environmental documentation and supporting studies. He has been involved in more than 80 EISs, EAs, and CEs. Mr. Marchaterre has managed permitting, air quality studies, noise analyses, socioeconomic baseline studies, land use analyses, conservation and historic preservation analyses, community impact assessments, Phase I hazardous materials site assessments, biological assessments, wetlands delineations, environmental justice, cumulative impacts, and public involvement activities. For the U.S. Environmental Protection Agency, he provided support to the National Environmental Justice Advisory Committee for two years.

Education
- **J.D. 1988**, College of William and Mary, Williamsburg, Virginia
- **B.A. History and Political Science**, 1985, Williams College, Williamstown, Massachusetts
- Williams-Mystic American Maritime Program, 1985

Selected Project Experience

Tennessee Valley Authority

Wilson Dam Bridge Deck Refurbishment EA. Tennessee Valley Authority, Alabama.
Project manager for an environmental assessment analyzing the potential impacts resulting from refurbishment of the Wilson Dam bridge Deck spanning Pickwick Reservoir and connecting Colbert and Lauderdale counties, Alabama. Authored multiple resource sections and coordinated directly with TVA NEPA and project management team.

Kingston Fossil Plant Wastewater Treatment Facility EA. Tennessee Valley Authority, Tennessee.
Assistant Project Manager for an environmental assessment addressing installation of new wet flue gas desulfurization wastewater treatment facilities and modification of existing processes at Kingston Fossil Plant to enhance wastewater quality. Authoring resource sections and responsible for senior-level NEPA support and QA/QC.

Natural Resource Plan Supplemental EIS. Tennessee Valley Authority, Tennessee.
Assistant Project Manager for a supplemental EIS analyzing the implementation of a revised Natural Resource Plan covering 293,000 acres of TVA reservoir land. TVA manages 154 natural areas and conducts specific management activities compatible with the goals for each area. Providing technical review of draft resource sections, working with subject matter experts, and reviewing drafts of the Supplemental EIS.

Riverton Development Project EA. Tennessee Valley Authority, TN. Assistant project manager for an EA analyzing issuance of a shoreline construction permit associated with the proposed Riverton mixed-use development in Chattanooga, Tennessee. The permit would be issued under Section 26(a) of the TVA Act to allow Riverton to install floating residential boat docks and place riprap along the shoreline of the Nickajack Reservoir. Key issues included floodplain alteration, cultural and tribal resources, potential impacts on the NRHP-listed Chickamauga Dam Reservation, and conversion of a natural setting to one with mixed residential and commercial uses.

Chickamauga Law Enforcement Training Center Easement EA. Tennessee Valley Authority, TN. Assistant project manager for an EA analyzing issuance of an easement and land use permit for development of a law enforcement training center on TVA land near Chattanooga, Tennessee. Key issues include avoidance of cultural resources and federally listed species, potential impacts on the NRHP-listed Chickamauga Dam Reservation, and impacts on transportation and noise. Required close coordination with TVA archaeologist and botanist.

Clean Water Act Section 401 Permitting Tool for TVA Natural Resources Group, Tennessee. Assistant project manager responsible for developing a new tool to ensure TVA Section 26(a) permitting is consistent with state requirements for Clean Water Act Section 401 water quality certifications and U.S. Army Corps of Engineers Section 404 permits. Required clear and accurate identification of differing permitting processes across seven states (Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia) and three Corps districts (Nashville, Savannah, and Memphis).

TVA Programmatic EIS for Closure of Ash Impoundments in Alabama, Kentucky, and Tennessee.
For TVA, helped prepare the EIS for the closure of ash impoundments as a result of new US EPA coal combustion residuals requirements and TVA's goal to close wet ash storage facilities. The EIS evaluated the potential effects of multiple closure alternatives. Prepared scoping report and participated in five public meetings held at different power plants. Supported public involvement and developed materials and posters for the public meetings. Drafted text for the programmatic component as well as the site-specific analysis for closing ten ash impoundments at six different fossil fuel plants. Prepared comment response document and Record of Decision.

TVA Multiple Reservoir Land Management Plan EIS, Alabama, Kentucky and Tennessee.
For TVA, helped prepare the EIS for multiple reservoir land management plans (RLMPs) for 138,000 acres of TVA-managed public land on eight reservoirs. The updated RLMPs are needed to consider changes to land uses over time, to make land planning decisions on these eight reservoirs consistent with the TVA Land Policy and the Comprehensive Valleywide Land Plan and to incorporate TVA's goals for managing natural resources on public lands. Developed air quality, recreation, and cultural resource sections of the EIS, as well as provided technical review.

EA/FONSI, Ash Dewatering Facility at Shawnee Fossil Plant, Tennessee Valley Authority, McCracken County, Kentucky.
Supported development of EA/FONSI for a bottom ash dewatering facility to help TVA convert from wet ash storage to dry storage. Evaluated project affects to parks and nearby wildlife management areas and water use. Potential visual impacts on historic resources were a concern.

EIS for TVA Bull Run Fossil Plant Landfill, TN.
EIS Author and Technical Reviewer for preparation of an EIS to address the storage of coal combustion residuals (ash) generated at Bull Run Fossil Plant. Helped prepare draft sections of the EIS including hazardous materials and cultural resources components, as well as provided technical review of draft documents.

TVA Muscle Shoals Reservation EA, Colbert County, AL.
Supported the environmental assessment on the proposed relocation and realignment of essential operations at the Muscle Shoals Reservation. The EA evaluated three alternatives: 1) no action; 2) construct a new facility on a Greenfield site; or 3) modify an existing facility on the Reservation to house the relocated essential operations. Developed text for the EA and provided technical review.

Solar
Site Characterization Study for Solar Energy Development. Confidential Client. Breckinridge County, Kentucky. Assistant Project Manager for a site characterization study analyzing a property in Breckinridge County, Kentucky, for possible development as a solar energy generating facility. The study included a desktop review of federal and state data pertaining to sensitive resources such as listed species, wetlands or other surface waters, prime farmland, karst topography, and public and protected lands. Copperhead staff then performed a one-day field verification to characterize vegetative communities, possible bat habitat, and the presence of jurisdictional waters. A summary report was provided to the client which outlined potential environmental concerns and presented a permitting matrix delineated by issuing agency, trigger, and timeline.

Site Characterization Study for a Proposed Solar Energy Project. Confidential Client. Kentucky.
Managed a site characterization study to identify potential environmental constraints associated with land cover/use, soils, wetlands and watercourses, farmland, threatened and endangered species, and other considerations. The study included a desktop assessment using publicly available databases and a field reconnaissance survey of the subject property.

Biological Assessment for Indiana Bats, Northern Long-eared Bats, and Bog Turtle. Confidential Client, New York. Managing the development of a biological assessment with adverse effects to bat habitat. Consultation with United States Fish and Wildlife to develop mitigation alternatives.

Site Characterization Study, Wetland Delineations, Phase I ESA, and Cultural Resources Overview for a Proposed Solar Project. Confidential Client. Kentucky. Managed site characterization studies, aquatic resources delineation, Phase I ESA, and cultural resources overview for solar project on an approximately

800-acre parcel in Garrard County, KY. The study included a desktop review of federal and state data pertaining to sensitive resources such as listed species, wetlands or other surface waters, prime farmland, karst topography, and public and protected lands. A wetland delineation identified and demarcated aquatic features that may be jurisdictional waters of the U.S. or isolated waters of the state.

Site Characterization Study, Wetland Delineations, Phase I ESA, and Cultural Resources Overview for a Proposed Solar Project. Confidential Client. Kentucky. Managed site characterization studies, aquatic resources delineation, Phase I ESA, and cultural resources overview for solar project on an approximately 800-acre parcel in Metcalfe County, KY. The study included a desktop review of federal and state data pertaining to sensitive resources such as listed species, wetlands or other surface waters, prime farmland, karst topography, and public and protected lands. A wetland delineation identified and demarcated aquatic features that may be jurisdictional waters of the U.S. or isolated waters of the state.

Three Solar Projects - Site Characterization Study, Wetland Delineations, Phase I ESA, and Cultural Resources Overview. Confidential Client. Kentucky. Managed desktop review and field studies to support development of site characterization studies, wetland delineations, Phase I ESAs, acoustical analyses, and cultural resource overviews. A site reconnaissance identified potential habitat for federally listed and state-listed at-risk species and identified areas of potential concern, such as cemeteries..

Acoustic Analysis for Multiple Solar Projects. Confidential Clients. Kentucky. Managed acoustical analyses for multiple projects. Described existing sound levels from the project site and surrounding areas as well as potential impacts from construction, operation, and maintenance activities. Provided a report of the findings of the acoustical analysis. The report will contain a summary of the project, describe existing sound conditions, identify potential sensitive receptors (e.g., residences), and evaluate potential construction and operation sound levels.

Critical Issues Analysis (CIA) for a Solar Facility. Confidential Client. Tennessee. Assistant project manager for development of a CIA. The CIA's goal is to gain a better understanding of the environmental issues that could potentially affect project development. Some of the resource areas Copperhead collected information on include vegetation communities and general wildlife, threatened and endangered species, migratory birds nests, soil types, and historic and cultural resources. The wetland/stream mapping's goal is to estimate how much of the Project Area may be wetlands as opposed to uplands and to identify anticipated buffer setbacks. The information gathered helps to inform Copperhead and the client about what regulations will need to be adhered to and what permits will need to be acquired.

Critical Issues Analysis (CIA) for a Solar Facility. Confidential Client. Mississippi. Assistant project manager for development of a CIA. The CIA's goal is to gain a better understanding of the environmental issues that could potentially affect project development. Some of the resource areas Copperhead collected information on include vegetation communities and general wildlife, threatened and endangered species, migratory birds nests, soil types, and historic and cultural resources. The wetland/stream mapping's goal is to estimate how much of the Project Area may be wetlands as opposed to uplands and to identify anticipated buffer setbacks. The information gathered helps to inform Copperhead and the client about what regulations will need to be adhered to and what permits will need to be acquired.

Multiple Studies for Solar Facility. Confidential Client. Kentucky. Project manager for a site characterization study, a wetlands delineation, an Approved Jurisdictional Determination (JD) from the US Army Corps of Engineers (USACE) Louisville District, a Phase I Environmental Site Assessment (ESA), cultural resource assessments, a threatened and endangered species habitat assessment, a preliminary geotechnical site characterization, and prepare an acoustical analysis.

Bat Conservation Plans for Solar Projects. Confidential Client. Virginia. Technical reviewer for multiple bat conservation plans to reduce potential impacts from solar projects on bat roosting, foraging, and commuting habitat.

Transportation

Threatened and Endangered Species Habitat Assessments and Surveys, Bridging Kentucky Program, Kentucky Transportation Cabinet. Project Manager. Throughout Kentucky, Copperhead as subconsultant is tasked with providing environmental services including coordination for Threatened and Endangered Species (TES), assessment of potential habitat, preparation of biological assessments, programmatic agreement comments, and NEPA permit assistance (including Section 401/404 and U.S. Coast Guard Section 10) for the program to rehabilitate or replace over 1,000 bridges in the next six years. Screened over 400 bridges for environmental concerns and potential TES habitat. Conducting habitat assessments, mussel and fish surveys, and preparing permits, biological assessments, and no effect documentation.

EA/FONSI, US 68, Bourbon-Nicholas Counties, Kentucky. Item No. 7-310.00.
Prepared an EA and individual Section 4(f) evaluation as well as baseline studies for this 13.3-mile project. Section 106 issues were a critical component due to over 50 historic sites and 2 historic districts. Seventeen alternates were considered to avoid or minimize impacts to historic sites and prime farmland. Section 401/404 and floodplain construction permits and stream mitigation required due to 10,000 feet of channel change. Developed a public involvement plan and participated in public meetings, a public hearing, and Section 106 consulting party meetings.

EA/FONSI, East Nicholasville Bypass, Jessamine County, Kentucky.
Prepared an EA and managed the development of the FONSI for this 7-mile project. Managed the historic and archaeological studies of several farm sites. Due to potential impacts to a historic site, avoidance alternates were developed. Prepared socioeconomic, traffic noise and hazardous materials/underground storage tank studies and oversaw the other environmental base studies and addenda. Helped address concerns about economic impacts of developing the bypass and visual/noise concerns for residents. Supported citizen advisory committee meetings, public information meetings and the public hearing. Participated in the biological assessment for running buffalo clover, Indiana bat and gray bat.

EA/FONSI, US 60 Tennessee River Crossing, McCracken-Livingston Counties, Kentucky.
Managed preparation of the EA and Section 4(f) evaluation for the replacement of the historic George Rogers Clark Memorial Bridge and approaches. Oversaw minimization and mitigation efforts for wetlands, floodplains, historic bridge, and relocations.

EA/FONSI, US 119 (Partridge to Whitesburg), KYTC, Letcher County, Kentucky.
Project Manager. Managed preparation of two EAs and baseline studies for two connecting projects (14.8 miles in length). Managed public involvement activities (Pine Mountain Crossing Task Force, public meetings, and public hearings), and oversaw minimization and mitigation efforts for wetland, stream, floodplain, historic and relocation impacts. Due to numerous crossings of the Poor Fork of the Cumberland River and potential impacts to the Bad Branch Nature Preserve, Pine Mountain Wildlife Management Area, and a historic site, this project evaluated Section 4(f) impacts, numerous alternates, the potential impacts of 20 bridges, a 4.2-mile tunnel, and several waste areas. Managed the biological assessment for the Indiana bat, gray bat, and blackside dace. Participated in the Section 401 and 404 permitting process for wetland and stream impacts.

Categorical Exclusion 2, Town Branch Trail Phase 6, Fayette County, Kentucky. Item No. 7-7310.00.
Project Manager for Town Branch Trail Phase 6 Categorical Exclusion. Conducted environmental studies and prepared environmental documents for the multi-use trail between McConnell Springs Drive on Old Frankfort Pike to Oliver Lewis Way. Participated in project and public meetings on the proposed trail and developed Section 4(f) evaluation of potential impacts on historic James McConnell House as well as dry laid retaining walls along Town Branch.

Mitigation Support. Newtown Pike Extension, Fayette County. Kentucky. Item No. 7-593.00.
For the Community Land Trust, providing environmental justice advocacy for a low-income, minority neighborhood concerning EIS commitments and mitigation due to the Newtown Pike Extension. Reviewed environmental justice commitments, oversaw streetscape design work, examined traffic calming measures and plans for adjacent park, bike lanes, and bus transit facilities.

Categorical Exclusion and Programmatic Section 4(f), US 25 (Williamstown), Grant County, Kentucky. Item No. 6-1049.00.
Prepared the CE and Programmatic Section 4(f) evaluation concerning a bridge replacement / road improvement project. Historic sites, traffic noise, a senior citizen home, mobile home park relocation, business relocations, a railroad line, and park access were concerns. Worked with KY Department of Local Government to avoid Section 6(f) impacts due to a new park access.

Environmental Documentation for All Aboard Florida High Speed Rail, Florida.
For All Aboard Florida, developed technical baseline documents and provided technical review of methodology, existing environment, and environmental consequences sections for an approximately 128-mile section of a high-speed rail project from West Palm Beach to Miami, Florida. Involved in cultural resources, transportation, public utilities, and aesthetic components. Reviewed cultural resource report prepared by a subconsultant. Potential impacts to historic districts and resources were a concern. For All Aboard Florida, helped to review the DEIS prepared by a Third Party for Federal Railroad Administration.

Heartland Parkway Planning Study, Adair, Green, Taylor, Marion, Nelson, and Washington Counties, Kentucky.
Managed the environmental evaluation of the 68-mile corridor scoping study. Helped identify project needs and potential environmental concerns (historic battlefield, parks, conservation areas, endangered species, and cave/karst terrain). Identified the regional needs for improving/supporting economic development, tourism, higher education, and the agricultural sector. Participated in extensive public involvement activities. Managed the archaeological overview and Phase I archaeological survey for the 23-mile design project in Taylor and Adair Counties.

Environmental Assessment, KY 313, Hardin and Meade Counties, Kentucky.
Prepared an EA and FONSI for this 14-mile project. Managed the preparation of environmental baseline studies. Prepared a purpose and need statement to help justify the project. Helped evaluate potential cave and karst impacts. Managed the biological field studies that captured a federally endangered gray bat in the project area and helped evaluate mitigation options. Supported public meetings and the public hearing and coordinated with federal and state resource agencies.

Environmental Assessment, KY 40 (Inez to Warfield), Martin County, Kentucky.
Responsible for the EA for this 8.5-mile project. Relocations, strip mines, cemeteries, a historic site, and stream channel changes were environmental concerns. A separate waste disposal area and industrial development site were later evaluated. Managed review of environmental impacts of the roadway segment crossing into West Virginia. Supported KYTC in coordinating with the West Virginia Department of Highways and other West Virginia resource agencies. Supported the historic consultant in

evaluating methods to minimize potential indirect visual impacts of the proposed roadway and bridge on a historic site. Participated in stream mitigation and permitting activities.

Categorical Exclusion and Programmatic Section 4(f), US 25 (Williamstown), Grant County, Kentucky. Prepared the CE and Programmatic Section 4(f) and managed the environmental studies concerning a bridge replacement and road improvement project. Historic sites, traffic noise, a senior citizen home, a mobile home park, business relocations, a railroad line, and a park were issues. Worked with the KY Department of Local Government to avoid a Section 6(f) impact during the development of new access to a park.

Environmental Assessment/US 68 (Columbia to Greensburg), Green and Adair Counties, Kentucky. Prepared an EA for this 16-mile project. Managed the preparation of environmental overviews and baseline environmental studies, including wetlands, noise, air quality, Phase I ESA, socioeconomic, and threatened and endangered speices. Oversaw the development of a cultural historic overview and survey and an archaeological overview, an archaeological high probability study, and a Phase I archaeological survey. Supported the citizen advisory committee, public meetings, and a Section 106 consulting party meeting. Aided the roadway designers in developing alternates to avoid impacts to a historic farm and in evaluating a land bridge over a historic railroad tunnel rather than imploding the tunnel. Worked with the cultural historian to analyze the potential indirect visual and vibration impacts of the land bridge on the tunnel.

Environmental Assessment for the Leslie, Knott, Letcher Perry County Community Action Council for Intermodal Transit Facility and Parking Structure, Hindman, Kentucky.
Managed the EA and environmental studies to secure federal funding for the rehabilitation of a 46-year old former jail building to be an intermodal transit facility and creation of a street level 150-space parking structure. Potential floodplain impacts, environmental justice concerns, archaeological sites, and historic viewshed effects were evaluated. Worked closely with Community Action Council and design firm to avoid and minimize impacts.

Documented CEs and EAs for Transit Projects, Christian, Clay, Franklin, Jefferson, and Knott Counties, Kentucky.
Managed successful preparation of Documented CEs and EAs for transit facilities, maintenance facilities, bus wash, and parking structures with the KYTC Office of Transportation Delivery. For a proposed City of Frankfort Transit bus wash/maintenance facility, a documented CE was completed within one month to meet a funding deadline. Mr. Marchaterre participated in all aspects of this project including desktop environmental analysis, site reconnaissance, agency coordination, and report preparation.

Environmental Studies and Categorical Exclusion for Clays Mill Road, Fayette County, Kentucky. Project Manager responsible for the categorical exclusion and supporting studies for a 3.7-mile project in Lexington, KY. Prepared the HazMat/UST baseline study and assisted with the traffic noise modeling. Managed the sampling of streams, fish and macroinvertebrates to determine water quality. Groundwater in the project area is hydrologically sensitive due to the karst topography. Participated in citizen advisory committee and public meetings.

Environmental Assessment for Memphis Regional Intermodal Facility, Private Client, Rossville, TN. Technical Reviewer and Author for a complex EA for a 650-acre intermodal facility. Conducted technical review of EA and baseline studies including Stream Assessment Report, Ecology Study Report, Noise Assessment Report, Cultural Resources, and Phase I archaeological Survey, and Viewshed Analysis. The intermodal facility will improve freight transportation capacity in the region and used Tiger Grant funds. FHWA is the lead federal agency with TDOT as lead state agency. Twenty-one out of 29 federal, state, and local agencies requested to participate in the NEPA process. To adequately involve the public, both a

public information meeting and a public hearing were conducted in the local area. Completed the NEPA process in approximately one year, fastest for TDOT.

Federal Railroad Administration Categorical Exclusion for TIGER Grant for Railroad Bridge Replacement, IN.
Prepared Categorical Exclusion for historic bridge replacement partially funded from a TIGER grant. Categorical Exclusion was prepared for a private railroad for submission to the Federal Railroad Administration. A Memorandum of Agreement was developed between the US Army Corps of Engineers, State Historic Preservation Office, and the railroad to document the replacement of the historic bridge.

140-Mile Virginia Rail Expansion (VRE) Project, Virginia.
Managed cultural resources and environmental constraints analysis for proposed 140-mile expansion project. Oversaw archival and field studies to identify historic and ecological resources within areas of potential effect. Identified NEPA categorical exclusions that could apply to sections of the project area to speed the permitting process.

Third Party Review of Tier I EIS Process for Empire Corridor High Speed Rail Corridor, New York.
For a private railroad company, reviewed Tier I EIS process for the 463-mile Empire Corridor for High Speed Rail from New York City to Niagara Falls. Provided recommendations and position paper on Draft Tier I EIS process and opportunities for the railroad company to participate in the NEPA process both formally and informally. Evaluated potential impacts to railroad operations of an additional track for high speed rail.

Third Party Review of Tier II EIS for Southeast High-Speed Rail Corridor, Richmond, VA to Raleigh, NC.
For a private railroad company, reviewed Draft Tier II EIS for the Southeast High-Speed Rail Corridor and provided recommendations and comments on Draft Tier II EIS document and potential impacts to railroad operations.

Environmental Studies and Categorical Exclusion for KY 32, Kentucky Transportation Cabinet, Lawrence County, Kentucky.
Project Manager for the environmental studies for KY 32 in Lawrence County, KY. Prepared a Categorical Exclusion and Programmatic Section 4(f) evaluation for minor impacts to two historic sites. Identified potential onsite mitigation opportunities for approximately 3,000 feet of stream channel changes. Historic sites, a cemetery, and residential relocations were concerns.

Third Party Review of Tier I EIS for Atlanta BeltLine Project, GA.
For a private freight railroad company, reviewed Draft Tier I EIS for the proposed Atlanta Beltline Project for potential impacts to railroad operations. Concerns exist that a new transit line, trails, crossings, and designation of the railway line as a historic district would affect existing and future expansions of freight operations and safety. Prepared comments on the Draft Tier I EIS document. Participated in public involvement process, such as attending public meetings and workgroup meetings.

EA / FONSI, US 60 Bypass, Daviess County, Kentucky. Item No. 2-287.00.
Managed preparation of an EA and FONSI as well as baseline studies for this 5.2-mile project. A Citizen Advisory Committee met five times to express area citizen and business views. Wetland, stream, and archaeological site impacts were concerns.

Categorical Exclusion for I-75/I-71 Auxiliary Lanes, Boone County, Kentucky.
For Kentucky Transportation Cabinet, prepared a Categorical Exclusion 3 for adding auxiliary lanes for I-71/I-75 in Boone County. Conducted ecological, air, noise, hazardous materials, and socioeconomic studies. Conducted noise studies and supported preparation of noise analysis. Noise analyses, noise abatement modeling, and noise barrier public meetings were critical to success of project. Noise barriers were determined to be appropriate mitigation for project.

I-69 Strategic Corridor Planning Study (Eddyville to Henderson), Lyon, Caldwell, Hopkins, Webster, and Henderson Counties, Kentucky.
Managed and helped prepare the environmental component for evaluating the 80-mile corridor for an I-69 segment. Identified potential environmental concerns (relocations, environmental justice, conservation areas, and endangered species). Managed aquatic / terrestrial, socioeconomic, hazardous materials / underground storage tank, and air and traffic noise analysis. Identified the regional needs for improving / supporting economic development.

Third Party Review of Socioeconomic Study for I-66 Project (London to Somerset), Pulaski County, Kentucky.
Provided a third-party review for the KYTC for the I-66 socioeconomic study. Evaluated economic and community impacts, potential residential and commercial relocations, environmental justice concerns, land use changes, and farmland impacts for a 40-mile highway project. Identified gaps in the socioeconomic analysis and provided recommendations on how to improve the study. Information from the revised study was incorporated into the EIS.

Technical Reviewer for Bus Maintenance Facility Categorical Exclusion (CE), Transit Authority of River City (TARC), Jefferson County, Kentucky.
Provides quality assurance/quality control for ongoing projects by TARC. For a bus maintenance facility annex on a former Louisville & Nashville Railroad site, analyzed traffic information, bus emission reductions, land use, historic resources, environmental justice concerns, and the potential for hazardous materials/UST contamination. Determined that a CE was appropriate and prepared the documentation which was quickly approved by the FTA.

Environmental Assessment, KY 55 (Heartland Parkway), Adair and Taylor Counties, Kentucky. Item No. 4-124.00.
Technical reviewer for preparation of EA for this 23-mile project. Managed cultural resource studies (archaeological and historic architectural surveys), Section 106 consultation, and Section 4(f) evaluation. Identified sensitive areas such as Tebbs Bend Civil War Battlefield area, Native American mounds, and potential historic sites.

East Market Street Streetscape Categorical Exclusion, Louisville, Kentucky.
For Louisville Downtown Development and Louisville Metro, prepared a categorical exclusion for the East Market Streetscape project. Potential impacts to historic structures in several historic districts were potential concerns that were addressed with coordination with the Kentucky Heritage Council.

Statewide Programmatic Agreement for Historic Timber Railroad Bridges, Georgia.
For a private client, worked with United States Army Corps of Engineers and State Historic Preservation Office to develop a statewide programmatic agreement for the replacement and repair of historic timber railroad bridges throughout Georgia. The programmatic agreement covered more than 300 bridges across the state.

United States Fish and Wildlife
Multi-State NiSource Habitat Conservation Plan Environmental Impact Statement, United States Fish and Wildlife Service and United States Forest Service, 14 States.
Supported development of an EIS for a habitat conservation plan and incidental take permit to cover 15,000 miles of pipeline in 14 states for the USFWS, USFS, FERC, USACE, and NPS. The EIS addressed unique subject matter and legal and regulatory concerns due to the large area covered and 43 threatened and endangered species considered. The Project crossed Kentucky, Louisiana, Mississippi, Tennessee, Virginia and West Virginia. Supported technical reviews, socioeconomic analysis, cumulative impacts, consultation, and participated in public involvement activities.

Department of Defense
Environmental Assessment for an Army Aviation Support Facility, Boone National Guard Center, Frankfort, Kentucky.
For the Kentucky Army National Guard, prepared an environmental assessment for a 30-acre proposed replacement site for the army aviation support facility which included maintenance facilities and a wash station. Evaluated potential noise impacts of helicopters taking off and landing at the facility and the cumulative noise impacts due to adjacent airport. Adjusted EA analysis to constantly changing project location. The site was in a karst area so potential impacts from subsidence and groundwater contamination were considered.

Environmental Assessment for Multi-Purpose Machine Gun Range, Indiana Army National Guard, Camp Atterbury, Indiana.
At the Camp Atterbury Joint Maneuver Training Center in Indiana (approximately 33,100 acres), Preparing an environmental assessment for a multipurpose machine gun range. Assessed potential environmental impacts, including cumulative impacts, of short-range site plans and long-range plans for developing and managing the installation. Reviewed existing site studies and worked closely with facility staff to analyze plans and potential effects. Worked closely with client and design team to minimize impacts to forested wetlands, streams, and floodplains. Evaluated socioeconomic and land use impacts from creation of new training areas on the facility and nearby communities. Coordinated with federal and state resource agencies.

Environmental Assessment and Public Involvement, Muscatatuck Urban Training Center, Indiana. At the Muscatatuck Urban Training Center, supported the development of an environmental assessment for a new urban warfare and homeland security training center. Responsible for preparing portions of the Affected Environment and Environmental Impact sections for the EA. The Muscatatuck Urban Training Center (MUTC) would provide a new center for required urban assault and homeland security training at the former Muscatatuck State Development Center in Butlerville, Indiana. The MUTC would provide an urban training center to serve the wartime mission and combat readiness goals of military units as well as civilian homeland security and natural disaster response training needs. Natural resources on the proposed site include Pleasant Run, North Vernon Muscatatuck River, the Brush Creek Reservoir, and forested and non-forested lands. Preservation of historic structures was a significant concern. Prepared outreach materials and participated in public meetings.

Statewide Integrated Wildland Fire Management Plans (IWFMPs), Indiana, Kentucky, North Carolina, and West Virginia.
For the National Guard, managed preparation of statewide IWFMPs for training sites in multiple states. The IWFMPs developed programs to reduce wildfire potential; protect and enhance natural and cultural resources; preserve infrastructure and facilities; and promote safety. The IWFMPs examined the historical role of fire within and in the vicinity of installations; identified current ignition and fuel sources; and addressed fire training requirements and safety considerations including unexploded ordinance (UXO) and live fire areas. The IWFMPs recommended wildland fire prevention and

suppression measures, as well as prescribed burn management and site-specific burn plans. EAs were prepared for each IWFMP.

Integrated Natural Resources Management Plans (INRMPs) at Wendell H. Ford Regional Training Center (WHFRTC), Disney Training Center (DTC), and Hidden Valley Training Site (HVTS) and an Environmental Assessment (EA) for Training Operations at WHFRTC, Kentucky.
Managed two Environmental Assessments, three INRMPs, three Forest Management Plans (FMPs), and a state-wide Integrated Wildland Fire Management Plan (IWFMP) for three training sites. Worked closely with the KYARNG, the U.S. Fish and Wildlife Service (USFWS), and the Kentucky Department of Fish and Wildlife Resources (KDFWR) as well as other federal, state, and local agencies with an interest in the management of natural resources. Also, evaluated approximately 3,000 acres of new maneuver training areas added to the Training Center for potential impacts to the environment of planned training activities.

NEPA and Planning Support to West Virginia Army National Guard, West Virginia.
Project Manager for environmental assessments for the West Virginia Army National Guard related to training areas, firing ranges, urban training centers, demolition ranges, readiness centers/armories, and army aviation facilities. Managed preparation of environmental assessments, land use plans, integrated natural resource management plans, forest management plans and endangered species management plans.

Indiana Bat Programmatic Biological Assessment, Camp Atterbury Joint Maneuver Training Center, Indiana Army National Guard, Edinburgh, Indiana.
Oversaw the preparation of a programmatic Biological Assessment (BA) and associated formal consultation process with the US Fish & Wildlife Services regarding effects on Indiana Bats with respect to future routine training and land management activities and upcoming development projects at the approximately 33,132-acre Camp Atterbury Joint Maneuver Training Center. The BA was prepared in close coordination with the USFWS Bloomington Field Office. The programmatic BA will streamline the consultation process and reduce administrative costs for the INARNG and USFWS.

Programmatic Biological Assessment for the Indiana Bat, Northern Long-eared Bat, and Gray Bat, U.S. Air Force Arnold Air Force Base, Tennessee.
Managed development of a programmatic biological assessment of routine training, land management, and Elk River Dam operations at the 39,000-acre Arnold Air Force Base in Tennessee. Potential adverse effects could result from timber management, prescribed fire, tree clearing during summer roadside maintenance activities, hazardous tree removal, range operations, wildfires, or emergency repairs/inspections at the dam. The proposed action may affect, and is likely to adversely affect Indiana bats, northern long-eared bats, and gray bats that use habitat within/near the Arnold Air Force Base.

Training Site Master Plan, Camp Dawson, West Virginia. Managed preparation of a conceptual master plan for the Camp Dawson Cantonment Area and the Volkstone Training Area. The conceptual master plan assisted in setting strategic goals for the mission and vision of the base, and is the starting point for a more detailed Training Facility Master Plan (TFMP) that is underway. The TFMP provides a foundation for the future development of Camp Dawson. Helped identify current conditions, facility and site constraints, and opportunities for enhanced opportunities.

Design, Mitigation, and Geotechnical Services for Modified Record Firing Range, Camp Dawson, West Virginia.
Managed some of the design components of the modified record firing range. Provided technical review of the EA. Helped evaluate alternatives to minimize impacts to stream and wetlands. Managed development of erosion and sedimentation controls and coordination with state and Federal agencies on

mitigation and permitting issues. Oversaw optimization of target elevations to minimize required earthwork and geotechnical evaluations of the access road and range control facilities locations.

EA/FONSI for Armed Forces Reserve Center (AFRC), Buckhannon, West Virginia.
Managing the EA for the Buckhannon AFRC. Conducted a site visit and record search to evaluate potential environmental constraints, such as 100-year floodplains along Brushy Fork Creek. Developed a pdEA that evaluates environmental impacts on a 49-acre site and potential mitigation options for the proposed AFRC. The AFRC will replace a 48-year old armory and provide needed training facilities.

Environmental Assessment and Phase I Environmental Site Assessment for Armed Forces Reserve Center, Elkins, West Virginia.
Managed the preparation of a Phase I Site Assessment and an environmental assessment for an armed forces reserve center on a 112-acre site. The site was a former farm and strip mine site. The Phase I ESA did not identify any evidence of spills or contamination at the site based on a review of historic records, field reconnaissance, and a review of Federal and state databases. Cultural resources, wetlands, and roadway access were concerns.

Ripley Joint Armed Forces Reserve Center (JAFRC) Planning Charrette, Ripley, West Virginia.
Managed a three-day planning charrette for the proposed Ripley JAFRC. The purpose of the planning charrette was to conduct a fact-finding mission and to have discussions on the project details with key installation stake holders and to review the 1391 construction cost estimate. The planning report outlined the findings of the charrette and outlined next steps for the project.

Briery Mountain Range Development Plan EA, Camp Dawson, West Virginia.
Managed the EA for three proposed Briery Mountain Training Area ranges which include a Live Fire Breach Facility (LFBF), Hand Grenade Familiarization Range, and an Urban Assault Course (UAC). Coordinated with WVARNG to evaluate potential constraints, such as stream impacts, and to avoid and minimize environmental impacts.

Water Resources Management Plan, Camp Dawson, West Virginia.
Project Manager. Managed the preparation of a water resources management plan for the West Virginia Army National Guard for Camp Dawson (approximately 3,797 acres). Assessed current availability of data regarding Camp Dawson water resources including the Cheat River, streams and numerous tributaries. Conducted site visits and recommended management goals for surface water, wetlands, floodplains, and groundwater resources.

Environmental Assessment for Integrated Natural Resources Management Plan (INRMP) Updates, Marseilles Training Area (MTA), Illinois.
Managed EA for 2,850-acre MTA INRMP. Worked closely with Illinois Army National Guard and Illinois Department of Natural Resources, joint owners of the MTA. The EA evaluated potential environmental impacts of the plans for managing land, forest, aquatic and terrestrial habitat, special areas, fish and wildlife, rare species, pest control, and fire. The project allowed the ILARNG to remain in compliance with Army policy and other federal, state, and local laws and regulations, and to provide for no net loss in the capability of lands to support the military mission. Also, evaluated training plan for the construction and operation of ranges and other training facilities. Covered 15 proposed projects including range expansions, new ranges, live-fire breach facility, anti-tank range, grenade launcher range relocation, live fire shoot house, training support facility development projects, and training area maintenance projects.

Integrated Natural Resource Management Plans (INRMPs), Environmental Assessments and an Endangered Species Management Plan (ESMP), Camp Crowder and Camp Clark Training Sites, MOARNG, Newton and Vernon Counties, Missouri.
Assistant Project Manager. Responsible for preparing two INRMPs and EAs for Camp Crowder and Camp Clark, which are comprised of 4,300 acres and 1,287 acres, respectively. Management Plans revised in this INRMP included land use, forest, aquatic and terrestrial species, special natural areas, fish and wildlife, rare species, pests, and fire.

Joint Land Use Study (JLUS), Camp Atterbury and Muscatatuck Urban Training Center (MUTC) | Bartholomew, Brown, Jennings, and Johnson Counties, Indiana.
Author and Technical Reviewer. Helped prepare the Camp Atterbury and MUTC JLUS, which is a cooperative land use planning effort by communities and military installations to jointly ensure future compatible development. The JLUS involved four south-central Indiana counties; several cities/towns, such as Columbus, Edinburgh, and North Vernon; economic development and regulatory agencies; and the two military installations. After extensive public involvement activities, the JLUS identified compatible land use and growth management guidelines and recommendations, which are now being implemented.

Recreation
Environmental Assessment for Sports Park, Elizabethtown, Kentucky.
For the City of Elizabethtown, conducted environmental studies and prepared permit applications for a proposed 200-acre sports complex that includes soccer fields, baseball fields, basketball courts, tennis courts, and hiking trails. Worked with the designer to minimize impacts to environmental resources by shifting trails and parking areas. Managed wetlands delineations, archaeological surveys, Phase I environmental site assessment, and a threatened and endangered species habitat survey. Worked with the USFWS on mitigation for potential impacts to the federally endangered Indiana bat.

Noise Studies for World Shooting and Recreational Complex, Sparta, Illinois – For the Illinois Department of Natural Resources, managed the preparation of noise studies for the development of a 1,600 acre shooting complex in Sparta, Illinois. Environmental assessment was prepared on an expedited schedule so that the Grand American Trapshooting Championships could be held at the complex opening. Evaluated potential noise impacts on adjacent property owners and recommended use of berms to minimize impacts. The site includes 120 trap shooting fields covering 3.5 miles, 24 skeet fields, 2 courses for sporting clays, and archery fields.

Town Branch Trail Environmental Education Sign Project – Using a Kentucky Fish and Wildlife Resources grant, prepared environmental education signs and booklet on fourteen topics associated with Town Branch Creek and its environmental context. The role of water in the environment is a main focus of the project, along with raising awareness about human impacts on ecosystems and ways to reduce those impacts. An exhibit and outreach materials were developed. The environmental sign project exhibit was on display at the state wildlife center for two months. The exhibit has also been displayed at libraries, schools, and the Children's science center. Environmental education signs have been fabricated and placed along the completed sections of the Town Branch Trail.

Environmental Studies for Isaac Murphy Park Development, Lexington, KY. Provided technical oversight of the environmental and cultural resource studies for the Isaac Murphy Memorial Art Garden Project in downtown Lexington. Participated in public archaeology events to promote park and understanding of neighbourhood history. Due to minority and low-income neighbourhoods, environmental justice was a concern.

Southwest Jefferson County Greenways, Louisville Metro Parks Department, Louisville. Supported Louisville Metro Parks Department develop a master plan to create greenways in southwest Jefferson County which will include shared use trails. The study area covers approximately 97 square miles or a quarter of Jefferson County. Identified ways to include cultural resources into the planning process such as historic properties to be destinations or waypoints for the education and benefit of trail users or archaeological sites to avoid. Provided technical review of draft documents and outreach materials.

Pipelines

206-Mile Lobos CO2 Pipeline Project, Kinder Morgan, New Mexico and Arizona.
Assistant ecological team lead supporting wetland and waters of the U.S. delineation, threatened and endangered species studies, and vegetation / habitat assessments in support of permitting for a proposed 206-mile CO2 pipeline to be used in enhanced oil recovery process. Technical reviewer of draft Bureau of Land Management (BLM) plan of development and supporting ecological and cultural documents. Agency coordination includes the BLM, USACE, USFWS, Native American Nations, and state and local regulatory agencies from Arizona and New Mexico.

Cortez Loop Pipeline Extension, Kinder Morgan, New Mexico.
Assistant ecological team lead for 40-mile pipeline extension, four new pump stations and other associated facilities. Ecological, paleontological resources, and cultural resource studies were undertaken for this proposed pipeline extension. Access roads and potential compressor stations and temporary storage areas were evaluated. Agency coordination included the Bureau of Land Management, United States Army Corps of Engineers, United States Fish and Wildlife Service, and state and local regulatory agencies.

Supplemental Environmental Assessment for Relocation of a Petroleum Products Pipeline, CSX Transportation, Virginia.
Project manager for developing a supplemental environmental assessment for relocation of a 24-inch petroleum product pipeline due to the addition of 11 miles of a third railroad track. Approximately 3.0 miles of horizontal directional drilling occurred to reduce potential construction impacts to utilities, roads, water bodies and wetlands. Permitting, endangered species and floodplain issues were concerns, and required coordination with local, state, and federal regulatory agencies.

Sparrows Point Liquified Natural Gas (LNG) Terminal and Pipeline Project, Maryland and Pennsylvania.
Technical reviewer of cultural resource sections for FERC EIS for LNG facility and 88-mile pipeline. Acted as the third-party consultant to FERC for the preparation of National Environmental Policy Act (NEPA) compliant documents (the Draft Environmental Impact Statement [DEIS] and the Final EIS) for the LNG facility and related pipelines. The terminal is proposed for Sparrows Point, southeast of Baltimore in Baltimore County, MD and will can unload LNG ships, storing up to 480,000 cubic meters of LNG, vaporizing the LNG, and sending out the natural gas.

Environmental Documentation for Water Pipeline, Bowling Green, Kentucky.
Project Manager for environmental studies and documentation for a 10-mile water pipeline for the Transpark Industrial Development. Oversaw cultural resources, wetlands, socioeconomic, hazardous materials, karst, and threatened and endangered species investigations. Cumulative impacts were an issue because of potential impacts of future industrial growth in the area and karst terrain. Permitting and mitigation were concerns due to potential impacts to Mammoth Caves National Park. Public involvement was a key component due to citizen advocacy groups.

Dams and Levees

NRCS Upper Walnut Creek FRD No. 6 and FRD No. 21, Butler County, Kansas.
NEPA Manager for two dam rehabilitation projects, prepared environmental assessments. The projects purposes are to rehabilitate FRD 6 and FRD 21 to meet safety and performance standards for high hazard dams and provide flood water protection to downstream areas. The EAs included the NRCS environmental evaluation worksheet and discussions of threatened and endangered species, wetlands, environmental justice, economic and social conditions, and cultural resources.

NRCS Pine Creek Dam Rehabilitation EA, Oneida, Tennessee.
Technical Reviewer. Supported Pine Creek Dam rehabilitation EA and archaeological and architectural historic surveys. The EA included the NRCS environmental evaluation worksheet and discussions of threatened and endangered species, wetlands, environmental justice, economic and social conditions, and cultural resources. This multi-purpose dam and reservoir project serves as flood control and as the town's primary water supply.

Environmental Impact Statements (EISs) for Two Flood Damage Reduction Projects (Levisa Fork Watershed Section 202 Program), Floyd and Pike Counties, KY.
For the USACE-Huntington District, Project Manager for the preparation of sections for the structural and nonstructural flood damage reduction measures EISs in Floyd and Pike Counties, KY. Major issues included community impacts, environmental justice, cultural resources and terrestrial and aquatic mitigation. Identified concerns about the potential for residential and business relocation, impacts to property values, loss of community cohesion, the potential for induced flooding, hardships from raising residences, impacts to habitat for the Indiana bat, potential loss of tributary streams, and the potential impact of floodwall construction on the riparian corridor. Extensive agency coordination required.

EIS for Flood Damage Reduction, Pike County, Kentucky, Levisa Fork Watershed Section 202 Program. Supported development of Draft EIS assessing impacts of flood damage reduction alternatives within the Levisa Fork Watershed in Pike County, Kentucky for the USACE, Huntington District. Project alternatives include structural and non-structural components. Reviewed Habitat Assessment Procedure (HEP) analysis for terrestrial impacts and a stream assessment for tributaries. Major issues included community impacts, cultural resources, and terrestrial and aquatic mitigation. Project required extensive coordination with U.S. Fish and Wildlife.

Muddy Fork Conservancy District Supplemental EIS, Borden, Indiana.
A Supplemental EIS is being prepared for a new dam to provide additional municipal water supplies, control flooding, and create recreational opportunities. Early steps including reviewing technical and environmental studies to determine data gaps and areas for update. A review of the 1992 FEIS determined that a Supplemental EIS is necessary. Water supply studies were evaluated and revised in coordination with the water utility. The purpose and need section was expanded to include recreational opportunities for the reservoir.

Transmission Lines

Herleman to Meredosia Transmission Line, Ameren, Illinois.
Provided environmental planning support for the proposed 48-mile 345-kV overhead electric transmission line which crosses several named streams including the Illinois River. The Herleman to Meredosia line is part of Ameren's 330-mile Illinois Rivers Transmission Line initiative stretching from Palmyra, Missouri to the Illinois/Indiana state line. Supporting the development of a Conservation Plan in accordance with the Illinois Department of Natural Resources (IDNR) requirements for state-listed threatened and endangered species.

Meredosia to IpavaTransmission Line, Ameren, Illinois.
Provided environmental planning support for the Meredosia to Ipava Transmission Line, Ameren, Illinois. The Meredosia to Ipava line is part of Ameren's 330-mile Illinois Rivers Transmission Line initiative stretching from Palmyra, Missouri to the Illinois/Indiana state line. Supporting the development of a Conservation Plan in accordance with the Illinois Department of Natural Resources (IDNR) requirements for state-listed T&E species.

Maywood to Herleman Transmission Line, Ameren, Missouri and Illinois.
Provided environmental planning support for a proposed 345-kV electric transmission line crossing of the Mississippi River on federal property near Quincy, Illinois. The Maywood to Herlemen line is part of Ameren's 330-mile Illinois Rivers Transmission Line initiative stretching from Palmyra, Missouri to the Illinois/Indiana state line. Supporting the development of a Conservation Plan in accordance with the Illinois Department of Natural Resources (IDNR) requirements for state-listed threatened and endangered species.

United States Nuclear Regulatory Commission
Nuclear Reactor Operator Examination and Licensing Study, Multiple States. For the U.S. Nuclear Regulatory Commission, conducted a study of the reactor operator examination and licensing function. Reviewed information collected from 300 written questionnaires. Conducted personal interviews with reactor operators, senior reactor operators, training managers, and plant technical managers at multiple nuclear power facilities, and NRC regional offices.

Bell Bend Nuclear Power Plant Third Party EIS for Nuclear Regulatory Commission, Pennsylvania.
As a Senior Planner, prepared Third Party EIS sections for the Nuclear Regulatory Commission on land use, transmission lines, cultural resources, cooling tower, and cumulative impacts for a new reactor at the Bell Bend Nuclear Power Plant. Conducted site visits and interviews to evaluate existing and changes in land use resulting from the addition of a new reactor and changes to transmission lines. Reviewed the Environmental Report and prepared requests for additional information (RAIs) concerning potential data gaps.

Victoria Station Nuclear Power Plant Third Party EIS for Nuclear Regulatory Commission, Texas.
Senior planner developing land use, transmission line, cultural resource, and cumulative impact sections of a Third Party EIS for the proposed Victoria Station Nuclear Power Plant Project. Evaluated sections of the ER and prepared RAIs. Evaluated existing and changes in land use resulting from the facility and transmission lines.

Environmental Report, Confidential Client, Nuclear License Application Project, Michigan.
Technical reviewer of Socioeconomic sections of the ER for a new medical isotope production facility in the central US. This work is in accordance with the provisions of NUREG 1537 and related laws and regulations and entails the documentation of all socioeconomic baseline characteristics of the project site and vicinity.

Utilities
Electric Power Industry Waste Reduction Activities – For USEPA's WasteWise program, analyzed waste reduction activities at utility generating stations, distribution and transmission facilities, and recovery and warehouse operations, including PG&E facilities. Worked with the Edison Electric Institute to select utilities to profile for waste reduction and recycling activities. Conducted site visits to power plants in 6 states. Profiled PG&E's waste reduction activities at generating stations and distribution facilities; Investment Recovery and Warehouse locations, Fleet Maintenance; and General Office facilities. Life cycle cost analysis, solid waste consulting, employee and public education activities, and measurement

criteria were considered. Developed the Waste Reduction Activities of Selected WasteWise Partners: Electric Power Industry report.

Report to Congress on Fossil Fuel Combustion Waste – Supported USEPA in developing a Report to Congress on Fossil Fuel Combustion Waste. Worked on the technical studies concerning waste characterization, potential damage cases, risk analysis, and groundwater impacts. Evaluated existing federal and state regulatory requirements and cross media impacts of fossil fuel combustion wastes.

Guide for Industrial Nonhazardous Waste Management – For USEPA, helped develop the guide for the management of industrial nonhazardous waste management. The guidance applied to waste managed in surface impoundments, landfills, and land application areas. Worked with the Edison Electric Institute and the Electric Power Research Institute (EPRI) to consider impacts of the guidance on the electric utility industry.

United States Housing and Urban Development

United States Housing and Urban Development Task Force Report on Lead-Based Paint (LBP) Hazard Reduction and Financing. Washington, D.C. For the United States Department of Housing and Urban Development and the United States Environmental Protection Agency, provided support to the Task Force concerning the impacts of liability on LBP hazard reduction and victim compensation. Helped to draft a report and recommendations on reducing LBP hazards to children. Evaluated state requirements for LBP hazard reduction, management of lead-based paint contaminated debris, and state liability standards.

Draft Environmental Assessment for the Museum Plaza High-Rise and Parking Garage, Louisville, Kentucky. Project manager overseeing environmental studies and preparation of an environmental assessment for the proposed Museum Plaza, a new multi-use development in downtown Louisville. The proposed project would consist of a 1.5-million-square-foot, 62-story building containing residential units, office space, a non-profit contemporary art museum, two hotels, and the University of Louisville Master of Fine Arts program, as well as a portion of the university's graduate business school. Floodplain and cultural resource issues were potential concerns. A Housing and Urban Development (HUD) grant is anticipated to help support this project and the National Environmental Policy Act (NEPA) documentation is being prepared to comply with HUD's requirements under 24 Code of Federal Regulations (CFR) 58.

Other Private Clients

Assessment of Visual, Auditory, and Lighting Effects of RiverPark Place Development on Cultural Resources, Private Client, Louisville, Kentucky.

On an accelerated schedule for a private developer, managed the assessment of potential visual, auditory, and lighting impacts from the waterfront development project on cultural historic resources. The project covered a one-mile Area of Potential Effect (APE) in Kentucky and Indiana. The development will include two 16-story structures surrounded by four 5-story structures for residential/commercial use. Two historic sites and part of a historic district will be adversely visually impacted by the proposed construction. Two historic sites also will be adversely affected by temporary construction noise and noise associated with increased vehicular or watercraft traffic. Worked with Kentucky Heritage Council to prepare an MOA for the project.

Environmental Overview and Phase I ESA for a Proposed Commercial Development, Frankfort, KY.

For a private developer, managed the preparation of a Phase I ESA, environmental overview, wetlands delineation, and an archaeological overview of a 100-acre site near I-64. The site contained an auto body shop and farmland that were evaluated for potential recognized environmental conditions. Coordinated with the Kentucky Transportation Cabinet concerning developing a new access point on US127. Held discussions with City of Frankfort planners concerning requirements for site development.

Jefferson Commons, Outer Loop, Louisville, Kentucky.
For a private client, successfully obtained a Section 404 permit on a fast time schedule and managed the wetlands delineation and Phase I archaeological investigation for a development project along the Outer Loop in Louisville, Kentucky. Due to wetland and stream impacts, credits were obtained from a wetlands bank.

Fisherman's Energy Atlantic City Windfarm, New Jersey. Technical reviewer for cultural resource concerns related to National Historic Landmark Lucy the Elephant. Helped evaluate potential visual impacts of offshore wind turbines on listed National Register of Historic Resource. Helped coordinate with New Jersey State Historic Preservation Office (SHPO) on study needed to determine project would not adversely affect historic resources.

Electric Power Research Institute Bat Mitigation Alternative Manual, Nationwide. For the Electric Power Research Institute, developing a manual to evaluate mitigation alternatives, such as habitat enhancements, artificial roosts, conservation areas and banks, in lieu fee programs, and wetland creation for threatened and endangered bat species affected by utility operations, maintenance, and project activities. Evaluated information from government, non-profit, and commercial resources to identify compensatory mitigation alternatives. Analyzed peer-reviewed literature, data from bat working groups, and communications with regulators and other bat experts. The manual will quickly inform utilities about bat mitigation opportunities using graphic summaries, tables, decision trees, and case studies. As part of the project, developed user-friendly bat fact sheets for distribution to utility clients.