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

In the Matter of the Electronic Application of Horseshoe Bend Solar, LLC for a Certificate of Construction for an Approximately 60 Megawatt Merchant Electric Solar Generating Facility in Green County, Kentucky Pursuant to KRS 278.700 and 807 KAR 5:110	))))))	**Case No. 2020-00190**

HORSESHOE BEND SOLAR, LLC'S RESPONSE TO THE CONSULTANT'S REPORT

Horseshoe Bend Solar, LLC ("Horseshoe Bend"), by counsel, hereby provides its Response to the report prepared by Wells Engineering. In this Response, Horseshoe Bend will generally describe the background, comment on Wells Engineering's review of the components of the Site Assessment Report, and discuss Wells Engineering's proposed mitigation measures.

I. BACKGROUND

Horseshoe Bend proposes to construct a 60-megawatt alternating current photovoltaic (PV) electricity generation facility, situated on land in Green County. Horseshoe Bend filed an application for a certificate to construct this solar-energy project with the Siting Board on December 14, 2020. Prior to that filing, Horseshoe Bend communicated with neighbors and local community leaders throughout its planning process within the constraints dictated by the Covid-19 safety measures. In fact, contacts were made with local officials as early as September 2019. Several other contacts were made with community leaders, neighbors of the project, and other interested individuals over the following months.[1]

[1] For a detailed description of the outreach, see Attachment E of the Application.

Pursuant to the notice requirements of KRS 278.706 and the Siting Board's Order dated July 15, 2020, Horseshoe Bend also held a public meeting on July 16, 2020, at the Greensburg Community and Senior Center and online to inform the public about the Project and receive comments from them. Attendees were shown and invited to inspect enlarged satellite images showing the location of the proposed solar array. The meeting also afforded attendees the opportunity to ask questions of the presenters. The *Greensburg Record-Herald* published an article about the project following that meeting.

Consistent with KRS 278.708(5), the Siting Board retained Wells Engineering to review the site assessment report ("SAR") filed by Horseshoe Bend and provide recommendations concerning the adequacy of the SAR and proposed mitigation measures. Pursuant to subsection (2)(a) of that statute, the SAR is required to have a description of the proposed facility, including surrounding land uses, legal boundaries, proposed access controls, location of structures on the property, location of roadways, location of utility infrastructure, setbacks, and anticipated noise. The SAR must also include evaluation of four aspects of the project:

> 1. the compatibility of the facility with scenic surroundings,
>
> 2. potential changes in property values and land use resulting from the proposed facility for property owners adjacent to the facility,
>
> 3. anticipated peak and average noise levels associated with the facility's construction and operation, and
>
> 4. impact of the facility's operation on road and rail traffic to and within the facility, including anticipated levels of fugitive dust and any anticipated degradation of roads and lands.

KRS 278.708(2)(b)-(e).

II. DISCUSSION

In addition to its own review of the Site Assessment Report, Wells Engineering retained Cloverlake Consulting to analyze the proposed project related to the contents of the Site Assessment Report.

A. Description of the proposed facility

1. Surrounding land uses

As indicated in the Site Assessment Report, the surrounding land use for the project is primarily agricultural and residential.[2] Cloverlake Consulting also determined the majority of the project site was located on agricultural and residential land.[3] It specifically found that the Site Assessment report is in compliance with the intent of the statute as it relates to surrounding land use.[4]

Wells Engineering requested that the site layout and 2-mile vicinity maps include identification of the water storage tank on Highway 218 and water bodies.[5] With respect to the water tank, it is owned by the Green-Taylor Water District and an updated 2-mile vicinity map is attached hereto as Exhibit A. Horseshoe Bend will update the final site layout plan to include the water storage tank.[6]

[2] Site Assessment Report at 2.
[3] Cloverlake Consulting Report at 4.
[4] *Id.* Throughout most of the report, Cloverlake Consulting mentions that Horseshoe Bend's Site Assessment Report is in compliance with the intent of KRS 278.216 until its conclusion on page 27 where it indicates that the Site Assessment Report is in compliance with KRS 278.708. Because KRS 278.216 applies to utilities instead of merchant electric generating facilities, we presume Cloverlake Consulting's statements were intended to refer to KRS 278.708, as it did in the conclusion.
[5] Wells Engineering Report at 11.
[6] We note that KRS 278.706(2)(b) does not require identification of utility infrastructure as it only requires identification of "residential neighborhoods, the nearest residential structures, schools, and public and private parks."

In regards to the surface water on site, please refer to the aquatic resources delineation report prepared for Horseshoe Bend, which identifies all water bodies including ponds, lakes and creeks on the site, attached as Exhibit B.[7]

In 2020, Horseshoe Bend applied to the US Army Corps of Engineers (USACOE) for a Jurisdictional Determination, a process whereby USACOE confirms USACOE's opinion on whether each water body identified in the aquatic resources delineation report is a jurisdictional water of the US. Typically, this process involves a site visit by USACOE. USACOE has already visited the Horseshoe Bend site and provided their Jurisdictional Determination for the project.

Horseshoe Bend will comply with all local, state and federal permitting requirements, including USACOE permitting requirements, for any impacts to water bodies. The permitting and approval process that solar projects go through for impacts to water bodies is well defined; more information can be provided on this permitting and approval process if requested by the Siting Board.

2. The legal boundaries of the proposed site;

Cloverlake Consulting specifically found that the data contained in the Site Assessment report is in compliance with the intent of the statute as it relates to legal boundaries of the proposed site.[8] Wells Engineering noted that there may be some discrepancies with the application materials and the Green County PVA records and recommends updating the information.[9] Horseshoe Bend has reviewed the legal descriptions, which show an assessed value; thus, it is not clear to Horseshoe Bend what needs to be updated. If the Siting Board

[7] Please note that Exhibits B-D to the report, which run over 200 pages, have been deleted from Exhibit B.
[8] Cloverlake Consulting Report at 6.
[9] Wells Engineering Report at 12.

deems it appropriate, Horseshoe Bend will again review the land records and update the materials as necessary, but additional guidance is requested to know what needs to be updated.[10]

3. Proposed access control to the site;

Cloverlake Consulting summarized the project's anticipated proposed access locations along Highway 218.[11] It specifically found that the data contained in the Site Assessment report is in compliance with the intent of the statute as it relates to proposed access control to the site.[12] Wells Engineering noted that Horseshoe Bend should provide any signage, caution boards, and safety standards.[13] Horseshoe Bend will ensure compliance with any OSHA requirement as the design and engineering of the project is finalized.

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

Wells Engineering and Cloverlake Consulting provided brief sections on location of facility buildings, transmission lines, and other structures. Cloverlake Consulting specifically found that the data contained in the Site Assessment report is in compliance with the intent of the statute as it relates to this element.[14] Wells Engineering noted that there are three residences within 300 feet from the property boundary.[15] It suggested that necessary approvals or deviations shall be obtained, but no such approval for individual residents outside a neighborhood is required. Because the statutory setback requirements apply to neighborhoods—not individual houses—and the referenced residences are not within neighborhoods, no separate approval or deviation is required.

[10] If additional discrepancies beyond those identified in the Wells Engineering report are known, it would be beneficial if those parcels were identified.
[11] *Id.*
[12] *Id.* at 7.
[13] Wells Engineering Report at 12.
[14] Cloverlake Consulting Report at 8.
[15] Wells Engineering Report at 12.

Wells Engineering also noted that precautions should be taken to ensure underground utilities on the project site were identified. Horseshoe Bend will call 811 prior to any digging activities. Additionally, all recorded utility easements have been marked on the survey and will be avoided in the final site design.

5. Location and use of access ways, internal roads, and railways;

Cloverlake Consulting specifically found that the data contained in the Site Assessment report is in compliance with the intent of the statute as it relates to the location and use of access ways, internal roads, and railways. Wells Engineering noted that the project's internal roads are intended to be gravel and that railroads are not applicable to this site.[16] It also noted that public access to the cemeteries is required.[17] Horseshoe Bend will not interfere with access to the cemeteries.

6. Existing or proposed utilities to service the facility;

Cloverlake Consulting specifically found that the data contained in the Site Assessment Report is in compliance with the intent of the statute as it relates to the existing or proposed utilities to service the facility.[18] Wells Engineering noted that the plot plans do not indicate the utilities to the facility of the building.[19] As Horseshoe Bend stated in the Site Assessment Report, it does not currently anticipate that it will need external utility services during operation. If electric service is necessary, it would be received from Taylor County RECC.[20]

[16] Wells Engineering Report at 14.
[17] *Id.*
[18] Cloverlake Consulting Report at 8.
[19] Wells Engineering Report at 15.
[20] Site Assessment Report at 5.

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

Cloverlake Consulting specifically found that the data contained in the Site Assessment report is in compliance with the intent of the statute as it relates to setbacks.[21] Wells Engineering suggested that the "KRS required setback is 2000 feet". As it relates to solar facilities, KRS 278.704 provides primacy for local setback requirements, but where there is no local setback requirement, the only setback requirement is 2,000 feet from any residential neighborhood, school, hospital, or nursing home facility. In this case, Horseshoe Bend has requested a deviation for the one neighborhood that is within 2,000 feet from the proposed facility. It proposes a 600-foot setback from that neighborhood.

Wells Engineering also stated that a 2,000-foot setback for solar facilities is not practical. Horseshoe Bend agrees with this position, and appreciates Wells Engineering pointing out the obvious differences between turbine-based generating facilities and a solar facility.

8. Noise levels expected to be produced by the facility

As stated by Wells Engineering, it appointed "industry leading expert [W. Thomas Chaney of Cloverlake Consulting] for the Environmental Assessment of site for Noise, Traffic & Fugitive dust."[22] Cloverlake Consulting provided an in-depth analysis of the expected noise levels from the site during construction and operation.[23] It noted that the surrounding environment is "expected to continue being dominated by several significant sources of sound," which is "primary (HWY 218) and secondary roadways."[24] Cloverlake Consulting also indicated that "the ambient daytime sound level for the area surrounding this project is

[21] *See* Cloverlake Consulting Report at 8.
[22] Wells Engineering Report at 15.
[23] Cloverlake Consulting Report at 6-13.
[24] *Id*. at 10.

anticipated to be between 50 and 60 dBA."[25] Cloverlake Consulting specifically found that the data contained in the Site Assessment report is in compliance with the intent of the statute as it relates to noise.[26] It concluded as follows: "Due to the nature of this Project including the construction, types of equipment to be installed, and planned operation, it is anticipated the impacts to the existing sound level environment will be minimal in the Consultant's (GAI) opinion."[27]

B. Compatibility of the Facility with Scenic Surroundings

Regarding scenic surroundings, both Wells Engineering and Cloverlake Consulting reviewed the two non-participating residences that are within 300 feet of the project boundaries.[28] Wells Engineering noted that Horseshoe Bend will provide screening for the closest residence and that those residents have not objected to the project.[29] It determined that "the solar power plant will not detract from the view of" the other non-participating residence that is within 300 feet from the project.[30] Wells Engineering also evaluated another non-participating landowner with a direct view of the solar panels from approximately 1,100 feet away. It mentioned the existing transmission line that already runs through that viewshed and determined that the impact of the solar facility "will be minimal."[31] Likewise, it determined that the impact to the viewshed of the nearest neighborhood would be "negligible."[32]

Wells Engineering summarized its findings as follows:

> While there will always be impact to the scenery of neighboring properties the impact of this project is minimal. The combination

[25] *Id.* at 12.
[26] *Id.* at 13.
[27] *Id* at 17.
[28] Wells Engineering Report at 15-17; Cloverlake Consulting Report at 6. One of the three residences within 300 feet of the project is a participating owner.
[29] Wells Engineering Report at 15.
[30] *Id.*
[31] *Id.*
[32] *Id.*at 16.

> of the topography, existing tree line, and existing human made features works well to minimize the impact to property valuation. The major exceptions to this are the project participants and a few other directly neighboring landowners.[33]

Cloverlake Consulting similarly determined that any impact of the project to the scenic surroundings would be relatively minor by concluding that the evaluation of the facility with the scenic surroundings in in compliance with the intent of the statute.[34]

C. Potential Changes in Property Values

Wells Engineering requested both Cloverlake Consulting and Mary McClinton Clay to review the property-value report submitted in the Site Assessment Report and prepared by Richard Kirkland. After a review of Cloverlake Consulting's and Ms. Clay's discussion, Wells Engineering concluded: **"In our opinion there will be no impact to property values."**[35]

Finding that Mr. Kirkland's report was in compliance with the intent of the statute related to the project's potential impact on property values, Cloverlake Consulting provided the following quote:

> The matched pair analysis shows no impact in home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land. 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.
>
> 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

[33] *Id.* at 17.
[34] Cloverlake Consulting Report at 18.
[35] Wells Engineering Report at 18 (emphasis added).

> uses, schools, churches, and residential developments. Industrial uses rarely absorb negative impacts from adjoining uses.
>
> Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property ***will have no impact*** on the value of adjoining or abutting property and that the proposed use is in harmony with the area in which it is located. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more 2 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.[36]

It is not surprising that Ms. Clay's assessment is not as favorable because she has in the past been a vocal opponent of development, including solar. As an example, Ms. Clay was a member of the Bourbon County Comprehensive Plan Task Force, when the members discussed whether to include solar-energy facilities in the Comprehensive Plan. Minutes of a September 2016 Task Force Meeting indicated that, on the topic of solar facilities, "Mary Clay stated I think there are a lot of unintended consequences. I don't think we want to encourage it, they are so unsightly."[37]

Not only has Ms. Clay exhibited personal bias against solar development, her professional review of Mr. Kirkland's report is defective. Mr. Kirkland provides rebuttal in his responsive letter attached hereto as Exhibit D. In summary, Mr. Kirkland points out (1) how the methodology he used is a common appraisal approach, (2) that there are additional university studies that support his conclusions, (3) that his report was identified as a consulting report that is subject to USPAP's Competency, Ethics, and Jurisdictional Exception Rules, (4) what is and is

[36] Cloverlake Consulting Report at 19 (emphasis added); *see also* Wells Engineering Report at 20.
[37] *See* Minutes of the September 2016 Bourbon County Comprehensive Plan Task Force meeting, attached hereto as Exhibit C.

not relevant in considering viewshed in this analysis, (5) and several other erroneous findings of her report.

Ultimately, Wells Engineering concluded that there would be no impact to property values for this project. Horseshoe Bend agrees with this position. It also agrees with the Siting Board that found in two prior cases that there is sufficient evidence that "solar facility will more than likely not have any adverse impact on nearby property values" because the characteristics of the solar facility's operations is passive in nature in that it does not produce any air, noise, waste, or water pollution nor does it create any traffic issues during operations."[38]

D. Anticipated Peak and Average Noise Levels

Section II(A)(8) above provides information on Wells Engineering's and Cloverlake Consulting's findings related to peak and average noise levels. Neither Wells Engineering nor Cloverlake Consulting indicated that there would be significant negative impacts from the project related to noise.

E. Traffic and Fugitive Dust

Wells Engineering relied exclusively on Cloverlake Consulting for the analysis of any impact on traffic or fugitive dust.[39] In regards to road and rail traffic, Cloverlake Consulting reviewed the anticipated impact and concluded that "traffic impacts for the construction and operation of the facility will be minimal.[40] It determined that the data contained in the Site Assessment report is in compliance with the intent of the statute as it relates to road and rail traffic.[41]

[38] *SR Turkey Creek Solar, LLC*, Case No. 2020-00040 at 14-15 (KSB Sept. 23, 2020); *Glover Creek Solar, LLC*, Case No. 2020-00043 at 15 (KSB Sept. 23, 2020
[39] Wells Engineering Report at 15.
[40] Cloverlake Consulting Report at 17.
[41] *Id*. at 17.

As for fugitive dust impact, Cloverlake Consulting noted that there may be "minor impacts" during construction as a result of fugitive dust.[42] Because of possible PM 10 (particulate matter 10 microns or less in diameter) during construction, Cloverlake Consulting recommended Horseshoe Bend prepare a plan to control fugitive dust and PM 10, which Horseshoe Bend will do.

III. PROPOSED MITIGATION MEASURES

In addition to the mitigation measures proposed by Horseshoe Bend, Wells Engineering and Cloverlake Consulting proposed the following mitigation measures, to which Horseshoe Bend responds.

> 1. Create an over-all plot plan indicating all water bodies, bridges, culverts, access roads, power lines, residential and public structures, etc.
> *Response: Horseshoe Bend will include this information on its final site plan prior to construction.*
>
> 2. Leaving existing vegetation between solar equipment and neighboring residences in place, to the extent practicable, to help screen the Project and reduce visual impact.
> *Response: Horseshoe Bend agrees to this mitigation measure, as it was included within the mitigation measures proposed in the initial Site Assessment Report.*
>
> 3. Provide Site access control as per NERC, NFPA and OSHA guidelines as necessary.
> *Responses: Horseshoe Bend will comply with applicable NERC, NFPA, OSHA and other federal regulations regardless of whether the Siting Board includes this as a mitigating measure.*
>
> 4. Evaluate the existing bridges for their load bearing capacity for construction, operation, and Maintenance. During our site visit between stop #1 and #2 there is a culvert designed for farm equipment but may not be able to sustain loaded tractor trailers used for delivering equipment.

[42] *Id*. at 16.

Response: Horseshoe Bend will evaluate existing bridges that are anticipated to be used during construction, operation, and maintenance for their capacity and safety.

5. Construct new bridges wherever required necessary.
Response: Horseshoe Bend agrees to this measure. To the extent that a new bridge is required at the project site, Horseshoe Bend will construct or contract for the construction of that bridge.

6. Adhere to the setback distance at all locations as per guidelines from the local planning zone authority.
Response: There are no setback requirements established by a local planning authority for this project. Horseshoe Bend respectfully requests a deviation from the setback requirements established by KRS 278.704(2), as stated in its Motion for Deviation filed on February 23, 2021.

7. Notices to neighbors regarding potential construction and operation noises, as well as limits on working hours [7 a.m. to 9 p.m.] during the construction period, as described in Section 4.
Response: Horseshoe Bend agrees to this mitigation measure, as it was included within the mitigation measures proposed in the initial Site Assessment Report by Horseshoe Bend.

8. Traffic Safety: Most of the roads adjacent and through the site are narrow and, in some cases, curvy. The Applicant should submit a detailed plan on how traffic safety will be maintained during the construction of the facility ten days before commencing construction.
Response: Horseshoe Bend agrees to coordinate with state and local authorities to ensure appropriate traffic-safety measures are maintained during construction.

9. Fugitive Dust & PM10: The applicant will submit in writing the specific plan to control fugitive dust and PM 10 during the construction process ten days prior to commencing construction.
Response: Horseshoe Bend agrees to this measure.

.

10. Protection of Streams: Ten days prior to the commencement of construction, the Applicant will provide a detailed plan on how they will protect the water resources in the project area. The site assessment documents in several locations says that certain mitigation measures regarding erosion and protection of water resources "may" be carried out. This needs to be clearly specified. The primary focus should be on preventing

turbidity being added to local water sources as a result of erosion during construction.

Response: Pursuant to Kentucky regulations, Horseshoe Bend will be required to obtain a Kentucky Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction Activities. It will prepare a Stormwater Pollution Prevention Plan that will outline protection measures including, but not limited to, installation of BMP's that will control runoff.

Horseshoe Bend respectfully notes that impacts to waterways are regulated by the U.S. Corps of Engineers, state and local bodies. We recommend that the Siting Board require that solar projects apply for and receive all necessary USACOE, state and local permits related to impacts to waterways prior to the start of construction. Submitting a detailed plan for water impacts to the Siting Board for review or approval may result in delays and confusion because the Siting Board does not typically regulate this area of development.

IV. CONCLUSION

Wells Engineering's report is undoubtedly favorable for approval of a construction certificate for Horseshoe Bend's project. In addition, it retained Cloverlake Consulting to preform additional analysis, and Cloverlake Consulting concluded that "all sections of the [site assessment] report are in compliance with the intent of KRS 278.708."[43] Horseshoe Bend encourages the Siting Board to issue the certificate of construction for this project based on Wells Engineering's report.

Respectfully submitted,
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[43] *Id.* at 25.

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COUNSEL FOR HORSESHOE BEND

Horseshoe Bend Solar Context Map

CAROLINA SOLAR ENERGY

N

2 mile radius

Green Taylor Water District Water Tank

KY 218

KY 70

2,000 foot radius

KY 70

	Horseshoe Bend Solar Project Outline
	Residential Neighborhoods (as defined in KRS 278.700(6))
	Residential Structures
	East Kentucky Power Cooperative Transmission Line
	Kentucky State Roadways

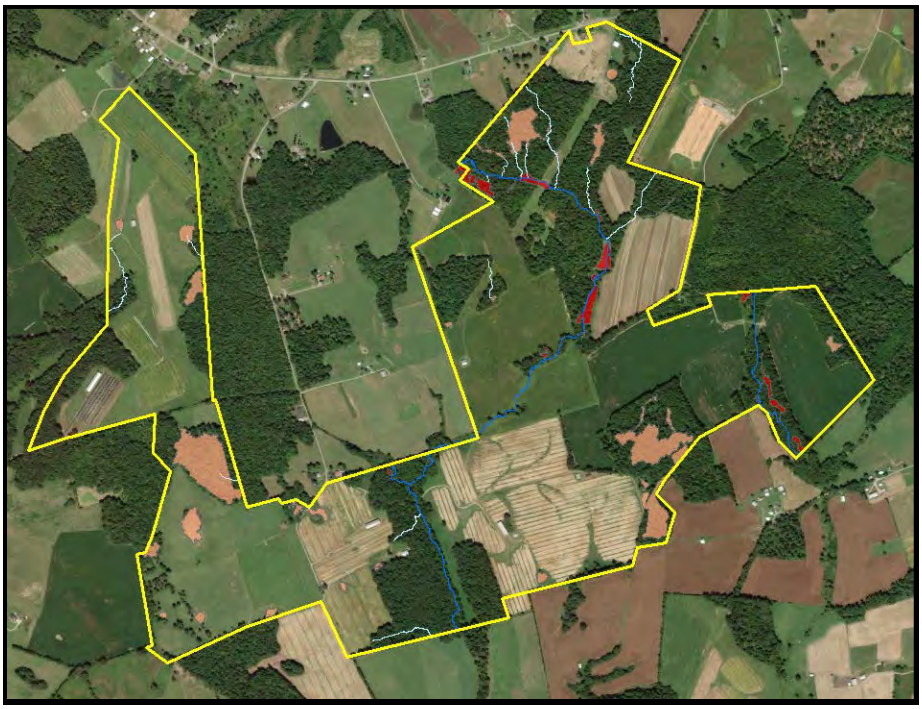
*There are no schools or parks within 2 miles of the proposed Horseshoe Bend Solar Project

EXHIBIT

A

COPPERHEAD
ENVIRONMENTAL CONSULTING

Aquatic Resources Delineation for the Proposed Horseshoe Bend Solar, LLC Project in Green County, Kentucky



29 August 2020

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B

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ACRONYMS AND ABBREVIATIONS

FEMA	Federal Emergency Management Agency
GPS	global positioning system
KYWRAM	Kentucky Division of Water Wetland Rapid Assessment Method
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high-water mark
PSS1E	palustrine scrub-shrub wetland (broad-leaved deciduous, seasonally saturated/flooded)
PFO1E	palustrine forested wetland (broad-leaved deciduous, seasonallysaturated/flooded)
PUB3Hh	palustrine unconsolidated mud bottom (permanently flooded, impounded)
PEM1	palustrine emergent wetland (persistent vegetation)
PSS1B	palustrine scrub-shrub wetland (broad-leaved deciduous, saturated)
PUB3Ef	palustrine unconsolidated mud bottom wetland (seasonally saturated/flooded, farmed)
RBP	Rapid Bioassessment Protocol
RPW	Relatively Permanent Wetlands
STR	perennial and intermittent streams
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UT	Unnamed Tributary
WOTUS	Waters of the United States
WL	wetland

1 INTRODUCTION

Horseshoe Bend Solar, LLC, contracted Copperhead Environmental Consulting, Inc. (Copperhead) to conduct a field delineation for the Horseshoe Bend Solar, LLC Project (Project) in Green County, Kentucky, to identify and delineate aquatic features likely to be considered jurisdictional Waters of the United States (WOTUS) or isolated waters of the state. The Project consists of a 654-acre Survey Area which is located in a rural area between Pierce and Exie, Kenucky. The Project has reference coordinates of 37.16751° N, -85.57388° W, as shown on Figure 1 – Project Area Map in Appendix A. The Survey Area includes all parcels considered for the Project. The Survey Area lies within the U.S. Army Corps of Engineers (USACE) Eastern Mountains and Piedmont Region and is part of the Highland Rim and Pennyroyal Region (NRCS Major Land Resource Area N 122). Primary land covers are pasture, hayfields, cultivated crops, forested hillsides and forested wetlands. The field delineation was conducted on March 3-4, March 10-11, and July 31, 2020.

2 METHODS

2.1 Preliminary Desktop Analysis

Prior to the field survey, a preliminary desktop analysis of available information was conducted using the following sources:

- ESRI GeoServer Web Map Service, National Land Cover Database (NLCD)_2016 Land Cover L48;
- Federal Emergency Management Agency (FEMA) National Flood Hazard Map (FEMA 2015);
- National Wetlands Inventory (NWI) Maps (USFWS 2020);
- The National Hydrography Dataset (NHD; U.S. Geological Survey [USGS] 2006);
- U.S. Department of Agriculture (USDA) *Soil Survey of Green and Taylor County, Kentucky* (1982);
- USDA Natural Resource Conservation Service (NRCS) Green County hydric soils list (USDA NRCS 2020a); and
- Web Soil Survey (USDA NRCS 2020b).

The locations of surface waters, wetlands, and floodplains identified during the preliminary desktop analysis were mapped (Figure 2 – Existing Hydrological Datasets Map in Appendix A) and used as a baseline reference that was compared, verified, and/or modified based on actual conditions observed during the field investigations using the methodologies outlined in Sections 2.2 and 2.3.

2.2 Methods for Delineating Wetlands

Copperhead conducted field investigations to identify the presence or absence of wetlands. When present, the location, extent, and boundaries of wetlands within the Survey Area were delineated in accordance with the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and *Regional Supplement to the Corps of Engineers' Wetland Delineation Manual:*

Eastern Mountains and Piedmont Region (Version 2.0) (USACE 2012). Wetland delineations were based on the presence of hydric soils, hydrophytic (wetland) vegetation, and wetland hydrology. Wetlands were described utilizing Cowardin classes (Cowardin, et al. 1979). The Cowardin classification system was adopted by the US Fish and Wildlife Service (USFWS) and is used by federal agencies to describe the type of wetland feature present.

Soil profiles within each respective community were then sampled to a depth of approximately 18 inches to determine if hydric soil indicators were present. Soil colors were documented using a Munsell Soil Color Chart (Munsell Color 2010). Vegetative cover at each wetland was identified and the wetland indicator status of each plant species was determined according to the 2016 National Wetland Plant List (Lichvar et al. 2016). Finally, observations of the presence of wetland hydrology indicators were made. Areas with the presence of all three wetland indicators (i.e. hydric soils, hydrophytic vegetation, and wetland hydrology) were delineated as wetlands. Please note that long-term agricultural land practices have disturbed soils in much of the Survey Area, including in and near wetlands. Therefore, hydric soil indicators were not always readily observable. In these instances, hydric soils were assumed to be disturbed and the predominance of wetland vegetation and multiple indicators of wetland hydrology were used to determine if a site met the criteria for wetlands.

At locations where wetland indicators were observed (i.e. hydric soils, hydrophytic vegetation, and/or wetland hydrology), a USACE Wetland Determination Data Form was completed. Each data form included supporting rationales for determining the presence or absence of each wetland parameter. The classification of wetlands deemed potentially jurisdictional was computed using the Kentucky Division of Water Wetland Rapid Assessment Method (KYWRAM) version 3. The KYWRAM rating denotes the quality of the wetland and can be used to evaluate mitigation efforts.

The wetland boundaries within the Survey Area were delineated using a Trimble global positioning system (GPS) handheld unit. GPS data were collected using Trimble TerraSync software. The GPS points of wetland boundaries and test pit locations (including coordinates and attribute information) were subsequently imported into ESRI ArcGIS software for creating maps of delineated wetlands and calculating wetland acreages.

2.3 Methods for Assessing Streams

Hydrologic features other than wetlands (e.g. stream channels) were delineated in the field by identifying the ordinary high-water mark (OHWM). OHWM is defined as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR 328.3(e)).

Streams were evaluated to assess the flow regime (i.e. ephemeral, intermittent, or perennial). Natural linear features with a defined bed and bank, OHWM, and observed or mapped hydrologic connection to navigable waters downstream were considered to be jurisdictional

streams. Man-made features (e.g. grassy swales or agricultural drainage ditches) with or without a bed and bank, but no discernable OHWM, were considered to be non-jurisdictional. Delineated streams and man-made features were evaluated and recorded with a Trimble GPS handheld unit.

Stream habitat was evaluated following methods described in the U.S. Environmental Protection Agency's (USEPA) *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et al. 1999). The Rapid Bioassessment Protocol (RBP) Habitat Assessment Field Data Sheets was completed to determine habitat quality of each stream.

3 REGULATORY AUTHORITY

Wetlands are defined by the USACE (33 CFR 328.3, 1986) and the U.S. Environmental Protection Agency (40 CFR 230.3, 1980) as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions". Many wetlands and other surface water features, including intermittent and perennial streams, are considered waters of the United States by the USACE, and these "jurisdictional" areas are regulated under Section 404 of the Clean Water Act (CWA).

The jurisdictional status of the wetlands and other water features is generally based on the feature being adjacent to or having an obvious hydrologic connection to a known jurisdictional waterway or wetland ("Waters of the United States") as defined by the June 22, 2020 Navigable Waters Protection Rule in 33 CFR 328.3. In the USACE/Environmental Protection Agency CWA regulations (33 CFR 328.3(a)), the term "jurisdictional waters," which is considered waters of the United States, is defined as follows:

1. The territorial seas, and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide;
2. Tributaries;
3. Lakes and ponds; and impoundments of jurisdictional waters; and
4. Adjacent wetlands, which is defined as (33 CFR 328.3(c)(1)) wetlands that:
    a. Abut, meaning to touch at least at one point or side of, a water identified in paragraph (a)(1), (2), or (3).
    b. Are inundated by flooding from a water identified in (a)(1), (2), or (3) in a typical year;
    c. Are physically separated from a water identified in (a)(1), (2), or (3) only by a natural berm, bank, dune, or similar natural features; or
    d. Are physically separated from a water identified in (a)(1), (2), or (3) of this section only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrologic surface connection between the wetlands and the water identified in (a)(1), (2), or (3) in a typical year.

In the USACE/Environmental Protection Agency CWA regulations (33 CFR 328.3(b)), the term "non-jurisdictional waters," which is not considered waters of the United States, is defined as follows:

1. Waters or water features that are not identified in paragraph (a)(1), (2), (3), or (4);
2. Groundwater, including groundwater drained through subsurface drainage systems;
3. Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools;
4. Diffuse stormwater run-off and directional sheet flow over upland;
5. Ditches that are not water identified in paragraph (a)(1) or (2) and those portions of ditches constructed in water identified in (a)(4) that do not satisfy the conditions of an adjacent wetland;
6. Prior converted cropland;
7. Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease;
8. Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters;
9. Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel;
10. Stormwater control features constructed or excavated in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater run-off;
11. Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention, and infiltration basins and ponds, constructed or excavated in upland or non-jurisdictional waters; and
12. Water treatment systems.

Impacts to jurisdictional waters will likely require a Section 404 permit and USACE approval. Impacts to non-jurisdictional waters will not require a Section 404 permit or USACE approval. However, impacts to non-jurisdictional water may require state specific Section 401 approval.

4 RESULTS

4.1 Desktop Analysis Results

The following information on soils and hydrology was gathered to inform and prepare the field team completing the delineation.

4.1.1 Site Soils

A review of the NRCS's Web Soil Survey and the Soil Survey of Green County, Kentucky, (USDA 1982) identified nine soil map units (excluding water) within the Survey Area. Two soil types have components with hydric soil ratings (Table 3-1 and Figure 3 – USDA Soil Types Map).

Table 4-1. Soil map units in Aquatic Resources Delineation Survey Area for the Horseshoe Bend Solar Energy Survey Area, Green County, Kentucky, 1967.

Map Unit Name	Acres	Survey Area %
Dickson silt loam, 2-6% slopes	135.4	24.3%
Elk silt loam, 2-6% slopes	7.9	1.4%
Frederick silt loam, 6-12% slopes	161	28.9%
Frederick silt loam, 12-20% slopes	32.1	5.8%
Frederick silty clay loam, 12-20% slopes, severely eroded	27.9	5.0%
Melvin silt loam (Poorly drained, **Hydric** Rating)	12.3	2.2%
Mountview silt loam, 2-6% slopes	126.7	22.7%
Nolin silt loam	13.2	2.4%
Taft silt loam - 5% Bonnie (**Hydric** soil rating: Yes)	40	7.2%
Water	0.6	0.1%

Source: USDA 2006, USDA NRCS 1982

4.1.2 Site Hydrology

The Survey Area is within the Greasy Creek watershed, which drains to the Little Barren River (Hydrologic Unit Code 05110001110460) and then to the Green River. The Green River is considered a traditional navigable water (TNW). The hydrology within the watershed is influenced by karst geology and drainage for agriculture. Karst geologic features were observed at the Survey Area, including sinkholes and springs that emerge from bedrock openings. The underlying karst geology directly influences the hydrology and may contribute to the input of the ponds and other wetlands within the Survey Area.

The NWI features in this area were photo-interpreted using 1:58,000 scale color infrared imagery from 1983 (USFWS 1983). The Survey Area includes 2.51 acres of NWI wetlands and 10,133 feet of NHD riverine features. There are 5.47 acres of Zone A FEMA flood hazard area located within the Survey Area (Figure 2 – Existing Hydrological Datasets Map).

4.2 Field Survey Results

The following sections provide the field survey results for the aquatic resources delineation. Photographic documentation of the site and delineated aquatic features is provided in Appendix B. USACE Wetland Determination Data Forms are provided in Appendix C. RBP Habitat Assessment Field Data Sheets are provided in Appendix D.

4.2.1 Wetland Delineation

The field survey resulted in the identification and delineation of 30 wetlands and nine ponds totaling 31.90 acres within the Survey Area (Figure 4 – Streams and Wetlands Map). Twenty-nine wetlands are presumed to be isolated (27.10 acres) and 15 wetlands are presumed to be jurisdictional WOTUS (4.80 acres). One NWI mapped freshwater pond was field verified to exhibit no wetland characteristics. Historic and aerial imagery suggests that the pond was drained and the area regraded between October 2008 and September 2010. Classifications and acreages of each delineated wetland are described in Table 4-2.

Table 4-2. Summary of delineated wetland resources within the Horseshoe Bend Solar Energy Project Survey Area, Green County, Kentucky, 2020.

Feature Name	*Preliminary Jurisdictional Determination*[1]	*Feature Size (acres)*	*Cowardin Classification Code*[2]
Pond-1	Isolated	0.28	PUB3Hh
Pond-2	Isolated	0.09	PUB3Hh
Pond-3	WOTUS	0.68	PUB3Hh
Pond-4	Isolated	1.34	PUB3Hh/PEM
Pond-5	Isolated	0.10	PUB3Hh
Pond-6	Isolated	0.23	PUB3Hh
Pond-7	Isolated	0.24	PUB3Hh
Pond-8	Isolated	0.26	PUB3Hh
Pond-9	WOTUS	0.21	PUB3Hh/PEM
WL-01	Isolated	0.41	PFO1E
WL-02	Isolated	2.89	PFO
WL-03	Isolated	0.09	PEM
WL-04	Isolated	0.87	PFO
WL-05	WOTUS	1.16	PFO/PUB3Hh
WL-06	WOTUS	0.03	PFO
WL-07	WOTUS	0.57	PFO/PEM
WL-08	WOTUS	0.08	PFO
WL-09	Isolated	0.12	PFO
WL-10	WOTUS	0.09	PSS
WL-11	WOTUS	0.98	PFO
WL-12	Isolated	0.06	PEM
WL-13	WOTUS	0.10	PFO
WL-14	Isolated	7.88	PFO

Feature Name	*Preliminary Jurisdictional Determination*[1]	*Feature Size (acres)*	*Cowardin Classification Code*[2]
WL-15	Isolated	0.47	PFO
WL-16	Isolated	0.30	PFO/PUB3Hh
WL-17	Isolated	0.37	PEM
WL-18	WOTUS	0.06	PFO
WL-19	Isolated	0.05	PEM
WL-20	Isolated	0.13	PEM
WL-21	Isolated	0.14	PEM/PSS
WL-22	Isolated	8.42	PFO
WL-23	WOTUS	0.03	PFO
WL-24	WOTUS	0.58	PFO
WL-25	WOTUS	0.23	PFO
WL-26	Isolated	0.37	PFO
WL-27	Isolated	0.044	PEM
WL-28	Isolated	0.273	PUB
WL-29	Isolated	0.63	PSS
WL-30	Isolated	1.081	PFO
Total Isolated		**27.10 acres**	
Total WOTUS		**4.80 acres**	
Total		**31.90 acres**	

[1]Jurisdictional determinations and boundaries when presented are preliminary and are subject to final verification by the USACE.

[2]Classifications are based on Copperhead's professional judgment of actual field conditions.

Pond-1 (0.28 acres)

Pond-1 is a small, impounded, permanently flooded, palustrine unconsolidated mud bottom (PUB3Hh) pond. This wetland was not indicated on the NWI map. This excavated pond is located near the northern edge of the Survey Area. Pond-1 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields. Dominant vegetation consists of water pepper (*Polygonum hydropiper),* seedbox (*Ludwigia alternifolia*) and common rush (*Juncus effuses*) bordering the pond. Pond-1 is considered isolated, because it does not exhibit a significant nexus.

Pond-2 (0.09 acres)

Pond-2 is a PUB3Hh pond located in the north-center of the Survey Area. This wetland was not indicated on the NWI map. Pond-2 receives hydrology from a high water table and overland

sheet flow from surrounding agricultural fields. Dominant vegetation consists of a small strip of common rush (*Juncus effusus*) bordering the pond. Pond-2 is considered isolated, because it does not exhibit a significant nexus.

Pond-3 (0.68 acres)
Pond-3 is indicated on the NWI map as a riverine feature. The field survey found the presence of a PUB3Hh pond. This excavated/impounded feature occurs on a section of intermittent stream (UT-A) in the northeast section of the project area. Pond-3 receives hydrology from a stream (UT-A), a high water table, and overland sheet flow from surrounding agricultural fields and wooded hillsides. Dominant vegetation consists of red maple (*Acer rubrum*) and American sycamore (*Platanus occidentalis*) bordering the pond. The hydrology from this wetland flows into UT-A and is considered a jurisdictional WOTUS.

Pond-4 (1.34 acres)
Pond-4 is indicated on the NWI map as a freshwater pond. The field survey confirmed the presence of a PUB3Hh pond with a PEM fringe. This excavated pond is located near the western edge of the Survey Area. Pond-4 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields. Dominant vegetation consists of red maple and devil's beggarsticks (*Bidens frondosa*) bordering the pond. Pond-4 is considered isolated, because it does not exhibit a significant nexus.

Pond-5 (0.10 acres)
Pond-5 is a PUB3Hh pond located near the southwest corner of the Survey Area. This wetland was not indicated on the NWI map. Pond-5 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields. Cattle have trampled and grazed the vegetation bordering the pond. Pond-5 is considered isolated, because it does not exhibit a significant nexus.

Pond-6 (0.23 acres)
Pond-6 is a PUB3Hh pond located near the southwest corner of the Survey Area. This wetland was not indicated on the NWI map. Pond-6 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields. Cattle have trampled and grazed the vegetation bordering the pond. Pond-6 is considered isolated, because it does not exhibit a significant nexus.

Pond-7 (0.24 acres)
Pond-7 is indicated on the NWI map as a freshwater pond. The field survey found the presence of a PUB3Hh pond. Pond-7 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields. Cattle have trampled and grazed the vegetation bordering the pond. The hydrology from this wetland drains into a culvert that runs under Jim Meadows Road and into a sinkhole outside of the Survey Area. Pond-7 is considered isolated, because it does not exhibit a significant nexus.

Pond-8 (0.26 acres)
Pond-8 is a PUB3Hh pond located near the southwest corner of the Survey Area. This wetland was not indicated on the NWI map. Pond-8 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields. Dominant vegetation consists of black willow (*Salix nigra*) and American sycamore bordering the pond. Pond-8 is considered isolated, because it does not exhibit a significant nexus.

Pond-9 (0.21 acres)
Pond-9 is indicated on the NWI map as a freshwater pond. The field survey confirmed the presence of a PUB3Hh pond with an emergent wetland attached. It is located near the eastern edge of the Survey Area. Pond-9 receives hydrology from a high water table and overland sheet flow. Dominant vegetation included red maple, shallow sedge (*Carex lurida*), and woodland bluegrass (*Poa sylvestris*). The hydrology from this wetland flows into UT-B and is considered a jurisdictional WOTUS.

WL-01 (0.41 acres)
WL-01 is a small seasonally flooded/saturated, broad-leaved deciduous, palustrine forested wetland (PFO1E) located in the north-center of the Survey Area. This wetland was not indicated on the NWI map. WL-01 receives hydrology from a high water table and overland sheet flow from surrounding wooded slopes and agricultural fields. Dominant vegetation in WL-01 consists of red elm (*Ulmus rubra*), American sycamore, and American beech (*Fagus grandifolia*). WL-01 is considered isolated, because it does not exhibit a significant nexus.

WL-02 (2.89 acres)
WL-02 is a PFO1E located in the north-center of the Survey Area. It was not indicated on the NWI map. WL-02 receives hydrology from a high water table and overland sheet flow from surrounding wooded slopes and agricultural fields. Dominant vegetation in WL-01 consists of red maple, sweet gum (*Liquidambar styraciflua*), and tulip poplar (*Liriodendron tulipifera)*. WL-02 is considered isolated, because it does not exhibit a significant nexus.

WL-03 (0.09 acres)
WL-03 is a seasonally saturated persistent palustrine emergent wetland (PEM1) in the northern section of the Survey Area. This wetland was not indicated on the NWI map. WL-03 receives hydrology from UT-A and overland sheet flow from surrounding woodlands and an herbaceous ROW clearing. Dominant vegetation consists of common rush, shallow sedge, and woodland bluegrass. WL-03 is considered isolated, because it does not exhibit a significant nexus.

WL-04 (0.87 acres)
WL-04 is indicated on the NWI map as a freshwater pond. The field survey confirmed the presence of a PUB3Hh pond with a PFO1E fringe. The wetland is located within a swale in the north-central part of the Survey Area. WL-04 receives hydrology from overland sheet flow from the surrounding agricultural field. Dominant vegetation consists of red elm, red maple, American beech, American hornbeam (*Carpinus caroliniana*) and common green brier (*Smilax rotundifolia*). WL-04 is considered isolated, because it does not exhibit a significant nexus.

WL-05 (1.16 acres)
WL-05 is indicated on the NWI map as a freshwater pond. The field survey confirmed the presence of a PUB3Hh pond within a larger PFO1E. The wetland is located within a forested terrace, in the north-central part of the Survey Area. WL-05 receives hydrology from overland sheet flow from the surrounding agricultural field and (presumably) a high water table. Dominant vegetation consists of red maple, red elm, black gum (*Nyssa sylvatica*), and American hornbeam. The hydrology from this wetland has a significant nexus to UT-A10 (a jurisdictional stream). Therefore, this wetland is considered jurisdictional WOTUS.

WL-06 (0.03 acres)
WL-06 is a PFO1E located in the north-center of the Survey Area. It was not indicated on the NWI map. WL-06 receives hydrology from a high water table and overland sheet flow from surrounding wooded slopes. Dominant vegetation in WL-06 consists of red maple, American sycamore, and tulip poplar. The hydrology from this wetland has a significant nexus to UT-A (a jurisdictional stream). Therefore, this wetland is considered jurisdictional WOTUS.

WL-07 (0.57 acres)
WL-07 is a PFO1E extending into a PEM1 across an overhead transmission line right-of-way. It is located in the north-central portion of the Survey Area. It was not indicated on the NWI map. WL-07 receives hydrology from UT-A, a high water table and overland sheet flow from surrounding wooded slopes. Dominant vegetation in WL-07 consists of red maple, black gum, red elm, tulip poplar in the forested section and common rush, woodland bluegrass, and sensitive fern (*Onoclea sensibilis*) in the emergent section. The hydrology from this wetland has a significant nexus to UT-A (a jurisdictional stream). Therefore, this wetland is considered jurisdictional WOTUS.

WL-08 (0.08 acres)
WL-08 is a small, PFO1E located within the floodplain of UT-A, in the north-center of the Survey Area. This wetland was not indicated on the NWI map. WL-08 receives hydrology from overland sheet flow from UT-A at flood stages and surrounding agricultural fields. Dominant vegetation in WL-08 consists of American sycamore, red maple, and Japanese stiltgrass (*Microstegium vimineum*). The hydrology from this wetland has a significant nexus to UT-A (a jurisdictional stream). Therefore, this wetland is considered a jurisdictional WOTUS.

WL-09 (0.12 acres)
WL-09 is a small, PFO1E located within a swale in the north-central portion of the Survey Area. This wetland was not indicated on the NWI map. WL-09 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields and forested slopes. Dominant vegetation in WL-09 consists of American sycamore, red maple, and Japanese stiltgrass. WL-09 is considered isolated, because it does not exhibit a significant nexus.

WL-10 (0.09 acres)
WL-10 wetland is a small, seasonally flooded/saturated, broad-leaved deciduous, palustrine scrub shrub wetland (PSS1B) located within the floodplain of UT-A, in the north-center of the

Survey Area. This wetland was not indicated on the NWI map. WL-10 receives hydrology from overland sheet flow from surrounding wooded slopes. Dominant vegetation in WL-10 consists of American sycamore, and narrowleaf cattail (*Typha angustifolia*). The hydrology from this wetland has a significant nexus to UT-A (a jurisdictional stream). Therefore, is considered a jurisdictional WOTUS.

WL-11 (0.98 acres)
WL-11 is a small, PFO1E located within a swale in the north-center of the Survey Area. This wetland was not indicated on the NWI map. WL-11 receives hydrology from UT-A and overland sheet flow from surrounding agricultural fields and forested slopes. Dominant vegetation in WL-11 consists of American sycamore, red maple, and Japanese stiltgrass. The hydrology from this wetland has a significant nexus into UT-A (a jurisdictional stream). Therefore, this wetland is considered a jurisdictional WOTUS.

WL-12 (0.06 acres)
WL-12 is a PEM1 wetland located at a sinkhole near the center of the Survey Area. This wetland was not indicated on the NWI map. WL-14 receives hydrology from an ephemeral stream (UT-A-Isolated-01) and overland sheet flow from surrounding wooded slopes and agricultural fields. This sparsely vegetated wetland has dominant vegetation of black willow, and American sycamore. WL-12 is considered isolated, because it does not exhibit a significant nexus.

WL-13 (0.10 acres)
WL-13 is a PFO1E wetland located near the east-center of the Survey Area. This wetland was not indicated on the NWI map. WL-13 receives hydrology from UT-A, a high water table, and overland sheet flow from the surrounding agricultural fields. Dominant vegetation includes common hackberry (*Celtis occidentalis*), American hornbeam, and Japanese stiltgrass. The hydrology from this wetland has a significant nexus to UT-A (a jurisdictional stream) and is considered a jurisdictional WOTUS.

WL-14 (7.88 acres)
WL-14 is a PFO1E wetland located near the western edge of the Survey Area. This wetland was not indicated on the NWI map. WL-14 receives hydrology a high water table and overland sheet flow from the surrounding agricultural fields and forested slopes. Dominant vegetation includes tulip poplar, red maple, and sweet gum. WL-14 is considered isolated, because it does not exhibit a significant nexus.

WL-15 (0.47 acres)
WL-15 is a PFO1E wetland located near the western edge of the Survey Area. WL-15 continues outside of the Survey Area. This wetland was not indicated on the NWI map. WL-15 receives hydrology a high water table and overland sheet flow from the surrounding agricultural fields. Dominant vegetation includes black willow, red maple, and American hornbeam. WL-15 is considered isolated, because it does not exhibit a significant nexus.

WL-16 (0.30 acres)
WL-16 is a wetland matrix with 0.25-acres of PFO1E wetland and a 0.05-acres of PUB3Hh pond occurring within the Survey Area. It is located on the western side of the Survey Area. WL-16 continues outside of the Survey Area. This wetland was not indicated on the NWI map. It is located within a forested terrace in the north-central part of the Survey Area. WL-16 receives hydrology from overland sheet flow from the surrounding agricultural fields and roads, and a high water table. Dominant vegetation consists of sweet gum, red maple, and American sycamore. WL-16 is considered isolated, because it does not exhibit a significant nexus.

WL-17 (0.37 acres)
WL-17 is a PEM1 wetland located at a sinkhole in the western part of the Survey Area. This wetland was not indicated on the NWI map. WL-17 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields. Dominant vegetation includes narrowleaf cattail, common rush, and green bulrush (*Scirpus atrovirens*). WL-17 is considered isolated, because it does not exhibit a significant nexus.

WL-18 (0.06 acres)
WL-18 is a small PFO1E wetland located within the floodplain of UT-A03, in the south-center of the Survey Area. This wetland was not indicated on the NWI map. WL-18 receives hydrology from overland flooding from UT-A03 at flood stages and surrounding agricultural fields. Dominant vegetation in WL-08 consists of red elm, tulip poplar, and boxelder (*Acer negundo)*. The hydrology from this wetland has a significant nexus into UT-A03 (a jurisdictional stream). Therefore, this wetland is considered a jurisdictional WOTUS.

WL-19 (0.05 acres)
WL-19 is a small PEM wetland located near the southern extent of the Survey Area. It was not indicated on the NWI map. It receives hydrology from overland sheet flow from the surrounding agricultural fields. This depressional wetland is located within a cornfield and vegetation was significantly disturbed. WL-19 is considered isolated, because it does not exhibit a significant nexus.

WL-20 (0.13 acres)
WL-20 is a small PEM wetland located near the southern extent of the Survey Area. It was not indicated on the NWI map. It receives hydrology from overland sheet flow from the surrounding agricultural fields. This depressional wetland is located within a cornfield and vegetation was significantly disturbed. WL-20 is considered isolated, because it does not exhibit a significant nexus.

WL-21 (0.14 acres)
WL-21 is a PEM1/PSS wetland located near the southern extent of the Survey Area. WL-21 appears to be within an area previously used as a pond. This wetland was not indicated on the NWI map. WL-21 receives hydrology from overland sheet flow from the surrounding agricultural fields. Dominant vegetation included green bulrush, water pepper, and black willow. WL-21 is considered isolated, because it does not exhibit a significant nexus.

WL-22 (8.42 acres)
WL-22 is indicated on the NWI map as a freshwater pond. The field survey confirmed the presence of a PUB3Hh pond within a PFO1E wetland. It is located in the southeast of the Survey Area. WL-22 receives hydrology from a high water table and overland sheet flow from surrounding agricultural fields and forest. Dominant vegetation included red elm, black gum, red maple, and sweet gum. The hydrology from this wetland flows into a sinkhole. WL-22 is considered isolated, because it does not exhibit a significant nexus.

WL-23 (0.03 acres)
WL-23 is a small PFO1E wetland located within the floodplain of UT-B, in the south-center of the Survey Area. This wetland was not indicated on the NWI map. WL-23 receives hydrology from a high water table, and overland flooding from UT-B at flood stages. Dominant vegetation in WL-23 consists of red maple and common hackberry. The hydrology from this wetland has a significant nexus to UT-B (a jurisdictional stream). Therefore, this wetland is considered a jurisdictional WOTUS.

WL-24 (0.58 acres)
WL-24 is a PFO1E wetland located in a floodplain in the eastern portion of the Survey Area. This wetland was not indicated on the NWI map. WL-24 receives hydrology from overland sheet flow from the surrounding agricultural fields and forested slopes, and a high water table. Dominant vegetation included red maple, spicebush (*Lindera benzoin*), and Japanese stiltgrass. The hydrology from this wetland has a significant nexus to UT-B (a jurisdictional stream) and is considered a jurisdictional WOTUS.

WL-25 (0.23 acres)
WL-25 is a PFO1E wetland located in a floodplain in the eastern portion of the Survey Area. This wetland was not indicated on the NWI map. WL-25 receives hydrology from a high water table and overland sheet flow from the surrounding agricultural fields and forested slopes. Dominant vegetation included red maple, sweet gum, and spicebush. The hydrology from this wetland has a significant nexus to UT-B (a jurisdictional stream) and is considered a jurisdictional WOTUS.

WL-26 (0.37 acres)
WL-26 is a PFO1E wetland located in a plain in the eastern portion of the Survey Area. This wetland was not indicated on the NWI map. WL-26 receives hydrology from a high water table and overland sheet flow from the surrounding agricultural fields and forested slopes. Dominant vegetation included red maple, red elm, and spicebush. WL-26 is considered isolated, because it does not exhibit a significant nexus.

WL-27 (0.044)
WL-27 is a PEM located in the northern most tip of the Survey Area along at the toe of a roadbed. This wetland was not indicated on the NWI map. WL-27 receives hydrology from an adjacent PUBHh wetland and overland sheet flow from surrounding agricultural fields. Dominant vegetation included water pepper and rice cutgrass. WL-27 is considered isolated because it does not exhibit a significant nexus.

WL-28 (0.040)
WL-28 is comprised of a PEM and PUB type wetland located in the northwestern portion of the Survey Area. This wetland was not indicated on the NWI map. WL-28 receives hydrology from an ephemeral stream feeding the pond and overland sheet flow from surrounding agricultural fields. Dominant species included black willow, red maple, rice cutgrass and water pepper. WL-28 is considered isolated because it does not exhibit a significant nexus.

WL-29 (0.63)
WL-29 is a PSS located in the northeastern portion of the Survey Area. This wetland was not indicated on the NWI map. WL-29 receives hydrology from UT-A03b and overland sheet flow from surrounding agricultural fields and forested slopes. Dominant species included black willow, shallow sedge, soft rush, Japanese stilt grass and Canadian goldenrod. WL-29 is considered isolated because it does not exhibit a significant nexus.

WL-30 (1.081)
WL-30 is a PFO located in the northwestern portion of the Survey Area. This wetland was not indicated on the NWI map. WL-30 receives hydrology from overland sheet flow from surround forested slopes. Dominant species included red maple, and Japanese stilt grass. WL-30 is considered isolated because it does not exhibit a significant nexus.

4.2.2 Streams Assessments

The field survey resulted in the identification and delineation of 19 streams based on field observation at the time of the survey (Figure 4 – Streams and Wetlands Map). Three intermittent streams and 16 ephemeral streams were identified. All streams identified are unnamed tributaries (UT), with 11 streams feeding into an intermittent unnamed tributary (UT-A) of Greasy Creek that flows south. A separate unnamed tributary of Greasy Creek (UT-B) has an intermittent section flowing through the eastern section of the survey area. Sinkholes drain three streams in the survey area. The three intermittent streams are considered jurisdictional WOTUS. The 16 ephemeral streams are considered isolated. Flow regime and length of each of the streams are summarized in Table 4-3 and described in detail below.

Table 4-3. Summary of hydrologic conveyance resources within the Horseshoe Bend Solar Energy Project Survey Area, Green County, Kentucky, 2020.

Stream Name	*Preliminary Jurisdictional Determination*[1]	*Linear Feet*	*Flow Regime*	*OHWM Average Width (Ft.)*	*USEPA RBP Score*	*NWI Class*
UT-A	WOTUS	9412	*Intermittent*	2.00	89	Riverine
UT-A01	WOTUS	828	*Ephemeral*	0.25	59	N/A
UT-A02	WOTUS	569	*Ephemeral*	0.25	65	N/A
UT-A03	WOTUS	461	*Intermittent*	4.00	122	Riverine

UT-A03a	WOTUS	236	*Ephemeral*	0.25	61	N/A
UT-A03b	WOTUS	374	*Ephemeral*	3	54	N/A
UT-A04	WOTUS	1100	*Ephemeral*	0.75	64	N/A
UT-A05	WOTUS	632	*Ephemeral*	0.50	68	Riverine
UT-A05-ISO	Isolated	915	*Ephemeral*	1.00	89	N/A
UT-A05a-ISO	Isolated	351	*Ephemeral*	0.50	78	N/A
UT-A06	WOTUS	1526	*Ephemeral*	0.50	125	N/A
UT-A07	WOTUS	495	*Ephemeral*	1.00	88	N/A
UT-A08	WOTUS	634	*Ephemeral*	0.50	82	N/A
UT-A09	WOTUS	251	*Ephemeral*	0.75	91	N/A
UT-A10	WOTUS	93	*Ephemeral*	0.50	74	N/A
UT-ISO-01	Isolated	524	*Ephemeral*	0.50	30	N/A
UT-B	WOTUS	2425	*Intermittent*	1.00	120	Riverine
UT-C	Isolated	1,083	*Ephemeral*	1.00	61	N/A
UT-C01	Isolated	189	*Ephemeral*	1.00	61	N/A
Totals						
Intermittent WOTUS		**12,297**				
Ephemeral Isolated		**9,802**				

[1] Jurisdictional determinations and boundaries when presented are preliminary and are subject to final verification by the USACE.

UT-A (9,412 linear feet)

UT-A is an intermittent unnamed tributary of Greasy Creek and flows southwest through the Survey Area. UT-A and 11 of its tributaries drain the majority of the Survey Area. The Survey 5.47 acres of FEMA Zone A Flood Hazard Area within the Study area are associated with this stream. Since UT-A has a defined bed and bank, OHWM, and observed hydrologic connection to traditional navigable waters downstream, it is considered a jurisdictional WOTUS.

UT-A01 (828 linear feet)

This unnamed tributary of UT-A is an ephemeral stream in the southern portion of the Survey Area. UT-A01 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-A01 is considered isolated due to its ephemeral flow regime.

UT-A02 (569 linear feet)

This unnamed tributary of UT-A is an ephemeral stream that drains an area at the southern section of the Survey Area. UT-A02 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-A02 is considered isolated due to its ephemeral flow regime.

UT-A03 (461 linear feet)
This unnamed tributary of UT-A is an intermittent stream that drains the northwestern section of the Survey Area. Since UT-A03 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A, it is considered a jurisdictional WOTUS.

UT-A03a (236 linear feet)
This unnamed tributary of UT-A03 is an ephemeral stream that drains a forested wetland in the northwestern section of the Survey Area. Because this stream flowed out of the Survey Area, hydrologic connection was based on observations on aerial imagery. UT-A03a has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A03. However, UT-A03a is considered isolated due to its ephemeral flow regime.

UT-A03b (374 linear feet)
This unnamed tributary of UT-A03 is an ephemeral stream that drains adjacent PFO WL-30 in the northwestern section of the Survey Area. Because this stream flows into the survey area, hydrologic connection was based on observations on areal imagery. UT-A03b has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A03. However, UT-A03b is considered isolated due to its ephemeral flow regime.

UT-A04 (1,100 linear feet)
This unnamed tributary of UT-A is an ephemeral stream that drains part of the northeastern section of the Survey Area. UT-A04 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-04 is considered isolated due to its ephemeral flow regime.

UT-A05 (632 linear feet)
This unnamed tributary of UT-A is an ephemeral stream that drains a forested wetland in the northeastern section of the Survey Area. UT-A05 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-A05 is considered isolated due to its ephemeral flow regime.

UT-A05-ISO (915 linear feet)
This unnamed stream is an ephemeral stream that drains a part of the northeastern section of the Survey Area and a smaller tributary. This stream flows into sinkhole up the valley from UT-A05. Although UT-A05-ISO has a defined bed and bank and an OHWM, no hydrologic connection to WOTUS was observed, therefore the stream is considered isolated due to its ephemeral flow regime.

UT-A05a-ISO (351 linear feet)
This unnamed stream is an ephemeral stream that drains a part of the northeastern section of the Survey Area. This stream flows into UT-A05-ISO, which flows into a sinkhole. Although UT-A05-ISO has a defined bed and bank and an OHWM, no hydrologic connection to WOTUS was observed, therefore the stream is considered isolated due to its ephemeral flow regime.

UT-A06 (1,526 linear feet)
This unnamed tributary of UT-A06 is an ephemeral stream that drains part of the northeastern section of the Survey Area. Since UT-A06 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-A06 is considered isolated due to its ephemeral flow regime.

UT-A07 (495 linear feet)
This unnamed tributary of UT-A is an ephemeral stream that drains a forested wetland in the northcentral section of the Survey Area. UT-A07 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A However, UT-A07 is considered isolated due to its ephemeral flow regime.

UT-A08 (634 linear feet)
This unnamed tributary of UT-A is an ephemeral stream that drains a forested wetland in the northcentral section of the Survey Area. UT-A08 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-A08 is considered isolated due to its ephemeral flow regime.

UT-A09 (251 linear feet)
This unnamed tributary of UT-A is an ephemeral stream that drains a forested wetland in the northcentral section of the Survey Area. UT-A09 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-A09 is considered isolated due to its ephemeral flow regime.

UT-A10 (93 linear feet)
This unnamed tributary of UT-A is an ephemeral stream that drains a forested wetland in the northcentral section of the Survey Area. UT-A10 has a defined bed and bank, OHWM, and observed hydrologic connection to UT-A. However, UT-A10 is considered isolated due to its ephemeral flow regime.

UT-B (2,425 linear feet)
UT-B is an intermittent unnamed tributary of Greasy Creek and flows south through the eastern side of Survey Area. Since UT-B has a defined bed and bank, OHWM, and observed hydrologic connection to traditional navigable waters downstream, it is considered a jurisdictional WOTUS.

UT-C (1,084 linear feet)
This unnamed tributary is an ephemeral stream that drains forested hill slopes and overland sheet flow from agricultural fields in the northwestern portion of the Survey Area. This stream flows into WL-28, which is defined as isolated. No hydrologic connection to WOTUS was observed therefore, the stream is considered isolated due to its ephemeral flow regime.

UT-C01 (190 linear feet)
UT-C01 is an ephemeral unnamed tributary in the northwestern portion of the survey area. This stream drains overland sheet flow from agricultural fields to WL-28 which is defined as isolated.

No hydrologic connection to WOTUS was observed, therefore the stream is considered isolated due to its ephemeral flow regime.

UT-ISO-01 (524.1 linear feet)
This unnamed stream is an ephemeral stream that drains a part of the northcentral section of the Survey Area. This stream flows into sinkhole. Although UT-ISO-01 has a defined bed and bank and an OHWM, no hydrologic connection to WOTUS was observed, therefore the stream is considered isolated due to its ephemeral flow regime.

5 CONCLUSIONS

It is Copperhead's professional judgment that the Survey Area contains 30 wetland areas and nine ponds totaling approximately 31.90 acres that meet the technical criteria for wetlands (i.e. hydric soils, hydrophytic [wetland] vegetation, and wetland hydrology). Twenty-nine of these wetlands are presumed to be isolated (27.10 acres) and 15 wetlands are presumed to be jurisdictional WOTUS (4.80 acres).

In addition, there are 19 streams (22,099 linear feet) based on field observations at the time of the survey. There were three intermittent streams (12,297 linear feet) and 16 ephemeral streams (9,802 linear feet) identified. The three intermittent streams are likely jurisdictional WOTUS because they have a defined bed and bank, observable OHWM, and a connection to traditional navigable waters downstream. The 16 ephemeral streams are considered isolated due to their flow regime.

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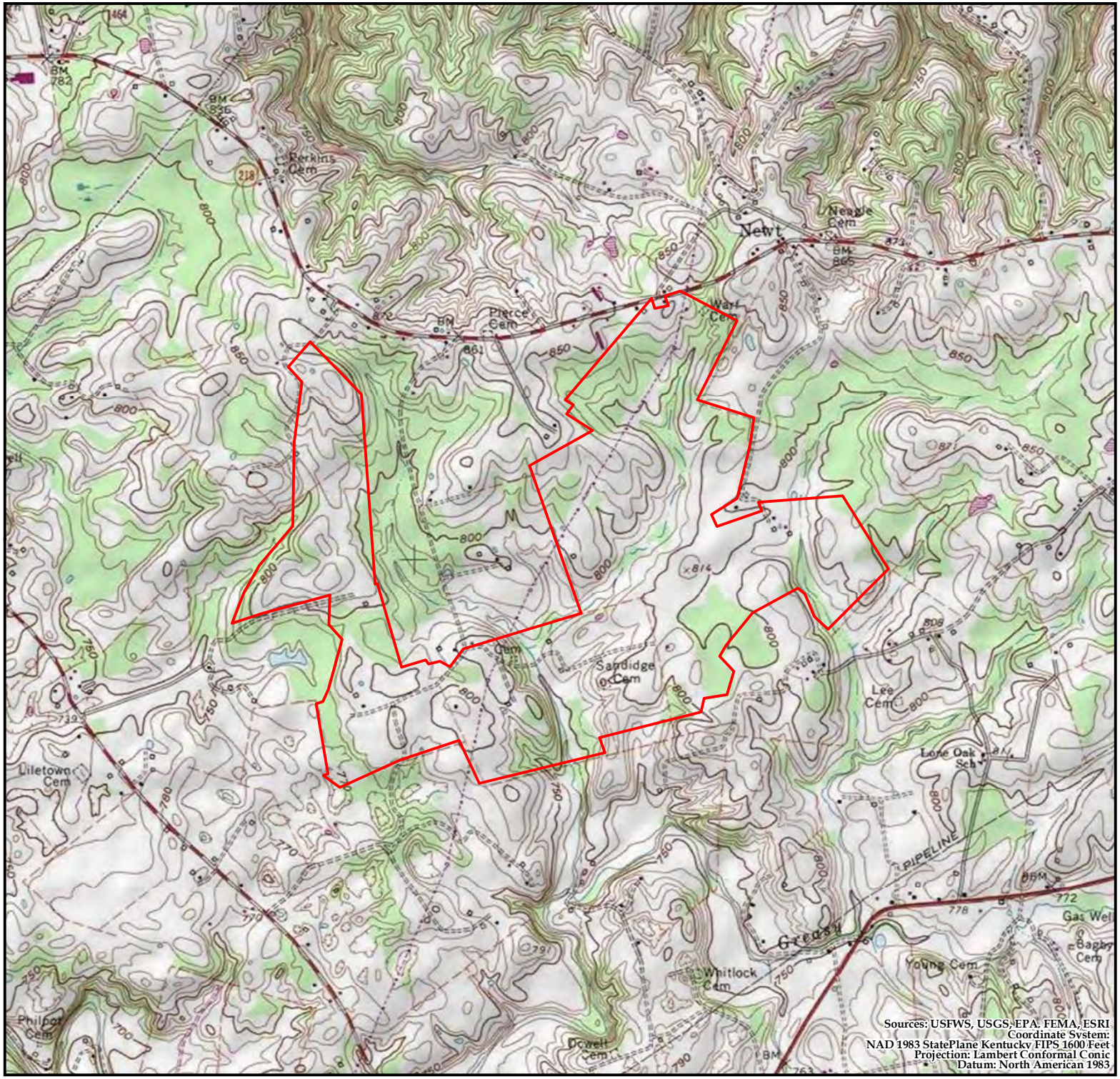
Appendix A - Figures



COPPERHEAD
ENVIRONMENTAL CONSULTING

Prepared for:

Horseshoe Bend Solar, LLC

FIGURE 1:
Project Area of the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

Survey Area

0 2,000 4,000
Feet

Scale: 1 in = 2,000 ft

Prepared by :
Copperhead Environmental Consulting, Inc.
471 Main Street
P.O. Box 73
Paint Lick, Kentucky 40461

Drawn by:	RWE	Date: 8/24/2020
Checked by:	CWM	Revision:

Project Location

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Prepared for:

Horseshoe Bend Solar, LLC

FIGURE 2:
Existing Hydrological Datasets
at the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

- Survey Area
- NHD_Streams
- NHD Streams
- NHD Ponds
- NWI Wetlands
- National Flood Hazard Zone A

0 1,300 2,600
Feet

Scale: 1 in = 1,333 ft

Prepared by :
Copperhead Environmental Consulting, Inc.
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Paint Lick, Kentucky 40461

Drawn by:	RWE	Date: 8/24/2020
Checked by:	CWM	Revision:

Project Location

Map

Unit Symbol	Map Unit Name	Acres	Survey Area %
DcB	Dickson silt loam, 2-6% slopes	138.4	21.2%
ElB	Elk silt loam, 2-6% slopes	7.9	1.2%
FrC	Frederick silt loam, 6-12% slopes	204.3	31.3%
FrD	Frederick silt loam, 12-20% slopes	43.2	6.6%
FsD3	Frederick silty clay loam, 12-20% slopes, severely eroded	35.6	5.4%
Me	Melvin silt loam (Poorly drained, Hydric Rating)	12.3	1.9%
MoB	Mountview silt loam, 2-6% slopes	151.7	23.2%
No	Nolin silt loam	13.2	2.0%
OtB	Otwood silt loam, 2-6% slopes	5.2	0.8%
Ta	Taft silt loam - 5% Bonnie Hydric soil rating: Yes	41.2	6.3%
W	Water	0.6	0.1%

Sources: USDA, ESRI
Coordinate System:
NAD 1983 StatePlane Kentucky FIPS 1600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

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Prepared for:
Horseshoe Bend Solar, LLC

FIGURE 2-1:
USDA Soil Types
at the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

Legend

- Soil Type Boundaries
- Hydric Soil Rating
- 5% Hydric Soil Component

0 1,250 2,500
Feet

Scale: 1 in = 1,333 ft

Prepared by :
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Drawn by:	RWE	Date: 8/24/2020
Checked by:	MRT	Revision: 01

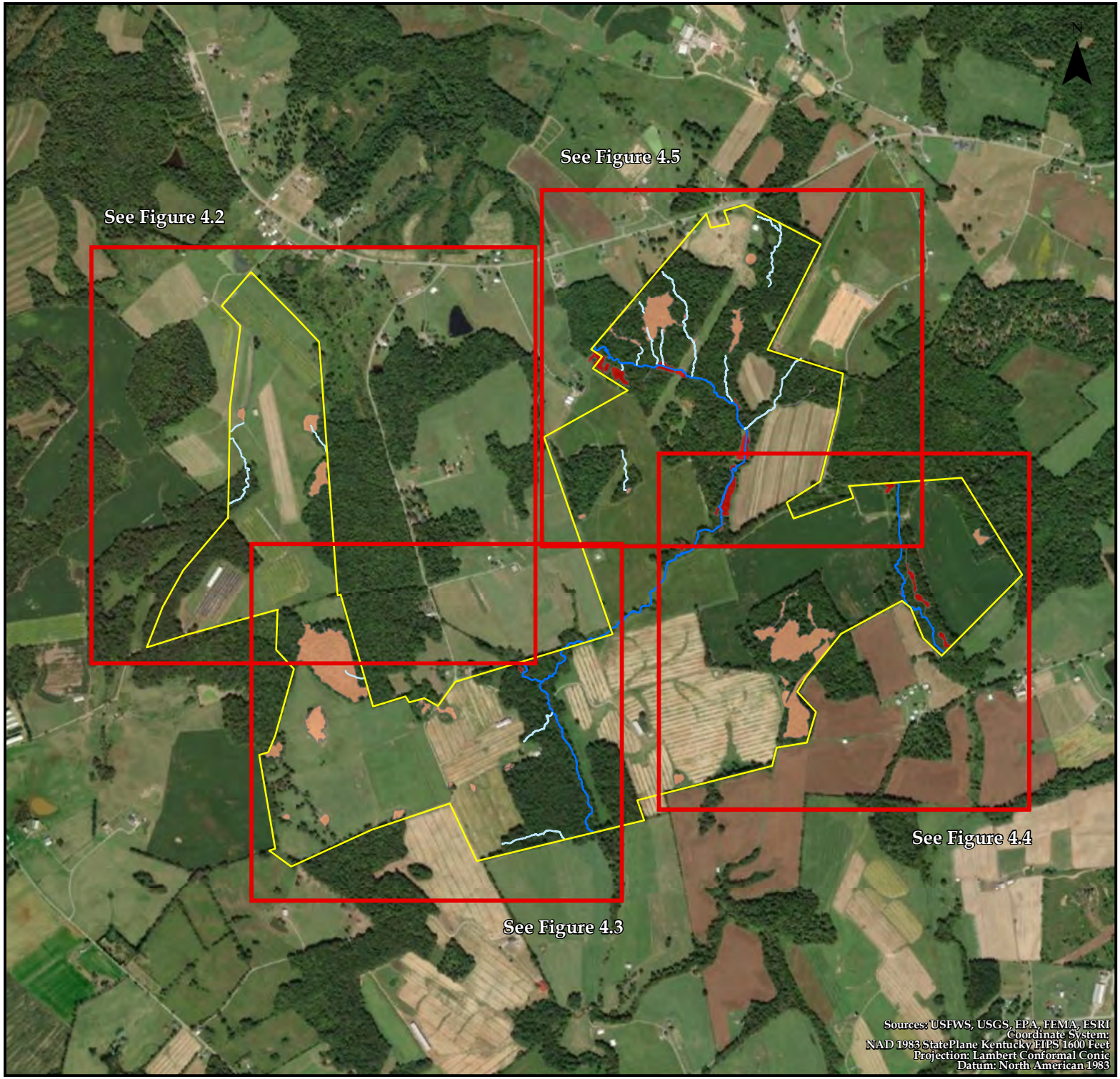

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FIGURE 4.1:
Streams and Wetlands
Overview
of the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

Legend

- Survey Area
- Ephemeral Stream
- Intermittent Stream
- Isolated Wetland
- Jurisdictional Wetland

0 1,450 2,900
Feet

Scale: 1 in = 1,500 ft

Prepared by :
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Checked by:	MRT	Revision:

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Prepared for:

Horseshoe Bend Solar, LLC

FIGURE 4.2:
Streams and Wetlands
Overview
of the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

Legend

- Survey Area
- Ephemeral Stream
- Intermittent Stream
- Isolated Wetland
- Jurisdictional Wetland

0 550 1,100
Feet

Scale: 1 in = 583 ft

Prepared by :
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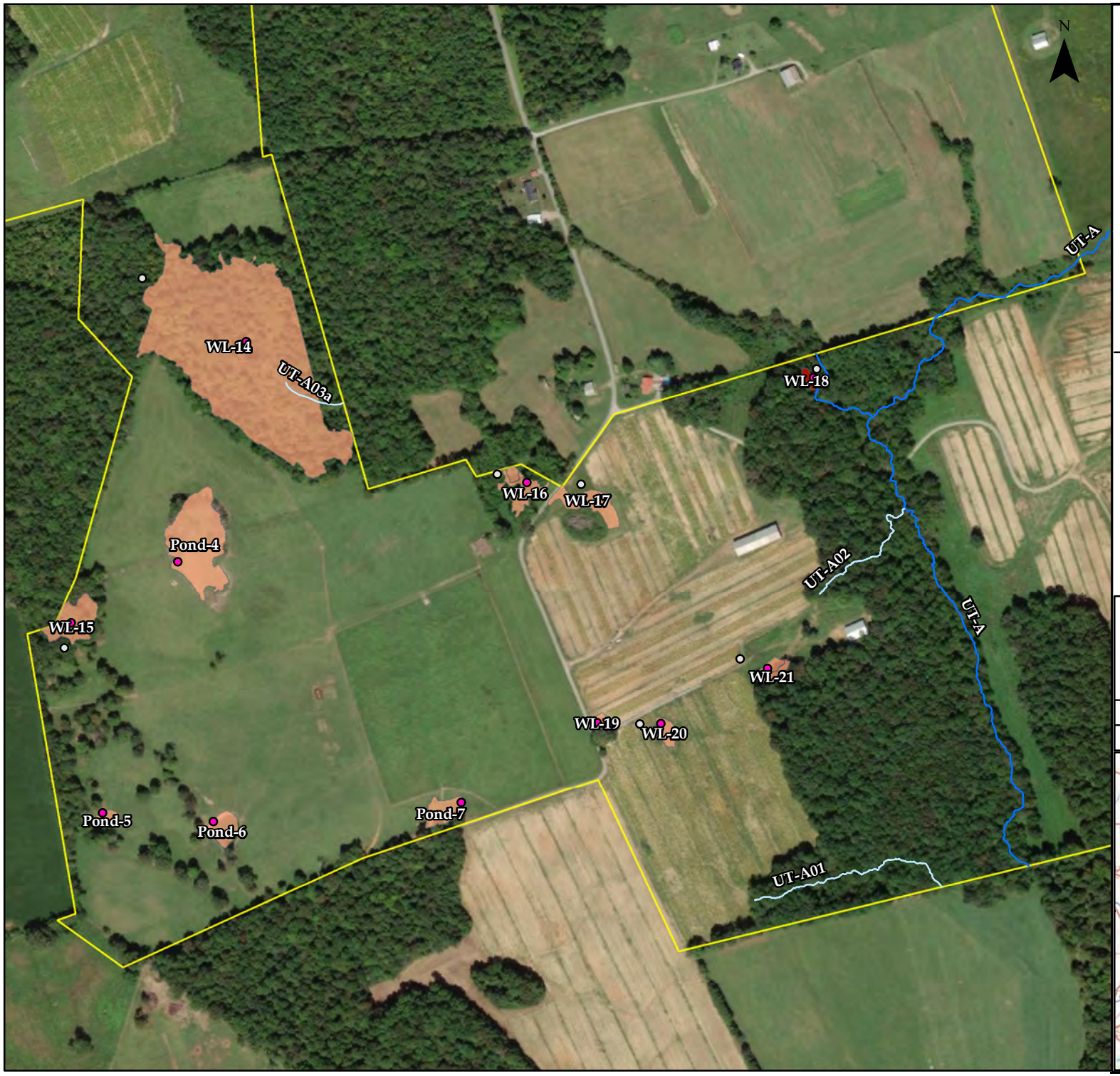
Checked by:	MRT	Revision:	



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Prepared for:

Horseshoe Bend Solar, LLC

FIGURE 4.3:
Streams and Wetlands
Overview
of the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

Legend

- Survey Area
- Ephemeral Stream
- Intermittent Stream
- Isolated Wetland
- Jurisdictional Wetland

0 550 1,100
Feet

Scale: 1 in = 583 ft

Prepared by :
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Checked by:	MRT	Revision:	

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FIGURE 4.4:
Streams and Wetlands
Overview
of the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

Legend

- Survey Area
- Ephemeral Stream
- Intermittent Stream
- Isolated Wetland
- Jurisdictional Wetland

0 550 1,100
Feet

Scale: 1 in = 583 ft

Prepared by :
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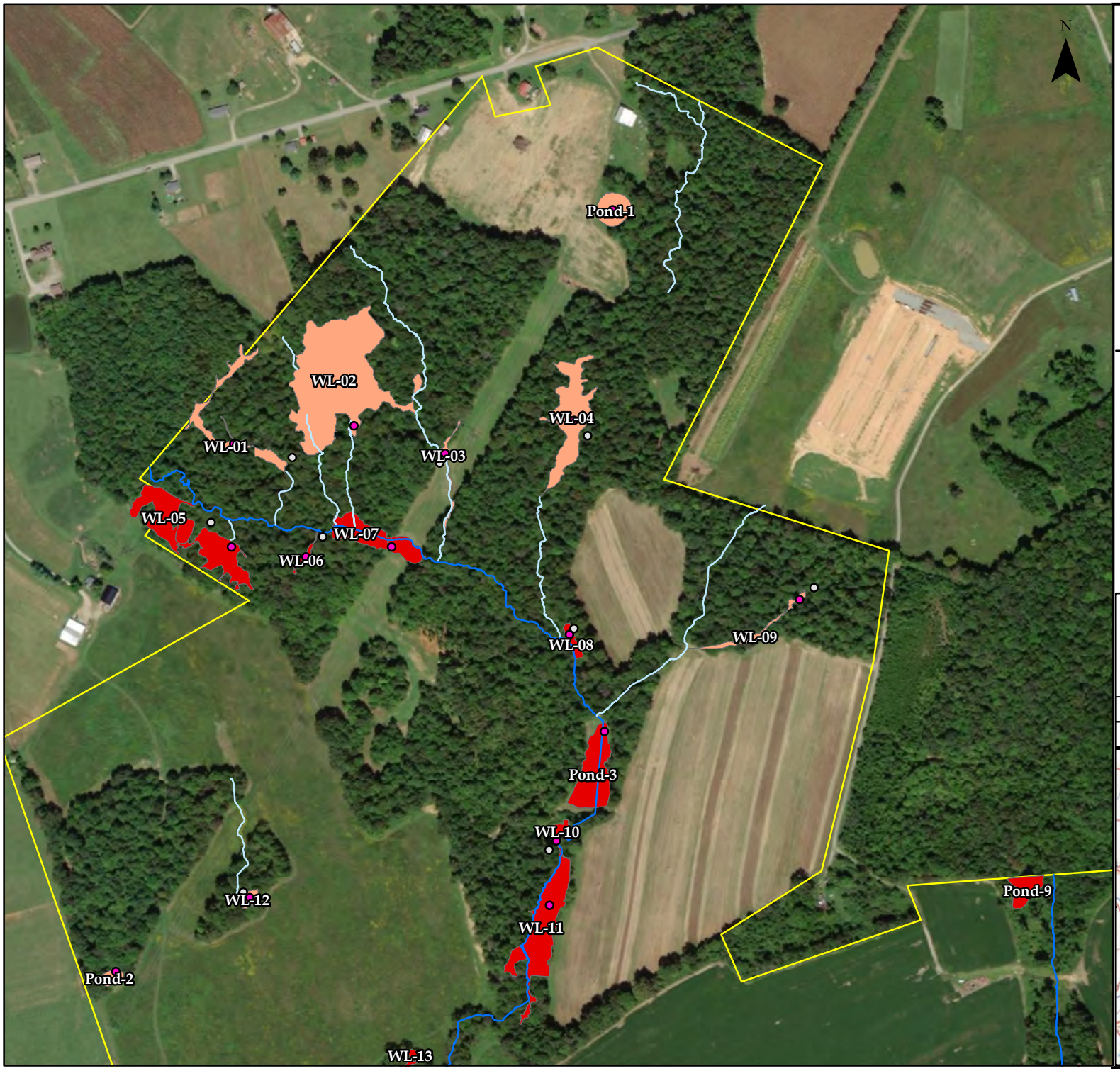

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Prepared for:

Horseshoe Bend Solar, LLC

FIGURE 4.5:
Streams and Wetlands
Overview
of the Proposed
Horseshoe Bend Solar Farm
Green County, Kentucky

Legend

- Survey Area
- Ephemeral Stream
- Intermittent Stream
- Isolated Wetland
- Jurisdictional Wetland

0 550 1,100
Feet

Scale: 1 in = 583 ft

Prepared by :
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Drawn by:	RWE	Date: 8/29/2020
Checked by:	MRT	Revision:

BOURBON COUNTY
COMPREHENSIVE PLAN TASK FORCE
September 8, 2016

PRESENT: **Gary Wilson, Mike Withrow, Guy Bowman, Andrea Lacy, Mary Clay, Mark Offutt, Gordon Wilson and Michelle Thornsburg**

Andrea Lacy stated I really want to focus forward in during this meeting, I have provided some points to start talking about implementation and I brought the maps in because I want to start at a really high level rather than delving into the land use section and comparing and contrasting 2004 versus 2008 land use map. I would like to look at how we going about land use in the county and then focus in on the city. But I want to start with the county level view and talk about what our ordinance covers generally and how that will impact the way in which we choose to implement the plan. So those changes that we need to make to the ordinances, small area plans, we might want to conduct corridor studies we would want to conduct that would then lead to an overlay district or zone that provides design guidelines for certain areas in particular, Main Street. Right now it is a basic commercial for a lot of the lots, we have certain setbacks that is a way of developing auto centric manner so the cars are in the front and the building is in the back but there are some things we want to think harder about in keeping our Main Street intact and making it so that it is safe and walkable for people in town. That's just one example. I want to start at the higher level view of the county itself. When I first looked at the county ordinance, I was pleasantly surprised to see the A-2 zone in the county because as a planner I focus on seeing growth in those naturally existing nodes around the county. Those are Ruddles Mills, Centerville, Clintonville and Little Rock. The ordinance has language in it and this language we could explore changing this in time, but as of right now, the ordinance shows a ½ mile radius around each of these nodes to be designated for residential development, so Squires Pointe is one example of that which we could talk more about sort of the origination of the A-2 and then following that Squires Pointe but the idea is that the development is concentrating around those areas. That is currently how the ordinance shows for those A-2 zones. Mike Withrow stated it talks about small area development districts and then doesn't it identify what they are, but does it leave some area in there to have other small area development districts? Mr. Bowman stated I don't think it does. It is very specific on where those are going. Mike Withrow stated because if you drive around the county it looks like there are some of them out there. Mr. Bowman stated well some of those in the county were preexisting, you see clusters of homes. Mr. Withrow stated you get to the intersection of Peacock Road and Currentsville and there are even lots of record that are an acre or two acres. Mrs. Lacy stated right so if in the future we wanted to identify other zones that could be, or rather small area.....Mr. Withrow asked if I have a 2 acre lot of record, can I build a house on it? Mr. Bowman stated if it is already existing yes, you can subdivide it down to a two acre lot. Mrs. Lacy stated yes you could build on it and you could apply for a variance if you need to. Mr. Withrow stated so it doesn't matter if it is A-2 or A-1 or whatever, I am speaking of in the county. Mr. Bowman stated if it was pre-existing the zoning ordinance, like right now if you say you want to subdivide 2 acres off my 20.....Mr. Withrow stated yeah there are areas out there that are already.....Mr. Bowman stated well there are like small communities out there that are like that. Mrs. Thornsburg

EXHIBIT
C

stated but you can't put a single wide on it. Mr. Withrow stated so really by default, by lots of record, there is already small area development districts. Andrea stated right that were grandfathered in. So what the 4 mean, they are not necessarily zoned A-2 right now, but if somebody came forth with a development plan, I as staff would look at the ordinance and say okay is this within an half mile radius of this area, if yes, then I am going to be more likely to recommend it for approval if it is also in alignment with the comprehensive plan support these small areas throughout the county, then that is one added level of review or reference that I would make. Mr. Withrow is our function as a comp plan update committee should we identify spots? Andrea stated you could identify additional areas that you would like to amend the A-2 zone to include or those A-2 small areas to include. Mr. Withrow stated that way it would make it easier if somebody did come and want to go out here and rezone this and make it a small area, and they come back and say well it was identified in the comp plan update that this area for growth. Andrea stated right that is the first step for.....Guy Bowman stated that is one intent for the next comp plan not this one, because we are going to open up a big can of worms if we start opening up development out in the county, we want to get this one done, I don't mean to say we are going to short change this one, but we kind of are if we are going to be doing that. Cause what we are going to do if we start opening up new development out in the county, you are going to slow this down to a grinding halt and you know that. So I would suggest we not talk about new zones out in the county in this one, but immediately after this one, open it wide up to anything that is reasonable, that would be my suggestion in doing this in this particular function. Let's get this one legal and then this next one, the overlays and things that she is talking about, those are going to be important in the next one, other types of development in the county is going to be extremely important as well.....Mr. Withrow stated I agree.....Guy Bowman stated but I don't want to slow this one down to a grinding halt.....Mr. Withrow stated in an effort to not slow things down, I will tell you this, and Gordon you were in on these meetings that we met before, much like adopting the Goals and Objectives, we adopted land use maps and that was presented before Millersburg, North Middletown and the Paris City Commission and they have all approved those. I wish Stan was here, he was the guy with the pencil that was coloring them in. Andrea stated right and those were actually what was passed on to Bluegrass ADD when they wrote the land use portion of the plan, what they did was they looked at the acreages through GIS from the 2004 plan and they compared them to what was approved.....Mr. Withrow stated but they on their own left like 3 or 4 parcels out, the industrial sites were mysteriously missing so I mean I don't have a photographic memory I can't remember everything we picked out so it makes me wonder what else they left out. Andrea stated no they didn't produce any maps, they produced tables for us and they were based off the maps. The map that you and I were looking at was the map that Charlie and I were sitting down and looking at the other day that was from the 2004 plan, does that make sense? Mr. Withrow stated it does, the map we looked it was penciled in industrial but it was left off.....Andrea stated well the map that is going to be included in the plan and what we want to talk about is this one right here, this is the one that you gave me. Do we all have a consensus that yes this is the map that was approved? Everyone stated yes.

Discussion regarding property in Millersburg in the flood plain. Andrea stated that is noted in the section in the comp plan.

Discussion regarding septic tanks. Specific language in the ordinance regarding septic tanks.

Randall Lowman came into the meeting. Andrea recapped what we had already gone over for Randall.

We can put language in the implementation section of the plan if we want to either expand or conduct further studies about future A-2 designations. Guy Bowman stated we should probably leave it more general in saying further development in the county instead of saying further A-2 development. Make it a little more general so it doesn't close you into a box. Randall stated make it opened so it can be more inclusive. Guy Bowman stated well it just opens the ideas up rather than just thinking about A-2 zone.

Discussion regarding water capacity for county development. Mr. Withrow stated the City of Paris has run water out North Middletown Road, Millersburg Road, Georgetown Road and are working on a project on Lexington Road so we are going out in every direction. It would depend on the size of the development. Clintonville and Centerville both have Kentucky American Water. Andrea will obtain the maps of existing utilities to include as existing infrastructure. There is already a section on that, but it doesn't show the lines and how far out each on goes. Mr. Withrow stated that the Bluegrass ADD would probably have a better map for the whole county and all the lines.

Andrea stated I would like to continue to focus on talking about implementation with implementing the, looking at the amendment or the changing of these areas out in the county in the future, I would envision some sort of work group would be, we would put together a work group to meet on a regular basis and to work through the language and if changing some zones would be the result, then that is the method in which I would focus on getting it done. Mr. Offutt asked what would be your goals in changing the A-2 out in the county, what would you be trying to accomplish with that? Andrea stated further specify because in the zoning ordinance it is very vague and the A-2 zone is more targeted towards strictly residential development but if there were ways that we could encourage mixed uses in the very core of these areas, like down in Clintonville, you have a store, develop small area planning to look at encouraging growth and develop town centers. So where you have both commercial and residential, mixed use. Mr. Offutt stated so I am just asking, I guess that store has been grandfathered in that area for ever and ever, I guess, it was there before. Andrea stated so if you look down here you can see the yellow that is in Clintonville area, this is all zoned as R-1 currently, there is one business B-2 zone property. Guy Bowman stated there must have been a business there as some point because a lot of those zones were done when they implemented the zoning ordinance, they went around the county and found little pockets like that that didn't meet the A-1 zone, we didn't have an A-2 zone. So basically everything outside the city limits was A-1, but they knew there were pockets around the county that had clusters of homes and things like that so they gave them a zone that best matched something in the zoning ordinance, they may not exactly match, but that was the closest match. So you might have a B-2, maybe someone had a mechanic shop out of a barn out there somewhere and everyone was fine with it but they had to give him a business zone because he had a business, it may or may not exist today, but that's how those zones were created, they were just randomly, okay here is a pocket of homes, they kind of look like R-2 so

let's just put R-2 on it. Andrea stated yeah and so here whether they intended to or not, they are providing a basis for further developing a town center concept throughout the county. To not only serve the residents that are here but to draw people in. Guy Bowman stated well that was the intent of the A-2 zone on those cross roads communities, because literally Clintonville is a cross road, you go half a mile outside those cross roads and anywhere within there is subject to an A-2 zone. Typically, if you look at like Clintonville, that setup is just like Centerville, there is a store, some homes around there, a little bit of a mixed bag around there and that is what the intent was, it is already a living center for a certain number of people, so just make that denser where the density is already started. But if you want to go out say Winchester Road and put a development in, today you can't do that. Not saying you shouldn't do that or you won't be able to do that in the future, but today you can't do that.

Andrea stated the other part of it are specific subdivision regulations or at least.....

Mary Clay came into the meeting at 2:30 p.m. (Andrea recapped what we have already gone over)

Andrea stated there are different ways to incentivize or encourage smart growth, cluster type developments, conservation subdivision designs and different ways of growing that is also sensitive to the natural surroundings. Often time's municipalities or communities will have within their subdivision regulations certain language that encourages smarter type of growth in that way. Curious of what your thoughts are, right now, the subdivision regulations (in audible) but if we are encouraging smart development to occur, we are also encouraging more healthy communities. So what I am suggesting is that in the future we look at the subdivision regulations closer to encourage that type of growth. Mr. Withrow stated the subdivision regulations needed to be updated 10 or 20 years ago and haven't been done. The city updated our zoning ordinance and the next step was to do the subdivision regulations, but it hasn't been done. The city adopted a city ordinance that is known as the subdivision regulations, it gets complicated on how you change them because the subdivision regulations are approved by the planning commission I do believe but we also have them adopted as a city ordinance. Guy Bowman stated well we do need to update our subdivision regulations, go through them and update where we need to, there shouldn't be two that we are going by. So if there are items in an ordinance that are followed as opposed to the subdivision regulations, it gets kind of sticky so that's the thing..... Mr. Withrow stated that needs to be looked at from time to time and updated.

Discussion regarding the sidewalks. Need to focus on existing infrastructure and improving it. Something needs to change in the ordinance about the sidewalks. Mr. Withrow stated a misconception is that the City owns the sidewalks and they do not. The actual individual property owners own the sidewalks and the ordinance says they are supposed to maintain it. There are other communities that the City owns them. But here, it is the property owner's sidewalk, it is not the City's sidewalk. Debra asked how Georgetown, Woodford and Clark, how do they do it? Mike stated it is the individual property owner's responsibility to maintain their sidewalk. There is no sidewalk program in the City's budget.

Andrea stated it should be a part of implementation, starting to embrace and move forward with our pedestrian and sidewalk plan that has been adopted. Mike stated that Stan Galbraith is working on a plan to incentivize people to replace and upgrade their sidewalks by giving them tax credits or tax breaks on their city property tax. Mary Clay stated I think you either have to enforce it or change the rule. Maybe a lot of these people don't know, maybe you should have an article in the newspaper and explain what the situation is and let them know what is required of them and if they don't do it, inform them of the what the consequence is because it hadn't been enforced, so they just let it go.

Debra Hamelback & Randall discussed creating a Main Street Merchant Board in order to help each other. Andrea stated that would be great and go into the implementation as well.

Other public facilities. What has occurred recently, what your ideas are, what are some plans that are put forth. Debra stated that the original master plan for the park is beautiful if it is ever to come. There is a big athletic facility concept is out there, but no spot picked out yet. That is something that could be included in the comp plan – an avenue to implement something like that. Mary Clay asked what are the specifications for the park with respect to finding a spot? What are you looking for? Mark Offutt stated they are looking for 200 acres centrally located close to the City limits. An ad will be run in the paper stating they are looking for property to purchase for a park. Then see what kind of response we get. Basically sending a feeler out to see if anyone is interested in selling. Mary Clay stated it seems to me that the best place to put one is Ron Carter's farm, he is on both sides of the road. Mike Withrow stated they submitted that for a flood mitigation project to channel water and the grant would purchase the property and also channel some water through there. Mary Clay stated the thing that appealed to her about this is it is zoned PUD, there is no demand for PUD, however it is zoned that. I figured if someone could buy it like CMC/CLA maybe the Hinkles, put a conservation easement on it because it is zoned PUD, let's say it is worth $10,000 an acre as a PUD because there is no demand. Then buy it for $10,000 an acre, put a conservation easement on it, it now becomes worth $5,000 an acre just as ag land, they get the tax benefit and to shelter other income from other sources then they donate it to the City for the $5,000, they get that tax credit. So it is not costing anybody anything, the Carters get the maximum value for the PUD right now, whoever puts up the money gets all the tax credit, so they aren't out anything and the City gets the park. Guy Bowman stated I would suggest not put it inside the bypass. We are talking about growth in the city, that is going to be a prime spot for growth in the city in the future inside the bypass, it is a big chunk of land. I think it will be more valuable from the City's standpoint for development.

(Lengthy discussion regarding placement of the athletic park)

Andrea brought up not only just recreation but also transportation, so like we have a rail line in the city that is not used currently and there are Federal grant funds that could go towards a rails to trails project. This is just one example. But when you think about transportation, and in the transportation section of the plan, it is very lite on alternative modes of transportation. Are there other projects that have been talked about in the past or on the back burner that you would like to bring up regarding alternate modes of transportation? Trying to gather information here. Discussion regarding the abandon line that intersects 19th street, Clintonville Road, behind Bourbon County Schools and

across Bethlehem Road. Possibly good for a walk way to tie all Bourbon County school campus in with all those subdivisions. CSX owns it the abandon line. Mary Clay offered to talk to CSX about the abandon line. The rails to trails is huge and a lot of people are getting involved in it now.

Discussion about bike path on Paris Pike. There is plenty of space for a bike path.

Andrea stated that the bike and pedestrian plan really needs to develop legs.....it has been sitting there and I think that is another aspect of implementation that we need to create.

Guy stated that is one of the things we want to do with the County portion of that any kind of alternate transportation trails or anything like that, I think that is important, green space is important to include in the implementation section.

Andrea stated she listed several other items under implementation that I would like to touch upon and hear your thoughts about. Small area planning at the much higher level view at the county itself. So in the future if we could focus on those, Clintonville, Centerville, Ruddles Mill, Little Rock, even Millersburg and North Middletown if in the future we either got funding for the development of small area plans or through our budget if we wanted to allocate resources toward developing a plan for those area we could do so. Now in the City of Paris itself, one of the things that continually comes up regarding land use is the fact that we have this beautiful Main Street that has so much potential yet our ordinance could be refined to having an overlay district or something that maintains that character. One of the implementation measures that is recommended is conducting a Main Street corridor study and then further developing an overlay district so that we can maintain a similar appeal to what we have now making the Main Street walkable. Any thoughts about that? Guy stated in my opinion, Main Street is a sensitive area development wise and it defines the character of your town so I think it would actually be good to have someone from the outside to look at all that and get a fresh look. Even in the Planning Commission when we have development along the Main Street corridor I'd say from Bypass to Bypass we have contention because you don't want all these little strip centers down through Main Street and things like that. It would just define what that design and character is going to be and just makes it easier for everyone to understand and your City has to define what it wants to look like. Mike Withrow stated it would be similar to the Park Pike Corridor Commission which makes it agonizing to do anything and rightly so, but I can see how it would deter people from developing and locating on Main Street because there are so many hoops and hurdles to go through to be able to locate down there. Randall stated a town like this needs the overlay on Main Street because when outside people come in they will ask for this. Mary Clay stated we have to understand what the problems are and what the potential is before we get some outside person in that is going to tell us what....you have to analyze the situation and figure out what we want and after we have understood the pros and cons and the problems and the solutions at that point you get somebody in so then you can talk to them intelligently rather than just .....Andrea stated that is called a corridor study. Mike Withrow stated we have 23 empty buildings down there, I mean do you want to put more restrictions on it? Mary Clay stated no, once you get to the urban center, you don't want restrictions, I mean the Paris Pike Corridor is something else.....Mike Withrow stated I just know it is an overlay zone and it was a big deal to make that happen then we build a 4 lane highway

between here and Millersburg there is no overlay zone or anything, you can pretty much do what ever the heck you want out there. Why didn't we do anything on Millersburg Road, an overlay zone or anything regulating any development along that stretch of highway. Mary Clay stated well I think Planning & Zoning, zoning regulations control that. Mike Withrow stated they didn't control the Paris Pike? It will just be another hoop and hurdle that says you can't paint your building pink if you wanted to. Andrea stated but in talking about an overlay zone, we are not getting down to pain colors....this is again getting into the weeds but we want to agree here that we would like to conduct a corridor study to understand what it is that we need on Main Street and if as a result of the corridor study we would like to then further develop an overlay district then that's what we will do. Now I would differ in that overlay districts contribute to further economic development in the community and I believe there is literature that backs that. Again, that is getting too far down the line, what we want to do is identify in the plan that we are going to look at the Main Street area in more detail and decide upon the conduction of a corridor study so that we can be informed about what it is that we are deciding to do, what changes we are deciding to do to our ordinance.

Guy stated when we talk about an overlay zone, we are talking about, you take a defined area, like just to throw out there from Bypass to Bypass, similar to Paris Pike. If we want to take Main Street and we are going apply this strip overlay over Main Street from Bypass to Bypass, regardless of what your actual zone is, you are still subject to your actual zone plus whatever is in that overlay. So what that does, that overlay puts additional requirements on your property if you are located in that overlay just to say this is what our town wants to see when you drive down Main Street this is what our town wants to see. Debra stated we should absolutely do that. Guy stated but you are kind of controlling how the area looks and interacts with transportation and everything else.

Andrea asked Randall if he had experience with corridor studies? Randall stated he hasn't written one but I have worked with consultants in the past on them.

Andrea stated okay, moving on. Historic Preservation and Cultural Resources, this is another aspect of the comprehensive plan that we are going to have to look at expanding upon. So currently we have one locally recognized historic district surrounding the Courthouse Square. On the historic register there are 4 districts within Paris within the downtown area and then there are 6 or 7 rural historic district throughout the county. Mike Withrow stated you need to define Historic District, when it applies to planning and zoning, we have 1 area that is identified in the City Ordinance. Now that is not to say there are federal historic districts all around town. (Discussion regarding historic districts) (Discussion regarding the cell tower possibly going up on Main Street)

Andrea stated the point being we want to explore how to expand historic designations throughout the county. Now the preservation counsel, I did meet with them and learn about what they have already done. They were really the force behind establishing these districts on the historic register and there are just 100's of structures throughout the county. It is just a matter of how and if we want to take it to the next step of recognizing it at the local level. Mike Withrow stated if they are that concerned with it, why for 30 or 40 years haven't they taken our ordinance and said hey we know you have them established in here, we want to expand on that ordinance. In my lifetime, it has never

changed, it is always been a block around the courthouse for 40 years. Andrea stated well then that is kind of contradictory to what they .....We can start building a relationship with the Kentucky Heritage Council who is going to provide us with the maps that show where those structures are. They have all that information it is just a matter of someone asking to receive it. The other benefit of developing a preservation program is funds. If communities become a certified local government you can apply for grant funds to go toward the revitalization of your community. So there are certain things that if we were to pursue and explore down the line, there could be an economic benefit to us.

(Discussion regard small development article in the Wall Street Journal)

Andrea stated lets shift gears. I want to talk about energy for a moment and how energy applies to our ordinances. Currently, it is recognized minimally within the ordinance. I am talking about things such as wind turbans, solar, things that you wouldn't ordinarily think are compatible with this area. Wind power is less desirable than solar however our ordinances currently only acknowledge solar as residential roof mount on a very small scale. But you have these other communities like Clark, Harrison who are developing these large solar farms and I am not necessarily advocating for it however if we were to be approached, our ordinances are ready for something like that. And thinking about land use, where are some areas that we would want to encourage these uses to go or the updating of our ordinance for residential solar. So I wanted to bring that up just to plant the seed, I think that we should acknowledge it in the comprehensive plan and that we need to look into updating the ordinance language. Mike Withrow stated we can just say that we encourage it, but right now it is not feasible. Mary Clay stated I think there are a lot of unintended consequences. I don't think we want to encourage it, they are so unsightly. Guy stated we can't just leave it alone because if we are approached by someone.....Mike Withrow stated because of where we are located, it wouldn't be feasible for a major corporation to come in here and buy 200 acres and put solar panels because our weather varies so much. Andrea stated I bring it up because I know that the market demand is out there and some sort of work group is going to have to be joined together of the planning commissioners to work out language because communities and residences have the incentives to adopt solar, farmers are might not necessarily be on a large scale, but I think that we need to build language into our ordinance to get with the times. We do need to look into energy more, we want to acknowledge that it is in there.

Guy stated we have a lot of good ideas out there, but we don't want to throw something out there too controversial at this point because we really do need to get this comp plan wrapped up. I am excited because we will have a lot of good ideas coming out to apply to a new comp plan. Mary Clay stated this comp plan can kind of lay the foundation for the next one.....Guy stated oh this isn't going to stop, this is just a benchmark and once this one is finished, then that really starts the new one. Debra stated can't we just finish is and get it done in a month? Andrea stated there are 4 approvals that need to happen. Guy stated talking about new stuff just slows things down, we just need to get this one solid and then move on.

Andrea stated okay so let's go ahead and wrap up. I sent out the Land Use section we didn't get into the weeds on that so much. Bluegrass Add provided us with a draft, I would like for you to look

through it digest it and provide me with feedback. If it requires one on one meetings we can do that. Aside from that, you can expect 1 more meeting, a public hearing and then we will move forward with it. That is my goal.

Gordon Wilson asked about the color coded future land use maps, do they stand as they are? Andrea stated yeah, I mean you were there, you tell me. Mike Withrow stated on page 55 it talks about a B4 zone and we don't have a B4 zone. Other than that, I think it looks pretty good. Andrea stated I am sure I will be sitting down with Mary Clay.

Meeting adjourned.

Kirkland Appraisals

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April 1, 2021

Carson Harkrader
Carolina Solar Energy
400 West Main Street, Suite 503
Durham, NC 27701

RE: Horseshoe Bend Solar Impact Study, Greensburg, Green County, KY

Ms. Harkrader

The purpose of this letter is to address comments from the Wells Engineering Solar Generation Siting Final Report for Horseshoe Bend Solar, LLC that was submitted to the Kentucky Siting Board related to the market impact analysis that I completed on this project on February 5, 2021.

While I agree with the Wells Engineering conclusion of no impact on value for this project, I would like to respond to some comments both in the Wells Engineering summary as well as the review by Mary McClinton Clay, MAI that was included in the addenda of that report.

Methodology

While the Wells Engineering conclusion indicates that the methodology was not included in the report. The type of analysis as a Matched Pair Analysis or Paired Sales Analysis is indicated in the report, though it is not explained in detail it is a common appraisal methodology. 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 and I have far more than 5 sales considered in the test area near solar farms.

The Wells Engineering conclusion mentions studies only being funded by solar companies but there are two university studies of note that should be addressed. Ms. Clay identifies and discusses these in her analysis, but oddly uses the studies to conclude on the opposite of what both studies explicitly state that they concluded. I discuss both studies below and I note that I have discussed the findings of both studies with the researchers who conducted those studies to confirm the analysis presented below. I have also included two additional studies for consideration.

EXHIBIT
D

A. University of Texas at Austin, May 2018

An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations

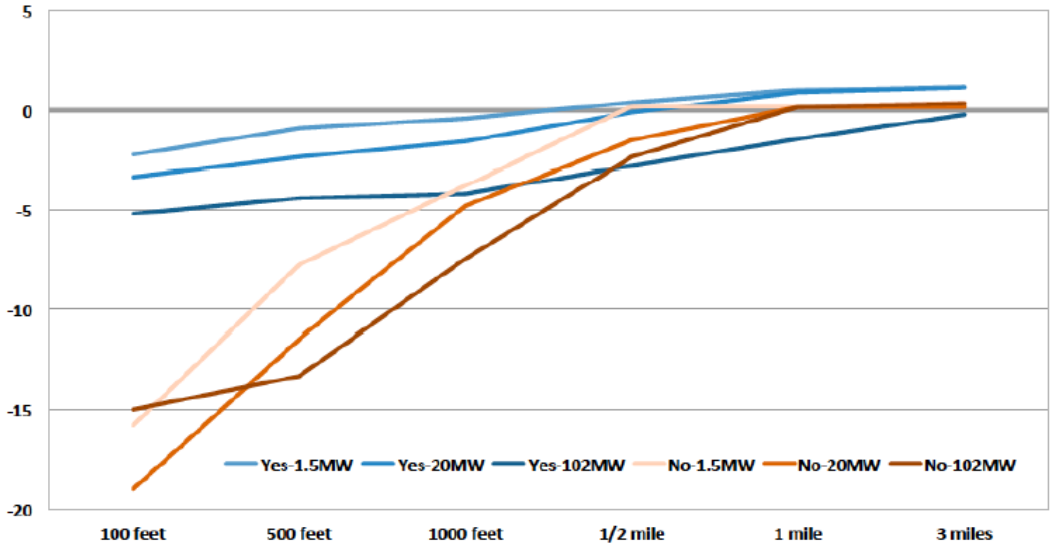
This study considers solar farms from two angles. First it looks at where solar farms are being located and concludes that they are being located primarily in low density residential areas where there are fewer homes than in urban or suburban areas.

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.

Chart B.2 - Estimates of Property Value Impacts (%) by Size of Facility, Distance, & Respondent Type

Have you assessed a home near a utility-scale solar installation?



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 a conclusion of no impact on adjoining property values for the subject property where homes are much further away than 100 feet from the adjoining solar panels.

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 density.

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 Donansburg CCD of Green County, which has a population of 2,460 population for 2020 based on SiteToDoBusiness by ESRI and a total area of 76.6 square miles. This indicates a population density of 32 people per square mile which puts this well below the threshold indicated by the Rhode Island Study. Censusreporter.org website indicates a population of 2,598 over that same area for an indicated density of 33.9 people per square mile. Both indicators are well below the threshold indicated by this study and support a finding of no impact on adjoining property values.

I therefore conclude that the Rhode Island Study supports the indication of no impact on adjoining properties for the proposed solar farm project.

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.

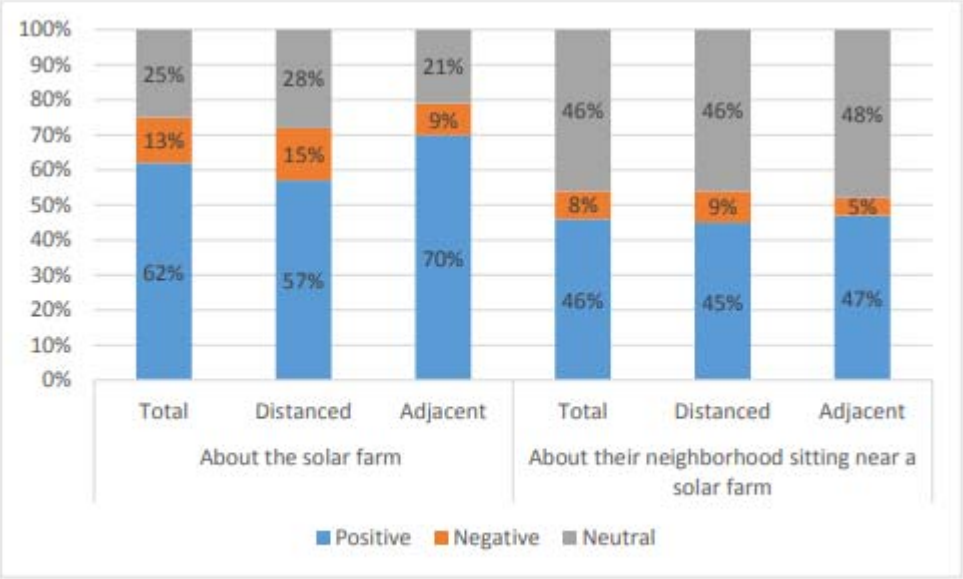


Figure 11: Residents' positive/negative word choices by geographic setting for both questions

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.

Standards and Methodology

In the review by Ms. Clay, she notes that the property fails to follow USPAP. This report is specifically noted as being a consulting assignment which falls under USPAP guidelines for Appraisal Practice as a valuation service and is not subject to Standards 1 and 2 of USPAP, but subject to the Competency, Ethics, and Jurisdictional Exception Rules. Reference to other sections of USPAP that do not apply is immaterial.

Moving to the Mary McClinton Clay, MAI review begins with a discussion on Methodology. As noted above, the methodology is supported. Her assertion that there are not enough data points is an opinion and not supported by the work she cites **Real Estate Damages** by Randall Bell, PhD, MAI. Matched pair data is used in supporting adjustments in appraisals as an ongoing function of appraisers on a daily basis and having reviewed countless such studies.

I have completed similar studies working in 19 states over the last 12 years. In that time I have worked with appraisers across the country and similar studies using the same methodology has not only been reviewed but those appraisers have also testified under oath in quasi-judicial hearings as to the adequacy and applicability of the methodology as well as the findings. I have included a list of appraisers who have testified as such include: Tom Hester, MAI, Damon Bidencope, MAI, Patricia McGarr, MAI, William J. Sapio, MAI, Christian P. Kaila, MAI, SRA, Susan D. Baldwin, MAI, AI-GRS, as well as others.

This same methodology used specifically for solar farms by Kirkland Appraisals, LLC has been upheld in at least three NC Superior Court cases of which I am aware as being significant, competent and material evidence.

Viewshed

The review by Ms. Clay indicates that viewshed was not considered though the report specifically addresses the appearance of the solar farm and discusses that as the primary area of concern as well as the factors that mitigate the appearance of the solar farm.

While Ms. Clay further notes by quoting Dr. Bell 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 indicates that the view enhances and adjacent property, even if the adjacent property has no legal right to that view. However, 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."

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.

Ms. Clay compares the solar farm to high voltage transmission lines and studies on those, which is not comparable.

All of the cited studies on viewsheds are specific to protected views such as adjoining lakes, golf courses, and the like and not unprotected views such as at the subject property, which necessarily overstates the issue. I regularly work on conservation easements and agricultural easements and there is a measurable enhancement in most cases for being adjacent to preserved open space and farm land, but that is not this situation.

McBride Place

Ms. Clay compares sales prices to assessed values for determining impacts on value, which is not an acceptable appraisal method.

Literature Review

Inclusion of these other discussions and studies is not required, but I have included information above on the University Studies.

As noted earlier, Ms. Clay misrepresents the findings and conclusions of the University of Texas Study.

As noted earlier, Ms. Clay misrepresents the findings and conclusions of the University of Rhode Island.

Fred H. Beck and Associates, LLC documented a cancelled sales contract as an example of a negative impact. Mr. Beck has since indicated as documented in a report by Christian P. Kaila, MAI, SRA on December 28, 2018 for the Spotsylvania County Solar Project on Page 4 that Mr. Beck indicated that if there was landscaping to be around the proposed project then he would not see any drop in property value. The contract that fell through was thought at the time would be in full view of the solar farm with no landscaping. Also, there was no change to any assessments at that project as that solar farm was never built.

The literature review provided by Ms. Clay also does not consider any of the very many solar impact assessments that conclude no impact on value such as those completed by Patricia McGarr, MAI with Cohn Reznick, Christian P. Kaila, MAI, SRA, Donald Fisher, ARA, with Pomeroy Appraisers, and Kern G. Slucter, with Gannon Group. By only focusing on studies that show negative impacts and excluding any reference to the many studies showing no impacts she presents a biased review of the subject matter.

Neighbor Agreements

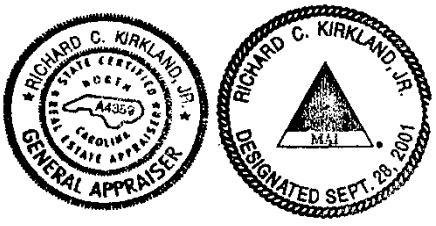
These are not indicative of market impacts, but more of a form of marketing the project to get neighbors on board with a project to improve chances of approval.

North Star Case Study

Returning to the Wells Engineering comments, the North Star case study indicated by Ms. Clay showed developers flipping property adjoining a solar farm at a loss. The problem with using this as an indicator on property value is that solar developers are not typically motivated in purchasing or selling homes adjoining their projects. In order to determine if there is a market impact you must be considering a market value which includes typically motivated buyers and sellers. This is akin to a lending institution selling surplus property, which frequently sells at a significant discount not due to any problem associated with the property but because the lending institution is not a typical seller and is just liquidating inventory. OREO (Other Real Estate Owned) property sales are generally not used in any appraisal analysis without careful consideration of the specifics of that transaction due to the atypical motivations. I know of situations where solar developers have acquired adjoining homes and then sold them at discounts just to get rid of the hassle. This is not a typical market participant and therefore not indicative of typical market activity. Motivated sellers, whether a lending institution or someone who needs to move quickly, are not good indicators of market value.

If you have any further questions please call me any time.

Sincerely,



Richard C. Kirkland, Jr., MAI
Kirkland Appraisals, LLC