

**BEFORE
THE OHIO POWER SITING BOARD**

In the Matter of the Application of	)	
Kingwood Solar I LLC for a Certificate	)	Case No. 21-0117-EL-BGN
of Environmental Compatibility and	)	
Public Need	)	

**NOTICE OF RESPONSES TO DATA REQUESTS FROM
THE STAFF OF THE OHIO POWER SITING BOARD**

On April 16, 2021, Kingwood Solar I LLC (“Kingwood Solar”) filed an Application for a Certificate of Environmental Compatibility and Public Need with the Ohio Power Siting Board (the “Board”). On September 29, 2021, the Board’s Staff provided Kingwood Solar with Data Requests pertaining to Kingwood Solar’s Application. Attached to this notice are copies of Kingwood Solar’s responses, previously submitted to the Board’s Staff.

Respectfully submitted,

/s/ Nathaniel B. Morse
Michael J. Settineri (0073369) Counsel of Record
Anna Sanyal (0089269)
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Attorneys for Kingwood Solar I LLC

CERTIFICATE OF SERVICE

The Public Utilities Commission of Ohio's e-filing system will electronically serve notice of the filing of this document on the parties referenced on the service list of the docket card who have electronically subscribed to the case. In addition, the undersigned certifies that a courtesy copy of the foregoing document is also being sent via electronic mail on October 19, 2021 to:

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/s/ Nathaniel B. Morse
Nathaniel B. Morse

**BEFORE
THE OHIO POWER SITING BOARD**

In the Matter of the Application of	)	
Kingwood Solar I LLC for a Certificate	)	Case No. 21-0117-EL-BGN
of Environmental Compatibility and	)	
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**KINGWOOD SOLAR'S OCTOBER 12, 2021 RESPONSES
TO STAFF'S SEPTEMBER 29, 2021 DATA REQUESTS**

- 1. Given the documented karst geology in and around the project area and given the shallow (<12 feet) depths to bedrock found in several of the 30 site borings, has the applicant considered bedrock coring to identify karst features and their extent?***

Upon final engineering, bedrock coring may be considered in areas where arrays may be placed and bedrock depths were encountered at <12 feet, if necessary, however this is not anticipated based on the Geotechnical Report results. As noted in the Geotechnical Report, no karst features have been identified in the Project Area as shown in Figure 8-04 of the Application which is based on data from the Ohio Department of Natural Resources. Approximately 85 acres out of the 1,500 acre Project Area has been identified as "Probable Karst" area based on data from the ODNR and as shown in Figure 8-04. Thirty boring locations identified as B-1 through B-30 were analyzed and bedrock was encountered at depths of 2 to 12 feet in eleven of the borings as shown in Table 1 to the Geotechnical Report attached as Appendix L to the Application. None of those boring locations are within the 85 acres identified as "Probable Karst" areas.

- 2. Is any additional geotechnical work planned at this time? If so, please elaborate on what that may include.***

No additional geotechnical work is planned at this time although additional geotechnical input and analysis may occur as part of the final engineering for the Project and in consultation with the Project's EPC contractor.

- 3. Should karst features be identified during construction, please explain what the Applicant will do to mitigate any potential issues associated with karst? i.e. will karst features be avoided?***

Final engineering and Project design will take into consideration the 'Probable Karst' areas identified by the ODNR, shown in Figure 8-04 of the Application. This may include avoiding these areas and/or performing specific mitigation measures like NX or NQ bedrock coring, pile load testing during pre-construction activity, or pre-drilling pile holes during construction.

- 4. Please discuss the site hydrology in further detail to include discussion of karst geology influence.***

The Project Area is largely outside of high flood depth areas and the Project layout is deliberately designed to avoid above-ground features in 100-year floodplain designated areas. Karst features are not

anticipated to have influence in the Project Area considering there are no identified karst features within the Project Area, as shown in Figure 08-4. Areas in the project area designated as ‘Probable Karst’ by ODNr will be closely assessed when consulting with the EPC Contractor and during pre-construction activity.

5. *Has any pile load testing been conducted at the project site? What consideration has been given to pile load capacities for piles that must be pre-drilled and grouted piles due to the shallow bedrock contact in certain areas?*

Pile load testing has not been conducted. Out of the eleven boring locations where bedrock depths were encountered at <12 feet, as shown in Appendix L of the Application, only three boring locations are currently being considered for array areas, two of which encountered bedrock at depths of 9.5 and 12 feet. The Project Permitting Layout is shown in Appendix A of the Application. For these three locations, pre-drilling may be considered upon final engineering and in consultation with the EPC Contractor.

6. *Does the Applicant have an estimate of the number of piles that may require pre-drilling?*

The three boring locations with bedrock depths of <12 feet which are currently considered for array areas in the Project Layout, are anticipated to comprise less than 5% of the entire Project Area. An estimate of the number of piles that may require pre-drilling is unavailable at this time.

7. *The ODNr geology assessment in Appendix N speaks to bedrock outcrops at or immediately below ground level in the project area. Are any special trenching methods planned for underground collection lines where bedrock may be encountered?*

Specific trenching methods for underground collection lines where bedrock may be encountered may include a hydraulic bedrock trencher, hoe ram, or another piece of equipment suitable for such applications. Explosives will not be used.

8. *Please provide a description and or chart of the vegetative community types comprising the Kingwood Solar Project area in total acreage. (# of acres of deciduous forest, # of acres of grassland/pasture, # of acres of wetlands, etc.)*

As summarized in the table below, approximately 97% of the Project Site is currently dominated by an agricultural vegetative community (pasture/crop). As outlined in Appendix M, Aquatic Resource Report, approximately 1.52 acres of wetland were delineated, of which 0.62 acre were PEM and 0.88 acre were PFO.

Ecological Community	Approximate Area (acres)	Percentage
Agricultural	1,369	92.5%
Developed	6	0.4%
Forested	19	1.3%
Herbaceous	15	1.0%
Pasture	63	4.3%
Scrub-Shrub	7	0.4%
Wetland	1.5	0.1%
Total	1,480.5	100%

9. Please describe the vegetative management plan that Kingwood Solar anticipates using post project construction. Please also describe what steps will be taken by Kingwood Solar to prevent the establishment and/or further propagation of noxious weeds post Project construction?

The Vegetation Management Plan, provided as Appendix O of the Application, provides details associated with vegetation management during both construction and operation. Details are provided regarding the pollinator seed mix and the intent of the Applicant to work with Ernst/Monarch Vegetation for supply of the pollinator-friendly vegetation seed. Details are also provided that describe the mowing and maintenance activities planned during Project operation. As noted, it is not anticipated that any herbicides will be used for regular maintenance.

The prevention of establishment and/or further propagation of noxious weeds post-construction, will be first addressed by implementing the following measures during construction:

- Heavy seeding of desirable species. As a part of the EPC contractor's requirements, work will not be considered complete until vegetation has sufficiently established such that ground stability is achieved. Final stabilization is defined under the Ohio Stormwater General Permit as having a density of at least 70 percent cover prior to filing for the Notice of Termination.
- Use of clean equipment. In order to limit or minimize the potential for incidental seed to be transported from off-site locations, vehicle washing will be conducted in controlled areas.

Then, as noted in the Vegetation Management Plan, monthly inspections will occur once construction is complete. In addition to inspecting for vegetation height and debris requiring removal, the status of planted and seeded vegetation will also be observed. As a part of this inspection, observations as to whether noxious weeds have begun to encroach within the Project Area will be noted. The presence of any such species will be controlled by methods, such as hand-pulling, digging, or tarping/mulching, to eradicate noxious weeds that may be present. Additional seed for desired species may also be applied. Control methods will be selected that are appropriate for the given season, and these regular inspections have a goal of controlling weeds while they are young, and preferably before they flower. Areas noted as requiring observation will be logged during the monthly inspections and specifically monitored. Only if the area is non-responsive to manual control methods would the controlled use of herbicides be considered.

After approximately three years of favorable vegetation establishment, inspections for noxious weeds may be reduced to bi-monthly during the spring growing season. A vegetation expert will remain on-call to address any identification or control recommendations.

10. Does the applicant propose to have an on-site O&M building? If yes, please provide a description of the proposed building and mapping of the proposed location.

No, the project will not include a stand-alone O&M building structure. Kingwood may consider use of Connex container(s) to house Project equipment and/or parts required for the Project O&M activity. The exact location for the container(s) if used will be determined upon final design, however the location is anticipated to be adjacent to the Project substation, as identified in the Project Permitting Layout attached as Appendix A to the Application.

11. Does the applicant propose a setback from non-participating residences?

As stated in the Application, a minimum setback of 25 feet is proposed from arrays to non-participating property boundaries. No setback is proposed from non-participating residences.

12. Approximately how many inverters would be included in the project.

Approximately 55 inverters are planned to be used in the project. The exact number of inverters will be finalized at a later design stage closer to construction.

13. Would access roads be wider than 20 feet during construction or is the 20-foot width discussed in the application the maximum width of disturbance associated with access roads?

All access roads will be a maximum width of 20 feet during both construction and operation of the Project.

14. Please provide details on proposed laydown areas including mapping, total acreage, and

As shown in Appendix A to the OPSB Application, Project Permitting Layout, and quantified in Table 08-7 of the Application, a maximum of approximately 21 acres will be used for temporary laydown areas.

15. In follow up to Kingwood Solar's June 1, 2021 Responses to Staff's May 17 and May 20 Data Requests (DR#20) which included an updated Figure 03-3, the included Figure 03-3 doesn't depict the 200 feet of 138 kV gen-tie line but only a POI. Please provide an updated Figure 03-3 (Project Layout) and other relevant facility mapping that depicts the specific proposed location of the gen-tie line referenced on page 1 of the Application and provide associated shapefiles.

An updated version of Figure 03-3 is provided depicting the approximate location of the 200-foot 138-kV gen-tie mentioned on page 1 of the Application. This location may shift slightly depending on the final design of the interconnection facilities.

16. In follow up to Kingwood Solar's June 1, 2021 Responses to Staff's May 17 and May 20 Data Requests (DR#30 and 31), please explain will Kingwood Solar implement a setback to any water well within the project area? If so, what setback to water wells will Kingwood Solar implement?

As mentioned in Kingwood's previous Data Request responses, coordination with individual landowners will occur to confirm location and active/inactive status of identified wells within the Project Area. For any water wells within the Project Area that are determined to be active and in use, Applicant will implement a sufficient setback to allow for access and future maintenance.

17. In follow up to Kingwood Solar's June 1, 2021 Responses to Staff's May 17 and May 20 Data Requests (DR#37), please confirm would the total volume of water to be used by Kingwood Solar to clean the panels in one year would be 282,8675 gal (365 days x 775 gal/day)?

If panel cleaning is necessary, the maximum total volume of water anticipated for Kingwood Solar is 282,875 gallons per year, or an average of 775 gallons per day.

18. Have the solar panels under consideration by Kingwood Solar passed the US EPA's Toxicity Characteristic Leaching Procedure (TCLP) test?

The Applicant has not confirmed with the manufacturers if the panels included in Appendix J – Representative Equipment Specifications have been tested under US EPA TCLP testing procedures. However, Applicant is considering a comparable panel provider, JA Solar, with a model that has been tested using the TCLP methods. Please see “JAM72D30 UDS Level 2 Report Final Report” provided, conducted by Eurofins TestAmerica in North Canton, Ohio.

19. Please estimate when the remaining 15% of the archaeological survey will be completed.

The remaining archaeological field work will be completed upon conclusion of the 2021 harvest season, as well as obtaining site access permission from the remaining landowners. It is expected that the work will be completed either in late fall of 2021 or early spring of 2022.

20. When drain tile damage is discovered during construction how will it be handled?

If a drain tile is damaged during construction of the Project, the damage occurrence will be flagged to the EPC Contract Site Lead, and the owner of the affected drain tile and associated field will be notified. If the owner of the drain tile elects that the drain tile be repaired, a local drain tile contractor will be hired to repair the affected drain tile as soon as possible. Damaged drain tiles determined not to impact adjacent properties (i.e. not a 'Main' tile) may not be repaired pending discussions with the subject property owner.

21. Staff will likely be including a condition in the staff report that would require:

The Applicant shall ensure that nearby parcels are protected from unwanted drainage problems due to construction and operation of the project. The Applicant shall ensure this by either 1) documenting benchmark conditions of surface and subsurface drainage systems prior to construction, including the location of laterals, mains, grassed waterways, and county maintenance/repair ditches. The Applicant will make efforts to conduct a perimeter dig utilizing a tile search trench and consult with owners of all parcels adjacent to the property, the county soil and water conservation district, and the county to request drainage system information over those parcels. The Applicant shall consult with the county engineer for tile located in a county maintenance/repair ditch, or 2) locate and replace all field tile drainage systems, or 3) agree to compensate parcels owners affected by damage to functioning field tile drainage systems and soils resulting from the construction, operation, and/or maintenance of the facility in agricultural areas for damage to crops or other agricultural activities.

Do you have an idea which of those three options you would choose? Or if you have an alternate option what would be?

Applicant will provide feedback on any proposed conditions in the Staff Report either through testimony or as part of discussions on any stipulation proposed for this proceeding.

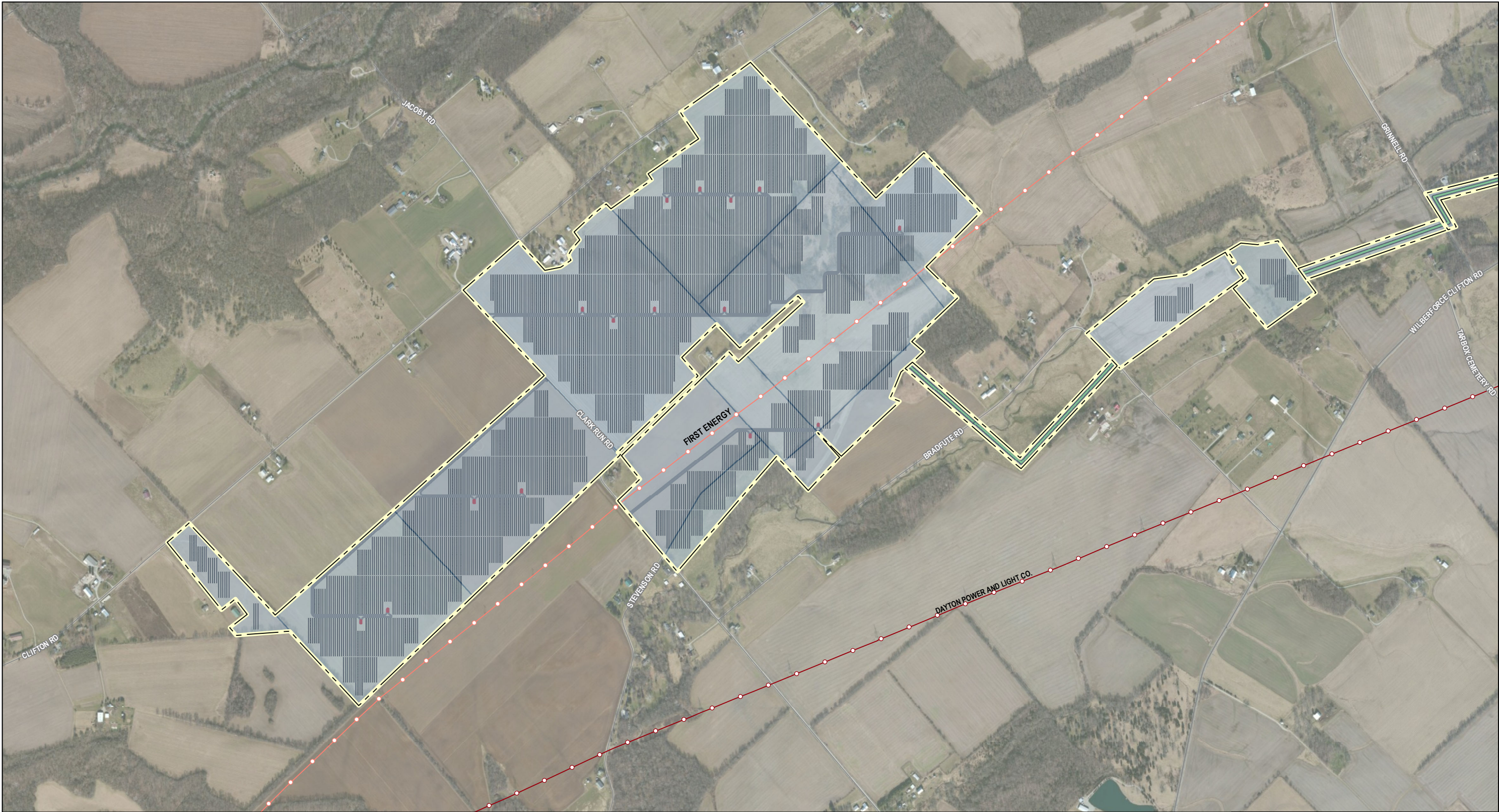
22. If during project construction or operation a neighboring parcel owner/tenant complains that their parcel is not draining properly and they make a claim that the drainage problem is due the project, describe how the complaint will be handled?

a. How will you determine if damage to due to the project?

Upon any complaint received through the Complaint Resolution Process regarding drainage issues, Kingwood will promptly consult with complainant as well as a local drain tile contractor to determine whether the supposed damage to the complainant's property was due to the Project and Project activity.

b. If you determine the damage is due to the project, what is the timeframe for repairs to be done. For example, repairs will be attempted to be completed within x days and at worst will be completed within x days.

If the damage is concluded by the drain tile contractor to be due to the Project and Project activities, repairs will be conducted as soon as possible, and estimated to be within 30 days of such conclusion being made that the damage is due to Project activity, and subject to field conditions and contractor availability.



LEGEND

POTENTIAL SOLAR ARRAY

POTENTIAL TRANSFORMER PAD

POTENTIAL COLLECTION LINE

POTENTIAL GRAVEL ROAD

138 kV TRANSMISSION LINE

345kV TRANSMISSION LINE

ROAD

HIGHWAY

PROJECT AREA

PROJECT PARCEL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. kV = KILOVOLTS

3. ELECTRIC TRANSMISSION LINES DATA SOURCE: DEPARTMENT OF HOMELAND SECURITY (DHS) HOMELAND INFRASTRUCTURE FOUNDATION-LEVEL DATA (HIFLD)

4. PARCEL BOUNDARY DATA SOURCE: GREENE COUNTY

5. ROADS DATA SOURCE: OHIO DEPARTMENT OF TRANSPORTATION (ODOT)

6. AERIAL IMAGERY SOURCE: ESRI

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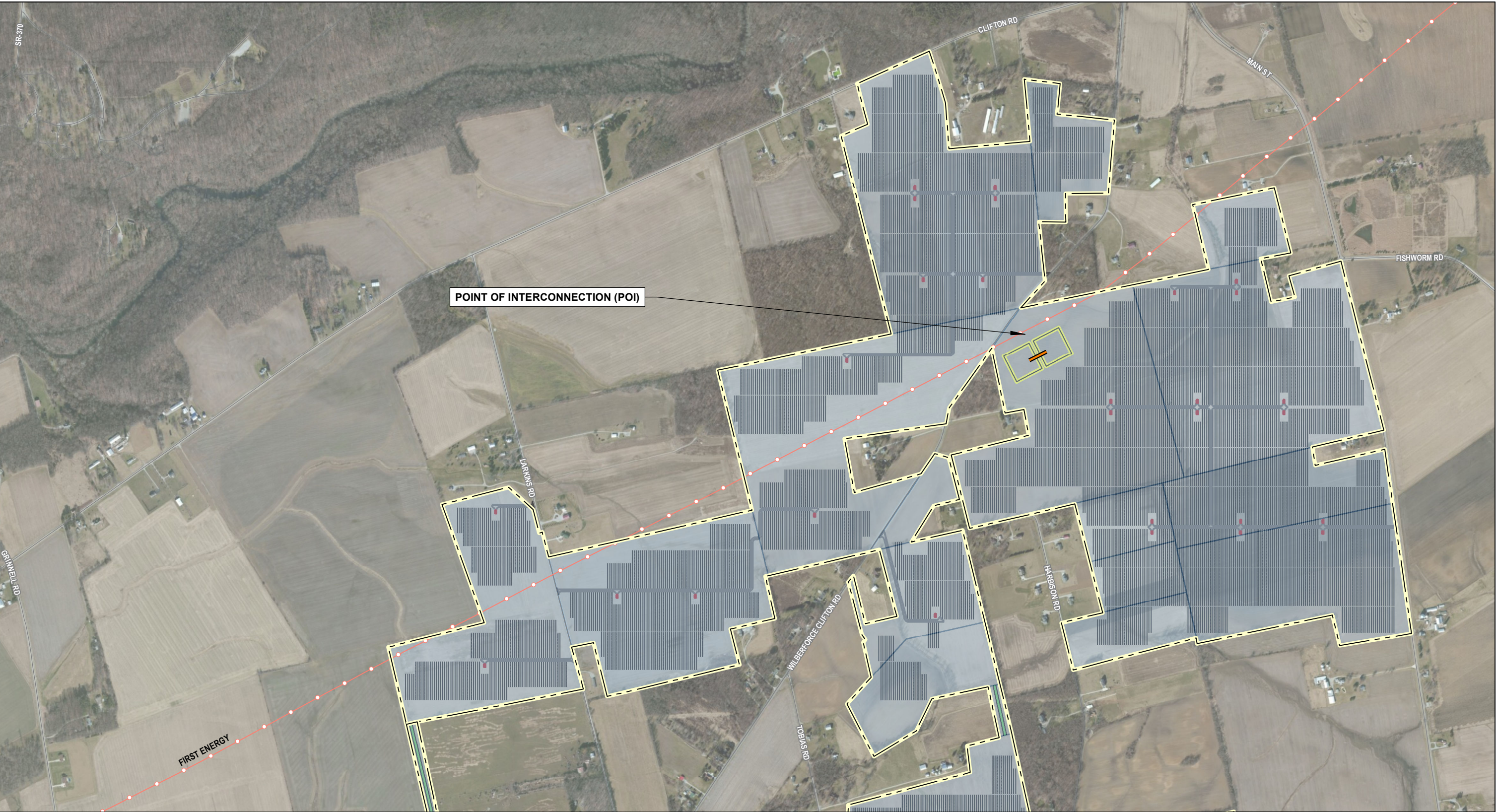
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SCALE IN FEET

**Figure 03-3
Project Layout**

Sheet 1 of 3

Kingwood Solar
Greene County, Ohio



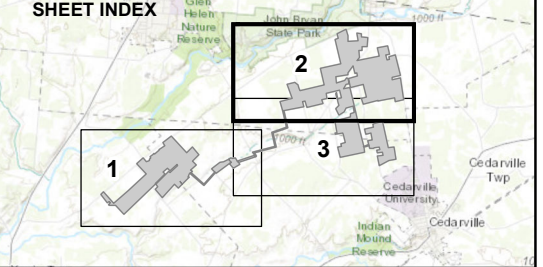
LEGEND

	POTENTIAL SOLAR ARRAY		138 kV TRANSMISSION LINE
	POTENTIAL TRANSFORMER PAD		345kV TRANSMISSION LINE
	POTENTIAL COLLECTION LINE		ROAD
	POTENTIAL GRAVEL ROAD		HIGHWAY
	SUBSTATION		PROJECT AREA
	POTENTIAL GEN-TIE LINE		PROJECT PARCEL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. kV = KILOVOLTS
3. ELECTRIC TRANSMISSION LINES DATA SOURCE: DEPARTMENT OF HOMELAND SECURITY (DHS) HOMELAND INFRASTRUCTURE FOUNDATION-LEVEL DATA (HIFLD)
4. PARCEL BOUNDARY DATA SOURCE: GREENE COUNTY
5. ROADS DATA SOURCE: OHIO DEPARTMENT OF TRANSPORTATION (ODOT)
6. AERIAL IMAGERY SOURCE: ESRI

SCALE IN FEET

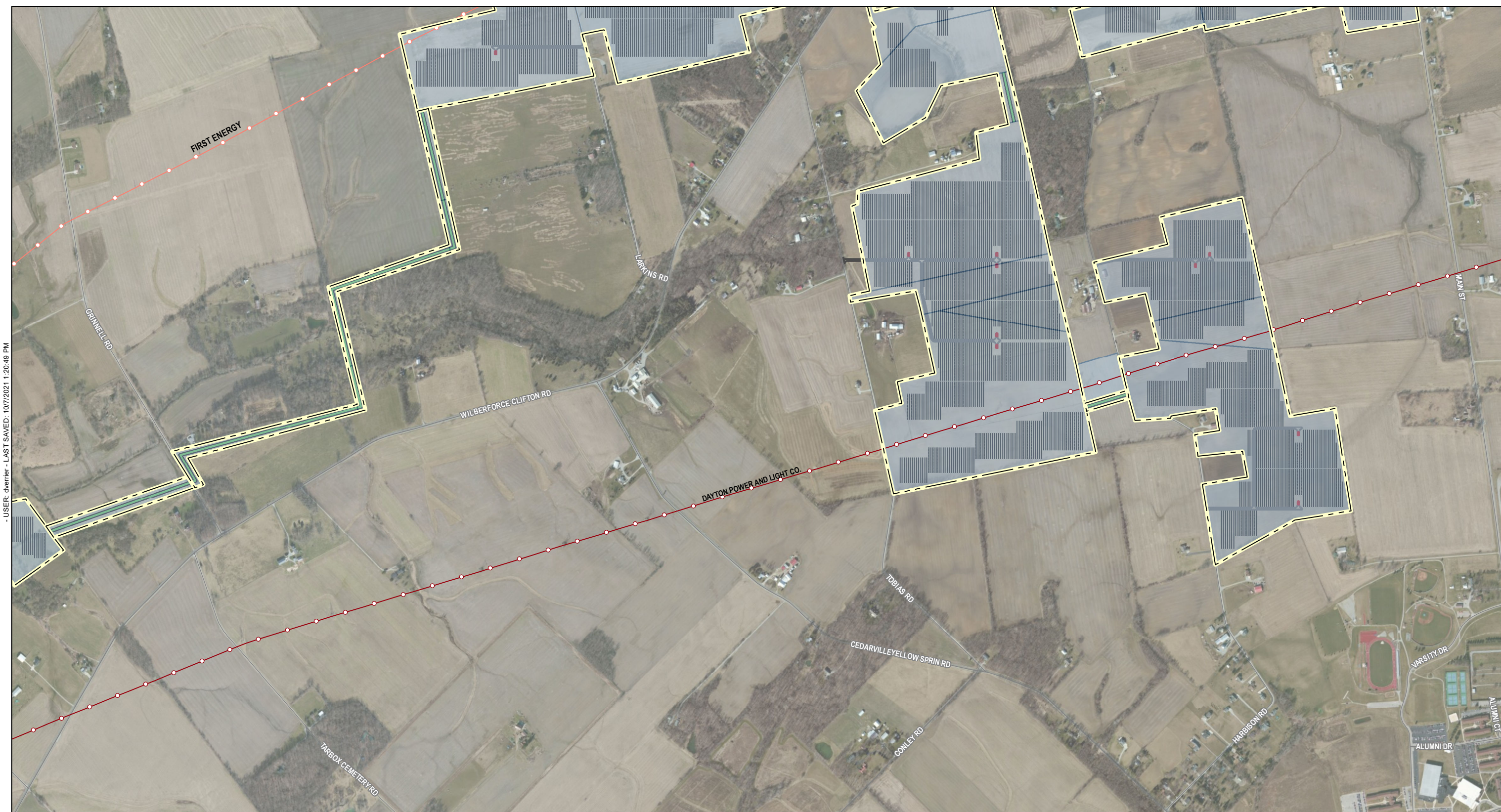


**Figure 03-3
Project Layout**

Sheet 2 of 3

Kingwood Solar
Greene County, Ohio

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LEGEND

POTENTIAL SOLAR ARRAY

POTENTIAL TRANSFORMER PAD

POTENTIAL COLLECTION LINE

POTENTIAL GRAVEL ROAD

138 kV TRANSMISSION LINE

345kV TRANSMISSION LINE

ROAD

HIGHWAY

PROJECT AREA

PROJECT PARCEL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. kV = KILOVOLTS

3. ELECTRIC TRANSMISSION LINES DATA SOURCE: DEPARTMENT OF HOMELAND SECURITY (DHS) HOMELAND INFRASTRUCTURE FOUNDATION-LEVEL DATA (HIFLD)

4. PARCEL BOUNDARY DATA SOURCE: GREENE COUNTY

5. ROADS DATA SOURCE: OHIO DEPARTMENT OF TRANSPORTATION (ODOT)

6. AERIAL IMAGERY SOURCE: ESRI

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ALDRICH

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SCALE IN FEET

**Figure 03-3
Project Layout**

Sheet 3 of 3

Kingwood Solar
Greene County, Ohio

ANALYTICAL REPORT

Eurofins TestAmerica, Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

Laboratory Job ID: 240-148075-2
Client Project/Site: Solar Module TCLP

For:
JA Solar
2570 North First Street
Suite 360
San Jose, California 95131

Attn: Teodor Galitev



Authorized for release by:
5/7/2021 9:38:38 AM

Michael DelMonico, Project Manager I
(330)497-9396
Michael.DelMonico@Eurofinset.com

LINKS

Review your project
results through

TotalAccess

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www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Job ID: 240-148075-2

Laboratory: Eurofins TestAmerica, Canton

Narrative

Job Narrative
240-148075-2

Comments

No additional comments.

Receipt

The samples were received on 4/23/2021 10:20 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 15.1° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

DEEP BLUE 3.0

Mono

550W MBB Bifacial Mono PERC
Half-cell Double Glass Module

JAM72D30 525-550/MB Series

Introduction

Assembled with 11BB bifacial PERC cells and half-cell configuration, these double glass modules have the capability of converting the incident light from the rear side together with the front side into electricity, providing higher output power, lower temperature coefficient, less shading loss, as well as enhanced tolerance for mechanical loading.



Higher output power



More reliable, more stable
power generation



Less shading effect

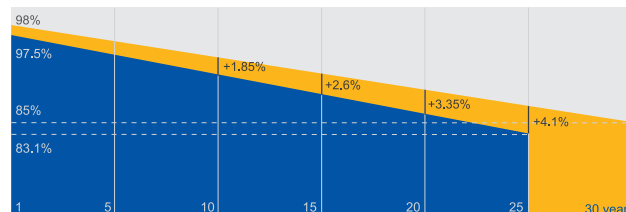


Lower temperature coefficient

Superior Warranty

- 12-year product warranty
- 30-year linear power output warranty

0.45% Annual Degradation
Over 30 years



■ Bifacial double glass module linear power warranty

■ Standard module linear power warranty

Comprehensive Certificates

- IEC 61215, IEC 61730, UL 61215, UL 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems
- IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in PV module design qualification and type approval



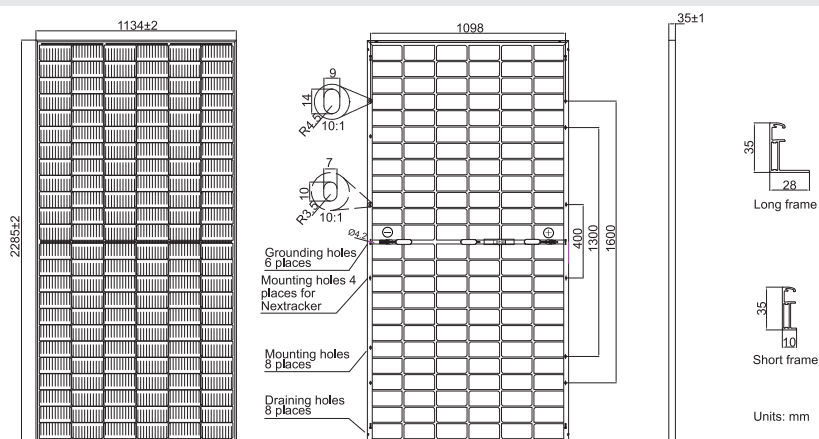
JA SOLAR

www.jasolar.com

Specifications subject to technical changes and tests.
JA Solar reserves the right of final interpretation.



MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

Cell	Mono
Weight	31.6kg±3%
Dimensions	2285±2mm×1134±2mm×35±1mm
Cable Cross Section Size	4mm ² (IEC), 12 AWG(UL)
No. of cells	144(6×24)
Junction Box	IP68, 3 diodes
Connector	QC 4.10-35
Cable Length (Including Connector)	Portrait:300mm(+)/400mm(-); Landscape:1300mm(+)/1300mm(-)
Front Glass/Back Glass	2.0mm/2.0mm
Packaging Configuration	31pcs/Pallet, 620pcs/40ft Container

ELECTRICAL PARAMETERS AT STC

TYPE	JAM72D30 -525/MB	JAM72D30 -530/MB	JAM72D30 -535/MB	JAM72D30 -540/MB	JAM72D30 -545/MB	JAM72D30 -550/MB
Rated Maximum Power(Pmax) [W]	525	530	535	540	545	550
Open Circuit Voltage(Voc) [V]	49.15	49.30	49.45	49.60	49.75	49.90
Maximum Power Voltage(Vmp) [V]	41.15	41.31	41.47	41.64	41.80	41.96
Short Circuit Current(Isc) [A]	13.65	13.72	13.79	13.86	13.93	14.00
Maximum Power Current(Imp) [A]	12.76	12.83	12.90	12.97	13.04	13.11
Module Efficiency [%]	20.3	20.5	20.6	20.8	21.0	21.2
Power Tolerance	0~+5W					
Temperature Coefficient of Isc(α _{Isc})	+0.045%/°C					
Temperature Coefficient of Voc(β _{Voc})	-0.275%/°C					
Temperature Coefficient of Pmax(γ _{Pmp})	-0.350%/°C					
STC	Irradiance 1000W/m ² , cell temperature 25°C, AM1.5G					

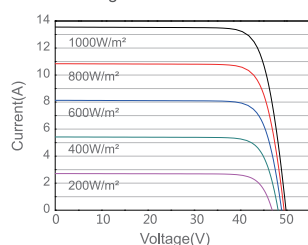
Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

ELECTRICAL CHARACTERISTICS WITH DIFFERENT POWER RANGES
(REFERENCE TO 10% SOLAR ILLUMINANCE RATIO)

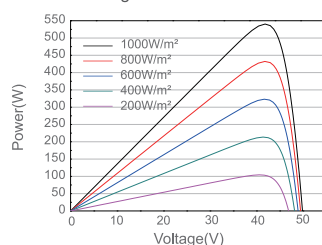
TYPE	JAM72D30 -525/MB	JAM72D30 -530/MB	JAM72D30 -535/MB	JAM72D30 -540/MB	JAM72D30 -545/MB	JAM72D30 -550/MB	OPERATING CONDITIONS	
Rated Max Power(Pmax) [W]	562	567	572	578	583	589	Maximum System Voltage	1500V DC
Open Circuit Voltage(Voc) [V]	49.54	49.67	49.80	49.93	50.03	50.21	Operating Temperature	-40°C~+85°C
Max Power Voltage(Vmp) [V]	41.53	41.77	41.99	42.24	42.43	42.67	Maximum Series Fuse Rating	30A
Short Circuit Current(Isc) [A]	14.34	14.39	14.45	14.50	14.56	14.63	Maximum Static Load, Front* Maximum Static Load, Back*	5400Pa(112 lb/ft ²) 2400Pa(50 lb/ft ²)
Max Power Current(Imp) [A]	13.52	13.58	13.63	13.69	13.74	13.79	NOCT	45±2°C
*For NexTracker installations, Maximum Static Load, Front is 2400Pa while Maximum Static Load, Back is 2400Pa. **Bifaciality=Pmax,rear/Rated Pmax,front							Bifaciality**	70%±10%
							Fire Performance	UL Type 29

CHARACTERISTICS

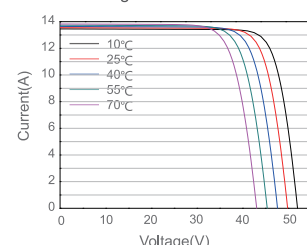
Current-Voltage Curve JAM72D30-540/MB



Power-Voltage Curve JAM72D30-540/MB



Current-Voltage Curve JAM72D30-540/MB



Method Summary

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL CAN
7470A	Mercury (CVAA)	SW846	TAL CAN
1311	TCLP Extraction	SW846	TAL CAN
3010A	Preparation, Total Metals	SW846	TAL CAN
7470A	Preparation, Mercury	SW846	TAL CAN
Part Size Red	Particle Size Reduction Preparation	None	TAL CAN

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-148075-2	D30	Solid	04/22/21 00:00	04/23/21 10:20	

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Detection Summary

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Client Sample ID: D30

Lab Sample ID: 240-148075-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	1.6		0.50		mg/L	1		6010B	TCLP
Lead	1.9		0.050		mg/L	1		6010B	TCLP

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

Client Sample Results

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Client Sample ID: D30

Lab Sample ID: 240-148075-2

Date Collected: 04/22/21 00:00

Matrix: Solid

Date Received: 04/23/21 10:20

Method: 6010B - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		04/28/21 14:00	04/29/21 16:25	1
Barium	1.6		0.50		mg/L		04/28/21 14:00	04/29/21 16:25	1
Cadmium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 16:25	1
Chromium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 16:25	1
Lead	1.9		0.050		mg/L		04/28/21 14:00	04/29/21 16:25	1
Selenium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 16:25	1
Silver	ND		0.050		mg/L		04/28/21 14:00	04/29/21 16:25	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020		mg/L		04/28/21 14:00	04/30/21 11:00	1

QC Sample Results

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 240-483208/2-A
Matrix: Solid
Analysis Batch: 483437

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 483208

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:52	1
Barium	ND		0.50		mg/L		04/28/21 14:00	04/29/21 13:52	1
Cadmium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:52	1
Chromium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:52	1
Lead	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:52	1
Selenium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:52	1
Silver	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:52	1

Lab Sample ID: LCS 240-483208/3-A
Matrix: Solid
Analysis Batch: 483437

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 483208

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.00	1.95		mg/L		97	50 - 150
Barium	2.00	1.90		mg/L		95	50 - 150
Cadmium	1.00	0.974		mg/L		97	50 - 150
Chromium	1.00	0.926		mg/L		93	50 - 150
Lead	1.00	0.942		mg/L		94	50 - 150
Selenium	2.00	2.01		mg/L		100	50 - 150
Silver	0.100	0.0995		mg/L		100	50 - 150

Lab Sample ID: LB 240-483078/1-B
Matrix: Solid
Analysis Batch: 483437

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 483208

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:47	1
Barium	ND		0.50		mg/L		04/28/21 14:00	04/29/21 13:47	1
Cadmium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:47	1
Chromium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:47	1
Lead	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:47	1
Selenium	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:47	1
Silver	ND		0.050		mg/L		04/28/21 14:00	04/29/21 13:47	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 240-483211/2-A
Matrix: Solid
Analysis Batch: 483586

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 483211

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020		mg/L		04/28/21 14:00	04/30/21 10:35	1

Lab Sample ID: LCS 240-483211/3-A
Matrix: Solid
Analysis Batch: 483586

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 483211

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00500	0.00530		mg/L		106	80 - 120

Eurofins TestAmerica, Canton

QC Sample Results

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LB 240-483078/1-C
Matrix: Solid
Analysis Batch: 483586

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 483211

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020		mg/L		04/28/21 14:00	04/30/21 10:33	1

QC Association Summary

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Metals

Processed Batch: 482994

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-148075-2	D30	TCLP	Solid	Part Size Red	

Leach Batch: 483078

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-148075-2	D30	TCLP	Solid	1311	482994
LB 240-483078/1-B	Method Blank	TCLP	Solid	1311	
LB 240-483078/1-C	Method Blank	TCLP	Solid	1311	

Prep Batch: 483208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-148075-2	D30	TCLP	Solid	3010A	483078
LB 240-483078/1-B	Method Blank	TCLP	Solid	3010A	483078
MB 240-483208/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 240-483208/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 483211

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-148075-2	D30	TCLP	Solid	7470A	483078
LB 240-483078/1-C	Method Blank	TCLP	Solid	7470A	483078
MB 240-483211/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 240-483211/3-A	Lab Control Sample	Total/NA	Solid	7470A	

Analysis Batch: 483437

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-148075-2	D30	TCLP	Solid	6010B	483208
LB 240-483078/1-B	Method Blank	TCLP	Solid	6010B	483208
MB 240-483208/2-A	Method Blank	Total/NA	Solid	6010B	483208
LCS 240-483208/3-A	Lab Control Sample	Total/NA	Solid	6010B	483208

Analysis Batch: 483586

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-148075-2	D30	TCLP	Solid	7470A	483211
LB 240-483078/1-C	Method Blank	TCLP	Solid	7470A	483211
MB 240-483211/2-A	Method Blank	Total/NA	Solid	7470A	483211
LCS 240-483211/3-A	Lab Control Sample	Total/NA	Solid	7470A	483211

Lab Chronicle

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Client Sample ID: D30

Lab Sample ID: 240-148075-2

Date Collected: 04/22/21 00:00

Matrix: Solid

Date Received: 04/23/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Processed	Part Size Red			482994	04/27/21 10:20	POP	TAL CAN
TCLP	Leach	1311			483078	04/27/21 16:25	DRJ	TAL CAN
TCLP	Prep	3010A			483208	04/28/21 14:00	MRL	TAL CAN
TCLP	Analysis	6010B		1	483437	04/29/21 16:25	DSH	TAL CAN
TCLP	Processed	Part Size Red			482994	04/27/21 10:20	POP	TAL CAN
TCLP	Leach	1311			483078	04/27/21 16:25	DRJ	TAL CAN
TCLP	Prep	7470A			483211	04/28/21 14:00	MRL	TAL CAN
TCLP	Analysis	7470A		1	483586	04/30/21 11:00	SLD	TAL CAN

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: JA Solar
Project/Site: Solar Module TCLP

Job ID: 240-148075-2

Laboratory: Eurofins TestAmerica, Canton

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-22

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15415-1
Environment Testing
AmericaEurofins TestAmerica, Canton
4101 Shuffel Street NW
North Canton, OH 44720Tel: (330) 497-9396
Fax: (330) 497-0772
www.testamericainc.com

22, 2021

Teodor Galitev
JA Solar
2570 North First Street
Suite 360
San Jose, CA 95131
Teodor.galitev@jasolar.us
Tel: (408) 586-0000Subject: Analytical Services Proposal - Solar Modules TCLP Metals Testing
Eurofins TestAmerica Quotation Number 24026957

240-148075 Chain of Custody

Dear Teodor Galitev:

We appreciate the opportunity to provide your company with a quotation for your Solar Modules TCLP Metals Testing project. Eurofins TestAmerica has a unique combination of full service capabilities, technical expertise, local service options, and online resources necessary to ensure successful project outcomes.

At Eurofins TestAmerica, quality is the hallmark of our business. To ensure your project's data quality objectives are met, we offer experienced personnel who are trained and committed to completing your analytical project on time, a fully documented QA/QC program, and state-of-the-art laboratory equipment and facilities. In addition to being a full service laboratory, we are part of the nation's largest environmental laboratory network. This provides access to an unparalleled spectrum of capabilities and turnaround time options, all through a single point of contact. Michael DelMonico has been assigned as your Project Manager for this work and can be reached by phone at 330 497-9396 or via email at Michael.DelMonico@Eurofinset.com.

- **Total Access:** a web portal offering you customizable, real time access to data. With 24 hour access you can perform data trending, compare data to industry or project limits, track CoCs, invoices, reports and much more.
- **Level IV Deliverables/Customizable EDDs:** high resolution, text searchable reports, available in virtually any format.
- **Extensive Experience:** Project Managers with in-depth knowledge of regulatory protocols and procedures.
- **Nationwide Logistical Support:** bringing you an extensive courier network, service centers and shipping options throughout the U.S. and abroad.
- **PFAS, Dioxins/Furans, Air, Radiochemistry, IH** and other specialty analyses are offered alongside routine soil and water methods with seamless reports and consolidated EDDs.

The following quotation includes a detailed price breakdown, as well as any notes and clarifications pertaining to your project, and is subject to Eurofins TestAmerica's Standard Terms and Conditions, unless otherwise agreed upon in writing.

We thank you for choosing Eurofins TestAmerica, and we look forward to working with you on this project.

Sincerely,

Gary Wood
Client Relations Manager
gary.wood@Eurofinset.com

cc: Michael DelMonico

4-23-21 1020

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Eurofins TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : _____

Client JA Scler Site Name _____ Cooler unpacked by: [Signature]
Cooler Received on 4-23-21 Opened on 4-23-21
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box _____ Client Cooler Box Other _____
Packing material used: Bubble Wrap _____ Foam _____ Plastic Bag None Other _____
COOLANT: Wet Ice _____ Blue Ice _____ Dry Ice _____ Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
IR GUN# IR-11 (CF +0.1 °C) Observed Cooler Temp. 15.0 °C Corrected Cooler Temp. 15.1 °C
IR GUN #IR-12 (CF +0.2 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity _____ Yes No
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
-Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC? Yes No
9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)? Yes No
10. Were correct bottle(s) used for the test(s) indicated? Yes No
11. Sufficient quantity received to perform indicated analyses? Yes No
12. Are these work share samples and all listed on the COC? Yes No
If yes, Questions 13-17 have been checked at the originating laboratory.
13. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC022887
14. Were VOAs on the COC? Yes No
15. Were air bubbles >6 mm in any VOA vials? Yes No NA  Larger than this.
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
17. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not
checked for pH by
Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other _____

Concerning _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by: _____

19. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

20. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

10/19/2021 11:35:36 AM

in

Case No(s). 21-0117-EL-BGN

Summary: Notice of Response to Data Request 4 electronically filed by Nathaniel Morse on behalf of Kingwood Solar I LLC