Vinton Solar Energy LLC
Case No. 17-774-EL-BGN

Application Part 5 of 5

Part 5 includes:

- **Exhibit G PJM Feasibility Study AC1-194 May 2017**
- **Exhibit H Economic Impact Report April 2017**
- **Exhibit I Complaint Resolution Plan**
- **Exhibit J Certificate of Liability Insurance - CONFIDENTIAL**
- **(filed under seal)**
- **Exhibit K Vinton County Airport Notice May 2017**
- **Exhibit L U.S. Fish and Wildlife Service Communication April 2017**
- **Exhibit M TRC Cultural Resources Records Report June 2017**
- **Exhibit N TRC Viewshed Analysis and Aesthetic Resources Inventory June 2017**
- **Exhibit O Glare Analysis April 2017**
- **Exhibit P ODNR-DOW National Heritage Database April 2017**

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Date Filed: July 5, 2017

Vinton Solar Energy LLC
Case No. 17-774-EL-BGN

Exhibit G

PJM Feasibility Study AC1-194
Elk 138kV
May 2017

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Exhibit G

Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AC1-194

Elk 138 kV

May 2017

Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

Invenergy Solar Development, LLC (Invenergy) proposes to install PJM Project #AC1-194, a 125.0 MW (47.5 MW Capacity) solar generating facility in Vinton County, Ohio (see Figure 2). The primary point of interconnection will be a direct connection to AEP's Elk 138 kV substation (see Figure 1). The secondary point of interconnection is to AEP's Elk – Bolins 138 kV section of the Elk – Poston 138 kV circuit (see Figure 4).

The requested in service date is December 31, 2018.

Attachment Facilities

Primary Point of Interconnection (Elk 138 kV Substation)

To accommodate the interconnection at Elk 138 kV substation, Elk substation will have to be expanded to a new six (6) circuit breaker 138 kV substation physically configured in a breaker and half bus arrangement (see Figure 1). Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

Direct Connection at the Elk 138 kV Substation Work and Cost:

- Expand Elk 138 kV substation to a new six (6) circuit breaker 138 kV substation physically configured in a breaker and half bus arrangement (see Figure 1). Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required. (see Figure 1).

- **Estimated Station Cost: $6,000,000**

Direct Connection Cost Estimate

The total preliminary cost estimate for Direct Connection work is given in the following tables below.

For AEP building Direct Connection cost estimates:

Description	Total Cost
Elk-Poston 138 kV circuit Cut Into Elk	**$500,000**
Total	**$500,000**

Non-Direct Connection Cost Estimate

The total preliminary cost estimate for Non-Direct Connection work is given in the following tables below:

For AEP building Direct Connection cost estimates:

Description	Estimated Cost
138 kV Revenue Metering	**$300,000**
Upgrade line protection and controls at the expanded Elk 138 kV substation.	**$250,000**
Upgrade line protection and controls at the Poston 138 kV substation to coordinate with the expanded Elk 138 kV substation.	**$250,000**
Upgrade line protection and controls at the Corwin 138 kV substation to coordinate with the expanded Elk 138 kV substation.	**$250,000**
Total	**$1,050,000**

Table 1

Secondary Point of Interconnection (Elk – Bolins 138 kV)

To accommodate the interconnection on the Elk – Bolins 138 kV section of the Elk – Poston 138 kV circuit, a new three (3) circuit breaker 138 kV switching station physically configured in a breaker and half bus arrangement but operated as a ring-bus will be constructed (see Figure 3). Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

It is understood that Invenergy is responsible for all costs associated with this interconnection. The costs above are reimbursable to AEP. The cost of Invenergy's generating plant and the costs for the line connecting the generating plant to Invenergy's switching station are not included in this report; these are assumed to be Invenergy's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

Interconnection Customer Requirements

Requirement from the PJM Open Access Transmission Tariff:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering

which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

Revenue Metering and SCADA Requirements

PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

AEP Requirements

The Interconnection Customer will be required to comply with all AEP Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Requirements for Connection of New Facilities or Changes to Existing Facilities Connected to the AEP Transmission System" document located at the following link:

http://www.pjm.com/~/media/planning/plan-standards/private-aep/aep-interconnection-requirements.ashx

Network Impacts

The Queue Project AC1-194 was evaluated as a 125.0 MW (Capacity 47.5 MW) injection at the Elk 138kV substation in the AEP area. Project AC1-194 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC1-194 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Base Case Used

Summer Peak Analysis – 2020 Case

Contingency Descriptions

The following contingencies resulted in overloads:

None

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Steady-State Voltage Requirements

None

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None

Affected System Analysis & Mitigation

LGEE Impacts:

LGEE Impacts to be determined during later study phases (as applicable).

MISO Impacts:

MISO Impacts to be determined during later study phases (as applicable).

Duke, Progress & TVA Impacts:

Duke Carolina, Progress, & TVA Impacts to be determined during later study phases (as applicable).

OVEC Impacts:

OVEC Impacts to be determined during later study phases (as applicable).

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

None

New System Reinforcements

None

Additional Interconnection Customer Responsibilities:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

Schedule

It is anticipated that the time between receipt of executed agreements and Commercial Operation may range from 12 to 18 months if no line work is required. If line work is required, construction time would be between 24 to 36 months after signing an interconnection agreement.

Note: The time provided between anticipated normal completion of System Impact, Facilities Studies, subsequent execution of ISA and ICSA documents, and the proposed Backfeed Date is shorter than usual and may be difficult to achieve.

Conclusion

Based upon the results of this Feasibility Study, the construction of the 125.0 MW (47.5 MW Capacity) solar generating facility of Invenergy (PJM Project #AC1-194) will require the following additional interconnection charges. This plan of service will interconnect the proposed solar generating facility in a manner that will provide operational reliability and flexibility to both the AEP system and the Invenergy generating facility.

Cost Breakdown for Primary Point of Interconnection (Elk 138 kV Substation)		
Attachment Cost	Expand Elk 138 kV Substation	**$6,000,000**
Direct Connection Cost Estimate	Elk-Poston 138 kV circuit Cut Into Elk	**$500,000**
Non-Direct Connection Cost Estimate	138 kV Revenue Metering	**$300,000**
	Upgrade line protection and controls at the expanded Elk 138 kV substation.	**$250,000**
	Upgrade line protection and controls at the Poston 138 kV substation to coordinate with the expanded Elk 138 kV substation.	**$250,000**
	Upgrade line protection and controls at the Corwin 138 kV substation to coordinate with the expanded Elk 138 kV substation.	**$250,000**
	Total Estimated Cost for Project AC1-194	**$7,550,000**

Table 3

The estimates are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements.

Option 2

Network Impacts

The Queue Project AC1-194 was evaluated as a 125.0 MW (Capacity 47.5 MW) injection tapping the Elk-Bolins 138kV line in the AEP area. Project AC1-194 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC1-194 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Base Case Used

Summer Peak Analysis – 2020 Case

Contingency Descriptions

The following contingencies resulted in overloads:

None

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

None

Figure 1: Primary Point of Interconnection (Elk 138 kV Substation)

Single-Line Diagram

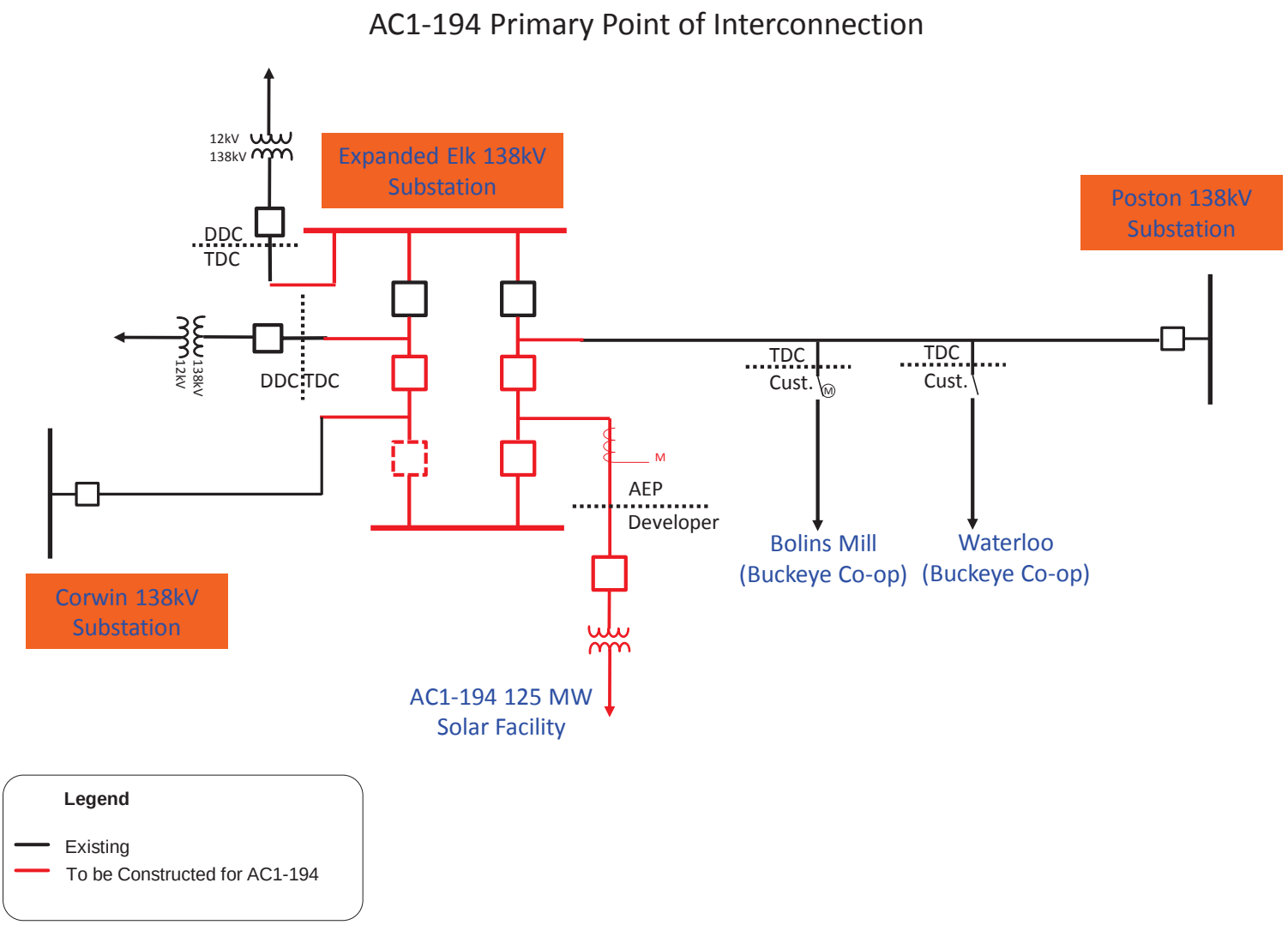


Figure 2: Primary Point of Interconnection (Elk 138 kV Substation)

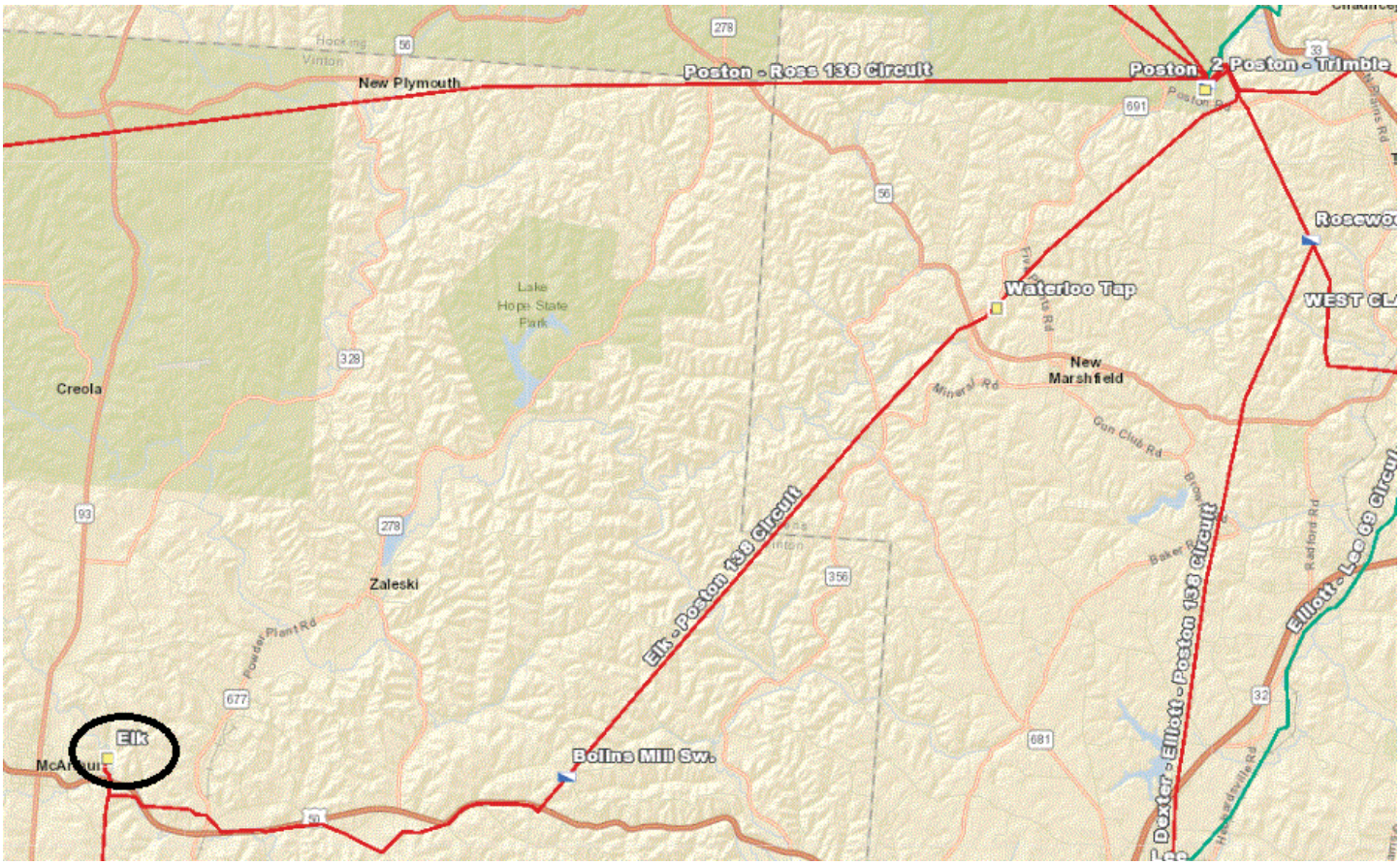


Figure 3: Secondary Point of Interconnection (Elk - Bolins 138 kV)

Single-Line Diagram

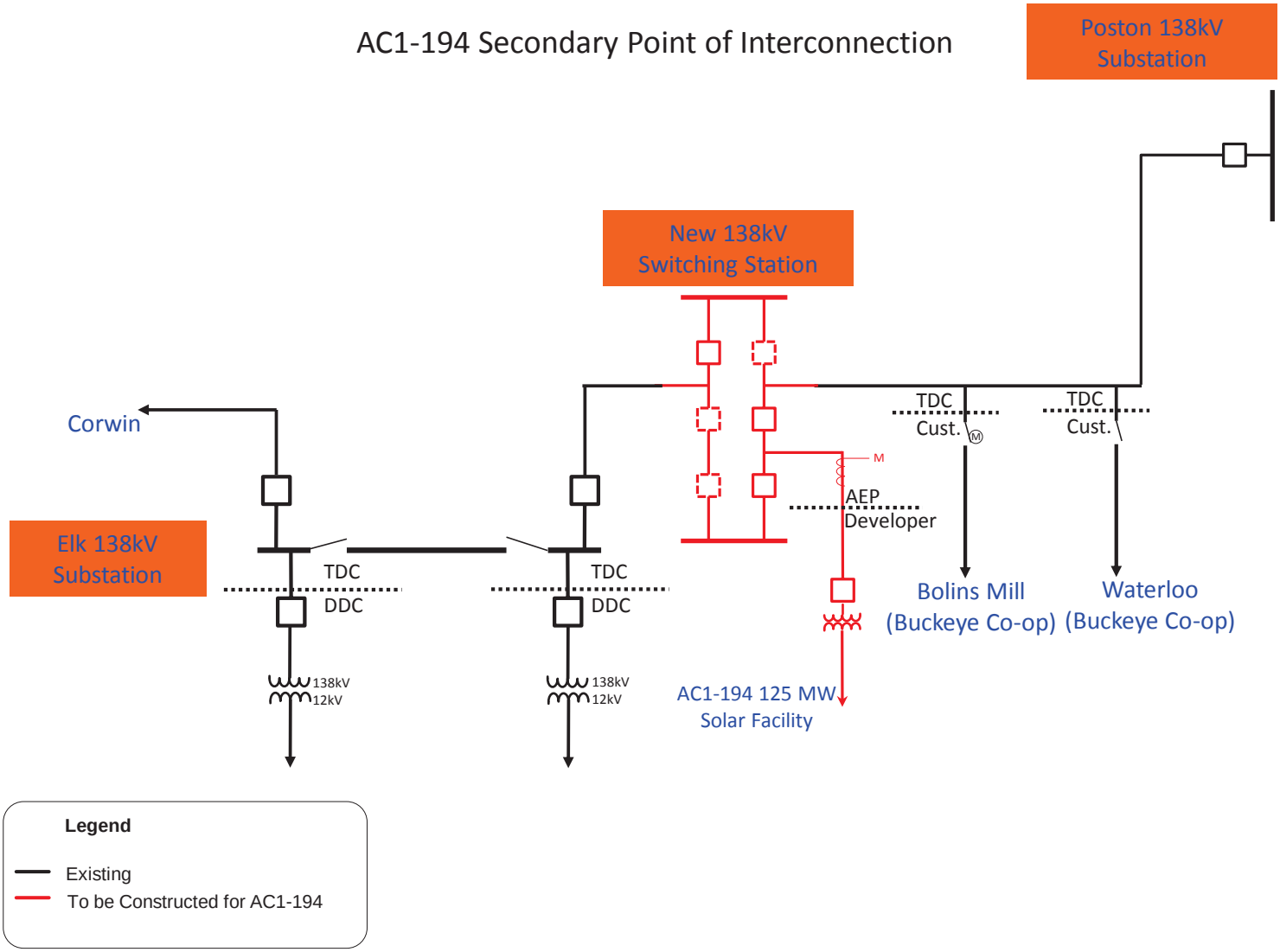
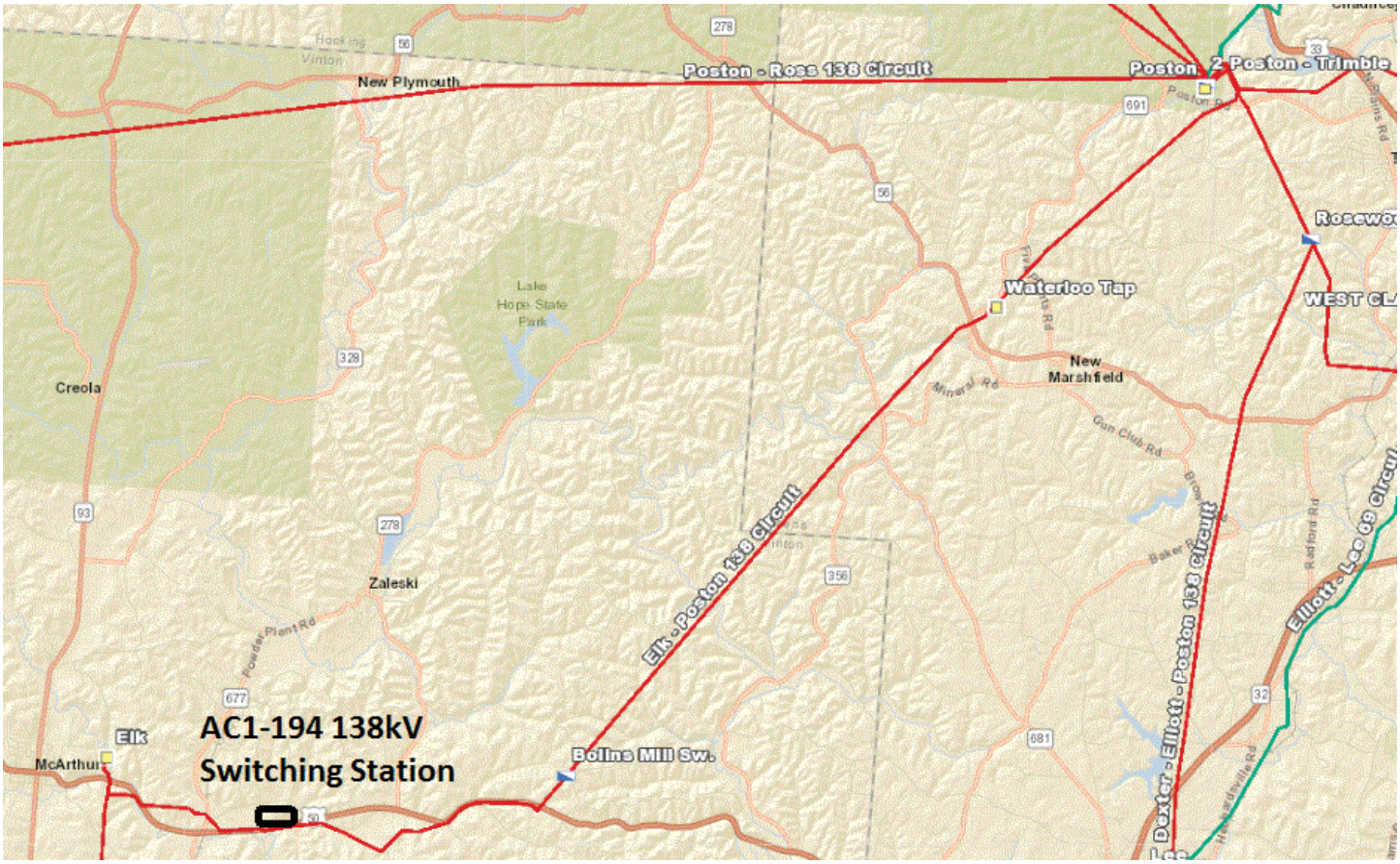


Figure 4: Secondary Point of Interconnection (Elk - Bolins 138 kV)



Vinton Solar Energy LLC
Case No. 17-774-EL-BGN

Exhibit H

Economic Impact Report
April 2017

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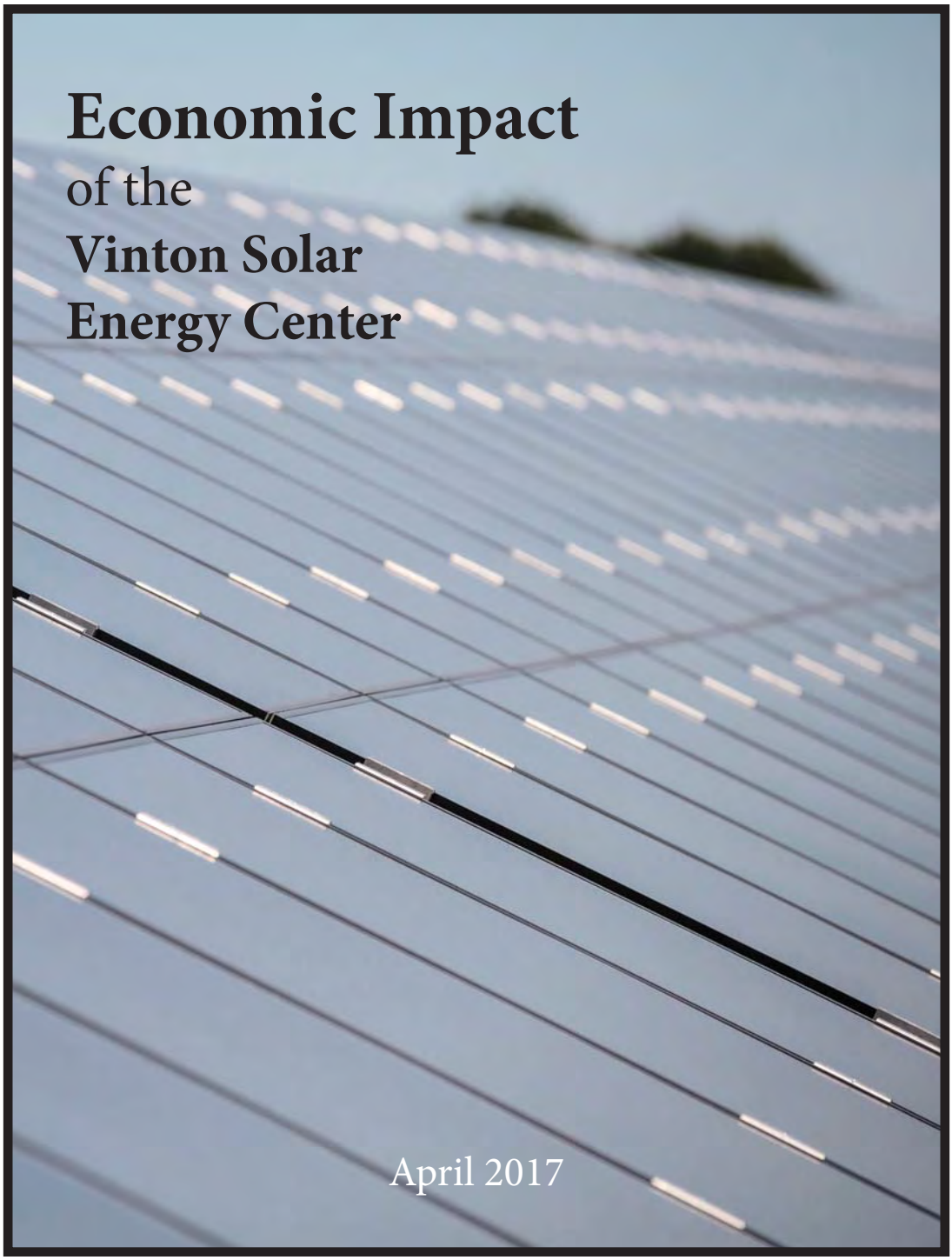

Economic Impact of the Vinton Solar Energy Center

April 2017

Strategic Economic Research, LLC

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About the Author

Dr. David G. Loomis is Professor of Economics at Illinois State University and Director of the Center for Renewable Energy. He has over 10 years of experience in the renewable energy field and has performed economic analyses at the county, region, state and national levels for utility-scale wind and solar generation. He has served as a consultant for Clean Line Energy Partners, the National Renewable Energy Laboratories, State of Illinois, EO.N, EDF Renewables, Invenergy, Geronimo Energy and others. Dr. Loomis is a widely recognized expert and has been quoted in the Wall Street Journal, Forbes Magazine, Associated Press, and Chicago Tribune as well as appearing on CNN.

Dr. Loomis has published over 15 peer-reviewed articles in leading energy policy and economics journals. He has raised and managed over $7 million in grants and contracts from government, corporate and foundation sources. He received the 2011 Department of Energy's Midwestern Regional Wind Advocacy Award and the 2006 Best Wind Working Group Award. Dr. Loomis received his Ph.D. in economics from Temple University in 1995.

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Executive Summary

Invenergy Solar Development North America LLC is developing the Vinton Solar Energy Center in Vinton County, Ohio. Invenergy is North America's largest independent, privately held renewable energy provider. The Company develops, owns and operates large-scale renewable and other clean energy generation and storage facilities in North America, Latin America, Japan and Europe. The purpose of this report is to aid decision makers in evaluating the economic impact of this project on Vinton County and the State of Ohio. The basis of this analysis is to study the direct, indirect and induced impacts on job creation, wages and total economic output.

The Vinton Solar Energy Center is a 120 MW solar project using the next generation of single-axis tracking panels. The project represents an investment in excess of $150 million. The total development is anticipated to result in the following:

Jobs

- 428 new local jobs during construction for Vinton County which is 23% of non-governmental employment
- 622 new local jobs during construction for the State of Ohio
- 7.0 new local long term jobs for Vinton County
- 10.1 new local long term jobs for the State of Ohio

Earnings

- Over $10.6 million in new local earnings during construction for Vinton County which is 19% of non-governmental employment
- Almost $39 million in new local earnings during construction for the State of Ohio
- Over $210 thousand in new local long term earnings for Vinton County annually
- Over $571 thousand in new local long term earnings for the State of Ohio annually

Output - the value of production in the state or local economy. It is an equivalent measure to the Gross Domestic Product.

- Almost $30 million in new local output during construction for Vinton County
- Almost $60 million in new local output during construction for the State of Ohio
- Almost $460 thousand in new local long term output for Vinton County annually
- Over $1.2 million in new local long term output for the State of Ohio annually

Taxes

- Vinton School District will receive over $367 thousand annually from the Project
- Vinton County General Fund will receive over $76 thousand annually
- These projections assume a Payment in Lieu of Taxes (PILOT) plan in which Invenergy will pay $6,500 per MW, or up to $780 thousand annually

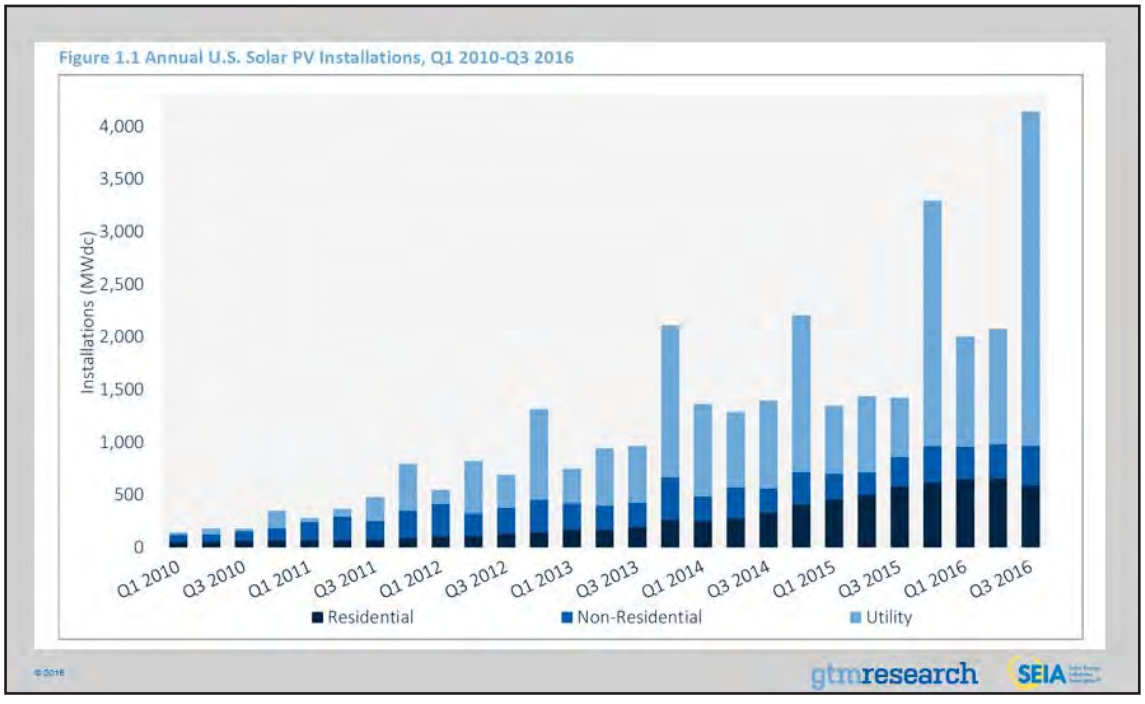
II. U.S. Solar PV Industry Growth and Economic Development

a. U.S. Solar PV Industry Growth

The U.S. solar industry is growing at a rapid and accelerating pace. From 2000 to 2015, the amount of electricity generated from solar photovoltaics (PV) increased from 804 GWh to 44,296 GWh for a 338% average annual increase (NREL, 2015). The industry continued to add increasing numbers of PV systems to the grid. In the third quarter of 2016 alone, the U.S. installed 4,143 MWdc of solar PV driven mostly by utility-scale PV. As Figure 1 clearly shows, this was the largest number of quarterly installations on record. The third quarter of 2016 installations represents a 99% increase over the second quarter of 2016 and 191% increase over the third quarter of 2015. The primary driver of this sharp pace of growth is large price declines. Since 2009, the price of solar PV has declined from about $7.50/watt in 2009 to almost $2.00/watt in 2015 according to Figure 2. Solar PV also benefits from the Federal Investment Tax Credit (ITC) which provides 30 percent tax credit for residential and commercial properties.

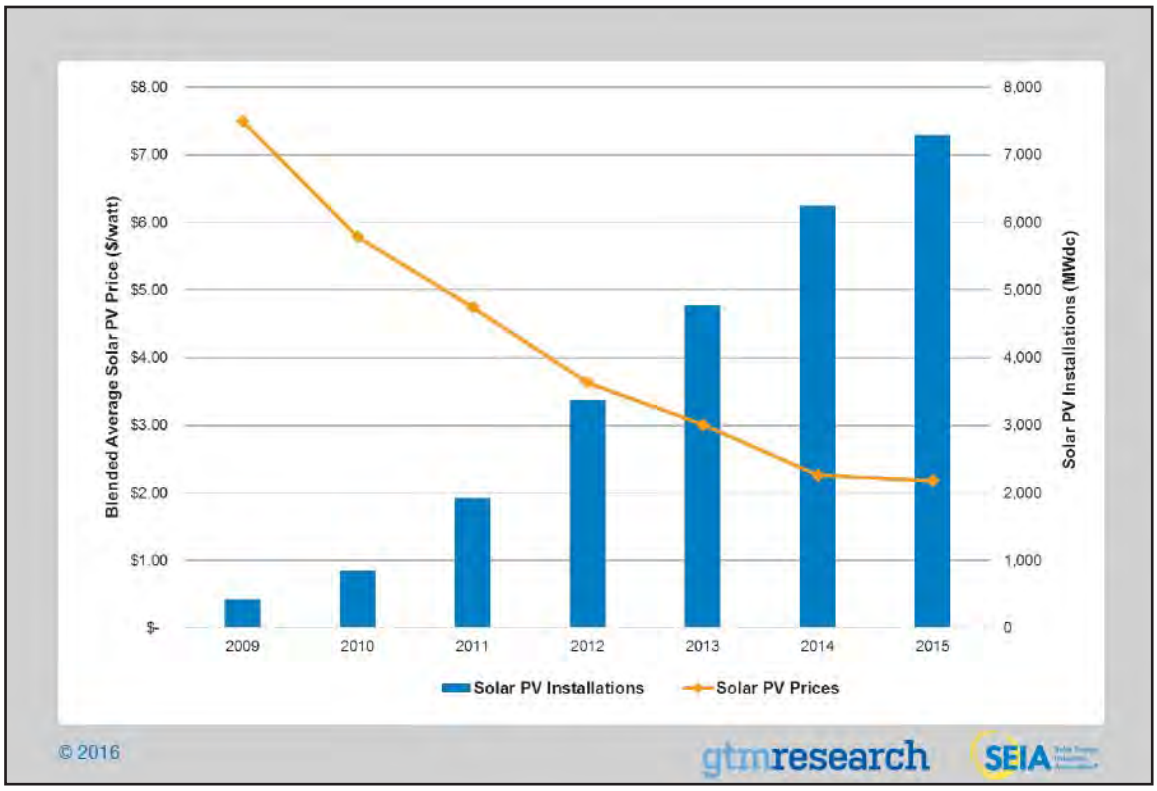
Utility-scale PV leads the installation growth in the U.S. A total of 3.2 GWdc of utility PV projects were completed in the third quarter of 2016 and accounted for 77% of the total installed capacity during that time. An additional 4.8 GWdc are under construction and are expected to come on-line in the fourth quarter of 2016. According to Figure 3, there are 19,220 MWdc of utility-scale PV solar operating in the U.S. and an additional 19,940 MWdc has been contracted and another 34,333 MWdc announced.

Figure 1.—Annual U.S. Solar PV Installations, Q1 2010 – Q3 2016



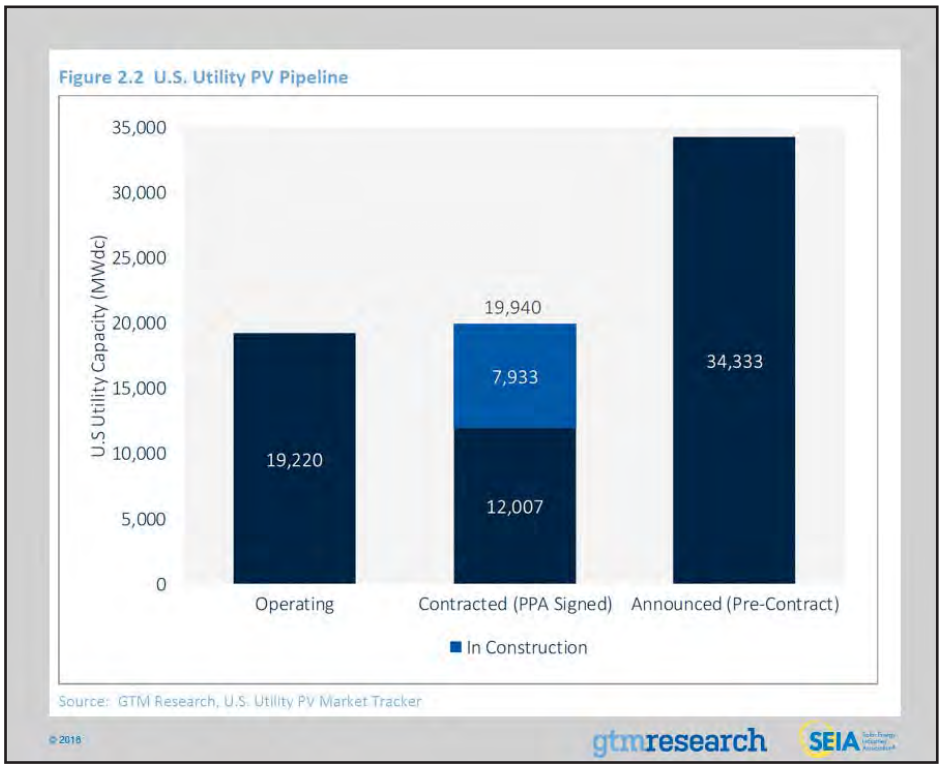
Source: Solar Energy Industries Association, Solar Market Insight Report 2016 Q4

Figure 2.—U.S. Annual Solar PV Installations and Prices



Source: Solar Energy Industries Association, Solar Market Insight Report 2016 Q4

Figure 3.—U.S. Utility PV Pipeline



Source: Solar Energy Industries Association, Solar Market Insight Report 2016 Q4

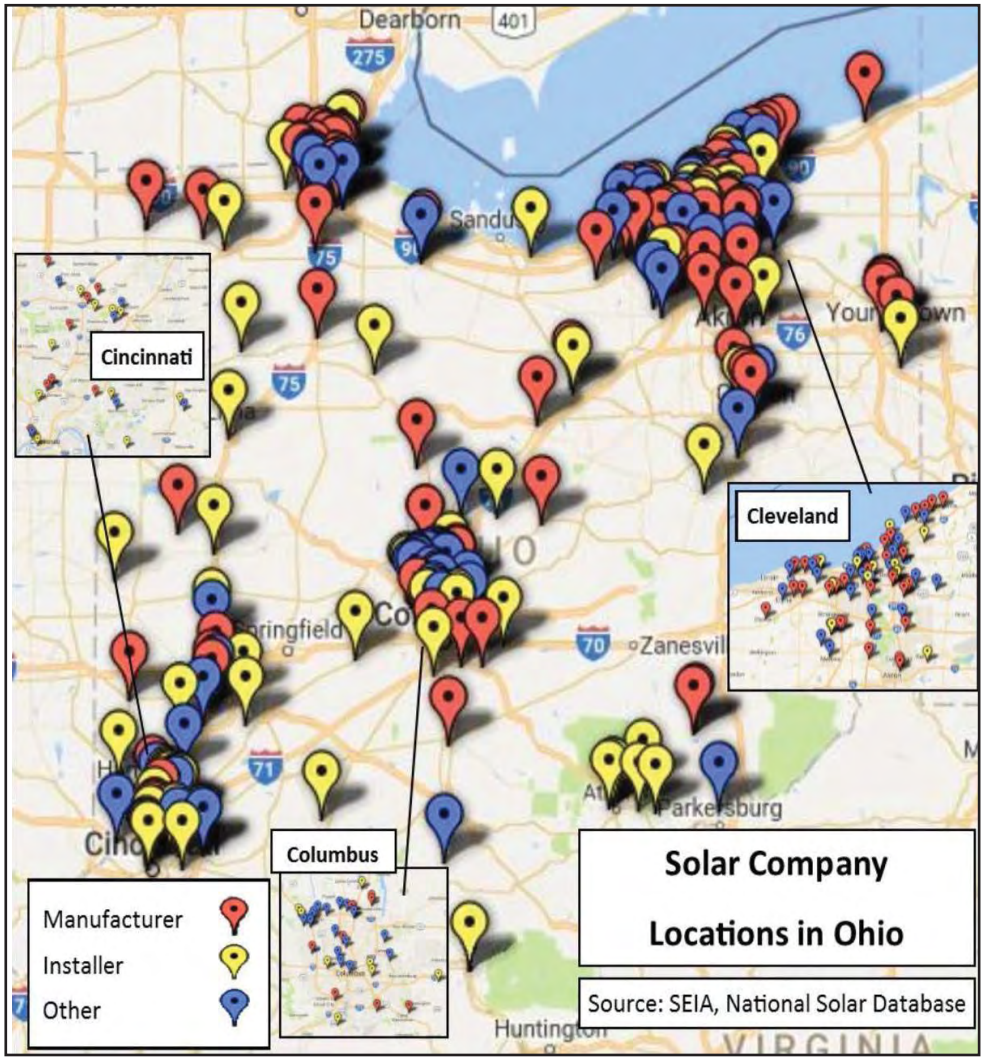
b. Ohio Solar Industry

According to SEIA, Ohio is ranked 26th among the states in cumulative installations of solar PV. California, North Carolina, and Arizona are the top 3 states for solar PV which may not be surprising because of the high solar radiation that they receive. However, other states with similar or lower solar potential rank highly including New Jersey (4th), Massachusetts (6th), New York (9th), and Maryland (13th). In 2016, Ohio installed 12 MW of solar electric capacity bringing its cumulative capacity to 124.6 MW.

There are more than 270 solar companies in Ohio including 107 manufacturers, 93 installers/developers and 73 others. Figure 4 is a map showing the locations of solar companies in Ohio. Currently, there are 5,831 solar jobs in the State of Ohio according to SEIA.

A 10 MW solar PV project, BNB Napolean Solar, was completed in 2014 by developer BNB Renewable Energy Holdings. Wyandot Solar facility is a 10 MW installation completed in 2010 by developer Juwi Solar, Inc. Many large Ohio companies have purchased solar energy including General Motors, IKEA, Assurant, Walmart and Staples. Campbell's Soup has installed a 10 MW system at their location in Napoleon, OH.

Figure 4. — Solar Company Locations in Ohio



Source: Solar Energy Industries Association, Solar Spotlight: Ohio

c. Economic Benefits of Utility-Scale Solar Energy

Utility-scale solar energy projects have numerous economic benefits. Solar installations create job opportunities in the local area during both the short-term construction phase and the long-term operational phase. In addition to the workers directly involved in the construction and maintenance of the solar energy project, numerous other jobs are supported through the indirect supply chain purchases and the higher spending that is induced by these workers. Solar projects strengthen the local tax base helping to improve county services, schools, police and fire departments and infrastructure improvements, such as public roads.

Numerous studies have quantified the economic benefits of Solar PV projects across the United States in peer-reviewed academic journals using the same methodology used in this report. Some of the studies examine smaller-scale solar systems and some studies utility-scale solar energy. Croucher (2012) uses JEDI modeling methodology to find which state will receive the greatest economic impact from installing one hundred 2.5 kW systems which are smaller residential systems. He shows that Pennsylvania ranked first supporting 28.98 jobs during installation and 0.20 jobs during operations. Ohio ranked fourth supporting 31.32 jobs during construction and 0.03 jobs during operations.

Jin (2016) analyzes the financing options and economic impact of solar photovoltaic systems in Normal, IL and uses the JEDI model to determine the county and state economic impact. The study examines the effect of 100 residential retrofit fixed-mount crystalline-silicone systems having a nameplate capacity of 5kW. Eight JEDI models estimated the economic impacts using different input assumptions. They found that county employment impacts varied from 377 to 1,059 job years during construction and 18.8 to 40.5 job years during the operating years.

Loomis (2016) estimates the economic impact for the State of Illinois if the state were to reach its maximum potential for solar PV. They estimate the economic impact of three different scenarios for Illinois – building new solar installations of 2,292 MW, 2,714 MW or 11,265 MW. They assume the 60% of the capacity is utility-scale solar, 30% of the capacity is commercial, and 10% of the capacity of the systems are residential. They find the employment impacts vary from 26,753 to 131,779 job years during construction and from 1,223 to 6,010 job years during operating years.

Several other reports quantify the economic impact of solar energy. Bezdek (2006) estimated the economic impact for the State of Ohio. He estimated the PV market in Ohio to be $25 million with 200 direct jobs and 460 total jobs. The Center for Competitive Florida (2009) estimated the impact if the state were to install 1,500 MW of solar. They found that 45,000 direct jobs and 50,000 indirect jobs could be created. The Solar Foundation (2013) used the JEDI modeling methodology to show that Colorado's solar PV installation to date created 10,790 job-years. They also analyzed what would happen if the state were to install 2,750 MW of solar PV from 2013 to 2030 and found that it would result in almost 32,500 job years. Berkman et. al (2011) estimate the economic and fiscal impacts of the Desert Sunlight Solar Farm. The project created approximately 440 construction jobs over a 26 month period, $15 million in new sales tax revenues and $12 million in new property revenues for Riverside County, CA and $336 million if indirect benefits to local businesses in the county.

d. Solar PV and Ohio Taxes

A property tax is imposed on the value of taxable property located within a county or taxing jurisdiction. There are generally four different categories of property – real property, personal property, tangible property and intangible property. Real property is usually land, buildings or objects that cannot be moved from one location to another. Personal property is generally an object of value that can be moved such as a vehicle, table chair, etc. Intangible property does not exist in physical form but nevertheless has value such as trademarks, copyrights, etc. Each state or local government has its own definition for taxable property and how a particular asset will be classified and valued.

Property taxes are an important source of funds for county and other local units of government. In Ohio, most property taxes go to school districts. "On a statewide basis, approximately two-thirds of all real property taxes collected by counties are distributed to school districts." (County Commissioners Association of Ohio, p.3). In Vinton County, the school district effective tax rate for commercial and industrial property is 21.68 mils. Vinton County rate is 4.5 mills and the Elk Township General Fund rate is 0.40 mills.

Generally, utility-scale power plants pay property taxes in the county in which they are located. Often, a state agency such as the Department of Revenue centrally assess the real and personal property of utilities but sometimes local tax assessors value utility property. In Ohio, generation facilities are valued by the Ohio Department of Taxation (Martin, p. 6). Public utility tangible personal property valuation are assessed at 24% of true value (County Commissioners Association of Ohio, p.15). Although tax assessor will have the final say on the assessed value, it seems likely that the Vinton Solar Energy will be assessed like public utility property.

III. Vinton Solar Energy Center Project Description and Location

a. Vinton County Solar Energy Center Project Description

Invenergy Solar Development North America LLC is developing the Vinton Solar Energy Center in Vinton County, Ohio. Vinton Solar Energy Center is a fixed tilt solar energy project providing large-scale, low-cost energy in Ohio designed to fully capitalize on the federal Investment Tax Credit (ITC). The project will be up to 120 MWac and will pursue commercial operations as early as late 2018 or early 2019. The Project will interconnect to the existing 138kV Elk Substation. Local permitting is superseded by the Ohio Power Siting Board (OPSB). The Project will require a Qualified Energy Project Certification from the OPSB. Invenergy will submit applications for this state permit in May 2017 and is targeting receipt of the permits in late 2017/early 2018. To date, no significant environmental findings have been reported. The Project will capitalize on full utilization of the investment tax credit.

As shown later in the results section, the project will support 428 new local jobs during construction for Vinton County which is 23% of non-governmental employment; 622 new local jobs during construction for the State of Ohio; 7.0 new local long term jobs for Vinton County; and 10.1 new local long term jobs for the State of Ohio.

Invenergy is North America's largest independent, privately held renewable energy provider. The Company develops, owns and operates large-scale renewable and other clean energy generation and storage facilities in North America, Latin America, Japan and Europe. Invenergy's expertise includes a complete range of fully integrated in-house capabilities, including: Project Development, Permitting, Transmission, Interconnection, Energy Marketing, Finance, Engineering, Project Construction, Operations and Maintenance. To date, the Company has developed more than 15,673 MW of large-scale wind, solar, natural gas and energy storage facilities in North America, Latin America, Japan and Europe. The 103 completed projects include:

- 75 Wind Projects – 9,829 MW
- 12 Solar Projects – 231 MW
- 10 Natural Gas Projects – 5,519 MW
- 6 Storage Projects – 94 MW

Invenergy is headquartered in Chicago with regional development offices in the United States, Canada, Latin America, Japan and Europe.

b. Vinton County, Ohio

Vinton County is located in the south central part of Ohio (see Figure 6). It has a total area of 415 square miles and the U.S. Census estimates that the 2015 population was 13,048 with 6,291 housing units. The County has a population density of 15.3 (persons per square mile) compared to 282 for the State of Ohio. Median household income in the county was $34,242 (2010).

As shown in Table 2, the largest industries are manufacturing and wholesale trade followed by, health care and social assistance, retail trade, accommodations and food services, and transportation and warehousing. The small number of workers in the construction sector (20-99) limits the local employment impacts from the solar energy project construction.

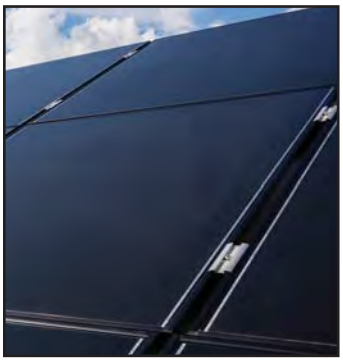
Figure 5.—Map of Vinton County, Ohio

Table 1. — Non-Governmental Employment by Industry in Vinton County

Industry	Number	Percent
Manufacturing	250-499	13.5-27.0%
Wholesale trade	250-499	13.5-27.0%
Health care and social assistance	347	18.8%
Retail trade	155	8.4%
Accommodations and food services	154	8.3%
Transportation and warehousing	104	5.6%
Construction	20-99	1.1%-5.4%
Mining, quarrying, and oil and gas extraction	20-99	1.1%-5.4%
Finance and insurance	20-99	1.1%-5.4%
Other services (except public administration)	20-99	1.1%-5.4%
Agriculture, forestry, fishing and hunting	49	2.7%
Professional, Scientific, and Technical Services	20	1.1%
Administrative	0-19	0.0%-1.0%
Information	0-19	0.0%-1.0%
Real estate and rental and leasing	0-19	0.0%-1.0%
Management of companies and enterprises	0-19	0.0%-1.0%
Utilities	0-19	0.0%-1.0%
Arts, entertainment, and recreation	0-19	0.0%-1.0%

Source: 2014 County Business Patterns, U.S. Census

IV. Methodology



NREL: National Renewable Energy Laboratory

JEDI: Jobs and Economic Development Impacts

IMPLAN: IMpact Analysis for PLANning

The economic analysis of solar PV project development presented here uses the NREL's latest Jobs and Economic Development Impacts (JEDI) PV Model (PV12.23.16). The JEDI PV Model is an input-output model that measures the spending patterns and location-specific economic structures that reflect expenditures supporting varying levels of employment, income, and output. That is, the JEDI Model takes into account that the output of one industry can be used as an input for another. For example, when a PV system is installed, there are both soft costs consisting of permitting, installation and customer acquisition costs, and hardware costs, of which the PV module is the largest component. The purchase of a module not only increases demand for manufactured components and raw materials, but also supports labor. When an installer/developer purchases a module from a manufacturing facility, the manufacturer uses some of that money to pay employees. The employees use a portion of their compensation to purchase goods and services within their community. Likewise, when a developer pays workers to install the systems, those workers spend money in the local economy that boosts economic activity and employment in other sectors. The goal of economic impact analysis is to quantify all of those reverberations throughout the economy.

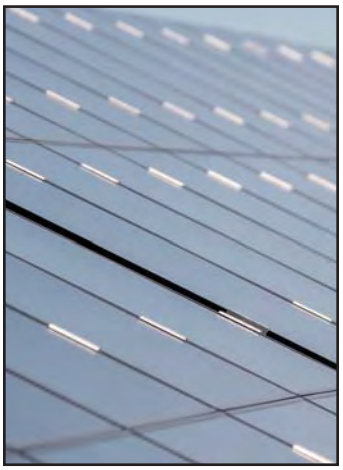
The first Jobs and Economic Development Impacts (JEDI) Model was developed in 2002 to demonstrate the economic benefits associated with developing wind farms in the United States. Since then, JEDI models have been developed for biofuels, natural gas, coal, transmission lines and many other forms of energy. These models were created by Marshall Goldberg of MRG & Associates, under contract with the National Renewable Energy Laboratory. The JEDI model utilizes state-specific industry multipliers obtained from IMPLAN (IMpact analysis for PLANning). IMPLAN software and data are managed and updated by the Minnesota IMPLAN Group, Inc., using data collected at federal, state, and local levels. This study analyzes the gross jobs that the new solar energy project development supports and does not analyze the potential loss of jobs due to declines in other forms of electric generation.

The total economic impact can be broken down into three distinct types: direct impacts; indirect impacts and induced impacts. **Direct impacts** during the construction period refer to the changes that occur in the onsite construction industries in which the direct final demand (i.e., spending on construction labor and services) change is made. Onsite construction-related services include installation labor, engineering, design, and other professional services. Direct impacts during operating years refer to the final demand changes that occur in the onsite spending for the solar operations and maintenance workers.

The initial spending on the construction and operation of the PV installation creates a second layer of impacts, referred to as "supply chain impacts" or "indirect impacts." **Indirect impacts** during construction period consist of the changes in inter-industry purchases resulting from the direct final demand changes, and include construction spending on materials and PV equipment and other purchases of goods and offsite services. Utility-scale PV Indirect impacts include PV modules, invertors, tracking systems, cabling, and foundations.

Induced impacts during construction refer to the changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects of final demand changes. Local spending by employees working directly or indirectly on the PV project who receive their paychecks and then spend money in the community is included. Additional local jobs and economic activity are supported by these purchases of goods and services.

V. Results



The economic impact results were derived from detailed project estimates supplied by Invenergy. In addition, Invenergy also estimated the percentages of project materials and labor that will be coming from within Vinton County and the State of Ohio. Invenergy plans to negotiate a Payment in Lieu of Taxes (PILOT) agreement with Vinton County. For the purposes of this report, the analysis assumes that Invenergy will pay $6,500/MW or up to $780 thousand annually.

Two separate JEDI models produced results to show the economic impact of the Vinton Solar Energy Center. The first JEDI model used the 2015 Vinton County multipliers from IMPLAN. The second JEDI model used the built-in JEDI state multipliers for the State of Ohio and the same project costs.

Tables 2-4 show the output from these models. Table 2 lists the total employment impact from the Vinton Solar Energy Center for Vinton County and the State of Ohio. Table 3 shows the impact on total earnings and Table 4 contains the impact on total output.

Table 2. — Total Employment Impact from the Vinton Solar Energy Center

	Vinton County Jobs	State of Ohio Jobs
Construction		
Project Development and Onsite Labor Impacts (direct)	225	369
Turbine and Supply Chain Impacts (indirect)	184	150
Induced Impacts	19	103
New Local Jobs during Construction	428	622
Operations (Annual)		
Onsite Labor Impacts (direct)	4.0	4.0
Local Revenue and Supply Chain Impacts (indirect)	1.7	1.6
Induced Impacts	1.3	4.5
New Local Long Term Jobs	7.0	10.1

The results from the JEDI model show significant employment impacts from the Vinton Solar Energy Center. Employment impacts can be broken down into several different components. Direct jobs created during the construction phase typically last anywhere from 12 to 18 months depending on the size of the project; however, the direct job numbers present in Table 2 from the JEDI model are based on a full time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2,080 hours worked in a year. A part time or temporary job would constitute only a fraction of a job according to the JEDI model. For example, the JEDI model results show 428 new direct jobs during construction in Vinton County, though the construction of the solar center could involve closer to 856 workers working half-time for a year. Thus, due to the short-term nature of construction projects, the JEDI model significantly understates the number of people actually hired to work on the project. It is important to keep this fact in mind when looking at the numbers or when reporting the numbers.

As shown in Table 2, new local jobs created or retained during construction total 428 for Vinton County, and 622 for the State of Ohio. New local long-term jobs created from the Vinton Solar Energy Center total 7.0 for Vinton County and 10.1 for the State of Ohio.

Direct jobs created during the operational phase last the life of the solar energy center, typically 20-30 years. Direct construction jobs and operations and maintenance jobs both require highly-skilled workers in the fields of construction, management, and engineering. These well-paid professionals boost economic development in rural communities where new employment opportunities are welcome due to economic downturns. Accordingly, it is important to not just look at the number of jobs but also the earnings that they produce. Table 3 shows the earnings impacts from the Vinton Solar Energy Center, which are categorized by construction impacts and operations impacts. The new local earnings during construction total over $10.6 million for Vinton County and almost $39 million for the State of Ohio. The new local long-term earnings total over $210 thousand for Vinton County and over $571 thousand for the State of Ohio.

Table 3. — Total Earnings Impact from the Vinton Solar Energy Center

	Vinton County	State of Ohio
Construction		
Project Development and Onsite Earnings Impacts	$2,230,086	$23,916,967
Module and Supply Chain Impacts	$7,935,673	$9,614,921
Induced Impacts	$435,980	$5,288,522
New Local Earnings during Construction	$10,601,739	$38,820,410
Operations (Annual)		
Onsite Labor Impacts	$140,423	$239,634
Local Revenue and Supply Chain Impacts	$39,665	$87,288
Induced Impacts	$29,922	$244,088
New Local Long Term Earnings	$210,010	$571,010

Output refers to economic activity or the value of production in the state or local economy. It is an equivalent measure to the Gross Domestic Product, which measures output on a national basis. According to Table 4, the new local output during construction totals almost $30 million for Vinton County and almost $60 million for the State of Ohio. The new local long-term output totals almost $460 thousand for Vinton County and over $1.2 million for the State of Ohio.

Table 4. — Total Output Impact from the Vinton Solar Energy Center

	Vinton County	State of Ohio
Construction		
Project Development and Onsite Jobs Impacts on Output	$8,473,208	$24,094,779
Module and Supply Chain Impacts	$19,213,149	$20,011,974
Induced Impacts	$2,244,462	$15,837,098
New Local Jobs during Construction	$29,930,819	$59,943,851
Operations (Annual)		
Onsite Labor Impacts	$140,423	$239,634
Local Revenue and Supply Chain Impacts	$165,424	$261,871
Induced Impacts	$154,037	$731,093
New Local Long Term Jobs	$459,884	$1,232,598

Solar PV projects increase the property tax base of a county, creating a new revenue source for education and other local government services. Although it is difficult to calculate the precise assessed value and taxes of the project until construction is completed, we can calculate the taxes on an illustrative example to get an idea of the size of the contributions that a project of this magnitude will have on the local tax base. The Vinton Solar Energy Center is expected to represent an investment of over $150 million and will be located in the Vinton Local School District. Using the PILOT plan of $6,500/MW, we can calculate the expected payment to each of the taxing entities based on their respective tax rates.

Table 5 details the property tax implications of the Vinton Solar Energy Project. There are several important assumptions built into the analysis in this table. First, the analysis assumes that Vinton County and Invenergy agree to a PILOT plan payment of $6,500/MW and that the full 120 MW facility is constructed, amounting to an annual tax revenue of $780 thousand. Second, the table assumes the 2016 tax rates posted on the Ohio Department of Revenue website for each taxing body. Third, the projections assume that the tax rate and the cost do not change before the project is put into service in 2018. Fourth, the distribution is assumed to be the same relative shares as implied by the tax rates. The county could redistribute the PILOT revenue as needed if the agreement allows for redistribution.

As shown on Table 5, Vinton School District is expected to receive over $367 thousand annually from the Vinton Solar Energy Project and the Vinton County General Fund will receive over $76 thousand annually. Other taxing districts will receive between $5,084 and $50,836 annually as detailed in Table 5.

Table 5. — Illustration of PILOT Revenue by the Vinton Solar Energy Project

Taxing District	Estimated Annual PILOT Revenue
Vinton Local School District	$367,378
County General Fund	$76,255
Emergency Medical Service	$50,836
Mental Retardation and Development Disabilities (MRDD)	$50,836
Gallia-Jackson-Vinton Joint Vocational School District (JVSD)	$33,891
TBMRF Health District	$33,891
Elk Township Road and Bridge	$32,196
Elk Township Cemetery	$25,418
Elk Township Road Improvement	$16,945
Elk Township Fire	$16,945
Rio Grande Community College	$16,945
County Health	$16,945
Cooperative Extension Service	$12,709
Senior Citizens	$10,167
Library	$6,778
Elk Township General Fund	$6,778
Public Safety	$5,084
TOTAL	$780,000

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VII. Curriculum Vita - David Loomis

David G. Loomis
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Education

Doctor of Philosophy, Economics, Temple University, Philadelphia, Pennsylvania, May 1995.

Bachelor of Arts, Mathematics and Honors Economics, Temple University, Magna Cum Laude, May 1985.

Experience

1996-present Illinois State University, Normal, IL
Full Professor – Department of Economics (2010-present)
Associate Professor - Department of Economics (2002-2009)
Assistant Professor - Department of Economics (1996-2002)

- Taught Regulatory Economics, Telecommunications Economics and Public Policy, Industrial Organization and Pricing, Individual and Social Choice, Economics of Energy and Public Policy and a Graduate Seminar Course in Electricity, Natural Gas and Telecommunications Issues.
- Supervised as many as 5 graduate students in research projects each semester.
- Served on numerous departmental committees.

1997-present Institute for Regulatory Policy Studies, Normal, IL
Executive Director (2005-present)
Co-Director (1997-2005)

- Grew contributing membership from 5 companies to 16 organizations.
- Doubled the number of workshop/training events annually.
- Supervised 2 Directors, Administrative Staff and internship
- program.
- Developed and implemented state-level workshops concerning regulatory issues related to the electric, natural gas, and telecommunications industries.

Experience (cont'd)

2006-present Illinois Wind Working Group, Normal, IL
Director
- Founded the organization and grew the organizing committee to over 200 key wind stakeholders
- Organized annual wind energy conference with over 400 attendees
- Organized strategic conferences to address critical wind energy issues
- Initiated monthly conference calls to stakeholders
- Devised organizational structure and bylaws

2007-present Center for Renewable Energy, Normal, IL
Director
- Created founding document approved by the Illinois State University Board of Trustees and Illinois Board of Higher Education.
- Secured over $150,000 in funding from private companies.
- Hired and supervised 4 professional staff members and supervised 3 faculty members as Associate Directors.
- Reviewed renewable energy manufacturing grant applications for Illinois Department of Commerce and Economic Opportunity for a $30 million program.
- Created technical "Due Diligence" documents for the Illinois Finance Authority loan program for wind farm projects in Illinois.

2011-present Strategic Economic Research, LLC
President
- Performed economic impact analyses on policy initiatives and energy projects such as wind energy and transmission lines and at the county and state level.
- Provided expert testimony before state legislative bodies, public utility commissions, and county boards.
- Wrote telecommunications policy impact report comparing Illinois to other Midwestern states.

1997-2002 International Communications Forecasting Conference
Chair
- Expanded Planning Committee with representatives from over 18 different international companies and delivered high quality conference attracting over 500 people over 4 years.

1985-1996 Bell Atlantic, Philadelphia, Pa.
Economist - Business Research
- Wrote and taught Applied Business Forecasting multimedia course.
- Developed and documented 25 econometric demand models that were used in regulatory filings.
- Provided statistical and analytic support to regulatory costing studies.
- Served as subject matter expert in switched and special access.
- Administered $4 million budget including $1.8 million consulting budget.

Professional Awards and Memberships

2016 Cross-Disciplinary Team Research Award with Jin Jo and Matt Aldeman – awarded to team for excellence in research

2011 Midwestern Regional Wind Advocacy Award from the Department of Energy's Wind Powering America presented at WindPower 2011

2009 Economics Department Scott M. Elliott Faculty Excellence Award – awarded to faculty who demonstrate excellence in teaching, research and service.

2009 Illinois State University Million Dollar Club – awarded to faculty who have over $1 million in grants through the university.

2008 Outstanding State Wind Working Group Award from the Department of Energy's Wind Power America presented at WindPower 2008.

1999 Illinois State University Teaching Initiative Award

Member of the American Economic Association, National Association of Business Economists, International Association for Energy Economics, Institute for Business Forecasters; Institute for International Forecasters, International Telecommunications Society.

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18. Macon County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of E.ON Energy, Direct Oral Testimony, August 11, 2015.

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16. Kankakee County (Illinois) Planning, Zoning, and Agriculture Committee, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of EDF Renewables, Direct Oral Testimony, July 22, 2015.

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15. Kankakee County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of EDF Renewables, Direct Oral Testimony, July 13, 2015.

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11. Missouri Public Service Commission, Case No. EA-2014-0207, Oral Cross-examination Testimony on behalf of Grain Belt Express Clean Line LLC appeared before the Commission on November 21, 2014.

10. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of Invenergy, Direct Oral Testimony, November 17-19, 2014.

9. Missouri Public Service Commission, Case No. EA-2014-0207, Written Surrebuttal Testimony on behalf of Grain Belt Express Clean Line LLC, filed October 14, 2014.

8. Missouri Public Service Commission, Case No. EA-2014-0207, Written Direct Testimony on behalf of Grain Belt Express Clean Line LLC, filed March 26, 2014.

7. Illinois Commerce Commission, Case No. 12-0560, Oral Cross-examination Testimony on behalf of Rock Island Clean Line LLC appeared before the Commission on December 11, 2013.

6. Illinois Commerce Commission, Case No. 12-0560, Written Rebuttal Testimony on behalf of Rock Island Clean Line LLC filed August 20, 2013.

5. Boone County (Illinois) Board, Examination of Wind Energy Conversion System Ordinance, Direct Testimony and Cross-Examination, April 23, 2013.

Expert Testimony (cont'd)

3. Whiteside County (Illinois) Board and Whiteside County Planning and Zoning Committee, Examination of Wind Energy Conversion System Ordinance, Direct Testimony and Cross-Examination, on behalf of the Center for Renewable Energy, April 12, 2012.

2. State of Illinois Senate Energy and Environment Committee, Direct Testimony and Cross-Examination, on behalf of the Center for Renewable Energy, October 28, 2010.

1. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of the Center for Renewable Energy, Direct Testimony and Cross-Examination, July 28, 2010.

Selected Presentations

"Energy Storage Economics and RTOs," presented October 30, 2016 at the Energy Storage Conference at Argonne National Laboratory.

"Wind Energy in Illinois," on October 6, 2016 at the B/N Daybreak Rotary Club, Bloomington, IL.

"Smart Grid for Schools," presented August 17, 2016 to the Ameren External Affairs Meeting, Decatur, IL.

"Solar Energy in Illinois," presented July 28, 2016 at the 3rd Annual K-12 Teachers Clean Energy Workshop, Richland Community College, Decatur, IL

"Wind Energy in Illinois," presented July 28, 2016 at the 3rd Annual K-12 Teachers Clean Energy Workshop, Richland Community College, Decatur, IL

"Smart Grid for Schools," presented June 21, 2016 at the ISEIF Grantee and Ameren Meeting, Decatur, IL.

"Costs and Benefits of Renewable Energy," presented November 4, 2015 at the Osher Lifelong Learning Institute at Bradley, University, Peoria, IL.

"Energy Sector Workforce Issues," presented September 17, 2015 at the Illinois Workforce Investment Board, Springfield, IL.

Selected Presentations (cont'd)

"The Past, Present and Future of Wind Energy in Illinois," presented March 13, 2015 at the Peoria Rotary Club, Peoria, IL.

"Where Are All the Green Jobs?" presented January 28, 2015 at the 2015 Illinois Green Economy Network Sustainability Conference, Normal, IL.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards: Addressing the Critical Need for a More Energy-Literate Workforce," presented September 30, 2014 at the Mathematics and Science Partnerships Program 2014 Conference in Washington, DC.

"National Utility Rate Database," presented October 23, 2013 at Solar Power International, Chicago, IL.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented May 6, 2013 at WindPower 2013, Chicago, IL.

"Why Illinois? Windy City, Prairie Power," presented May 5, 2013 at WindPower 2013, Chicago, IL.

"National Utility Rate Database," presented January 29, 2013 at the EUEC Conference, Phoenix, AZ.

"Energy Learning Exchange and Green Jobs," presented December 13, 2012 at the TRICON Meeting of Peoria and Tazewell County Counselors, Peoria, IL.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented November 12, 2012 at the Offshore Wind Jobs and Economic Development Impacts Webinar.

"Energy Learning Exchange," presented October 31, 2012 at the Utility Workforce Development Meeting, Chicago, IL.

"Wind Energy in McLean County," presented June 26, 2012 at BN By the Numbers, Normal, IL.

"Wind Energy," presented June 14, 2012 at the Wind for Schools Statewide Teacher Workshop, Normal, IL.

"Economic Impact of Wind Energy in Illinois," presented June 6, 2012 at AWEA's WINDPOWER 2012, Atlanta, GA.

"Trends in Illinois Wind Energy," presented March 6, 2012 at the AWEA Regional Wind Energy Summit – Midwest in Chicago, IL.

Selected Presentations (cont'd)

"Challenges and New Growth Strategies in the Wind Energy Business," invited plenary session speaker at the Green Revolution Leaders Forum, November 18, 2011 in Seoul, South Korea.

"Overview of the Center for Renewable Energy," presented July 20, 2011 at the University-Industry Consortium Meeting at Illinois Institute of Technology, Chicago, IL.

"Building the Wind Turbine Supply Chain," presented May 11, 2011 at the Supply Chain Growth Conference, Chicago, IL

"Building a Regional Energy Policy for Economic Development," presented April 4, 2011 at the Midwestern Legislative Conference's Economic Development Committee Webinar.

"Wind Energy 101," presented February 7, 2011 at the Wind Power in Central Illinois - A Public Forum, CCNET Renewable Energy Group, Champaign, IL.

"Alternative Energy Strategies," presented with Matt Aldeman November 19, 2010 at the Innovation Talent STEM Education Forum, Chicago, IL.

"Siting and Zoning in Illinois," presented November 17, 2010 at the Wind Powering America Webinar.

"What Governor Quinn Should Do about Energy?" presented November 15, 2010 at the Illinois Chamber of Commerce Energy Forum Conference, Chicago, IL.

"Is Wind Energy Development Right for Illinois," presented with Matt Aldeman October 28, 2010 at the Illinois Association of Illinois County Zoning Officials Annual Seminar in Utica, IL.

"Economic Impact of Wind Energy in Illinois," presented July 22, 2010 at the AgriEnergy Conference in Champaign, IL.

"Renewable Energy Major at ISU," presented July 21, 2010 at Green Universities and Colleges Subcommittee Webinar.

"Economics of Wind Energy," presented May 19, 2010 at the U.S. Green Building Council meeting in Chicago, IL.

Selected Presentations (cont'd)

"Forecasting: A Primer for the Small Business Entrepreneur," presented with James E. Cox, Jr. April 14, 2010 at the Allied Academies' Spring International Conference in New Orleans, LA.

"Are Renewable Portfolio Standards a Policy Cure-All? A Case Study of Illinois' Experience," presented January 30, 2010 at the 2010 William and Mary Environmental Law and Policy Review Symposium in Williamsburg, VA.

"Creating Partnerships between Universities and Industry," presented November 19, 2009, at New Ideas in Educating a Workforce in Renewable Energy and Energy Efficiency in Albany, NY.

"Educating Illinois in Renewable Energy, presented November 14, 2009 at the Illinois Science Teachers Association in Peoria, IL.

"Green Collar Jobs," invited presentation October 14, 2009 at the 2009 Workforce Forum in Peoria, IL.

"The Role of Wind Power in Illinois," presented March 4, 2009 at the Association of Illinois Electric Cooperatives Engineering Seminar in Springfield, IL.

"The Economic Benefits of Wind Farms," presented January 30, 2009 at the East Central Illinois Economic Development District Meeting in Champaign, IL.

"Green Collar Jobs in Illinois," presented January 6, 2009 at the Illinois Workforce Investment Board Meeting in Macomb, Illinois.

"Green Collar Jobs: What Lies Ahead for Illinois?" presented August 1, 2008 at the Illinois Employment and Training Association Conference.

"Mapping Broadband Access in Illinois," presented October 16, 2007 at the Rural Telecon '07 conference.

"A Managerial Approach to Using Error Measures to Evaluate Forecasting Methods," presented October 15, 2007 at the International Academy of Business and Economics.

"Dollars and Sense: The Pros and Cons of Renewable Fuel," presented October 18, 2006 at Illinois State University Faculty Lecture Series.

Selected Presentations (cont'd)

"Broadband Access in Illinois," presented July 28, 2006 at the Illinois Association of Regional Councils Annual Meeting.

"Broadband Access in Illinois," presented November 17, 2005 at the University of Illinois' Connecting the e to Rural Illinois.

"Improving Forecasting Through Textbooks – A 25 Year Review," with James E. Cox, Jr., presented June 14, 2005 at the 25th International Symposium on Forecasting.

"Telecommunications Demand Forecasting with Intermodal Competition, with
Christopher Swann, presented April 2, 2004 at the Telecommunications Systems Management Conference 2004.

"Intermodal Competition," with Christopher Swann, presented April 3, 2003 at the Telecommunications Systems Management Conference 2003.

"Intermodal Competition in Local Exchange Markets," with Christopher Swann, presented June 26, 2002 at the 20th Annual International Communications Forecasting Conference.

"Assessing Retail Competition," presented May 23, 2002 at the Institute for Regulatory Policy Studies' Illinois Energy Policy for the 21st Century workshop.

"The Devil in the Details: An Analysis of Default Service and Switching," with Eric Malm presented May 24, 2001 at the 20th Annual Advanced Workshop on Regulation and Competition.

"Forecasting Challenges for U.S. Telecommunications with Local Competition," presented June 28, 1999 at the 19th International Symposium on Forecasting.

"Acceptance of Forecasting Principles in Forecasting Textbooks," presented June 28, 1999 at the 19th International Symposium on Forecasting.

"Forecasting Challenges for Telecommunications With Local Competition," presented June 17, 1999 at the 17th Annual International Communications Forecasting Conference.

Selected Presentations (cont'd)

"Measures of Market Competitiveness in Deregulating Industries," with Eric Malm, presented May 28, 1999 at the 18th Annual Advanced Workshop on Regulation and Competition.

"Trends in Telecommunications Forecasting and the Impact of Deregulation," Proceedings of EPRI's 11th Forecasting Symposium, 1998.

"Forecasting in a Competitive Age: Utilizing Macroeconomic Forecasts to Accurately Predict the Demand for Services," invited speaker, Institute for International Research Conference, September 29, 1997.

"Regulatory Fairness and Local Competition Pricing," presented May 30, 1996 at the 15th Annual Advanced Workshop in Regulation and Public Utility Economics.

"Optimal Pricing For a Regulated Monopolist Facing New Competition: The Case of Bell Atlantic Special Access Demand," presented May 28, 1992 at the Rutgers Advanced Workshop in Regulation and Public Utility Economics.

Grants

"SmartGrid for Schools 2017 and Energy Challenge," with William Hunter, Illinois Science and Energy Innovation Foundation, RSP Award # A15-0092-002 - extended, January 2017, $350,000.

"Illinois Jobs Project," University of California Berkeley, RSP Award # A16-0148, August, 2016, $10,000.

"Energy Workforce Ready Through Building Performance Analysis," Illinois Department of Commerce and Economic Opportunity through the Department of Labor, RSP # A16-0139, June, 2016, $328,000 (grant was de-obligated before completion).

"SmartGrid for Schools 2016 and Smart Appliance Challenge," with William Hunter, Brad Christenson and Jeritt Williams, Illinois Science and Energy Innovation Foundation, RSP Award # A15-0092-002, January 2016, $450,000.

"SmartGrid for Schools 2015," with William Hunter and Matt Aldeman, Illinois Science and Energy Innovation Foundation, RSP Award # A15-0092-001, February 2015, $400,000.

Grants (cont'd)

"Economic Impact of Nuclear Plant Closings: A Response to HR 1146," Illinois Department of Economic Opportunity, RSP Award # 14-025001 amended, January, 2015, $22,000.

"Partnership with Midwest Renewable Energy Association for Solar Market Pathways" with Missy Nergard and Jin Jo, U.S. Department of Energy Award Number DE-EE0006910, October, 2014, $109,469 (ISU Award amount).

"Renewable Energy for Schools," with Matt Aldeman and Jin Jo, Illinois Department of Commerce and Economic Opportunity, Award Number 14-025001, June, 2014, $130,001.

"SmartGrid for Schools 2014," with William Hunter and Matt Aldeman, Illinois Science and Energy Innovation Foundation, RSP # 14B116, March 2014, $451,701.

"WINDPOWER 2014 Conference Exhibit," Illinois Department of Commerce and Economic Opportunity, RSP #14C167, March, 2014, $95,000.

"Lake Michigan Offshore Wind Energy Buoy," with Matt Aldeman, Illinois Clean Energy Community Foundation, Request ID 6435, November, 2013, $90,000.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards," with William Hunter, Matt Aldeman and Amy Bloom, Illinois State Board of Education, RSP # 13B170A, October, 2013, second year, $159,954; amended to $223,914.

"Solar for Schools," with Matt Aldeman, Illinois Green Economy Network, RSP # 13C280, August, 2013, $66,072.

"Energy Learning Exchange Implementation Grant," with William Hunter and Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 13-052003, June, 2013, $350,000.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards," with William Hunter, Matt Aldeman and Amy Bloom, Illinois State Board of Education, RSP # 13B170, April, 2013, $159,901.

Grants (cont'd)

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431006, March, 2013, $225,000.

"Illinois Pathways Energy Learning Exchange Planning Grant," with William Hunter and Matt Aldeman, Illinois State Board of Education (Source: U.S. Department of Education), RSP # 13A007, December, 2012, $50,000.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431005, June 2011, amended March, 2012, $98,911.

"Wind for Schools Education and Outreach," with Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 11-025001, amended February, 2012, $111,752.

"A Proposal to Support Solar Energy Potential and Job Creation for the State of Illinois Focused on Large Scale Photovoltaic System," with Jin Jo (lead PI), Illinois Department of Commerce and Economic Opportunity, Award Number 12-025001, January 2012, $135,000.

"National Database of Utility Rates and Rate Structure," U.S. Department of Energy, Award Number DE-EE0005350TDD, 2011-2014, $850,000.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431005, June 2011, $75,000.

"Wind for Schools Education and Outreach," with Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 11-025001, March 2011, $190,818.

"Using Informal Science Education to Increase Public Knowledge of Wind Energy in Illinois," with Amy Bloom and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February 2011, $13,713.

"Wind Turbine Market Research," with Matt Aldeman, Illinois Manufacturers Extension Center, May, 2010, $4,000.

"Petco Resource Assessment," with Matt Aldeman, Petco Petroleum Co., April, 2010 amended August 2010 $34,000; original amount $18,000.

"Wind for Schools Education and Outreach," with Anthony Lornbach and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February, 2010, $13,635.

Grants (cont'd)

"IGA IFA/ISU Wind Due Diligence," Illinois Finance Authority, November, 2009, $8,580 amended December 2009; original amount $2,860.

"Green Industry Business Development Program, with the Shaw Group and Illinois Manufacturers Extension Center, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021007, August 2009, $245,000.

"Wind Turbine Workshop Support," Illinois Department of Commerce and Economic Opportunity, June 2009, $14,900.

"Illinois Wind Workers Group," with Randy Winter, U.S. Department of Energy, Award Number DE-EE0000507, 2009-2011, $107,941.

"Wind Turbine Supply Chain Study," with J. Lon Carlson and James E. Payne, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021003, April 2009, $125,000.

"Renewable Energy Team Travel to American Wind Energy Association WindPower 2009 Conference, Center for Mathematics, Science and Technology, February 2009, $3,005.

"Renewable Energy Educational Lab Equipment," with Randy Winter and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), February, 2008, $232,600.

"Proposal for New Certificate Program in Electricity, Natural Gas and Telecommunications Economics," with James E. Payne, Extended Learning Program Grant, April, 2007, $29,600.

"Illinois Broadband Mapping Study," with J. Lon Carlson and Rajeev Goel, Illinois Department of Commerce and Economic Opportunity, Award Number 06-205008, 2006-2007, $75,000.

"Illinois Wind Energy Education and Outreach Project," with David Kennell and Randy Winter, U.S. Department of Energy, Award Number DE-FG36-06GO86091, 2006-2010, $990,000.

"Wind Turbine Installation at Illinois State University Farm," with Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), May, 2004, $500,000.

Grants (cont'd)

"Illinois State University Wind Measurement Project," Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), with August, 2003, $40,000.

"Illinois State University Wind Measurement Project," with Doug Kingman and David Kennell, NEG Micon matching contribution, August, 2003, $65,000.

"Distance Learning Technology Program," Illinois State University Faculty Technology Support Services, Summer 2002, $3,000.

"Providing an Understanding of Telecommunications Technology By Incorporating Multimedia into Economics 235," Instructional Technology Development Grant (peer-reviewed), January 15, 2001, $1,400.

"Using Real Presenter to create a virtual tour of GTE's Central Office," with Jack Chizmar, Instructional Technology Literacy Mentoring Project Grant (peer-reviewed), January 15, 2001, $1,000.

"An Empirical Study of Telecommunications Industry Forecasting Practices," with James E. Cox, College of Business University Research Grant (peer-reviewed), Summer, 1999, $6,000.

"Ownership Form and the Efficiency of Electric Utilities: A Meta-Analytic Review" with L. Dean Hiebert, Institute for Regulatory Policy Studies research grant (peer-reviewed), August 1998, $6,000.

Total Grants: $7,469,913

External Funding

Corporate Funding for Institute for Regulatory Policy Studies, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon/ ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2017, $75,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2016, $17,915.

Corporate Funding for Energy Learning Exchange, Calendar Year 2016, $53,000.

Corporate Funding for Institute for Regulatory Policy Studies, Ameren ($7,500), Aqua Illinois ($7,500); Commonwealth Edison ($7,500); Exelon/Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Utilities, Inc. ($7,500) Fiscal Year 2016, $82,500 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2015, $15,897.

Corporate Funding for Institute for Regulatory Policy Studies, Ameren ($7,500), Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Exelon/Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midcontinent ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2015, $90,000 total.

Corporate Funding for Energy Learning Exchange, Calendar Year 2014, $55,000.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2014, $12,381.

External Funding (cont'd)

Corporate Funding for Institute for Regulatory Policy Studies, Ameren ($7,500), Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Energy Efficiency Alliance ($4,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2014, $102,000 total.

Corporate Funding for Energy Learning Exchange, Calendar Year 2013, $53,000.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2013, $17,097.

Corporate Funding for Institute for Regulatory Policy Studies, Ameren ($7,500), Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2013, $97,500 total.

Corporate Funding for Illinois Wind Working Group, Calendar Year 2012, $29,325.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2012, $16,060.

Corporate Funding for Institute for Regulatory Policy Studies, Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2012, $90,000 total.

Corporate Funding for Illinois Wind Working Group, Calendar Year 2011, $57,005.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2011, $13,562.

External Funding (cont'd)

Corporate Funding for Institute for Regulatory Policy Studies, Alliance Pipeline ($7,500); Aqua Illinois ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); Illinois American Water ($7,500) ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2011, $90,000 total.

Corporate Funding for Center for Renewable Energy, Calendar Year 2010, $50,000.

Corporate Funding for Illinois Wind Working Group, Calendar Year 2010, $49,000.

Workshop Surplus for Institute for Regulatory Policy Studies, with Lon Carlson, Fiscal Year 2010, $17,759.

Corporate Funding for Institute for Regulatory Policy Studies, Alliance Pipeline ($7,500); Ameren ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); ITC Holdings ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2010, $82,500 total.

Corporate Funding for Illinois Wind Working Group, Calendar Year 2009, $57,140.

Workshop Surplus for Institute for Regulatory Policy Studies, with Lon Carlson, Fiscal Year 2009, $21,988.

Corporate Funding for Institute for Regulatory Policy Studies, Alliance Pipeline ($7,500); Ameren ($7,500); AT&T ($7,500);Commonwealth Edison ($7,500); Constellation NewEnergy ($7,500); MidAmerican Energy ($7,500); Midwest Generation ($7,500); MidWest ISO ($7,500); NICOR Energy ($7,500); People Gas Light and Coke ($7,500); PJM Interconnect ($7,500); Fiscal Year 2009, $82,500 total.

Corporate Funding for Center for Renewable Energy, Calendar Year 2008, $157,500.

External Funding (cont'd)

Corporate Funding for Illinois Wind Working Group, Calendar Year 2008, $38,500.

Workshop Surplus for Institute for Regulatory Policy Studies, with Lon Carlson, Fiscal Year 2008, $28,489.

Corporate Funding for Institute for Regulatory Policy Studies, Alliance Pipeline ($5,000); Ameren ($5,000); AT&T ($5,000);Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); Peabody Energy ($5,000), People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); Fiscal Year 2008, $60,000 total.

Corporate Funding for Illinois Wind Working Group, Calendar Year 2007, $16,250.

Workshop Surplus for Institute for Regulatory Policy Studies, with Lon Carlson, Fiscal Year 2007, $19,403.

Corporate Funding for Institute for Regulatory Policy Studies, AARP ($3,000), Alliance Pipeline ($5,000), Ameren ($5,000); Citizens Utility Board ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); Peabody Energy ($5,000), People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); SBC ($5,000); Verizon ($5,000); Fiscal Year 2007, $73,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with Lon Carlson, Fiscal Year 2006, $13,360.

Corporate Funding for Institute for Regulatory Policy Studies, AARP ($1,500), Alliance Pipeline ($2,500), Ameren ($5,000); Citizens Utility Board ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); DTE Energy ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); Peabody Energy ($2,500), People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); SBC ($5,000); Verizon ($5,000); Fiscal Year 2006, $71,500 total.

External Funding (cont'd)

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Fiscal Year 2005, $12,916.

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); Citizens Utility Board ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); MidWest ISO ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); SBC ($2,500); Verizon ($2,500); Fiscal Year 2005, $60,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Fiscal Year 2004, $17,515.

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); Commonwealth Edison ($5,000); Constellation NewEnergy ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); Midwest Generation ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); PJM Interconnect ($5,000); Fiscal Year 2004, $45,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Fiscal Year 2003, $8,300.

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($2,500); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Fiscal Year 2003, $32,500 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Calendar Year 2002, $15,700.

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($2,500); AT&T ($5,000); Commonwealth Edison ($2,500); Illinois Power ($2,500); MidAmerican Energy ($2,500); NICOR Energy ($2,500); People Gas Light and Coke ($2,500); Calendar Year 2002, $17,500 total.

External Funding (cont'd)

Corporate Funding for International Communications Forecasting Conference, National Economic Research Associates ($10,000); Taylor Nelson Sofres Telecoms ($10,000); Calendar Year 2002, $20,000 total

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 2001, $35,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Calendar Year 2001, $19,400.

Corporate Funding for International Communications Forecasting Conference, National Economic Research Associates ($10,000); Taylor Nelson Sofres Telecoms ($10,000); SAS Institute ($10,000); Calendar Year 2001, $30,000 total.

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 2000, $35,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Calendar Year 2000, $20,270.

Corporate Funding for International Communications Forecasting Conference, National Economic Research Associates ($10,000); Taylor Nelson Sofres Telecoms ($10,000); Calendar Year 2000, $20,000 total.

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); AT&T ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); NICOR Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 1999, $35,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Calendar Year 1999, $10,520.

Corporate Funding for International Communications Forecasting Conference, National Economic Research Associates ($10,000); PNR Associates ($10,000); Calendar Year 1999, $20,000 total.

External Funding (cont'd)

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); CILCO ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 1998, $30,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Calendar Year 1998, $44,334.

Corporate Funding for International Communications Forecasting Conference, National Economic Research Associates ($10,000); PNR Associates ($10,000); Calendar Year 1998, $20,000 total.

Corporate Funding for Institute for Regulatory Policy Studies, with L. Dean Hiebert, AmerenCIPS ($5,000); CILCO ($5,000); Commonwealth Edison ($5,000); Illinois Power ($5,000); MidAmerican Energy ($5,000); People Gas Light and Coke ($5,000); Calendar Year 1997, $30,000 total.

Workshop Surplus for Institute for Regulatory Policy Studies, with L. Dean Hiebert, Calendar Year 1997, $19,717.

Total External Funding: $2,404,803

Exhibit I

Complaint Resolution Plan

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VINTON SOLAR ENERGY, LLC ("Vinton Solar")
Case No 17-774-EL-BGN

Vinton Solar Complaint Resolution Plan

PURPOSE: To provide a transparent and effective method for residents of the community to lodge concerns, problems and complaints related to the solar facility.

BACKGROUND: Vinton Solar is committed to ensuring that an accessible process is in place for community members to voice concerns and for those concerns to be addressed as quickly and effectively as possible.

Maintaining a detailed record of all complaints and the resolutions that follow is an important aspect of the complaint resolution plan.

POLICY: The policy of Vinton Solar is to take reasonable necessary actions to rectify legitimate interference or disturbances that are a direct result of the solar facilities.

PROCEDURE:

1.) Vinton Solar will establish an 800-phone number prior to the solar facility being commercially operational and will ensure that the phone number is provided to the county commissioners, township trustees, emergency responders, the schools, and public libraries within the project area. A resident who has a complaint about the solar facility may either call the 800# and leave a message 24 hours a day or go to the Operations and Maintenance Facility for the solar facility during regular business hours to register a complaint.

2.) Vinton Solar will document every complaint that is received, including all pertinent information about the person making the complaint, the issues surrounding the complaint and the date that the complaint was received. The logbook will also contain the resolution that Vinton Solar suggests, the date the complaining party agreed to the proposed resolution and the date when the proposed resolution was implemented. Vinton Solar will investigate each complaint.

3.) Vinton Solar personnel will generate a quarterly report about the nature and resolution of all complaints received in that quarter and file the report with the Ohio Power Siting Board on the following date of each year (April 15th, July 15th, October 15th, and January 15th).

4.) Residents who register a complaint with Vinton Solar will be contacted by the company no later than 48 hours after registering the complaint. The intent of the initial contact is to garner more information from the individual's complaint. Within 30 days of the complaint being received Vinton Solar will initiate reasonable action to resolve the legitimate interference or disturbance that is a direct result of the solar facility.

5.) If Vinton Solar and the complaining resident cannot agree to a resolution proposed by Vinton Solar or one negotiated with the complaining resident, Vinton Solar will provide a summary of the complaint and proposed resolution to the complaining resident so that the resident may bring the complaint to the Ohio Power Siting Board.

Exhibit J

Certificate of Liability Insurance

CONFIDENTIAL

FILED UNDER SEAL

Vinton Solar Energy LLC has requested confidential treatment of this document in accordance with OAC Rule 4906-2-21.

This document contains critical infrastructure information, confidential research and development information, commercial information, trade secrets, and/or proprietary information and, as such, is entitled to confidential treatment under state and/or federal statutes and regulations.

An unredacted version of the following document has been submitted to the Docketing Division of the OPSB in accordance with OAC Rule 4906-2-21(D)(2):

Christine M.T. Pirik (0029759)
(Counsel of Record)
William V. Vorys (0093479)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
Phone: (614) 591-5461
Email: cpirik@dickinsonwright.com
wvorys@dickinsonwright.com

Attorneys for Vinton Solar Energy LLC

Vinton Solar Energy LLC
Case No. 17-774-EL-BGN

Exhibit K

Vinton County Airport Notice
May 2017

Christine M.T. Pirik (0029759)
(Counsel of Record)
William V. Vorys (0093479)
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Attorneys for Vinton Solar Energy LLC

May 25, 2017

Mr. Nick Rupert
President – Vinton County Pilots & Boosters Association
66285 Airport Rd,
New Plymouth, OH 45654

Dear Mr. Jennings:

The Ohio Power Siting Board requires Vinton Solar Energy LLC (Vinton Solar) to notify public and private airports within five miles of the proposed solar facility we are planning outside of McArthur. The Vinton County Airport is just under 3 miles to the north of the proposed solar project area.

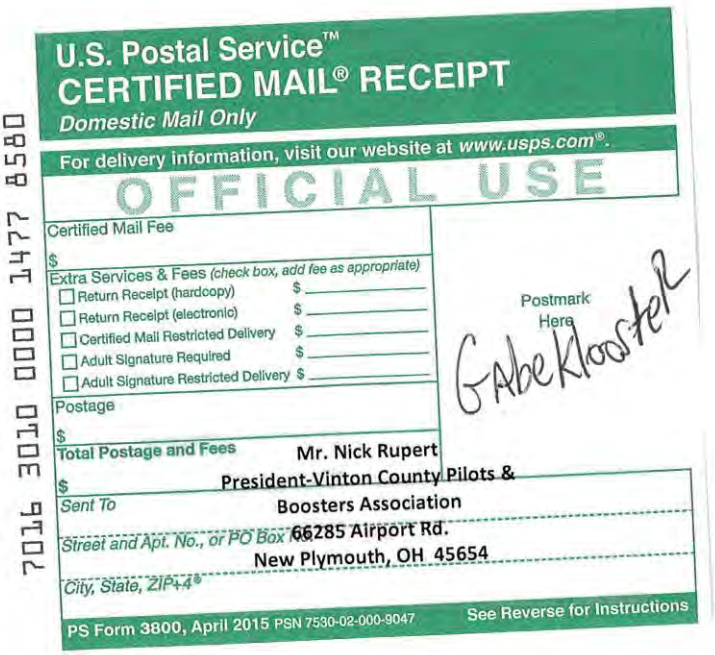
As the runway of the airport is oriented from east to west, and the solar project is due south, we do not believe Vinton Solar will have any impact on landing/approach procedures. We have run a glare analysis of the project, and found no risk of glare for either east-west or west-east landings at the airport.

Thank you for your time and should you have any follow up questions, please feel free to contact me.

Sincerely,

Gabe Klooster
Analyst, Business Development

Vinton Solar Energy LLC
One South Wacker Drive, Suite 1800
Chicago, IL 60606
312-638-8478
gklooster@invenergyllc.com



Vinton Solar Energy LLC
Case No. 17-774-EL-BGN

Exhibit L

U.S. Fish and Wildlife Service Communication
April 2017

Christine M.T. Pirik (0029759)
(Counsel of Record)
William V. Vorys (0093479)
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Columbus, Ohio 43215
Phone: (614) 591-5461
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Attorneys for Vinton Solar Energy LLC

From: Whittle, Jason <JWhittle@trcsolutions.com>
Sent: Wednesday, April 12, 2017 11:03 AM
To: Sponsler, Michael
Subject: Fwd: Invenergy LLC, Vinton Solar Energy Center Project, Vinton Co.

Out in field today. Second letter to follow

Jason Whittle
330.472.8210

From: susan_zimmermann@fws.gov <susan_zimmermann@fws.gov> on behalf of Ohio, FW3 <ohio@fws.gov>
Sent: Wednesday, April 12, 2017 10:58:35 AM
To: Whittle, Jason
Cc: nathan.reardon@dnr.state.oh.us; kate.parsons@dnr.state.oh.us
Subject: Invenergy LLC, Vinton Solar Energy Center Project, Vinton Co.

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service
Ecological Services Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / Fax (614) 416-8994

TAILS: 03E15000-2017-TA-1089

Dear Mr. Whittle,

We have received your recent correspondence requesting information about the subject proposal. There are no federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. The following comments and recommendations will assist you in fulfilling the requirements for consultation under section 7 of the Endangered Species Act of 1973, as amended (ESA).

The U.S. Fish and Wildlife Service (Service) recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat (e.g., forests, streams, wetlands). Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted to determine whether a Clean Water Act section 404 permit is required. Best management practices should be used to minimize erosion, especially on slopes. All disturbed areas should be mulched and revegetated with native plant species. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats.

FEDERALLY LISTED SPECIES COMMENTS: All projects in the State of Ohio lie within the range of the federally endangered **Indiana bat** (*Myotis sodalis*) and the federally threatened **northern long-eared bat** (*Myotis septentrionalis*). In Ohio, presence of the Indiana bat and northern long-eared bat is assumed wherever suitable habitat occurs unless a presence/absence survey has been performed to document absence. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches diameter at breast height (dbh) that have any exfoliating bark, cracks, crevices, hollows and/or cavities), as well as linear

features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. In the winter, Indiana bats and northern long-eared bats hibernate in caves and abandoned mines.

Should the proposed site contain trees ≥3 inches dbh, we recommend that trees be saved wherever possible. If any caves or abandoned mines may be disturbed, further coordination with this office is requested to determine if fall or spring portal surveys are warranted. If no caves or abandoned mines are present and trees ≥3 inches dbh cannot be avoided, we recommend that removal of any trees ≥3 inches dbh only occur between October 1 and March 31. Seasonal clearing is being recommended to avoid adverse effects to Indiana bats and northern long-eared bats. While incidental take of northern long-eared bats from most tree clearing is exempted by a 4(d) rule (see http://www.fws.gov/midwest/endangered/mammals/nleb/index.html), incidental take of Indiana bats is still prohibited without a project-specific exemption. Thus, seasonal clearing is recommended where Indiana bats are assumed present.

If implementation of this seasonal tree cutting recommendation is not possible, summer surveys may be conducted to document the presence or probable absence of Indiana bats within the project area during the summer. If a summer survey documents probable absence of Indiana bats, the 4(d) rule for the northern long-eared bat could be applied. Surveys must be conducted by an approved surveyor and be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have a valid federal permit. Please note that summer surveys may only be conducted between June 1 and August 15.

If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), no tree clearing should occur on any portion of the project area until consultation under section 7 of the ESA, between the Service and the federal action agency, is completed. We recommend that the federal action agency submit a determination of effects to this office, relative to the Indiana bat and northern long-eared bat, for our review and concurrence.

Due to the project type, size, and location, we do not anticipate adverse effects to any other federally endangered, threatened, proposed, or candidate species. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be initiated to assess any potential impacts.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the ESA, and are consistent with the intent of the National Environmental Policy Act of 1969 and the Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. We recommend that the project be coordinated with the Ohio Department of Natural Resources due to the potential for the project to affect state listed species and/or state lands. Contact John Kessler, Environmental Services Administrator, at (614) 265-6621 or at john.kessler@dnr.state.oh.us.

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or ohio@fws.gov.

Sincerely,

Dan Everson
Field Office Supervisor

cc: Nathan Reardon, ODNR-DOW

Kate Parsons, ODNR-DOW

Vinton Solar Energy LLC
Case No. 17-774-EL-BGN

Exhibit M

TRC Cultural Resources Records Report
June 2017

Christine M.T. Pirik (0029759)
(Counsel of Record)
William V. Vorys (0093479)
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Attorneys for Vinton Solar Energy LLC

TRC
Results you can rely on

Liberty Technology Center
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CONFIDENTIAL BUSINESS INFORMATION

June 9, 2017

Gabe Klooster
Analyst, Business Development
Invenergy
One South Wacker Drive, Suite 1800
Chicago, IL 60606

Re: Cultural Resources Due Diligence Records Review
Vinton Solar Energy Center Project
Vinton County, Ohio

Project Description

On behalf of the Vinton Solar Energy, LLC (VSE), TRC Environmental Corporation (TRC) has prepared this Cultural Resources Due Diligence Records Review as part of the environmental studies conducted for the Vinton Solar Energy Center Project located in Elk Township, Vinton County, OH (Figure 1). The Project Area of Potential Effects (APE) consists of approximately 658 acres of pasture land and comprises all areas of proposed ground disturbance. The project area in its entirety has been previously impacted by past surface coal mining activity.

Database Review

TRC conducted a records review of the resources available from the State Historic Preservation Office (SHPO), i.e. Ohio Historic Preservation Office (OHPO) including the Ohio Historic Inventory (OHI), the Ohio Archaeological Inventory (OAI), and the National Register of Historic Places (NRHP) files, as well as information on historic cemeteries maintained by the Ohio Genealogical Society (OGS). As part of this records review, TRC examined all available cultural resources survey reports relating to previous investigations in the area. This review identified previously surveyed, National Register-eligible, or National Register-listed resource structures or districts within the defined area of interest (AOI) and constituted the initial cultural background research and architectural (visual effects) Area of Potential Effects (APE) for the project.

The APE for architectural resources is based primarily on those resources and areas that could potentially fall within line of sight of the proposed facility. It consisted of an 8-km (5-mi) radius around the proposed Vinton Solar Power Facility (Figure 2). Based on topography, areas of potential site visibility and areas of potential obstructed viewshed, TRC further refined the research area to include only those resources within a 0.6-km (1-mi) radius of the project footprint as well.

The APE for ground disturbance consists of the approximately 658 acres which comprises all areas that will fall within the proposed fence-line in which the construction will take place.

This records review was conducted in accordance with the Secretary of the Interior's Standards for Archaeology and Historic Preservation (Federal Register Vol. 48, No. 190, Part IV, (1983) and the OHPO's Archaeological Guidelines (1994).

The final task of the background research was to conduct a brief review of soils and topographic conditions. Archaeological sites in the area are known to be associated with certain environmental parameters, which can then be used to help assess the relative potential of the project for containing archaeological sites.

Historic Architectural Resources

Background research in the OHPO Online Mapping System revealed there are no previously surveyed architectural resources or NRHP-listed or eligible resources located within the APE boundaries. There are five NRHP-listed architectural resources located within the 5-mile radius AOI (see Figure 2). Four of these NRHP-listed resources are located in the town of Zaleski approximately three miles east of the project area, and the remaining is located in the town of McArthur, approximately one mile to the west of the project area. There are a total of 351 previously surveyed resources located within the 5-mile AOI. Most of these previously surveyed resources are clustered in the towns of Zaleski and McArthur. Based on topography, areas of potential site visibility and areas of potential obstructed viewshed, the research area was further refined to include only those resources within a 0.6-km (1-mi) radius. Only eight previously surveyed resources were identified within a 1-mile radius of the project area, which are listed in the table below and depicted on Figure 3. These resources within the 1-mile radius have yet to be evaluated for NRHP eligibility. In addition to these resources, three cemetery resources were identified within the 1-mile AOI (see Figure 3).

HISTORIC ARCHITECTURAL RESOURCES WITHIN 1-MILE RADIUS		
OHI SURVEY ID#	**RESOURCE NAME/TYPE**	**DATE**
VIN0009407	**Dwelling**	**c.1900**
VIN0008807	**Dwelling**	**c.1860**
VIN0001607	**Dwelling**	**c.1890**
VIN0001707	**ODOT Building**	**c.1930**
VIN0010107	**Dwelling**	**c.1850**
VIN0023907	**Dwelling - Farmhouse**	**c.1890**
VIN0024007	**Howard & Cristal Lyle House**	**c.1920**
VIN0024207	**Gene Engle Barn**	**c.1900**
OGSID12106	**Elk Fork Cemetery**	
OGSID12107	**Thaddues Fuller Cemetery**	
OGSID12112	**Stevens-Robb Cemetery**	

Archaeological Resources

The file review revealed 434 archaeological resources were previously documented within the 8-km (5-mi) radius of the project location (see Figure 2). A total of 383 of these resources are characterized as

open habitation sites primarily dating to an unknown prehistoric cultural temporal period. Of the remaining sites, 31 of these are characterized as prehistoric and historic multi-component resources, and 20 are characterized as historic period sites.

Of the 434 resources, 101 were identified within a 0.6-km (1-mi) radius of the project footprint, and 22 of these previously recorded archaeological resources were identified within the boundaries of the APE. These resources are listed in the table below and depicted on Figure 4. Similar to the sites documented throughout the region, the majority of the resources, 19 in total, are characterized as open habitation sites primarily dating to an unknown prehistoric cultural temporal period. Of the remaining sites within in the APE, two dated from the Archaic prehistoric temporal period and one from the Woodland period. Although these archaeological resources were previously documented within the APE footprint, they were initially identified during previous investigation areas that have been cleared for cultural resources, and are located in areas previously destroyed by past surface coal mining activity. Site 33VI0374, which is located on a hilltop adjacent to the APE was avoided during the mining activity and could potentially yield cultural material; however, this resource will also be avoided as part of the proposed solar project. To preserve it, a clearance buffer has been incorporated into the project design thereby the resource will be outside the proposed disturbed area.

ARCHAEOLOGICAL RESOURCES WITHIN THE APE		
SITE #	**SITE NAME**	**SITE TYPE**
33VI0164	**Unnamed**	**Prehistoric**
33VI0165	**Unnamed**	**Prehistoric**
33VI0166	**Unnamed**	**Prehistoric**
33VI0167	**Unnamed**	**Prehistoric**
33VI0168	**Unnamed**	**Prehistoric**
33VI0362	**Unnamed**	**Prehistoric**
33VI0363	**Unnamed**	**Prehistoric**
33VI0364	**Unnamed**	**Prehistoric**
33VI0365	**Unnamed**	**Prehistoric**
33VI0367	**Unnamed**	**Archaic Prehistoric**
33VI0369	**Unnamed**	**Prehistoric**
33VI0370	**Unnamed**	**Prehistoric**
33VI0371	**Unnamed**	**Prehistoric**
33VI0372	**Unnamed**	**Prehistoric**
33VI0373	**Unnamed**	**Prehistoric**
33VI0375	**Unnamed**	**Prehistoric**
33VI0378	**Unnamed**	**Prehistoric**
33VI0382	**Unnamed**	**Prehistoric**
33VI0495	**Unnamed**	**Prehistoric**
33VI0510	**Unnamed**	**Prehistoric**
33VI0513	**Unnamed**	**Woodland Prehistoric**

ARCHAEOLOGICAL RESOURCES WITHIN THE APE		
SITE #	**SITE NAME**	**SITE TYPE**
33VI0514	**Unnamed**	**Archaic Prehistoric**

Previous Cultural Resource Surveys

During the file review of previously conducted survey records maintained by the SHPO, it was revealed 43 Phase I Cultural Resources Surveys, seven Phase II Surveys, and one Phase III Data Recovery were completed within the 8-km (5-mi) radius of the project that have been previously cleared for cultural resources (see Figure 2). Of these surveys, six Phase I and two Phase II surveys were conducted within the APE footprint, which are listed in the table below and depicted on Figure 5.

CULTURAL RESOURCES SURVEY WITHIN THE APE		
NADB #	**SURVEY NAME**	**SURVEY TYPE**
12465	**A Benedict, Inc. Coal Mine (Permit #0718), Elk Township, Vinton Co., OH**	**Preliminary Archaeological Reconnaissance Survey**
12472	**A Benedict, Inc. Strip Mine Application #803, Elk Township, Vinton Co., OH**	**Phase I and II Archaeological Survey**
12484	**Surface Mining Permit Area D-609-2, Elk Township, Vinton Co., OH**	**Archaeological Assessment**
13128	**Surface Mining Permit Area D-609-3, Elk Township, Vinton Co., OH**	**Phase I Archaeological Investigation**
13629	**Surface Mining Permit Area D-609-4, Elk Township, Vinton Co., OH**	**Phase I Cultural Resource Survey**
13992	**Surface Mining Permit Area D-609-5, Elk Township, Vinton Co., OH**	**Phase I Cultural Resource Survey**
12485	**Sites 33VI0365, 33VI0367, and 33VI0374, Three Prehistoric Lithic Scatters Located within the Proposed Benedict, Inc. Surface Coal Mining Tract (Permit Area D-609-2, Elk Township, Vinton Co., OH**	**Phase II Archaeological Assessment Survey**
14126	**Sites 33VI0514, 33VI0564, 33VI0572, and 33VI0573, Elk Township, Vinton Co., OH**	**Phase II Cultural Resource Evaluation**

Conclusions

The OHPO Online Mapping System revealed no previously surveyed architectural resources or NRHP-listed or eligible resources located within the APE boundaries; however, five NRHP-listed architectural resources were identified within a 5-mile radius of the APE. Based on topography, areas of potential site visibility and areas of potential obstructed viewshed, TRC further refined the research area to include only those resources within a 0.6-km (1-mi) radius of the project footprint as well. Only eight previously surveyed resources were identified within a 1-mile radius. In addition to these above ground resources, three cemetery resources were also identified within the 1-mile radius of the APE.

Based on the records review, a total of 22 archaeological resources have been previously documented within the proposed APE. Although these archaeological resources were previously documented within the APE footprint, all were located in areas that were subjected to past surface coal mining activity. Site 33VI0374 was not destroyed by past coal mining activity, but this resource location will also be avoided as part of the proposed solar project and is outside of the proposed disturbed area. It is highly probable, that past mining activity has impacted all areas within the APE, leaving no area for further archaeological investigations.

This review was conducted by professionals who meet the 36 CFR 61 Secretary of the Interior's Professional Qualification Standards.

Sincerely,

Curtis L. Biondich, M.S., RPA
PPL Office Practice Leader/Practice Safety Lead
36CFR61-Qualified Archaeologist

References

Bier, Donald R., and John P. Nass

1986 *A Phase I and II Archaeological Survey for* a *Benedict, Inc. Strip Mine Application #803, Elk Township, Vinton Co., OH.*

Genheimer, Robert A.

1990 *An Archaeological Assessment of a Surface Mining Permit Area D-609-2, Elk Township, Vinton Co., OH.*

Haywood, Norman A.

1997 *A Phase I Cultural Resources Survey for a Surface Mining Permit Area D-609-4, Elk Township, Vinton Co., OH.*

1998 *A Phase I Cultural Resources Survey for a Surface Mining Permit Area D-609-5, Elk Township, Vinton Co., OH.*

1998 *Phase II Cultural Resource Evaluation of Sites 33VI0514, 33VI0564, 33VI0572, and 33VI0573, Elk Township, Vinton Co., OH.*

Immel-Blei, Elsie

1986 *A Preliminary Archaeological Reconnaissance Survey for a Benedict, Inc. Coal Mine (Permit #0718), Elk Township, Vinton Co., OH.*

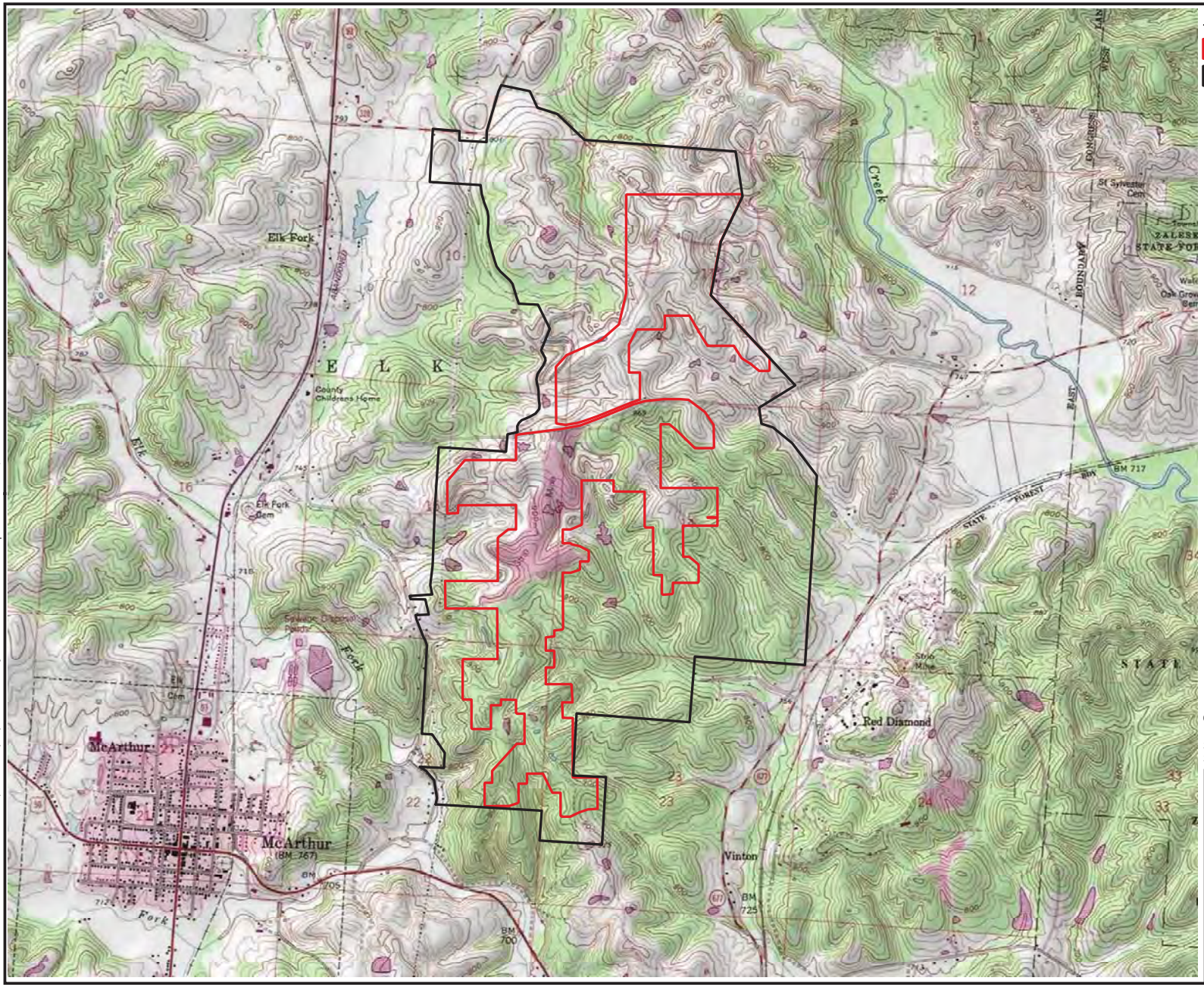
McDaniel, Gary

1998 *A Phase II Archaeological Assessment Survey of Sites 33VI0365, 33VI0367, and 33VI0374, Three Prehistoric Lithic Scatters Located within the Proposed Benedict, Inc. Strip Mining Tract (Permit Area D-609-2, Elk Township, Vinton Co., OH.*

United States Geological Survey (USGS)

1983 McArthur, Ohio 7.5-minute Quadrangle. Photorevised 1985.

1983 Zaleski, Ohio 7.5-minute Quadrangle. Photorevised 1985.



Legend

- Area of Potential Effects (APE)
- Project Area

N

0 1,000 2,000 Feet

1 " = 2,000 '

1:24,000

PROJECT:

VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:

USGS TOPOGRAPHIC MAP
PROJECT LOCATION MAP

DRAWN BY:	N.RENAUDIN	PROJ NO.:	274099.0000.0000
CHECKED BY:	J.WHITTLE		
APPROVED BY:	M.SPONSLER		1
DATE:	JUNE 2017		

TRC
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6334
www.trcsolutions.com

FILE NO.: Figure 1 Vinton.mxd

Plot Date: 6/8/2017, 15:21:17 PM by NRENAUDIN -- LAYOUT: ANSI B (11"x17")
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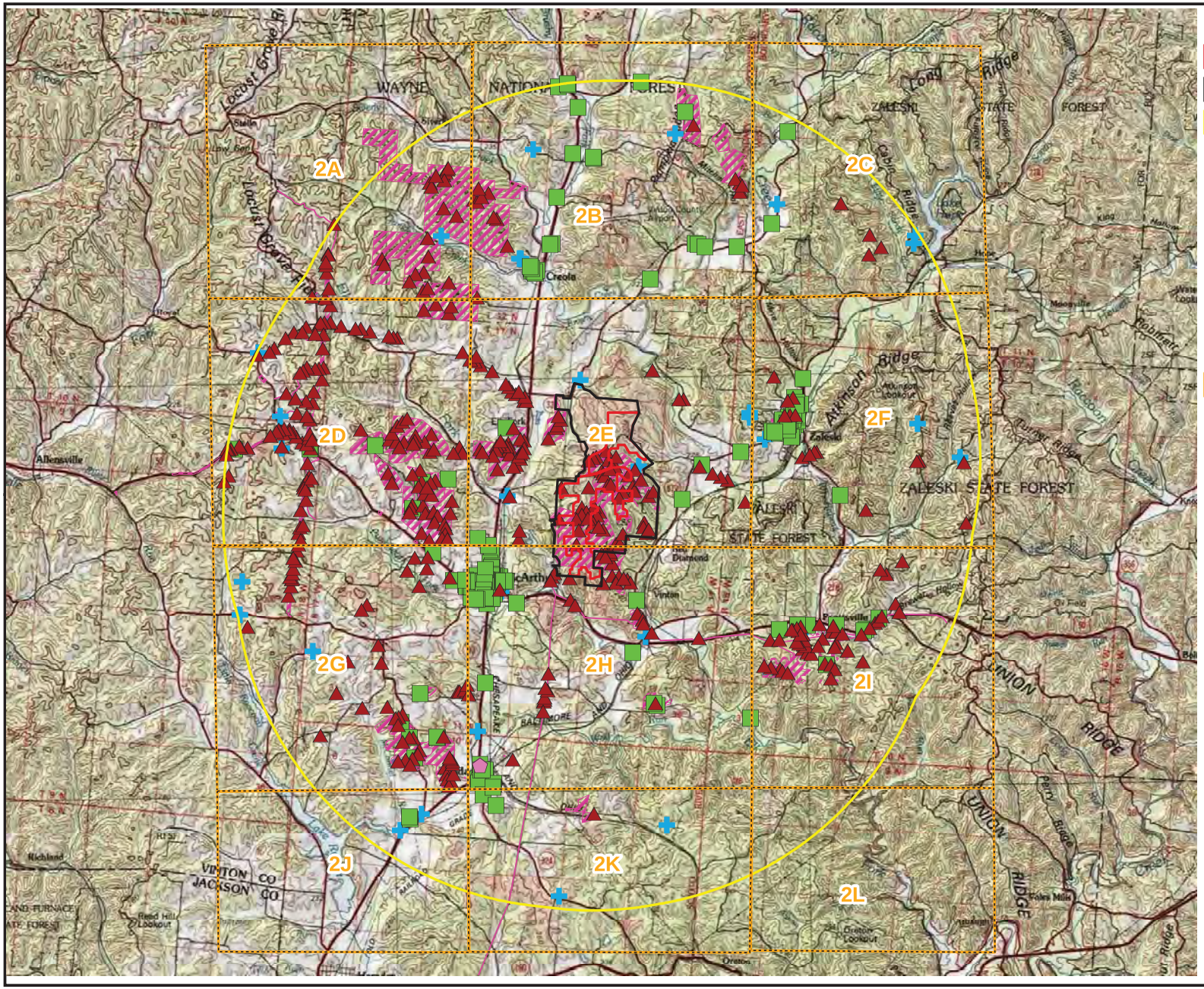
Map Rotation: 0

TRC - GIS



Legend

- Area of Potential Effects (APE)
- Project Area
- 5 Mile Buffer
- NR Determinations of Eligibility
- Archaeological Sites
- Historic Structures
- OGS Cemeteries
- Phase 1
- Phase 2
- Phase 3
- Index Grid

N

0 3,750 7,500 Feet

1 " = 7,500 '

1:90,000

PROJECT:

VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:

USGS TOPOGRAPHIC MAP
5 MILE RADIUS OF NR DETERMINATIONS OF ELIGIBILITY, ARCHAEOLOGICAL SITES, HISTORIC STRUCTURES, OGS CEMETERIES, AND PHASE 1, 2 AND 3 SURVEYS

DRAWN BY:	N.RENAUDIN	PROJ NO.:	274099.0000.0000
CHECKED BY:	J.WHITTLE		
APPROVED BY:	M.SPONSLER		2
DATE:	JUNE 2017		

TRC
921 Eastwind Drive, Suite 122
Westerville, OH 43081
Phone: 614.423.6334
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FILE NO.: Figure 2 Vinton.mxd

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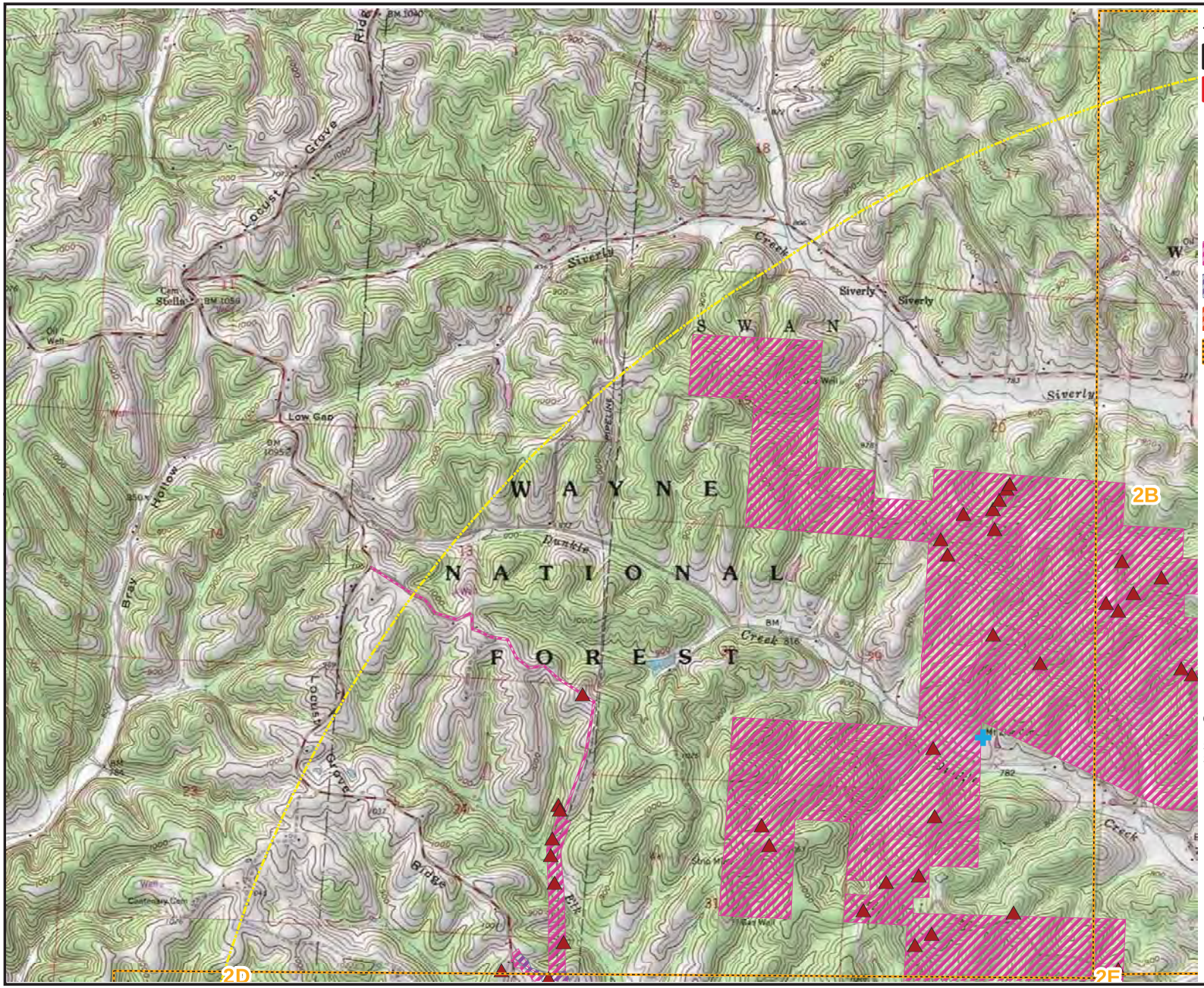
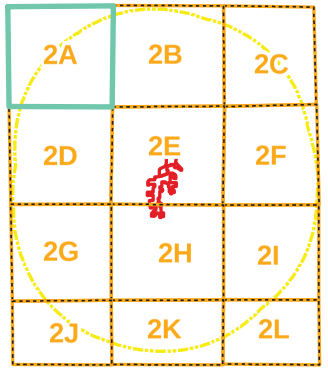
TRC - GIS



Legend

- Project Area
- Area of Potential Effects (APE)
- NR Determinations of Eligibility
- Archaeological Sites
- Historic Structures
- OGS Cemeteries
- Phase 1
- Phase 2
- Phase 3
- Index Grid



N

0 1,000 2,000 Feet

1 " = 2,000 '

1:24,000

PROJECT:

VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:

USGS TOPOGRAPHIC MAP
5 MILE RADIUS OF NR DETERMINATIONS OF ELIGIBILITY, ARCHAEOLOGICAL SITES, HISTORIC STRUCTURES, OGS CEMETERIES, AND PHASE 1, 2 AND 3 SURVEYS

DRAWN BY:	N.RENAUDIN	PROJ NO.:	274099.0000.0000
CHECKED BY:	J.WHITTLE		
APPROVED BY:	M.SPONSLER		**2 - 2A**
DATE:	JUNE 2017		

TRC
921 Eastwind Drive, Suite 122
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Phone: 614.423.6334
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FILE NO.: Figure 2 24K Vinton.mxd

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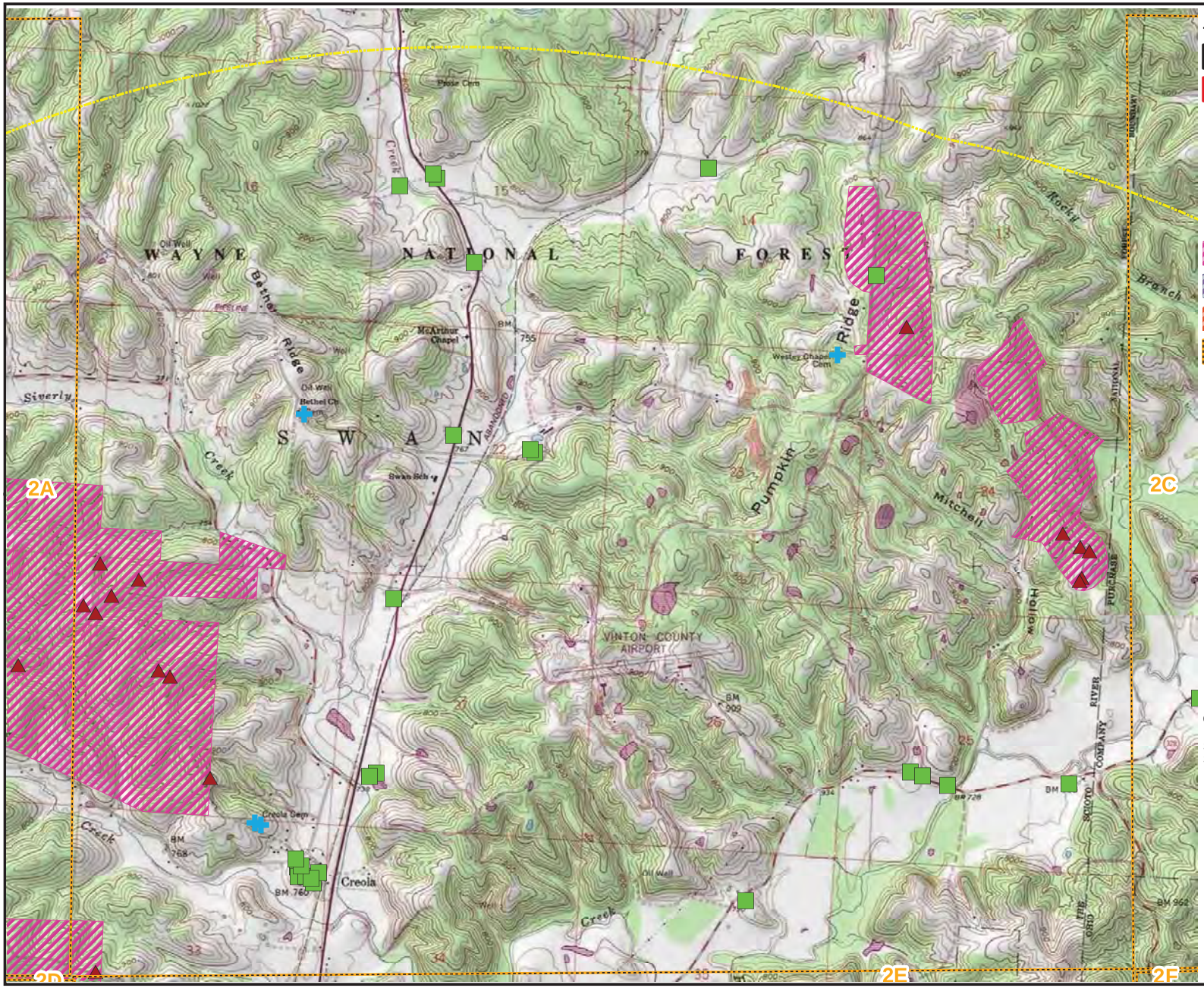
Map Rotation: 0
TRC - GIS



Legend

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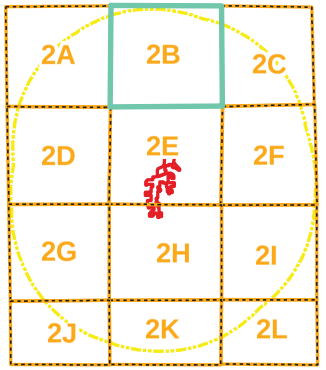

N

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1 " = 2,000 '
1:24,000

PROJECT:
VINTON SOLAR ENERGY, LLC
VINTON SOLAR ENERGY CENTER PROJECT
CONFIDENTIAL BUSINESS INFORMATION

TITLE:
USGS TOPOGRAPHIC MAP
5 MILE RADIUS OF NR DETERMINATIONS OF ELIGIBILITY, ARCHAEOLOGICAL SITES, HISTORIC STRUCTURES, OGS CEMETERIES, AND PHASE 1, 2 AND 3 SURVEYS

DRAWN BY:	N.RENAUDIN	PROJ NO.:	274099.0000.0000
CHECKED BY:	J.WHITTLE		
APPROVED BY:	M.SPONSLER		**2 - 2B**
DATE:	JUNE 2017		

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Coordinate System: NAD 1983 CORS96 StatePlane Ohio South FIPS 3402 Ft US (Foot US)
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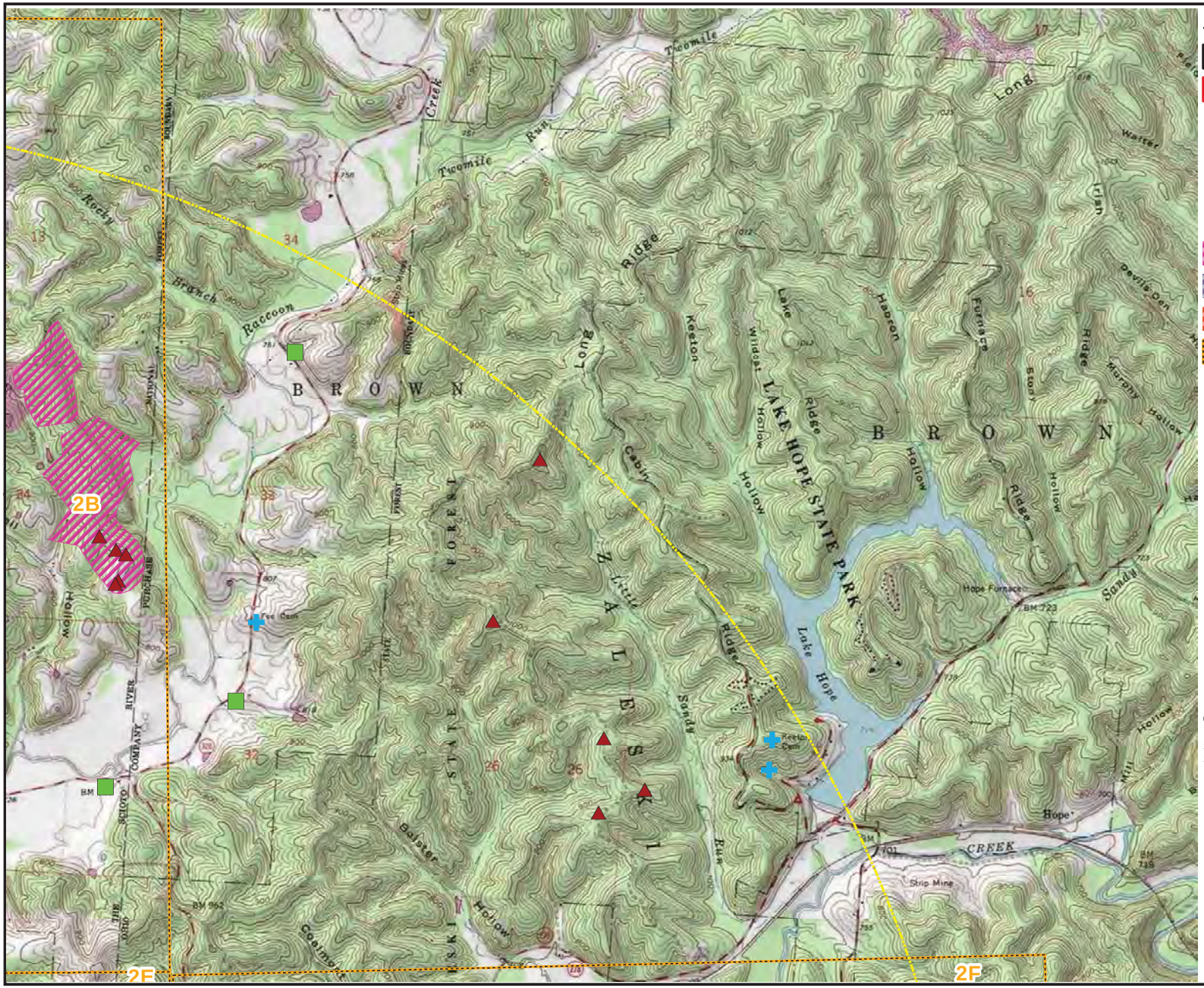

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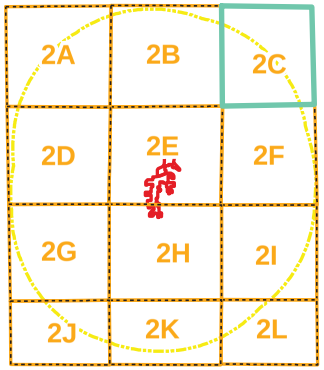

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APPROVED BY:	M.SPONSLER		2 - 2C
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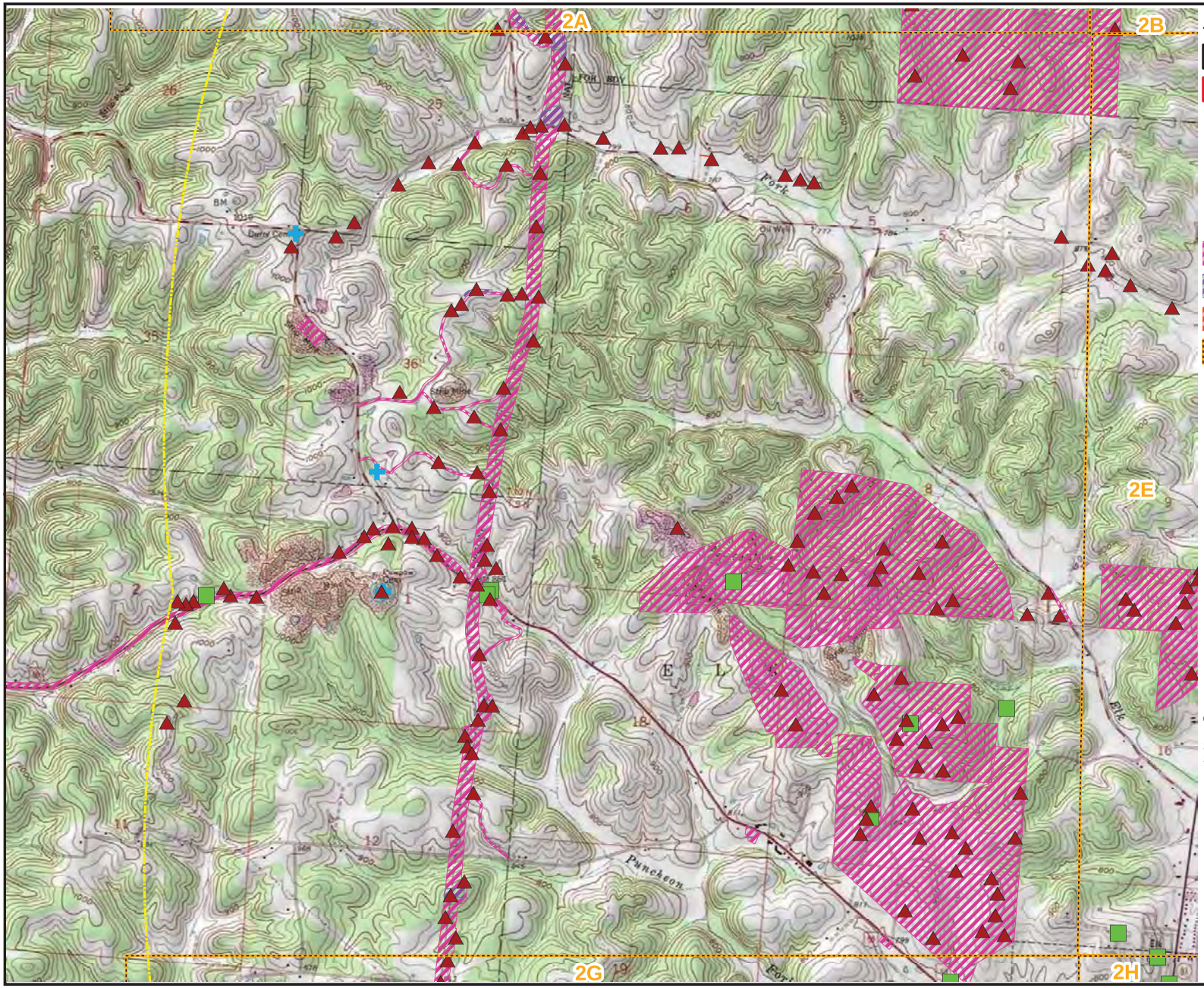

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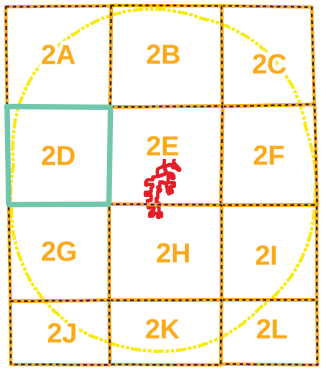

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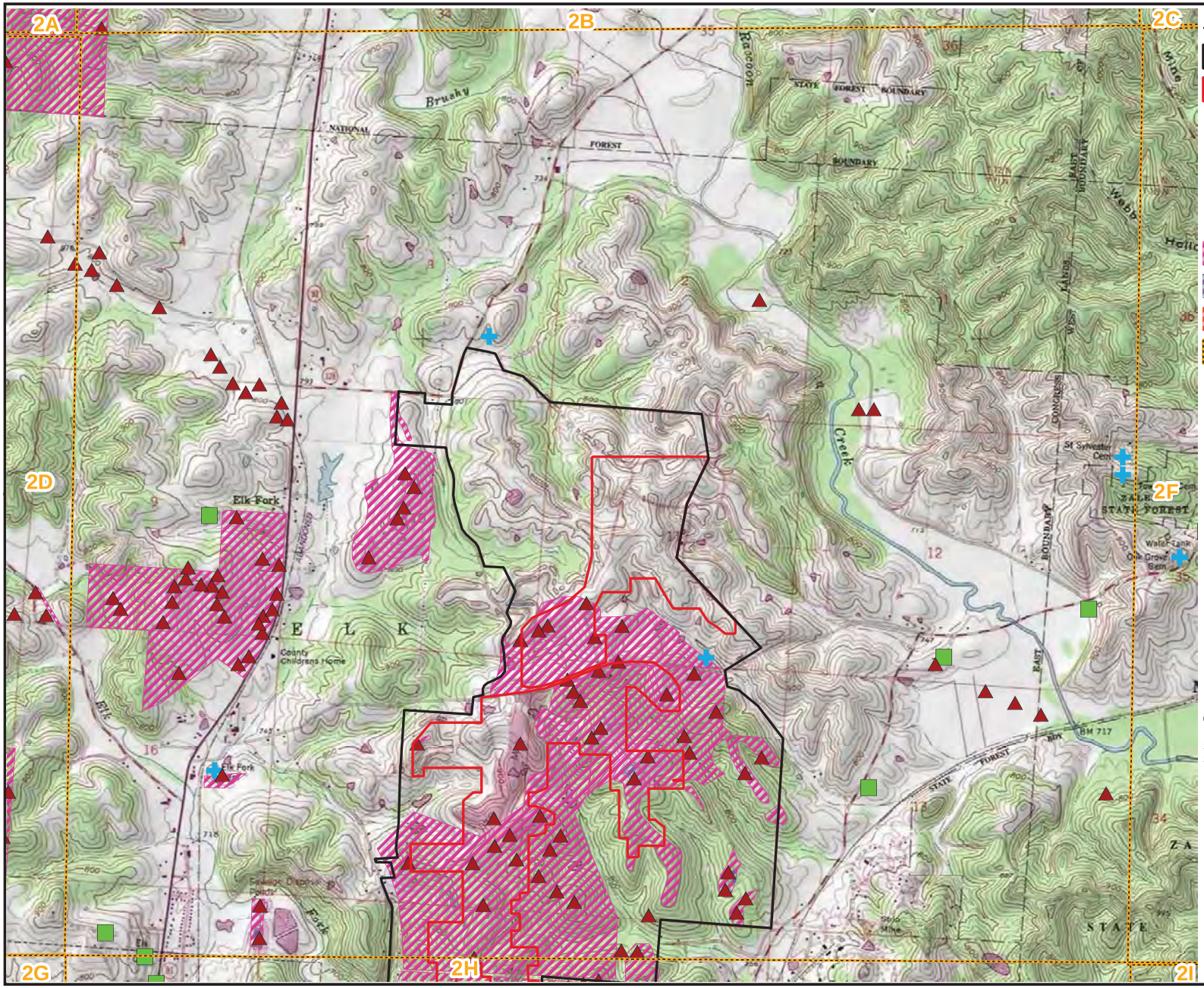

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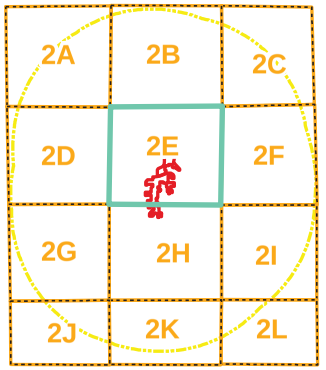

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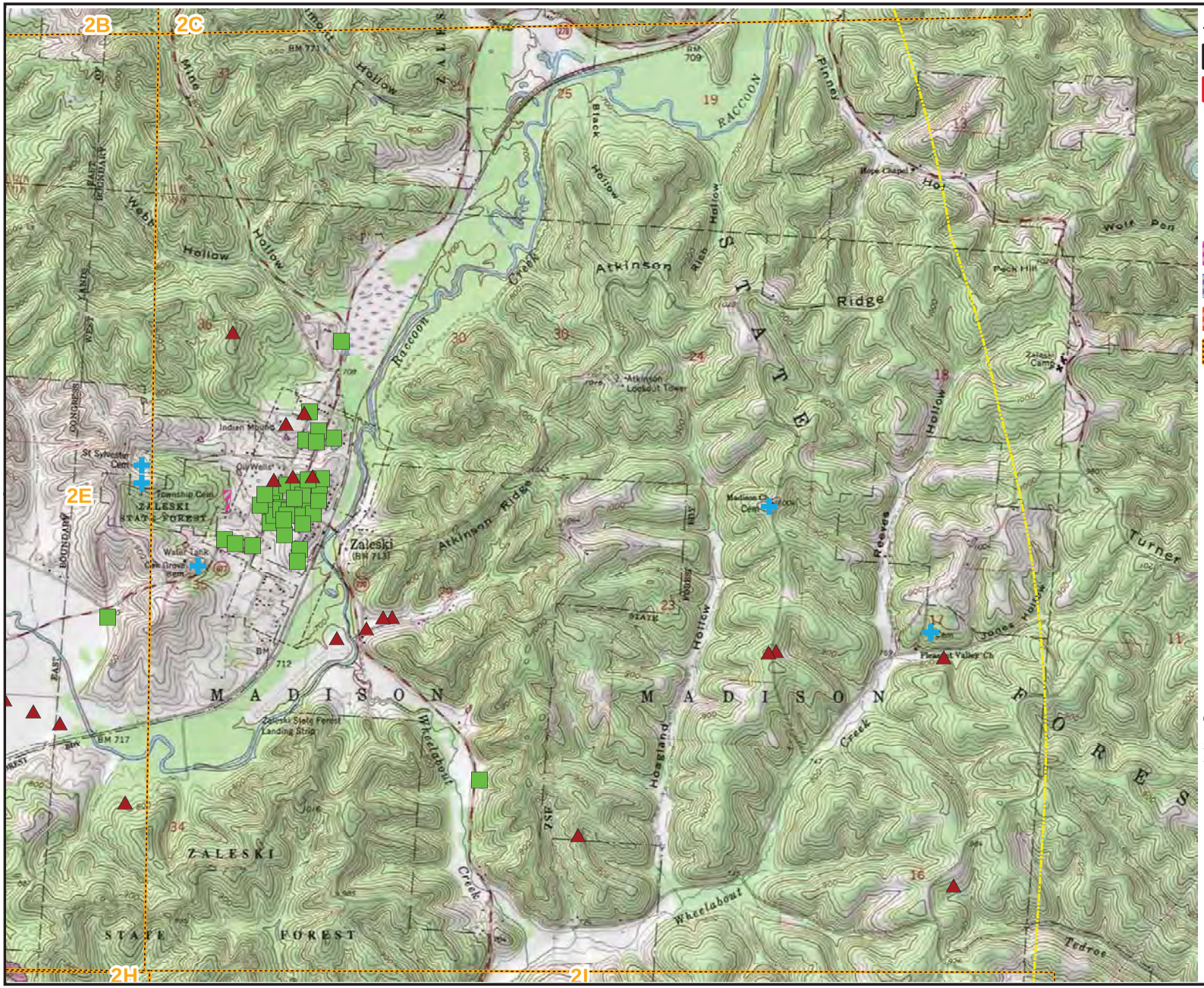

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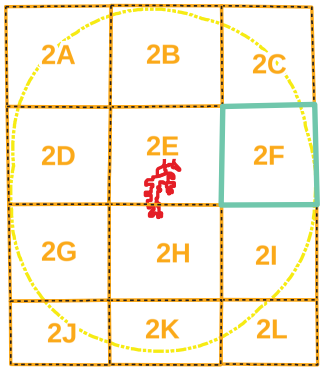

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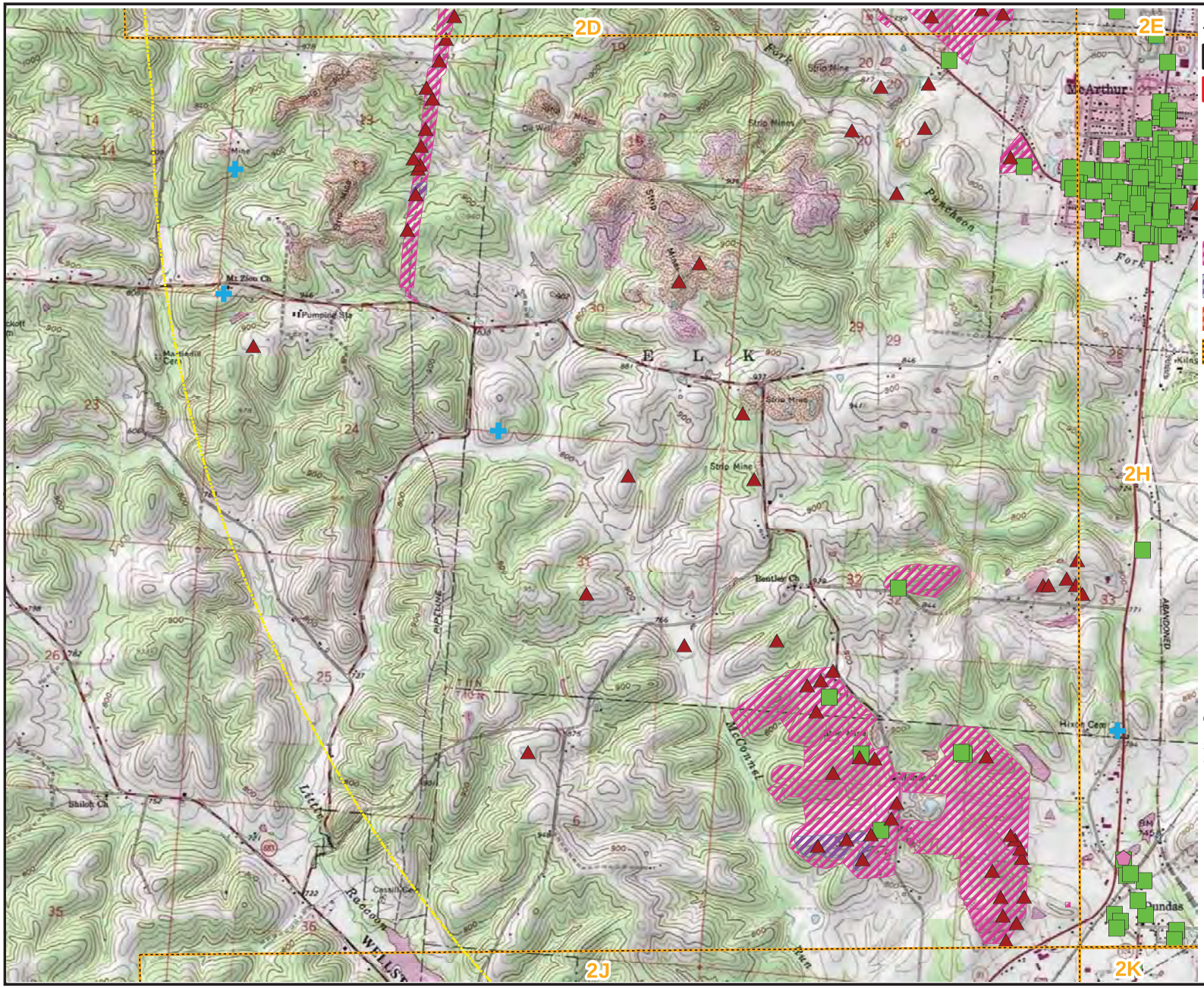

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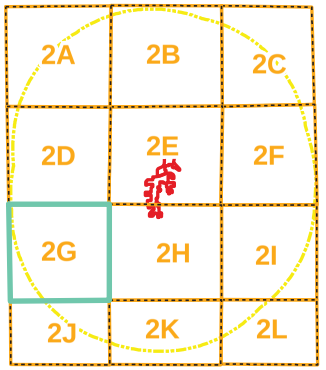

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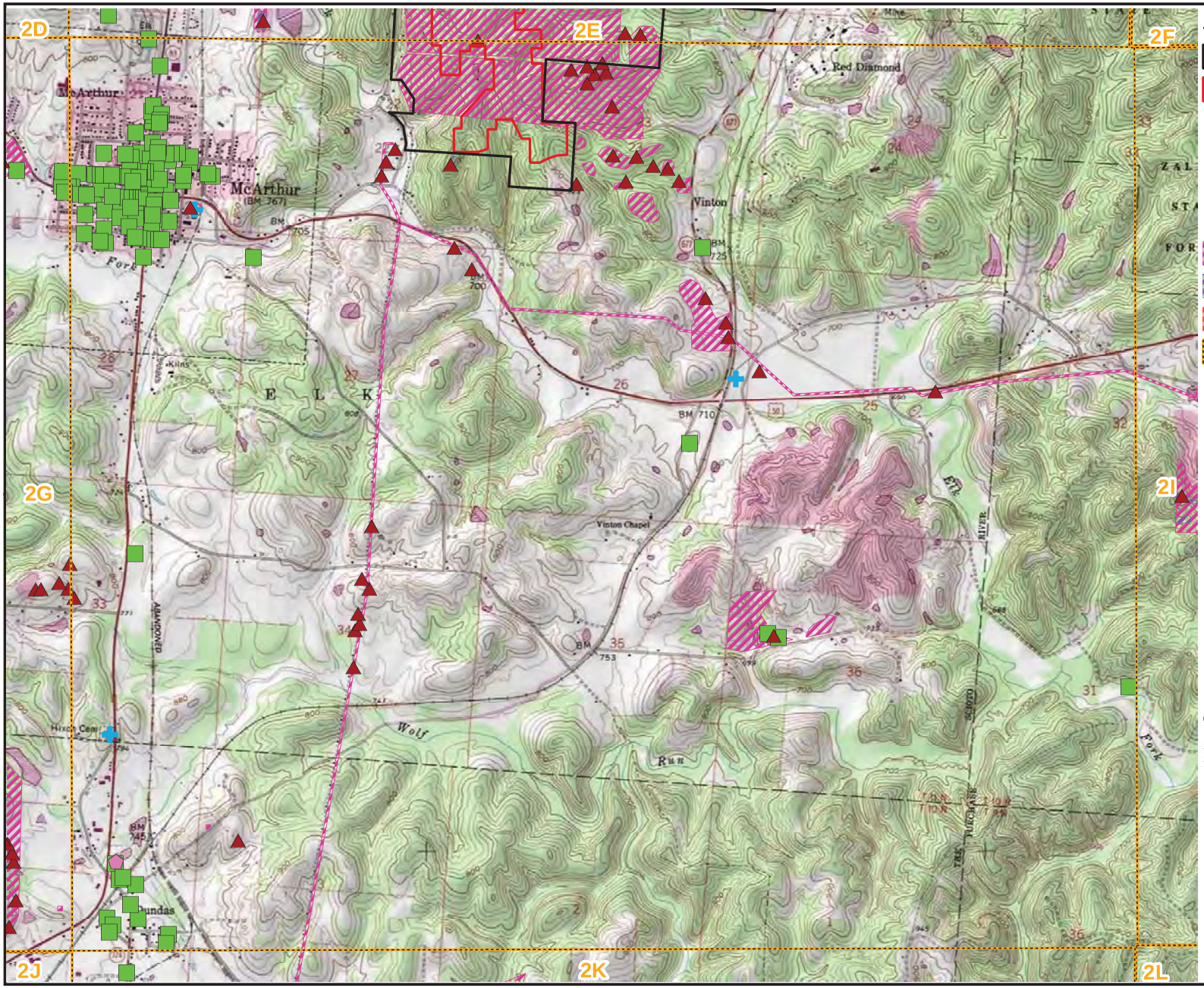

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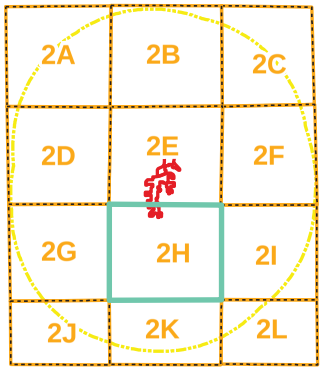

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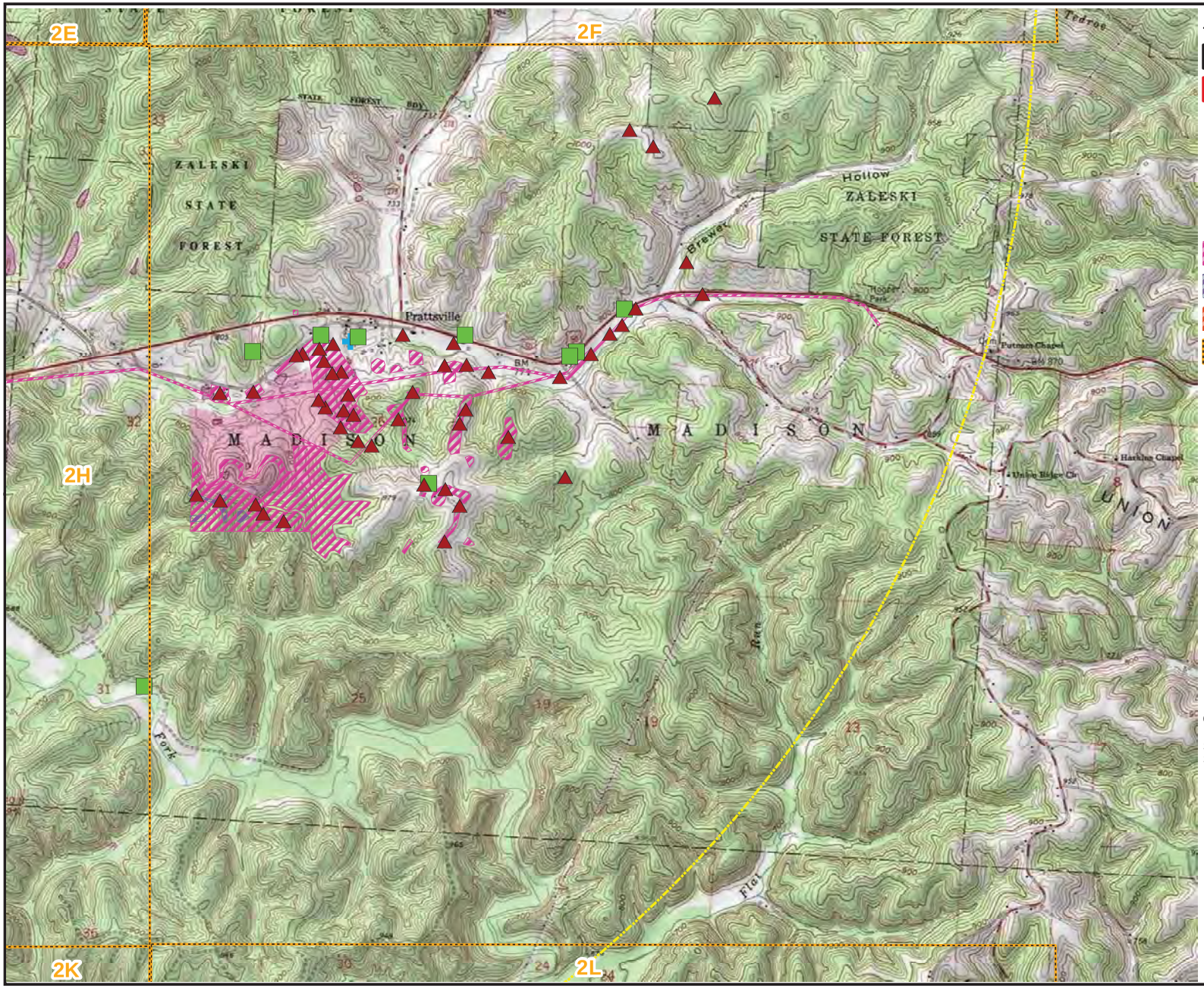

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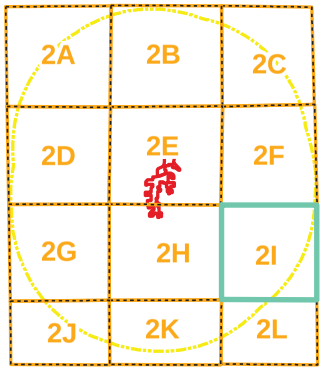

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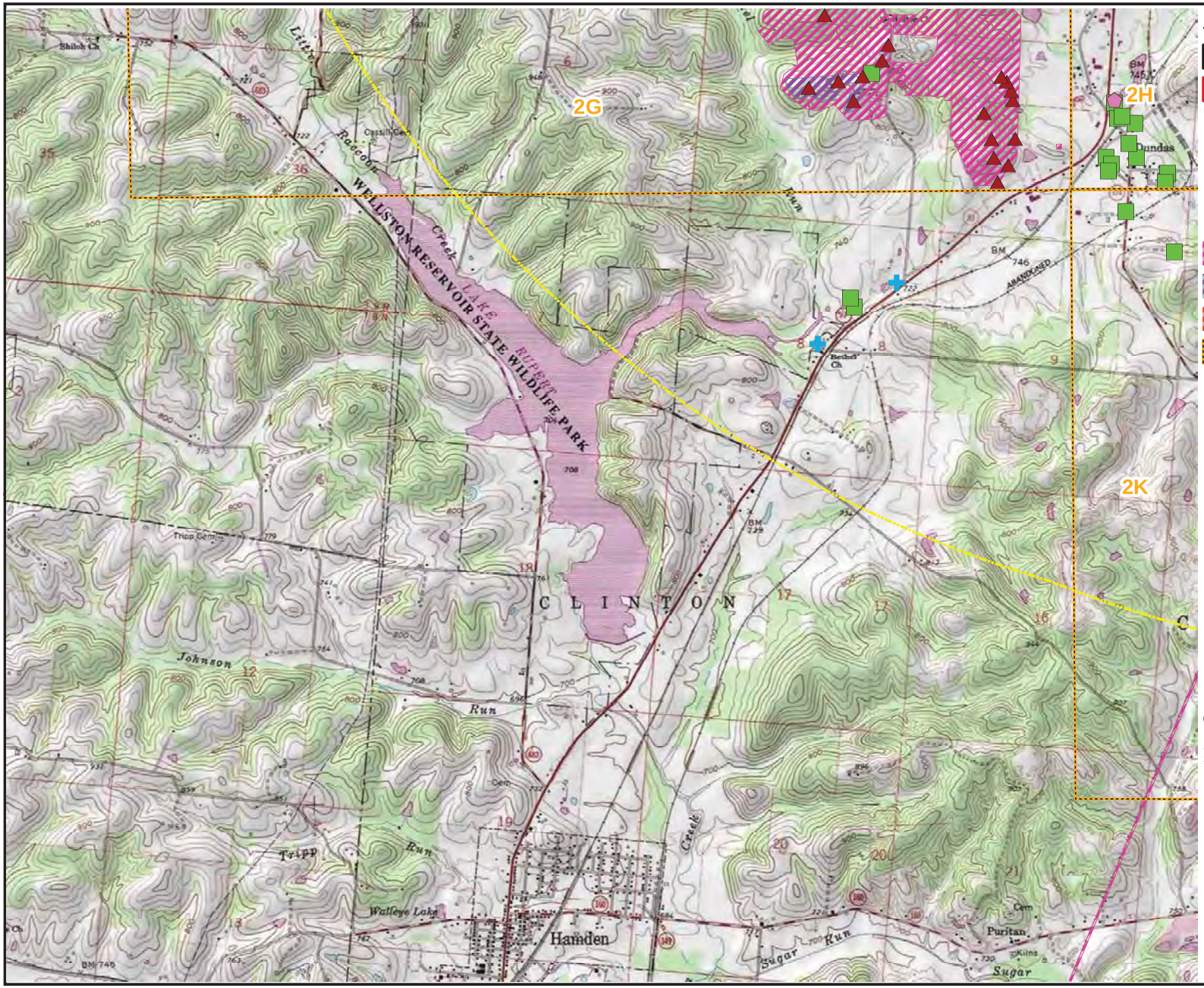

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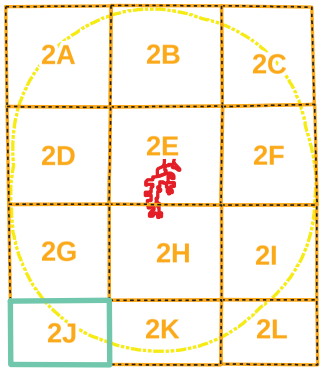

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Summary: Application Part 5 of 5 (part 1 of 2) Exhibits G through P electronically filed by Christine M.T. Pirik on behalf of Pirik, Chris M.T.