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

In the Matter of:

Electronic Application of Golden Solar, LLC for Certificate of Construction for an Approximately 100 Megawatt Merchant Electric Solar Generating Facility in Golden County, Kentucky	))))	Case No. 2020-00243

Response to Siting Board Staff's First Request for Information

Applicant, Golden Solar, LLC, herewith submits responses to the Siting Board Staff's First Request for Information. A signed certification of this Response on behalf of Golden Solar, LLC appears on the following page.

Respectfully submitted,

/s/ Kathryn A. Eckert

Jason R. Bentley
Katherine K. Yunker
Kathryn A. Eckert
McBrayer PLLC
201 East Main St., Suite 900
Lexington, KY 40507
(859) 231-8780
jbentley@mmlk.com
kyunker@mcbrayerfirm.com
keckert@mcbrayerfirm.com

Counsel for Applicant,
Golden Solar, LLC

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

In the Matter of:

Electronic Application of Golden Solar, LLC for Certificate of Construction for an Approximately 100 Megawatt Merchant Electric Solar Generating Facility in Golden County, Kentucky	))))	Case No. 2020-00243

Certification of Response to Information Requests

This is to certify that I have supervised the preparation of the response to the Siting Board Staff's First Request for Information to Golden Solar, LLC on behalf of the corporate respondent and that the responses are true and accurate to the best of my knowledge, information and belief after reasonable inquiry.

Courtney Pelissero

Courtney Pelissero, Permitting Specialist

Request

1. Provide a schedule for the project, starting from the receipt of the proposed certificate for construction to the completion of the project, and include the length of each construction phase.

Response

Task	Estimated Duration	Anticipated Timeframe 2024-2025
Site preparation	60 days	June - July
Pile Installation	150 days	August - December
Racking Installation	150 days	October - February
Module Installation	170 days	November -April
Project Substation	270 days	September - May
Transmission line	45 days	April - May
Operations building/parking lot	120 days	December - April
Mechanical Completion	100 days	April - July
Commissioning	120 days	June - September

Request

2. Provide the number of miles between the Golden Solar project and the Caldwell Solar, LLC (Caldwell Solar) Project, Case No. 2020-00244.[1]

[1] Case No. 2020-00244, *Electronic Application of Caldwell Solar, LLC for a Certificate of Construction for an Approximately 200 Megawatt Merchant Electric Solar Generating Facility in Caldwell County, Kentucky,* (Ky. PSC Apr. 8, 2022).

Response

At the nearest point, the property boundary for Golden Solar is 75 feet from the property boundary for Caldwell Solar. The projects are divided by a railroad, with parts of the projects also divided by Marion Road.

Request

3. Explain any overlaps in the projected construction schedules between Golden Solar and Caldwell Solar.

Response

Golden Solar and Caldwell Solar have overlaps in their projected construction schedules.

Task	Estimated Duration	Golden Anticipated Timeframe 2024-2025	Caldwell Anticipated Timeframe 2024-2025
Site preparation	60 days	June - July	September - October
Pile Installation	150 days	August – December	November - March
Racking Installation	150 days	October - February	January - May
Module Installation	170 days	November -April	February -July
Project Substation	270 days	September - May	November - July
Transmission line	45 days	April - May	June - July
Operations building/parking lot	120 days	December - April	March - June
Mechanical Completion	100 days	April - July	July - October
Commissioning	120 days	June - September	September - December

Request

4. Describe the potential for cumulative effects on traffic and roadways from construction activities between Golden Solar and Caldwell Solar, and any steps planned to minimize these effects.

Response

If both Caldwell Solar and Golden Solar are constructed around the same time, National Grid Renewables will strive to mitigate traffic and noise impacts by creating construction schedules that optimize efficiency and flow across the two Project sites. The goal of constructing two projects around the same time is to share resources and construction activities across the sites to reduce the total construction period time. National Grid Renewables will coordinate traffic and roadway activities with Caldwell County and will comply with any permits or agreements to mitigate impacts to roads.

Request

5. Describe the potential for cumulative effects on property values and land uses from the construction and operation from Golden Solar and Coldwell Solar.

Response

As described in the property value impact report, Cohn Reznick finds that solar facilities do not have negative impacts on adjacent property values, no matter the size, and therefore does not anticipate the siting of these two projects near each other would change this finding, as it would be similar to one, large solar facility.

Request

6. Verify if a power purchase agreement has been made. If so, provide.

Response

A power purchase agreement has not been made at this time; Golden Solar is actively marketing the power output for the project.

Request

7. Refer to the Application, Exhibit C, Attachment C, page 24.
    a. Explain whether Exhibit C, page 24 was provided to community leaders in Caldwell, Crittenden, Hopkins and Lyon counties, residents, or other interested parties who have spoken to Golden Solar representatives or attended public meetings.
    b. Explain how the estimate of 150 construction and related service jobs was determined and whether these are direct employment jobs during the project construction phase was determined. Include in the response whether the number of estimated direct jobs is based on National Grid Renewables' previous construction experience for projects of this size.
    c. Explain and provide a list of the types of construction and service- related jobs that will be created during the project construction phase.
    d. Explain how the estimate of four full time jobs during the project operational phase was determined.

Response

a. Exhibit C was provided to attendees of the March 2022 public information meeting, including Caldwell County community leaders.

b. The estimate of 150 construction and related service jobs is based on previous construction experience and available data for projects of this size. These jobs are directly tied to the construction of the project.

c. Electricians, operators, carpenters, laborers and various specialized subcontractors will be hired to support the project construction phase. These jobs will support site preparation and installation of piling, racking, tracker systems, modules, inverters, collection system, substation, transmission system, SCADA system, MET stations, and vegetation management.

d. The estimate of four full-time jobs during operation is based on previous experience with projects of this size

Request

8. Explain whether it is National Grid Renewables policy to hire as many local workers as feasible to perform work during the construction and operational phases of its projects.

Response

National Grid Renewables strives to hire as many qualified local workers as feasible to perform work during the construction and operational phases of its projects.

Request

9. Based upon National Grid Renewable's experience, explain how many of the types of jobs created by projects similar to the Golden Solar project are filled by hiring locally, which in this case is the four county Regional Socioeconomic Area of Interest (Regional SAOI) including Caldwell, Crittenden, Hopkins, and Lyon counties.

Response

The percentage of local hiring will vary based on regional differences and levels of skilled craft found in the local communities. For one National Grid Renewables project in Ohio, approximately 80% of jobs have been filled by local hires.

Request

10. During the project's 25-year operational phase, explain the types of work that will be conducted and the worker skills necessary to inspect, repair, and maintain the equipment and grounds.

Response

Operations activities typically include the following:

- corrective and preventative maintenance of the inverters, trackers, PV Panels, and other electrical and mechanical components in the PV field;
- substation maintenance of the high and medium voltage equipment; and
- vegetation management of the lease area as well as other ground maintenance.

Skills necessary to inspect, repair, and maintain the equipment and grounds include a good electrical and mechanical background, education, work experience, or a combination of the three with an emphasis on electrical.

Request

11. Refer to the Application, Exhibit F, page 3. Explain the rationale for selecting a four county Regional SAOI as opposed to focusing on Caldwell County alone.

Response

This is a professional judgement that attempted to balance uncertainty with geographic resolution. Generally speaking, economic impact analyses are less accurate when analyzed at scales associated with small populations and/or small economies. On the other hand, estimates for larger areas, like at the level of the state or the nation, have lower uncertainty but less geographic resolution. Because the Project Area is situated in a rural setting with low population density, and in a corner of Caldwell County within short commutes to other counties within Kentucky, it was deemed prudent to include more than just Caldwell County. The borders for Crittenden and Lyon counties are both within 5 miles of the Project Area, while Hopkins County is approximately 10 miles from the Project boundary at the closest approach. It is anticipated that employees and contractors associated with the development, construction, and operations of the facility will engage with business in and nearby to the Project site, while working on the Project.

Request

12. Refer to the Application, Exhibit F, page.
    a. Explain the differences between the JEDI model and the IMPLAN model. Explain why the JEDI model is better suited for conducting economic impact analyses for solar projects than the IMPLAN model. Include in the response differences in estimation results from the two models.
    b. Explain the source of the multipliers used in the JEDI model.
    c. Explain whether it is possible to conduct the economic impact analysis at the individual county level and, if not, explain why not.

Response

a. JEDI is a streamlined version of the IMPLAN model that has been curated by solar industry experts hired by the National Renewable Energy Laboratory (NREL). It uses IMPLAN data to populate the underlying economic environment. In addition, some of the model selection processes that are typically specified by the analyst in traditional IMPLAN runs are pre-selected by NREL experts in JEDI through their extensive solar industry research. A well specified JEDI analysis should not be materially different from a well specified IMPLAN analysis for the same project.

b. The source of data driving the estimates in JEDI are IMPLAN Group data at the state level.

c. Golden Solar performed an economic impact analysis on the local area surrounding the project. As stated, there is increased uncertainty with more geographic resolution. Generally speaking, the majority of the tax revenues associated with Golden Solar will be seen in Caldwell County, while the other Counties considered in the analysis would experience sales tax revenues from the sales of goods and services purchased by employees and contractors of the Project.

Request

13. Refer to the Application, Exhibit F, page 4, Table 2, Estimated Economic Impacts: Kentucky. Also, refer to the Application, Exhibit C, page 24. Table 2 states that Golden Solar is going to create 79.2 jobs during the construction period in the state.
    a. Reconcile the estimated 79.2 job figure with the 150 jobs indicated in Application Exhibit C, page 24.
    b. For both the construction and operational phases of the project, explain the basis for the earnings estimates by job category.

Response

a. It is estimated that 150 direct jobs will be created for construction of the Project. However, not all of these jobs will be filled by individuals that would be domiciled in Kentucky. It is not uncommon in this sector of the construction industry for workers to temporarily relocate for a limited period of construction. When estimating economic impacts, the JEDI and IMPLAN models omit employment impacts from non-local workers.

b. Earnings are estimates that are generated by the JEDI model outputs, that are in part informed by the developer's estimate of total labor expense during the construction and operational phases. They represent earnings before individual income taxes. It is not readily available through JEDI to determine the specific breakdown of trades (job categories) these would flow through.

Request

14. Verify whether the estimated labor costs for construction and operation include fringe benefits or other indirect labor costs. If not included, verify that Golden Solar will be required to pay the fringe benefits and indirect labor costs.

Response

The inputs to the JEDI model do account for employer payroll overhead employment expenses like various benefits and taxes. However, the Value of Earnings columns in Tables 2 and 3 do not include benefits in the quantitative estimates. Golden Solar will pay fringe benefits and indirect labor costs as specified in the labor agreements and in full compliance with all applicable laws.

Request

15. Refer to the Application, Exhibit F, page 4, Table 2, Estimated Economic Impacts: Kentucky. Refer to the second Note in Table 2. Explain National Grid Renewables experience with projects of similar size and how that experience influenced the downward adjustment of operational phase indirect and induced employment and wages from the JEDI model output. Include in the response what the JEDI model output was originally prior to the downward adjustment.

Response

Below is a table detailing the original JEDI estimates and the revised (*i.e.* adjusted) impacts estimated in light of applicant experience. From direct experience of National Grid Renewable facilities, a conservative estimate of 4.0 full time staff for operations was deemed prudent and aims to avoid overstating economic impacts during operations.

	Original JEDI Estimate (#Jobs)	Revised Estimate (#Jobs)	Original JEDI Estimate (Earnings, $000)	Revised Estimate (Earnings, $000)
Direct	13.5	4.0	$815	$280
Indirect	2.2	2.2	$139	$139
Induced	1.8	0.6	$86	$34

Request

16. Refer to the Application, Exhibit F, page 5, Table 3, Estimated Economic Impacts: Regional SAOI. Also, refer to Application, Exhibit C, page 24.
    a. Explain the difference between the estimated jobs in the Application, Exhibit C, page 24, and Table 3.
    b. Refer to the second Note in Table 3. Explain how National Grid Renewables' experience with projects of similar size influenced the estimation of operational phase direct employment.
    c. Refer to the second Note in Table 3. Explain National Grid Renewables' experience with projects of similar size and how that experience influenced the downward adjustment of operational phase indirect and induced employment and wages from the JEDI model output. Include in the response what the JEDI model output was originally prior to the downward adjustment.
    d. Explain whether Golden Solar informed the public at the information meetings and discussions that only two of the 150 construction phase jobs would be from within the four county Regional SAOI.
    e. Explain whether Golden Solar informed the public at the information meetings and discussions that only 0.1 of the four total operational phase jobs would come from within the four county Regional SAOI.

Response

a. Please see response to 1 ESB 13(a), above. In addition, note that the estimates provided in Table 3 likely represent underestimates of actual impacts due to the GDP scaling estimation method employed.

b. Please see the response to 1 ESB 15 above.

c. The table below details the original JEDI estimates and the revised (*i.e.* adjusted) impacts estimated in light of applicant experience. National Grid Renewables operates projects of various sizes, which provide operations employment numbers and wages based on real-life experience.

	Original JEDI Estimate (#Jobs)	Revised Estimate (#Jobs)	Original JEDI Estimate (Earnings)	Revised Estimate (Earnings)
Direct	0.2	0.1	$10,500	$3,600
Indirect	0.0	0.0	$1,800	$1,800
Induced	0.0	0.0	$1,100	$400

d. No, Golden Solar did not specify at the public information meetings that only two of the 150 construction phase jobs would be from within the four-county Regional SAOI. Part of the apparent difference here is explained by the economic impact model used in this analysis defining 'local' jobs relatively stringently. These 'local' jobs, as seen by the model are those individuals that are permanently (*i.e.* non-transient for work purposes) based in the specified area. Any construction worker who temporarily moves into the area for several months (or even the full construction period) is not counted in the estimate of job creation. Due to the inherent uncertainty of future availability of sufficiently skilled laborers and the conservatively specified nature of the economic model that the uncertainty necessitated, combined with the Applicant's intent to hire local workers to the greatest extent practical, job creation estimates are likely underestimates of true local hires.

e. No, Golden Solar did not specify at the public information meetings that only 0.1 of the four total operational phase jobs would come from within the four-county Regional SAOI. The Applicant aims to hire qualified, local workers for operation to the extent possible and the model is likely underestimating the amount of local hires.

Request

17. Refer to the Application, Exhibit F, page 5. Also, refer to the Application, Exhibit C, page 24.
    a. Explain how the tax revenues accruing to the state, local counties, and local school districts were derived. Include in the response whether the local counties and school districts include Caldwell, Crittenden, Hopkins and Lyon counties. If not, explain which counties will benefit from the increased tax revenue.
    b. Provide a list of the types of taxes behind the tax revenue estimates.
    c. Explain whether any sales or income taxes are included in the referenced amounts. If not, provide an estimate of the sales and income tax revenue that will be generated through the construction and operational phases of the project.

Response

a. Tax revenue estimates we derived from the estimated overall capital investment output from the JEDI Model and applying the local property tax rates. Generally speaking, the majority of the tax revenues associated with Golden Solar will be seen in Caldwell County, while the other Counties considered in the analysis would experience sales tax revenues from the sales of goods and services purchased by employees and contractors of the Project.

b. Property taxes

c. The estimates do not include sales or income taxes. Golden Solar is unable to estimate the sales taxes and income taxes resulting from the Project, due to the unprecedented volatility in the markets. The basis for the majority of the tax revenues to the State will depend heavily on the pricing of major project equipment and labor rates at the time of construction.

Request

18. Explain whether Golden Solar intends to pursue an Industrial Revenue Bond (IRB) agreement and a Payment in Lieu of Taxes (PILOT) agreement with Caldwell County. If yes, explain if the IRB and PILOT agreement will change the government revenue impact.

Response

Yes, Golden Solar intends to pursue an Industrial Revenue Bond (IRB) agreement and a Payment in Lieu of Taxes (PILOT) agreement with Caldwell County.

Request

19. Refer to the Application, Exhibit F, page 4, Section 6. The analysis indicates Golden Solar will make up to $400,000 in charitable donations to the local community. Explain how the charities will be chosen and when the distributions will be made.

Response

Golden Solar will seek input from local community stakeholders on how the charitable donations should be distributed. The charitable distributions will be made annually.

Request

20. Provide the current economic benefits arising from the real estate to be used in the Project including the current yield of the land and the income derived by the landowners from the current agrarian usage.

Response

Currently, the Project site is primarily used for agricultural purposes for a variety of row crops, mainly corn and soybeans. Income to the property owners comes either in the form of agricultural rental contracts and crop income which is yield multiplied by current commodity price less basis, transport, labor, and input costs.

Request

21. Provide current real property taxes for all parcels based upon current usage. Also provide, projected annual real property taxes for all parcels based upon project usage during the operational phase.

Response

It is estimated that the majority of agricultural parcels within the Project area have property tax bills between $20-$40 per acre depending on the year. Property tax revenues are anticipated to be over $100 per acre on the solar site, a 2-5 times increase from the existing use.

Request

22. Refer to the Application, Exhibit H, Site Assessment Report (SAR), Section 6 Mitigation Measures, Table 2. Mitigation Measure 12 states Golden Solar will commit to limit pile driving within 1,000 feet of a residence to between 9 am and 5 pm Monday through Friday. Explain whether Golden Solar is familiar with recent Siting Board Orders regarding construction activity time limits and noise mitigation requirements.[1]

[1] See Case No. 2021-00127, *Electronic Application of Rhudes Creek Solar, LLC for a Certificate of Construction for an Approximately 100 Megawatt Merchant Electric Solar Generation Facility and a Related 138 KV Nonregulated Electric Transmission Line Approximately 1½ Miles in length in Hardin County, Kentucky Pursuant to KRTS 278.700 and 807 KAR 5:110*, (KY PSC Mar 4, 2022).

Response

Yes, Golden Solar is familiar with recent Siting Board orders in other cases regarding construction activity time limits and noise mitigation requirements, and took those into consideration in the commitment that it made. Construction conditions in final Siting Board orders issued on and after March 4, 2022, have not consistently restricted pile-driving activity hours more than hours for general construction activity:

- Rhudes Creek Solar, Case No. 2021-00127, 3/4/22 Final Order Appx. A, condition #13: narrowing restriction of pile-driving hours to 9 a.m. to 5:00 p.m. Monday–Friday; hours restriction was a voluntary commitment of applicant.
- Caldwell Solar, Case No. 2020-00244, 4/8/22 Final Order Appx. A, condition #13: narrowing restriction of pile-driving hours to 9 a.m. to 5:00 p.m. Monday–Friday; in a motion filed August 2, 2022, applicant is requesting clarification that pile-driving hours restriction is a function of distance from residential noise receptors.

- Bluebird Solar, Case No. 2021-00141, 8/3/22 Final Order Appx. A, condition #13: no pile-driving hours restriction beyond general limitation of construction hours to 7:00 a.m. to 9:00 p.m. Monday–Saturday.
- Blue Moon Energy, Case No. 2021-00414, 8/3/22 Final Order Appx. A, condition #13: no pile-driving hours restriction beyond general limitation of construction hours to 7:00 a.m. to 9:00 p.m. Monday–Saturday; construction allowed on Sunday if necessary to make up for delays or to meet deadlines.
- Russellville Solar, Case No. 2021-00235, 8/23/22 Final Order Appx. A, condition #13: narrowing restriction of pile-driving hours to 9 a.m. to 5:00 p.m. Monday–Friday.

Golden Solar's commitment uses the restricted, "workday" time range (9 a.m. to 5 p.m. Monday–Friday) if a residence is within 1000 feet of the pile-driving activity. Other noise-related conditions often included in Siting Board orders are a function of distance; for example, operating equipment that produces sound at perceptible levels often is required to be located a minimum distance from residences or similar receptors. There is no reason to limit any sound-producing activity without considering whether there is a noise receptor located near enough to be bothered.

Request

23. Refer to the SAR, Section 4.2, Compliance. State whether Golden Solar will commit to limiting noise to maximum daylight sound levels of 55 A-Weighted Decibels at all non-participating sensitive noise receptors within 1,500 feet of construction activity during the project construction phase.

Response

No, Golden Solar does not commit to maximum daylight sound levels of 55 A-Weighted Decibels at all non-participating sensitive noise receptors within 1,500 feet of construction activity during the project construction phase. This commitment is solely tied to the operational phase of the Project. Restricting construction noise to maximum daylight sound levels of 55 A-Weighted Decibels at all non-participating sensitive noise receptors within 1,500 feet of construction activity during the project construction phase is overly restrictive and not feasible. Construction noise is temporary and Golden Solar has already committed to reducing working hours to mitigate impacts to neighbors.

Request

24. Refer to the SAR, Attachment B, Hessler Associates, Inc.'s (Hessler) Report, Page 10, Table 5.0.1.
    a. Confirm that a Vermeer PD10 Pile Driver is the type that Golden Solar will use on this project. If not, identify the type of pile driver that will be used and the associated noise levels produced by that machine.
    b. Explain how many pile drivers Golden Solar will use at any one time during construction and whether these machines will be used in close proximity to each other at any time, such that the combined dBA sound levels will exceed those listed in Table 5.0.1. If so, provide an updated chart showing the combined dBA sound levels.
    c. Provide a list of non-participating sensitive noise receptors within 1,500 feet of pile driving construction activity.

Response

a. Yes, a Vermeer PD10 Pile Driver or similar type of pile driver is anticipated to be used.

b. Golden Solar estimates up to 12 pile drivers could be used across the site at a time, with approximately 2-3 in close proximity to one another. Sound levels will increase incrementally with additional pile drivers operating near each other, but the specific sound levels created would depend on a wide variety of factors and it is not possible to provide an accurate chart for multiple pile drivers operating near each other. Sound levels from pile drivers depend on environmental conditions and the distances from each one to the point of observation. Moreover, available data doesn't provide a clear prediction of sound levels during pile driving activity. The additional sound levels from several pile drivers might increase the total level by 3-5 dBA at a maximum, but the impact on sound levels would depend on how close they were operating and when each machine was driving a pile.

c. A list and map of non-participating sensitive noise receptors within 1,500 feet of pile driving is attached hereto.

Golden Solar Data Request
Table A: Distance to Residences

Residence ID	Participation Status	Distance to Nearest Panel (ft)*
1	Non-Participating	616
2	Non-Participating	229
3	Non-Participating	299
5	Non-Participating	745
6	Non-Participating	382
7	Non-Participating	1174
8	Participating	237
10	Non-Participating	397
12	Non-Participating	315
14	Non-Participating	405
16	Non-Participating	353
17	Non-Participating	953
18	Non-Participating	290
20	Non-Participating	331
22	Non-Participating	408
23	Non-Participating	738
24	Non-Participating	397
26	Non-Participating	1262
27	Non-Participating	1106
29	Non-Participating	458
30	Non-Participating	1017
32	Non-Participating	1143
33	Non-Participating	401
36	Non-Participating	1453
37	Non-Participating	1130
38	Non-Participating	1420
39	Non-Participating	905
40	Non-Participating	1176
41	Non-Participating	835
42	Non-Participating	371
43	Non-Participating	1247
44	Non-Participating	1046
46	Non-Participating	973
47	Non-Participating	907
48	Non-Participating	798
49	Non-Participating	866
51	Non-Participating	265
52	Non-Participating	977
54	Non-Participating	1345
55	Non-Participating	945
59	Non-Participating	688
60	Non-Participating	999
62	Non-Participating	231
63	Non-Participating	347
64	Non-Participating	783
65	Non-Participating	736
66	Non-Participating	1276
67	Non-Participating	693
68	Participating	775
69	Non-Participating	1075
82	Non-Participating	1032
84	Participating	269
85	Non-Participating	744
86	Non-Participating	851

* = Distances based on preliminary design

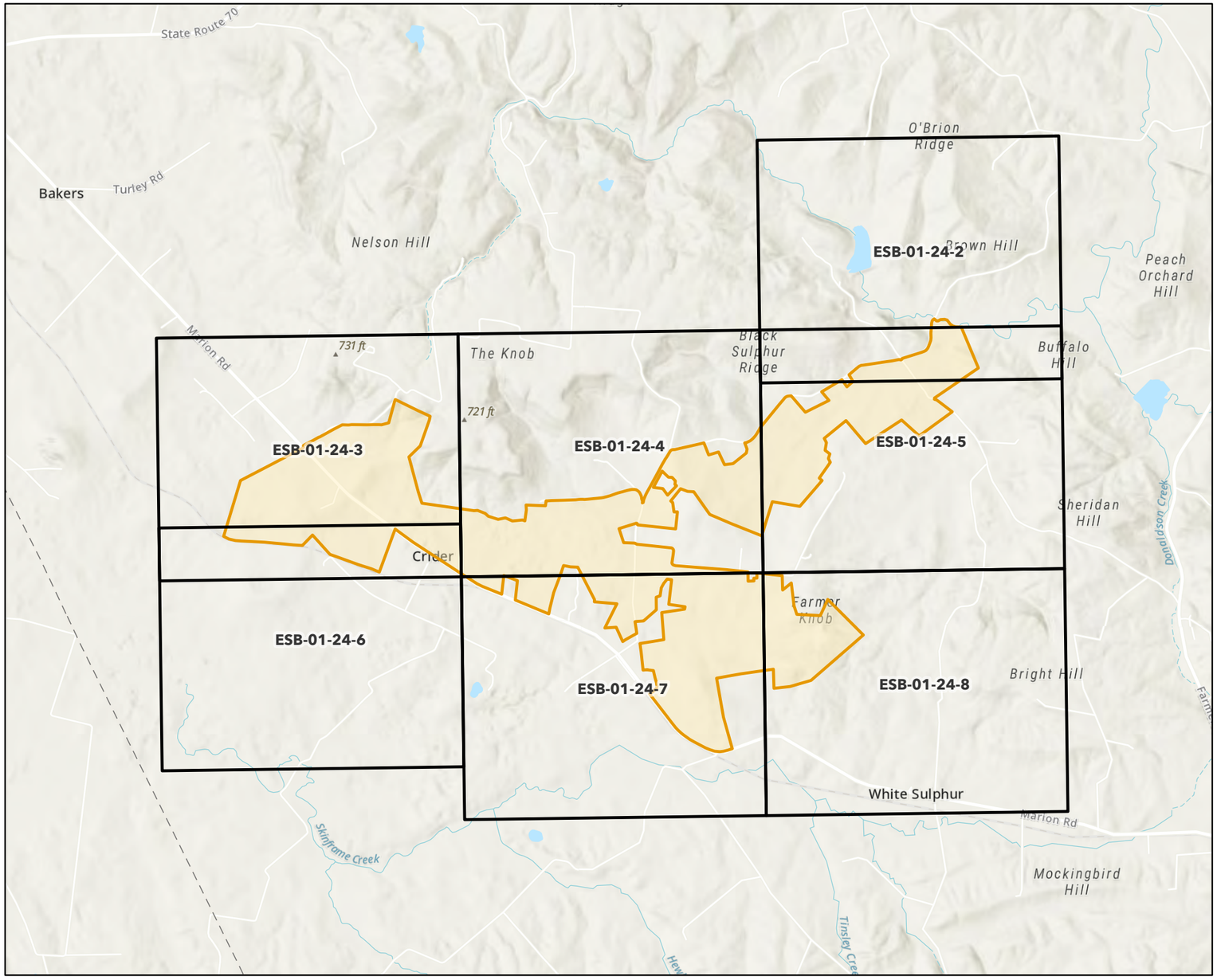


Figure No.
ESB-01-24-1

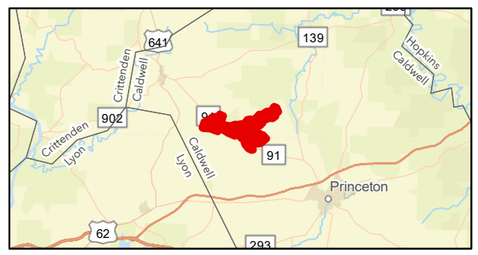
Title
Project Layout Map Key

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

Map Page
Project Area

0 0.35 0.7 Miles
(At original document size of 11x17)
1:40,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

Cardno now Stantec

Revised: 10/6/2022 By: leonard.luz

Path: K:\Project_Data\GeronimoVGolden\Projects\Mxds\Golden.aprx

Figure No.
ESB-01-24-2

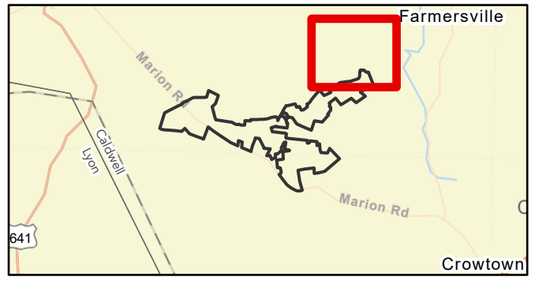
Title
Project Layout

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

- Project Area
- 1500-Ft Buffer
- Cemeteries
- Residence
- Business
- Church
- Fencing
- Substation
- Existing Substation
- Solar Panels
- Property Boundary

0 600 1,200 Feet
(At original document size of 11x17)
1:10,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Maxar

Cardno
now
Stantec

Revised: 10/7/2022 By: leonard.luz
Path: K:\Project_Data\Geroinmo\Golden\ProjectsMxds\Golden.aprx

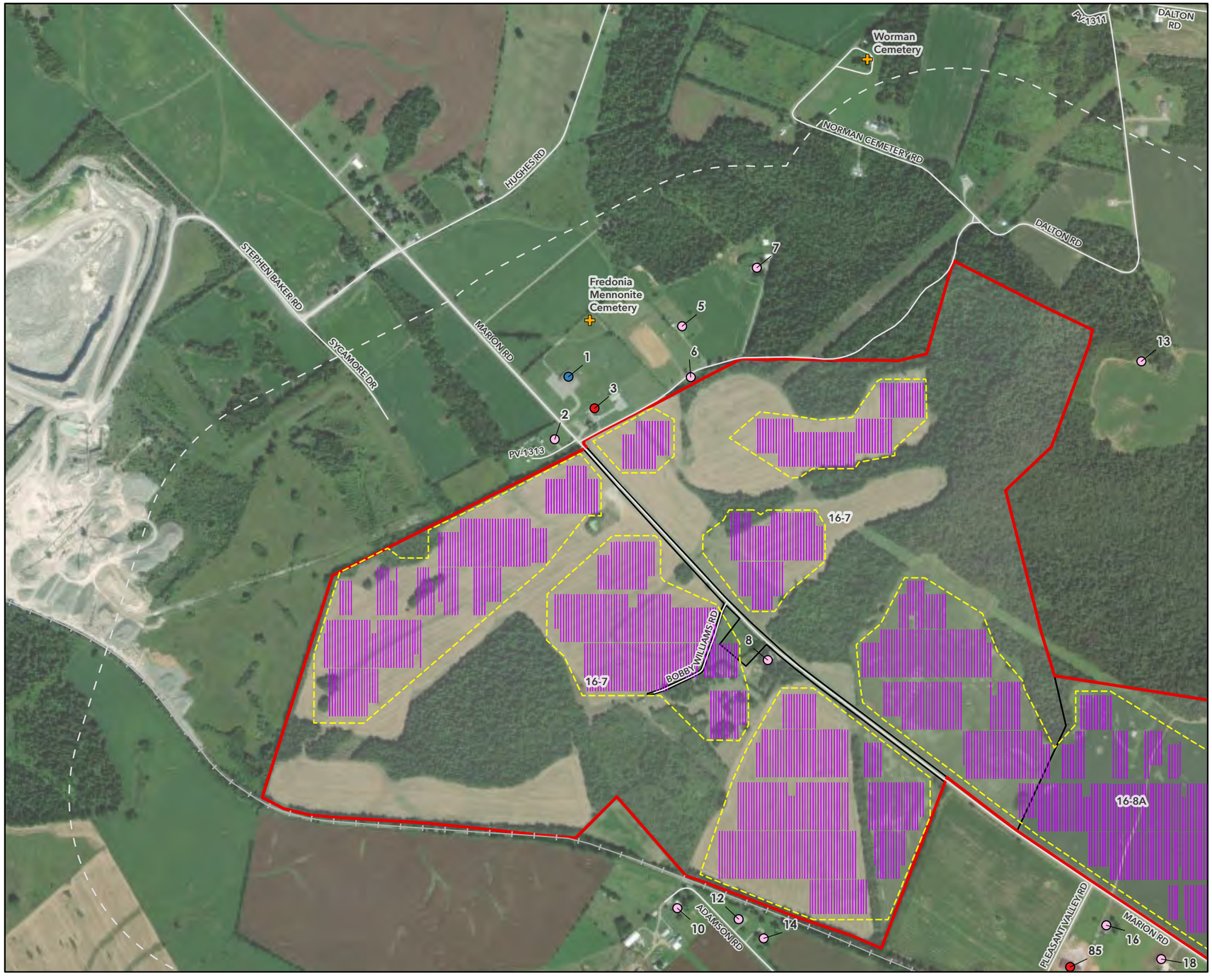


Figure No.
ESB-01-24-3

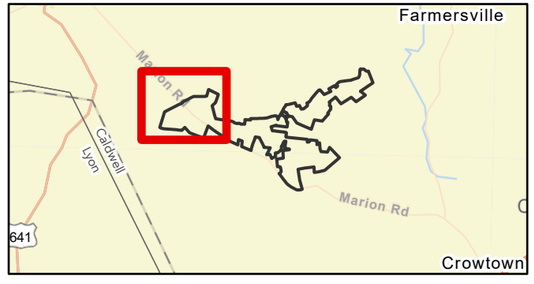
Title
Project Layout

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

- Project Area
- 1500-Ft Buffer
- Cemeteries
- Residence
- Business
- Church
- Fencing
- Substation
- Existing Substation
- Solar Panels
- Property Boundary

0 600 1,200 Feet
(At original document size of 11x17)
1:10,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Maxar

Cardno now Stantec

Revised: 10/7/2022 By: leonard.luz

Path: K:\Project_Data\Geronimo\Golden\ProjectsMxds\Golden.aprx

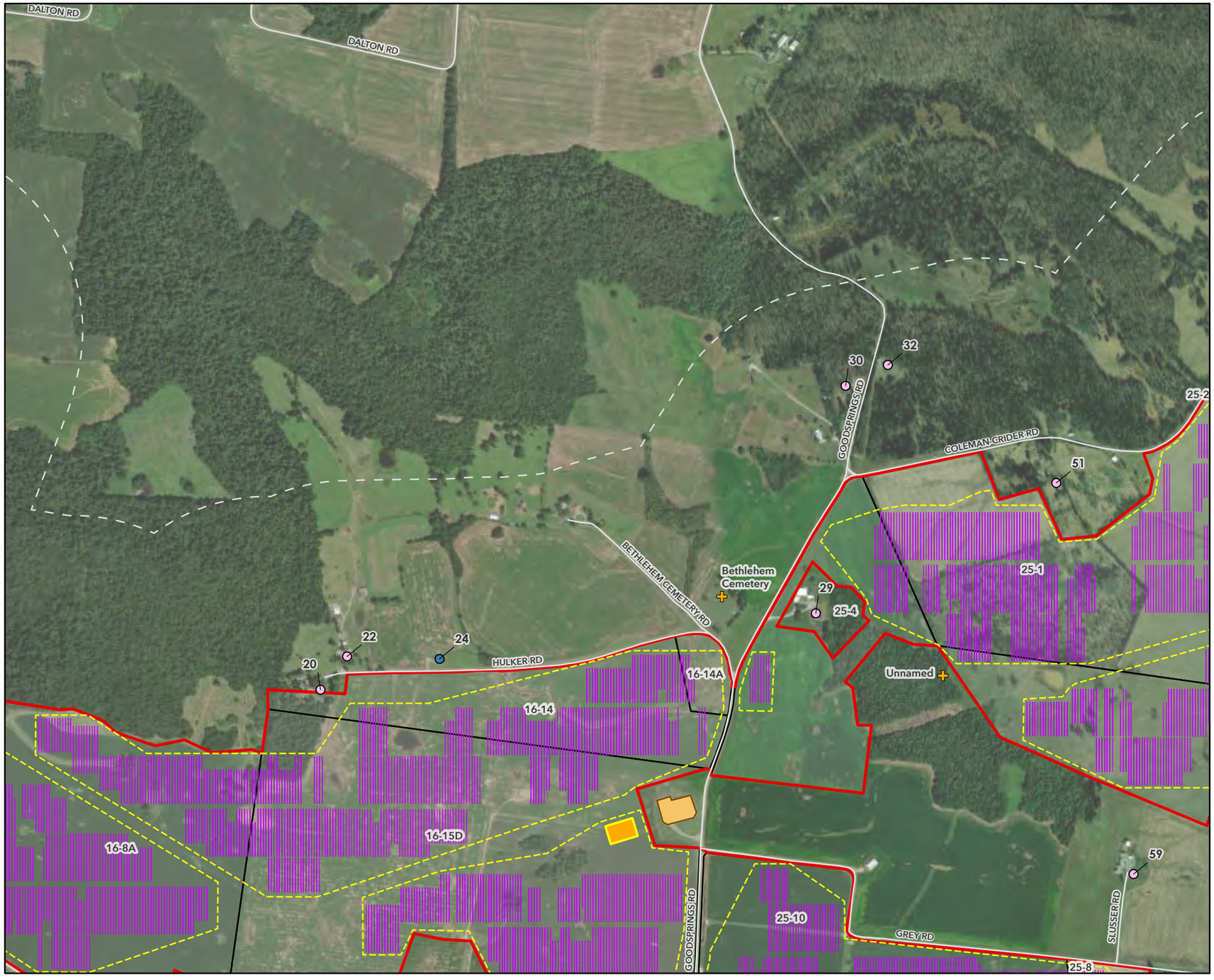


Figure No.
ESB-01-24-4

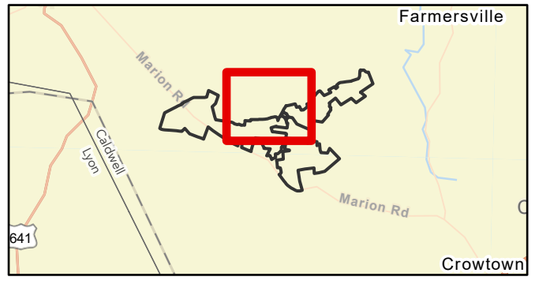
Title
Project Layout

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

- Project Area
- 1500-Ft Buffer
- Cemeteries
- Residence
- Business
- Church
- Fencing
- Substation
- Existing Substation
- Solar Panels
- Property Boundary

0 600 1,200 Feet
(At original document size of 11x17)
1:10,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Maxar

Cardno now Stantec

Revised: 10/7/2022 By: leonard.luz

Path: K:\Project_Data\Geronimo\Golden\ProjectsMxds\Golden.aprx

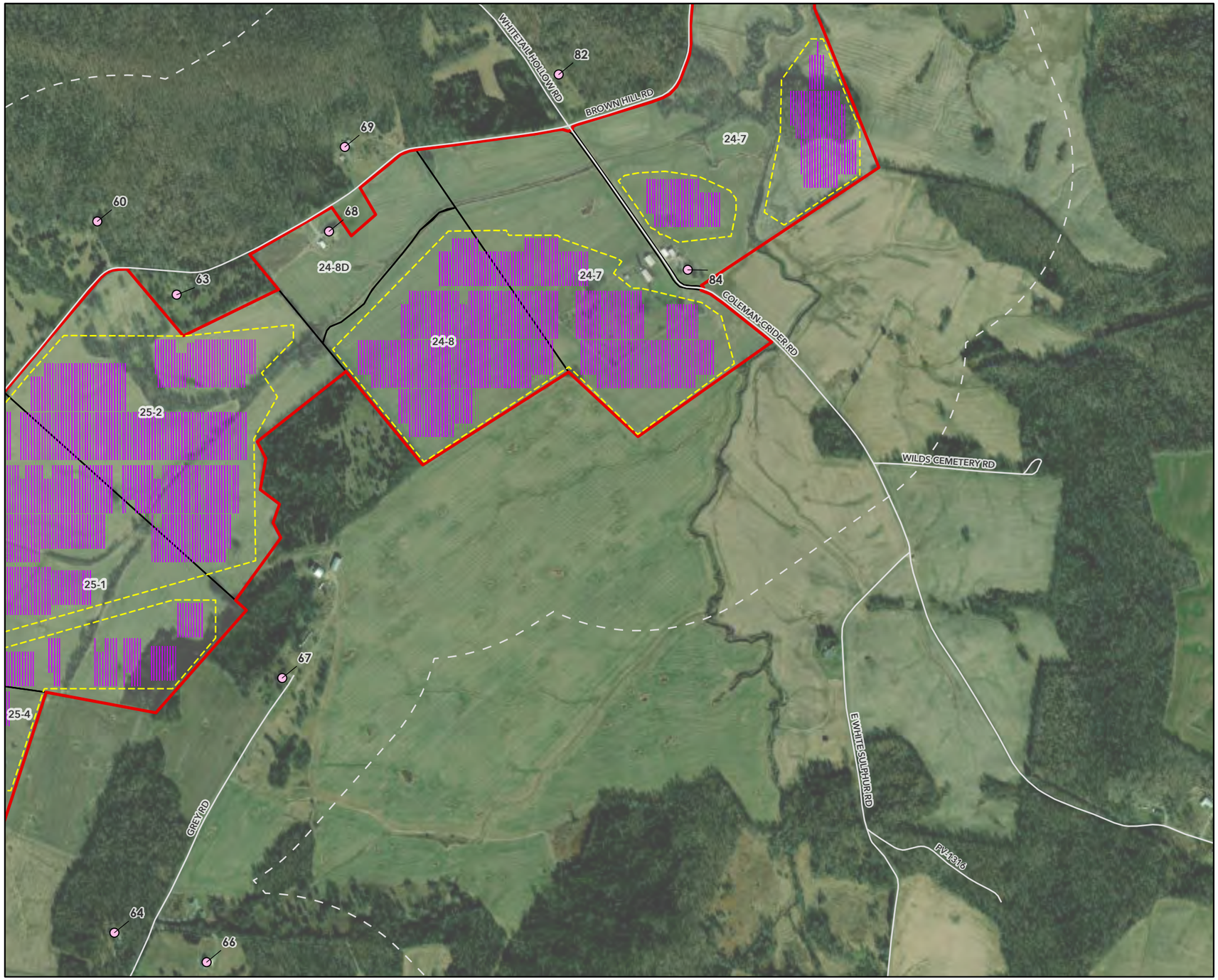


Figure No.
ESB-01-24-5

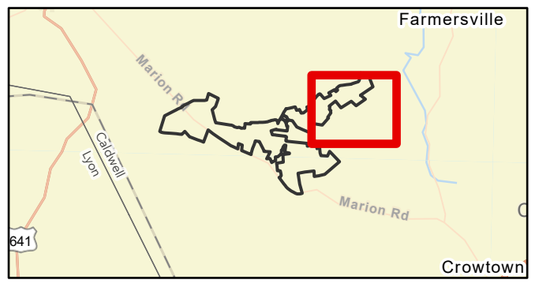
Title
Project Layout

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

- Project Area
- 1500-Ft Buffer
- Cemeteries
- Residence
- Business
- Church
- Fencing
- Substation
- Existing Substation
- Solar Panels
- Property Boundary

0 600 1,200 Feet
(At original document size of 11x17)
1:10,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Maxar

Cardno now Stantec

Revised: 10/7/2022 By: leonard.luz

Path: K:\Project_Data\Geronimo\Golden\ProjectsMxds\Golden.aprx

Figure No.
ESB-01-24-6

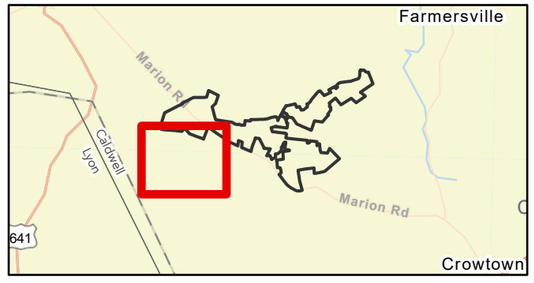
Title
Project Layout

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

- Project Area
- 1500-Ft Buffer
- Cemeteries
- Residence
- Business
- Church
- Fencing
- Substation
- Existing Substation
- Solar Panels
- Property Boundary

0 600 1,200 Feet
(At original document size of 11x17)
1:10,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Maxar

Cardno now Stantec

Revised: 10/7/2022 By: leonard.luz

Path: K:\Project_Data\Geronimo\Golden\ProjectsMxds\Golden.aprx

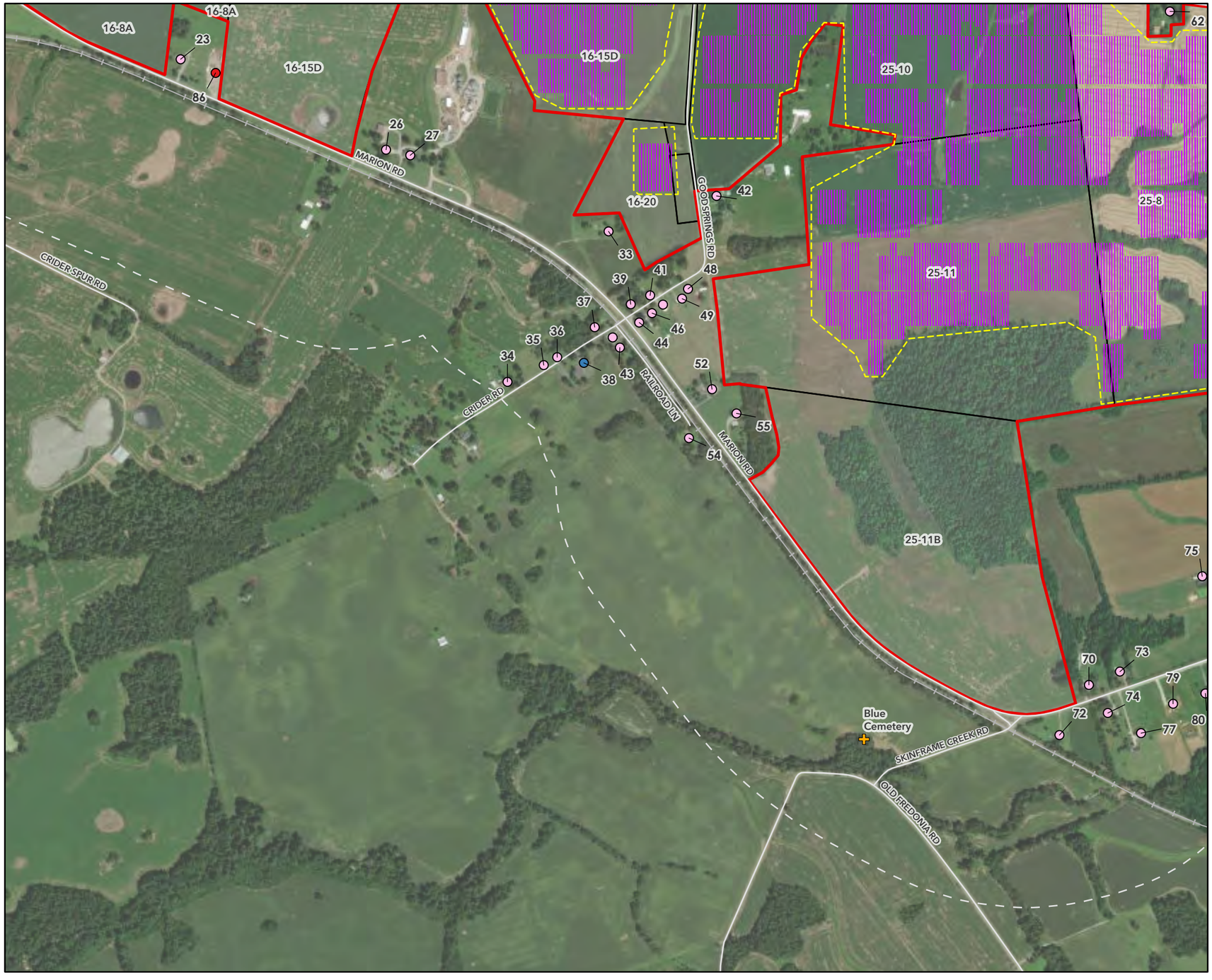


Figure No.
ESB-01-24-7

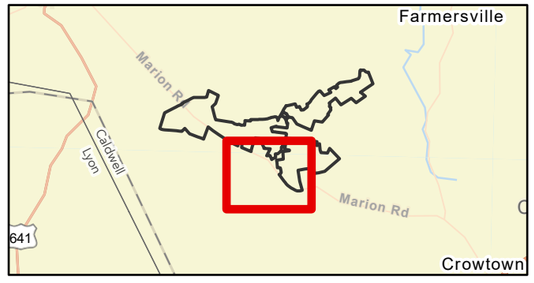
Title
Project Layout

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

- Project Area
- 1500-Ft Buffer
- Cemeteries
- Residence
- Business
- Church
- Fencing
- Substation
- Existing Substation
- Solar Panels
- Property Boundary

0 600 1,200 Feet
(At original document size of 11x17)
1:10,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Maxar

Cardno now Stantec

Revised: 10/7/2022 By: leonard.luz

Path: K:\Project_Data\Geronimo\Golden\ProjectMxds\Golden.aprx

Figure No.
ESB-01-24-8

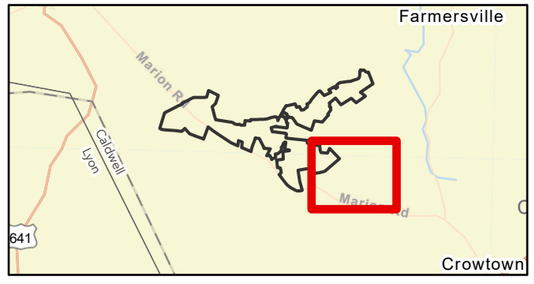
Title
Project Layout

Client/Project
Golden Solar Project

Project Location
Caldwell County, Kentucky

- Project Area
- 1500-Ft Buffer
- Cemeteries
- Residence
- Business
- Church
- Fencing
- Substation
- Existing Substation
- Solar Panels
- Property Boundary

0 600 1,200 Feet
(At original document size of 11x17)
1:10,000



Notes
1. Coordinate System: NAD 1983 2011 StatePlane Kentucky FIPS 1600 Ft US
2. Background Source: Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Maxar

Cardno now Stantec

Revised: 10/7/2022 By: leonard.luz

Path: K:\Project_Data\Geronimo\Golden\ProjectsMxds\Golden.aprx

Request

25. Refer to Application, Exhibit H, SAR, Attachment B, Hessler Report, Plot 1. Provide a Plot similar to Plot 1, showing 55 dBA sound levels around the project area footprint and all non-participating sensitive noise receptors within 1,500 feet of construction activity. If more than one pile driver is to be used in close proximity such that the combined dBA sound level is greater than that listed in Table 5.0.1, include that maximum dBA sound levels in constructing the updated Plot.

Response

The wide range of equipment and the unpredictable nature of construction makes it difficult to plot sound contours in a meaningful way for construction activity. In addition to challenges in modelling the sound from individual pieces of construction equipment,[1] any attempt to model sound from multiple pieces of equipment operating in close proximity adds an additional level of unpredictability to sound levels which makes a "construction sound" contour map highly speculative.

Sound levels from pile drivers or other construction equipment cannot be modeled with simple plots in the same way that inverter or transformer sounds can be modeled (*i.e.* as shown in Plot 1). Inverters and transformers emit a relative continuous sound during use which allows a plot to be generated which predicts sound over distance. Pile drivers and other construction equipment emit highly variable sound levels during use. Pile drivers and other construction equipment are also not operating at a fixed location and may move during operation. These factors make plotting sound over distance very difficult.

[1] See discussion with respect to pile-driving activity in the response to 1 ESB 24(b).

Request

26. Provide the existing or proposed utilities that will serve the facility during construction and operations. Include information regarding water service that will be used for dust control during construction.

Response

Electrical services will be needed for construction and operation activities, likely from Kenergy or Kentucky Utilities. Water and wastewater services may be needed for the operation and maintenance building. Water trucks will likely be used for dust control during construction.

Request

27. Provide the wastewater plans for construction and operations.

Response

These plans are not available at this stage in the project. We work with our Engineering, Procurement, and Construction (hereinafter "EPC") Contractor to develop wastewater and stormwater management plans and obtain necessary permits. We will not have a EPC Contractor selected until 2023.

Request

28. Refer to the Application, Exhibit J, Overall Site Plan 1 and 2, pages 2–3. The Site Plan includes multiple distinct areas separated by roads. Provide information regarding how these areas will be interconnected, including the impact of the method of interconnection.

Response

These areas are anticipated to be interconnected via underground electrical collection.

Underground cabling is installed via open trench or horizontal drilling. The underground collection will minimize visual impacts to neighbors.

Request

29. Provide an Electrical One-Line diagram of the Project.

Response

The one line diagram is attached hereto.

SYSTEM SPECIFICATIONS	
DC SYSTEM SIZE	143 MW
AC SYSTEM SIZE @ POI	100 MW
MODULE MODEL	FIRST SOLAR FS-6480-P
MODULE RATING	480 W
STRING LENGTH	6
STRING QUANTITIES	49,536
14-STRING RACKS	2,679
10-STRING RACKS	1,203
ROW SPACING	21 FT
INVERTER QUANTITY	27
INVERTER MODEL	POWER ELECTRONICS PE FS-4200M
GCR	32%
DC/AC @ INVERTER	1.26
DC/AC @ POI	1.43

GENERAL NOTES

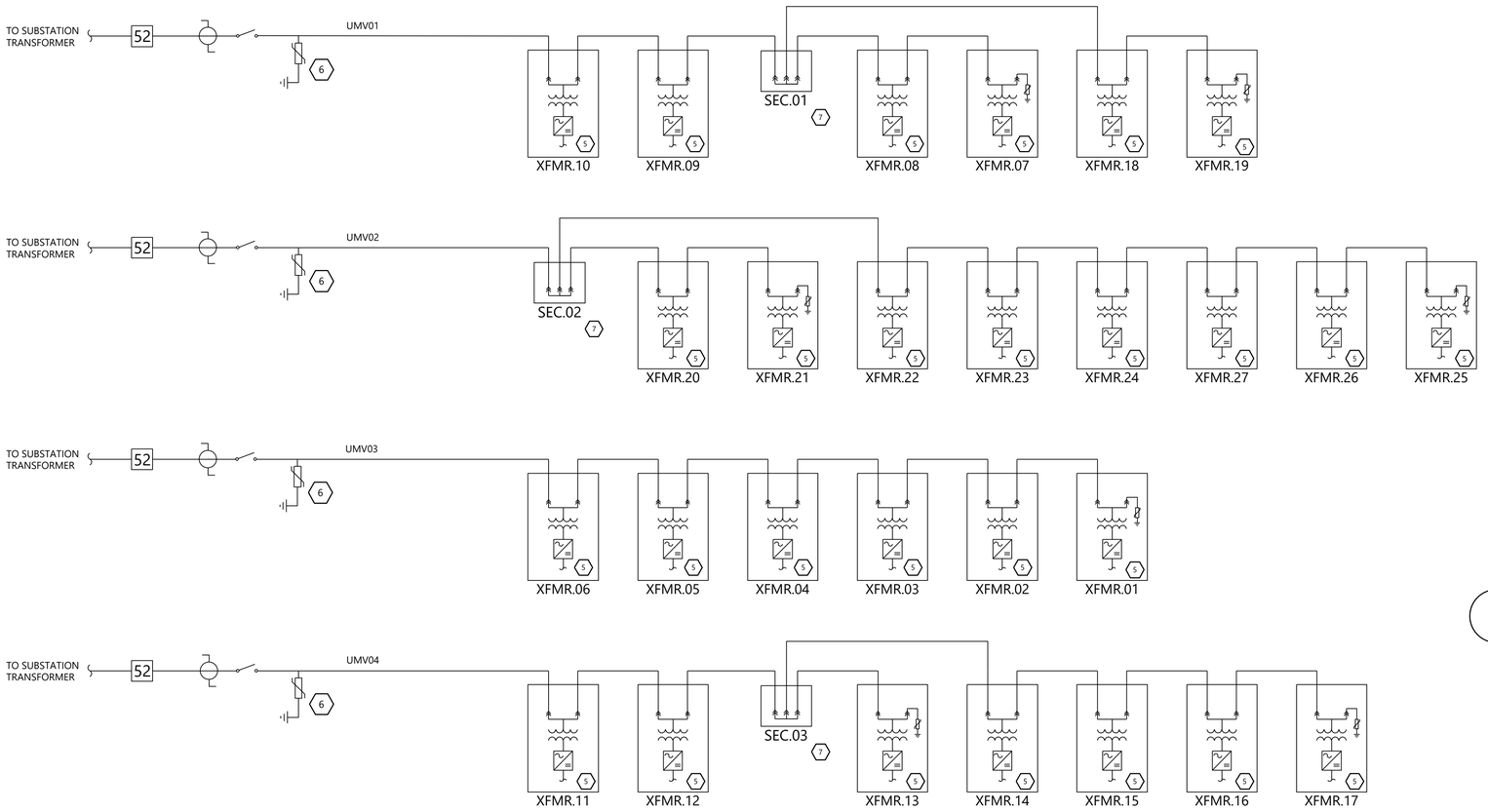
1. TRANSFORMER PRIMARY PROVIDED WITH 600A DEAD BREAK TERMINATIONS
2. 48" BEND RADIUS MINIMUM FOR ALL MV CONDUIT BENDS.
3. INSTALL ALL EQUIPMENT AND WIRING IN ACCORDANCE WITH THE NEC, NESC, AND ALL APPLICABLE REQUIREMENTS OF THE LOCAL UTILITY COMPANY AND LOCAL AUTHORITY HAVING JURISDICTION.
4. CONTRACTOR TO VERIFY PHASE ROTATION WITH SUBSTATION ENGINEER.

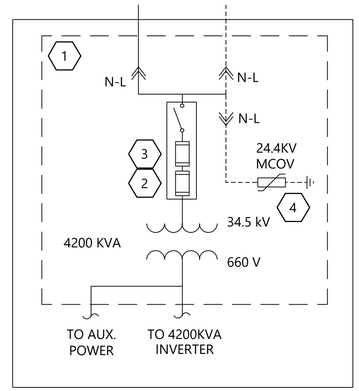
KEY NOTES

1. 4200KVA 34.5KV TWO-WINDING PAD MOUNTED STEP-UP TRANSFORMER. REFER TO VENDOR FOR ADDITIONAL INFORMATION.
2. CURRENT LIMITING FUSE, SEE SKID MANUFACTURER DRAWINGS FOR SIZE.
3. EXPULSION FUSE, SEE SKID MANUFACTURER DRAWINGS FOR SIZE.
4. SURGE ARRESTER 24.4KV (TYP). FINAL SIZE TBD BASED ON TOV STUDY AND COORDINATION WITH SUBSTATION RISER ARRESTER. TO BE PROVIDED WHERE SHOWN.
5. REFER TO DETAIL 1
6. POLE MOUNTED SURGE ARRESTOR
7. 35KV, 600A SECTIONALIZER

LEGEND

- RISER POLE
- 52 — CIRCUIT BREAKER
- SURGE ARRESTER
- SWITCH
- TRANSFORMER
- N-L — NON-LOAD BREAK ELBOW
- INVERTER
- FUSE





1 TYPICAL INVERTER SKID XFMR WITH OPTIONAL SURGE ARRESTOR
N.T.S.

Westwood

Phone (214) 473-4640
Toll Free (888) 937-5150
2901 Dallas Parkway, Suite 400
Plano, TX 75093
westwoodps.com

Westwood Professional Services, Inc.

PREPARED FOR:

nationalgrid renewables

8400 Normandale Lake Blvd, Suite 1200
Bloomington, MN 5537

REVISIONS:

#	DATE	COMMENT	BY	CHK	APR
A	10/12/2022	PRELIMINARY ONELINE			

Golden Solar Project
Caldwell County, Kentucky

MVAC SINGLE LINE DIAGRAM

NOT FOR CONSTRUCTION

DATE: 10/12/2022
SHEET: E1300
REV: A

2020-00243
1 ESB 29

Request

30. Provide information on the specifications, model number, and cutsheets of the photovoltaic (PV) cell/solar panels to be used.

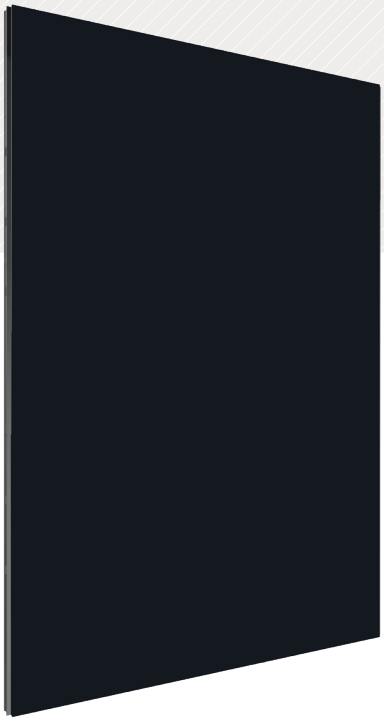
Response

Golden Solar anticipates using First Solar panels, such as FS-6, FS-6+, FS-7, or similar poly-crystalline panels as technology and design evolves. Datasheets for these panels are attached hereto.

First Solar Series 6 CuRe

ADVANCED THIN FILM SOLAR TECHNOLOGY

MODULE DATASHEET



HIGH-POWER PV MODULES

First Solar Series 6 CuRe modules represent the next evolutionary leap forward in thin film module design. Built on the Series 6 *Plus* platform, Series 6 CuRe modules deliver the same industry-leading quality and reliability, along with improved efficiency, unmatched lifetime energy performance, and lower LCOE for a superior return on investment.

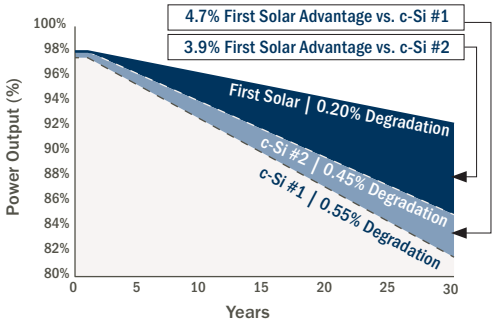
450-480 Watts
Up to 19.0% Efficiency

INDUSTRY'S BEST WARRANTED DEGRADATION RATE[1]

98% WARRANTY START POINT

0.2% WARRANTED ANNUAL DEGRADATION RATE

First Solar Lifetime Energy Advantage
From 30 Year Warranted Annual Power Degradation



- 30-Year Linear Performance Warranty
- 12-Year Limited Product Warranty
- Industry's first and only Cell Cracking Warranty

HIGHEST LIFETIME ENERGY

- More energy produced per nameplate watt over its lifetime compared to c-Si due to a superior degradation rate, temperature coefficient, spectral response and shading behavior
- No power loss from LID or LeTID mechanisms that affect c-Si modules
- Anti-reflective coated glass enhances energy production

INNOVATIVE MODULE DESIGN

- Under-mount frame provides the cleaning and snow-shedding benefits of a frameless module while protecting edges against breakage
- Innovative SpeedSlots™ combine the robustness of bottom mounting with the speed of top clamping while utilizing fewer fasteners to achieve the industry's fastest installation times and lowest mounting hardware costs
- Dual junction box design optimizes module-to-module connections and eliminates the need for wire management

BEST IN-CLASS RELIABILITY & DURABILITY

- Manufactured under one roof with 100% traceable QA/QC
- Independently tested and certified for reliable performance that exceeds IEC standards in high temperature, high humidity, extreme desert and coastal applications
- Inherently immune to and warranted against power loss from cell cracking
- Durable glass/glass construction

BEST ENVIRONMENTAL PROFILE

- Fastest energy payback time in the industry
- Carbon footprint that is 2.5X lower and a water footprint that is 3X lower than mono crystalline silicon panels on a life cycle basis
- Global PV module recycling services available through First Solar or customer-selected third-party

MODEL TYPES: FS-6XXX-C / FS-6XXXA-C / FS-6XXX-C-I / FS-6XXXA-C-I
(XXX = NOMINAL POWER)

RATINGS AT STANDARD TEST CONDITIONS (1000W/m², AM 1.5, 25°C)[2]

Nominal Power[3] (-0/+5%)	P_{MAX} (W)	450	455	460	465	470	475	480
Efficiency (%)	%	17.9	18.1	18.3	18.5	18.7	18.9	19.0
Cell Efficiency (%)	%	19.3	19.5	19.7	19.9	20.1	20.3	20.5
Voltage at P_{MAX}	V_{MAX} (V)	179.9	181.0	182.2	183.4	184.6	185.8	187.0
Current at P_{MAX}	I_{MAX} (A)	2.50	2.51	2.52	2.54	2.55	2.56	2.57
Open Circuit Voltage	V_{OC} (V)	221.7	222.4	223.1	223.9	224.6	225.3	226.0
Short Circuit Current	I_{SC} (A)	2.66	2.66	2.66	2.67	2.67	2.67	2.67
Maximum System Voltage	V_{SYS} (V)	1500[5]						
Limiting Reverse Current	I_R (A)	5.0						
Maximum Series Fuse	I_{CF} (A)	5.0						

RATINGS AT NOMINAL OPERATING CELL TEMPERATURE OF 45°C (800W/m², 20°C air temperature, AM 1.5, 1m/s wind speed)[2]

Nominal Power	P_{MAX} (W)	339.8	343.7	347.4	351.1	354.9	358.6	362.5
Voltage at P_{MAX}	V_{MAX} (V)	168.2	169.3	170.3	172.1	173.1	174.1	175.1
Current at P_{MAX}	I_{MAX} (A)	2.02	2.03	2.04	2.04	2.05	2.06	2.07
Open Circuit Voltage	V_{OC} (V)	211.0	211.7	212.4	213.1	213.8	214.5	215.2
Short Circuit Current	I_{SC} (A)	2.14	2.15	2.15	2.15	2.15	2.15	2.16

TEMPERATURE CHARACTERISTICS

Module Operating Temperature Range	(°C)	-40 to +85
Temperature Coefficient of P_{MAX}	$T_K(P_{MAX})$	-0.28%/°C [Temperature Range: 25°C to 75°C]
Temperature Coefficient of V_{OC}	$T_K(V_{OC})$	-0.24%/°C
Temperature Coefficient of I_{SC}	$T_K(I_{SC})$	+0.04%/°C

MECHANICAL DESCRIPTION

Length	2024mm
Width	1245mm
Area	2.52m²
Module Weight	34.9kg (FS-6XXX-C / FS-6XXXA-C) 34.2kg (FS-6XXX-C-I / FS-6XXXA-C-I)
Leadwire[6]	2.5mm², 733mm (+) & Bulkhead (-)
Connectors	TE Connectivity PV4-S, MC4-EVO 2, or alternate
Junction Box	IP68 Rated
Bypass Diode	N/A
Cell Type	Thin film CdTe semiconductor, up to 264 cells
Frame Material	Anodized Aluminum
Front Glass	Heat strengthened
Back Glass	Heat strengthened
Encapsulation	Laminate material with edge seal
Frame to Glass Adhesive	Silicone
Load Rating[7,8]	2400Pa

PACKAGING INFORMATION

Model Type	Modules Per Pack	Packs per 40' Container
FS-6XXX-C / FS-6XXXA-C	27	18
FS-6XXX-C-I / FS-6XXXA-C-I	29	18

CERTIFICATIONS AND TESTS [4]

IEC

61215:2016 & 61730-1:2016[5], CE
61701 Salt Mist Corrosion
60068-2-68 Dust and Sand Resistance

UL

UL 61730 1500V Listed

REGIONAL CERTIFICATIONS

InMetro SII
BIS
MyHijau
Buy American Act (BAA) Compliant

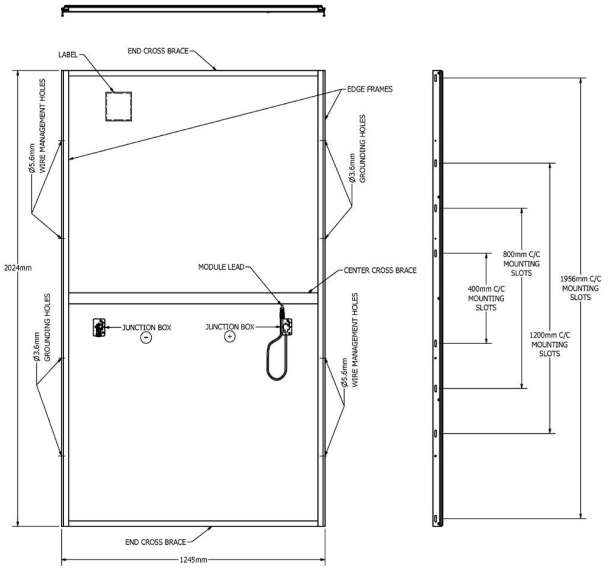
EXTENDED DURABILITY TESTS

ANSI/CAN/CSA-C450-18
Long-Term Sequential Thresher Test
PID Resistant

QUALITY & EHS

ISO 9001:2015
ISO 14001:2015
ISO 45001:2018
ISO 14064-3:2006
EPEAT Silver Registered

MECHANICAL DRAWING



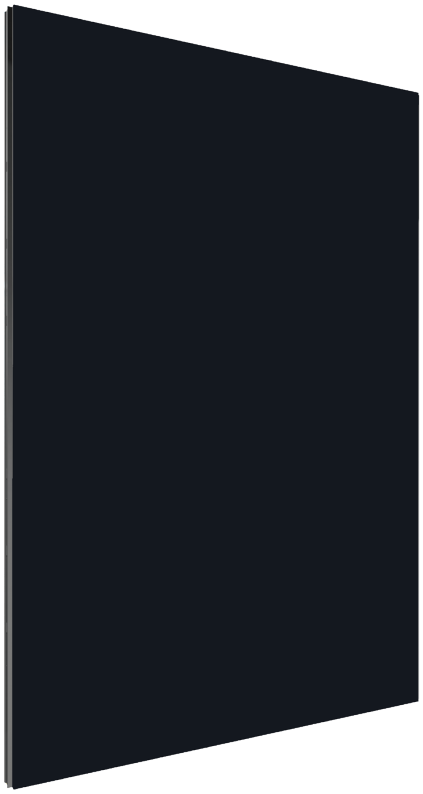
Install in portrait only

1 Limited power output and product warranties subject to warranty terms and conditions
2 All ratings ±10%, unless specified otherwise. Specifications are subject to change
3 Measurement uncertainty applies
4 Testing Certifications/Listings pending
5 IEC 61730-1: 2016 Class II
6 Leadwire length from junction box exit to connector mating surface
7 1500Pa tentative load rating for 1956mm mounting slots. Higher loads may be acceptable, subject to testing
8 Model Types FS-6XXX-C-I and FS-6XXXA-C-I meet UL 61730 with a reduced mechanical design load. Consult Module User Guide for additional details

Series 6 *Plus* Bifacial.

450-485 Watt Thin Film Solar Module

First Solar is once again setting the industry benchmark for reliable energy production, optimized design and environmental performance with Series 6 *Plus* Bifacial - the world's first bifacial thin film CdTe module. The advanced design signficantly reduces balance of system, shipping, and operating costs while delivering more energy per nameplate watt.



More Lifetime Energy per Nameplate Watt

- Industry's best (0.3%) warranted degradation rate
- Superior temperature coefficient, spectral response and shading behavior
- Unlike crystalline silicon modules, First Solar's thin film technology does not experience losses from LID or LeTID
- Anti-reflective coated glass enhances energy production
- Added bifacial energy yield

Innovative Module Design

- Under-mount frame provides the cleaning and snowshedding benefits of a frameless module while protecting edges against breakage
- Innovative SpeedSlots combine the robustness of bottom mounting with the speed of top clamping while utilizing fewer fasteners to achieve the industry's fastest installation times and lowest mounting hardware costs
- Dual junction box design reduces wire management complexity and cost

Best In-Class Reliability & Durability

- Manufactured under one roof with 100% traceable QA/QC
- Independently tested and certified for reliable performance that exceeds IEC standards in high temperature, high humidity, extreme desert and coastal applications
- Inherently immune to and warranted against power loss from cell cracking
- Durable glass/glass construction

Best Environmental Profile

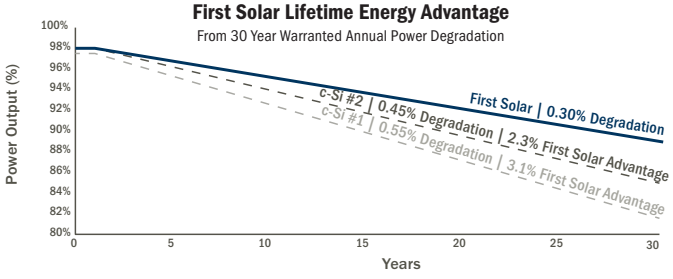
- Fastest energy payback time in the industry
- Carbon footprint that is 2.5X lower and a water footprint that is 3X lower than mono crystalline silicon panels on a life cycle basis
- Global PV module recycling services available through First Solar or customer-selected third-party

19.2%
HIGH BIN EFFICIENCY

30YR
LINEAR PERFORMANCE WARRANTY

98%
WARRANTY START POINT

0.3%
WARRANTED ANNUAL DEGRADATION RATE[1]



Learn more about First Solar and Series 6 *Plus* Bifacial at firstsolar.com/S6

Series 6 *Plus* Bifacial.

Electrical Specifications

RATINGS AT STANDARD TEST CONDITIONS (1000W/m², AM 1.5, 25°C)[2]

SERIES 6 PLUS BIFACIAL SL MODEL TYPES: FS-6XXX-P-B-I / FS-6XXXA-P-B-I

SERIES 6 PLUS BIFACIAL HL MODEL TYPES: FS-6XXX-P-B / FS-6XXXA-P-B (XXX = NOMINAL POWER)

Nominal Power[3] (-0/+5%)	P_{MAX} (W)	450		455		460		465		470		475		480		485	
		MSTC[4]	BSTC[5]	MSTC	BSTC	MSTC	BSTC	MSTC	BSTC	MSTC	BSTC	MSTC	BSTC	MSTC	BSTC	MSTC	BSTC
Nominal Power	P_{MAX} (W)	450	463	455	468	460	473	465	478	470	483	475	488	480	493	485	499
Voltage at P_{MAX}	V_{MAX} (V)	186.8	186.8	187.8	187.8	188.8	188.8	189.8	189.8	191.1	191.1	191.5	191.5	192.8	192.8	194.0	194.0
Current at P_{MAX}	I_{MAX} (A)	2.41	2.48	2.42	2.49	2.44	2.51	2.45	2.52	2.46	2.53	2.48	2.55	2.49	2.56	2.50	2.57
Open Circuit Voltage	V_{OC} (V)	221.1	221.1	222.0	222.0	222.9	222.9	223.8	223.8	224.3	224.3	224.8	224.8	225.4	225.4	225.9	225.9
Short Circuit Current	I_{SC} (A)	2.57	2.64	2.58	2.65	2.59	2.66	2.60	2.68	2.61	2.69	2.61	2.69	2.62	2.69	2.62	2.70
Efficiency (%)	%	17.9		18.1		18.3		18.5		18.7		18.9		19.0		19.2	
Maximum System Voltage	V_{SYS} (V)	1500[6]															
Limiting Reverse Current	I_R (A)	5.0															
Maximum Series Fuse	I_{CF} (A)	5.0															

TEMPERATURE CHARACTERISTICS

Module Operating Temperature Range	°C	-40 to +85
Temperature Coefficient of P_{MAX}	$T_K(P_{MAX})$	-0.32%/°C [Temperature Range: 25°C to 75°C]
Temperature Coefficient of V_{OC}	$T_K(V_{OC})$	-0.28%/°C
Temperature Coefficient of I_{SC}	$T_K(I_{SC})$	+0.04%/°C
Nominal Operating Cell Temperature	°C	43
Bifaciality Factor	%	20±5

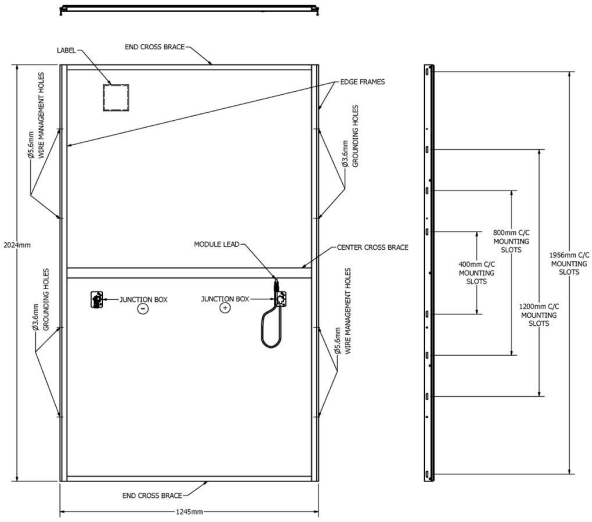
MECHANICAL DESCRIPTION

Length	2024mm
Width	1245mm
Area	2.52m²
Module Weight	SL: 33.3kg HL: 34.0kg
Leadwire[7]	2.5mm², 733mm (+) & Bulkhead (-)
Connectors	TE Connectivity PV4-S, MC4-EVO 2, or alternate
Junction Box	IP68 Rated
Bypass Diode	N/A
Cell Type	Thin film CdTe semiconductor, up to 268 cells
Frame Material	Anodized Aluminum
Front Glass	Heat strengthened
Back Glass	Heat strengthened
Encapsulation	Laminate material with edge seal
Frame to Glass Adhesive	Silicone
Load Rating[8]	SL: +1950/-1350Pa HL: +/-2400Pa

PACKAGING INFORMATION

Model Type	Modules Per Pack	Packs per 40' Container
FS-6XXX-P-B / FS-6XXXA-P-B	27	18
FS-6XXX-P-B-I / FS-6XXXA-P-B-I	30	18

Mechanical Specifications



Install in portrait only

Certifications & Tests[9]

CERTIFICATIONS AND LISTINGS	EXTENDED DURABILITY TESTS	QUALITY & EHS
IEC 61215:2021 & 61730-1:2016[5], CE	IEC 63209-1 Extended Stress Test	ISO 9001:2015
IEC 61701 Salt Mist Corrosion	Long-Term Sequential	ISO 14001:2015
IEC 60068-2-68 Dust and Sand Resistance	Thresher Test	ISO 45001:2018
UL 61730	PID Resistant	ISO 14064-3:2006
Buy American Act (BAA) Compliant		EPEAT Silver Registered

1 Limited power output and product warranties subject to warranty terms and conditions
2 All ratings ±10%, unless specified otherwise. Specifications are subject to change
3 Measurement uncertainty applies
4 Monofacial electrical ratings
5 Bifacial electrical ratings
6 IEC 61730-1: 2016 Class II
7 Leadwire length from junction box exit to connector mating surface
8 1500Pa tentative load rating for 1956mm mounting slots. Higher loads may be acceptable,subject to testing
9 Testing Certifications/Listings pending

First Solar

Series 7 *TR1*.

505-540 Watt Thin Film Solar Module

Series 7 *TR1* thin film solar modules combine First Solar's thin film technology with an optimized structural design to deliver improved efficiency, enhanced installation velocity, and unmatched lifetime energy performance for large/utility-scale PV projects.

More Lifetime Energy per Nameplate Watt

- Industry's best (0.3%/yr) warranted degradation rate (>89% power output after 30 years)
- Superior temperature coefficient, spectral and shading response

Unmatched Quality and Reliability

- End-to-end manufacturing process for globally consistent quality
- Tested and certified to IEC standards and beyond
- Durable glass/glass construction
- Immune to and warranted against power loss from cell cracking
- 30-year Linear Performance Warranty
- 12-year Limited Product Warranty

Optimized Module Design

- Optimized back rail mount design enhances installation velocity
- Frameless design improves soiling and snow shedding
- Dual junction box design reduces wire management complexity and cost

Industry's Most Eco-efficient PV Solution

- Industry leading carbon footprint, water footprint and energy payback time
- Globally available PV module recycling services

America's Solar Company

- Designed, responsibly sourced, and manufactured in the USA

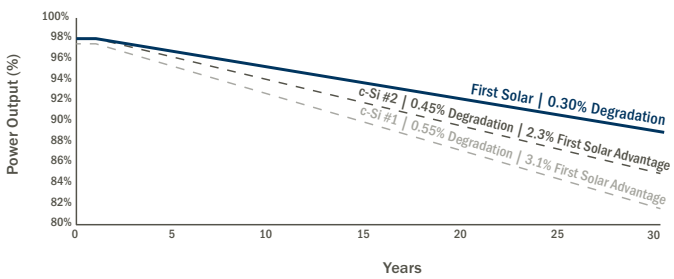
19.3%
HIGH BIN EFFICIENCY

30YR
LINEAR PERFORMANCE WARRANTY

98%
WARRANTY START POINT

0.3%
WARRANTED ANNUAL DEGRADATION RATE

First Solar Lifetime Energy Advantage
From 30 Year Warranted Annual Power Degradation



Learn more about First Solar and Series 7 *TR1* at firstsolar.com/S7

Series 7 TR1.

Electrical Specifications

MODEL TYPES: FS-7XXXA-*TR1* (XXX = NOMINAL POWER) RATINGS AT STANDARD TEST CONDITIONS (1000W/m², AM 1.5, 25°C)[2]									
Nominal Power[3] (-0/+5%)	P_{MAX} (W)	505	510	515	520	525	530	535	540
Efficiency (%)	%	18.1	18.3	18.4	18.6	18.8	19.0	19.1	19.3
Cell Efficiency (%)	%	18.9	19.1	19.3	19.5	19.7	19.9	20.1	20.3
Voltage at P_{MAX}	V_{MAX} (V)	182.5	183.4	184.3	185.2	186.0	186.9	187.8	188.7
Current at P_{MAX}	I_{MAX} (A)	2.77	2.78	2.80	2.81	2.82	2.84	2.85	2.86
Open Circuit Voltage	V_{OC} (V)	223.9	221.5	225.0	225.6	226.1	226.7	227.2	227.7
Short Circuit Current	I_{SC} (A)	3.01	3.02	3.03	3.04	3.04	3.05	3.06	3.06
Maximum System Voltage	V_{SYS} (V)	1500[5]							
Limiting Reverse Current	I_R (A)	5.0							
Maximum Series Fuse	I_{CF} (A)	5.0							
RATINGS AT NOMINAL OPERATING CELL TEMPERATURE OF 45°C (800W/m², 20°C air temperature, AM 1.5, 1m/s wind speed)[2]									
Nominal Power	P_{MAX} (W)	378.1	381.8	385.6	389.4	393.2	396.8	400.6	404.4
Voltage at P_{MAX}	V_{MAX} (V)	168.8	169.7	170.6	170.8	171.7	172.5	173.4	174.3
Current at P_{MAX}	I_{MAX} (A)	2.24	2.25	2.26	2.28	2.29	2.30	2.31	2.32
Open Circuit Voltage	V_{OC} (V)	209.1	212.4	212.9	213.5	214.0	214.5	215.0	215.5
Short Circuit Current	I_{SC} (A)	2.44	2.44	2.45	2.45	2.46	2.47	2.47	2.48

TEMPERATURE CHARACTERISTICS		
Module Operating Temperature Range	(°C)	-40 to +85
Temperature Coefficient of P_{MAX}	T_K (P_{MAX})	-0.32%/°C [Temperature Range: 25°C to 75°C]
Temperature Coefficient of V_{OC}	T_K (V_{OC})	-0.28%/°C
Temperature Coefficient of I_{SC}	T_K (I_{SC})	+0.04%/°C

Certifications & Tests[4]

CERTIFICATIONS & LISTINGS

UL 61730 1500V Listed
IEC 61215:2021 & 61730-1:2016[5]
IEC 61701 Salt Mist Corrosion
IEC 60068-2-68 Dust and Sand Resistance
IEC 62716 Ammonia Corrosion
Buy American Act (BAA) Compliant

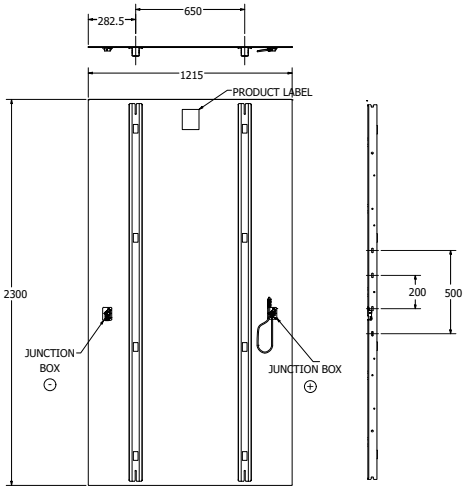
EXTENDED DURABILITY TESTS

IEC 63209-1 Extended Stress Test
Long-Term Sequential
Thresher Test
PID Resistant

QUALITY & EHS

ISO 9001:2015
ISO 14001:2015
ISO 45001:2018
ISO 14064-3:2006
EPEAT Silver Registered

Mechanical Specifications



MECHANICAL DESCRIPTION	
Length	2300mm
Width	1215mm
Area	2.79m²
Module Weight	39.7kg
Leadwire[6]	2.5mm², 650mm (+) & Bulkhead (-)
Connectors	TE Connectivity PV4-S or alternate
Junction Box	IP68 Rated
Bypass Diode	N/A
Cell Type	Thin film CdTe semiconductor, up to 268 cells
Back Rail Material	Galvanized steel
Front Glass	Heat strengthened
Back Glass	Heat strengthened
Encapsulation	Laminate material with edge seal
Frame to Glass Adhesive	Silicone
Load Rating	2400Pa

Install in portrait only

PACKAGING INFORMATION		
Model Type	Modules Per Pack	Packs per 53' Container
FS-7XXXA-*TR1*	46	10

1 Limited power output and product warranties subject to warranty terms and conditions
2 All ratings ±10%, unless specified otherwise. Specifications are subject to change
3 Measurement uncertainty applies
4 Testing Certifications/Listings pending
5 IEC 61730-1: 2016 Class II
6 Leadwire length from junction box exit to connector mating surface

First Solar
LEADING THE WORLD'S SUSTAINABLE ENERGY FUTURE

Request

31. Provide information on where the PV cells/solar panels and the plant equipment are manufactured.

Response

Solar modules will likely be manufactured in the United States or Asia. Inverters will likely be manufactured in Spain or China.

Request

32. Identify whether storage is being used and provide safety data sheets/cutsheets for any proposed energy storage system.

Response

Energy storage is not anticipated at this time.

Request

33. Provide information on the environmental impact of the energy storage system.

Response

Energy storage is not anticipated at this time.

Request

34. If batteries are to be used for energy storage, provide the life expectancy of the batteries.

Response

Energy storage is not anticipated at this time.

Request

35. Explain whether the batteries will be recycled. If not, explain how the batteries will be disposed.

Response

Energy storage is not anticipated at this time.

Request

36. Provide information on any fiber optic or communication network installed as a part of the project and any excavation that may be required for the installation.

Response

Fiber optic cable is typical for communication between some of the PV equipment such as the inverter skids. Trenching and other design details are not available until an EPC is selected and completes the engineering drawings for the project.

Request

37. Refer to the Site Assessment Report (SAR), page 0, Section 2.2.3. Provide any communication with neighboring landowners regarding the scenic impacts of the project that occurred after the public information meetings.

Response

Golden Solar has been in contact with the landowner of PID 16-29A regarding scenic impacts since the March 24, 2022 public information meeting. Communications with this landowner have been provided separately under seal with a concurrently filed Petition for Confidential Treatment. Attached hereto is a brochure that was sent to the landowner.

Solar Energy:
Frequently Asked Questions

nationalgrid renewables

farmer-friendly

adjective: exhibiting a respect and appreciation for hardworking farmers, their communities, and the rural American way of life.

We know that nobody knows the land better than our landowner partners and tenants – which is why we retain open lines of communication with each of our land partners throughout the project lifecycle and compensate our land partners fairly.

Who is National Grid Renewables?

We are farmer-friendly and community-driven. National Grid Renewables was founded with deep roots in agriculture and an understanding and respect for agriculture, farmers, and their local communities.

National Grid Renewables, which includes the renewables development company formerly known as Geronimo Energy, is a leading North American renewable energy company based in Minneapolis, Minnesota, with satellite offices located throughout multiple states in the regions where it develops, constructs, and operates. As a farmer-friendly and community focused company, National Grid Renewables develops projects for corporations and utilities that seek to repower America's electricity grid by reigniting local economies and reinvesting in a sustainable future. National Grid Renewables is part of the competitive, unregulated Ventures division of National Grid and has a robust portfolio of solar, wind, and energy storage projects located throughout the United States in various stages of development, construction and operation.

National Grid Renewables is excited to partner with our landowners to bring millions of dollars into their local economy via renewable energy development. We promise prompt responsiveness and diplomacy at all times, as well as a willingness to answer questions from supporters and objectors alike.

We look to hire from the existing local work force near our projects.

We work closely with our landowners and their neighbors during the siting process to ensure that our projects are well-received by the community to yield sustaining support for the long term operation of a project.

Solar Energy Basics

Photovoltaic Solar Panels

Photovoltaic (PV) solar panels are designed to absorb as much incoming sunlight as possible. As light passes through the front surface of a solar panel, it is trapped in the panel's solar cells and converted to electricity. The most common solar panels available today are polycrystalline, thin film and monocrystalline.

Tracking Technology Maximizes Electric Output

While each site warrants its own unique design, the increase in the use of tracking solar panels has resulted in maximum solar resource for many of National Grid Renewables' projects. Tracking solar racking systems have unique technology that allows the panel to track the sun as it travels across the sky throughout the day. This allows for maximum solar energy absorption, extended sunlight capture in the mornings and evenings and greater electrical output during peak demand.

Fixed Tilt Technology

Fixed tilt racking systems are the most abundant type of racking system in the US. They typically face south to maximize the sun's rays throughout the year. The advantages of fixed tilt racking are their ability to withstand greater topographical grades and that they can be a more economic choice over tracking systems.

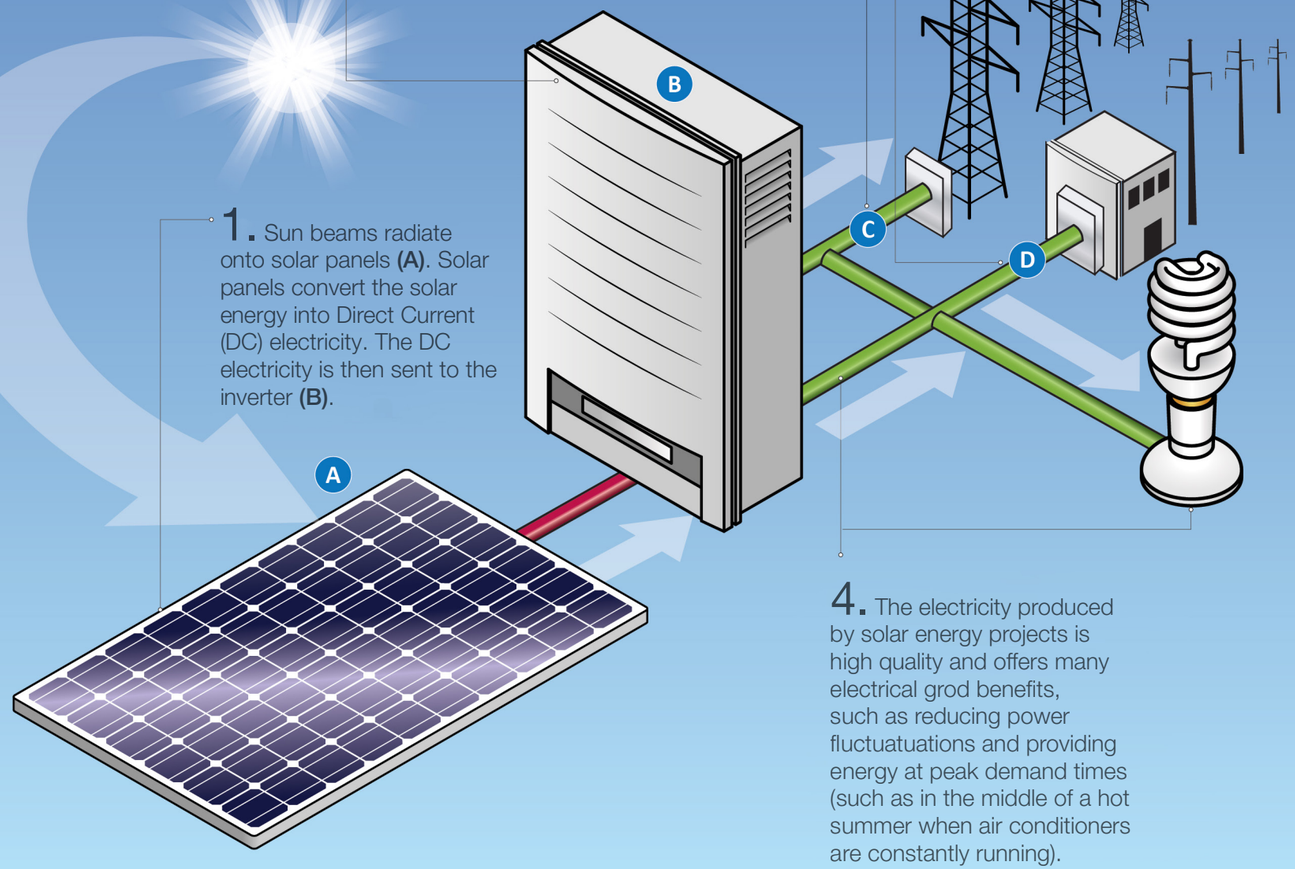
Solar Energy Projects Are Reliable

Did you know that no power plant is 100% reliable? Back-ups are needed for every type of energy producer. A modern solar panel produces electricity 100% of the time the sun is shining, but generates different energy outputs depending upon the solar strength and other factors. Over the course of a year, a solar panel can be expected to generate approximately 20% of its maximum output, which is known as the "net capacity factor."

How a Solar Panel Works

2. An inverter's job is to convert DC electricity into Alternating Current (AC) electricity.

1. Sun beams radiate onto solar panels **(A)**. Solar panels convert the solar energy into Direct Current (DC) electricity. The DC electricity is then sent to the inverter **(B)**.



3. AC electricity is then pumped into the local electric grid, either through transmission lines **(C)** or via local distribution lines or substations **(D)**.

4. The electricity produced by solar energy projects is high quality and offers many electrical grod benefits, such as reducing power fluctuatuations and providing energy at peak demand times (such as in the middle of a hot summer when air conditioners are constantly running).

National Grid Renewables' farmer-friendly approach ensures that each of our projects will benefit the local area for generations to come.

Solar Energy Facts

Responsible Planning and Siting

National Grid Renewables works hard to ensure our solar facilities are built to the highest of standards. When considering locations for our solar sites, we consider: the projected size of the facility, land type and quality, localized environmental impacts, the local climate and (if necessary) snow load, the host community's receptiveness to renewable energy, the electric service territory ownership, the proximity of the site to nearby existing electrical infrastructure, and permitting and interconnection considerations, among other factors.

National Grid Renewables has experience in acquiring hundreds of thousands of acres for renewable energy projects and works diligently to identify the best land through local jurisdictions, permitting authorities, and landowner interest. National Grid Renewables' farmer-friendly approach ensures that each of our projects will benefit the local area for generations to come. National Grid Renewables is committed to providing each of its landowners with prompt responsiveness, expert advice and fair compensation. We work closely with landowners and neighbors during the siting process to ensure that projects are well received by the community and yield sustaining support for the long term operation of the project.

Advanced Solar Technology Keeps You Safe

Solar arrays not only produce clean energy for current electricity demand, but also provide clean energy for future generations. While stray voltage can be an issue with traditional electric generation sources for farmers with livestock, solar facilities that are built correctly will not produce stray voltage. All National Grid Renewables solar facilities are built to electric code and are thoroughly reviewed for any possible electrical impacts on the surrounding community. When siting and designing a project, stray voltage is addressed through various methods, including soil studies. Soil studies are conducted to determine the corrosive nature and thermal capacity of the earth. This helps ensure that all grounding equipment and buried cable are designed correctly and no stray issues arise from corroded grounding equipment.

Electromagnetic Field (EMF)

The term electromagnetic field (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from voltage or electrical charges, and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection lines, substation transformers, house wiring, and electrical appliances. The intensity of an electric field is related to the voltage of the line, and the intensity of a magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. In fact, all power lines produce EMF, including those that connect your home to the electrical grid.

While the general consensus is that electric fields pose no risk to humans, the question of whether or not exposure to magnetic fields potentially causes biological responses or even health effects continues to be the subject of research and debate. For a solar project, the sources of EMF are from electrical collection lines that will likely be buried underground and from the transformers installed at each inverter pad. EMF from underground electrical collection lines dissipates right next to the lines because they are installed below ground inside insulated shielding. A solar facility has to comply with the National Electric Code, which ensures proper installation, safety procedures, and equipment specifications for all of the electrical components utilized in the array. As a result, National Grid Renewables does not anticipate any issues to arise regarding EMF.

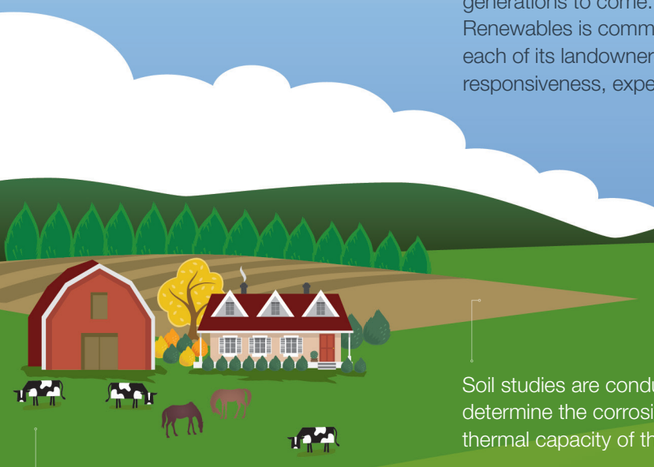
Reflection and Glare

The glass surface of modern solar panels can include an anti-reflective coating, similar to that used on optical equipment (camera lenses), as well as texturing to minimize any loss of incoming light. Studies have shown that PV solar panels reflect as little as 2% of incoming light, which means that PV solar panels are less reflective than water or window glass.

In the past, solar panel glare had primarily been a concern only for the aviation industry. However, recent studies have proved that solar panels pose minimal concern to pilots. In fact, there are numerous solar panel installations near U.S. airports, and there has never been a documented case of an accident due to solar panel glare. Hindawi Publishing Corporation, in conjunction with International Scholarly Research Notices, conducted an experiment that measured the potential glare that an aircraft pilot could experience as a result of ground-mount solar panels. Their findings concluded that "the potential for hazardous glare from flat-plate PV systems is similar to that of smooth water and not expected to be a hazard to air navigation."

By working with expert construction and technology partners, National Grid Renewables is able to model facility locations and solar panel arrays with no reflective glare issues or safety concerns. National Grid Renewables develops each solar site with the approved Federal Aviation Administration (FAA) and Sandia Labs solar glare hazard analysis tool, which identifies and mitigates solar glint and glare.

Protecting the earth, environment and its inhabitants is at the heart of why we do what do: solar energy is one of the least harmful types of energy production.



National Grid Renewables is committed to providing each of its landowners with prompt responsiveness, expert advice and fair compensation.

Soil studies are conducted to determine the corrosive nature and thermal capacity of the earth.

The glass surface of modern solar panels can include an anti-reflective coating, similar to that used on optical equipment (camera lenses), as well as texturing to minimize any loss of incoming light.

Solar Energy and the Environment

Diligent Development

Protecting the earth, environment and its inhabitants is at the heart of why we do what do: solar energy is one of the least harmful types of energy production. The solar energy industry as a whole off-sets billions of tons of carbon dioxide emissions, consumes little to no water, and uses a naturally occurring and replenishing fuel source. Our business is the business of environmental stewardship, and National Grid Renewables will continue to take every step to ensure that we conduct business in the most environmentally responsible way possible.

Solar is a Good Neighbor

Solar projects are a relatively low impact development option for communities. They are low to the ground (approximately 10-15 feet above grade), are pollutant free, virtually noiseless, improve water quality, reduce runoff and do not create any odors or undesirable impacts.

Solar Projects Are Free Of Pollutants

Solar projects do not generate air or water emissions, produce any hazardous waste, deplete natural resources, cause environmental damage through resource extraction and transportation, or require significant amounts of water during operation. Solar power's pollutant-free electricity helps offset the environmental damage caused by other forms of power generation.

Wildlife Advocates

Prior to constructing a solar project, National Grid Renewables conducts local wildlife studies to ensure that each project is developed in the most environmentally-friendly way. Factors such as animal breeding areas and wildlife corridors are all considered when choosing a location for a solar project. Maintenance plans for the solar facility also take into consideration wildlife that may live within the fence. National Grid Renewables also follows DNR siting and seed mix guidance for solar arrays.

National Grid Renewables often develops a habitat conservation plan for our solar projects. After a solar project is constructed, areas that do not contain permanent project facilities will be revegetated with a low growing seed mix developed specifically for each site to ensure establishment, create a stable habitat, and promote biodiversity. In this way, National Grid Renewables' solar projects not only protect the environment by reducing carbon dioxide emissions and water usage, but they also help provide a safe harbor for vital ecosystem species. The creation of a stable habitat also helps reduce runoff and can improve water quality, two important topics for rural communities.

Protecting the environment
The solar energy industry as a whole off-sets billions of tons of carbon dioxide emissions, uses little to no water consumption, and uses a naturally occurring and replenishing fuel source.

After a solar project is constructed, areas that do not contain permanent project facilities will be revegetated with a low growing seed mix developed specifically for each site to ensure establishment, create a stable habitat, and promote biodiversity.

Prior to constructing a solar project, National Grid Renewables conducts local wildlife studies to ensure that each project is developed in the most environmentally-friendly way.

Solar power's pollutant-free electricity helps offset the environmental damage caused by other forms of power generation.

Solar projects are low to the ground (approximately 10-12 feet above grade), are pollutant free, virtually noiseless, improve water quality, reduce runoff and do not create any odors or undesirable impacts.

The Economics of Solar Energy

Unlike fossil fuels, whose costs fluctuate with the market, solar energy does not rely upon market-dependent fuel costs. Such stability means there is a possibility of locking in solar energy pricing for the life of the project.

The Strong Market for Solar Energy

The solar industry has experienced exceptional growth, driven primarily by dramatic reductions in the installation cost. These price decreases have made solar energy cost competitive with traditional energy sources and is now one of the least expensive renewable energy resource available in many areas of the United States today.

Additionally, solar energy is a peaking resource, which means that in general, solar's peak energy supply occurs when it's needed most. For example, on hot sunny, summer days when everyone turns on their air conditioning, solar projects are operating at their highest capacity and can best support the increased demand for electricity.

Solar Energy is a Stable Investment

Unlike fossil fuels, whose costs fluctuate with the market, solar energy does not rely upon market-dependent fuel costs. Such stability means there is a possibility of locking in solar energy pricing for the life of the project. Furthermore, because of the recent significant technological advancements, solar energy has seen a steady decrease in its cost to produce energy, so today's fixed price is significantly less than the fixed prices of years past.

Solar Projects are Popular and Lucrative for Farmers

Solar projects are popular with farmers because solar projects provide an additional revenue source for their family. National Grid Renewables calls this supplemental revenue "Extraordinary Seed Crop".

Extraordinary Seed Crop is guaranteed revenue provided by hosting a National Grid Renewables solar project. In uncertain times, our operating solar projects provide farmers and landowners with income certainty. As we all know, the commodity markets fluctuate up and down and are unpredictable. Solar energy provides income certainty, diversified revenue streams, and decreased risk. No other "seed crop" can promise that kind of certainty.

Solar Energy Brings Substantial Money to Local Communities

Solar projects bring significant economic benefit to their host communities throughout the development, construction and operation phases. During the development phase, solar projects bring an influx of spending to the host and surrounding communities in the form of sponsorships, travel, lodging, meals, and legal and recording fees. Throughout development, National Grid Renewables may bring construction companies, power purchasers and other solar industry constituents into the local area to survey the project location, which puts money back into the community's pocket via restaurants, gas stations, hotels and retail shops.

During the construction phase, solar project communities experience another boom in all of the above mentioned spending categories, but this time, multiplied by the dozens. Solar projects cause an influx of new construction jobs in the local area, which means even more revenue for local shops, restaurants and hotels, plus a boost to the local economy in the form of increased resident income.

Once a solar project is operational, it contributes to the local tax base, which can include increased income for local school districts, fire and police departments, counties and townships. These additional revenue streams afford communities the ability to build and improve schools, roads, bridges and other infrastructure items.

Price decreases have made solar energy cost competitive with traditional energy sources and is now one of the least expensive renewable energy resource available in many areas of the United States today.

Once a solar project is operational, it contributes to the local tax base, which can include increased income for local school districts, fire and police departments, counties and townships.

During the development phase, solar projects bring an influx of spending to the host and surrounding communities in the form of sponsorships, travel, lodging, meals, and legal and recording fees.

Solar projects are popular with farmers because solar projects provide an additional revenue source for their family. National Grid Renewables calls this supplemental revenue "Extraordinary Seed Crop".

The Life of a Solar Project

Construction of a Solar Project

Construction of larger solar projects (100+ MW) typically takes eight months from commencement of construction to commercial operation. Smaller projects (less than 100 MW) typically take up to 6 months to reach commercial operation. As you can imagine, a lot goes into the construction of a solar project, but the process always includes: civil preparation (including clearing and grubbing of the property), fence installation, structural work such as the installation of steel piers and the racking system on which the modules sit, electrical cable installation and trenching, and module and inverter installation. After equipment installation is complete, the property will be seeded into a stable low growing seed mix. Testing and commissioning are the final stages of construction, which include utility testing to ensure safe and effective delivery of electricity to the grid.

After construction, property that has been disturbed will be restored. Landowners will be compensated for crop damages incurred during development and construction. National Grid Renewables' agreements provide many protections for landowners to ensure that they don't incur costs or risks during development and construction.

Drain Tile

In addition to crop damage payments, it is part of National Grid Renewables' core development philosophy to consider drain tile when designing solar projects. For every solar project we develop, we analyze the location of existing drain tile and try our best to design project layouts around it. If for some reason, we are unable to design around drain tile, we take great care when cutting into the tile in order to minimize impacts. Just like our crop damage clause, National Grid Renewables offers drain tile damage payments, which ensures that drain tile is restored to it original state after project construction is complete.

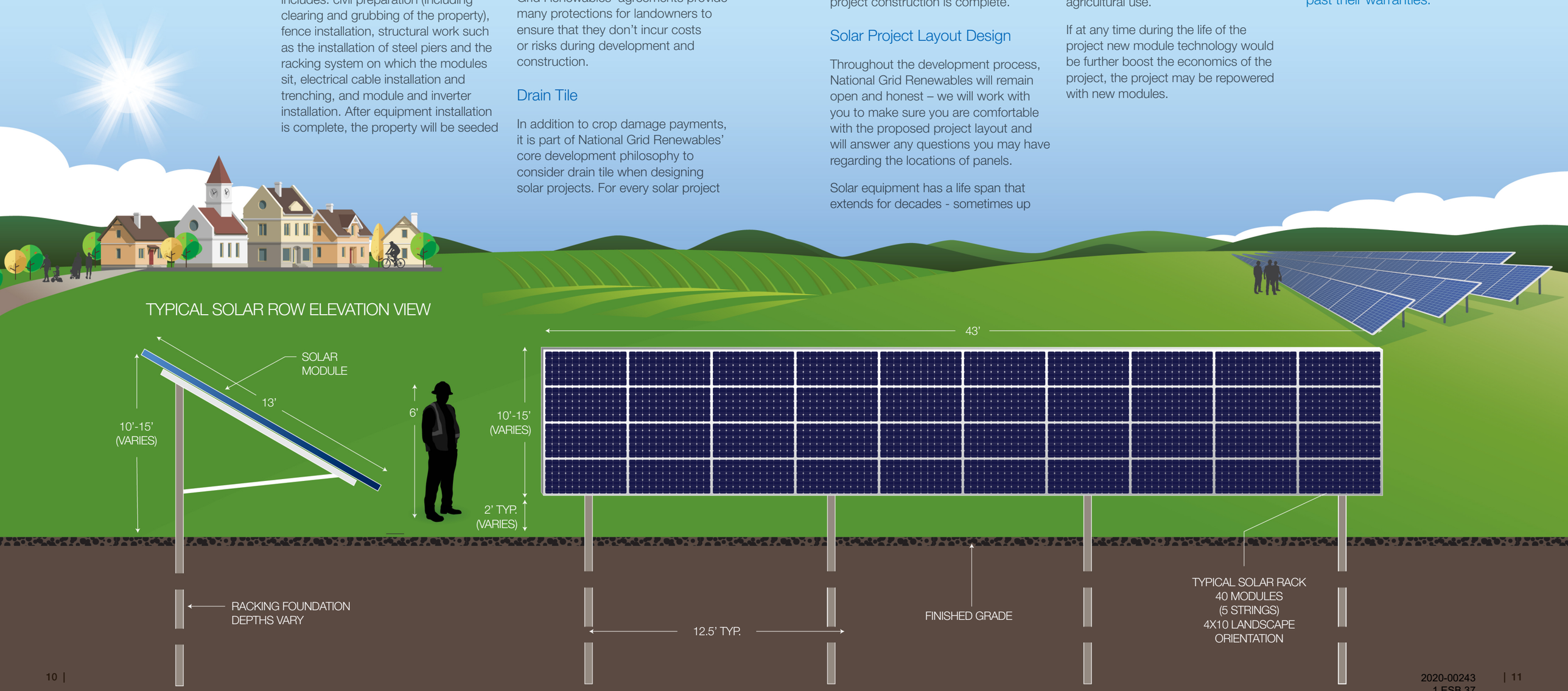
Solar Project Layout Design

Throughout the development process, National Grid Renewables will remain open and honest – we will work with you to make sure you are comfortable with the proposed project layout and will answer any questions you may have regarding the locations of panels.

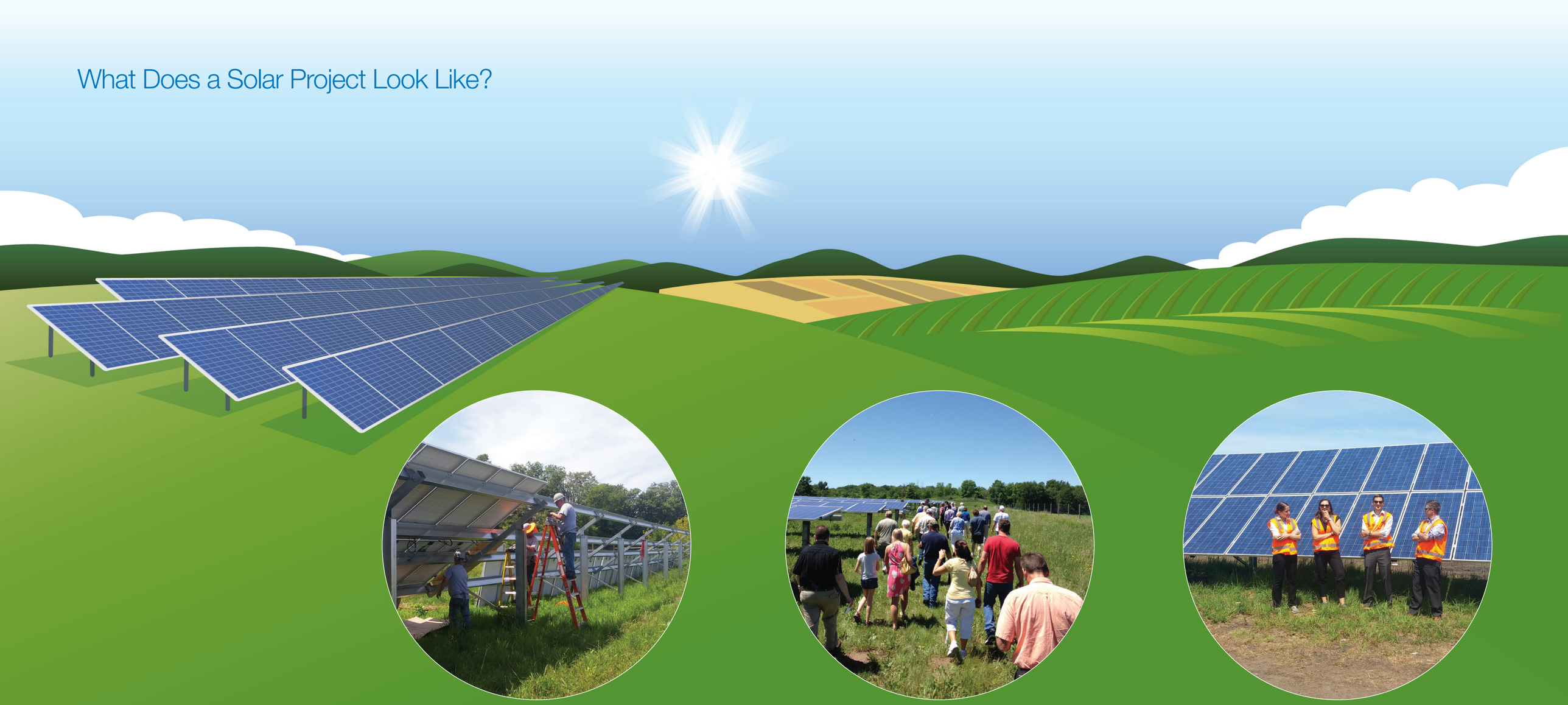
Solar equipment has a life span that extends for decades - sometimes up to 50 years. Modules will continue to produce electricity well past their warranties. At the end of the life of the project, solar equipment can be removed, recycled and salvaged for additional value. Because solar energy projects are considered low impact development, solar projects allow for flexibility in regards to the land use of after its removal. Some solar project lands are even returned to their original agricultural use.

If at any time during the life of the project new module technology would be further boost the economics of the project, the project may be repowered with new modules.

Solar equipment has a life span that extends for decades - sometimes up to 50 years. Modules will continue to produce electricity well past their warranties.



What Does a Solar Project Look Like?



Racking

Fixed Panels

Tracking Panels

Inverters

Communications and Technical Equipment

Fencing

We would love to show you around!

If you are interested in visiting one of our operating solar projects, or to learn more about National Grid Renewables, visit any one of our office locations or call us at 952.988.9000. You can also email your questions and comments to info@nationalgridrenewables.com, or visit us on the web at www.nationalgridrenewables.com.

Company Headquarters

National Grid Renewables
8400 Normandale Lake Boulevard
Suite 1200
Bloomington, MN 55437
P 952-988-9000
F 952-988-9001
info@nationalgridrenewables.com

Sources

Fengxiang Chen and Lisheng Wang (2011). Light Trapping Design in Silicon-Based Solar Cells, Solar Cells Silicon

Lazard Levelized Cost of Energy Analysis v13.0, November 2019.

Wafer-Based Technologies, Prof. Leonid A. Kosyachenko (Ed.), ISBN: 978-953-307-747-5, InTech.

Federal Aviation Administration: Office of Airport Planning and Environmental Division, Technical Guidance for Evaluating Selected Solar Technologies on Airports, pg 37, November 2010.

GreenTech Media's Energy Gang Podcast: "The Solar-Utility Battle is Getting Ugly." January 28th, 2015.

GTM Research and Solar Energy Industries Association (SEIA), Solar Market Insight Report 2015 Q2.

MN SEIA, "Solar Industry Data". http://www.seia.org/research-resources/solar-industry-data. February 24, 2015.

Shea P. Stephen, Ph.D. Evaluation of Glare Potential for Photovoltaic Installations, pg 3-4, August 2012.

nationalgrid renewables

Request

38. Refer to the SAR, Section 6, Mitigation Measures, Mitigation Measure 26. Provide details regarding the Compliant Resolution Program for the Project.

Response

The Complaint Resolution Program will involve tracking complaints from neighbors and the steps taken to resolve the issues. Neighbors will be provided contact information to contact Project representatives with any issues.

Request

39. Provide any communications with any local, state, or federal agencies regarding wetlands, endangered species, or historic sites located within the project boundaries.

Response

Golden Solar has requested a jurisdictional determination from U.S. Army Corp of Engineers (USACE). See attached 8/24/22 email. USACE is currently reviewing the wetland delineation and JD request. The communication following the request has been managed by Golden Solar's consultant and is about planning a site visit on October 20, 2021.

Golden Solar has communicated with the Office of Kentucky Nature Preserves and the U.S. Fish and Wildlife Service (USFWS) regarding endangered species and has had meetings with the USFWS. See attached communications and meeting notes.

Golden Solar recently submitted a Cultural Historic Survey (Historic Structure Inventory) report to the Kentucky Heritage Council and will supplement this Response with the final communication. The Archaeological report will be submitted before the end of 2022.

From:	Bruce Moreira
To:	CELRL.Door.To.The.Corps@usace.army.mil; Watson, Jennifer A LRN
Cc:	Courtney Pelissero; Ben Hess
Subject:	[External] USACE AJD Request for Golden Solar Project (Caldwell County, KY): Nashville USACE District
Date:	Wednesday, August 24, 2022 6:21:38 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png 20211015_Geronimo_Golden_DelinRpt Text Only.pdf Caldwell ORM_Upload_Sheet_Consolidated_NWPR_20220309.xlsm Golden PJD Form.pdf

---

To whom it may concern,
Golden Solar, LLC is requesting an Approved Jurisdictional Determination for the Golden Solar Energy Facility, located northwest of the town of Princeton, Kentucky in Caldwell County (Figure 1 of Wetland Report). The project is a proposed utility scale solar energy facility covering approximately 2500 acres. Proposed project infrastructure will consist of fence-line, photovoltaic (PV) panel arrays, below-ground or hybrid electrical collection lines, inverters, access roads, a substation, an operations and maintenance (O&M) building, weather stations, and laydown yards.

An complete copy of the October 2021 Regulated Water Delineation Report for the Project site can be downloaded from the site below and contains basic site information that is typically requested for approved jurisdictional determinations.

USACE Jurisdictional Determination

We have also attached a smaller version of the report which includes the report text and overview figures if you need a more portable version.

We have included a Excel ORM Consolidated Table with the key features of each wetland/water delineated included in the Aquatic Resources Tab. Please let me know once the project has been assigned a Corps ID number and what staff will be involved in completing this JD request. If you have any questions or comments about the enclosed request, or require any further clarification, please contact me.

I understand that you plan to visit the Caldwell Solar site in September. This site is adjacent to Caldwell Solar and both sites can be visited at the same time.

Bruce Moreira
SENIOR ENVIRONMENTAL SCIENTIST
CARDNO

Cardno now Stantec

Direct +1 503 233 3608 Mobile +1 971 284 3373
Address 601 SW 2nd Ave Suite 1400, Portland, OR 97204
Email bruce.moreira@cardno.com Web www.cardno.com

CONNECT WITH CARDNO

The health, wellbeing and livelihoods of our people, families, clients and communities is Cardno's key priority. Our teams are responding to COVID-19 with robust business continuity plans and we will continue to work closely with our people and clients to support them every day. *> LEARN MORE*

July 7, 2020

Mr. Lee Andrews
Field Supervisor
U.S. Fish & Wildlife Service
Kentucky Ecological Services
330 West Broadway, Rm 265
Frankfort, KY 40601

VIA EMAIL: KentuckyES@fws.gov

Subject: Golden Solar Farm Project
Caldwell County, Kentucky
Request for Environmental Review

Dear Mr. Andrews:

Golden Solar, LLC (Golden Solar) is submitting a request for the Environmental Review for the Golden Solar Farm in Caldwell County, Kentucky. The proposed Project is an up to 100 MW utility scale photovoltaic solar farm (Figure 1).

Golden Solar is preparing an application for submittal to the Kentucky Electric Generation and Transmission Siting Board (KYSB) in an effort to obtain a Certificate of Construction for the Project. In support of the KYSB filing, Golden Solar has conducted the following surveys within the Project Area:

- Wetland delineation with stream assessment; and
- Habitat Evaluation for Threatened and Endangered Species.

The purpose of this request is to obtain existing information on Federally-listed species and unique or protected habitats that may occur within the proposed Project Area. We have requested a review of the Kentucky Biological Assessment Tool (KYBAT) database for any natural areas and state-listed sensitive species that may be located within the Project Area (Appendix A). Many of the state-listed species are also federally protected so the results may help inform your review.

Generally, the Project Area is located within a rural, unincorporated portion of Caldwell County (Figure 1). Based on desktop and field reviews, the predominant land use was agricultural, with some pasture and forest areas. The agricultural fields were observed to be primarily a mix of soybean crops and corn. The pasture areas were a mix of grasses used for livestock grazing or the production of seed or hay crops. The forest areas existed mostly as isolated woodlots and windrows between crop areas. Forested areas will be preserved where possible, however, Golden Solar anticipates the need to clear limited windrows and edges of woodlots in order to construct and operate the Project. Golden Solar is committed to minimizing the tree clearing where possible, and

observing seasonal restrictions on tree clearing to protect sensitive bat species (e.g., cutting trees only between November and March) as conditions specify.

Golden Solar will use an environmental consultant, Cardno to conduct field studies. During the field surveys, Cardno will investigate the area for rare, threatened, or endangered (RTE) species or freshwater mussel species in the waterbodies in the Project Area. The relative narrowness of the woodlots and fragmentation of wooded habitats by roads, residential land use, and farm fields reduces the likelihood of RTE wildlife occurring in the Project Area.

As stated above, in order to assure proper project planning and permitting, Golden Solar requests your review of the Project area. We understand that maps and electronic files of RTE species and habitat in the Project area will be provided by KYBAT but request any additional information on RTE species and habitat from your office. Please provide any recommendations on avoidance and mitigation measures for RTE species in the Project area.

We would be happy to have a conversation over the phone, or meet you, or a member of your staff, at your office or the site to obtain this information in the most efficient manner. We look forward to working with your office to identify sensitive resources and minimize potential impacts from the proposed Golden Solar Farm Project.

Please contact me with any questions,

Regards,

Courtney Pelissero

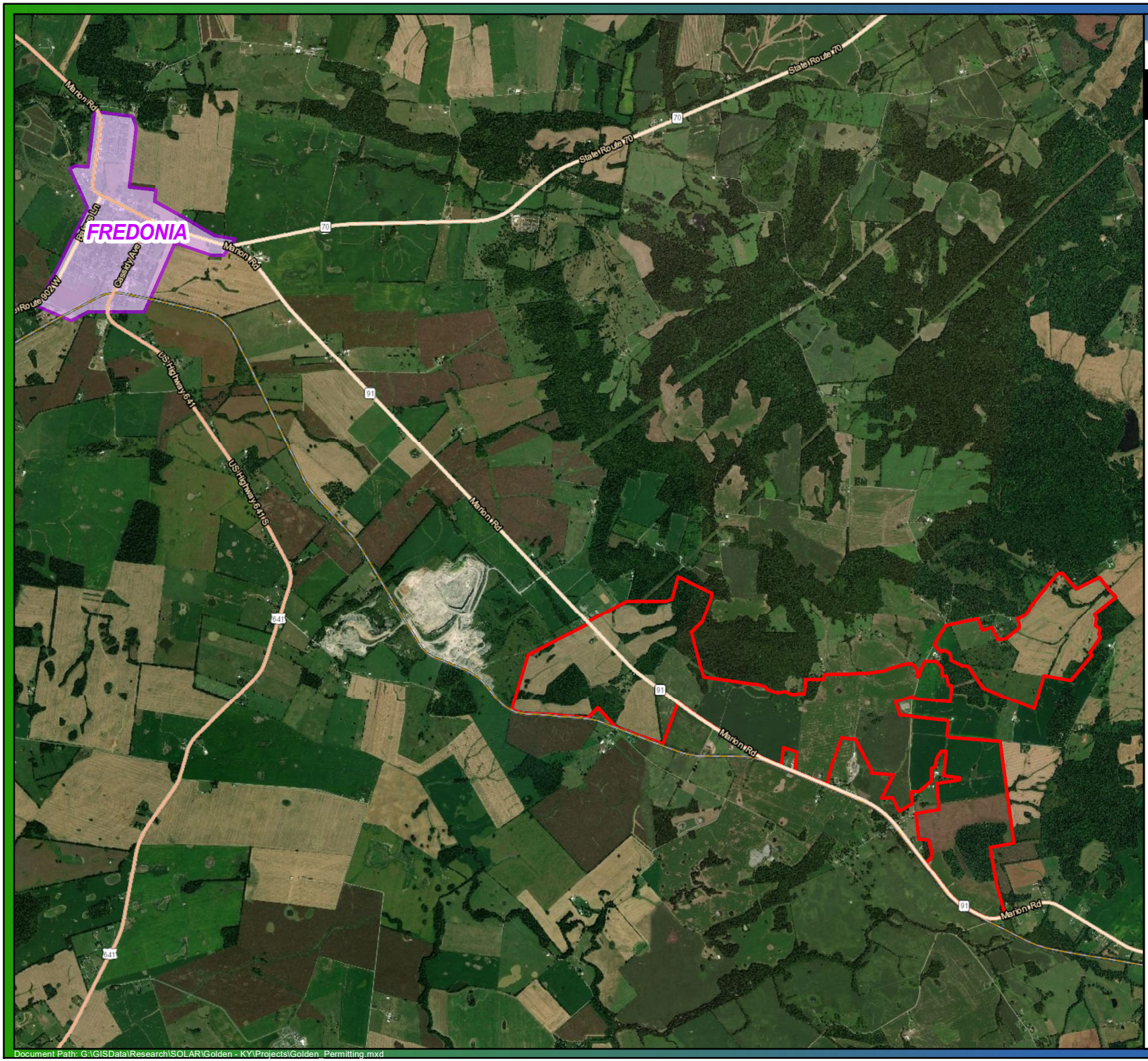
Courtney Pelissero
Permitting Associate
Golden Solar
8400 Normandale Lake Boulevard, Suite 1200,
Bloomington, MN 55437
cpelissero@geronimoenergy.com

+1 (952) 358-5693

Attachments:

Figure 1 Project Location

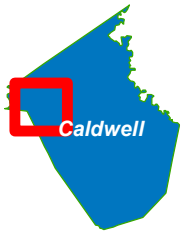
Appendix A KYBAT Results



GOLDEN

Project Area

Municipalities



0 0.5 1

Miles

GERONIMO ENERGY

2020-00243
1 ESB 39

Document Path: G:\GISData\Research\SOLAR\Golden - KY\Projects\Golden_Permitting.mxd

amcintyre Date: 6/18/2020

ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

ZEB WEESE
EXECUTIVE DIRECTOR

ENERGY AND ENVIRONMENT CABINET
OFFICE OF KENTUCKY NATURE PRESERVES

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601
TELEPHONE: 502-573-2886
TELEFAX: 502-564-7484

June 11, 2020

Bruce Moreira
Cardno, Inc.
6720 S Macadam Ave, Suite 150
PORTLAND, OR 97219

Project:	Caldwell and Golden Projects; Cardno
Project ID:	20-0166
Project Type:	Standard (*customers will be invoiced), 1 mile buffer ($120 fee)
Site Acreage:	3,371.96
Site Lat/Lon:	37.162065 / -88.013859
County:	Caldwell
USGS Quad:	CRIDER; FREDONIA
Watershed HUC12:	Skinframe Creek; Upper Donaldson Creek; Upper Livingston Creek

Dear Bruce Moreira,

This letter is in response to your data request for the project referenced above. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Office of Kentucky Nature Preserves occur within your general project area. Your project does pose a concern at this time, therefore please see the attached reports and report key for more detailed information.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Office of Kentucky Nature Preserves, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Office of Kentucky Nature Preserves." The exact location of plants, animals, and natural communities, if released by the Office of Kentucky Nature Preserves, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Biological Assessment Branch (300 Sower Blvd - 4th Floor, Frankfort, KY, 40601. Phone: 502-782-7828).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent

on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions, or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Nour Salam
Geoprocessing Specialist

Standard Occurrence Report
KNP monitored species within 1 Miles of Project Area

EO ID	Scientific Name	Common Name	GRank	SRank	SPROT	USESA	STWG	Last Obs Date	Precision	EO Rank	Lat / Lon	Directions	Habitat
20011	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20015	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20019	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20020	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20021	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20023	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20053	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20073	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20103	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
20147	*Cave*		GU	SNR	N			No Date	S	E		Sensitive Element - Contact KSS at ksscaves.com	
4797	*Hyla gratiosa*	Barking Treefrog	G5	S3S4	N		Y	1998-06-17	S	C	37.1453 / -88.0976	South side Oak Grove Rd [Coleman-Doles Rd), w/i 0.5 rd mi W of US 641 (060A and 060G), ca 0.5 mi S of Beck Rd, ca 0.4 rd mi E of US 641 (060B), E side Oak Grove Rd, ca 0.3 rd mi S jct w/ Coleman-Doles Rd (060F), W of Oak Grove Rd, ca 0.5 rd mi N jct w/ KY	In Kentucky, the species is known from swamps and sinkhole ponds, some of which are situated in pastures, hayfields, and agricultural crop fields.
10022	*Hyla gratiosa*	Barking Treefrog	G5	S3S4	N		Y	1998-06-17	S	D	37.1294 / -88.0069	North side of Princeton-Fredonia Rd, 0.45 rd mi E of jct Pleasant Valley Rd.	In Kentucky, the species is known from swamps and sinkhole ponds, some of which are situated in

Standard Occurrence Report
KNP monitored species within 1 Miles of Project Area

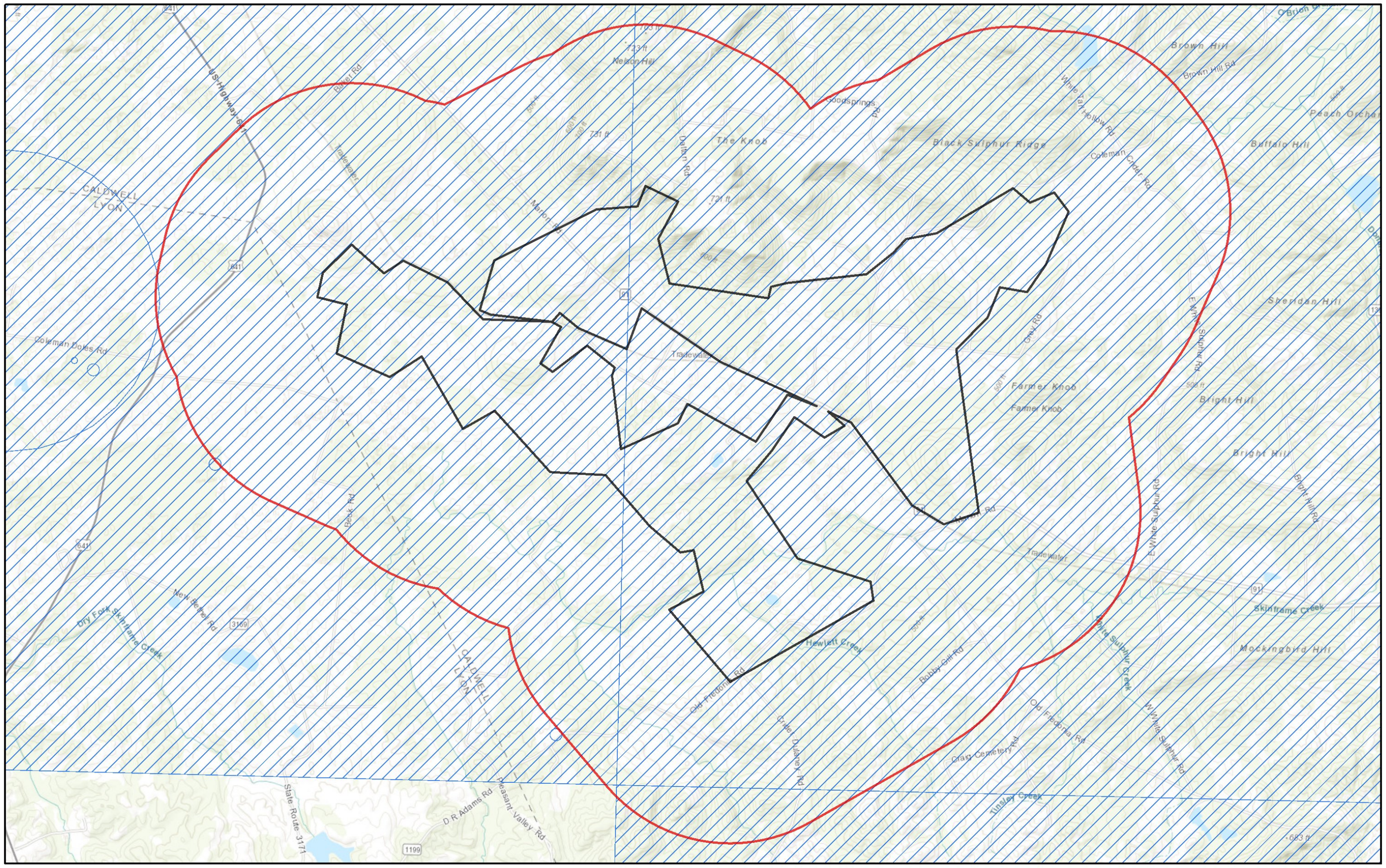
EO ID	Scientific Name	Common Name	GRank	SRank	SPROT	USESA	STWG	Last Obs Date	Precision	EO Rank	Lat / Lon	Directions	Habitat
													pastures, hayfields, and agricultural crop fields.
15891	*Lanius ludovicianus*	Loggerhead Shrike	G4	S3S4B,S4N	S	SOMC	Y	1990-06-20	Q	NR	37.0625 / -87.9375	CW block of quadrangle	
15894	*Lanius ludovicianus*	Loggerhead Shrike	G4	S3S4B,S4N	S	SOMC	Y	1990-06-24	Q	NR	37.1875 / -87.9375	CW block of quadrangle	
15954	*Lanius ludovicianus*	Loggerhead Shrike	G4	S3S4B,S4N	S	SOMC	Y	1990-06-24	Q	NR	37.1875 / -88.0625	CW block of quadrangle.	
13265	*Myotis grisescens*	Gray Myotis	G4	S2	T	LE	Y	2007-06-26	M	E	37.1671 / -88.0694	Forested drive [Clift Rd] off US 641.	Primarily use caves throughout the year, although they move from one cave to another seasonally. Males and young of the year use different caves in summer than females. Smaller colonies also occasionally roost under bridge structures.
16746	*Panax quinquefolius*	American Ginseng	G3G4	S3S4	CE			2014	S	C		Sensitive Element - Contact OKNP at naturepreserves@ky.gov	

Areas of Significant Biodiversity within 1 Miles of Project Area

Site ID	Site Name
719	*McElroy Cave (Fredonia)*
720	*Phelps Cave (Fredonia)*
721	*Rice Cave (Fredonia)*

THESE DATA ARE VALID ONLY ON THE DATE ON WHICH THE REPORT WAS GENERATED.
THESE DATA MAY ONLY BE USED FOR THE PROJECT NAMED ABOVE.

Caldwell and Golden Projects



June 11, 2020

- Project Boundary
- Buffered Project Boundary
- Element Occurences

1:53,903

0 0.45 0.9 1.8 mi

0 0.75 1.5 3 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

From:	Courtney Pelissero
To:	kentuckyes@fws.gov; lee_andrews@fws.com
Subject:	Golden Solar Project Bat Habitat Assessment and Avoidance
Date:	Monday, November 16, 2020 4:16:09 PM
Attachments:	NG_Renewables_Logo_Primary_RGB_small_b3464f9a-abea-443c-8d43-87fd96c8afec.png LinkedInIcon_8e0cea1f-d234-405f-8a61-4afe010bf11b.png TwitterIcon_ff6acde5-6940-4a01-92b6-0ef9db8c446d.png WebIcon_e1c44bce-dc58-4738-94a6-8941e49d8897.png Golden Solar_Bat Habitat_November 2020.pdf

---

Hello Mr. Andrews,

Golden Solar had previously reached out to you to regarding our solar energy project in Caldwell County, KY. We are following up with a letter regarding bat habitat assessment and avoidance. Please see attached document.

Please let us know if we should be coordinating with you or someone else from USFWS. We would like to set up a call soon to discuss a few of our projects in this region of Kentucky.

Thank you,
Courtney

nationalgrid renewables
952.988.9000

Courtney Pelissero
Permitting Associate

P 952-358-5693
E cpelissero@nationalgridrenewables.com

8400 Normandale Lake Boulevard, Suite 1200 | Bloomington, MN 55437

November 16, 2020

Mr. Lee Andrews
Field Supervisor
U.S. Fish & Wildlife Service
Kentucky Ecological Services
330 West Broadway, Rm 265
Frankfort, KY 40601

VIA EMAIL: KentuckyES@fws.gov

Subject: **Golden Solar Farm Project**
Caldwell County, Kentucky
Consultation Code: 04EK1000-2020-SLI-1535
Bat Habitat Assessment and Avoidance

Dear Mr. Andrews:

Golden Solar, LLC (Golden Solar) completed an IPAC (Information for Planning and Consultation) review for a proposed 100 MW utility scale photovoltaic solar farm (Project) in Caldwell County, Kentucky (Figure 1) on July 23, 2020. The IPAC review determined that the Project had potential to include habitat for three bat species:

Gray Bat (*Myotis grisescens*): Endangered
Indiana Bat *(Myotis sodalist):* Endangered
Northern Long-eared Bat (*Myotis septentrionalis):* Threatened

During field review, biologists completed preliminary habitat assessments of five forested parcels in the Project area. The results of these assessments are included in Table 1. Representative photos of the forested areas are included in Photos 1-7. General habitat quality of the parcels was moderate to high, represent generally smaller forested areas than those present on the surrounding landscape. All of the parcels are present on private land with no conservation easements.

Table 1. Bat Habitat Summary

Parcel ID	Habitat Summary	Habitat Quality Rating
A	Area A contained high quality woodlands with sinkholes and four cave openings. The western side of the forested area was higher quality woodlands and contained low invasive species, high diversity and mature trees. The canopy in the high quality woods was dominated by sugarberry (Celtis laevigata), black walnut (Juglans nigra), pignut hickory (Carya glabra), sugar maple (Acer saccharum), and American elm (Ulmus americana). Average diameter at breast height (DBH) for these canopy species was approximately twelve (12) to sixteen (16) inches. Understory vegetation was dominated by saplings of the canopy species but overall the woods were fairly open. No roost trees were recorded. Areas on the eastern side of the forested area were lower quality and contained dense non-native underbrush, low diversity, and immature trees. One cave opening and many sinkholes throughout the woodlands were recorded. The canopy in the low quality woods was dominated by sugarberry, black walnut, and sugar maple. Average diameter at breast height (DBH) for these canopy species was approximately six (6) to eight (8) inches. Understory vegetation was dominated by Amur honeysuckle (Lonicera maackii) and saplings of the canopy species. No roost trees were recorded.	High
B	Area B contained high quality woodlands with one cave opening where a stream was flowing out of it. Sinkholes were also recorded in this area. The canopy was dominated by black walnut. Average diameter at breast height (DBH) for canopy trees was approximately eight (8) to twelve (12) inches. Understory vegetation was dominated by black walnut saplings. No roost trees were recorded.	High
C	Area C contained moderate to high quality woodlands with some areas containing steep slopes and rocky outcrops. One cave opening and many sinkholes were recorded within this area. The canopy was dominated by black walnut. Average diameter at breast height (DBH) for canopy trees was approximately ten (10) to twelve (12) inches. Understory vegetation was dominated by coralberry (Symphoricarpos orbiculatus) and black walnut saplings. No roost trees were recorded.	Moderate/High
D	Area D contained moderate quality woodlands with some sink holes. The canopy was dominated by sugarberry, black walnut, and eastern red cedar (Juniper virginicus). Average diameter at breast height (DBH) for canopy trees was approximately ten (10) to twelve (12) inches. Understory vegetation was dominated by Amur honeysuckle and saplings of the canopy species. No roost trees were recorded.	Moderate
E	Area E contained moderate quality woodlands with many sink holes. Evidence of past logging activity was observed in this area. The canopy was dominated by sugarberry, black walnut, and eastern red cedar. Average diameter at breast height (DBH) for canopy trees was approximately ten (10) to twelve (12) inches. Understory vegetation was dominated by Amur honeysuckle and saplings of the canopy species. Approximately eight (8) shagbark hickories (Carya ovata) were noted for potential roost trees.	Moderate

The Project layout currently plans to clear these areas of standing trees and grade the surface for solar panel installation. Based on these determinations and the IPAC review finding that potential bat habitat could be present in the Project area, we wish to determine if additional studies should be conducted on these parcels to make a final determination of critical habitat presence with regards to the bat species listed above. Based on findings, we wish to identify the requirements under the Endangered Species Act (ESA) to clear and grade these areas for Project construction.

We would like to set up a phone call with staff from your office to discuss next steps for surveys and habitat determinations within the next few weeks.

Please contact me with any questions,

Regards,

Courtney Pelissero
Permitting Associate
Golden Solar
8400 Normandale Lake Boulevard, Suite 1200,
Bloomington, MN 55437
cpelissero@nationalgridrenewables.com

+1 (952) 358-5693

Attachments:

Figure 1 Project Location

Figure 2 Forest Parcel Locations

Photos 1-7 Site Conditions

Photo 1: Forest Parcel A. West Side: Higher Quality.

Photo 2: Forest Parcel A. East Side: Lower Quality.

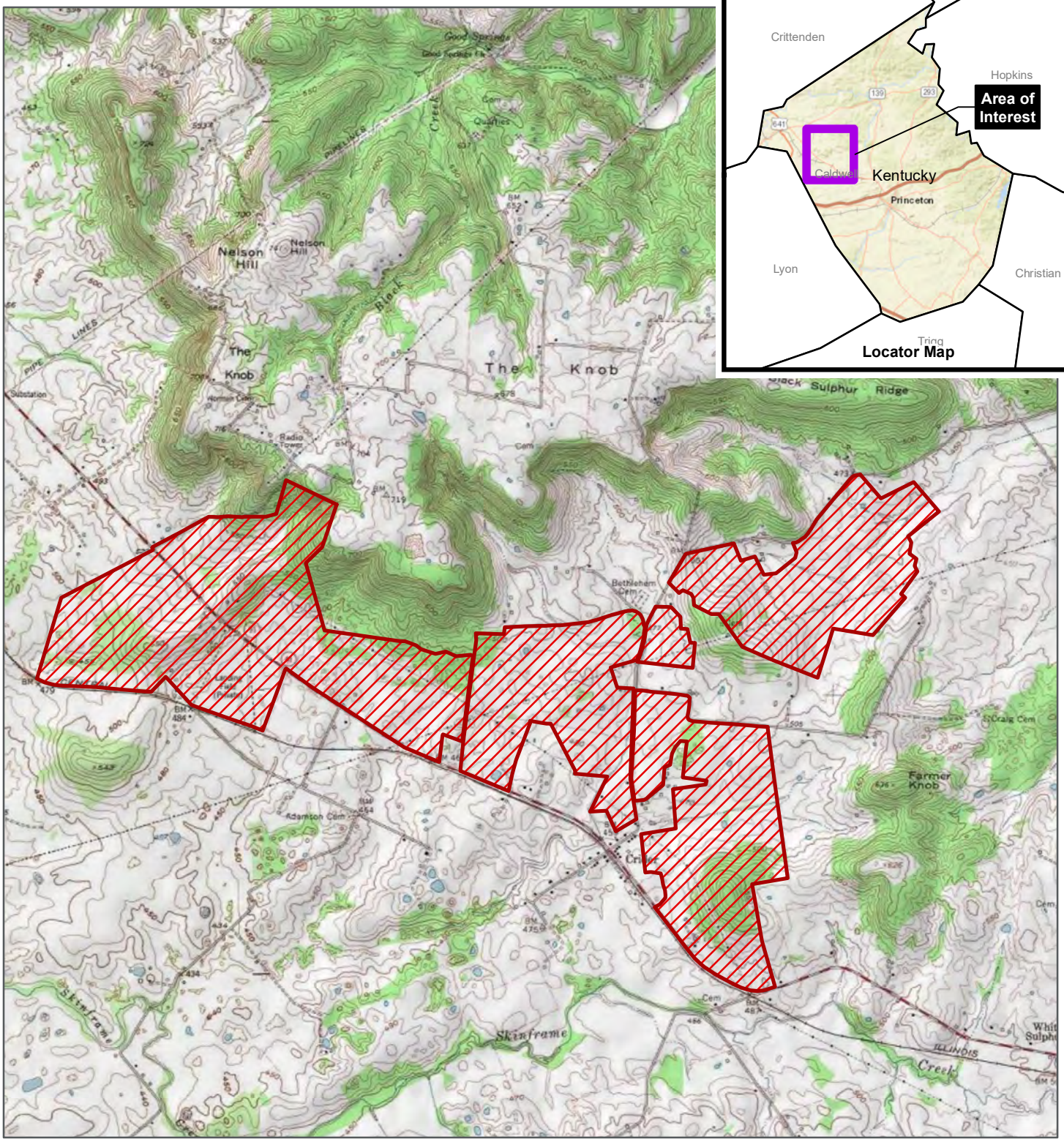
Photo 3: Forest Parcel B. High Quality Area.

Photo 4: Forest Parcel B. Cave with Subsurface Stream.

Photo 5: Forest Parcel C. Moderate/High Quality Area.

Photo 6: Forest Parcel D. Moderate Quality Area.

Photo 7: Forest Parcel E. Moderate quality wooded area and rock outcrops.



N
W E
S

7.5' Quadrangles:
Fredonia Quad
Crider Quad
Project No.
E320201000

Figure 1: Project Location
Golden Solar
Regulated Waters Delineation Report
Golden Solar LLC
Caldwell County, Kentucky

Cardno
3901 Industrial Blvd.,Indianapolis, IN 46254
Phone (+1) 317-388-1982 Fax (+1) 317-388-1986
www.cardno.com

Date: 5/21/2020 File Path: R:\Projects\QF121 Client Folders\e320201200_Golden\GIS\MXD\Delineation\F1_Location.mxd Saved By: Stephen.LaFon

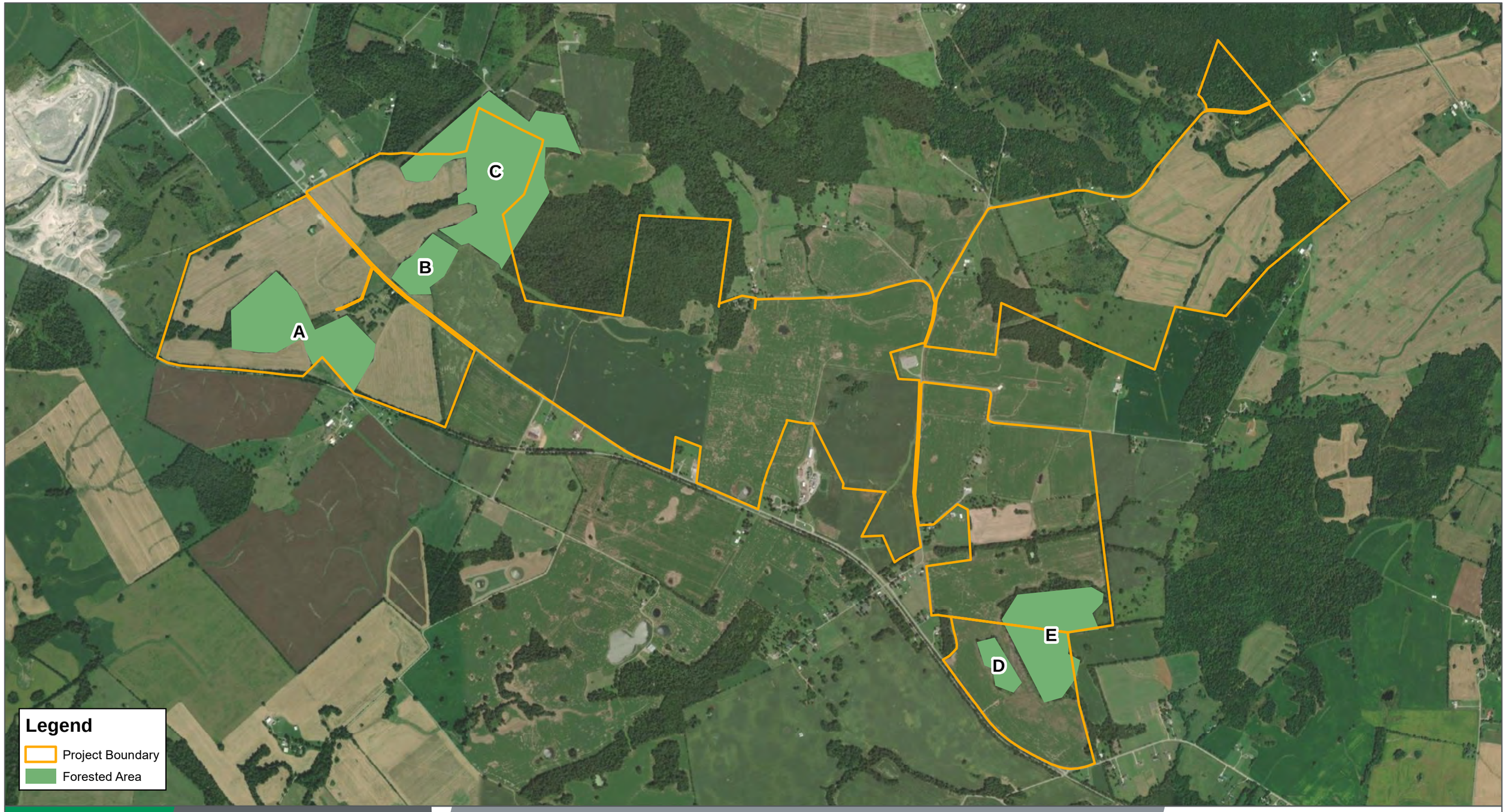


Image: 2016

This map and all data contained within are supplied as is with no warranty. Cardno Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

0 1,000 2,000 3,000 Feet

0 300 600 900 Meters

Figure 2. Forest Avoidance Map

Golden Solar Project
Caldwell County, Kentucky

Cardno

121 Continental Drive, Newark, DE 19713 USA
Phone (+1) 302-395-1919 Fax (+1) 302-395-1920
www.cardno.com

2020-00243
1 ESB 39

Date Created: 10/14/2020 Date Revised: 10/29/2020 File Path: S:\GIS\Geronimo Energy\Golden Solar Project\MXD\Forest Avoidance Map.mxd
GIS Analyst: Peter.Marsey

From: Courtney Pelissero
To: Allison, Carrie
Subject: RE: [External] Solar Farm Projects
Date: Monday, December 14, 2020 3:09:36 PM
Attachments: image005.png
image006.png
image007.png
image008.png
image021.png
image022.png
image023.png
image024.png
NG_Renewables_Logo_Primary_RGB_small_b3464f9a-abea-443c-8d43-87fd96c8afec.png
LinkedInIcon_8e0cea1f-d234-405f-8a61-4afe010bf11b.png
TwitterIcon_ff6acde5-6940-4a01-92b6-0ef9db8c446d.png
WebIcon_e1c44bce-dc58-4738-94a6-8941e49d8897.png
Unbridled_Caldwell_Golden_USFWS_Bat Habitat Meeting Minutes_Nov 2020.pdf

---

Hello Carrie,

Thank you for meeting with us a few weeks ago. Please see the attached meeting minutes. Let me know if you have any questions or comments.

Thanks,
Courtney

nationalgrid renewables
Courtney Pelissero
Permitting Associate
P 952.358.5693
952.988.9000

From: Courtney Pelissero <cpelissero@nationalgridrenewables.com>
Sent: Friday, November 20, 2020 9:14 AM
To: Allison, Carrie <Carrie_Allison@fws.gov>
Subject: RE: [External] Solar Farm Projects

Hi Carrie,

Please call 612-259-3085 (passcode 1234). Talk to you soon.

Thank you,
Courtney

nationalgrid renewables
Courtney Pelissero
Permitting Associate
P 952-358-5693
952.988.9000

From: Allison, Carrie <Carrie_Allison@fws.gov>
Sent: Thursday, November 19, 2020 7:29 PM
To: Courtney Pelissero <cpelissero@nationalgridrenewables.com>
Subject: Re: [External] Solar Farm Projects

Hi, Courtney-

Yes...tomorrow from 2-3 works great for me. Is there a number I should call? I can also do Zoom or Microsoft Teams...whichever you prefer.

Thanks and talk to you then!

Carrie L. Allison
U.S. Fish and Wildlife Service
330 W. Broadway, Rm. 265
Frankfort, KY 40601
502-382-5965 (cell)
502-695-0468 ext. 46103 (office)
502.695.1024 (fax)

"You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make." ~Jane Goodall

---

From: Courtney Pelissero <cpelissero@nationalgridrenewables.com>
Sent: Thursday, November 19, 2020 11:25 AM
To: Allison, Carrie <Carrie_Allison@fws.gov>
Subject: RE: [External] Solar Farm Projects

Hello Carrie,

Thank you for getting back to us. Would tomorrow from 2-3 EST work for you?

Sincerely,
Courtney

nationalgrid renewables
Courtney Pelissero
Permitting Associate

952.988.9000

P 952-358-5693
E cpelissero@nationalgridrenewables.com

8400 Normandale Lake Boulevard, Suite 1200 | Bloomington, MN 55437

From: Allison, Carrie <Carrie_Allison@fws.gov>
Sent: Wednesday, November 18, 2020 2:01 PM
To: Courtney Pelissero <cpelissero@nationalgridrenewables.com>
Subject: [External] Solar Farm Projects

Hi, Courtney

Our office received requests to set up a call regarding bat habitat information for the Unbridled, Caldwell, and Golden solar projects. I am available Thursday and Friday of this week and Tuesday next week if there is time that works for you.

Sincerely,

Carrie L. Allison
U.S. Fish and Wildlife Service
330 W. Broadway, Rm. 265
Frankfort, KY 40601
502-382-5965 (cell)
502-695-0468 ext. 46103 (office)
502.695.1024 (fax)

"You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make." ~Jane Goodall

MEETING	**Kentucky Project Bat Habitat Meeting**
DATE/TIME	**November 20, 2020, 1:00 PM- 2:00 PM CST**
LOCATION	**Phone Call**
PARTICIPANTS	**Courtney Pelissero (National Grid Renewables)** **Elle DeBlieck (National Grid Renewables)** **Bruce Moreira (Cardno)** **Carrie Allison (UWFWS)**

- Meeting with USFWS and National Grid Renewables to introduce the Unbridled, Caldwell, and Golden solar energy projects in Western Kentucky and discuss potential bat habitat
- National Grid Renewables provided an overview of the Projects
    - Unbridled Solar is an up to 160 MW project in Henderson and Webster Counties
    - Caldwell Solar is an up to 200 MW project in Caldwell County
    - Golden Solar is an up to 100 MW project in Caldwell County
- Cardno provided an overview of initial habitat surveys conducted on the Project sites and the desktop IPaCs that were completed
    - Initial surveys found some potential roost trees in wooded areas but many areas were lower quality with out widespread roost trees.
    - IPaC review for each project (Unbridled, Caldwell, Golden) listed the same three listed bat species:
        - Gray Bat (Myotis grisescens): Endangered
        - Indiana Bat (Myotis sodalist): Endangered
        - Northern Long-eared Bat (Myotis septentrionalis): Threatened
- National Grid Renewables is planning to clear some of the forested areas on the Project sites to replace with solar panels. National Grid Renewables inquired about the types of surveys which USFWS would consider adequate to determine if clearing areas of trees would not impact listed bat species.
- USFWS advised that the forested areas on the Project sites that have potential to be cleared should be surveyed for suitable bat habitat. Suitable habitat is defined as trees that are greater than 5 inches dbh with suitable characteristics, such as peeling bark. Trees which meet roosting characteristics and are greater than 9 inches DBH are consider “Primary Roost Trees”.
- To determine if wooded areas are suitable habitat, surveys should be completed which maps suitable habitat (i.e. areas with trees over 5 inches DBH meeting habitat criteria) or primary roosting habitat (i.e. areas with trees over 9 inches DBH meeting habitat criteria). Surveys should use GPS field mapping to delineate areas within clusters of suitable or primary roosting habitat trees and provide photos showing typical field conditions in mapped areas.

- A memo of the survey results, field mapping, and conclusions should be provided to the USFWS. The memo should also address available research regarding potential attraction of Gray Bats to solar panels because Gray Bats feed over water and may confuse panels for water surfaces.
- The results of habitat surveys will determine if the forested areas can be cleared.
    - If the surveys show no suitable bat habitat in the forested areas, then tree clearing will be allowed with no mitigation required. Wooded areas outside of the areas mapped as suitable or primary roosting habitat can be cleared without mitigation. All wooded areas with trees of any type over 3 inches DBH should be cleared outside of the pup season (June 1-July 31). (For previous project, this restriction has been set to the entire roosting season: March 31-October 1).
    - If the surveys show suitable bat habitat, then National Grid Renewables must either avoid clearing those areas or submit payment to the Bat Fund per acre of suitable habitat cleared. (Estimated cost/acre = $3,900).
- Next steps:
    - National Grid Renewables and Cardno will conduct bat habitat surveys on the Project sites this winter.
    - USFWS will put further project review on hold until the surveys are completed and they receive memos

Request

40. Locate any cemeteries within the project boundaries. If there are any cemeteries located within the boundaries, provide the setbacks to be used.

Response

Golden Solar is not aware of any cemeteries within the project boundary.

Request

41. Refer to Application, Exhibit D, page 4, Figure 1, Surrounding Community Map. There is a residential neighborhood within 1,000 feet of the project. Provide the distance from the residential neighborhood to the Project. Provide the deviation from the 2,000-foot setback that Golden Solar is requesting for this residential neighborhood.

Response

Refer to the Motion for Deviation filed on September 16, 2022. Golden proposes to place panels no closer than 300 feet, central inverters no closer than 500 feet and the substation no closer than 1000 feet to any residence in the residential neighborhood.