Madison Fields Solar Project, LLC
Case No. 19-1881-EL-BGN

Application Part 3 of 8

Part 3 includes:

- **Exhibit B** **Manufacturer Specifications**
- **Exhibit C** **Vegetation Management Plan**
- **Exhibit D** **Comment Cards**
- **Exhibit E** **Community Engagement**
- **Exhibit F** **Interconnection Studies**
- **Exhibit G** **Economic Impact Study**
- **Exhibit H** **Complaint Resolution Plan**
- **Exhibit I** **Certificate of Liability Insurance**
- **Exhibit J** **Construction Route Study**
- **Exhibit K** **Decommissioning Plan**

Date Filed: July 17, 2020

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Attorneys for Madison Fields Solar Project, LLC

Exhibit B
Manufacturer Specifications

Attachment A
Modules

1. **Jinko**
2. **Longi**
3. **Risen**
4. **Talesun**
5. **Trina**

Attachment B
Inverters

1. **Ingeteam**
2. **SMA**
3. **Sungrow**
4. **TMEIC**

Attachment C
Trackers

1. **Array Technologies**
2. **FTC Solar**
3. **Gamechange Solar**
4. **NEXTracker**
5. **Soltec**
6. **Sunfolding**

Respectfully submitted,

/s/ Christine M.T. Pirik

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Attachment A
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1. **Jinko**
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Exhibit B
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Modules

1. Jinko

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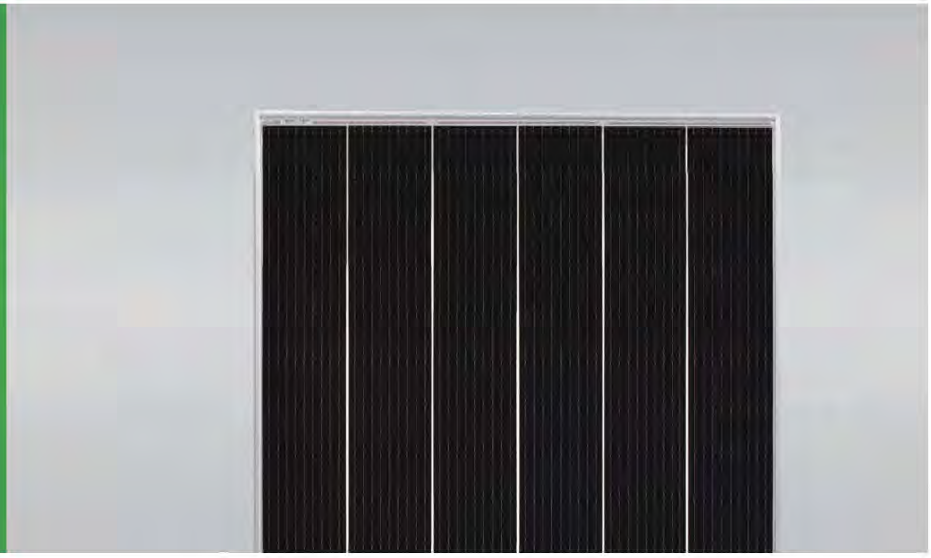
Jinko
Building Your Trust in Solar

Tiger Mono-facial
72M 410-430 Watt

Tiling Ribbon (TR) Technology

Positive power tolerance of 0~+3%



KEY FEATURES

TR technology + Half Cell
TR technology with Half cell aims to eliminate the cell gap to increase module efficiency (mono-facial up to 20.70%)

9BB instead of 5BB
9BB technology decreases the distance between bus bars and finger grid line which is benefit to power increase.

Higher lifetime Power Yield
2.5% first year degradation,
0.6% linear degradation

Best Warranty
12 year product warranty,
25 year linear power warranty

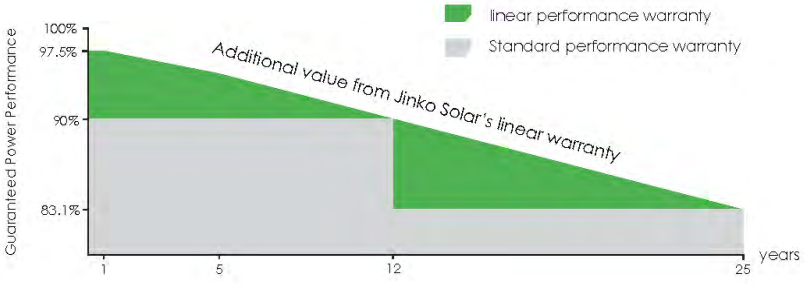
Avoid debris, cracks and broken gate risk effectively
9BB technology using circular ribbon that could avoid debris, cracks and broken gate risk effectively

PV CYCLE · TÜVRheinland CERTIFIED · CE · POSITIVE QUALITY™ Continuous Quality Assurance · CLEAN ENERGY COUNCIL MEMBER

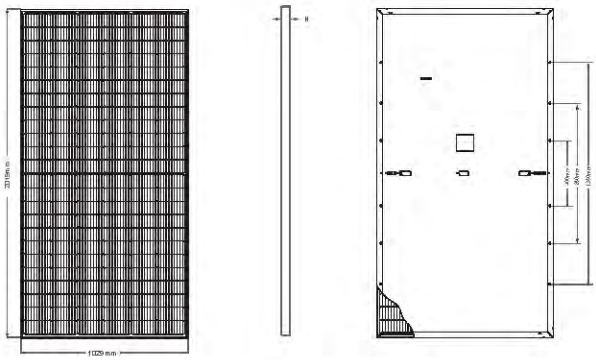
- ISO9001:2015, ISO14001:2015, OHSAS18001 certified factory
- IEC61215, IEC61730 certified product

LINEAR PERFORMANCE WARRANTY

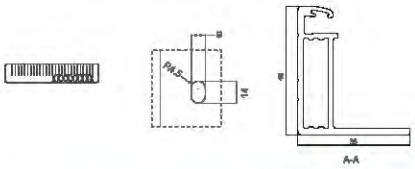
12 Year Product Warranty 25 Year Linear Power Warranty
0.6% Annual Degradation Over 25 years



Engineering Drawings



Front Side Back



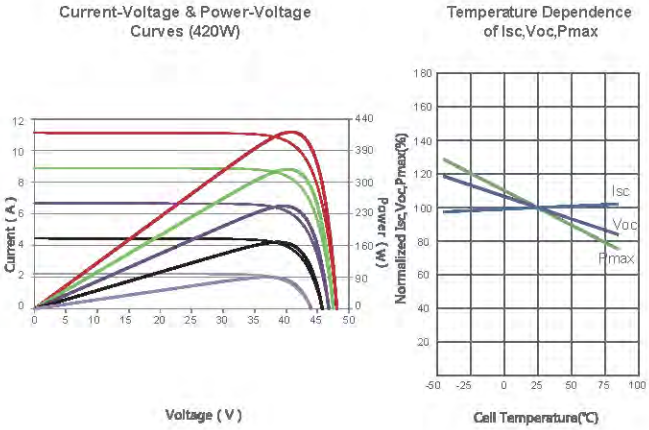
Lenth: ±2mm
Width: ±2mm
Height: ±1mm
Row Pitch: ±2mm

Packaging Configuration

(Two pallets = One stack)

27pcs/pallets, 54pcs/stack, 594pcs/ 40'HQ Container

Electrical Performance & Temperature Dependence



Mechanical Characteristics

Cell Type	P type Mono-crystalline
No.of cells	144 (2×72)
Dimensions	2019×1029×40mm (79.49×40.51×1.57 inch)
Weight	24.3 kg (53.57 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TUV 1×4.0mm² (+): 290mm, (-): 145 mm or Customized Length

SPECIFICATIONS

Module Type	JKM410M-7TL3 JKM410M-7TL3-V		JKM415M-7TL3 JKM415M-7TL3-V		JKM420M-7TL3 JKM420M-7TL3-V		JKM425M-7TL3 JKM425M-7TL3-V		JKM430M-7TL3 JKM430M-7TL3-V	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	410Wp	305Wp	415Wp	309Wp	420Wp	312Wp	425Wp	316Wp	430Wp	320Wp
Maximum Power Voltage (Vmp)	39.46V	36.10V	39.56V	36.20V	39.66V	36.33V	39.77V	36.43V	39.86V	36.56V
Maximum Power Current (Imp)	10.39A	8.45A	10.49A	8.53A	10.59A	8.60A	10.69A	8.68A	10.79A	8.75A
Open-circuit Voltage (Voc)	47.45V	44.78V	47.54V	44.87V	47.63V	44.96V	47.72V	45.04V	47.93V	45.24V
Short-circuit Current (Isc)	11.20A	9.05A	11.30A	9.13A	11.40A	9.21A	11.50A	9.29A	11.60A	9.37A
Module Efficiency STC (%)	19.73%		19.98%		20.22%		20.46%		20.70%	
Operating Temperature(℃)	-40℃~+85℃									
Maximum system voltage	1000/1500VDC (IEC)									
Maximum series fuse rating	20A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.35%/℃									
Temperature coefficients of Voc	-0.28%/℃									
Temperature coefficients of Isc	0.048%/℃									
Nominal operating cell temperature (NOCT)	45±2℃									

*STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

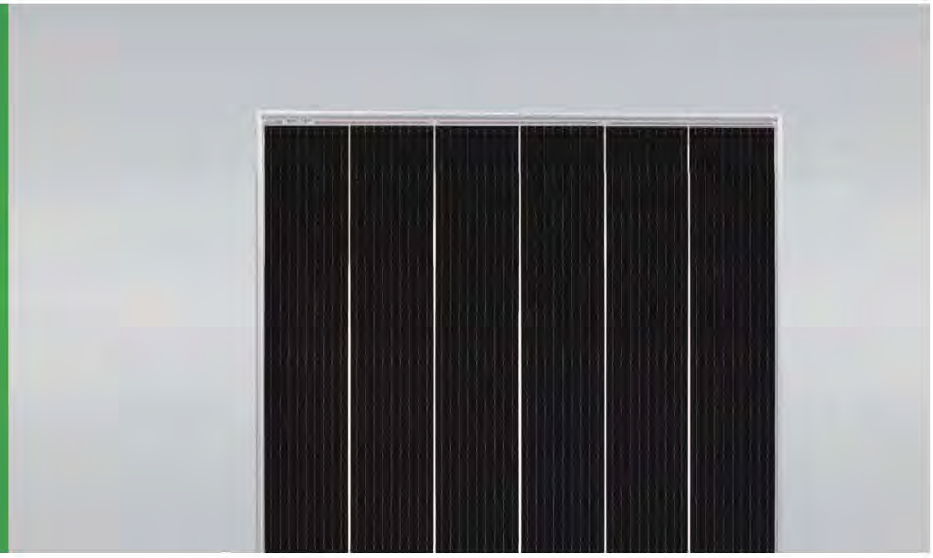
Building Your Trust in Solar

Tiger Bifacial

72M 410-430 Watt

Tiling Ribbon (TR) Technology

Positive power tolerance of 0~+3%



KEY FEATURES

TR technology + Half Cell
TR technology with Half cell aims to eliminate the cell gap to increase module efficiency (bi-facial up to 20.40%)

9BB instead of 5BB
9BB technology decreases the distance between bus bars and finger grid line which is benefit to power increase.

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Best Warranty
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30 year linear power warranty

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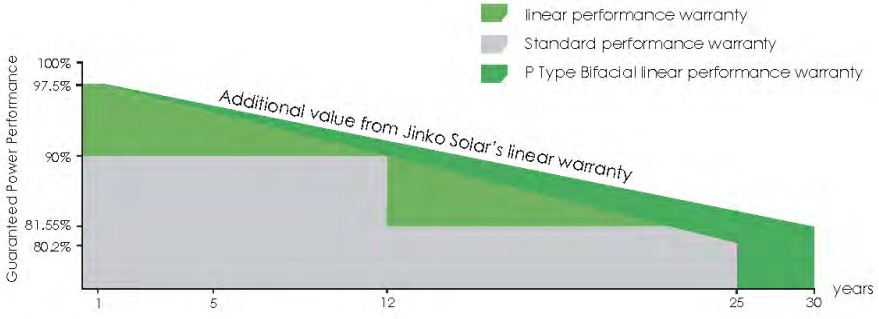
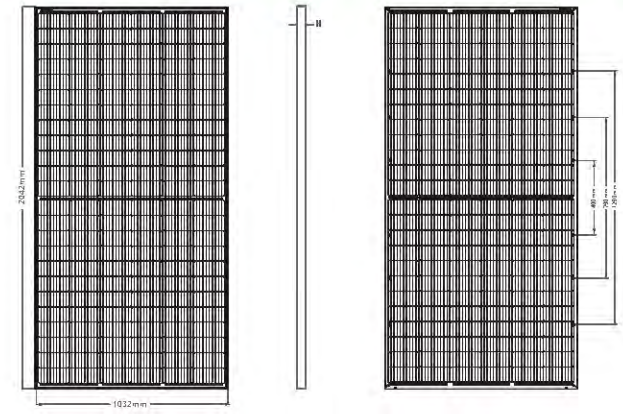
- IEC61215, IEC61730 certified product

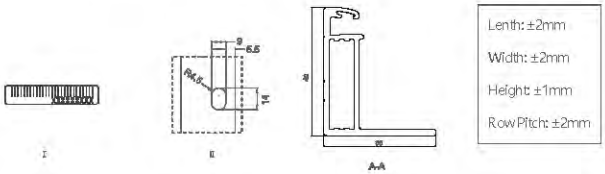
LINEAR PERFORMANCE WARRANTY

12 Year Product Warranty • 30 Year Linear Power Warranty
0.55% Annual Degradation Over 30 years



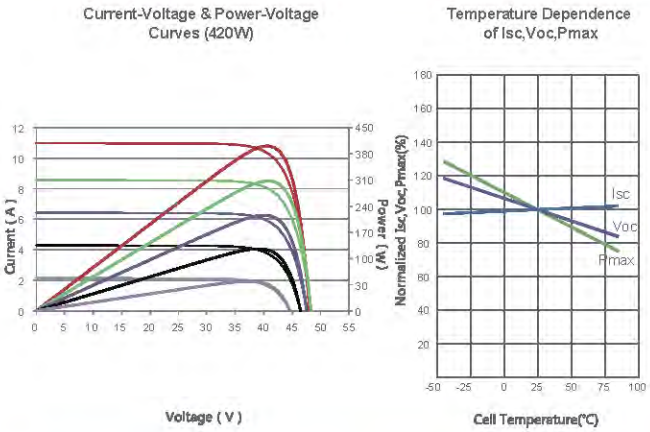
Engineering Drawings





Lenth: ±2mm
Width: ±2mm
Height: ±1mm
Row Pitch: ±2mm

Electrical Performance & Temperature Dependence



Packaging Configuration

(Two pallets = One stack)

27pcs/pallets, 54pcs/stack, 594pcs/ 40'HQ Container

Mechanical Characteristics

Cell Type	P type Mono-crystalline
No.of cells	144 (2×72)
Dimensions	2042×1032×40mm (80.39×40.63×1.57 inch)
Weight	24.6 kg (54.23 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TUV 1×4.0mm² (+): 250mm, (-): 150 mm or Customized Length

SPECIFICATIONS

Module Type	JKM410M-7TL3-TV		JKM415M-7TL3-TV		JKM420M-7TL3-TV		JKM425M-7TL3-TV		JKM430M-7TL3-TV	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	410Wp	305Wp	415Wp	309Wp	420Wp	312Wp	425Wp	316Wp	430Wp	320Wp
Maximum Power Voltage (Vmp)	39.81V	36.40V	39.87V	36.54V	39.92V	36.68V	39.99V	36.81V	40.04V	36.86V
Maximum Power Current (Imp)	10.30A	8.38A	10.41A	8.45A	10.52A	8.52A	10.63V	8.59A	10.74A	8.68A
Open-circuit Voltage (Voc)	47.63V	44.96V	47.72V	45.04V	47.82V	45.13V	47.91V	45.22V	48.00V	45.31V
Short-circuit Current (Isc)	11.10A	8.97A	11.19A	9.04A	11.28A	9.11A	11.37A	9.18A	11.46A	9.26A
Module Efficiency STC (%)	19.46%		19.69%		19.93%		20.17%		20.40%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1500VDC (IEC)									
Maximum series fuse rating	20A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.35%/°C									
Temperature coefficients of Voc	-0.28%/°C									
Temperature coefficients of Isc	0.048%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									
Refer. Bifacial Factor	70±5%									

BIFACIAL OUTPUT-REARSIDE POWER GAIN

5%	Maximum Power (Pmax)	431Wp	436Wp	441Wp	446Wp	452Wp
	Module Efficiency STC (%)	20.43%	20.68%	20.93%	21.18%	21.43%
15%	Maximum Power (Pmax)	472Wp	477Wp	483Wp	489Wp	495Wp
	Module Efficiency STC (%)	22.37%	22.65%	22.92%	23.19%	23.47%
25%	Maximum Power (Pmax)	513Wp	519Wp	525Wp	531Wp	538Wp
	Module Efficiency STC (%)	24.32%	24.62%	24.91%	25.21%	25.51%

*STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

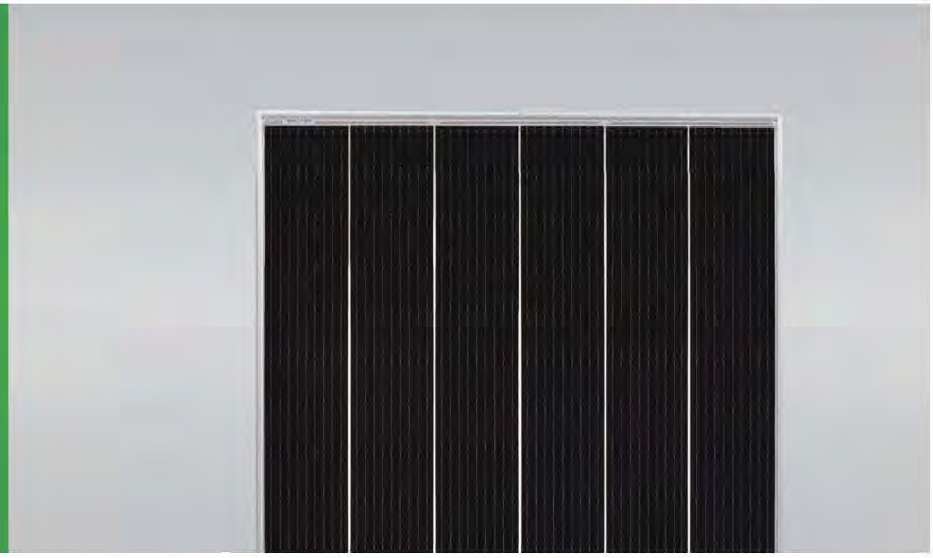
The company reserves the final right for explanation on any of the information presented hereby. TR JKM410-430M-7TL3-TV-D1-EN

JinKO
Building Your Trust in Solar

Tiger Mono-facial
455-475 Watt

Tiling Ribbon (TR) Technology

Positive power tolerance of 0~+3%



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0.6% linear degradation

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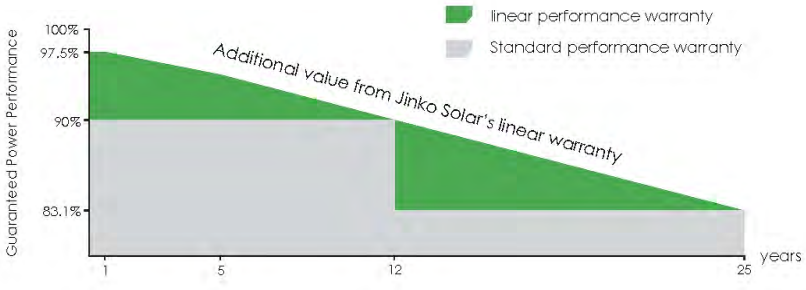
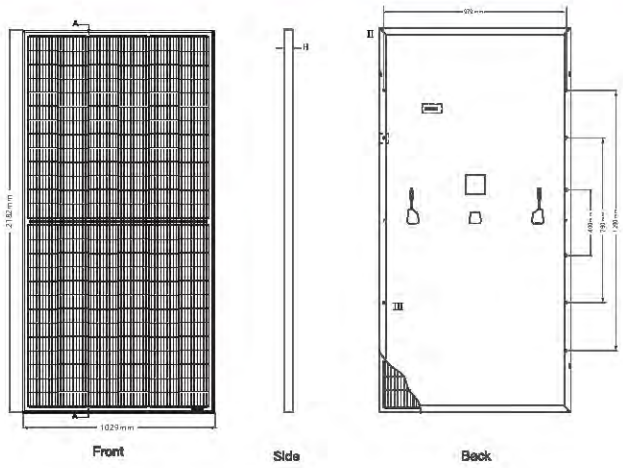
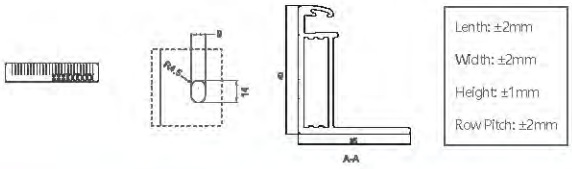


Engineering Drawings





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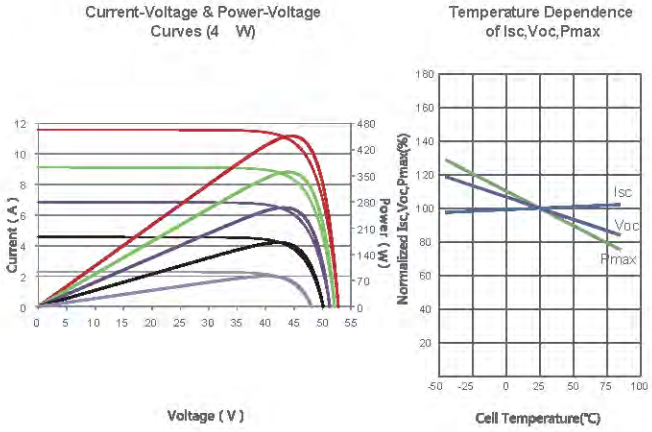
Row Pitch: ±2mm

Electrical Performance & Temperature Dependence



Packaging Configuration

(Two pallets = One stack)

27pcs/pallets, 54pcs/stack, 540pcs/ 40'HQ Container

Mechanical Characteristics

Cell Type	P type Mono-crystalline
No.of cells	156 (2×78)
Dimensions	2182×1029×40mm (85.91×40.51×1.57 inch)
Weight	25.1 kg (55.12 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TUV 1×4.0mm² (+): 290mm, (-): 145 mm or Customized Length

SPECIFICATIONS

Module Type	JKM455M-7RL3 JKM455M-7RL3-V		JKM460M-7RL3 JKM460M-7RL3-V		JKM465M-7RL3 JKM465M-7RL3-V		JKM470M-7RL3 JKM470M-7RL3-V		JKM475M-7RL3 JKM475M-7RL3-V	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	455Wp	339Wp	460Wp	342Wp	465Wp	346Wp	470Wp	350Wp	475Wp	353Wp
Maximum Power Voltage (Vmp)	43.13V	39.69V	43.24V	39.75V	43.34V	39.86V	43.44V	39.92V	43.54V	40.02V
Maximum Power Current (Imp)	10.55A	8.53A	10.64A	8.61A	10.73A	8.68A	10.82A	8.76A	10.91A	8.83A
Open-circuit Voltage (Voc)	51.80V	48.79V	51.90V	48.88V	52.00V	48.98V	52.10V	48.07V	52.20V	49.17V
Short-circuit Current (Isc)	11.41A	9.22A	11.50A	9.29A	11.59A	9.36A	11.68A	9.43A	11.77A	9.51A
Module Efficiency STC (%)	20.26%		20.49%		20.71%		20.93%		21.16%	
Operating Temperature(℃)	-40℃~+85℃									
Maximum system voltage	1000/1500VDC (IEC)									
Maximum series fuse rating	20A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.35%/℃									
Temperature coefficients of Voc	-0.28%/℃									
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* Power measurement tolerance: ± 3%

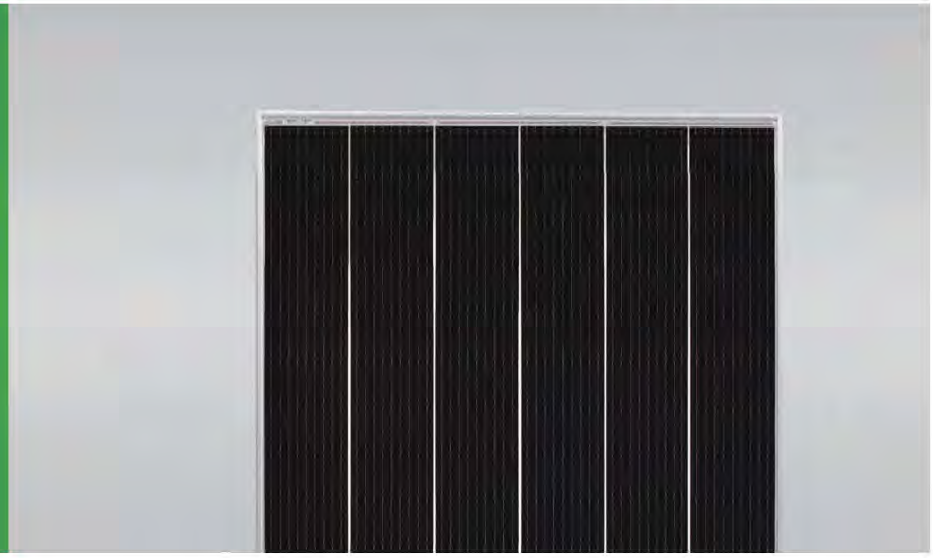
JinKO
Building Your Trust in Solar

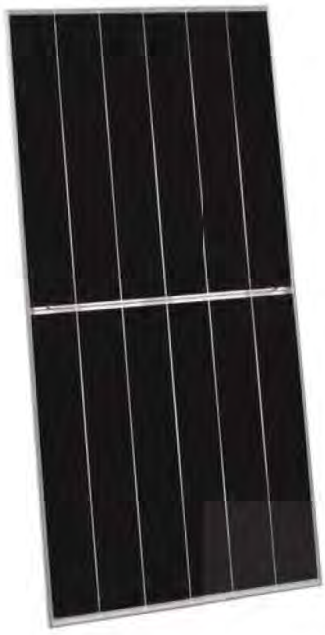
Tiger Bifacial

445-465 Watt

Tiling Ribbon (TR) Technology

Positive power tolerance of 0~+3%





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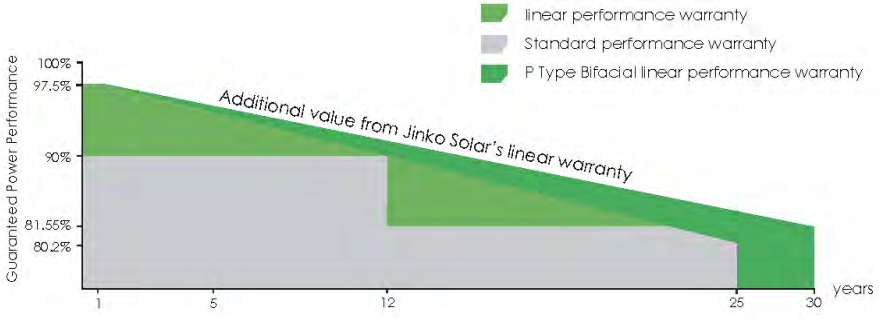
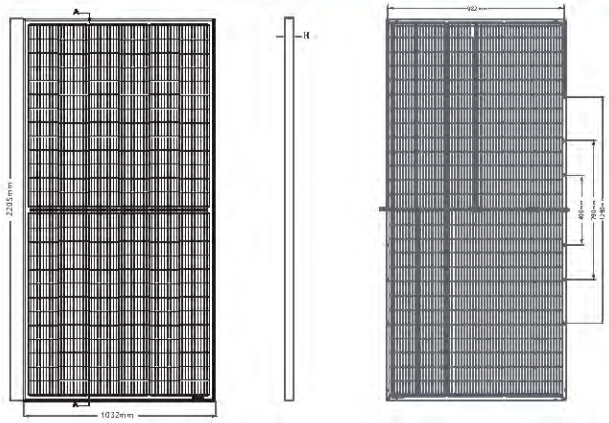
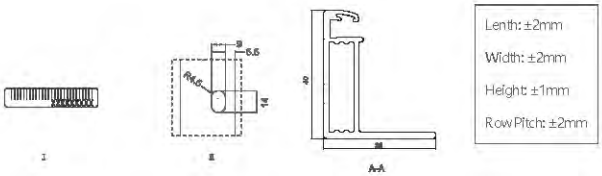


Engineering Drawings





Lenth: ±2mm
Width: ±2mm
Height: ±1mm
Row Pitch: ±2mm

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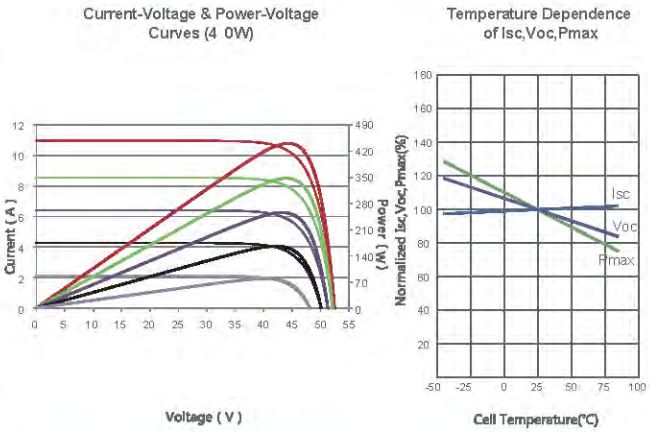

Packaging Configuration

(Two pallets = One stack)

27pcs/pallets, 54pcs/stack, 540pcs/ 40'HQ Container

Mechanical Characteristics

Cell Type	P type Mono-crystalline
No.of cells	156 (2×78)
Dimensions	2205×1032×40mm (86.81×40.63×1.57 inch)
Weight	25.7 kg (56.66 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TUV 1×4.0mm² (+): 250mm, (-): 150 mm or Customized Length

SPECIFICATIONS

Module Type	JKM445M-7RL3-TV		JKM450M-7RL3-TV		JKM455M-7RL3-TV		JKM460M-7RL3-TV		JKM465M-7RL3-TV	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	445Wp	331Wp	450Wp	335Wp	455Wp	339Wp	460Wp	342Wp	465Wp	346Wp
Maximum Power Voltage (Vmp)	43.73V	39.60V	43.82V	39.72V	43.90V	39.83V	44.02V	39.93V	44.09V	40.04V
Maximum Power Current (Imp)	10.18A	8.36A	10.27A	8.43A	10.37A	8.50A	10.45V	8.57A	10.55A	8.64A
Open-circuit Voltage (Voc)	51.80V	48.79V	51.90V	48.88V	52.00V	48.98V	52.10V	49.07V	52.20V	49.17V
Short-circuit Current (Isc)	11.03A	8.91A	11.12A	8.98A	11.21A	9.05A	11.30A	9.13A	11.39A	9.20A
Module Efficiency STC (%)	19.56%		19.78%		20.00%		20.21%		20.43%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1500VDC (IEC)									
Maximum series fuse rating	25A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.35%/°C									
Temperature coefficients of Voc	-0.28%/°C									
Temperature coefficients of Isc	0.048%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									
Refer. Bifacial Factor	70±5%									

BIFACIAL OUTPUT-REARSIDE POWER GAIN

5%	Maximum Power (Pmax)	467Wp	473Wp	478Wp	483Wp	488Wp
	Module Efficiency STC (%)	20.53%	20.76%	20.99%	21.23%	21.46%
15%	Maximum Power (Pmax)	512Wp	518Wp	523Wp	529Wp	535Wp
	Module Efficiency STC (%)	22.49%	22.74%	22.99%	23.25%	23.50%
25%	Maximum Power (Pmax)	556Wp	563Wp	569Wp	575Wp	581Wp
	Module Efficiency STC (%)	24.44%	24.72%	24.99%	25.27%	25.54%

*STC: Irradiance 1000W/m² Cell Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

The company reserves the final right for explanation on any of the information presented hereby. TR JKM445-465M-7RL3-TV-D4-EN

Exhibit B
Manufacturer Specifications

Attachment A
Modules

2. Longi

Respectfully submitted,

/s/ *Christine M.T. Pirik*
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(Counsel of Record)
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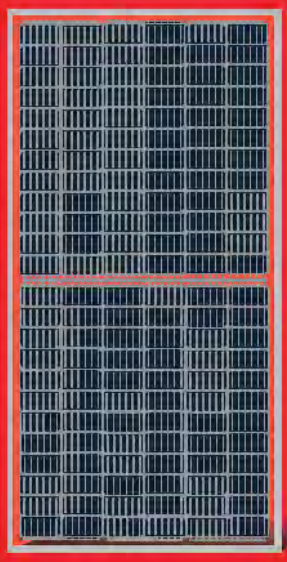
Attorneys for Madison Fields Solar Project, LLC

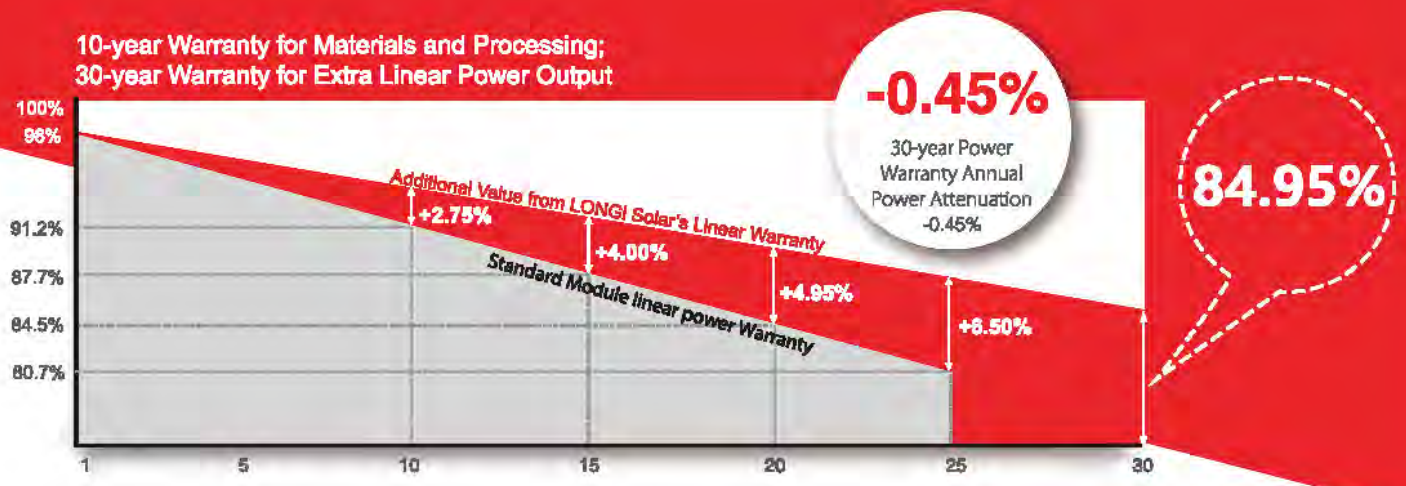
LR4-72HBD
415~435M

Hi-MO4



High Efficiency Low LID Bifacial PERC with Half-cut Technology

10-year Warranty for Materials and Processing;
30-year Warranty for Extra Linear Power Output



Complete System and Product Certifications

IEC 61215, IEC61730, UL1703

ISO 9001:2008: ISO Quality Management System

ISO 14001: 2004: ISO Environment Management System

TS62941: Guideline for module design qualification and type approval

OHSAS 18001: 2007 Occupational Health and Safety

* Specifications subject to technical changes and tests. LONGi Solar reserves the right of interpretation.

Front side performance equivalent to conventional low LID mono PERC:
- High module conversion efficiency (up to 19.4%)
- Better energy yield with excellent low irradiance performance and temperature coefficient
- First year power degradation <2%

Bifacial technology enables additional energy harvesting from rear side (up to 25%)

Glass/glass lamination ensures 30 year product lifetime, with annual power degradation < 0.45%, 1500V compatible to reduce BOS cost

Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

LONGi

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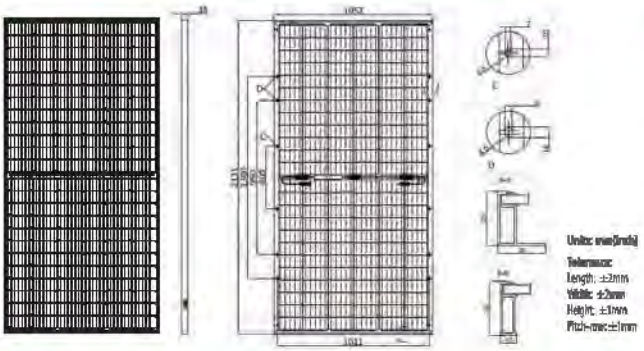
LR4-72HBD 415~435M

Design (mm)



Mechanical Parameters

Cell Orientation: 144 (6×24)
Junction Box: IP68, three diodes
Output Cable: 4mm², 300mm in length, length can be customized
Glass: Dual glass 2.0mm tempered glass
Frame: Anodized aluminum alloy frame
Weight: 29.5kg
Dimension: 2131×1052×35mm
Packaging: 30pcs per pallet 150pcs per 20'GP 600pcs per 40'HC

Operating Parameters

Operational Temperature: -40℃ ~ +85℃
Power Output Tolerance: 0 ~ +5 W
Voc and Isc Tolerance: ±3%
Maximum System Voltage: DC1500V (IEC/UL)
Maximum Series Fuse Rating: 20A
Nominal Operating Cell Temperature: 45±2℃
Safety Class: Class II
Fire Rating: UL type 3
Bifaciality: Glazing≥70%

Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-72HBD-415M		LR4-72HBD-420M		LR4-72HBD-425M		LR4-72HBD-430M		LR4-72HBD-435M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	415	308.6	420	312.3	425	316.0	430	319.7	435	323.5
Open Circuit Voltage (Voc/V)	49.0	45.6	49.2	45.8	49.4	46.0	49.6	46.2	49.8	46.4
Short Circuit Current (Isc/A)	10.89	8.82	10.96	8.87	11.02	8.93	11.09	8.98	11.16	9.04
Voltage at Maximum Power (Vmp/V)	40.6	37.7	40.8	37.9	41.0	38.1	41.2	38.2	41.4	38.4
Current at Maximum Power (Imp/A)	10.23	8.19	10.30	8.25	10.37	8.30	10.44	8.36	10.51	8.42
Module Efficiency(%)	18.5		18.7		19.0		19.2		19.4	

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25℃, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20℃, Spectra at AM1.5, Wind at 1m/S

Electrical characteristics with different rear side power gain (reference to 425W front)

Pmax /W	Voc/V	Isc /A	Vmp/V	Imp /A	Pmax gain
446	49.4	11.58	41.0	10.88	5%
468	49.4	12.13	41.0	11.40	10%
489	49.5	12.68	41.1	11.92	15%
510	49.5	13.23	41.1	12.44	20%
531	49.5	13.78	41.1	12.96	25%

Temperature Ratings (STC)

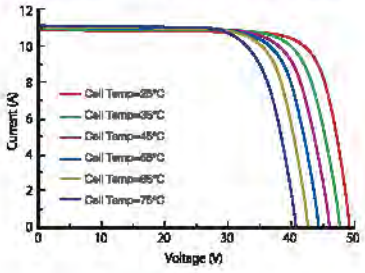
Temperature Coefficient of Isc	+0.060%/℃
Temperature Coefficient of Voc	-0.300%/℃
Temperature Coefficient of Pmax	-0.370%/℃

Mechanical Loading

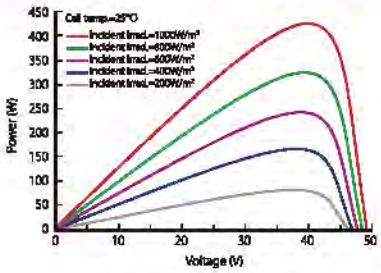
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

I-V Curve

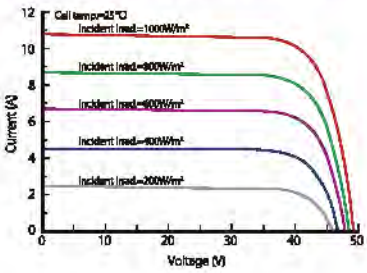
Current-Voltage Curve (LR4-72HBD-425M)



Power-Voltage Curve (LR4-72HBD-425M)



Current-Voltage Curve (LR4-72HBD-425M)



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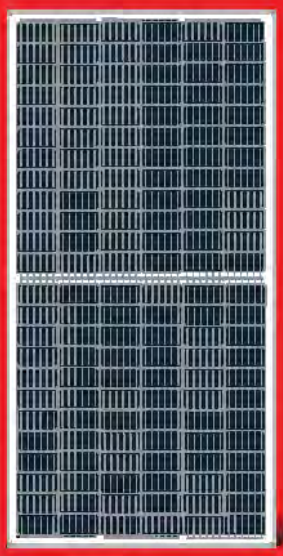
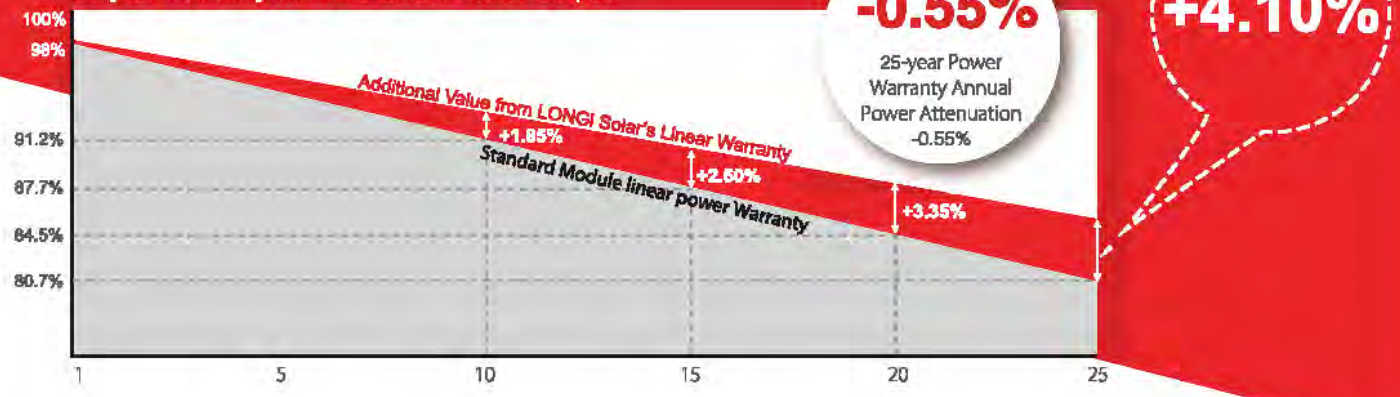
LR4-72HPH
420~440M

Hi-MO4m



High Efficiency
Low LID Mono PERC
with Half-cut Technology

10-year Warranty for Materials and Processing;
25-year Warranty for Extra Linear Power Output



Complete System and Product Certifications

IEC 61215, IEC61730, UL1703

ISO 9001:2008: ISO Quality Management System

ISO 14001: 2004: ISO Environment Management System

TS62941: Guideline for module design qualification and type approval

OHSAS 18001: 2007 Occupational Health and Safety

* Specifications subject to technical changes and tests. LONGi Solar reserves the right of interpretation.

Positive power tolerance (0 ~ +5W) guaranteed

High module conversion efficiency (up to 19.8%)

Slower power degradation enabled by Low LID Mono PERC technology: first year <2%, 0.55% year 2-25

Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

LONGi Solar

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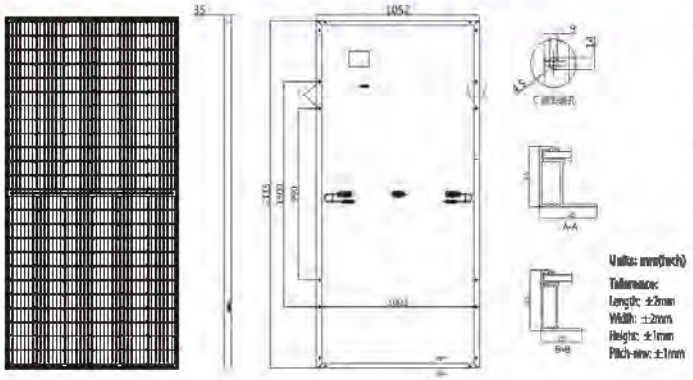
20190509-Draft

LR4-72HPH 420~440M

Design (mm)



Mechanical Parameters

Cell Orientation: 144 (6×24)

Junction Box: IP68, three diodes

Output Cable: 4mm², 300mm in length, length can be customized

Glass: Single glass
3.2mm coated tempered glass

Frame: Anodized aluminum alloy frame

Weight: 24 kg

Dimension: 2115×1052×35mm

Packaging: 30pcs per pallet
150pcs per 20'GP
660pcs per 40'HC

Operating Parameters

Operational Temperature: -40℃ ~ +85℃

Power Output Tolerance: 0 ~ +5 W

Voc and Isc Tolerance: ±3%

Maximum System Voltage: DC1500V (IEC/UL)

Maximum Series Fuse Rating: 20A

Nominal Operating Cell Temperature: 45±2℃

Safety Class: Class II

Fire Rating: UL type 4

Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-72HPH-420M		LR4-72HPH-425M		LR4-72HPH-430M		LR4-72HPH-435M		LR4-72HPH-440M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	420	311.1	425	314.8	430	318.5	435	322.2	440	326.0
Open Circuit Voltage (Voc/V)	48.8	45.5	49.0	45.7	49.2	45.9	49.4	46.1	49.6	46.3
Short Circuit Current (Isc/A)	11.04	8.90	11.11	8.95	11.19	9.02	11.26	9.08	11.33	9.13
Voltage at Maximum Power (Vmp/V)	40.2	37.1	40.4	37.3	40.6	37.5	40.8	37.7	41.0	37.9
Current at Maximum Power (Imp/A)	10.45	8.38	10.52	8.44	10.60	8.50	10.67	8.56	10.74	8.61
Module Efficiency(%)	18.9		19.1		19.3		19.6		19.8	

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25℃, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20℃, Spectra at AM1.5, Wind at 1m/S

Temperature Ratings (STC)

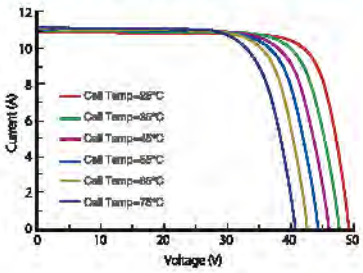
Temperature Coefficient of Isc	+0.057%/℃
Temperature Coefficient of Voc	-0.286%/℃
Temperature Coefficient of Pmax	-0.370%/℃

Mechanical Loading

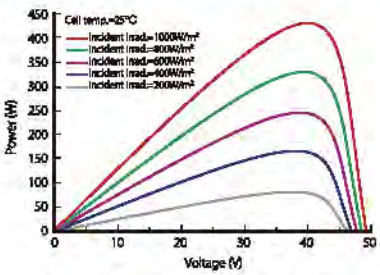
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

I-V Curve

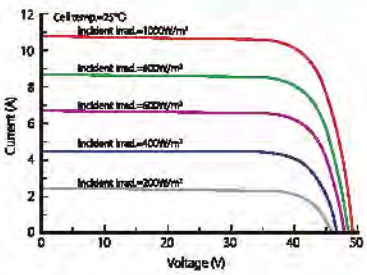
Current-Voltage Curve (LR4-72HPH-430M)



Power-Voltage Curve (LR4-72HPH-430M)



Current-Voltage Curve (LR4-72HPH-430M)



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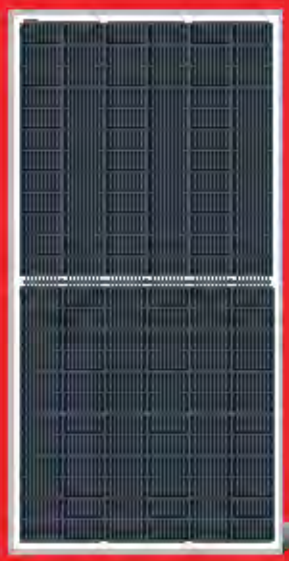
20190509-Draft

LR4-72HBD
425~455M

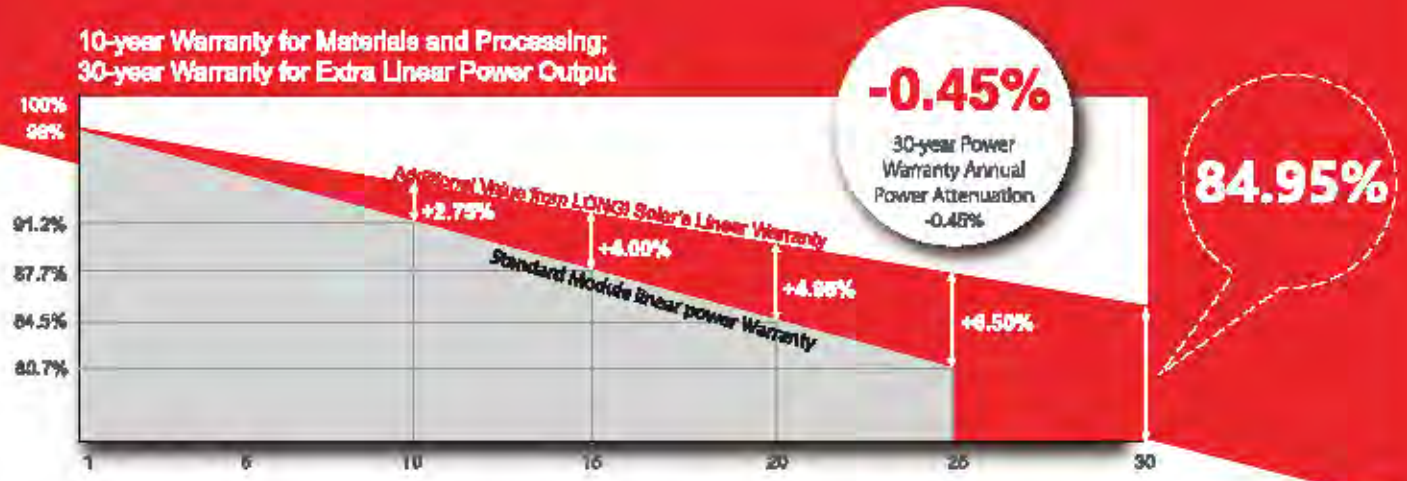
Hi-MO 4
NEW

High Efficiency
Low LID Bifacial PERC with
Half-cut Technology



*Both 6BB & 9BB are available

10-year Warranty for Materials and Processing;
30-year Warranty for Extra Linear Power Output



Complete System and Product Certifications

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ISO 14001: 2004: ISO Environment Management System

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Front side performance equivalent to conventional low LID mono PERC:
- High module conversion efficiency (up to 20.9%)
- Better energy yield with excellent low irradiance performance and temperature coefficient
- First year power degradation <2%

Bifacial technology enables additional energy harvesting from rear side (up to 25%)

Glass/glass lamination ensures 30 year product lifetime, with annual power degradation < 0.45%, 1500V compatible to reduce BOS cost

Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

LONGi

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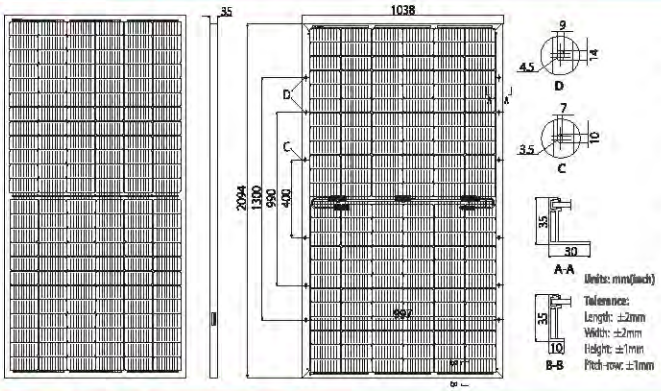
20200220-0 en

LR4-72HBD 425~455M

Design (mm)



Mechanical Parameters

Cell Orientation: 144 (6×24)
Junction Box: IP68, three diodes
Output Cable: 4mm², 300mm in length, length can be customized
Glass: Dual glass
2.0mm coated tempered glass
Frame: Anodized aluminum alloy frame
Weight: 27.5kg
Dimension: 2094×1038×35mm
Packaging: 30pcs per pallet
150pcs per 20'GP
660pcs per 40'HC

Operating Parameters

Operational Temperature: -40℃ ~ +85℃
Power Output Tolerance: 0 ~ +5 W
Voc and Isc Tolerance: ±3%
Maximum System Voltage: DC1500V (IEC/UL)
Maximum Series Fuse Rating: 25A
Nominal Operating Cell Temperature: 45±2℃
Safety Class: Class II
Fire Rating: UL type 3
Bifaciality: Glazing≥70%

Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-72HBD-425M		LR4-72HBD-430M		LR4-72HBD-435M		LR4-72HBD-440M		LR4-72HBD-445M		LR4-72HBD-450M		LR4-72HBD-455M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	425	316.0	430	319.7	435	323.5	440	327.2	445	330.9	450	334.6	455	338.3
Open Circuit Voltage (Voc/V)	48.7	45.4	48.9	45.6	49.1	45.7	49.2	45.8	49.4	46.0	49.6	46.2	49.8	46.4
Short Circuit Current (Isc/A)	11.22	9.08	11.30	9.14	11.36	9.20	11.45	9.27	11.52	9.32	11.58	9.38	11.65	9.43
Voltage at Maximum Power (Vmp/V)	40.4	37.5	40.6	37.7	40.8	37.9	41.0	38.1	41.2	38.3	41.4	38.4	41.6	38.6
Current at Maximum Power (Imp/A)	10.52	8.42	10.60	8.49	10.66	8.54	10.73	8.60	10.80	8.65	10.87	8.70	10.93	8.76
Module Efficiency(%)	19.6		19.8		20.0		20.2		20.5		20.7		20.9	

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25℃, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20℃, Spectra at AM1.5, Wind at 1m/S

Electrical characteristics with different rear side power gain (reference to 445W front)

Pmax /W	Voc/V	Isc /A	Vmp/V	Imp /A	Pmax gain
467	49.4	12.09	41.2	11.34	5%
490	49.4	12.67	41.2	11.88	10%
512	49.5	13.24	41.3	12.42	15%
534	49.5	13.82	41.3	12.96	20%
556	49.5	14.40	41.3	13.50	25%

Temperature Ratings (STC)

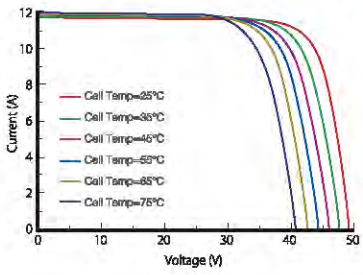
Temperature Coefficient of Isc	+0.050%/℃
Temperature Coefficient of Voc	-0.284%/℃
Temperature Coefficient of Pmax	-0.350%/℃

Mechanical Loading

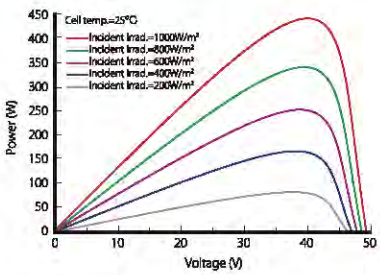
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

I-V Curve

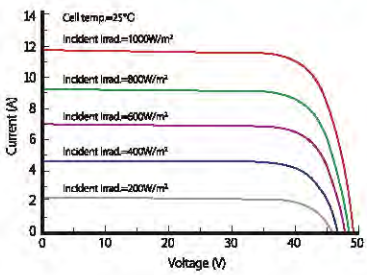
Current-Voltage Curve (LR4-72HBD-440M)



Power-Voltage Curve (LR4-72HBD-440M)



Current-Voltage Curve (LR4-72HBD-440M)



LONGi

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Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

Exhibit B
Manufacturer Specifications

Attachment A
Modules

3. Risen

Respectfully submitted,

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(Counsel of Record)
William Vorys (0093479)
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wvorys@dickinsonwright.com

Attorneys for Madison Fields Solar Project, LLC

Jäger Plus

HIGH PERFORMANCE BIFACIAL PERC MONOCRYSTALLINE MODULE

144

RSM144-6-395BMDG-415BMDG

144 CELL Mono PERC Module	**395-415Wp** Power Output Range
1500VDC Maximum System Voltage	**20.4%** Maximum Efficiency

KEY SALIENT FEATURES

- Global, Tier 1 bankable brand, with independently certified state-of-the-art automated manufacturing
- Bifacial technology enables additional energy harvesting from rear side (up to 30%)
- Industry leading lowest thermal co-efficient of power
- Industry leading 12 years product warranty
- Excellent low irradiance performance
- Excellent PID resistance
- Positive tight power tolerance
- Dual stage 100% EL Inspection warranting defect-free product
- Module Imp binning radically reduces string mismatch losses
- Warranted reliability and stringent quality assurances well beyond certified requirements
- Certified to withstand severe environmental conditions
  - Anti-reflective & anti-soiling surface minimise power loss from dirt and dust
  - Severe salt mist, ammonia & blown sand resistance, for seaside, farm and desert environments
  - Excellent mechanical load 2400Pa & snow load 5400Pa resistance

ISO9001
ISO14001
OHSAS18001
IEC TS 62941

RISEN ENERGY CO., LTD.

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risen solar technology

Preliminary
For Global Market

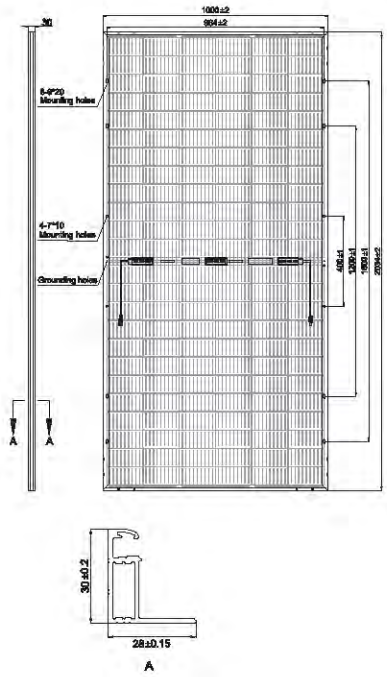
LINEAR PERFORMANCE WARRANTY

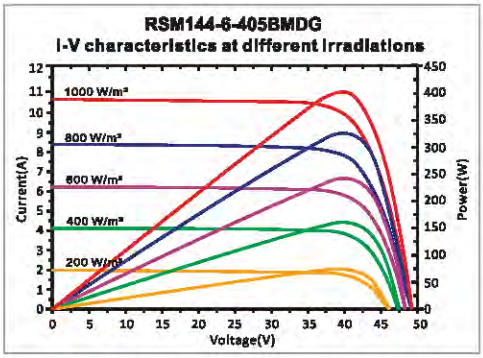
12 year Product Warranty / 30 year Linear Power Warranty

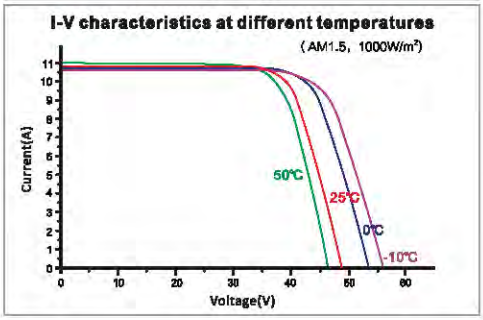
★ Please check the valid version of Limited Product Warranty which is officially released by Risen Energy Co., Ltd

THE POWER OF RISING VALUE

Dimensions of PV Module Unit: mm







Our Partners:

ELECTRICAL DATA (STC)

Model Number	RSM144-6-395BMDG	RSM144-6-400BMDG	RSM144-6-405BMDG	RSM144-6-410BMDG	RSM144-6-415BMDG
Rated Power in Watts-Pmax(Wp)	395	400	405	410	415
Open Circuit Voltage-Voc(V)	48.45	48.60	48.75	48.90	49.00
Short Circuit Current-Isc(A)	10.40	10.50	10.60	10.70	10.80
Maximum Power Voltage-Vmpp(V)	40.35	40.45	40.55	40.65	40.70
Maximum Power Current-Impp(A)	9.80	9.90	10.00	10.10	10.20
Module Efficiency (%) ★	19.4	19.7	19.9	20.2	20.4

STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5 according to EN 60904-3.
Bifacial factor: 75%±5 ★ Module Efficiency (%): Round-off to the nearest number

Electrical characteristics with different rear side power gain (reference to **405Wp** front)

Bifacial Gain ★	Pmax/W	Voc/V	Isc/A	Vmpp/V	Impp/A
5%	426	48.75	11.13	40.55	10.50
10%	446	48.75	11.66	40.55	11.00
15%	466	48.75	12.19	40.55	11.50
20%	487	48.75	12.72	40.55	12.00
25%	507	48.75	13.25	40.55	12.50
30%	527	48.75	13.78	40.55	13.00

★Bifacial Gain: The additional gain from the rear side compared to the power of the front side at the standard test condition. It depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

ELECTRICAL DATA (NMOT)

Model Number	RSM144-6-395BMDG	RSM144-6-400BMDG	RSM144-6-405BMDG	RSM144-6-410BMDG	RSM144-6-415BMDG
Maximum Power-Pmax (Wp)	295.6	299.3	303.1	306.9	309.2
Open Circuit Voltage-Voc (V)	44.60	44.70	44.90	44.99	45.63
Short Circuit Current-Isc (A)	8.53	8.61	8.69	8.77	8.80
Maximum Power Voltage-Vmpp (V)	37.00	37.05	37.14	37.24	37.30
Maximum Power Current-Impp (A)	8.00	8.08	8.16	8.24	8.29

MECHANICAL DATA

Solar cells	Monocrystalline, 9BB
Cell configuration	144 cells (6×12+6×12)
Module dimensions	2034×1000×30mm
Weight	27kg
Superstrate	High Transmission, Low Iron, Tempered ARC Glass
Substrate	Tempered Glass
Frame	Anodized Aluminium Alloy type 6063T5, Silver Color
J-Box	Potted, IP68, 1500VDC, 3 Schottky bypass diodes
Cables	4.0mm² (12AWG), Positive(+) 270mm, Negative(-) 270mm
Connector	Risen Twinsel PV-SY02, IP68

TEMPERATURE & MAXIMUM RATINGS

Nominal Module Operating Temperature (NMOT)	45°C±2°C
Temperature Coefficient of Voc	-0.28%/°C
Temperature Coefficient of Isc	0.05%/°C
Temperature Coefficient of Pmax	-0.36%/°C
Operational Temperature	-40°C~+85°C
Maximum System Voltage	1500VDC
Max Series Fuse Rating	20A
Limiting Reverse Current	20A

PACKAGING CONFIGURATION

	40ft
Number of modules per container	770
Number of modules per pallet	35
Number of pallets per container	22
Packaging box dimensions (LxWxH) in mm	2100×1130×1135
Box gross weight[kg]	1000

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

HIGH PERFORMANCE
BIFACIAL PERC MONOCRYSTALLINE MODULE

RSM144-6-370BMDG-390BMDG

144 CELL MONOCRYSTALLINE MODULE

370-390Wp POWER OUTPUT RANGE

1500VDC MAXIMUM SYSTEM VOLTAGE

19.5% MAXIMUM EFFICIENCY

risen solar technology

About Risen Energy

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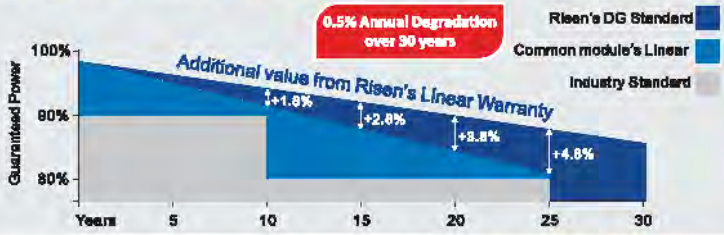
KEY SALIENT FEATURES

- Bloomberg TIER 1 — **Global, Tier 1 bankable brand, with independently certified state-of-the-art automated manufacturing**
- Bifacial — **Bifacial technology enables additional energy harvesting from rear side (up to 25%)**
- **Industry leading lowest thermal co-efficient of power**
- 12 years — **Industry leading 12 years product warranty**
- **Excellent low irradiance performance**
- PID — **Excellent PID resistance**
- **Positive tight power tolerance**
- 2 EL — **Dual stage 100% EL inspection warranting defect-free product**
- **Module Imp binning radically reduces string mismatch losses**
- **Warranted reliability and stringent quality assurances well beyond certified requirements**
- **Certified to withstand severe environmental conditions**
  - **Anti-reflective & anti-soiling surface minimise power loss from dirt and dust**
  - **Severe salt mist, ammonia & blown sand resistance, for seaside, farm and desert environments**
  - **Excellent mechanical load 2400Pa & snow load 5400Pa resistance**

ISO9001
ISO14001
OHSAS18001

LINEAR PERFORMANCE WARRANTY

12 year Product Warranty / 30 year Linear Power Warranty



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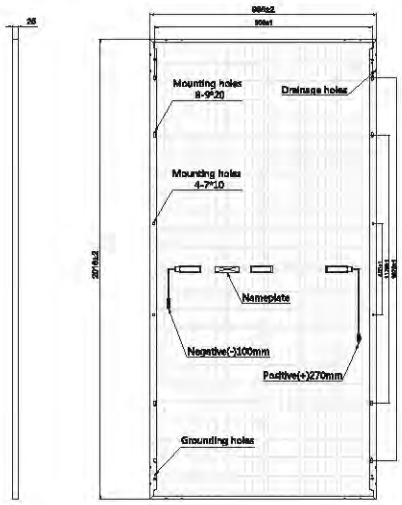
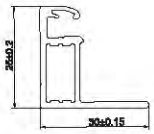
Website: www.risenenergy.com

risen solar technology

Dimensions of PV Module

Unit: mm





ELECTRICAL DATA (STC)

Model Number	RSM144-6-370BMDG	RSM144-6-375BMDG	RSM144-6-380BMDG	RSM144-6-385BMDG	RSM144-6-390BMDG
Rated Power in Watts-Pmax(Wp)	370	375	380	385	390
Open Circuit Voltage-Voc(V)	47.60	47.75	48.00	48.15	48.30
Short Circuit Current-Isc(A)	9.90	10.00	10.10	10.20	10.30
Maximum Power Voltage-Vmpp(V)	39.80	39.90	40.05	40.15	40.25
Maximum Power Current-Impp(A)	9.30	9.40	9.50	9.60	9.70
Module Efficiency (%)	18.5	18.8	19.0	19.3	19.5
Encapsulated Cell Efficiency (%)	20.8	21.1	21.4	21.6	21.9

STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5 according to EN 60904-3.
Power production tolerance: 0~+3%

REARSIDE POWER GAIN BIFACIAL FACTOR:75%±5

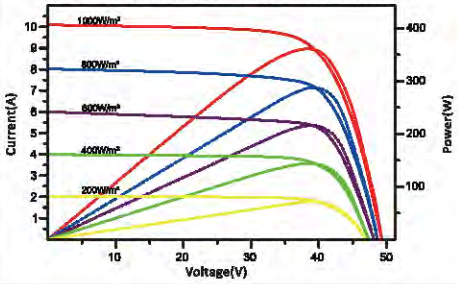
Model Number		RSM144-6-370BMDG	RSM144-6-375BMDG	RSM144-6-380BMDG	RSM144-6-385BMDG	RSM144-6-390BMDG
10%	Power Output(Wp)	407	413	418	424	429
15%	Power Output(Wp)	426	431	437	443	449
20%	Power Output(Wp)	444	450	456	462	468
25%	Power Output(Wp)	463	469	475	481	488

ELECTRICAL DATA (NMOT)

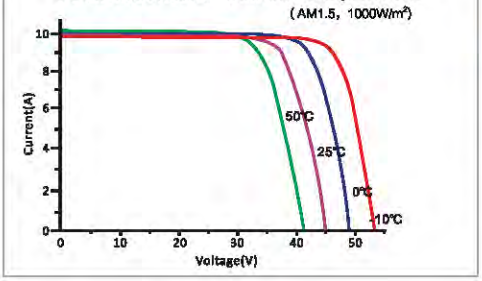
Model Number	RSM144-6-370BMDG	RSM144-6-375BMDG	RSM144-6-380BMDG	RSM144-6-385BMDG	RSM144-6-390BMDG
Maximum Power-Pmax (Wp)	276.7	280.3	284.4	288.1	291.8
Open Circuit Voltage-Voc (V)	43.8	43.9	44.2	44.3	44.4
Short Circuit Current-Isc (A)	8.12	8.20	8.28	8.36	8.45
Maximum Power Voltage-Vmpp (V)	36.5	36.6	36.7	36.8	36.9
Maximum Power Current-Impp (A)	7.59	7.67	7.75	7.83	7.92

NMOT: Irradiance at 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s.

RSM144-6-390BMDG
I-V characteristics at different irradiations



I-V characteristics at different temperatures
(AM1.5, 1000W/m²)



MECHANICAL DATA

Solar cells	Monocrystalline, 6" half cell
Cell configuration	144 cells (6×12+6×12)
Module dimensions	2016×998×25mm
Weight	26kg
Superstrate	2.0 mm, ARC Glass
Substrate	2.0 mm, Glazed Glass
Frame	Anodized Aluminium Alloy type 6063T5, Silver Color
J-Box	Potted, IP68, 1500VDC, 3 Schottky bypass diodes
Cables	4.0mm² (12AWG), positive 270mm length, negative 100mm length
Connector	Risen Twinsel PV-SY02, IP68

TEMPERATURE & MAXIMUM RATINGS

Nominal Module Operating Temperature (NMOT)	45°C±2°C
Temperature Coefficient of Voc	-0.29%/°C
Temperature Coefficient of Isc	0.06%/°C
Temperature Coefficient of Pmax	-0.37%/°C
Operational Temperature	-40°C~+85°C
Maximum System Voltage	1500VDC
Max Series Fuse Rating	20A
Limiting Reverse Current	20A

PACKAGING CONFIGURATION

	40ft	20ft
Number of modules per container	880	400
Number of modules per pallet	40	40
Number of pallets per container	22	10
Packaging box dimensions (LxWxH) in mm	2110×1130×1140	2110×1130×1140
Box gross weight[kg]	1100	1100

Our Partners:

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

THE POWER OF RISING VALUE

Jäger Plus

HIGH PERFORMANCE BIFACIAL PERC MONOCRYSTALLINE MODULE

144

RSM144-6-390BMDG-410BMDG

144 CELL Mono PERC Module	**390-410Wp** Power Output Range
1500VDC Maximum System Voltage	**20.2%** Maximum Efficiency

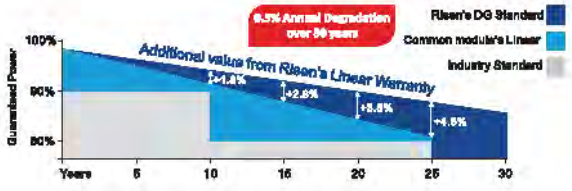
ISO9001
ISO14001
OHSAS18001
IEC TS 62941

KEY SALIENT FEATURES

- Global, Tier 1 bankable brand, with independently certified state-of-the-art automated manufacturing
- Bifacial technology enables additional energy harvesting from rear side (up to 25%)
- Industry leading lowest thermal co-efficient of power
- Industry leading 12 years product warranty
- Excellent low irradiance performance
- Excellent PID resistance
- Positive tight power tolerance
- Dual stage 100% EL Inspection warranting defect-free product
- Module Imp binning radically reduces string mismatch losses
- Warranted reliability and stringent quality assurances well beyond certified requirements
- Certified to withstand severe environmental conditions
  - Anti-reflective & anti-soiling surface minimise power loss from dirt and dust
  - Severe salt mist, ammonia & blown sand resistance, for seaside, farm and desert environments
  - Excellent mechanical load 2400Pa & snow load 5400Pa resistance

LINEAR PERFORMANCE WARRANTY

12 year Product Warranty / 30 year Linear Power Warranty



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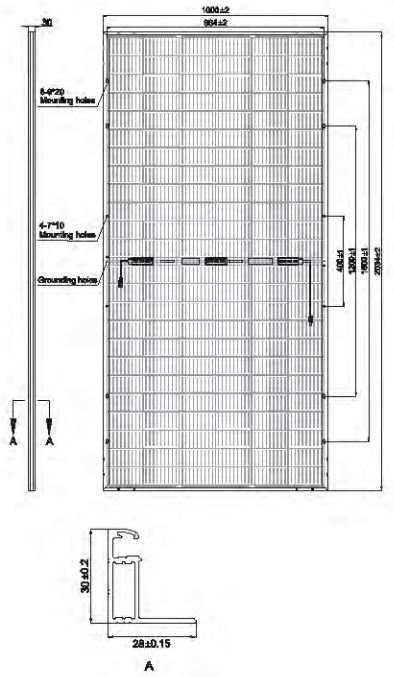
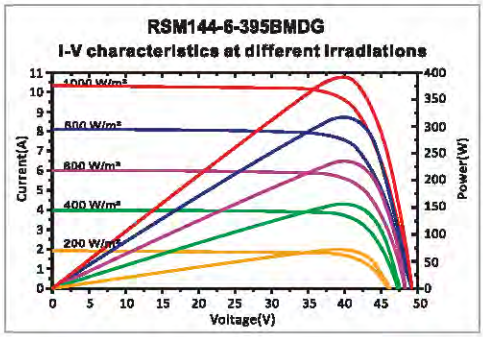
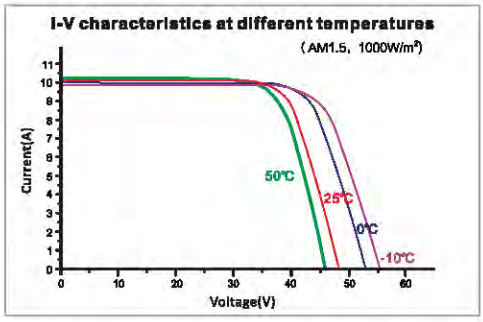
Dimensions of PV Module Unit: mm







Our Partners:

ELECTRICAL DATA (STC)

Model Number	RSM144-6-390BMDG	RSM144-6-395BMDG	RSM144-6-400BMDG	RSM144-6-405BMDG	RSM144-6-410BMDG
Rated Power in Watts-Pmax(Wp)	390	395	400	405	410
Open Circuit Voltage-Voc(V)	48.30	48.45	48.60	48.75	48.90
Short Circuit Current-Isc(A)	10.30	10.40	10.50	10.60	10.70
Maximum Power Voltage-Vmpp(V)	40.25	40.35	40.45	40.55	40.65
Maximum Power Current-Impp(A)	9.70	9.80	9.90	10.00	10.10
Module Efficiency (%)	19.2	19.4	19.7	19.9	20.2

STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5 according to EN 60904-3.
Bifacial factor: 75%±5%

ELECTRICAL DATA (NMOT)

Model Number	RSM144-6-390BMDG	RSM144-6-395BMDG	RSM144-6-400BMDG	RSM144-6-405BMDG	RSM144-6-410BMDG
Maximum Power-Pmax (Wp)	291.8	295.6	299.3	303.1	306.9
Open Circuit Voltage-Voc (V)	44.40	44.60	44.70	44.90	44.99
Short Circuit Current-Isc (A)	8.45	8.53	8.61	8.69	8.77
Maximum Power Voltage-Vmpp (V)	36.90	37.00	37.05	37.14	37.24
Maximum Power Current-Impp (A)	7.92	8.00	8.08	8.16	8.24

NMOT: Irradiance at 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s.

MECHANICAL DATA

Solar cells	Monocrystalline, 9BB
Cell configuration	144 cells (6×12+6×12)
Module dimensions	2034×1000×30mm
Weight	27kg
Superstrate	2.0 mm, High Transmission, Low Iron, Tempered ARC Glass
Substrate	2.0 mm, Tempered Glass
Frame	Anodized Aluminium Alloy type 6063T5, Silver Color
J-Box	Potted, IP68, 1500VDC, 3 Schottky bypass diodes
Cables	4.0mm² (12AWG), Positive(+) 270mm, Negative(-) 100mm
Connector	Risen Twinsel PV-SY02, IP68

TEMPERATURE & MAXIMUM RATINGS

Nominal Module Operating Temperature (NMOT)	45°C±2°C
Temperature Coefficient of Voc	-0.28%/°C
Temperature Coefficient of Isc	0.05%/°C
Temperature Coefficient of Pmax	-0.36%/°C
Operational Temperature	-40°C~+85°C
Maximum System Voltage	1500VDC
Max Series Fuse Rating	20A
Limiting Reverse Current	20A

PACKAGING CONFIGURATION

	40ft
Number of modules per container	770
Number of modules per pallet	35
Number of pallets per container	22
Packaging box dimensions (LxWxH) in mm	2100×1130×1135
Box gross weight[kg]	1000

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

HIGH PERFORMANCE BIFACIAL PERC MONOCRYSTALLINE MODULE

144

RSM144-6-440BMDG-460BMDG

144 CELL
Mono PERC Module

440-460Wp
Power Output Range

1500VDC
Maximum System Voltage

20.6%
Maximum Efficiency

KEY SALIENT FEATURES

- Global, Tier 1 bankable brand, with independently certified state-of-the-art automated manufacturing
- Bifacial technology enables additional energy harvesting from rear side (up to 25%)
- Industry leading lowest thermal co-efficient of power
- Industry leading 12 years product warranty
- Excellent low irradiance performance
- Excellent PID resistance
- Positive tight power tolerance
- Dual stage 100% EL inspection warranting defect-free product
- Module Imp binning radically reduces string mismatch losses
- Warranted reliability and stringent quality assurances well beyond certified requirements
- Certified to withstand severe environmental conditions
  - Anti-reflective & anti-soiling surface minimise power loss from dirt and dust
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  - Excellent mechanical load 2400Pa & snow load 5400Pa resistance

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risen solar technology

Preliminary
For Global Market

LINEAR PERFORMANCE WARRANTY

12 year Product Warranty / 30 year Linear Power Warranty

★ Please check the valid version of Limited Product Warranty which is officially released by Risen Energy Co., Ltd

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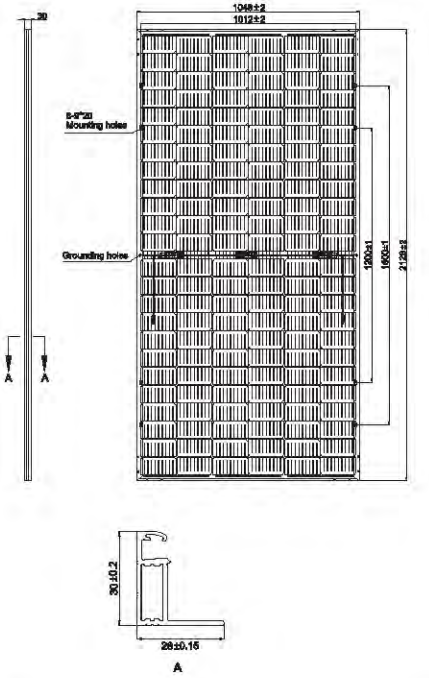
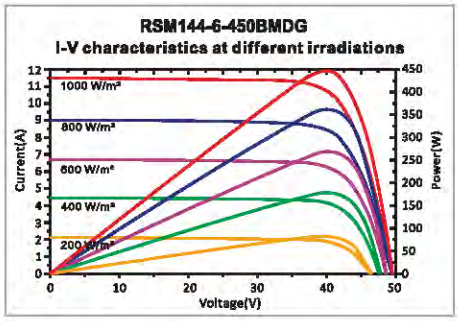
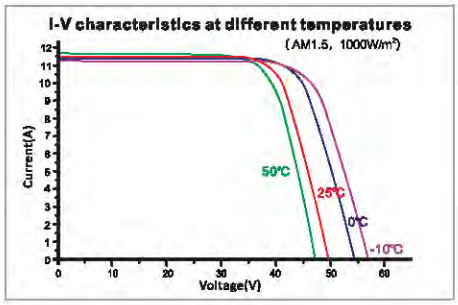
risen
solar technology

Dimensions of PV Module







Our Partners:

ELECTRICAL DATA (STC)

Model Number	RSM144-6-440BMDG	RSM144-6-445BMDG	RSM144-6-450BMDG	RSM144-6-455BMDG	RSM144-6-460BMDG
Rated Power In Watts-Pmax(Wp)	**440**	**445**	**450**	**455**	**460**
Open Circuit Voltage-Voc(V)	49.50	49.60	49.70	49.80	49.90
Short Circuit Current-Isc(A)	11.30	11.40	11.50	11.60	11.70
Maximum Power Voltage-Vmpp(V)	41.13	41.25	41.30	41.40	41.50
Maximum Power Current-Impp(A)	10.70	10.80	10.90	11.00	11.10
Module Efficiency (%) ★	19.7	20.0	20.2	20.4	20.6

STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5 according to EN 60904-3.
Bifacial factor: 75%±5 ★Module Efficiency (%): Round-off to the nearest number

Electrical characteristics with different rear side power gain (reference to **450Wp** front)

Bifacial Gain ★	Pmax/W	Voc/V	Isc/A	Vmpp/V	Impp/A
5%	473	49.70	12.08	41.30	11.45
10%	495	49.70	12.65	41.30	11.99
15%	518	49.70	13.23	41.30	12.54
20%	540	49.70	13.80	41.30	13.08
25%	563	49.70	14.38	41.30	13.63
30%	585	49.70	14.95	41.30	14.17

★Bifacial Gain: The additional gain from the rear side compared to the power of the front side at the standard test condition. It depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

ELECTRICAL DATA (NMOT)

Model Number	RSM144-6-440BMDG	RSM144-6-445BMDG	RSM144-6-450BMDG	RSM144-6-455BMDG	RSM144-6-460BMDG
Maximum Power-Pmax (Wp)	329.6	333.9	338.2	342.5	346.9
Open Circuit Voltage-Voc (V)	46.18	46.36	46.43	46.61	46.67
Short Circuit Current-Isc (A)	9.26	9.35	9.45	9.54	9.64
Maximum Power Voltage-Vmpp (V)	37.80	37.90	38.00	38.10	38.20
Maximum Power Current-Impp (A)	8.72	8.81	8.90	8.99	9.08

NMOT: Irradiance at 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s.

MECHANICAL DATA

Solar cells	Monocrystalline 166×83mm
Cell configuration	144 cells (6×12+6×12)
Module dimensions	2128×1048×30mm
Weight	29.0kg
Superstrate	High Transmission, Low Iron, Tempered ARC Glass
Substrate	Tempered Glass
Frame	Anodized Aluminium Alloy type 6063T5, Silver Color
J-Box	Potted, IP68, 1500VDC, 3 Schottky bypass diodes
Cables	4.0mm² (12AWG), Positive(+) 270mm, Negative(-) 270mm
Connector	Risen Twinsel PV-SY02, IP68

TEMPERATURE & MAXIMUM RATINGS

Nominal Module Operating Temperature (NMOT)	45°C±2°C
Temperature Coefficient of Voc	-0.28%/°C
Temperature Coefficient of Isc	0.05%/°C
Temperature Coefficient of Pmax	-0.36%/°C
Operational Temperature	-40°C~+85°C
Maximum System Voltage	1500VDC
Max Series Fuse Rating	20A
Limiting Reverse Current	20A

PACKAGING CONFIGURATION

	40ft(HQ)
Number of modules per container	700
Number of modules per pallet	35
Number of pallets per container	20
Packaging box dimensions (LxWxH) in mm	2194×1183×1130
Box gross weight[kg]	1100

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

THE POWER OF RISING VALUE

REM144-9MDG-9BB-EN-H2-2-2019-BVC

Draft 150

TITAN

HIGH PERFORMANCE BIFACIAL PERC MONOCRYSTALLINE MODULE

RSM150-8-480BMDG-505BMDG

150 CELL
Mono PERC Module

480-505Wp
Power Output Range

1500VDC
Maximum System Voltage

20.5%
Maximum Efficiency

KEY SALIENT FEATURES

- Global, Tier 1 bankable brand, with independently certified state-of-the-art automated manufacturing
- Bifacial technology enables additional energy harvesting from rear side (up to 30%)
- Industry leading lowest thermal co-efficient of power
- Industry leading 12 years product warranty
- Excellent low irradiance performance
- Excellent PID resistance
- Positive tight power tolerance
- Dual stage 100% EL inspection warranting defect-free product
- Module Imp binning radically reduces string mismatch losses
- Warranted reliability and stringent quality assurances well beyond certified requirements
- Certified to withstand severe environmental conditions
  - Anti-reflective & anti-soiling surface minimise power loss from dirt and dust
  - Severe salt mist, ammonia & blown sand resistance, for seaside, farm and desert environments
  - Excellent mechanical load 2400Pa & snow load 5400Pa resistance

ISO9001
ISO14001
OHSAS18001
IEC TS 62941

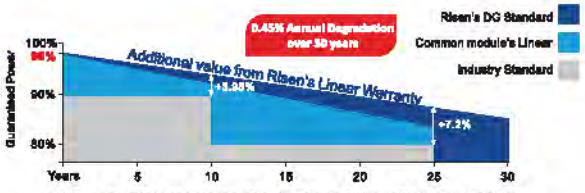
RISEN ENERGY CO., LTD.

Risen Energy is a leading, global tier 1 manufacturer of high-performance solar photovoltaic products and provider of total business solutions for residential, commercial and utility-scale power generation. The company, founded in 1986, and publicly listed in 2010, compels value generation for its chosen global customers. Techno-commercial innovation, underpinned by consummate quality and support, encircle Risen Energy's total Solar PV business solutions which are among the most powerful and cost-effective in the industry. With local market presence and strong financial bankability status, we are committed, and able, to building strategic, mutually beneficial collaborations with our partners, as together we capitalise on the rising value of green energy.

Tashan Industry Zone, Meilin, Ninghai 315609,Ningbo | PRC
Tel: +86-574-59953239 Fax: +86-574-59953599
E-mail: marketing@risenenergy.com Website: www.risenenergy.com

LINEAR PERFORMANCE WARRANTY

12 year Product Warranty / 30 year Linear Power Warranty



★ Please check the valid version of Limited Product Warranty which is officially released by Risen Energy Co., Ltd

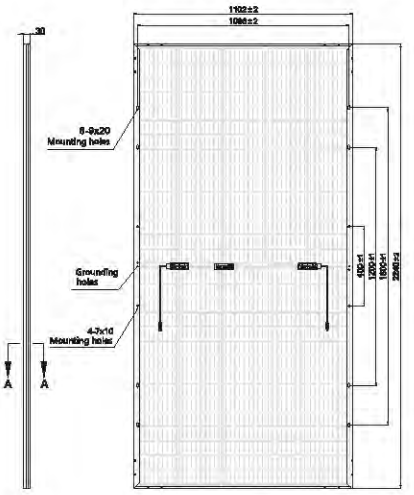
risen solar technology

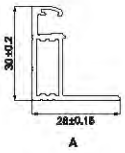
Preliminary
For Global Market

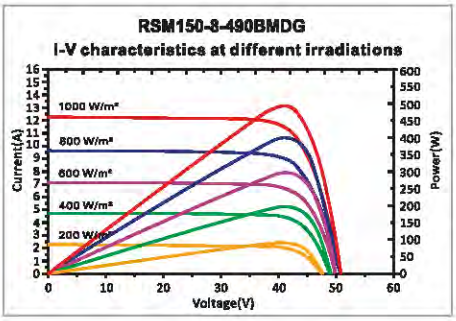
THE POWER OF RISING VALUE

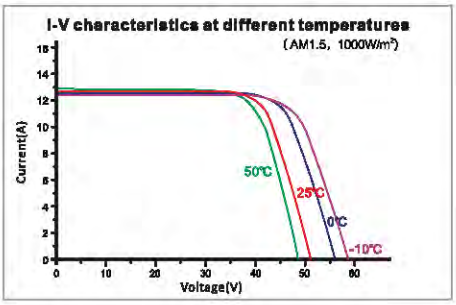
Dimensions of PV Module

Unit: mm









Our Partners:

ELECTRICAL DATA (STC)

Model Number	RSM150-8-480BMDG	RSM150-8-485BMDG	RSM150-8-490BMDG	RSM150-8-495BMDG	RSM150-8-500BMDG	RSM150-8-505BMDG
Rated Power In Watts-Pmax(Wp)	**480**	**485**	**490**	**495**	**500**	**505**
Open Circuit Voltage-Voc(V)	50.13	50.35	50.57	50.79	51.01	51.23
Short Circuit Current-Isc(A)	12.18	12.25	12.32	12.39	12.46	12.53
Maximum Power Voltage-Vmpp(V)	42.00	42.22	42.44	42.66	42.88	43.10
Maximum Power Current-Impp(A)	11.44	11.50	11.56	11.62	11.68	11.74
Module Efficiency (%) ★	19.4	19.6	19.9	20.1	20.3	20.5

STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5 according to EN 60904-3.
Bifacial factor: 70%±5 ★Module Efficiency (%): Round-off to the nearest number

Electrical characteristics with different rear side power gain (reference to **490Wp** front)

Bifacial Gain ★	Pmax/W	Voc/V	Isc/A	Vmpp/V	Impp/A
5%	515	50.57	12.94	42.44	12.14
10%	540	50.57	13.55	42.44	12.72
15%	564	50.57	14.17	42.44	13.29
20%	589	50.57	14.78	42.44	13.87
25%	613	50.57	15.40	42.44	14.45
30%	638	50.57	16.02	42.44	15.03

★Bifacial Gain: The additional gain from the rear side compared to the power of the front side at the standard test condition. It depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

ELECTRICAL DATA (NMOT)

Model Number	RSM150-8-480BMDG	RSM150-8-485BMDG	RSM150-8-490BMDG	RSM150-8-495BMDG	RSM150-8-500BMDG	RSM150-8-505BMDG
Maximum Power-Pmax (Wp)	363.8	367.7	371.5	375.4	379.3	383.2
Open Circuit Voltage-Voc (V)	46.62	46.83	47.03	47.23	47.44	47.64
Short Circuit Current-Isc (A)	9.99	10.05	10.10	10.16	10.22	10.27
Maximum Power Voltage-Vmpp (V)	38.98	39.18	39.38	39.59	39.79	40.00
Maximum Power Current-Impp (A)	9.34	9.38	9.43	9.48	9.53	9.58

NMOT: Irradiance at 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s.

MECHANICAL DATA

Solar cells	Monocrystalline 210×70mm
Cell configuration	150 cells (5×15+5×15)
Module dimensions	2240×1102×30mm
Weight	31.5kg
Superstrate	High Transmission, Low Iron, Tempered ARC Glass
Substrate	Tempered Glass
Frame	Anodized Aluminium Alloy type 6063T5, Silver Color
J-Box	Potted, IP68, 1500VDC, 3 Schottky bypass diodes
Cables	4.0mm² (12AWG), Positive(+) 270mm, Negative(-) 270mm
Connector	Risen Twinsel PV-SY02, IP68

TEMPERATURE & MAXIMUM RATINGS

Nominal Module Operating Temperature (NMOT)	44°C±2°C
Temperature Coefficient of Voc	-0.27%/°C
Temperature Coefficient of Isc	0.04%/°C
Temperature Coefficient of Pmax	-0.35%/°C
Operational Temperature	-40°C~+85°C
Maximum System Voltage	1500VDC
Max Series Fuse Rating	25A
Limiting Reverse Current	25A

PACKAGING CONFIGURATION

	40ft(HQ)
Number of modules per container	700
Number of modules per pallet	35
Number of pallets per container	20
Packaging box dimensions (LxWxH) in mm	2305×1130×1245
Box gross weight[kg]	1160

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

THE POWER OF RISING VALUE

REM150-8MDG-9BB-EN-H1-4-2020

Exhibit B
Manufacturer Specifications

Attachment A
Modules

4. Talesun

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
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wvorys@dickinsonwright.com

Attorneys for Madison Fields Solar Project, LLC

HIPRO PERC mono
TP672M / TP672M(H)
375 / 380 / 385/ 390 / 395 / 400 W

High Efficiency PERC Monocrystalline Solar Module

72-Cell Series

KEY FEATURES

Maximize limited space
PERC cell technology, maximum power output 400W

Excellent low light performance
Advanced surface texturing·Back surface field

Excellent Anti-PID performance
2 times of industry standard Anti-PID test by TUV SUD

Highly reliable due to stringent quality control
In-house testing goes well beyond certification requirements

Certified to withstand the most challenging environmental conditions
2400 Pa wind load·5400 Pa snow load·25 mm hail stones at 82 km/h

IP68 Junction box
The highest waterproof level

Lower temperature coefficients
Enhance power generation

SYSTEM & PRODUCT CERTIFICATES

- IEC 61215 / IEC 61730 / UL 1703
- ISO 9001 : 2015 Quality Management System
- ISO 14001 : 2015 Environment Mangement System
- ISO 45001 : 2018 Occupational Health and Safety Management Systems

QUALITY WARRANTY

TALESUN guarantees that defects will not appear in materials and workmanship defined by IEC61215, IEC61730 or UL1703 under normal installation, use and maintenance as specified in Talesun' s installation manual for 10 years from the warranty starting date.

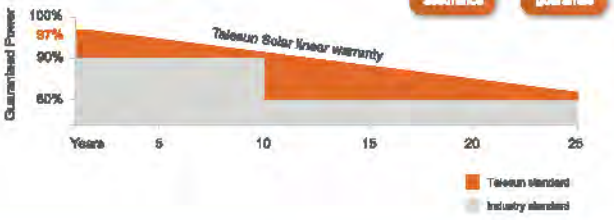
PowerGuard SPECIALTY INSURANCE SERVICES PICC 永诚保险 ALLTRUST INSURANCE

PERFORMANCE WARRANTY

Monocrystalline Solar Module

10 years Quality assurance

25 years Power output guarantee



ABOUT TALESUN SOLAR

TALESUN Solar is one of the world's largest integrated clean energy providers with 4 GW cell and 5 GW module production capacity globally. Its standard and high-efficiency product offerings are among the most powerful and cost-effective in the industry. Talesun Solar is committed to provide customers with customized; systematized and trustworthy turnkey solutions.

TALESUN

Website:www.talesun.com
Tel:+ 86 400 885 1088
Add:No.1 Talesun Road, Shajiabang, Changzhou, P.R. China

ELECTRICAL PARAMETERS

Performance at STC (Power Tolerance 0 ~ +3%)

Maximum Power(Pmax/W)	375	380	385	390	395	400
Operating Voltage(Vmpp/V)	39.3	39.6	39.8	40.0	40.3	40.5
Operating Current(Impp/A)	9.55	9.60	9.68	9.75	9.81	9.88
Open-Circuit Voltage(Voc/V)	48.0	48.3	48.5	48.7	49.0	49.2
Short-Circuit Current(Isc/A)	10.15	10.20	10.28	10.35	10.41	10.48
Module Efficiency ηm(%)	18.9	19.2	19.4	19.7	19.9	20.2

Performance at NMOT

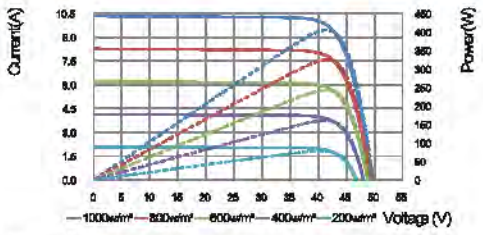
Maximum Power(Pmax/W)	280	283.8	287.4	290.9	294.8	298.4
Operating Voltage(Vmpp/V)	36.5	36.8	36.9	37.1	37.4	37.6
Operating Current(Impp/A)	7.67	7.71	7.78	7.83	7.88	7.94
Open-Circuit Voltage(Voc/V)	44.7	45.0	45.2	45.4	45.6	45.8
Short-Circuit Current(Isc/A)	8.19	8.23	8.3	8.35	8.4	8.46

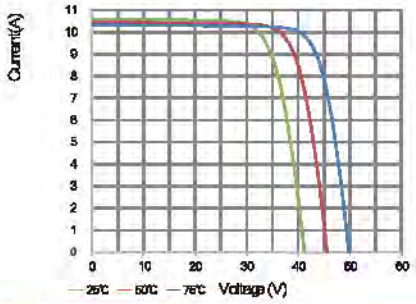
STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5 NMOT: Irradiance at 800W/m², Ambient Temperature 20°C, Air Mass AM1.5, Wind Speed 1m/s

MECHANICAL SPECIFICATION

Cell Type	Mono-Crystalline Silicon (5Busbar)
Cell Dimensions	158.75*158.75mm(6inches)
Cell Arrangement	72(6*12)
Weight	22.5kg(49.60lbs)
Module Dimensions	1979*1002*35mm (77.91*39.45*1.38inches)
Cable Length	1200mm(47.24inches)
Cable Cross Section Size	4mm²(0.006inches²)
Front Glass	3.2mm High Transmission, Tempered Glass
No.of Bypass Diodes	3/6
Packing Configuration (1)	30pcs/Pallet,660pcs/40hq
Packing Configuration (2)	30pcs+5pcs/Pallet,715pcs/40hq
Frame	Anodized Aluminium Alloy
Junction Box	IP68

I-V CURVE





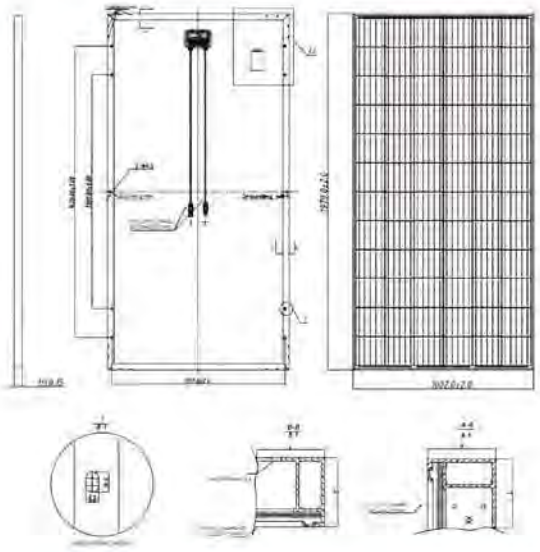
OPERATING CONDITIONS

Maximum System Voltage	1000V/DC(IEC)/1500V/DC(IEC)
Operating Temp	-40°C~+85°C
Maximum Series Fuse	20A
Static Loading	5400Pa
Conductivity at Ground	≤ 0.1Ω
Safety Class	II
Resistance	≥100MΩ
Connector	MC4 Compatible

TEMPERATURE COEFFICIENT

Temperature Coefficient Pmax	-0.39%/°C
Temperature Coefficient Voc	-0.30%/°C
Temperature Coefficient Isc	+0.05%/°C
NMOT	43±2°C

TECHNICAL DRAWINGS



TALESUN

Exhibit B
Manufacturer Specifications

Attachment A
Modules

5. Trina

Respectfully submitted,

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cpirik@dickinsonwright.com
wvorys@dickinsonwright.com

Attorneys for Madison Fields Solar Project, LLC

Preliminary

THE DUOMAX

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCTS	POWER RANGE
TSM-DEG18MC.20(II)	485-505W

500W+
MAXIMUM POWER OUTPUT

21.0%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716/UL1703
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
OHSAS18001: Occupation Health and Safety Management System

High power

- Up to 505W front power and 21.0% module efficiency with harmless cutting and MBB (Multi Busbar) technology
- Better light trapping effect and stronger current collection with lower series resistance of MBB ensure high power

High reliability

- Ensured PID resistance through cell process and module material control
- Resistant to salt, acid and ammonia
- Proven to be reliable in high temperature and humidity areas
- Certificated to fire class A
- Minimizes micro-crack and snail trails
- Mechanical performance: Up to 5400 Pa positive load and 2400 Pa negative load

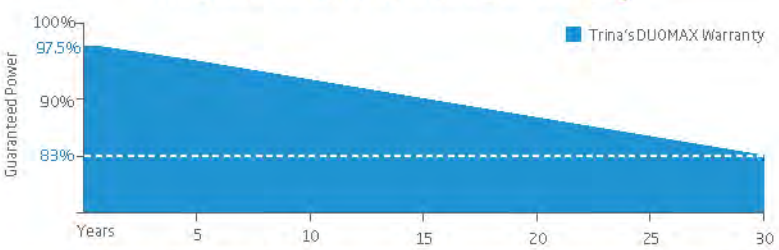
High energy generation

- Up to 25% additional power gain from back side depending on the albedo ;
- Excellent IAM and low light performance validated by 3rd party with cell process and module material optimization
- Lower temp coefficient (-0.35%) and NMOT bring more energy leading to lower LCOE
- Better anti-shading performance and lower operating temperature

High Customer value

- Frame design makes module compatible with all racking and installation methods
- Easy to handle and install as normal framed module during transportation
- High power and module Efficiency bring more BOS savings

Trina Solar's DUOMAX Performance Warranty

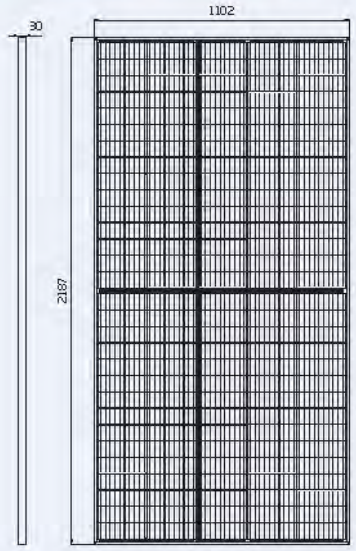


From the 2nd year to the 30th year, the average annual power decline will be no more than 0.5%.

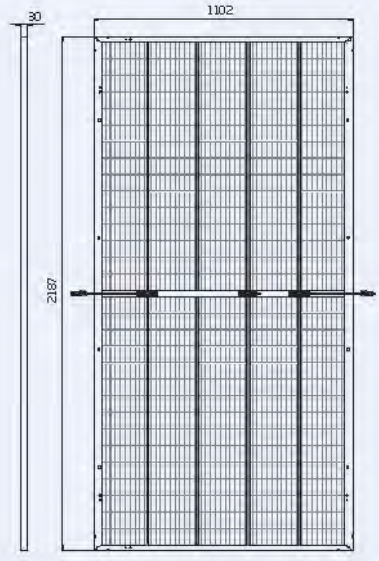
DUOMAX

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

DIMENSIONS OF PV MODULE(mm)

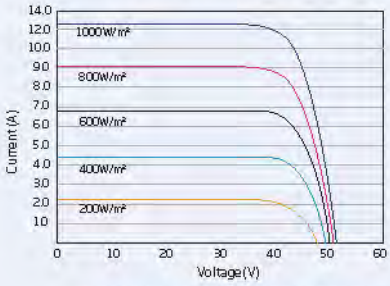


Front View

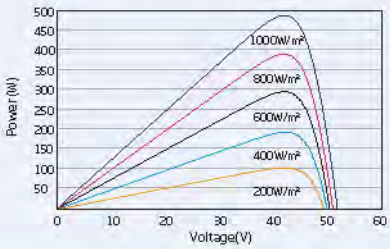


Back View

I-V CURVES OF PV MODULE(490 W)



P-V CURVES OF PV MODULE(490W)



ELECTRICAL DATA (STC)

Peak Power Watts-P_{MAX} (Wp)*	485	490	495	500	505
Power Output Tolerance-P_{MAX} (W)	0 ~ +5				
Maximum Power Voltage-V_{MPP} (V)	42.5	42.8	43.1	43.4	43.7
Maximum Power Current-I_{MPP} (A)	11.42	11.45	11.49	11.53	11.56
Open Circuit Voltage-V_{OC} (V)	50.9	51.1	51.3	51.5	51.7
Short Circuit Current-Isc (A)	12.01	12.05	12.09	12.13	12.17
Module Efficiency η_m (%)	20.1	20.3	20.5	20.7	21.0

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5.
*Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

Total Equivalent power -P_{MAX} (Wp)	519	524	530	535	540
Maximum Power Voltage-V_{MPP} (V)	42.5	42.8	43.1	43.4	43.7
Maximum Power Current-I_{MPP} (A)	12.22	12.24	12.29	12.34	12.37
Open Circuit Voltage-V_{OC} (V)	50.9	51.1	51.3	51.5	51.7
Short Circuit Current-Isc (A)	12.85	12.89	12.94	12.98	13.02
Irradiance ratio (rear/front)	10%				

ELECTRICAL DATA (NMOT)

Maximum Power-P_{MAX} (Wp)	367	371	374	378	382
Maximum Power Voltage-V_{MPP} (V)	40.0	40.2	40.5	40.8	41.0
Maximum Power Current-I_{MPP} (A)	9.18	9.21	9.25	9.28	9.33
Open Circuit Voltage-V_{OC} (V)	48.1	48.3	48.5	48.7	48.8
Short Circuit Current-Isc (A)	9.67	9.70	9.73	9.77	9.80

NMOT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	150 cells
Module Dimensions	2187×1102×30 mm (86.10×43.39×1.18 inches)
Weight	30.7 kg (67.7 lb)
Front Glass	2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	30mm (1.18 inches) Anodized Aluminium Alloy
J-Box	IP68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), Portrait: 280/280 mm (11.02/11.02 inches) Landscape: 2050/2050 mm (80.71/80.71 inches)
Connector	MC4 / TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NMOT (Nominal Moudule Operating Temperature)	41°C (±3°C)
Temperature Coefficient of P_{MAX}	- 0.35%/°C
Temperature Coefficient of V_{OC}	- 0.25%/°C
Temperature Coefficient of Isc	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	20A

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

12 year Product Workmanship Warranty

30 year Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per 40' container: 700 pieces

Trinasolar

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

Preliminary

THE

TALLMAX

FRAMED 150 LAYOUT MODULE

150 LAYOUT
MONOCRYSTALLINE MODULE

480-505W
POWER OUTPUT RANGE

21.1%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

PRODUCTS	POWER RANGE
TSM-DE18M(II)	480-505W

High power

- Up to 505W front power and 21.1% module efficiency with half-cut and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of half-cut and good reflection effect of MBB ensure high power

High reliability

- Ensured PID resistance through cell process and module material control
- Resistant to salt, acid and ammonia
- Mechanical performance: Up to 5400 Pa positive load and 2400 Pa negative load

High energy generation

- Excellent IAM and low light performance validated by 3rd party with cell process and module material optimization
- Lower temp coefficient (-0.36%) and NMOT bring more energy leading to lower LCOE
- Better anti-shading performance and lower operating temperature

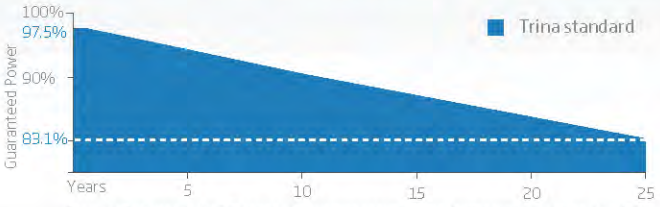
Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
OHSAS 18001: Occupation Health and Safety Management System

PERFORMANCE WARRANTY

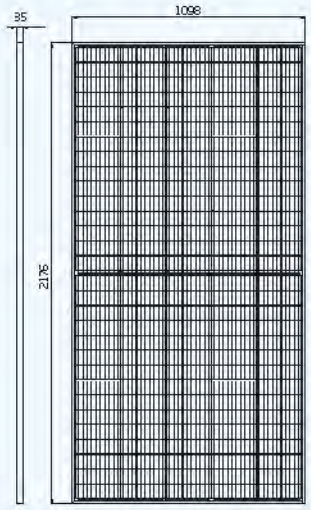
10 Year Product Warranty · 25 Year Power Warranty



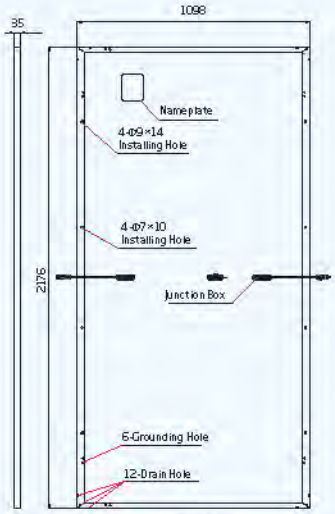
From the 2nd year to the 25th year, the average annual power decline will be no more than 0.6%.

Trinasolar

DIMENSIONS OF PV MODULE(mm)

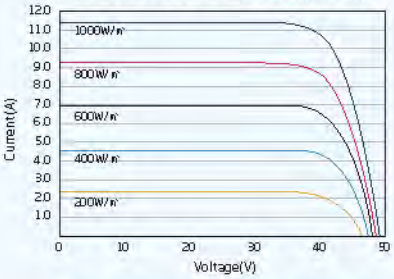


Front View

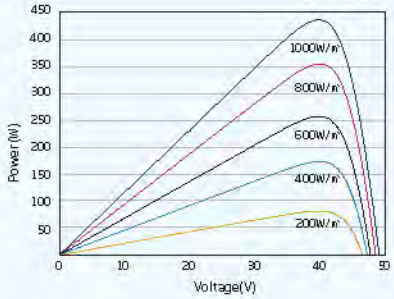


Back View

I-V CURVES OF PV MODULE(440W)



P-V CURVES OF PV MODULE(440W)



ELECTRICAL DATA (STC)

Peak Power Watts-PMAX (Wp)*	480	485	490	495	500	505
Power Output Tolerance-PMAX (W)	0 ~ +5					
Maximum Power Voltage-VMPP (V)	42.0	42.2	42.4	42.6	42.8	43.0
Maximum Power Current-IMPP (A)	11.42	11.49	11.56	11.63	11.69	11.75
Open Circuit Voltage-Voc (V)	50.8	51.1	51.3	51.5	51.7	51.9
Short Circuit Current-Isc (A)	11.99	12.07	12.14	12.21	12.28	12.35
Module Efficiency η m (%)	20.1	20.3	20.5	20.7	20.9	21.1

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5.
*Measuring tolerance: ±3%.

ELECTRICAL DATA (NMOT)

Maximum Power-PMAX (Wp)	363	367	371	375	379	382
Maximum Power Voltage-VMPP (V)	39.6	39.8	40.0	40.2	40.4	40.6
Maximum Power Current-IMPP (A)	9.15	9.20	9.26	9.32	9.37	9.43
Open Circuit Voltage-Voc (V)	48.0	48.2	48.4	48.6	48.8	49.0
Short Circuit Current-Isc (A)	9.65	9.72	9.77	9.83	9.89	9.94

NMOT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	150 cells (5 × 30)
Module Dimensions	2176 ×1098× 35 mm (85.67 × 43.23 × 1.38 inches)
Weight	27.0 kg (59.5 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	White
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), Portrait: N 280mm/P 280mm(11.02/11.02inches) Landscape: N 1400 mm /P 1400 mm (55.12/55.12 inches)
Connector	TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NMOT (Nominal Module Operating Temperature)	41℃ (±3℃)
Temperature Coefficient of PMAX	- 0.36%/℃
Temperature Coefficient of Voc	- 0.26%/℃
Temperature Coefficient of Isc	0.04%/℃

MAXIMUMRATINGS

Operational Temperature	-40~+85℃
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	20A

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

10 year Product Workmanship Warranty

25 year Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGUREATION

Modules per box: 30 pieces

Modules per 40' container: 600 pieces

Trinasolar

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

THE TALLMAX™

FRAMED 144 HALF-CELL MULTI-BUSBAR MODULE

PRODUCTS	COLOR OF FRAME	POWER RANGE
TSM-DE15M(II)	Silver	390-415W

144-Cell
MONOCRYSTALLINE MODULE

390-415W
POWER OUTPUT RANGE

20.4%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

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Comprehensive Products and System Certificates

IEC61215/IEC61730/UL1703/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
OHSAS 18001: Occupation Health and Safety Management System

Trinasolar

High power output

- Reduce BOS cost with high power bin and 1500V system voltage
- New cell string layout and split J-box location reduces the energy loss caused by inter-row shading
- Lower resistance of half-cut cells and increased MBB (Multi Busbar) reflectance ensure higher power

High energy generation, low LCOE

- Excellent 3rd party validated IAM and low light performance with cell process and module material optimization
- Low P_{max} temp coefficient (-0.36%) increases energy production
- Better anti-shading performance and lower operating temperature

Certified to perform in highly challenging environments

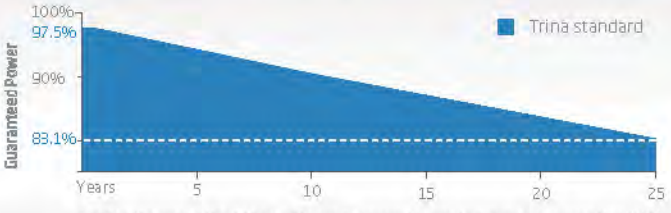
- High PID resistance through cell process and module material control
- Resistant to salt, acid, sand, and ammonia
- Certified to 5400 Pa positive load and 2400 Pa negative load

Easy to install, wide application

- Frame design enables compatibility with standard installation methods
- Deployable for ground mounted and rooftop projects
- Safe and easy to transport, handle, and install

PERFORMANCE WARRANTY

10 Year Product Warranty · 25 Year Power Warranty

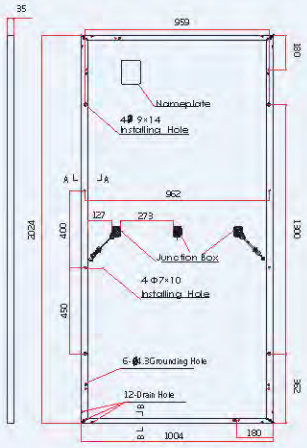


From the 2nd year to the 25th year, the average annual power decline will be no more than 0.6%.

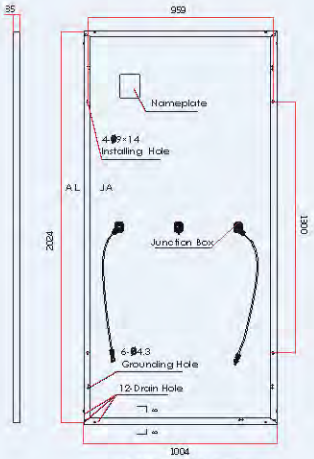
TALLMAX™

FRAMED144 HALF-CELL MULTI -BUSBAR MODULE

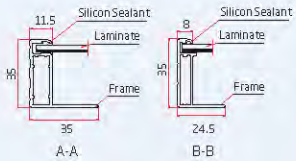
DIMENSIONS OF PV MODULE(mm)



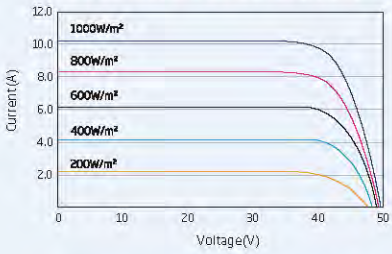
Back View(Portrait)



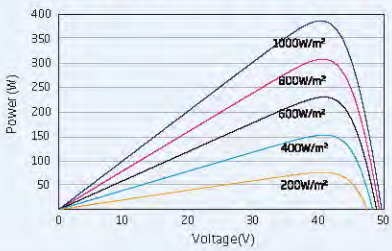
Back View(Landscape)



I-V CURVES OF PV MODULE (390W)



P-V CURVES OF PV MODULE (390W)



ELECTRICAL DATA (STC)

Peak Power Watts-P_{MAX} (Wp)*	390	395	400	405	410	415
Power Output Tolerance-P_{MAX} (W)			0 ~ +5			
Maximum Power Voltage-V_{MPP} (V)	40.0	40.1	40.3	40.5	40.7	40.9
Maximum Power Current-I_{MPP} (A)	9.75	9.86	9.92	10.0	10.07	10.15
Open Circuit Voltage-V_{OC} (V)	48.5	48.7	49.0	49.2	49.4	49.6
Short Circuit Current-I_{SC} (A)	10.30	10.37	10.45	10.52	10.59	10.66
Module E°ciency η_m (%)	19.2	19.4	19.7	19.9	20.2	20.4

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5.
*Measurement tolerance: ±3%.

ELECTRICAL DATA (NMOT)

Maximum Power-P_{MAX} (Wp)	295	299	302	306	310	314
Maximum Power Voltage-V_{MPP} (V)	37.6	37.8	38.0	38.2	38.4	38.6
Maximum Power Current-I_{MPP} (A)	7.84	7.90	7.95	8.01	8.07	8.13
Open Circuit Voltage-V_{OC} (V)	45.7	45.9	46.2	46.4	46.6	46.8
Short Circuit Current-I_{SC} (A)	8.30	8.35	8.42	8.47	8.53	8.58

NMOT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	144 cells (6 × 24)
Module Dimensions	2024 × 1004 × 35 mm (79.69 × 39.53 × 1.38 inches)
Weight	22.8kg (50.3lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	White
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²) Portrait: N 140mm/P 285mm (5.51/11.22 inches) Landscape: N 1400 mm /P 1400 mm (55.12/55.12 inches)
Connector	Trina TS4

TEMPERATURE RATINGS

NMOT(Nominal Module Operating Temperature)	41°C (±3°C)
Temperature Coefficient of P_{MAX}	- 0.36%/°C
Temperature Coefficient of V_{OC}	- 0.26%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	20A

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

10 year Product Workmanship Warranty

25 year Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 30 pieces

Modules per 40' container: 660 pieces

Trinasolar

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

Version number: TSM_DE15M(II)_EN_2019_C

www.trinasolar.com

Exhibit B
Manufacturer Specifications

Attachment B
Inverters

1. **Ingeteam**
2. **SMA**
3. **Sungrow**
4. **TMEIC**

Respectfully submitted,

/s/ Christine M.T. Pirik

Christine M.T. Pirik (0029759)
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Attorneys for Madison Fields Solar Project, LLC

Exhibit B
Manufacturer Specifications

Attachment B
Inverters

1. Ingeteam

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Attorneys for Madison Fields Solar Project, LLC

INGECON SUN

InverterStation U
1,500 Vdc

MV Solution up to 5400 kVA at 1500 Vdc

MEDIUM VOLTAGE INVERTER STATION, CUSTOMIZED UP TO 5.4 MVA

This brand new medium voltage solution integrates all the devices required for a multi-megawatt system.

Maximize your investment with a minimal effort

Ingeteam's Inverter Station is a compact, customizable and flexible solution that can be configured to suit each customer's requirements. It is supplied together with up to three photovoltaic inverters (one dual plus one single inverter). All the equipment is suitable for outdoor installation, so there is no need of any kind of housing.

Higher adaptability and power density

This PowerStation is now more versatile, as it presents a pad-mounted integrating the HV switching and fuse protection. Moreover, it features the greatest power density on the market: 5.2 W/in³.

Plug & Play technology

This MV solution integrates power conversion equipment –up to 5.4 MVA- and a liquid-filled pad-mounted transformer up to 35 kV. The Inverter Station has been conceived for a fast on-site connection with up to three PV inverters from Ingeteam's B Series central inverter family.

Complete accessibility

Thanks to the lack of housing, the inverters, the switchgear and the transformer can have immediate access. Furthermore, the design of the B Series central inverters has been conceived to facilitate maintenance and repair works.

Maximum protection

Ingeteam's B Series central inverters integrate the latest generation electronics and a much more efficient electronic protection. Apart from that, they feature the main electrical protections and they deploy grid support functionalities, such as low voltage ride-through capability, reactive power deliverance and active power injection control.

Furthermore, the electrical connection between the inverters and the transformer is fully protected from direct contact.

www.ingeteam.com
solar.us@ingeteam.com

Ingeteam

Medium voltage inverter station, customized up to 5.4 MVA

CONSTRUCTION

- Suitable for slab mounting.
- Compact design, minimizing freight costs.

TRANSFORMER FUNCTIONS

- Standard temperature and altitude service conditions as per ANSI IEE C57.12.00.
- Dead Front Loop Feed arrangement.
- Reduced power losses: high efficiencies rated at 50% load.
- Electrostatic shield, reducing disturbances, distorsions and overvoltages.
- Drain valve with sampling device.
- Upper fill valve.
- Liquid level and pressure vacuum gauges with auxiliary contacts.
- Dial type thermometer gauge with auxiliary contacts.
- T-blade switch rated 200 A for loop configuration.
- Dead front HV bushings rated 200 A.

STANDARD EQUIPMENT

- Up to three inverters with an output power of 5.4 MVA.
- Liquid-filled pad-mounted MV transformer up to 35 kV class (ask Ingeteam for transformer details).
- On-site commissioning and training.
- Remote communications.
- Minimum site installation with close-coupled AC flex copper busbars.
- Auxiliary Services Transformer.
- Auxiliary Services Panel.

	SKL - Single Inverter	SKL - Dual Inverter	SKL - Dual + Single Inverter
Number of inverters	1	2	3
Rated power @ 122 °F / 50 °C	1,613 kVA	3,226 kVA	4,840 kVA
Max. power @ 86 °F / 30 °C	1,793 kVA	3,586 kVA	5,379 kVA
Voltage class	12 - 35 kV	12 - 35 kV	12 - 35 kV
Maximum altitude(1)	14,750 ft / 4,500 m	14,750 ft / 4,500 m	14,750 ft / 4,500 m
Operating temperature range	-4 °F to +131 °F / -20 °C to +55 °C	-4 °F to +131 °F / -20 °C to +55 °C	-4 °F to +131 °F / -20 °C to +55 °C
Protection class	NEMA 3R	NEMA 3R	NEMA 3R
Dimensions without MV transformer	13.13 ft / 4,003 mm	22.39 ft / 6,823 mm	22.39 ft / 6,823 mm

Notes: (1) For installations beyond 3,300 ft / 1,000 m, please contact Ingeteam's solar sales department.

Configuration (Dual Inverter solution)

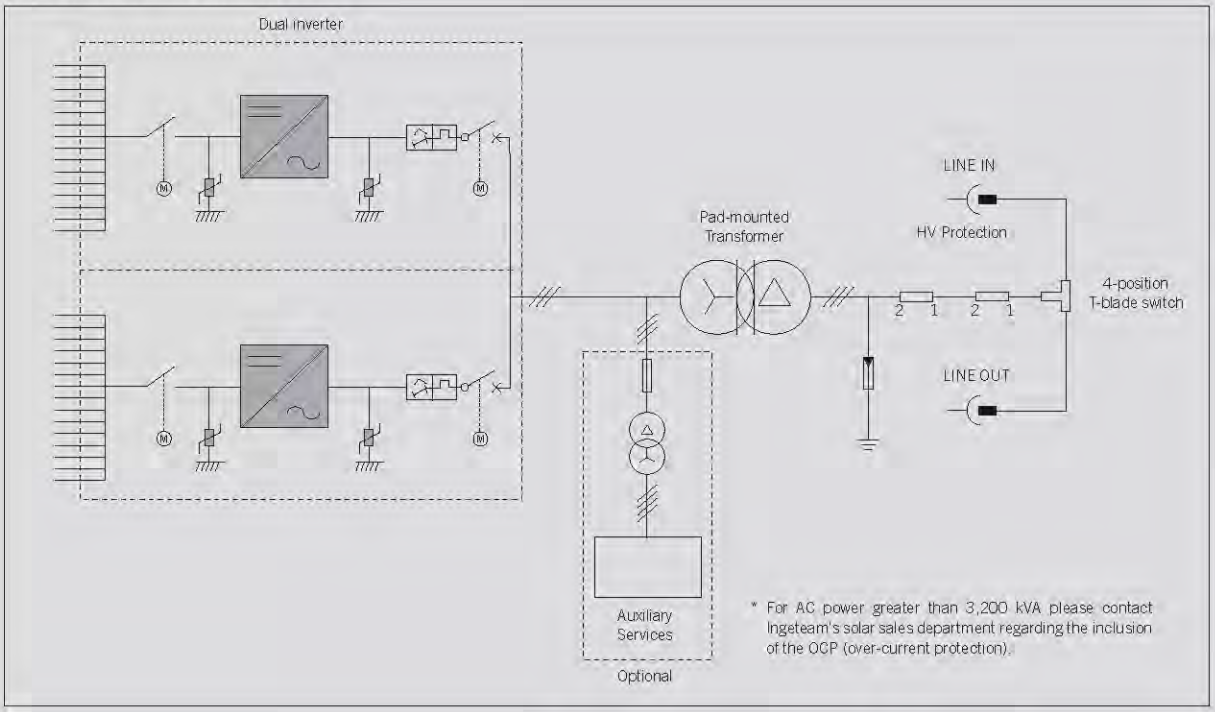

Exhibit B
Manufacturer Specifications

Attachment B
Inverters

2. SMA

Respectfully submitted,

/s/ Christine M.T. Pirik

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Attorneys for Madison Fields Solar Project, LLC

PRELIMINARY SUNNY CENTRAL
4000 UP-US / 4200 UP-US / 4400 UP-US / 4600 UP-US

Efficient
- Up to 4 inverters can be transported in one standard shipping container
- Overdimensioning up to 150% is possible
- Full power at ambient temperatures of up to 25 °C

Robust
- Intelligent air cooling system OptiCool for efficient cooling
- Suitable for outdoor use in all climatic ambient conditions worldwide

Flexible
- Conforms to all known grid requirements worldwide
- Q on demand
- Available as a single device or turn-key solution, including medium-voltage block

Easy to Use
- Improved DC connection area
- Connection area for customer equipment
- Integrated voltage support for internal and external loads

SUNNY CENTRAL
4000 UP-US / 4200 UP-US / 4400 UP-US / 4600 UP-US

The new Sunny Central: more power per cubic meter

With an output of up to 4600 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV power plants. A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.

SUNNY CENTRAL 4000 UP-US / 4200 UP-US

Technical data*	SC 4000 UP-US	SC 4200 UP-US
Input (DC)		
MPP voltage range V_{DC} (at 25 °C / at 50 °C)	880 to 1350 V / 1100 V	921 to 1350 V / 1100 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	849 V / 1030 V	891 V / 1071 V
Max. input voltage $V_{DC, max}$	1500 V	1500 V
Max. input current $I_{DC, max}$	4750 A	4750 A
Max. short-circuit current $I_{DC, sc}$	6400 A	6400 A
Number of DC inputs	24 double pole fused (32 single pole fused)	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	
Integrated zone monitoring	O	
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Output (AC)		
Nominal AC power at cos φ =1 (at 25°C / at 50°C)	4000 kVA / 3400 kVA	4200 kVA / 3570 kVA
Nominal AC power at cos φ =0.8 (at 25°C / at 50°C)	3200 kW / 2720 kW	3360 kW / 2856 kW
Nominal AC current $I_{AC, nom}$ (at 25°C / at 50°C)	3850 A / 3273 A	3850 A / 3273 A
Max. total harmonic distortion	< 3% at nominal power	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range[1] [8]	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals[9]	> 2	
Power factor at rated power / displacement power factor adjustable[8] [10]	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency[2] / European efficiency[2] / CEC efficiency[3]	98.7%* / 98.6%* / 98.5%*	98.7%* / 98.6%* / 98.5%*
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	O / O	
Insulation monitoring	O	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	
Weight	< 4000 kg / < 8818.5 lb	
Self-consumption (max.[4] / partial load[5] / average[6])	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	O Integrated 8.4 kVA transformer	
Operating temperature range[8]	–25 °C to 60 °C / –13 °F to 140 °F	
Noise emission[7]	67.0 dB(A)*	
Temperature range (standby)	–40 °C to 60 °C / –40 °F to 140 °F	
Temperature range (storage)	–40 °C to 70 °C / –40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL[8] 1000 m / 2000 m / 3000 m	● / O / O (earlier temperature-dependent derating)	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	O (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 6I), UL 1741-SA, UL 1998, IEEE 1547, MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	

● Standard features O Optional * preliminary

1) At nominal AC voltage, nominal AC power decreases in the same proportion
2) Efficiency measured without internal power supply
3) Efficiency measured with internal power supply
4) Self-consumption at rated operation
5) Self-consumption at < 75% Pn at 25°C
6) Self-consumption averaged out from 5% to 100% Pn at 25°C
7) Sound pressure level at a distance of 10 m
8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.
9) A short-circuit ratio of < 2 requires a special approval from SMA
10) Depending on the DC voltage

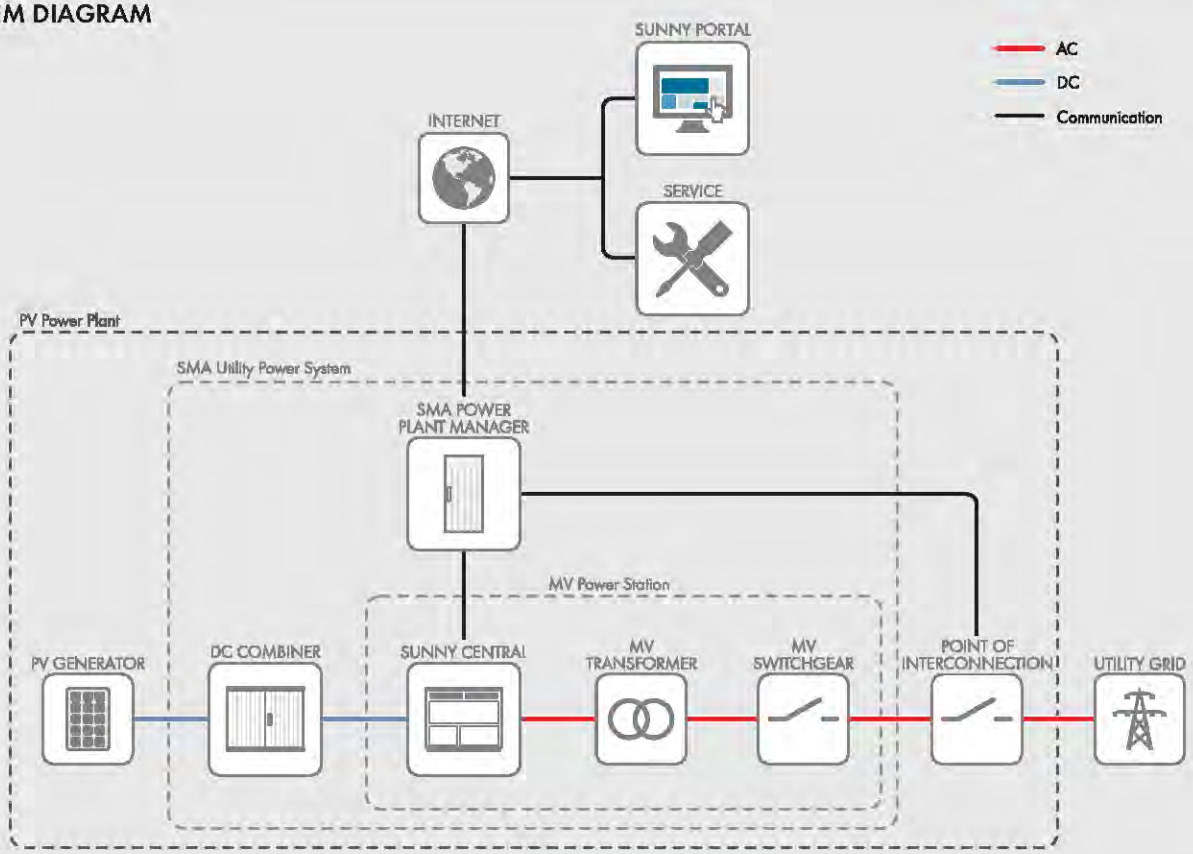
SUNNY CENTRAL 4400 UP-US / 4600 UP-US

Technical data*	SC 4400 UP-US	SC 4600 UP-US
Input (DC)		
MPP voltage range V_{DC} (at 25 °C / at 50 °C)	962 to 1350 V / 1100 V	1003 to 1350 V / 1100 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	934 V / 1112 V	976 V / 1153 V
Max. input voltage $V_{DC, max}$	1500 V	1500 V
Max. input current $I_{DC, max}$	4750 A	4750 A
Max. short-circuit current $I_{DC, sc}$	6400 A	6400 A
Number of DC inputs	24 double pole fused (32 single pole fused)	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	
Integrated zone monitoring	O	
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Output (AC)		
Nominal AC power at cos φ =1 (at 25°C / at 50°C)	4400 kVA / 3740 kVA	4600 kVA / 3910 kVA
Nominal AC power at cos φ =0.8 (at 25°C / at 50°C)	3520 kW / 2992 kW	3680 kW / 3128 kW
Nominal AC current $I_{AC, nom}$ (at 25°C / at 50°C)	3850 A / 3273 A	3850 A / 3273 A
Max. total harmonic distortion	< 3% at nominal power	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range[1] [8]	660 V / 528 V to 759 V	690 V / 552 V to 759 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals[9]	> 2	
Power factor at rated power / displacement power factor adjustable[8] [10]	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency[2] / European efficiency[2] / CEC efficiency[3]	98.7%* / 98.6%* / 98.5%*	98.7%* / 98.6%* / 98.5%*
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	O / O	
Insulation monitoring	O	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	
Weight	< 4000 kg / < 8818.5 lb	
Self-consumption (max.[4] / partial load[5] / average[6])	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	O Integrated 8.4 kVA transformer	
Operating temperature range[8]	−25 °C to 60 °C / −13 °F to 140 °F	
Noise emission[7]	67.0 dB(A)*	
Temperature range (standby)	−40 °C to 60 °C / −40 °F to 140 °F	
Temperature range (storage)	−40 °C to 70 °C / −40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL[8] 1000 m / 2000 m / 3000 m	● / O / O (earlier temperature-dependent derating)	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	O (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 61), UL 1741-SA, UL 1998 IEEE 1547, MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	

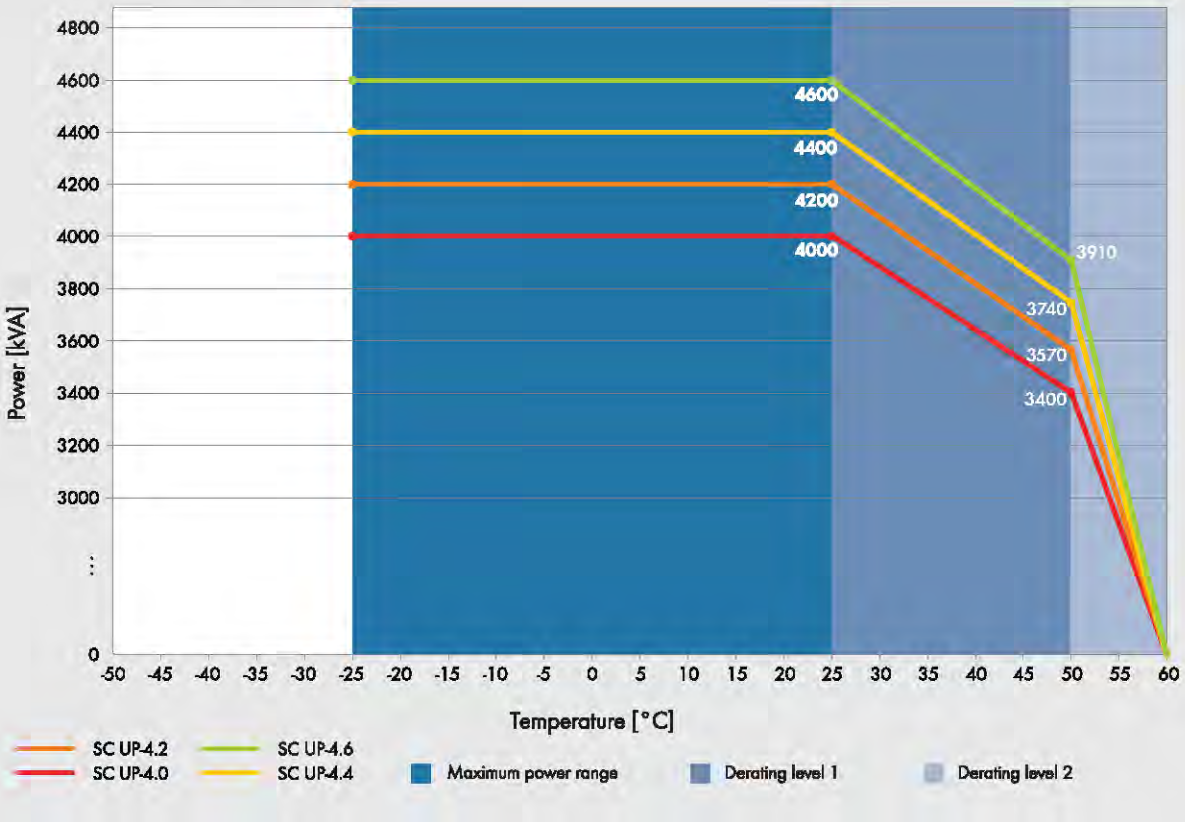
● Standard features O Optional * preliminary

1) At nominal AC voltage, nominal AC power decreases in the same proportion
2) Efficiency measured without internal power supply
3) Efficiency measured with internal power supply
4) Self-consumption at rated operation
5) Self-consumption at < 75% Pn at 25 °C
6) Self-consumption averaged out from 5% to 100% Pn at 25 °C
7) Sound pressure level at a distance of 10 m
8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.
9) A short-circuit ratio of < 2 requires a special approval from SMA
10) Depending on the DC voltage

SYSTEM DIAGRAM



TEMPERATURE BEHAVIOR (at 1000 m)



Toll Free +1 888 4 SMA USA
www.SMA-America.com

SMA America, LLC

Exhibit B
Manufacturer Specifications

Attachment B
Inverters

3. Sungrow

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Attorneys for Madison Fields Solar Project, LLC

SG3425/3600UD-MV Preliminary

SUNGROW
Clean power for all

Turnkey Station for North America 1500 Vdc System - MV Transformer Integrated

HIGH YIELD

- Advanced three-level technology, max. efficiency 98.9%
  Full power operation at 45 °C (113 °F)
- Effective cooling, wide operation temperature
- Max. DC/AC ratio up to 2.0

EASY O&M

- Integrated current, voltage and MV parameters monitoring function for online analysis and trouble shooting
- Modular design, easy for maintenance
- Convenient external touch screen

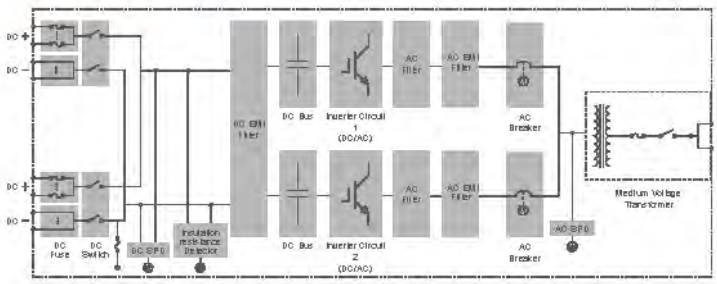
SAVED INVESTMENT

- Low transportation and installation cost due to 20-foot container size design
- DC 1500V system, low system cost
- Integrated MV transformer and LV auxiliary power supply
- Q at night optional

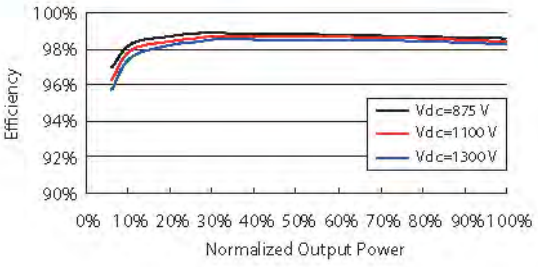
GRID SUPPORT

- Compliance with standards: UL1741, UL1741 SA, IEEE 1547, Rule 21 and NEC code
- Low / High voltage ride through (L/HVRT), L/HFRT, soft start/stop
- Active & reactive power control and power ramp rate control

CIRCUIT DIAGRAM



EFFICIENCY CURVE (SG3425UD)



Type designation	SG3425UD-MV	SG3600UD-MV
Input (DC)		
Max. PV input voltage	1500V	
Min. PV input voltage / Startup input voltage	875 V / 915 V	915 V / 955 V
Available DC fuse sizes	250A, 315A, 400A, 450A, 500A	
MPP voltage range for nominal power	875 – 1300 V	915 – 1300 V
No. of independent MPP inputs	1	
No. of DC inputs	20 (optional: 28)	
Max. DC short-circuit current	5000 A (Optional: 10000A)	
PV array configuration	Negative grounding or floating	
Output (AC)		
AC output power	3425 kVA @ 45 °C, 3083 kVA @ 50 °C	3600 kVA @ 45 °C, 3240 kVA @ 50 °C
AC voltage	12 kV to 34.5 kV	
Nominal grid frequency / Grid frequency range	60 Hz / 55 – 65 Hz	
THD	< 3 % (at nominal power)	
DC current injection	< 0.5 % In	
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading – 0.8 lagging	
Efficiency		
Inverter Max. efficiency	98.9 %	
Inverter CEC efficiency	98.5 %	
Transformer		
Transformer rated power	3425 kVA	3600 kVA
Transformer max. power	3425 kVA	3600 kVA
LV / MV voltage	0.6 kV / (12 – 35) kV	0.63 kV / (12 – 35) kV
Transformer vector	Dy1 or Dy11	
Transformer cooling type	ONAN (Optional: KNAN)	
Protection		
DC input protection	Load break switch + fuse	
Inverter output protection	Circuit breaker	
AC MV output protection	Load break switch + fuse	
Overvoltage protection	DC Type II / AC Type II	
Grid monitoring / Ground fault monitoring	Yes / Yes	
Insulation monitoring	Yes	
Overheat protection	Yes	
General Data		
Dimensions (W*H*D)	6058 * 2896 * 2438 mm (238.5'' * 114.0'' * 96.0'')	
Weight	18000 kg (39683.2 lbs)	
Degree of protection	IP65 (Electronics of Inverter) / IP54(Others)	
Auxiliary power supply	5 kVA, 120Vac / 240 Vac; Optional: 30 kVA, 480Vac / 277Vac	
Operating ambient temperature range	-30 to 60 °C (> 45 °C derating)	
Allowable relative humidity range (non-condensing)	0 – 100 %	
Cooling method	Temperature controlled forced air cooling	
Max. operating altitude	1000 m (Standard) / > 1000 m (Customized)	
Display	Touch screen	
Communication	Standard: RS485, Ethernet; Optional: optical fiber	
Compliance	UL 1741, IEEE 1547, UL1741 SA, NEC 2017, CSA C22.2 No.107.1-01	
Grid support	Q at night function (optional), L/HVRT, L/HFRT, Active & reactive power control and power ramp rate control, Volt-var, Frequency-watt	

hnology, max.
, inverter CEC

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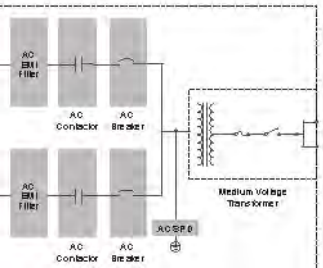
EASY O&M

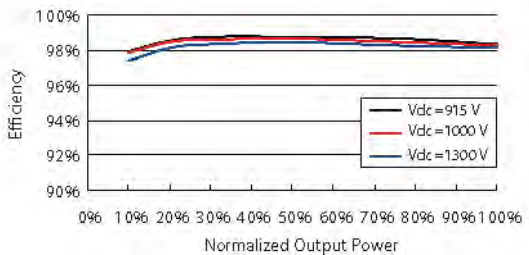
- Integrated current, voltage and MV parameters monitoring function for online analysis and fast trouble shooting
- Modular design, easy for maintenance
- Convenient external LCD

GRID SUPPORT

- Complies with UL 1741, UL 1741 SA, IEEE 1547, Rule 21 and NEC 2014/2017
- Grid support including L/HVRT, L/HFRT, active & reactive power control and power ramp rate control

EFFICIENCY CURVE (SG3150U)





Type designation	SG3150U-MV
Input (DC)	
Max. PV input voltage	1
Min. PV input voltage / Startup input voltage	915 V / 955 V
MPP voltage range for nominal power	940 – 1300 V
No. of independent MPP inputs	
No. of DC inputs	18 – 24
Max. PV input current	3420 A
Max. DC short-circuit current	4
PV array configuration	Negative
Output (AC)	
AC output power	3150 kVA @ 45 °C (113 °F)
Max. inverter output current	2
AC voltage range	3
Nominal grid frequency / Grid frequency range	60 Hz /
THD	< 3 % (at n
DC current injection	< 0
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 lea
Feed-in phases / Connection phases	
Efficiency	
Inverter Max. efficiency	9
Inverter Euro. efficiency	9
Transformer	
Transformer rated power	3150 kVA
Transformer max. power	3150 kVA
LV / MV voltage	0.63 kV / 34.5 kV
Transformer vector	
Transformer cooling type	ONAN (Oil Na
Oil type	Mineral oil (PCB free) o
Protection and Function	
DC input protection	Load brea
Inverter output protection	Circu
AC MV output protection	Load brea
Overvoltage protection	DC Type
Grid monitoring / Ground fault monitoring	Ye
Insulation monitoring	Op
Overheat protection	
General Data	
Dimensions (W*H*D)	6058 * 2896 * 2438 m
Weight	18 T (3
Degree of protection	NE
Auxiliary power supply	120 Vac, 5 kVA / Op
Operating ambient temperature range	-30 to 60 °C (> 45 °C derating) (-22 to 140 °F (> 113 °F derating))
Allowable relative humidity range (non-condensing)	0
Cooling method	Temperature contr
Max. operating altitude	1000 m (standard (3280.8 ft (standard
Display	Touc
Communication	Standard: RS485, Ether
Compliance	UL 1741, IEEE 1547, UL1741 SA, N
Grid support	Q at night function (optional), L/HVR and power ramp rate con

Exhibit B
Manufacturer Specifications

Attachment B
Inverters

4. TMEIC

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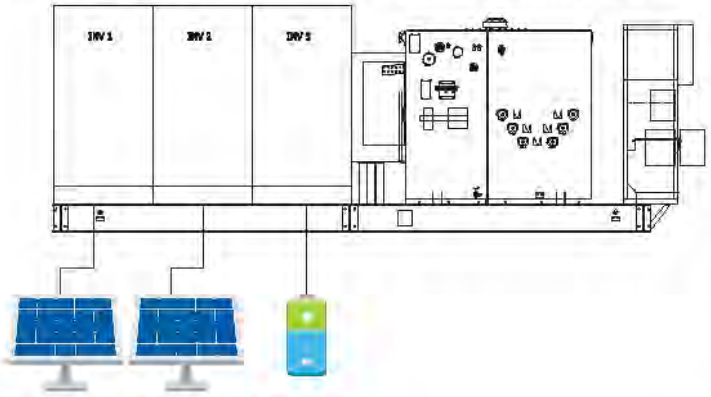
TMEIC
We drive industry

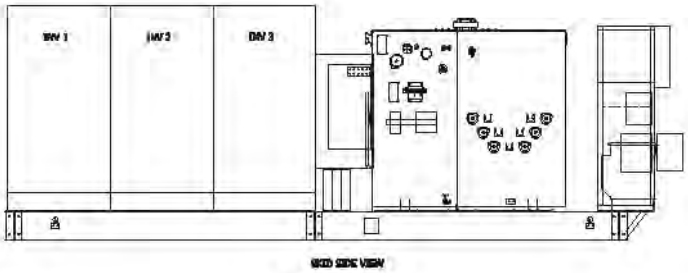
Solar Ware Ninja™

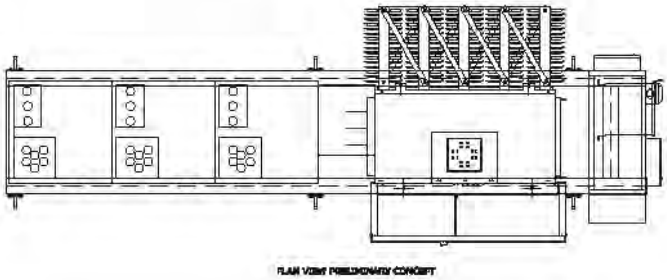
Multiple Configurations for Maximum Flexibility

TMEIC's Solar Ware Ninja is the latest evolution of the highly successful Solar Ware family of inverters, joining over 14GW of TMEIC's globally installed photovoltaic inverters. Continuing the legacy of high efficiency, cutting-edge features, and unmatched reliability, the new Ninja modular inverter system is the culmination of input from utilities, developers, and technicians.

The Ninja is a global product, performing the duties of both generation and energy storage. The modular system introduces multiple layers of flexibility to allow designers an almost unlimited number of options for every project. The advanced controls system is packed with features to meet not only today's smart inverter requirements, but also new requirements as they are introduced. Like the award-winning Samurai series of inverters, the Ninja utilizes the same highly reliable IGBT based power conversion system.







Customizable Block

Up to 6 Ninja units on the same skid. Able to combine PV and ESS inverters in the same lineup. A skid controller will manage output of the Ninja power station.

- Fully Modular design means:
  - Completely independent inverters for increased availability
  - Individual MPPT for greater energy yield
  - Latest generation of Smart Inverter controls platform
  - Multiple output options with various MPPT ranges
- DC Zone monitoring is standard
- UL or IEC certified global design
- PV or Energy Storage (bi-directional)
- Outdoor rated enclosure

TMEIC is Bankable

- Stable, with multi billion $USD revenue
- Diversified, with decades of power electronics experience in a variety of heavy industries, including metals, oil & gas, mining, and container cranes industries
- Manufacturing in the US and several other locations

TMEIC is Reliable

- Over 14GW of PV and ESS inverters globally
- Own exclusive use of Mitsubishi Electric's 3 level NPS technology
- Industry leading fleet availability

TMEIC is Support

- Award winning service
- 24/7 US based hot line
- Over 30 years PV inverter manufacturing and R&D experience
- Comprehensive customer training programs
- Authorized Service Provider program available

TMEIC Corporation • Roanoke, Virginia • Email: SolarPV@tmeic.com • www.tmeic.com

I-6006; Mar 2019

TMEIC
We drive industry

Solar Ware Ninja™

		PV-PCS			
Type		PVU-L0800GR	PVU-L0840GR	PVU-L0880GR	PVU-L0920GR
Output side (AC)	Rated Power@25°C	800kW	840kW	880kW	920kW
	Rated Power@50°C	730kW	765kW	800kW	840kW
	Rated Voltage	600V +10%, -12%	630V +10%, -12%	660V +10%, -12%	690V +10%, -12%
	Rated Frequency	50Hz / 60Hz (+0.5Hz, -0.7Hz)			
	Rated Power Factor	>0.99			
	Reactive Capability	+/-421-421 kVAR	+/-442-442 kVAR	+/-464-464 kVAR	+/-485-485 kVAR
	Rated Current	702 Arms @50 °C			
	Maximum Current	770 Arms @25 °C			
	Maximum Efficiency	98.9% *Tentative			
	CEC Efficiency	98.5% *Tentative			
Input side (DC)	Maximum Voltage	1500 Vdc			
	MPPT Operation Range	875-1300VDC	915-1300VDC	960-1300VDC	1005–1300VDC
Environ. Conditions	Ingress Protection Ratings	IP54 / NEMA3R			
	Installation	Outdoor			
	Ambient Temperature Range	-25° to 50°C			
	Maximum Altitude	>2000 m power derating (Max. 4000m)			
Protective Functions	Input (DC) Side	DC Protection: Fuses Ground Fault, DC Reverse Current, Over Voltage, Over Current			
	Grid (AC) Side	AC Protection: MCCB and Fuse Anti-islanding, Over/Under Voltage, Over/Under Frequency, Over Current			
	Grid Assistance	Reactive/Active Power Control, Power Factor Control, Fault Ride Through (optional)			
Harmonic Distortion of AC Current		≦ 3% THD (at rated power)			
Communication		Modbus/TCP			
Fault Analysis		Fault Event Log, Waveform Acquisition via memory card			
Compliance		UL1741, UL174SA / IEEE1547 / NEC2017 / IEC62109-1,2 / IEC61000-6-2,4 / IEC61727, IEC62116 / IEC61400, BDEW / IEC61683 / IEC60068 *Tentative			
Cooling Method		Forced Air Cooling			
Number of Inputs		Standard 6 inputs for PV (maximum 8 per inverter)			
Standard Control Power Supply		Control Power Supply from Inverter output and Capacitor backup circuit (3 sec. compensation)			
Weight		<1000kgs *Tentative			
Dimensions (H x W x D)		1100 X 1100 X 1900 mm (L x W x H)			
Floor Space		1875.5 sq. in. (1.21 m^2)			
Color		Cabinet: Sand White #Dic583			

I-6006; Mar 2019

Exhibit B
Manufacturer Specifications

Attachment C
Trackers

1. **Array Technologies**
2. **FTC Solar**
3. **GameChange Solar**
4. **NEXTracker**
5. **Soltec**
6. **Sunfolding**

Respectfully submitted,

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Exhibit B
Manufacturer Specifications

Attachment C
Trackers

1. Array Technologies

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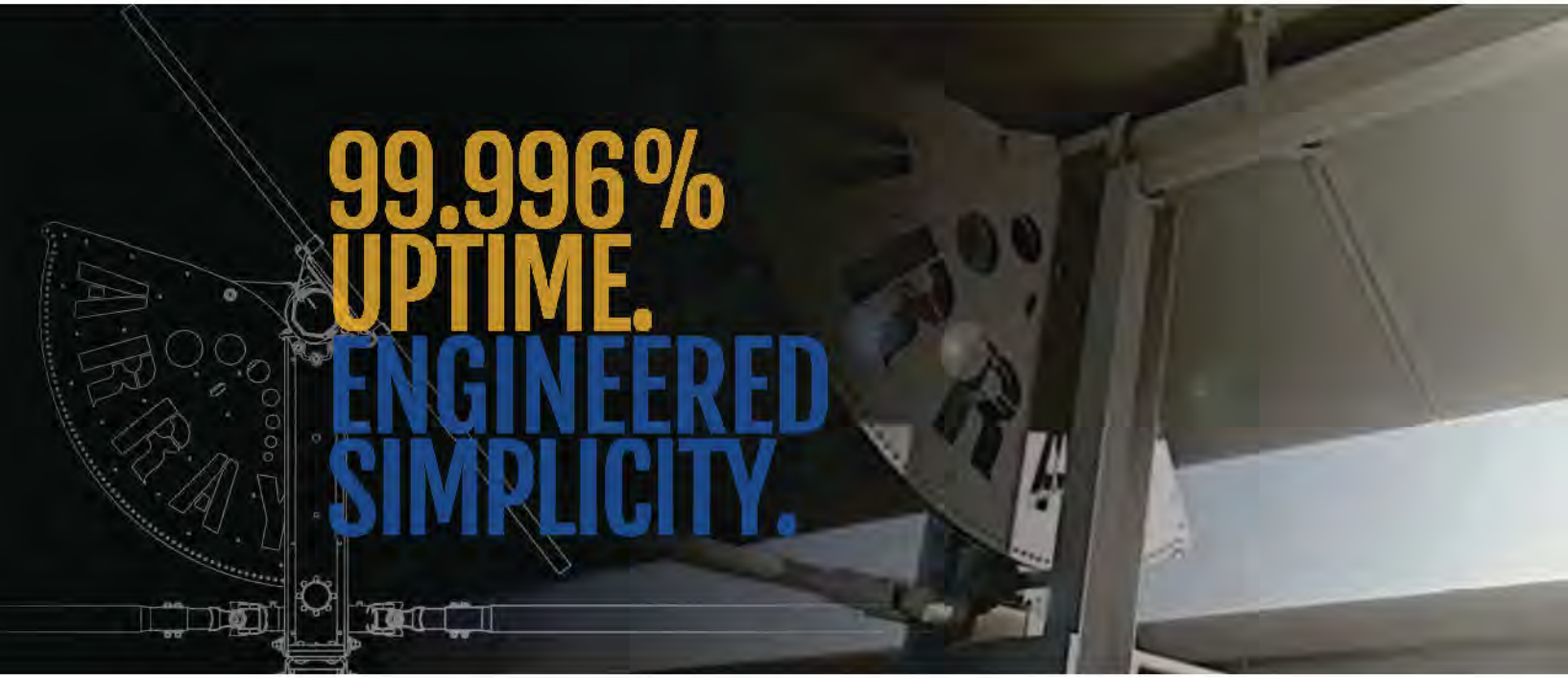
ARRAY TECHNOLOGIES

FOLLOW THE SUN.
FOLLOW THE LEADER.



7%
LOWER
LCOE

31%
LOWER
LIFETIME
O&M

DuraTrack® HZ v3

Three decades of field-tested design improvements have resulted in the DuraTrack® HZ v3 — the most durable, reliable tracking system under the sun. While our single-bolt module clamp and forgiving tolerances streamline installation, and our flexibly linked architecture maximizes power density, it's our innovative use of fewer components and a failure-free wind management system that makes Array Technologies the best choice for solar trackers. **Better. Stronger. Smarter.**

HIGHEST POWER DENSITY.

Higher density means more power and more profit. DuraTrack HZ v3 offers the unique ability to maximize the power density of each site, boasting 100 modules per row and higher density than our closest competition.

LEADING TERRAIN ADAPTABILITY.

Our flexibly linked architecture, with articulating driveline joints and forgiving tolerances, creates the most adaptable system on the market for following natural land contours while creating the greatest power generation potential from every site.

FEWER COMPONENTS. GREATER RELIABILITY.

Array was founded on a philosophy of engineered simplicity. Minimizing potential failure points (167 times fewer components than competitors), DuraTrack HZ v3 consistently delivers higher reliability and superior uptime.

FAILURE-FREE WIND DESIGN.

DuraTrack HZ v3 was designed and field tested to withstand some of the harshest conditions on the planet. It is the only tracker on the market that reliably handles wind events with a fully integrated, fully mechanical, passive wind-load mitigation system without the need for complex communication systems, batteries, or power.

ZERO SCHEDULED MAINTENANCE.

Maintenance-free motors and gears, fewer moving parts, and industrial-grade components—what does this mean for our customers? No scheduled maintenance required. While our competitors average two unscheduled maintenance events per day, we average only one per year.

ARRAY TECHNOLOGIES

FOLLOW THE SUN. FOLLOW THE LEADER.

COST VERSUS VALUE

We believe value is more than the cost of a tracking system. It's about building with forgiving tolerances and fewer parts so construction crews can work efficiently. It means protecting your investment with a failure-free wind management system. It also includes increasing power density. But most of all, value is measured in operational uptime, or reliability.

THE GLOBAL LEADER IN RELIABILITY

Array has spent decades designing and perfecting the most reliable tracker on the planet. Fewer moving parts, stronger components and intelligent design that protects your investment in the harshest weather are but a few of the innovative differences that keep your system running flawlessly all day and you resting easy at night.

ARRAY TECHNOLOGIES, INC.

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+1.505.881.7572

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arraytechinc.com

30 GW YEARS OF OPERATION

167× FEWER COMPONENTS THAN COMPETITIVE TRACKERS

STRUCTURAL & MECHANICAL FEATURES/SPECIFICATIONS

Tracking Type	Horizontal single axis
Less than 1 drive motor /MW	Up to 1.152 MW DC
String Voltage	Up to 1,500V DC
Maximum Linked Rows	32
Maximum Row Size	100 modules crystalline, and bifacial: 240 modules First Solar 4; 78 modules First Solar 6
Drive Type	Rotating gear drive
Motor Type	2 HP, 3 PH, 480V AC
East-West/North-South Dimensions	Site / module specific
Array Height	54" standard, adjustable (48" min height above grade)
Ground Coverage Ratio (GCR)	Flexible, 28–45% typical, others supported on request
Terrain Flexibility	N-S tolerance: 0-15% standard, 26% optional; Driveline: 40° in all directions
Modules Supported	Most commercially available, including frameless crystalline, thin film, and bifacial
Tracking Range of Motion	± 52° standard, ± 62° optional
Operating Temperature Range	-30°F to 140°F (-34°C to 60°C)
Module Configuration available.	Single-in-portrait standard, including bifacial. Four-in-landscape (thin film)
Module Attachment	Single fastener, high-speed mounting clamps with integrated grounding. Traditional rails for crystalline in landscape, custom racking for thin film and frameless crystalline and bifacial per manufacturer specs.
Materials	Pre-galv steel, HDG steel and aluminum structural members, as required
Allowable Wind Load (ASCE 7-10)	140 mph, 3-second gust exposure C
Wind Protection	Failiure free passive mechanical system protects against wind damage without the use of complex communications systems, batteries — no power required

ELECTRONIC CONTROLLER FEATURES/SPECIFICATIONS

Solar Tracking Method	Algorithm with GPS input
Control Electronics	MCU plus Central Controller
Data Feed	MODBUS over Ethernet to SCADA system
Night-time Stow	Yes
Tracking Accuracy	± 2° standard, field adjustable
Backtracking	Yes

INSTALLATION, OPERATION & MAINTENANCE

Software	SmarTrack optimization available
PE Stamped Structural Calculations & Drawings	Yes
On-site Training and System Commissioning	Yes
Connection Type	Fully bolted connections, no welding
In-field Fabrication Required	No
Dry Slide Bearings and Articulating Driveline Connections	No lubrication required
Scheduled Maintenance	None required
Module Cleaning Compatibility	Robotic, Tractor, Manual

GENERAL

Annual Power Consumption (kWh per 1 MW)	400 kWh per MW per year, estimate

Exhibit B
Manufacturer Specifications

Attachment C
Trackers

2. FTC Solar

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VOYAGER

FTCSOLAR
Engineering | Software | Tracker

The Next Evolution In Tracker Design From FTC Solar

Lowest Installed Cost

- Up to to 60% less posts
- Up to 20% less DC BOS cost
- Less than 300 man hrs/ MW to install

Optimized Bi-facial Performance

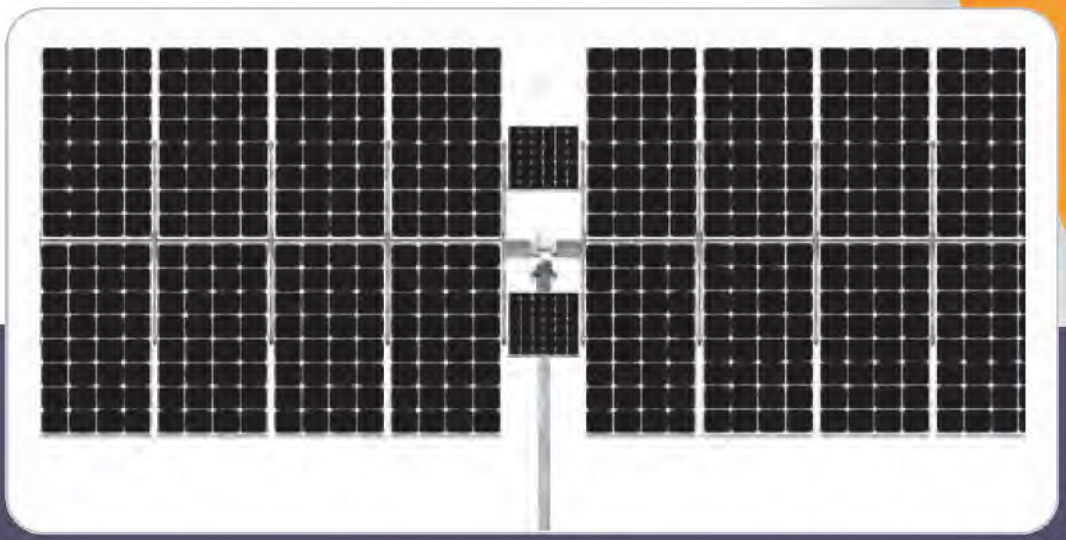
- Up to 0.5% yield improvement due to less backside shading and better albedo capture

Superior Design Flexibility

- 20%-60% GCR support
- 60m row provides layout compaction with more MWs/site

Designed for Reliability

- Hierarchy of row zone and site controllers provides communication and data redundancy
- Self-powered drive and control system with 3 day autonomy mitigates interruptions



FTCSOLAR
Engineering | Software | Tracker

FTC Inc. (HQ), USA, 11801 Domain Blvd., 3rd Floor, Austin, Texas 7875
FTC San Francisco, USA, 44 Montgomery St., 3rd Floor. San Francisco, CA 94104

www.ftcsolar.com

FTC SOLAR

VOYAGER TRACKER

PRODUCT

Module Configuration	- 104, 108, 112, 116 or 120 modules/row (C-Si or Bifacial) - 96 modules/row (**FSLR Series 6**) - 240 modules/ row (**FLSR Series 4**)
Tracking Range	-60° to +60° range of motion with backtracking
Tracking Drive Unit	24V DC self powered drive system with battery backup
Foundations	- 7 (std) or 9 posts per row, project-specific - W8 posts, length and weight project-specific
Certifications	UL 2703, 3703 and IEC EC 62817

CONDITIONS

Maximum Wind Speed	105 mph (std); 135 mph (configurable), per ASCE7-10
Maximum Snow Load	5 psf (std); 40 psf (configurable), per ASCE 7-10
Site Slope	Tolerances: N/S = 17.5% terrain following; E/W = no limit / customer defined
Operating Temperature	- 20°to +60°C
Ground Coverage ratio	20-60% GCR supported with adequate access pathways

VOYAGER CONTROLLER:
PRECISE CONTROL, ADVANCED ALGORITHMS, SECURE DATA

ROW-LEVEL CONTROL | ZONE-LEVEL CONTROL | SITE-LEVEL CONTROL

IN THE PALM OF YOUR HAND

The Voyager Smart Control System features:

Wireless mesh network offers communication redundancy

Bi- directional communication between row and zone controllers

Advanced performance analytics available

Site wind and temperature data available for site monitoring. Additional environmental sensors available.

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Engineering | Software | Tracker

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FTC San Francisco, USA, 44 Montgomery St., 3rd Floor. San Francisco, CA 94104

www.ftcsolar.com

Exhibit B
Manufacturer Specifications

Attachment C
Trackers

3. Gamechange Solar

Respectfully submitted,

/s/ Christine M.T. Pirik

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Attorneys for Madison Fields Solar Project, LLC

GAMECHANGE SOLAR
REPOWERING THE PLANET

OVER 6 GW SOLD
Global Leader for Fixed Tilt Structures & Trackers

TECHNICAL DATASHEET

GENIUS TRACKER™ 2P

WORLD'S HIGHEST POWER PRODUCING & FASTEST INSTALLING 2P SOLAR TRACKER

OWNER BENEFITS

UP TO **1.25%** **MORE POWER PRODUCTION**
RESULTS IN **HIGHER** KWH OUTPUT AND **HIGHER ROE**
based on project specifics

INSTALLER BENEFITS

- **FEWER POST COUNT PER MW** UP TO **55% LESS POSTS** THAN SOME 1P COMPETITORS
- **SHORTER 200 FT [60.96 M] TRACKERS** **INSTALL EASILY** ON UNDULATING SITES TO REDUCE GRADING
- UP TO **40% HIGHER MODULE INSTALL USING SPEEDTABS™**
- **FASTEST INSTALLING DRIVE SYSTEM** UTILIZING PRE-ASSEMBLED COMPONENTS

GAMECHANGE SOLAR
REPOWERING THE PLANET

OVER 6 GW SOLD

Global Leader for Fixed Tilt Structures & Trackers

OWNER BENEFITS

UP TO 1.25% MORE POWER PRODUCTION AND HIGHER ROE
Combine to increase owner cash flow

WEATHERSMART™
Proprietary algorithm optimizes tilt angle based on weather data to maximize power production, adds up to 1.25% additional power production

LOWEST O&M COST
Lowest grass cutting & module washing cost

Zero maintenance drive system

INSTALLER BENEFITS

FASTEST INSTALLING SYSTEM
Advanced design innovations & pre-assembled components

PRE-ASSEMBLED DRIVE ARM
Can be lifted by one worker, no machine required. 50% faster than typical competitors

PE STAMPED DRAWINGS
Design loads according to local building codes: ASCE 7, NBC, Eurocode, AS1170, GB 50009

PROPRIETARY INTEGRATED HARDWARE™
For faster structure assembly, module mounting and reduced O&M cost. Oversized Serrated Flange Nyloc Nut and Oversized Flange Star Bolt with integrated star washer eliminates the need for washers and star washers

SPEEDTABS™
Up to 40% higher module install

GameChange Solar
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Fax: +1 (646) 607-2223
media@gamechangesolar.com
gamechangesolar.com

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Madrid, Spain

ASIA OFFICE
Shanghai, China

Modules	**Modules Supported**	Most commercially available modules, including frameless crystalline and thin film
Civil	**Slope Tolerance (N-S)**	7% standard, can go to 10% special order
	Slope Tolerance (E-W)	15%
	Tracker follows slope (Y/N)	Yes
Structural	**Drive Type**	Robust linear actuator stainless steel & aluminum
	Posts per MW	170/MW for normal wind conditions
	Design Wind Load	105 mph [46.9 m/s](Std) / 115 mph [51.4 m/s](Premium 1) / 130 mph [58.12 m/s](Premium 2)
	Snow Load	5 psf [.24 kPa](Std) / 20 psf [.96 kPa](Premium 1) / 40 psf [1.92 kPa](Premium 2) / 60 psf [2.87 kPa](Premium 3)
	Tracking Range (Std)	45°, 52°
	Tracking Range (Premium)	60°
	Post Sections	HDG wide flange steel
	Post Size (Interior) & (Exterior)	W6x9 to W6x20 Wide Flange
	Motor Foundation	W6x15, W6x20 or larger Wide Flange
	Standard Embedment	5 - 9 ft. [1.52 - 2.75 m]
	Flood Plain Allowance	Up to 6 ft. [1.83 m]
Design	**Module Configuration**	2 up in portrait for crystalline & First Solar Series 6™, 2 up in portrait for Bifacial, 6 to 8 up landscape for First Solar Series 4™
	Length per Table	Up to 205 ft. [62.48 m] (for example 120 crystaline modules)
	Module Attachment	Bottom mount for framed modules or clamps for glass on glass modules
	Ground Coverage Ratio	0.3 to 0.65
	Rows per Drive	1 drive per tracker(table), distributed drive system
	Powering System	Onboard solar module with battery
	Ground Clearance To Module	18 - 48 in. [45.7 - 121.9 cm] typical
	Min / Max Ground to Top of Post	70 in. [1.78 m] typical + 9 in. [22.86 cm] min. adjustment range
	Backtracking / Anti-shading	Yes, although can be turned off as requested (i.e. for FSLR modules)
	Temperature Range	-20° C (-40° C also available) + 55° C
	Electromagnetic Interference	Compliant with FCC guidelines/ Applicable sections EN 61000
Install	**Specialty Tools Required**	No
	Max Offload for Deliveries	As per customer requirement
Electrical	**Tracking Method**	Time and location based algorithm
	String Design	Compatible with any string size
	Cable Supports	Hole punching as per customer requirement for nominal cost
	Linear Actuator Motor	24V DC UL Listed
	Parasitic Loss	0 amps
	Controller Box	ZigBee® wireless communications, 24V solar module and battery
	Control System	Master to Node: ZigBee® wireless communications Master to SCADA/DAS: Modbus TCP communications
	# of Motors	25/MW for typical conditions, depending on module wattage and loading
	1000V System or 1500V System	Both
	Grounding Method	Tracker structure is part of grounding path per UL 2703
	UL Compliance	UL 2703 / UL 3703
	Ingress Protection	IP66 stroke end / IP67 motor end (NEMA 4/4x equivalent)
	# Weather Station	1 per 6 MW - 10 MW typical
	Monitoring System	Web portal interface available Compatible with all standard third party monitoring vendors
	Snow & Flood Sensors	Move modules to optimum location for weather events
	Backup Power	Solar module and battery providing integrated backup - 3 days
O&M	**Warranty**	5 year drive & control, 10 year structural standard, 10 /20 also available
Shipping	**Max load**	International - 18.5 to 22.5 metric tons per container USA - 45,000 lbs. [20,411 kg] per truckload, 5,000 lbs. [2,267 kg] maximum bundle size, 2,900 lbs. [1315.4 kg] or other maximum as requested by customers
	Shipping Containers or Flatbeds	Flat beds for structure, dry vans for hardware
	# Trucks or Containers per MWdc	4 typical for trucks, 5 typical for containers
Commissioning	**Backfeed required?**	No, Generator for power as alternative

Rev. 1-8-2020

GAMECHANGE SOLAR
REPOWERING THE PLANET

OVER 6 GW SOLD
Global Leader for Fixed Tilt Structures & Trackers

TECHNICAL DATASHEET

GENIUS TRACKER™ 1P

WORLD'S HIGHEST POWER PRODUCING & FASTEST INSTALLING SOLAR TRACKER

OWNER BENEFITS

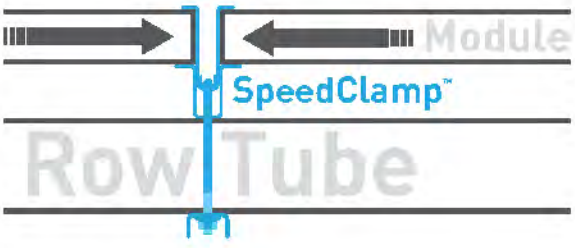
UP TO 6.75% MORE POWER PRODUCTION

RESULTS IN **HIGHER** KWH OUTPUT AND UP TO **40% HIGHER ROE**

based on project specifics

INSTALLER BENEFITS

200% FASTER INSTALL SPEED WITH **SPEEDCLAMP™** THAN ANY OTHER TRACKER



GAMECHANGE SOLAR
REPOWERING THE PLANET

OVER 6 GW SOLD
Global Leader for Fixed Tilt Structures & Trackers

OWNER BENEFITS

UP TO 40% HIGHER ROE
Combine to increase owner cash flow

HIGHER MODULE DENSITY
Increased row spacing means more time facing the sun and less time running from the shade, adds up to 5% more power production than competitors

WEATHERSMART™
Proprietary algorithm optimizes tilt angle based on weather data to maximize power production, adds up to 1.25% additional power production

LOWEST O&M COST
Lowest grass cutting & module washing cost

Zero maintenance drive system

INSTALLER BENEFITS

FASTEST INSTALLING SYSTEM
Advanced design innovations & pre-assembled components

SPEEDCLAMP™
Mounts modules with no mounting hardware, speeds module installation up to 200%

PRE-ASSEMBLED DRIVE ARM
Can be lifted by one worker, no machine required. 50% faster than typical competitors

PE STAMPED DRAWINGS
Design loads according to local building codes: ASCE 7, NBC, Eurocode, AS1170, GB 50009

PROPRIETARY INTEGRATED HARDWARE™
For faster structure assembly, module mounting and reduced O&M cost. Oversized Serrated Flange Nyloc Nut and Oversized Flange Star Bolt with integrated star washer eliminates the need for washers and star washers

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EUROPE OFFICES
Dublin, Ireland
Zug, Switzerland
Madrid, Spain

ASIA OFFICE
Shanghai, China

Modules	**Modules Supported**	Most commercially available modules, including frameless crystalline and thin film
Civil	**Slope Tolerance (N-S)**	7% standard, can go to 15% special order
	Slope Tolerance (E-W)	15%
	Tracker follows slope (Y/N)	Yes
Structural	**Drive Type**	Robust linear actuator stainless steel & aluminum
	Posts per MW	350-400/MW for 1 up portrait / 2 up landscape or 250-300/MW for 2 up portrait
	Design Wind Load	105 mph [46.9 m/s](Std) / 130 mph [58.1 m/s](Premium 1) / 150 mph [67 m/s](Premium 2)
	Snow Load	5 psf [.24 kPa](Std) / 20 psf [.96 kPa](Premium 1) / 40 psf [1.92 kPa](Premium 2) / 60 psf [2.87 kPa](Premium 3)
	Tracking Range (Std)	45°, 52°
	Tracking Range (Premium)	60°
	Post Sections	G235 [55 µm] galvanized steel (or HDG option) roll formed standard posts, HDG wide flange option also available
	Post Size (Interior) & (Exterior)	6 x 6 in. [15.24 x 15.24 cm] roll form shape or W6x7, W6x9, W6x12 or W6x15 wide flange
	Motor Foundation	6.5 x 8 in. [16.51 x 20.32 cm] roll form hat or W6x15 or larger wide flange
	Standard Embedment	5 - 7 ft. [1.52 - 2.13 m]
	Flood Plain Allowance	Up to 6 ft. [1.83 m]
Design	**Module Configuration**	1 or 2 up in portrait for crystalline & First Solar Series 6™, 2 up landscape or 1 or 2 up in portrait for Bifacial, 3 to 4 up landscape for First Solar Series 4™
	Length per Table	Up to 320 ft. [97.53 m] (for example 78 First Solar Series 6™ modules)
	Module Attachment	SpeedClamp™ or bolts available for bottom mount frame modules or clamps for glass on glass modules
	Ground Coverage Ratio	0.25 to 0.65
	Rows per Drive	1 drive per tracker(table), distributed drive system
	Powering System	Onboard solar module with battery
	Ground Clearance To Module	18 - 48 in. [45.7 - 121.9 cm] typical
	Min / Max Ground to Top of Post	56 in. [1.42 m] typical + 9 in. [22.86 cm] min. adjustment range
	Backtracking / Anti-shading	Yes, although can be turned off as requested (i.e. for FSLR modules)
	Temperature Range	-20° C (-40° C also available) + 48° C
	Electromagnetic Interference	Compliant with FCC guidelines/ Applicable sections EN 61000
Install	**Specialty Tools Required**	No
	Max Offload for Deliveries	As per customer requirement
Electrical	**Tracking Method**	Time and location based algorithm
	String Design	Compatible with any string size
	Cable Supports	Hole punching as per customer requirement for nominal cost
	Linear Actuator Motor	24V DC UL Listed
	Parasitic Loss	0 amps
	Controller Box	ZigBee® wireless communications, 24V solar module and battery
	Control System	Master to Node: ZigBee® wireless communications Master to SCADA/DAS: Modbus TCP communications
	# of Motors	20 to 52 / MW depending on module wattage and loading conditions (35 for typical conditions)
	1000V System or 1500V System	Both
	Grounding Method	Tracker structure is part of grounding path per UL 2703
	UL Compliance	UL 2703 / UL 3703
	Ingress Protection	IP66 stroke end / IP67 motor end (NEMA 4/4x equivalent)
	# Weather Station	1 per 6 MW - 10 MW typical
	Monitoring System	Web portal interface available Compatible with all standard third party monitoring vendors
	Snow & Flood Sensors	Move modules to optimum location for weather events
	Backup Power	Solar module and battery providing integrated backup - 3 days
O&M	**Warranty**	5 year drive & control, 10 year structural standard, 10 /20 also available
Shipping	**Max load**	International - 18.5 to 22.5 metric tons per container USA - 45,000 lbs. [20,411 kg] per truckload, 5,000 lbs. [2,267 kg] maximum bundle size, 2,900 lbs. [1315.4 kg] or other maximum as requested by customers
	Shipping Containers or Flatbeds	Flat beds for structure, dry vans for hardware
	# Trucks or Containers per MWdc	4 typical for trucks, 5 typical for containers
Commissioning	**Backfeed required?**	No, Generator for power as alternative

Rev. 1-8-2020

Exhibit B
Manufacturer Specifications

Attachment C
Trackers

4. NEXTracker

Respectfully submitted,

/s/ Christine M.T. Pirik

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Attorneys for Madison Fields Solar Project, LLC

NEXTracker
A Flex Company

NX Horizon

Smart Solar Tracking System

Serving as the backbone on over 20 gigawatts of solar power plants around the world, the NX Horizon™ smart solar tracker system combines best-in-class hardware and software to help EPCs and asset owners maximize performance and minimize operational costs.

Self-Powered System with Smart Performance Monitoring

NX Horizon's reliable self-powered motor and control system, balanced mechanical design and independent row architecture provide project design flexibility, while lowering operation and maintenance (O&M) costs. NX Horizon works in concert with the NX Data Hub platform, a utility-grade software that uses bidirectional communications to each and every tracker row in the power plant for continuous, real-time monitoring. In addition, NEXTracker's Digital O&M™ services provide real-time analytics and predictive maintenance to help manage operations and minimize O&M costs over the lifetime of the systems.

Flexible and Resilient by Design

With its self-aligning module rails and vibration-proof fasteners, NX Horizon can be easily and rapidly installed. The self-powered, decentralized architecture allows each row to be commissioned in advance of site power,and is designed to withstand high winds and other adverse weather conditions. On a recent 838 megawatt project in Villanueva, Mexico, these design features allowed for the project to go online nine months ahead of schedule.

TrueCapture and Bifacial Enabled

Incorporating the most promising innovations in utility scale solar, NX Horizon with TrueCapture™ smart control system can add additional energy production by up to six per cent. Further unlocking the advantages of independent-row architecture and the data collected from thousands of sensors across its built-in wireless network, the software continuously optimizes the tracking algorithm of each row in response to site terrain and changing weather conditions. NX Horizon can also be paired with bifacial PV module technology, which can provide even more energy harvest and performance. With bifacial technology, NX Horizon outperforms conventional tracking systems with over 1% more annual energy.

4 YEARS IN A ROW
Global Market Share Leader (2015-18)

25+ GW
Delivered on 5 Continents

BEST-IN-CLASS
Software Ecosystem and Global Services

UP TO 6%
Using TrueCapture Smart Control System

Quality and Reliability from Day One

Quality and reliability are designed and tested into every NX Horizon component and system across our supply chain and manufacturing operations. NEXTracker is the leader in dynamic wind analysis and safety stowing, delivering major benefits in uptime and long-term durability. NX Horizon is certified to UL 2703 and UL 3703 standards, underscoring NEXTracker's commitment to safety, reliability and quality.

GENERAL AND MECHANICAL

Tracking type	Horizontal single-axis, independent row
String voltage	1,500 V_{DC} or 1,000 V_{DC}
Typical row size	78 - 90 modules, depending on module string length
Drive type	Non-backdriving, high accuracy slew gear
Motor type	24V brushless DC motor
Array height	Rotation axis elevation 1.3 to 1.8 m / 4'3" to 5'10"
Ground coverage ratio (GCR)	Configurable. Typical range 28-50%
Modules supported	Mounting options available for virtually all utility-scale crystalline modules, First Solar Series 6 and First Solar Series 4.
Bifacial features	High-rise mounting rails, bearing + driveline gaps and round torque tube
Tracking range of motion	Options for ±60° or ±50°
Operating temperature range	Self powered: -30°C to 55°C (-22°F to 131°F) AC powered: -40°C to 55°C (-40°F to 131°F)
Module configuration	1 in portrait. 3 x 1,500V or 4 x 1,000V strings per standard tracker. Partial length trackers available.
Module attachment	Self-grounding, electric tool-actuated fasteners
Materials	Galvanized steel
Allowable wind speed	Configurable up to 200 kph (125 mph) 3-second gust.
Wind protection	Intelligent wind stowing with symmetric dampers for maximum array stability in all wind conditions.
Foundations	Standard W6 section foundation posts

ELECTRONICS AND CONTROLS

Solar tracking method	Astronomical algorithm with backtracking. TrueCapture™ upgrades available for terrain adaptive backtracking and diffuse tracking mode.
Control electronics	NX tracker controller with inbuilt inclinometer and backup battery.
Communications	Zigbee wireless communications to all tracker rows and weather stations via network control units (NCUs).
Nighttime stow	Yes
Power supply	Self powered: NX provided 30 or 60W Smart Panel AC powered: Customer-provided 120-240 V_{AC} circuit

INSTALLATION, OPERATIONS AND SERVICE

PE stamped structural calculations and drawings	Included
Onsite training and system commissioning	Included
Installation requirements	Simple assembly using swaged fasteners and bolted connections. No field cutting, drilling or welding.
Monitoring	NX Data Hub™ centralized data aggregation and monitoring
Module cleaning compatibility	Compatible with NX qualified cleaning systems.
Warranty	10-year structural, 5-year drive and control components
Codes and standards	UL 3703, UL 2703, IEC 62817

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NX Gemini

Introducing the NEXTracker Two-in-Portrait Smart Solar Tracker

The NX Gemini™ two-in-portrait (2P) solar tracker optimizes lifetime value and performance, helping project developers and asset owners get the most from their power plant. Ideally suited for sites with challenging soils, high winds, and irregular boundaries, the ruggedized 2P tracker features a patent-pending distributed drive system for maximum stability in extreme weather, eliminating the need for dampers and producing virtually zero energy losses associated with stowing.

Capitalize with Highest Power Density Solar Tracker

NX Gemini's flexible 2P module configuration allows for the maximum number of modules per foundation, requiring only 60 meters and seven foundation posts to provide support for up to 120 modules on four 1500-volt strings. With the lowest number of foundations per megawatts on the solar tracker market today, NX Gemini helps reduce tracker installation costs on difficult sites.

Pair with TrueCapture and Bifacial for Maximum Performance

The 2P tracker can be equipped with either monofacial or bifacial PV modules and integrated with the entire NEXTracker software ecosystem, including the TrueCapture™ advanced smart control and energy yield enhancement platform. Incorporated into the NX Gemini design is the field-proven innovations found in NX Horizon™, such as independent-row architecture, intelligent control systems and wireless communications.

FEATURES AND BENEFITS

- Industry-leading 2P design with 7 foundations points per 120 module row
- Ideal for challenging soils
- Bifacial-optimized for maximum performance
- Patent-pending distributed drive system for maximum stability in high winds
- TrueCapture ready, gain up to 6% more energy
- Special rotation feature for high velocity module installation

> "The NEXTracker team has always collaborated with us during their product development process, resulting in trackers that are faster to build, compatible for more sites and easier to maintain. NX Gemini is a strong tracker option for sites with challenging topography and geotechnical conditions."
>
> **George Hershman, President of Swinerton Renewable Energy**

GENERAL AND MECHANICAL

Tracking type	Horizontal single-axis, independent row
String voltage	1,500 V_{DC}
Typical row size	112 - 120 modules, depending on module string length
Drive type	NX patent-pending self-locking, distributed drive
Motor type	48 V brushless DC motor
Array height	Rotation axis elevation 1.9 to 2.5 m/ 6'2" to 8'2"
Ground coverage ratio (GCR)	Typical range 28-50%
Modules supported	Mounting options available for most utility-scale crystalline modules
Bifacial features	Available with optimized central torque tube gap

Tracking range of motion	±50°
Operating temperature range	Array powered: -20°C to 55°C (-4°F to 131°F) AC powered: -40°C to 55°C (-40°F to 131°F)
Module configuration	2 in portrait. 4 x 1,500 strings per standard tracker. Partial length trackers available.
Module attachment	Self-grounding, electric tool-actuated fasteners standard. Clamping system optional.
Materials	Galvanized steel
Allowable wind speed	Configurable up to 210 kph (130 mph) 3-second gust
Wind protection	Intelligent wind stowing with self-locking, distributed drive system for maximum array stability in all wind conditions
Foundations	Standard W8 section foundation posts. Typically ~160 piers/MW

ELECTRONICS AND CONTROLS

Solar tracking method	Astronomical algorithm with backtracking. TrueCapture™ upgrades available for terrain adaptive backtracking and diffuse tracking mode
Control electronics	NX tracker controller with inbuilt inclinometer and backup battery
Communications	Zigbee wireless communications to all tracker rows and weather stations via network control units (NCUs)
Nighttime stow	Yes
Power supply	Array powered: NX Integrated DC pre-combiner & power supply AC powered: Customer-provided AC circuit

INSTALLATION, OPERATIONS AND SERVICE

PE stamped structural calculations and drawings	Included
Onsite training and system commissioning	Included
Installation requirements	Simple assembly using swaged fasteners and bolted connections. No field cutting, drilling or welding
Monitoring	NX Data Hub™ centralized data aggregation and monitoring
Module cleaning compatibility	Compatible with virtually all standard cleaning systems
DC string monitoring	Available with array-powered option
Warranty	10-year structural, 5-year drive and control components
Codes and standards	UL 3703, UL 2703, IEC 62817

Installer-friendly array height with construction rotation feature for faster, easier installation

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Exhibit B
Manufacturer Specifications

Attachment C
Trackers

5. Soltec

Respectfully submitted,

/s/ Christine M.T. Pirik

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Attorneys for Madison Fields Solar Project, LLC


Soltec
SF7
One Track
Zero Gap
The latest generation of the horizontal single-axis tracker
LISTED

TECHNICAL DATASHEET

SF7
Single-Axis Tracker

MAIN FEATURES

Tracking System	Horizontal Single-Axis with independent rows
Tracking Range	120° +
Drive System	Enclosed Slewing Drive, DC Motor
Power Supply	Self-Powered PV Series
	Optional: AC/DC Universal Input
Tracking Algorithm	Astronomical with TeamTrack Backtracking
Communication	
Wireless	Hybrid Radio + RS-485 Cable
Optional: Wire	RS-485 Full Wired
Wind Resistance	Per Local Codes
Land Use Features	
Independent Rows	YES
Slope North-South	17%
Slope East-West	Unlimited
Ground Coverage Ratio	Configurable. Typical range: 28-50%
Foundation	Driven Pile | Ground Screw | Concrete
Temperature Range	
Standard	- 4°F to +131°F | -20°C to +55°C
Extended	-40°F to +131°F | -40°C to +55°C
Availability	>99%
Modules	Standard: 72 cells | Optional: 60 Cells; Crystalline, Thin Film (Solar Frontier, First Solar and others); Bifacial

MODULE CONFIGURATIONS

1000V	Length	Height	Width
2x38	124' 12" (38.1 m)	12' 12" (3.95 m)	12' 10" (3.92 m)
2x40	131' 7" (40.1 m)		

1500V	Length	Height	Width
2x42	138' 12" (42.1 m)	12' 12" (3.95 m)	12' 10" (3.92 m)
2x43.5	144' 8" (44.1 m)		
2x45	147' 12" (45.1 m)		

SERVICES

- Tracker Advisory Services
- Technical Support
- Pull Out Test
- Tracker Turnkey Contracting
- Commissioning
- Maintenance

MAINTENANCE ADVANTAGES

- Self-lubricating Bearings
- Face to Face Cleaning Mode
- 2x Wider Aisles

WARRANTY

Structure	10 years (extendable)
Motor	5 years (extendable)
Electronics	5 years (extendable)

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+45 70 43 01 50

IEC 62817 TÜVRheinland CERTIFIED

UL LISTED [PV SOLAR TRACKER] E476588

DNV GL Technology Review available
Bankability report
WIND TUNNEL TESTED

Soltec

Exhibit B
Manufacturer Specifications

Attachment C
Trackers

6. Sunfolding

Respectfully submitted,

/s/ Christine M.T. Pirik

Christine M.T. Pirik (0029759)
(Counsel of Record)
William Vorys (0093479)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
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Attorneys for Madison Fields Solar Project, LLC

sunfolding

Powered by Air

Sunfolding manufactures PV power plant solutions that enable fast and easy design, installation, and operations with a tracker built for simplicity and scalability: the Sunfolding T29™ horizontal single-axis tracker.

GWs and Counting

The Sunfolding team brings together engineering brilliance, extensive field knowledge, and savvy business strategy. Our executive team has collectively built and sold GWs of solar globally, successfully launching new solar products and technologies at leading solar companies including First Solar, SMA America, and Kaco. We bring innovation informed by extensive industry experience to meet solar tracking's greatest challenges.

A Motor-Free, Wear-Free Tracker

The Sunfolding T29 features AirDrive™ technology, which leverages the strength and resilience of air-based components to replace problematic tracker motors, gearboxes, and other wear surfaces.

Powered by the AirDrive, the Sunfolding T29 delivers a fundamentally streamlined design, with three structural components and two bolt sizes. The Sunfolding T29 amplifies ROI at every step in the solar project lifecycle.

A Tracker Built for the Next Generation

Powered by AirDrive technology, the Sunfolding T29 delivers improved economics, higher performance, and greater reliability for stakeholders across the solar value chain. Three structural components, two bolt sizes, one efficiently engineered tracker.

What is the AirDrive? It's the air-based actuator that moves the tracker. That's right: motor-free, wear-free solar tracking. No gears, no linkages, no bearings, no batteries. No finicky tolerances. Made in the USA from some of the most durable materials on the planet, the AirDrive re-purposes proven materials and manufacturing processes to produce a truly modular tracking system.

Gain Ground and Power
Tracker row length is now determined by string size. Realize 20% or more capacity by filling in site areas previously deemed unavailable and give your project more ground and more power without adding costs. For projects constrained by capacity and not land, generous row spacing allows you to fine-tune yield by more than 4%.

Install Twice as Fast
With three structural components and two bolt sizes, the Sunfolding T29 installs twice as fast, with an ease unlike any tracker you've installed before. Without using special tools, your crew can now power through more MWs in less time with fewer mistakes. The most generous tolerances in the industry and off-the-shelf components complement the tracker's overall simplicity, further easing construction timelines and logistics.

High Performance, Low Maintenance
Power into a secured asset future with a future-proof tracker; the AirDrive has hundreds of years, and counting, of without-fail performance. Rewrite the rules for high performance and smooth operations with one maintenance-free, wear-free actuator and 95% fewer maintenance locations than motor-based trackers.

When you partner with Sunfolding, your project stands on the shoulders of engineering's brightest minds, trusted industry insiders, and people who know how to get (and keep) your project tracking.

Project Services

- Project design support
- On-site project support
- Installation training
- Turnkey tracker installation
- O&M support from 3rd parties

World Class Supply Chain

- AirDrive assembled by Tier 1 automotive manufacturer Martinrea
- Material supplier: DuPont
- Steel supplier: OmCo (>7 GW structures delivered)

3rd Party Validation

- Independent technology & operations assessment by DNV-GL, CPP
- 4 years U.S. Department of Energy testing oversight
- 3rd party stamped structural drawings

Sunfolding T29 Technical Specifications

Structural and Mechanical Features

Tracking Type	Horizontal single-axis tracker with distributed actuation
Drive Type	Sunfolding AirDrive
Typical Dimensions	Height as low as 3 ft (0.9 m) when using standard 72-cell modules; tracker length scales with string voltage (600V, 1000V, 1500V); tracker width is equivalent to chosen PV module's length
Tracker Spacing	North & South: > 6 in (> 150 mm)
Module Spacing	≤ 0.25 in (6 mm)
Supported Modules	All commercially available framed and frameless crystalline and thin film modules
Module Configuration	Single module in portrait (standard), three modules in landscape (thin film)
Module Attachment	Module mounting via top mount clips (with integrated grounding) secured to support rails per manufacturer's recommendations
Structural Materials	Galvanized steel
Wind Load	115 mph (185 kmph) 3-second gusts per ASCE 7-10 (standard) Up to 130 mph (209 kmph) (available)
Snow Load	15 psf (0.72 kPa), higher available upon request
PE Stamped Structural Calcs & Drawings	Yes
Foundation	All foundation types (driven pier, concrete foundation, ground screw, ballasted, poured)
Ground Coverage Ratio (GCR)	Any; fully configurable by customer, typical range 25% - 55%

Control System Features

Control System	Array controller, plus row controllers
Data Feed	Modbus TCP/IP
Solar Tracking Method	GPS time and location based on astronomical algorithm
Backtracking	Yes (thin film tracking algorithm also available)
Night-time Idle	Position adjustable

Installation, Maintenance & Warranty

Installation	No in-field welding required; rapid field assembly
Maintenance	No actuator lubrication required, no batteries to replace
Warranty	10 years on structural components; 5 years on control components; 3 years on coatings

Exhibit C
Vegetation Management Plan

Stantec Consulting Services Inc.
July 7, 2020

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
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Attorneys for Madison Fields Solar Project, LLC

Stantec Consulting Services Inc.
6110 Frost Place, Laurel MD 20707-2927

July 7, 2020

Ms. Lauren Devine
Madison Fields Solar Project, LLC
422 Admiral Blvd
Kansas City, MO 64106

Re: Vegetation Management Plan for the Madison Fields Solar Project, Madison County, Ohio

Dear Ms. Devine:

Stantec Consulting Services Inc. (Stantec) is pleased to provide this vegetation management plan to Madison Fields Solar Project, LLC (Madison Fields) that summarizes conservation measures to be implemented at the Madison Fields Solar Project in Madison County, Ohio (Project). The purpose of this plan is to ensure the vegetation near Project facilities is protected to the extent possible per Ohio Administrative Code 4906-4-08(B)(2)(b)(v) and that areas temporarily disturbed by construction of the Project are stabilized and vegetation is restored as quickly and effectively as possible.

PROJECT INTRODUCTION

Madison Fields Solar Project, LLC proposes to develop a solar energy project on privately owned rural agricultural land in Pike Township near the communities of Rosedale and Mechanicsburg in west-central Ohio. The Project area encompasses approximately 1,932 acres and it is anticipated that the Project will have a footprint of approximately 1,006 acres within the Project area. The Project area is depicted in Figure 1 in Attachment A. A Certificate of Environmental Compatibility and Public Need (CECPN) will be needed from the Ohio Power Siting Board (OPSB) in order to construct the Project.

PROJECT SURVEYS AND VEGETATION IMPACTS

Ecology and Environment, Inc., a WSP member (E & E), completed field-based wetland and stream delineation surveys within the proposed Project boundary in August 2019 and April 2020. Two wetlands were delineated within the Project area totaling 1.7 acres. No streams, drainage features, or ponds were identified during the survey. The delineated wetlands are assumed to be federally jurisdictional waters regulated by the U.S. Army Corps of Engineers (USACE). Madison Fields has prepared preliminary site designs that avoid the wetlands identified during the field survey.

Damage to wetland vegetation will not occur because direct impacts to wetlands have been avoided. Furthermore, appropriate erosion and sediment control measures (e.g., silt fences, straw bale dikes, or other storm water control measures) will be used to mitigate potential indirect impacts that may occur to these aquatic resources during construction as a result of any on-site erosion and sedimentation. These specific measures will be outlined in more detail in the Stormwater Pollution Prevention Plan (SWPPP) that will be prepared for the Project once final design is complete and an Ohio National Pollutant Discharge Elimination System (NPDES) construction stormwater general permit is obtained for the Project. Madison Fields will also implement OEPA Guidance on Post-Construction Storm Water Controls for Solar Panel Arrays to further minimize runoff during operation of the Project (OEPA 2019).

Reference: **Vegetation Management Plan for the Madison Fields Solar Project, Madison County, Ohio**

In addition, E & E conducted a field-based habitat survey to document vegetative communities within the Project area. Habitat is predominately composed of corn (*Zea mays*) and soybean (*Glycine max*) cropland (1,918 acres, approximately 99.2% of the Project area). Scrub-shrub areas (4.5 acres), oak-hickory successional forest (4.3 acres), developed areas (2.9 acres), wetlands (1.7 acres), and old fields (1.2 acres) comprise the remainder of the Project area. Approximately 1,001 acres of agricultural land will be converted to accommodate the Project facilities. Approximately 4.3 acres of forested land and 1.4 acres of scrub-shrub areas will also be cleared during construction, primarily to accommodate the photovoltaic (PV) solar modules, the Project substation/switchyard, and operations and maintenance building. Woody debris generated during the pre-construction site clearing and grubbing process would be segregated, stockpiled, and spread on site, if practical, or hauled off site. Madison Fields will work closely with the construction team to ensure that tree clearing is minimized to the maximum extent practical and that all unnecessary tree clearing is avoided.

PROJECT CONSTRUCTION AND RESTORATION METHODS

Project construction will last approximately 12 months and will generally include clearing and grading; installation of stormwater retention features and laydown yard; access road and foundation construction; installation of Project equipment (racking posts, racking system, PV solar modules, inverters, collection systems, substation and generation tie line); and installation of fencing. Minimal grading and clearing are anticipated. The underground collection system will be installed through open-cut trenching and boring methods.

Permanent stabilization seeding shall be completed immediately following the completion of construction. To the extent possible, Madison Fields will implement the pollinator habitat recommendations provided by ODNR Division of Wildlife and the Madison Soil & Water Conservation District pertaining to the Ohio Pollinator Habitat Initiative. This could include reseeding areas disturbed during construction with a low-growth, native grass seed mix or native prairie grasses for areas under the solar modules and a native species, pollinator-friendly seed mix in select open areas outside of the array and within the Project perimeter fence. Noxious weeds and invasive species will be managed by mechanical means (mowing) and applications of commercially available herbicides in limited quantities, when needed.

The Project is considered to be permanently stabilized when all soil disturbance has occurred and a uniform perennial vegetative cover with a density of 70% has been achieved in all areas of the site not covered by other permanent surfaces. Any seed, straw, and/or matting used within the Project area shall meet Ohio stormwater standards (OEPA 2006).

Vegetation may be used as a way to mitigate potential viewshed impacts that would result from the Project. Madison Fields developed a Visual Impact Mitigation Plan (Exhibit Y to the CECPN Application) that explains the visual impact analysis that was conducted to determine specific landowner's potential viewshed impacts resulting from the Project. Based on the current design, there are approximately 20 residences within 0.5 miles of the Facility footprint. All but six of the residences are over 1,500 feet from the nearest solar panel, with the two closest residences located 1,032 feet and 1,036 feet from the nearest panel. Of the 20 residences that are within 0.5 miles of the Facility footprint, Madison Fields has identified those whose viewshed will be most impacted by the Project and will work with the landowners to mitigate impacts through a Good Neighbor Agreement or vegetative screening. If a landowner determines that vegetative screening is the desired mitigation, a vegetative buffer would be installed between the affected resident and the Project. A typical buffer includes evergreens: 15 feet on center and 6 feet tall at time of

planting, with a row of canopy trees, 5 feet (2 – 2 ½ caliper) at time of planting; and staggered bushes and shrubs, standard 3-gallon sized buckets at time of planting. To the extent practical, native species will be used in the vegetative buffer. An example vegetative buffer detail is included in Attachment A.

PROJECT OPERATION

Site vegetation will be managed on an as-needed basis through mowing during the operational phase of the Project. When feasible, Madison Fields will limit mowing to late summer and fall in order to allow for late-blooming pollinator species to flower. Madison Fields will monitor the site to ensure that noxious weeds do not become established within the Project fence line. Targeted applications of herbicide will be used if noxious weeds are identified.

MONITORING AND REPORTING

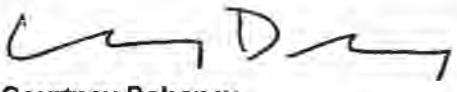
Following establishment of vegetation, Madison Fields will confirm restoration areas have been stabilized in accordance with the SWPPP when a minimum 70% vegetative cover density of erosion resistant perennial species has been achieved. Madison Fields will document that construction areas have been stabilized by conducting a visual inspection of the restoration areas, collecting photographs, and preparing a written report. If trees are planted during Project construction, post-planting maintenance will be conducted in accordance with the supplier's recommendations.

All required permits for construction and operation of the Project will be acquired prior to construction and Madison Fields will abide by all state standards and laws applicable to the Project.

If you have any questions regarding the contents of this plan, please contact me at (312) 636-6848 or courtney.dohoney@stantec.com.

Regards,

Stantec Consulting Services Inc.



Courtney Dohoney
Project Manager

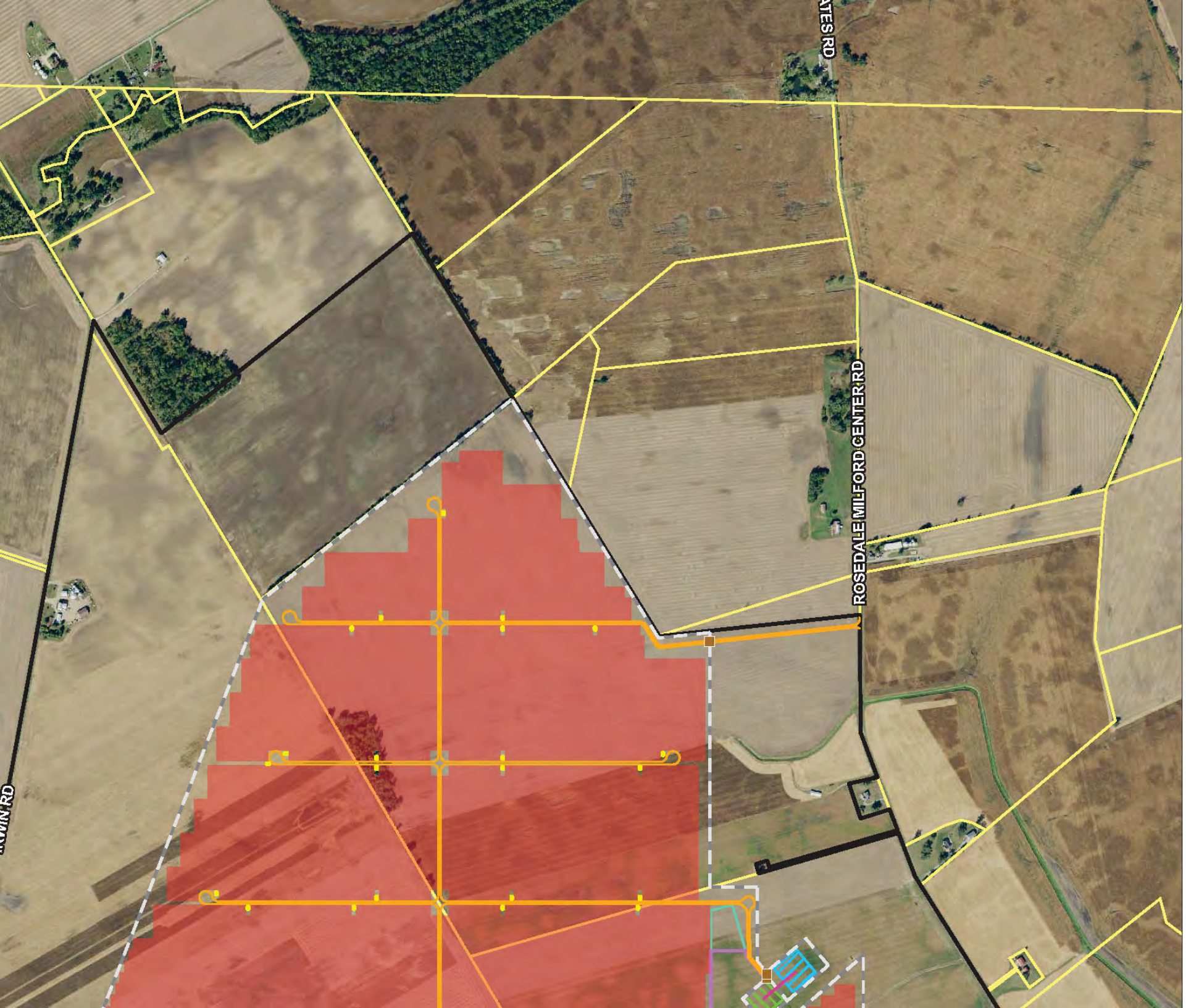
Attachments: Madison Fields Solar Project, Project Site Layout Map
Vegetative Buffer Detail

REFERENCES

Ohio Environmental Protection Agency (OEPA). 2006. *Rainwater and Land Development, Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection. Third Edition*. Columbus, Ohio. Accessed June 2020 at: https://epa.ohio.gov/dsw/storm/rainwater.

OEPA 2019. Guidance on Post-Construction Storm Water Controls for Solar Panel Arrays. Accessed June 2020 at: https://epa.ohio.gov/Portals/35/storm/Guidance%20on%20Post-Construction%20Storm%20Water%20Controls%20for%20Solar%20Panel%20Arrays.pdf?ver=2019-10-22-122431-753

Ohio Administrative Code Chapter 4906-4-08(B)(2)(b)(v). Health and safety, land use and ecological information. Available online at: http://codes.ohio.gov/oac/4906-4-08v1



Client/Project
Madison Fie
Madison Fie

Project Location
Madison County
Ohio

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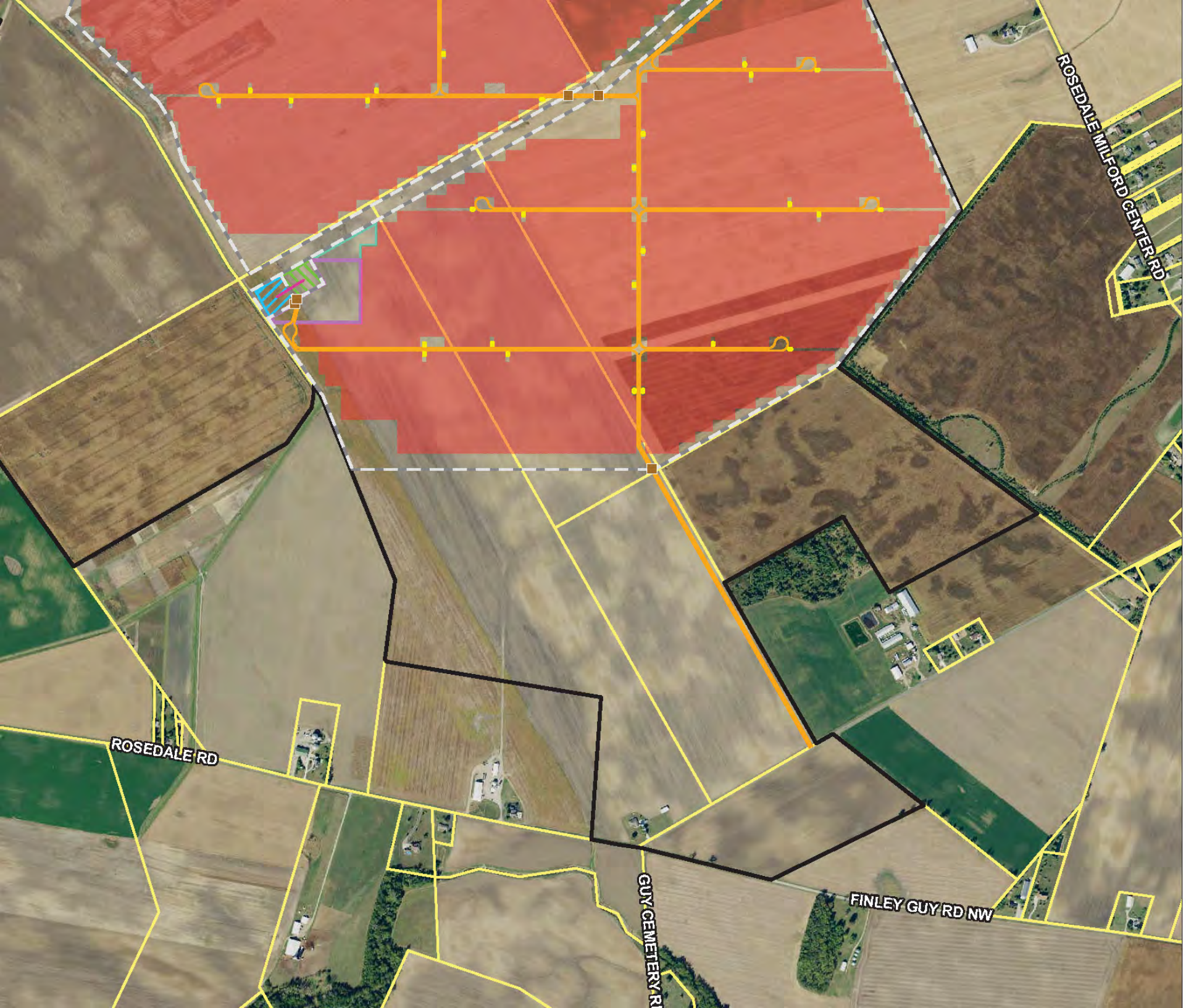
Mutual
village
4

Notes
1. Coordinate System:
2. Data Sources: Stan
3. Background: 2019 N



Client/Project
Madison Fie
Madison Fie

Project Location
Madison County
Ohio

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Legend
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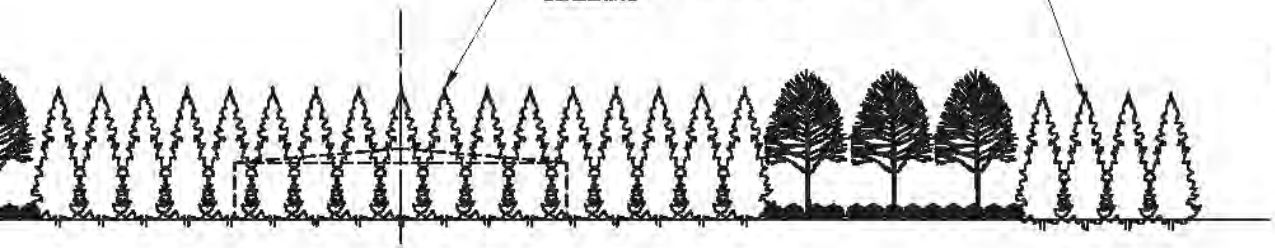
O&M
Subs
Swit

Notes
1. Coordinate System:
2. Data Sources: Stan
3. Background: 2019 N

H TREES)

ROW OF (EVERGREEN TREES)

ROW OF (EVERGREEN TREES) CENTERED ON HABITATED STRUCTURE FOR PRIMARY VIEW SCREENING



PLANTING SCHEME CONCEPT
NOT TO SCALE

PLANT LIST OPTIONS:

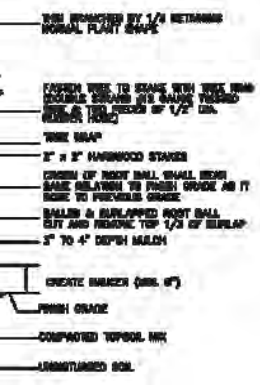
EVERGREEN TREES
TREES WILL BE A COMBINATION OF:
- PINUS NIGRA (AUSTRIAN PINE)
- PINUS STROBUS (WHITE PINE)
- THUJA OCCIDENTALIS (NORTHERN WHITE CEDAR)
- TSUGA CANADENSIS (HEMLOCK)

DECIDUOUS TREES
TREES WILL BE A COMBINATION OF:
- ACER RUBRUM (RED MAPLE)
- ACER SACCHARUM (SUGAR MAPLE)
- CELTIS OCCIDENTALIS (HACKBERRY)
- QUERCUS RUBRA (RED OAK)

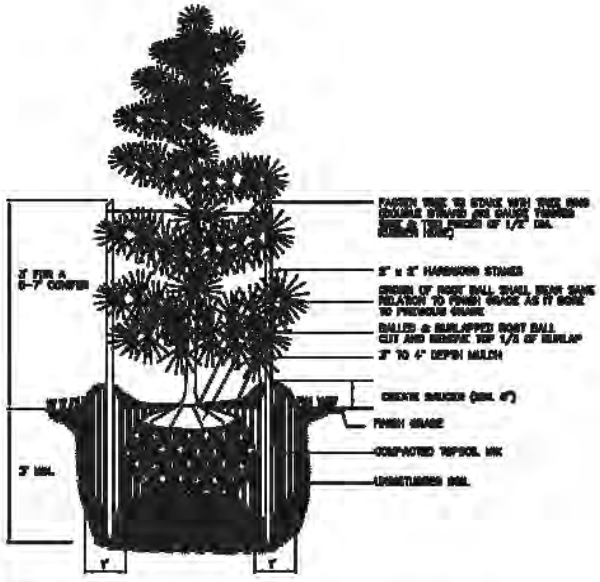
OR SIMILAR

SHRUBS WILL BE A COMBINATION OF:
- VIBURNUM DENTATUM (ARROWWOOD)
- VIBURNUM PRUNIFOLIUM (BLACKHAW)
- PHYSOCARPOS OPULIFOLIUS (NINEBARK)
- FORSYTHIA INTERMEDIA (FORSYTHIA)

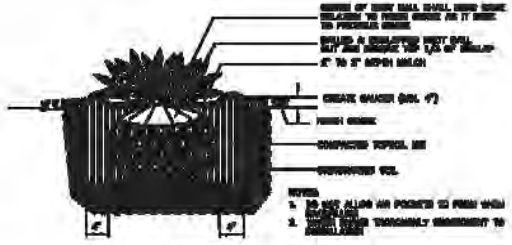
OR SIMILAR



NG DETAIL
PED



CONIFEROUS TREE PLANTING DETAIL
BALLED AND BURLAPPED
NOT TO SCALE



SHRUB PLANTING DETAIL
NOT TO SCALE

SAVION
422 Admiral Boulevard

0	05/
REV	

DRAWING

PROJECT

Exhibit D
Comment Cards

1. **Public Information Meeting Online Questions**
2. **Comment Cards from 1st Public Information Meeting – November 5, 2019**
3. **Comment Cards from 2nd Public Information Meeting – November 6, 2019**

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
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Attorneys for Madison Fields Solar Project, LLC

Exhibit D
Comment Cards

1. Public Information Meeting Online Questions

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
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William Vorys (0093479)
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Attorneys for Madison Fields Solar Project, LLC

MADISON FIELDS
SOLAR PROJECT

The following questions were received via

https://www.madisonfieldssolarproject.com/publicinformationmeeting

Tuesday, June 16, 2020

Form

Name DI Nichols

Phone Number [redacted]

Will you be on the call? Yes

Please let us know your question: Exactly where are the panels going to be placed.
I would like to know how close the eye sore will be to my home/views. Historically what will the facility impact in terms of property values?

Tuesday, June 16, 2020

Form

Name Jodi Taylor

Email [redacted]

Will you be on the call? Yes

Please let us know your question: We already have flooding when there is heavy rain and fields are off. If this causes more flooding and potentially causing our properties unsuitable for housing, do we have recourse through the law after this project is approved?

Exhibit D
Comment Cards

2. Comment Cards from 1st Public Information Meeting – November 5, 2019

Respectfully submitted,

/s/ Christine M.T. Pirik

Christine M.T. Pirik (0029759)
(Counsel of Record)
William Vorys (0093479)
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Attorneys for Madison Fields Solar Project, LLC

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

Love Solar its the future for our Kids + grandkids
We need more of this

(Optional information)

Name: _____

Phone: _____

Email: _____

MFD-SG1069-10302015

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

Good Idea

(Optional information)

Name: _____

Phone: _____

Email: _____

MFD-SG1069-10302019

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

Great to hear
go green!

(Optional information)

Name: _____

Phone: _____

Email: _____

MFD-SG1069-1030201

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

Use LOCAL resources &
bids for possible employment

(Optional information)

Name: _____

Phone: _____

Email: _____

MFD-SG1069-1030201

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

Rosedale needs speed limit signs for the extra 400+ contracted employees!!!

(Optional information)

Name: _____

Phone: _____

Email: _____

MFD-SG1069-10302015

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

Great Idea!

(Optional information)

Name: _____

Phone: _____

Email: _____

MFD-SG1069-10302015

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

HAVE A Presentation & Speaker for Next Meeting!

(Optional information)

Name: _____

Phone: _____

Email: _____

MFD-SG1069-10302019

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

Presentaion to hear what other questions are asked

and I need A Job
I live local

(Optional information)

Name: Bradley Russell

Phone: [redacted]

Email: _____

MFD-SG1069-10302019

MADISON FIELDS SOLAR PROJECT
COMMENT/QUESTION CARD

My comment and big question:
Why doesn't a project like this directly benefit the neighbors who have to deal with the change in view and lessened property values (potentially)?

over →

(Optional information)

Name: Jennifer Miller

Phone: _____

Email: [redacted]

MFD-SG1069-1030201

Some bargaining chips like faster internet and lower electric bills would make for happier neighbors.

Exhibit D
Comment Cards

3. Comment Cards from 2nd Public Information Meeting – November 6, 2019

Respectfully submitted,

/s/ Christine M.T. Pirik

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Attorneys for Madison Fields Solar Project, LLC

ATLANTA FARMS SOLAR PROJECT 2

COMMENT/QUESTION CARD

GO SOLAR GO!!
Madison County wants and needs you!! ☺

(Optional information)

Name: Alex Myers

Phone: [redacted]

Email: [redacted]

ALT-SG1068-10302019

MADISON FIELDS SOLAR PROJECT

COMMENT/QUESTION CARD 2

I am excited to see this project being considered for Madison Fields, and I sincerely hope it is approved.

—a neighbor; former president of Rosedale Bible College; international consulta.

(Optional information)

Name: Richard Showalter

Phone: [redacted]

Email: [redacted]

D-SG1069-10302019

MADISON FIELDS SOLAR PROJECT

2

COMMENT/QUESTION CARD

BRING ON THE PANELS, WE LOVE SOLAR!

(Optional information)

Name: Jacob Roark

Phone: [redacted]

Email: _____

MFD-SG1069-10302019

Exhibit E
Community Engagement

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
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wvorys@dickinsonwright.com

Attorneys for Madison Fields Solar Project, LLC

KAOH MEDIA

Madison Fields Solar Project Facebook Page Report

Overall Metrics

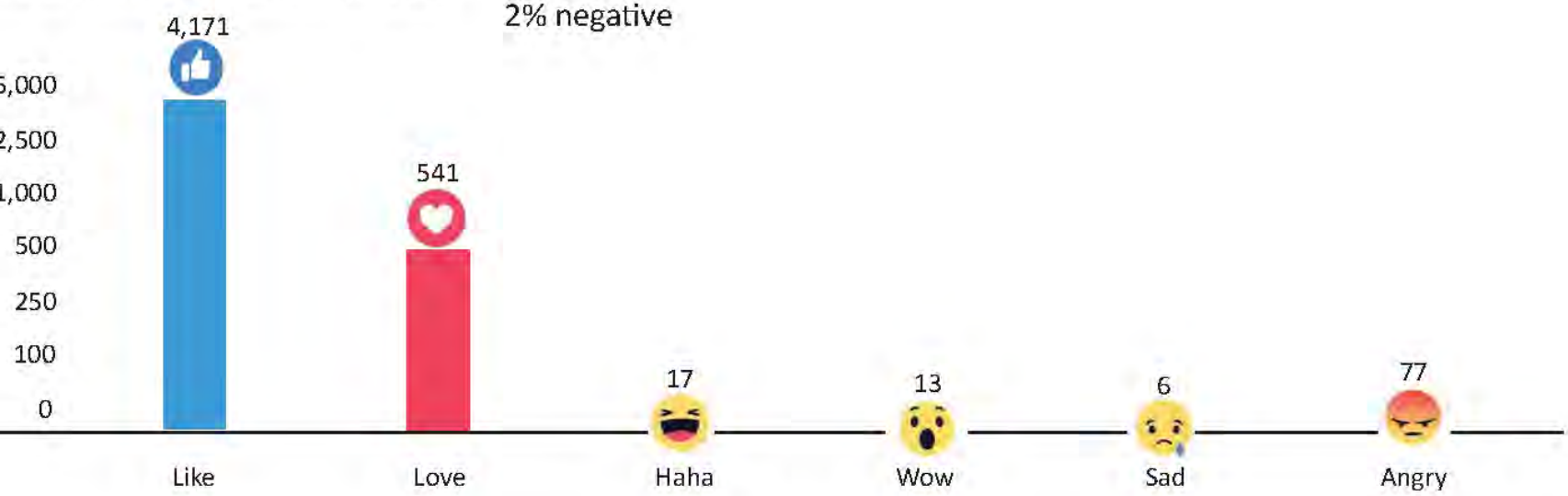
Fans	Engagement	Impressions
209	6.3K	374K

Legend
Fans: Individuals who like the Facebook page
Engagement: Comments, reactions, shares, clicks, and private messages
Impressions: The amount of times a Facebook user saw content from the Facebook page

Sentiment Breakdown

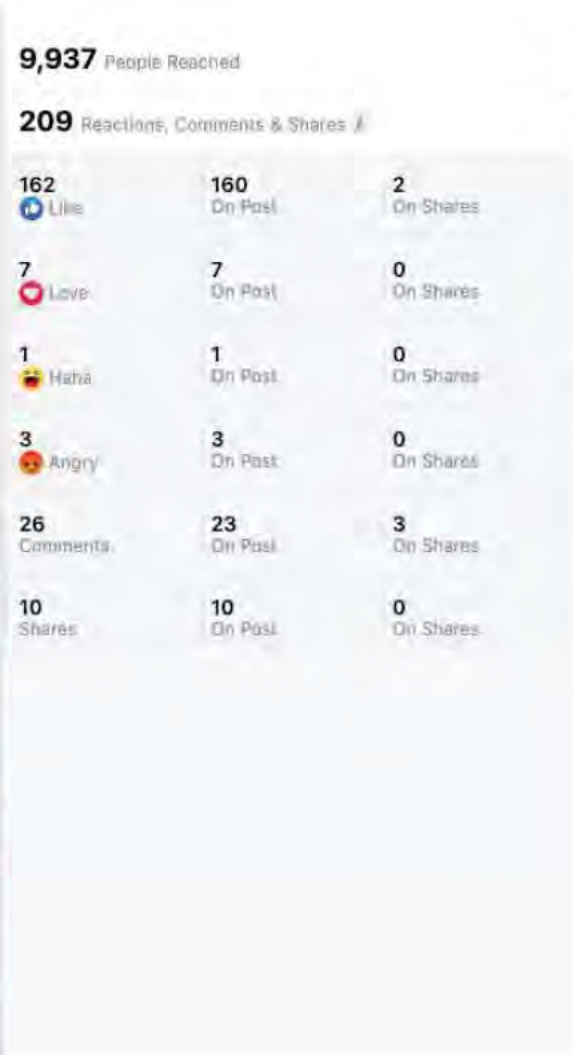
Total number of reactions: 4,825

98% positive
2% negative



Madison Fields Solar Project
Facebook Page Report

Outreach & Highlights



Summary

In this post and many others on the page, Project Manager Sarah Moser made herself available to anyone in on the page who had questions.

With COVID-19 restrictions putting a halt on in-person meetings, individuals who engaged with the page have enjoyed getting to "see" Sarah and gettir to meet her via Facebook.

Madison Fields Solar Project
Facebook Page Report

Outreach & Highlights

10,428 People Reached

182 Reactions, Comments & Shares

106 Like	106 On Post	0 On Shares
3 Love	3 On Post	0 On Shares
9 Angry	9 On Post	0 On Shares
59 Comments	49 On Post	10 On Shares
5 Shares	5 On Post	0 On Shares

Summary

This post highlighted the economic impacts of Madison Fields Solar Project. This post was one of the top performing posts on the page to date. This shows that community members are interested in the economic benefits of the project and are excited to support something that can support their local economy.

Madison Fields Solar Project
Facebook Page Report

Outreach & Highlights

19,937 People Reached		
124 Reactions, Comments & Shares		
88 Like	86 On Post	2 On Shares
2 Love	2 On Post	0 On Shares
2 Wow	2 On Post	0 On Shares
5 Angry	5 On Post	0 On Shares
19 Comments	14 On Post	5 On Shares
8 Shares	7 On Post	1 On Shares

Summary
This post encouraged users to take an action if they support solar energy in Madison County. The majority of those who engaged with the post engaged positively, showing their support for solar.

Exhibit F
Interconnection Studies

1. **PJM Feasibility Study Report – July 31, 2018**
2. **PJM System Impact Study Report – February 28, 2019**

Respectfully submitted,

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

Attorneys for Madison Fields Solar Project, LLC

Exhibit F
Interconnection Studies

1. PJM Feasibility Study Report – July 31, 2018

Respectfully submitted,

/s/ *Christine M.T. Pirik*
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2750 Monroe Blvd.
Valley Forge Corporate Center
Audubon, PA 19403

Via E-mail

July 31, 2018

Madison Fields Solar Project, LLC
16105 West 113th Street
Suite 105
Lenexa, KS 66211

Dear Mr. Cham:

Re: AD2-163 – East Springfield-Mill Creek 138kV – *Feasibility Study Report* and *System Impact Study Agreement*

Attached is a report documenting the results of the AD2-163 Feasibility Study. The intent of the Feasibility Study is to determine a plan, with preliminary cost estimates to connect the subject project to the PJM network at a location specified by the Interconnection Customer. The results of this Feasibility Study are predicated on a future year transmission system based upon PJM's best assumptions at the present time for load growth and connection of proposed new generation additions. The project was evaluated for system normal conditions and single contingency outage conditions.

Feasibility Studies are performed to provide an Interconnection Customer with preliminarily estimated reinforcement costs and information concerning both direct connection facilities and potential transmission network upgrades. Since the analysis inherently has to include assumptions for future system conditions, the results should be used in this context. More comprehensive estimates will be developed upon execution of a System Impact Study Agreement in accordance with Part VI of the PJM Tariff.

As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Attachment Facilities, which are new facilities and/or facilities upgrades needed to connect the project to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. In some instances a project may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g., another interconnection project, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. Note that Tariff §212.5 milestones require that you have all site permits, water and fuel agreements and associated right of way, and a memorandum of understanding for major equipment at the time

you return your executed Interconnection Service Agreement (ISA). It is your responsibility to ensure these requirements are met and if they cannot be met at the time of the return of the ISA, you must demonstrate your due diligence and propose dates when those milestones will be met.

In addition, the Feasibility Study estimates do not include any the costs associated with engineering and constructing the equipment and facilities on the developer's side of the point of interconnection. These costs are the responsibility of the project developer.

Please be advised that the System Impact Study deposit may be used to satisfy any outstanding Feasibility Study costs. The costs associated with the Feasibility Study are being tabulated and you will receive a final statement/invoice electronically from PJM detailing your balance and the System Impact Study deposit applied to that balance.

Pursuant to Section 204.3 of the PJM Tariff, enclosed is a copy of a System Impact Study Agreement for your consideration. The necessary deposit and executed agreement must be in the possession of PJM within thirty days (by close of business on **August 31, 2018**) to maintain the project's position in the queue. In addition, your project's electrical data sheet must be completed and submitted electronically through Queue Point by the above date for the Impact Study Agreement to be considered complete. The data sheet is located here: http://www.pjm.com/planning/rtep-development/expansion-plan-process/form-impact-study-data.aspx. Failure to submit this data by the due date will result in the withdrawal of your project.

Please use the DocuSign system for executing the System Impact Study Agreement: A link to the agreement will be sent via email and each recipient will have the ability to sign the agreement, or to assign the agreement to someone else for signature. Upon receipt of the executed agreement, and the required deposit, PJM will process the agreement accordingly and the DocuSign system will automatically return one (1) fully executed (electronic) copy to each party to the agreements.

Required with the signed agreement, per Section 3 of the enclosed System Impact Study Agreement is a deposit of **$90,000**. Please send the agreement, signed signature pages and check to:

Jeannette Mittan
PJM Interconnection, LLC
Valley Forge Corporate Center
2750 Monroe Blvd.
Audubon, PA 19403

The following information is provided for wire transfers:

Bank: PNC Bank, NA, New Jersey
ABA Number: 031-207-607
Account Number: 8013589826

Please e-mail Jeannette Mittan at jeannette.mittan@pjm.com with the project name, queue number, date and amount of wire.

In addition to the executed System Impact Study Agreement and deposit, you are responsible to ensure that all queue requests that you may have in the PJM queue are in good financial standing and that you meet the requirements of Tariff §204.3. Failure to meet the requirements of Tariff §204.3 or have your accounts in good standing will result in your project to be withdrawn from the queue. It is your responsibility to meet these requirements.

If you wish to discuss the results of the study report or the agreement with me, please let me know. My office telephone number is 610-666-4306 and my email address is Komal.Patel@pjm.com.

Sincerely,

Komal Patel

Engineer
PJM Interconnection Projects

Attachments

PJM (w/attachments): Dave Cardy – FE
Stephanie Dalton – FE
Valerie Davin – FE
Beth Snyder – FE
Rachel Elkins – FE
Joyce Tarner – FE
Mike Thorn – FE
Lea Jenkins – FE
DJ Solomon – FE

Chibu Ofoegbu – PJM
File

Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AD2-163

East Springfield-Mill Creek 138kV

July 2018

Preface

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

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

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

General

Madison Fields Solar Project, LLC, the Interconnection Customer (IC), has proposed a Solar generating facility located in Madison County, Ohio. The installed facilities will have a total capability of 180 MW with 120.7 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is December 1, 2021. **This study does not imply a ATSI commitment to this in-service date.**

Point of Interconnection

AD2-163 will interconnect with the ATSI transmission system along the East Springfield - Tangy 138 kV Line.

Cost Summary

The AD2-163 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ 0
Direct Connection Network Upgrades	$ 8,166,200
Non Direct Connection Network Upgrades	$ 31,067,900
Total Costs	**$ 39,234,100**

In addition, the AD2-163 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	$ 1,150,000
Previously Identified Upgrades	$ 0
Total Costs	**$ 1,150,000**

Cost allocations for these upgrades will be provided in the System Impact Study Report.

General Information

Interconnection Customer ("IC"): Madison Fields Solar Project, LLC Queue Position: AD2-163

Interconnected Transmission Owner ("TO"): American Transmission Systems, Incorporated ("ATSI")

Affected TO(s) (if applicable): American Transmission Systems, Incorporated ("ATSI")

PJM Zone: ATSI

FE Operating Company or Planning Region: Ohio Edison - Southern

Customer Connection Request

Requested Backfeed Date: 08/01/2021 Requested Commercial Operation Date: 12/01/2021

This study does not imply a FirstEnergy commitment to these dates.

New Facilities		Existing Facilities	
Capacity:	120.7 MW	Capacity:	N/A
Energy:	180 MW	Energy:	N/A
MFO[1]:	180 MW	MFO:	N/A
Fuel:	Solar	Prior Queue Position(s):	N/A

[1] Maximum Facility Output

Attachment Facilities

No Attachment Facilities are required to support this interconnection request.

Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Activity Cost	Tax (if applicable)	Total Cost
138kV Three Breaker Ring Bus Generation Interconnection at AD2-163 Interconnection	$ 8,166,200	$ 1,106,200	$ 9,272,400
Total Direct Connection Facility Costs	**$ 8,166,200**	**$ 1,106,200**	**$ 9,272,400**

Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Activity Cost	Tax (if applicable)	Total Cost
Loop in existing East Springfield-Tangy 138kV Line to create AD2-163-Tangy 138kV Line. Install approximately 25.5 miles of OPGW from AD2-163 to Tangy substation.	$ 16,980,100	$ 2,250,500	$ 19,230,600
Loop in existing East Springfield-Tangy 138kV Line to create AD2-163-Tangy 138kV Line. Install approximately 19.7 miles of OPGW from AD2-163 to East Springfield substation.	$ 13,312,700	$ 1,764,400	$ 15,077,100
East Springfield 138kV line exit at Tangy SS: Replace line relaying with 411Ls. Add fiber termination rack and conduit for fiber.	$ 160,900	$ 21,700	$ 182,600
Tangy 138kV line exit at East Springfield SS: Replace circuit breaker & line relaying, add arresters, fiber termination rack and conduit for fiber.	$ 614,200	$ 83,500	$ 697,700
Total Non-Direct Connection Facility Costs	**$ 31,067,900**	**$ 4,120,100**	**$ 35,188,000**

Connection Facility Requirements

The interconnection of the project at the Primary POI will be accomplished by constructing a new 138 kV three (3) breaker ring bus and looping the East Springfield - Tangy 138 kV Line into the new station. The new substation will be located approximately 19.7 miles from East Springfield substation and will be owned and operated by FE upon completion. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection switching station and the associated attachment facilities. The IC will also be responsible for the rough grade of the property and an access road to the proposed three breaker ring bus site. The project will also require non-direct connection upgrades at East Springfield and Tangy substations.

A summary of the connection facilities that will be required for the Primary POI and their estimated costs are shown in the following table. Based on this scope of work, it is expected to take a minimum of 29 months after the signing of an Interconnection Construction Service Agreement. This includes preliminary payment that compensates FE for the first three months of the engineering design work that is related to the construction of the AD2-163 interconnection substation. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined direct connection, and that PJM will allow all transmission system outages when requested. Due to the scope of work and estimated time to design and build, FE may not be able to meet the customer's requested commercial operation date.

Interconnection Customer Requirements

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

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

3. The purchase and installation of a fully rated 138 kV circuit breaker to protect the AD2-163 generator lead line. A single circuit breaker must be used to protect this line; if the project has several GSU transformers, the individual GSU transformer breakers cannot be used to protect this line.

4. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

5. The purchase and installation of supervisory control and data acquisition ("SCADA") equipment to provide information in a compatible format to the FE Transmission System Control Center.

6. Compliance with the FE and PJM generator power factor and voltage control requirements.

7. The execution of a back-up service agreement to serve the customer load supplied from the AD2-163 generation project metering point when the units are out-of-service. This assumes the intent of the IC is to net the generation with the load.

8. The IC shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the FE transmission system.

Revenue Metering, SCADA, & Protection Requirements

PJM Requirements

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

Metering

The IC will be require to comply with all FE revenue metering requirements for generation interconnection customers which can be found in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx.

FE Requirements

The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:

http://www.firstenergycorp.com/feconnect
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

System Protection

The IC must design it's Customer Facilities in accordance with all applicable standards, including the standards in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx. Preliminary Protection requirements will be provided as part of the Facilities Study. Detailed Protection Requirements will be provided once the project enters the construction phase.

Network Impacts

The Queue Project AD2-163 was evaluated as a 180.0 MW (Capacity 120.7 MW) injection tapping the East Springfield to Tangy 138kV line in the ATSI area. Project AD2-163 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-163 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis – 2021

Generator Deliverability

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

None.

Multiple Facility Contingency

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

None.

Contribution to Previously Identified Overloads

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

None.

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

#	Area	Bus No.	Bus	Breaker	Rating Type	Duty Percent Without AD2-163	Duty Percent With AD2-163	Duty Percent Difference
1	AEP	243485	05CLINTO 138.kV	101	S	99.95%	100.01%	0.05%
2	AEP	243485	05CLINTO 138.kV	102	S	99.95%	100.01%	0.05%
3	AEP	243529	05KENNY 138.kV	102	S	99.95%	100.00%	0.05%
4	AEP	243529	05KENNY 138.kV	106	S	99.95%	100.00%	0.05%

Contributions to previously identified circuit breakers found to be over-duty:

None.

Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

Steady State Voltage Studies to be conducted during later study phases

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

Stability Studies to be conducted during later study phases

Affected System Analysis & Mitigation

MISO Impacts:

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

Winter Analysis - 2021

Winter Studies to be conducted during later study phases

Light Load Analysis - 2021

Light Load Studies to be conducted during later study phases

Potential Congestion due to Local Energy Deliverability

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

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

None.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

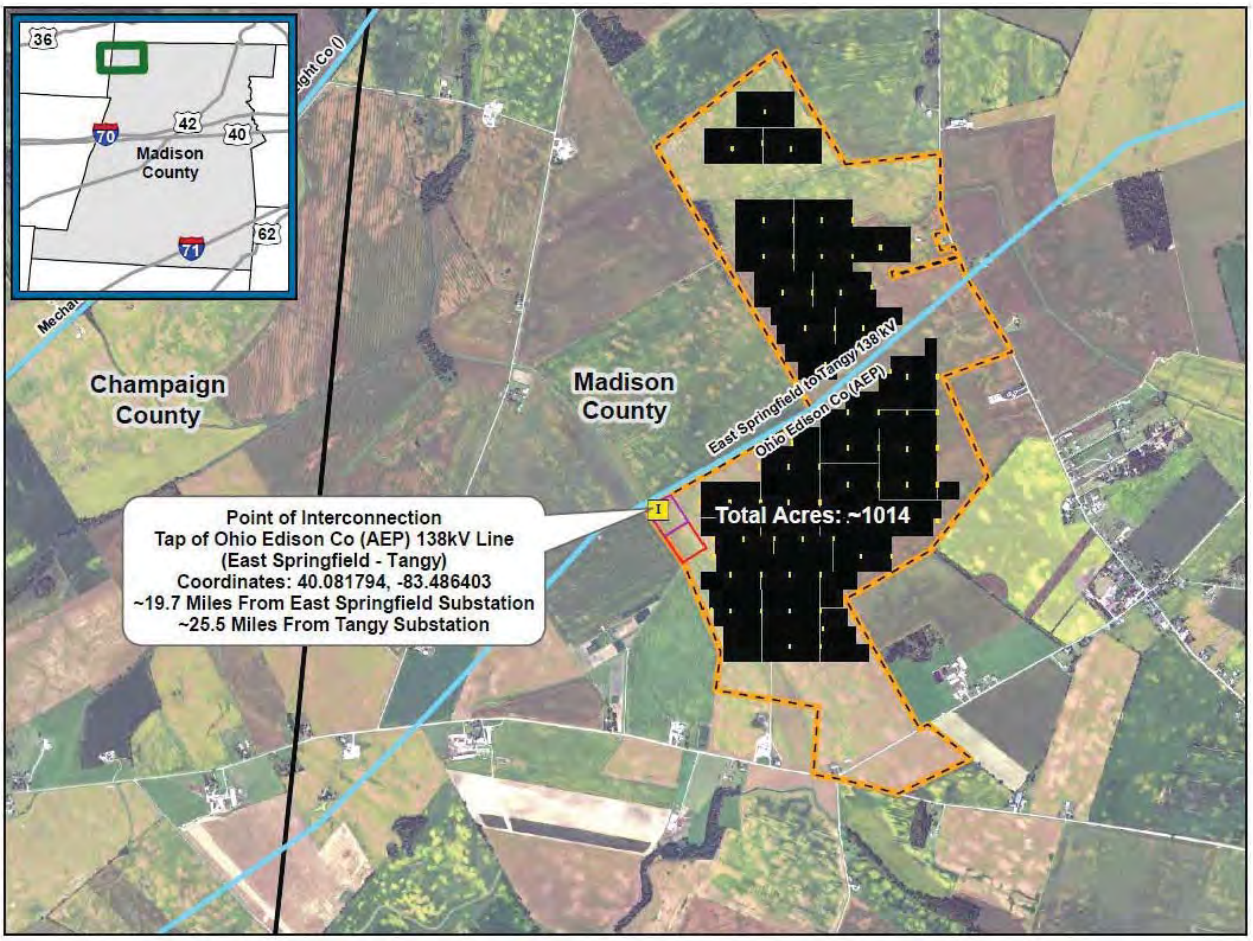
Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
#1, 2	Clinton 101 and 102 circuit breakers	In order to mitigate the overloads of facilities above, the following reinforcements are required: • Replace two 138kV circuit breakers at the Kenny 138kV switchyard. This reinforcement was identified as a supplemental project (#S1334); Therefore the AD2-163 project does not have cost responsibility for this upgrade, however it may be responsible for acceleration costs. AD2-163 would be subject to interim deliverability Studies until this project this project is completed.	S1334	**$ 0**
#3, 4	Kenny 102 and 106 circuit breakers	In order to mitigate the overloads of facilities above, the following reinforcements are required: • Replace two 138kV circuit breakers at the Kenny 138kV switchyard The estimated schedule duration is 12 months.		**$ 1,150,000**
			Total New Network Upgrades	**$ 1,150,000**

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

None.

Attachment 1. Project Location



Attachment 2. Single Line Diagram

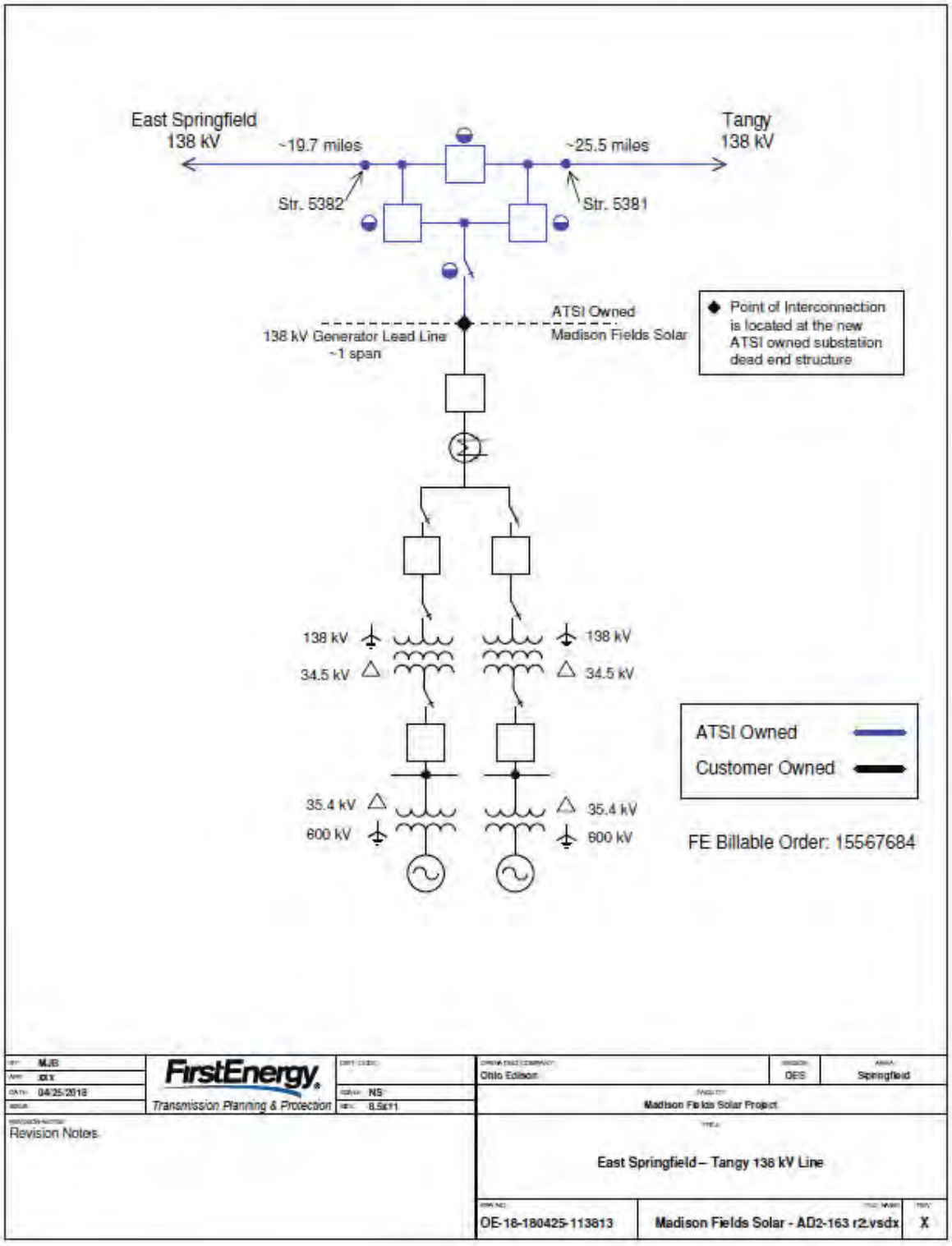


Exhibit F
Interconnection Studies

2. PJM System Impact Study Report – February 28, 2019

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
William Vorys (0093479)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
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cpirik@dickinsonwright.com
wvorys@dickinsonwright.com

Attorneys for Madison Fields Solar Project, LLC

2750 Monroe Blvd.
Valley Forge Corporate Center
Audubon, PA 19403

Via E-mail

February 28, 2019

Madison Fields Solar Project, LLC
16105 West 113th Street
Suite 105
Lenexa, KS 66211

Dear Mr. Cham:

Re: AD2-163 – East Springfield-Mill Creek 138kV – *System Impact Study Report – Facilities Study Agreement*

Enclosed, please find a report documenting the results of the AD2-163 System Impact Study. The results of this study are predicated on a year **2021** transmission system, based on PJM's best assumptions at the present time for load growth and for connection of proposed new generation additions. Short circuit duty screening was performed. Stability Analysis is being performed and will be provided in the future (Revised Impact Study Report).

System Impact Studies are performed to determine the facilities required for interconnection and to define the estimated cost and timing for construction of attachment and direct connection network facilities, transmission and local network upgrades required for the reliable interconnection of a generation project to the PJM system. The attachment and direct connection facilities, transmission and local network upgrade costs and associated timing described in the enclosed report are based upon estimates given to PJM by the affected Transmission Owner(s). The costs are your responsibility as the project developer.

Costs for the System Impact Study are being tabulated and you will receive an invoice for any amount owed to PJM for the analysis.

Pursuant to Section 207 of the PJM Tariff, attached is a Facilities Study Agreement for your consideration. The Agreement must be executed and in PJM's possession within thirty days (by close of business on **April 1, 2019**) to maintain the project's position in the queue. Please execute two copies of the signature page. A refundable deposit in the amount of **$100,000** must accompany the agreement and be in PJM's possession by the deadline stated above. In addition, this and any other queue requests that you may have in the PJM queue must be in good financial standing, and all information requested in the Milestones (Section 6) portion of the Agreement are required to accompany the signed agreement. Failure to meet these requirements will result in the project's withdrawal from the PJM queue. Please send the executed agreement, with two executed copies of the signature page, and required study deposit to:

Jeannette Mittan
PJM Interconnection, LLC

Valley Forge Corporate Center
2750 Monroe Blvd.
Audubon, PA 19403

The following information is provided for wire transfers:

Bank: PNC Bank, NA, New Jersey
ABA Number: 031-207-607
Account Number: 8013589826

Please e-mail Jeannette Mittan at jeannette.mittan@pjm.com with the project name, queue number, date and amount of wire.

Note that Tariff §212.5 milestones require that you have all site permits, water and fuel agreements and associated right of way, and a memorandum of understanding for major equipment at the time you return your executed Interconnection Service Agreement (ISA). It is your responsibility to ensure these requirements are met and if they cannot be met at the time of the return of the ISA, you must demonstrate your due diligence and propose dates when those milestones will be met. PJM will amend ISA §6 to reflect any revised milestone dates.

If you wish to discuss the results of the study report or the agreement with me, please let me know. My office telephone number is 610-666-4306 and my email address is Komal.Patel@pjm.com.

Sincerely,

Komal Patel

Engineer
PJM Interconnection Projects

Attachments

PJM (w/attachments): Dave Cardy – FE
Stephanie Dalton – FE
Valerie Davin – FE
Rachel Elkins – FE
Rita Zaltsberg – FE
Joyce Tamer – FE
Mike Thorn – FE
Ryan Leon – FE
DJ Solomon – FE

Chibu Ofoegbu – PJM
File

Generation Interconnection System Impact Study Report

For

PJM Generation Interconnection Request Queue Position AD2-163

East Springfield-Mill Creek 138kV

February 2019

Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

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

General

Madison Fields Solar Project, LLC, the Interconnection Customer (IC), has proposed a Solar generating facility located in Madison County, Ohio. The installed facilities will have a total capability of 180 MW with 120.7 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is December 1, 2021. **This study does not imply a ATSI commitment to this in-service date.**

Point of Interconnection

AD2-163 will interconnect with the ATSI transmission system along the East Springfield - Tangy 138 kV Line.

Cost Summary

The AD2-163 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ 302,400
Direct Connection Network Upgrades	$ 11,337,400
Non Direct Connection Network Upgrades	$ 752,400
Allocation for New System Upgrades	$ 0
Contribution for Previously Identified Upgrades	$ 0
Total Costs	**$ 12,392,200**

The transmission and substation costs given above exclude the Contribution in Aid of Construction ("CIAC") Federal Income Tax Gross up charge. If at a future date Federal CIAC taxes are deemed necessary by the IRS for this project, ATSI shall be reimbursed by the Interconnection Customer for such taxes. ATSI estimates the tax, if applicable, would be approximately $1,590,300.

General Information

Interconnection Customer ("IC"): Madison Fields Solar Project, LLC Queue Position: AD2-163

Interconnected Transmission Owner ("TO"): American Transmission Systems, Incorporated ("ATSI")

Affected TO(s) (if applicable): American Transmission Systems, Incorporated ("ATSI")

PJM Zone: ATSI

FE Operating Company or Planning Region: Ohio Edison - Southern

Customer Connection Request

Requested Backfeed Date: 08/01/2021 Requested Commercial Operation Date: 12/01/2021

This study does not imply a FirstEnergy commitment to these dates.

New Facilities		Existing Facilities	
Capacity:	120.7 MW	Capacity:	N/A
Energy:	180 MW	Energy:	N/A
MFO[1]:	180 MW	MFO:	N/A
Fuel:	Solar	Prior Queue Position(s):	N/A

Point of Interconnection

Primary Point of Interconnection: East Springfield – Tangy (future Broadview – Tangy) 138 kV Line

[1] Maximum Facility Output

Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Activity Cost
Install attachment facility line, line disconnect switch, and associated hardware to accept the Interconnection Customer generator lead line terminating at the AD2-163 Interconnection switching station. PJM Network Upgrade n5865.	$ 300,000
Customer-owned 138 kV revenue metering at AD2-163 Madison Fields Solar generation facility. (included in PJM Network Upgrade n5865)	$ 2,400
Total Attachment Facility Costs	**$ 302,400**

Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Activity Cost
138 kV Three Breaker Ring Bus Generation Interconnection @ AD2-163 Interconnection SS. PJM Network Upgrade n5866	$ 10,177,300
Project Management, Commissioning, Environmental, Forestry, Real Estate, and SCADA. (included in PJM Network Upgrade n5866)	$ 1,160,100
Total Direct Connection Facility Costs	**$ 11,337,400**

Non-Direct Connection Cost Estimate

There are no Non-Direct Connection Facilities are required to support this interconnection.

Description	Activity Cost
Cut the East-Springfield-Tangy 138 kV Line and terminate the line inside the proposed AD2-163 ring bus in an in-out configuration @ East Springfield - Tangy 138 kV Line. PJM Network Upgrade n5867	$ 368,600
Adjust remote, relaying, and metering settings, and Replace 138 kV wave trap, line tuner, and coax at Tangy 138kV Sub. PJM Network Upgrade n5868	$ 118,000
Adjust remote, relaying, and metering settings, and Replace 138 kV wave trap, line tuner, and coax. Also replace line and carrier relaying at East Springfield 138 kV Sub. PJM Network Upgrade n5869	$ 265,800
Total Non-Direct Connection Facility Costs	**$ 752,400**

Transmission Owner Scope of Work

The interconnection of the project at the Primary POI will be accomplished by constructing a new 138 kV three (3) breaker ring bus and looping the East Springfield – Tangy (future Broadview – Tangy) 138 kV Line into the new station. The new substation will be located approximately 19.7 miles from East Springfield and will be owned and operated by FE upon completion. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection switching station and the associated attachment facilities. The IC will also be responsible for the rough grade of the property and an access road to the proposed three breaker ring bus site. The project will also require non-direct connection upgrades at East Springfield and Tangy substations.

A summary of the connection facilities that will be required for the Primary POI and their estimated costs are shown in the following table. Based on this scope of work, it is expected to take a minimum of 28 months after the signing of an Interconnection Construction Service Agreement. This includes preliminary payment that compensates FE for the first three months of the engineering design work that is related to the construction of the AD2-163 interconnection substation. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined direct connection, and that PJM will allow all transmission system outages when requested. Due to the scope of work and estimated time to design and build, FE may not be able to meet the customer's requested commercial operation date.

Interconnection Customer Requirements

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

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

3. The purchase and installation of a fully rated 138 kV circuit breaker to protect the AD2-163 generator lead line. A single circuit breaker must be used to protect this line; if the project has several GSU transformers, the individual GSU transformer breakers cannot be used to protect this line.

4. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

5. The purchase and installation of supervisory control and data acquisition ("SCADA") equipment to provide information in a compatible format to the FE Transmission System Control Center.

6. Compliance with the FE and PJM generator power factor and voltage control requirements.

7. The execution of a back-up service agreement to serve the customer load supplied from the AD2-163 generation project metering point when the units are out-of-service. This assumes the intent of the IC is to net the generation with the load.

8. The IC will also be required to meet all PJM, ReliabilityFirst, and NERC reliability criteria and operating procedures for standards compliance. For example, the IC will need to properly locate and report the over and under voltage and over and under frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and ReliabilityFirst audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the FE system.

9. The IC shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the FE transmission system.

Revenue Metering, SCADA, & Protection Requirements

PJM Requirements

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

Metering

The IC will be require to comply with all FE revenue metering requirements for generation interconnection customers which can be found in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx.

FE Requirements

The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:

http://www.firstenergycorp.com/feconnect
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

System Protection

The IC must design it's Customer Facilities in accordance with all applicable standards, including the standards in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-

firstenergy.aspx. Preliminary Protection requirements will be provided as part of the Facilities Study. Detailed Protection Requirements will be provided once the project enters the construction phase.

Short Circuit

Short Circuit Values

The 138 kV fault values for the AD2-163 interconnection location with all new generation out of service are:

Three phase = 6.2 kA

Single line to ground = 4.3 kA

Z1= (2.052+ j 6.51) %

Z0= (4.35 + j 14.91) %

Impedances are given on 100 MVA and 138 kV bases. The faults provided are bolted, symmetrical values for normal system conditions. Future increases in fault currents are possible and it is the customer's responsibility to upgrade their equipment and/or protective equipment coordination when necessary.

FE System Modifications

East Springfield Substation

138 kV Transmission Line Protection

- AD2-163 Interconnecting Station line exit Relaying
- Primary relay: SEL-421 relay pilot protection over PLC with BF DTT and AI DTT
- Backup relay: SEL-421 relay pilot protection over PLC with BF DTT and AI DTT

Tangy Springfield Substation

138 kV Transmission Line Protection

- AD2-163 Interconnecting Station line exit Relaying
- Primary relay: SEL-421 relay pilot protection over PLC with BF DTT and AI DTT
- Backup relay: SEL-421 relay pilot protection over PLC with BF DTT and AI DTT

Settings Changes

- Settings changes are possible at remote substations.

General Connection Requirements

The AD2-163 delivery point substation (DPS) is a 138 kV three-breaker ring bus on the East Springfield-Tangy (Future Broadview – Tangy) 138 kV Line, see Attachment 1.

The existing line relays at East Springfield and Tangy require replacement.

Line protection between East Springfield and AD2-163 and between Tangy and AD2-163 shall consist of two independent SEL-421 line schemes with pilot protection over PLC for each 138 kV Line, at each terminal.

At the AD2-163 DPS, each 138 kV breaker shall have breaker failure-to-trip protection. SEL-501 relays are acceptable for this application.

Protection of the 138 kV Generator Lead Line of approximately 0.1 miles shall consist of two SEL-411L line current differential schemes with pilot communication over fiber optic cable, at each terminal.

Protection Requirements

AD2-163 138 kV Interconnecting Substation

138 kV Transmission Line Protection

- East Springfield line exit
- Primary relay: SEL-421 relay with pilot protection over PLC with BF DTT and AI DTT
- Backup relay: SEL-421 relay with pilot protection over PLC with BF DTT and AI DTT

- Tangy line exit
- Primary relay: SEL-421 relay with pilot protection over PLC with BF DTT and AI DTT
- Backup relay: SEL-421 relay with pilot protection over PLC with BF DTT and AI DTT

- AD2-163 generating facility
- Primary relay: SEL-411L with current differential and AI DTT
- Backup relay: SEL-411L with current differential and AI DTT

138 kV Breaker Failure to Trip Protection

- 138 kV Breaker Failure to Trip Relaying – SEL501 relay per breaker

138 kV AD2-163 Interconnecting Station Communications

- AD2-163 Interconnecting Station to East Springfield and Tangy for use with primary and backup SEL-421 with PLC pilot protection and BF DTT and AI DTT
- AD2-163 Interconnecting Station to AD2-163 generating facility
    - Dual, independent fiber-optic cable paths with dedicated fibers for use with the SEL-411L primary and backup relaying
        - Minimum of 12 fibers, separate primary and backup fiber cables

AD2-163 Generating Station 138 kV

138 kV Transmission Line Protection @ AD2-163 generating station

- AD2-163 Interconnecting Station line exit
- Primary relay: SEL-411L relay with line current differential protection over fiber and AI receive
- Backup relay: SEL-411L relay with line current differential protection over fiber and AI receive
- Synch check for manual/SCADA close on the interconnecting line to be done at AD2-163 Generating Station

138 kV Breaker Failure to Trip Protection

- 138 kV Breaker Failure to Trip Relaying
  - SEL-352-2 breaker failure to trip relaying on AD2-163 138 kV Generating Station breaker. The breaker failure to trip relaying on the AD2-163 Interconnecting Station line exit breaker shall initiate direct transfer trip via the SEL-411L primary and backup line relays (fiber).

138 kV Bus & GSU Transformer Protection @ AD2-163 generating station (minimum protection to meet FE requirements)

- Dual, independent transformer differential protection schemes (Transformer and Overall)
- Transformer neutral time overcurrent relay

The Connecting Party shall provide utility-grade relays for protection of the FE Transmission System. FE shall approve all relays specified for the protection of the FE Transmission System, including time delay and auxiliary relays. Relay operation for any of the listed functions that are required shall initiate immediate separation of the parallel generation from the FE Transmission System:

Relay	Function
Frequency	To detect under-frequency and over-frequency operation.
Overvoltage	To detect overvoltage operation.
Undervoltage	To detect undervoltage operation.
Ground Fault Detector	To detect a circuit ground on the FE Transmission System.
Phase Fault Detector	To detect phase to phase faults on the FE Transmission System.
Transfer Trip Receiver	To provide tripping logic to the generation owner for isolation of the generation upon opening of the FE supply circuits.
Directional Power	To detect, under all system conditions, a loss of FE primary source. The relay shall be sensitive enough to detect transformer magnetizing current supplied by the generation.

Network Impacts

The Queue Project AD2-163 was evaluated as a 180.0 MW (Capacity 120.7 MW) injection into a tap of the East Springfield – Mill Creek 138 kV line in the ATSI area. Project AD2-163 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-163 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

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

None.

Light Load Analysis - 2021

Light Load Studies to be conducted during later study phases (applicable to wind, coal, nuclear, and pumped storage projects).

Not Required.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)

None.

Short Circuit

(Summary of impacted circuit breakers)

None.

Contribution to Previously Identified Overloads

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

None.

Affected System Analysis & Mitigation

MISO Impacts:

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

Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

Stability Study to be provided in the future (revised Impact Study Report)

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

Stability Study to be provided in the future (revised Impact Study Report)

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

None.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

None.

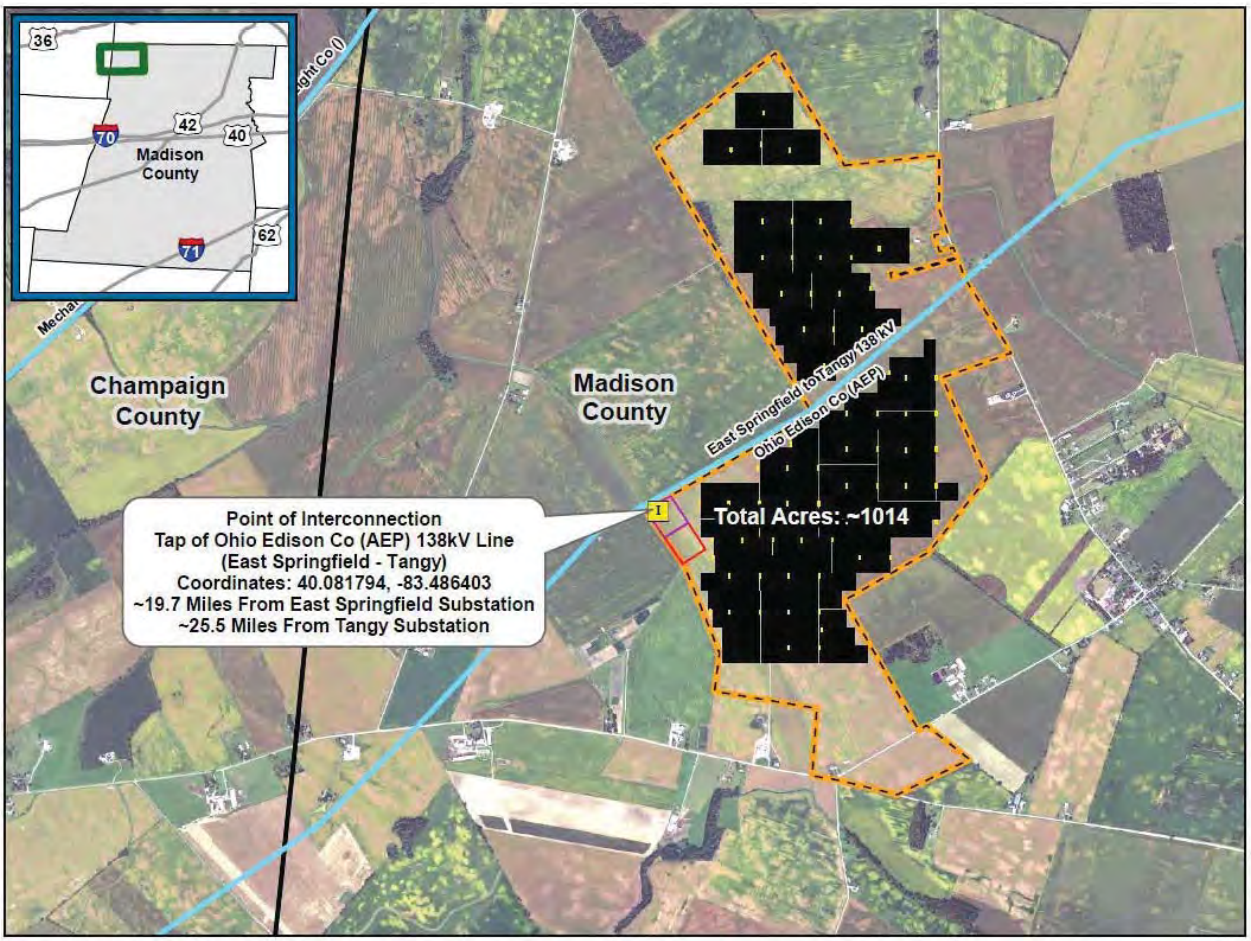
Potential Congestion due to Local Energy Deliverability

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

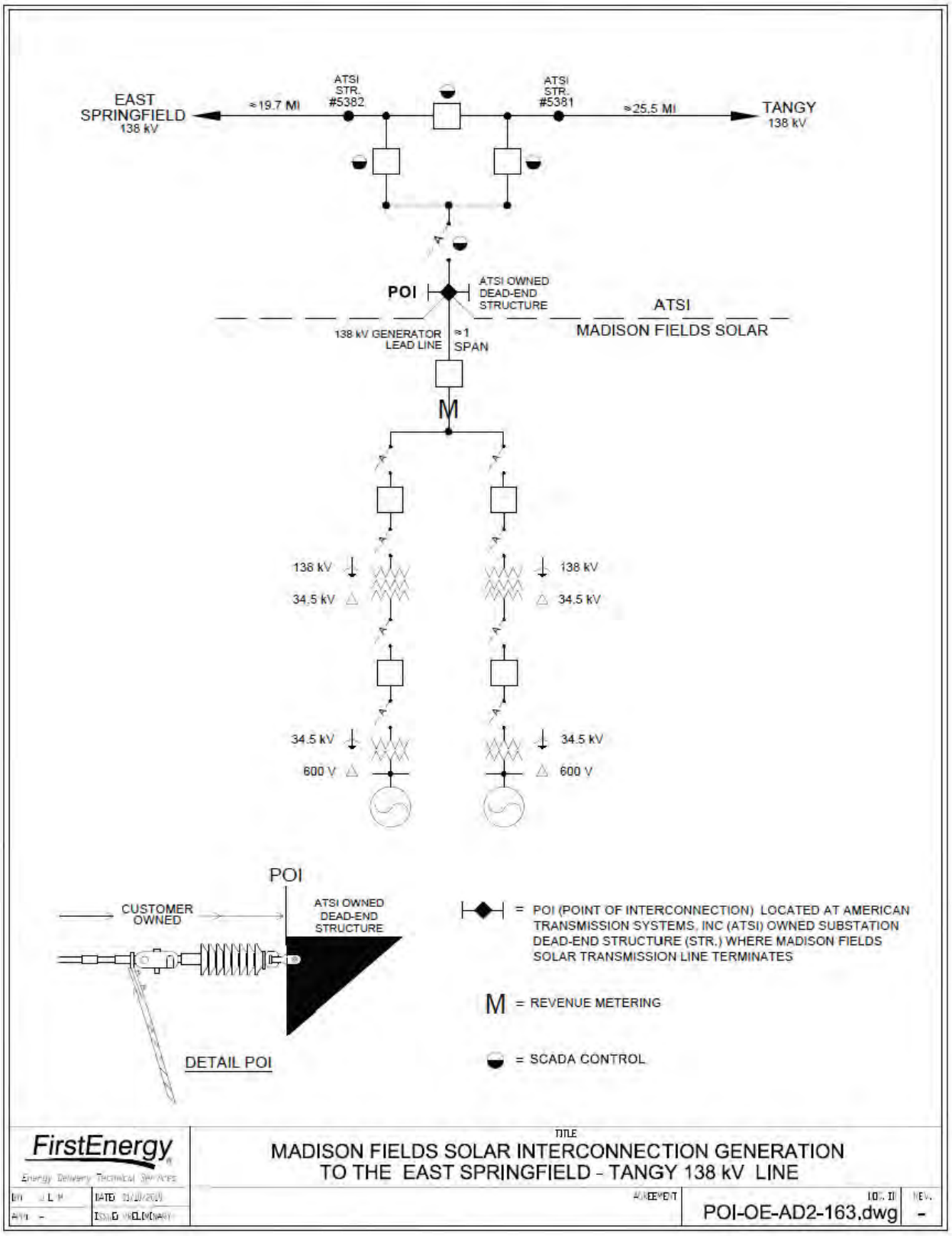
Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload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

None.

Attachment 1. Project Location



Attachment 2. Single Line Diagram



Madison Fields Solar Project, LLC
Case No. 19-1881-EL-BGN

CONFIDENTIAL
A portion filed under seal

Exhibit G
Economic Impact Study

Ecology and Environment, Inc.
June 2020

Madison Fields Solar Project, LLC has requested confidential treatment of a portion of this document in accordance with OAC Rule 4906-2-21.

This document contains cost numbers that are entitled to confidential treatment under state and/or federal statutes and regulations.

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

Respectfully submitted,

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Attorneys for Madison Fields Solar Project, LLC

Economic Impact Study for the Madison Fields Solar Project Madison County, Ohio

June 2020

Prepared for:

MADISON FIELDS SOLAR PROJECT, LLC
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Prepared by:

ECOLOGY AND ENVIRONMENT, INC., MEMBER OF WSP
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List of Abbreviations and Acronyms

BEA	Bureau of Economic Analysis
E & E	Ecology and Environment, Inc., member of WSP
FTE	full-time equivalent
JEDI	Jobs and Economic Development Impact Model
MW	megawatt
NREL	National Renewable Energy Laboratory
PILOT	payment in lieu of taxes
Project	Madison Fields Solar Project
PV	photovoltaic
RIMS II	Regional Input-Output Modeling System
USDA	U.S. Department of Agriculture

Executive Summary

Madison Fields Solar Project, LLC (Madison Fields Solar) is proposing to develop the Madison Fields Solar Project (Project) on approximately 1,006 acres of private land in a rural, agricultural region of central Ohio. Construction of the Project would generate a total economic output of almost $93 million in the state of Ohio. Of that, $36.6 million would be captured in Madison County, the location of the Project. Economic output represents the direct expenses of the developer (Madison Fields Solar), the indirect supply chain effects, and the induced spending of workers employed by Madison Fields Solar and the service providers engaged during installation. The employment benefit of Project construction consists of 1,364 new full-time equivalent (FTE) jobs in Ohio, 560 of which would be in Madison County. The jobs benefit represents jobs across industries, stimulated by the multiplier effects of the Project.

During operation, the Project is projected to create 81.5 FTE jobs statewide. These include the 19.9 FTEs employed directly by the Project in Madison County and the remaining jobs created across industries from multiplier effects. The earnings impact consists of $3.3 million in wages annually, generated by the multiplier effects of Project operation in the state of Ohio. Less than half of the earnings benefits are attributed to workers directly employed by the Project during operation. New FTE jobs created from multiplier effects would earn over $1.9 million annually.

Madison County is currently designated as an Alternate Energy Zone (AEZ), which requires qualified energy projects to pay an annual payment in lieu of taxes (PILOT) of $7,000 per megawatt (MW) in property taxes. An additional service fee of up to $2,000 per MW will be paid directly to the Madison County General Fund. Through the PILOT agreement between Madison Fields Solar Project and Madison County, the Project's nameplate capacity would pay $1.26 million in property taxes annually to millage recipients in Madison County and the additional service fee will be paid directly to the Madison County General Fund. This equates to an annual return from the Project to the County of over $1.6 million. Based on the estimated PILOT payment and the current apportionment of property taxes in Madison County, Fairbanks Local School District could expect around $888,851 annually, while Pike Township would receive about $102,326 annually. The Madison County General Fund would collect $425,038 annually, based on its current apportionment of property taxes and the currently configured PILOT agreement. Over its projected 30-year lifespan, the Project would contribute $48.6 million in property taxes to Madison County.

1 Solar Photovoltaic Industry in Ohio

The state of Ohio ranked 29th in the U.S. for total megawatts (MWs) of solar photovoltaic (PV) projects installed in 2017 and 2018 (SEIA 2019a). Based on PV installation in the first three quarters of 2019, Ohio's rank moved up to 25th in the U.S. (SEIA 2019b). By 2018, total PV installation in Ohio was approximately 208 MWs. The Madison Fields Solar Project (Project), proposed as a 180-MW PV installation, would almost double the amount of renewable solar PV power currently installed in Ohio.

Ohio has a growing solar industry that could be leveraged during construction and operation of the Project and enhance mutual benefits to the Project and the state of Ohio. In 2018, Ohio ranked 7th in the country for the number of solar industry jobs in a state (SEIA 2019b). Approximately 292 companies providing solar industry supplies or services are present in Ohio, including installers, manufacturers, and other industry-related firms (see Figure 1-1). The companies are concentrated around major cities in Ohio, including Columbus, Ohio, which is located less than 25 miles away from the Project area.

Figure 1-1 Solar Companies in Ohio

Key: green = installer; yellow = manufacturer; blue = other solar industry company
Source: reproduced from SEIA 2019b.

2 Introduction

2.1 Project Description and Socioeconomics

Madison Fields Solar is proposing to develop the 180-MW Project in Pike Township, Madison County. The Project Footprint is located on approximately 1,006 acres of agricultural land in the northwest corner of Madison County.

Madison County is a rural county in Ohio with a population of less than 50,000. Based on the last decennial census, density in the county is around 93 persons per square mile. Neighboring Franklin County, which contains most of the city of Columbus, has an estimated density of 2,186 persons per square mile, over 23 times greater (U.S. Census Bureau 2010). Table 2-1 summarizes basic socioeconomic statistics about Madison County and the state, for comparison. Madison County's civilian labor force is almost 20,000, of which 1,082 are unemployed.

Unemployed persons can take advantage of temporary construction projects to help them re-enter the workforce. In fact, the percentage of workers involved in construction in Madison County (8.1%) is high compared with the state average (5.2%), indicating that the county may have existing construction networks and job placement services that could help fill Project construction positions with local hires (U.S. Census Bureau 2018a).

Poverty levels are moderate in Ohio, and slightly lower in Madison County; both reflect average percentages around the country. Compared with the state average, the proportion of minority races and ethnicities in Madison County is low.

Table 2-1 Ohio and Madison County Socioeconomic Statistics

	Population	Population Change (%)	Civilian Labor Force	Unemployed Persons	Unemployment Rate (%)	Median Household Income	Persons Living below Poverty Level (%)	Total Minority (%)
	2018	2010-2018	2017					
Ohio	11,689,442	+1.3	5,866,915	378,735	6.5	$52,407	14.9	22.6
Madison County	44,413	+2.2	19,920	1,082	5.4	$62,897	10.2	13.1

Sources: U.S. Census Bureau, Population Division 2019; U.S. Census Bureau 2018a, b.

Figures 2-1 and 2-2 below demonstrate Madison County's relatively strong economic condition over the last decade compared with the state-at-large. By 2017, the county's median household income was estimated to be $10,000 greater than the median income statewide. Recently, unemployment in Madison County has hovered around 6%, reaching a high of 7.3% in 2014. Year-to-year, its unemployment level has been lower than the state's.

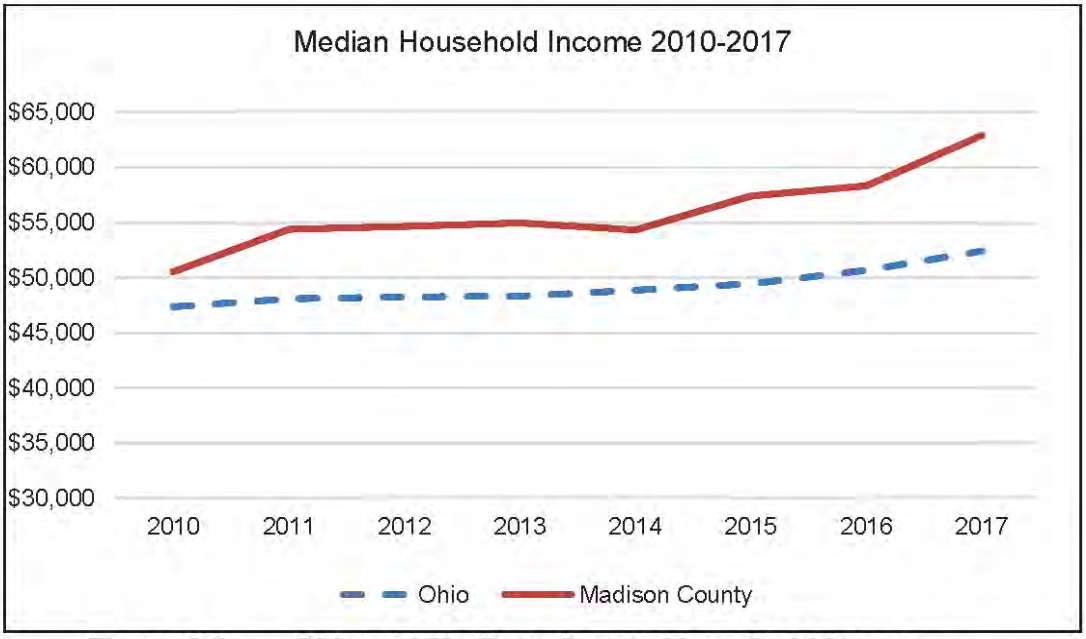

Figure 2-1 Ohio and Madison County Household Income

Source: U.S. Census Bureau 2018a.

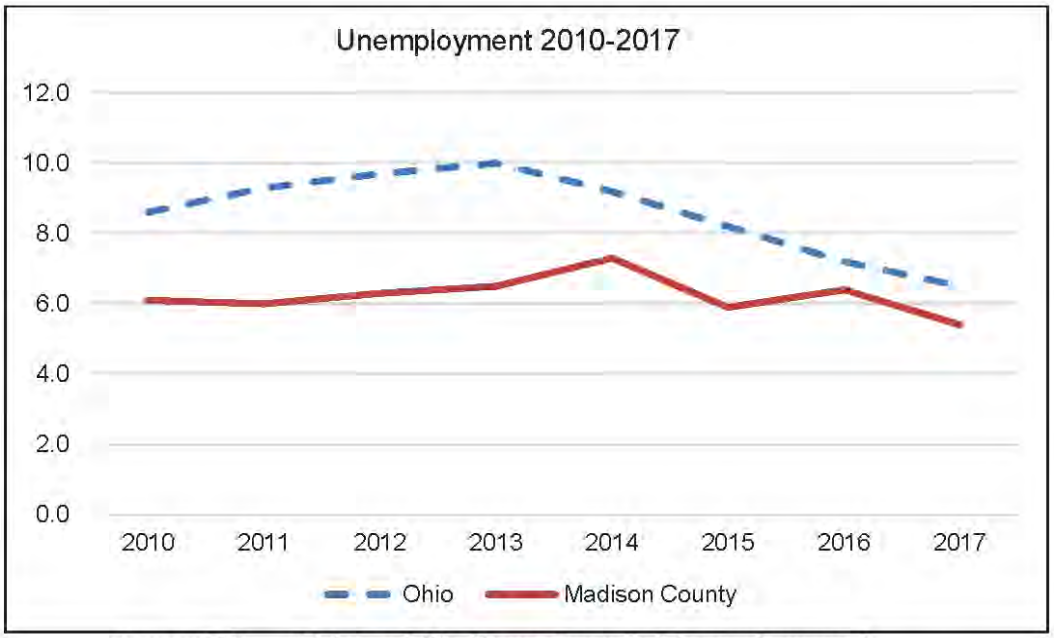

Figure 2-2 Ohio and Madison County Unemployment

Source: U.S. Census Bureau 2018a.

The top three industries in Madison County are educational services, health care, and social assistance; manufacturing; and retail (U.S. Census Bureau 2018b). As of 2017, Madison County had approximately 16,041 housing units, of which an estimated 1,125 units were vacant (7.0% vacancy rate). The median gross rent in Madison County was $776, slightly higher than the median gross rent of $764 in Ohio (U.S. Census Bureau 2018c).

2.2 Agricultural Industry

Table 2-2 provides farm and farmland statistics from 2012 and 2017, reproduced from the most recent U.S. Department of Agriculture (USDA) Census of Agriculture (USDA 2019). Based on these 2019 estimates, the amount of farmland in Madison County decreased by almost 11,000 acres from 2012 to 2017. The state of Ohio experienced an opposite trend as compared to Madison County and the rest of the country, with total acres of farmland increasing by almost 4,700 acres from 2012 to 2017 (USDA 2019; Brown and Zulauf 2019).

The Project footprint would impact 1,006 acres resulting in the reduction of 0.4% of farmland in Madison County based on the 2019 estimates.

The total number of farms increased in both Madison County and Ohio in the last 5-year period, including the somewhat notable addition of 90 farms in Madison County. Statewide, the number of very small farms, 10 acres or less, grew 52% from 2012 to 2017, faster than any other farm size classification (Brown and Zulauf 2019; see Table 2-3). These small farms could account for the fact that the number of farms increased, while total farmland decreased in Madison County.

In fact, the average size of a farm in Madison County decreased from 377 to 320 acres between 2012 and 2017 (USDA 2019).

Table 2-2 Farms and Farmland Statistics in Ohio and Madison County, 2012 to 2017

	Number of Farms (acres)			Land in Farms (acres)		
	2012	2017	% change	2012	2017	% change
Ohio	75,462	77,805	3.1	13,960,604	13,965,295	0.03
Madison County	699	789	12.9	263,275	252,392	-4.1

Source: USDA 2019.

Table 2-3 Farms by Size in Ohio, 2012 to 2017

	Number of Farms (acres)		
	2012	2017	% change
1 to 9 acres	6,796	10,333	52.0
10 to 49 acres	24,220	26,533	9.5
50 to 179 acres	26,890	23,671	-12.0
180 to 499 acres	11,291	10,574	-6.4
500 to 999 acres	3,674	3,955	7.6
1,000 to 1,999 acres	1,845	1,958	6.1
2,000 acres or more	746	781	4.7

Source: USDA 2019.

3 Methodology

3.1 Economic Assessment

The economic stimulus of the Project at the county and state levels was modeled using multipliers produced and updated by the Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS II). Historically, economic impact reports assessing solar energy projects in Ohio have used the PV Jobs and Economic Development Impact Model (JEDI) developed by the National Renewable Energy Laboratory (NREL) and its contractor. However, NREL stopped supporting the PV JEDI model after 2016 and, as such, the model is no longer available publicly available for use on their website (Stefek 2019).

RIMS II multipliers are used in economic impact studies to objectively evaluate changes in economic activity that would result from initial spending by a project. The multipliers are based on assessed linkages within and among industries in each county and state across the country. An activity in one industry typically increases demand for goods and services in other industries, and relationships among them are referred to as linkages. For example, increased activity in the construction industry boosts demand for raw materials, professional engineering services, heavy equipment, hotel and motel rooms, trucking services, etc. These industries may be said to be linked. When goods and service suppliers in linked industries are present in a single region, the region is well positioned to reap multiple economic benefits from each new activity in a linked industry.

In this assessment, RIMS multipliers released in August 2019 were used to forecast the stimulating effects of Project spending and hiring in Madison County and the state of Ohio (BEA 2019a,b). Three types of expenditures were evaluated to assess the Project's total effect on the economy, including direct, indirect, and induced expenditures. The Project's own expenditures, like payments for goods and services and payroll, are considered the direct effects of the Project. The direct expenditures' stimulating effect along connected supply chains are considered indirect effects (e.g., increasing Project suppliers' orders of raw materials). Finally, Project-related workers' and their householders' general spending (e.g., grocery and entertainment expenditures) are considered induced effects. Project-related workers include those employed directly by the Project, as well as those supported indirectly by the Project's spending in support industries.

To determine construction impacts, final demand multipliers were used to estimate the total economic outputs (changes in final demand) at the county and state levels that would result from Project spending. For operation impacts, direct effect multipliers were used to forecast the expected increase in earnings and employment in the local and state economies, based on the size of the Project's operations staff and payroll.

4 Results and Discussion

Madison Fields Solar expects the cost of construction, less land costs, to be approximately $[redacted] million. Table 4-1 shows the Project's direct expenses in Madison County ([redacted]M) and Ohio ($[redacted]M), and the stimulating effect these cash flows would have on the wider regional economy. The Project's county and state direct expense figures in this discussion are not additive, and those associated with Madison County are also represented in the state-wide numbers.

The remaining Project expenses ($[redacted]M) are associated with the purchase, manufacturing, and assembly of the required solar component parts and any other system inputs (generators, transmission lines, panels, etc.). At this time, it cannot be determined where these expenditures will occur geographically, therefore, they are not included within this economic analysis of regional effects.

The Project's construction expenditures in Ohio, of which the majority will be construction payroll expenses, would increase the total economic output by almost $[redacted] million. In Madison County, the direct expenditures of $[redacted] million would create indirect and induced expenditures, combining for a total economic output of $[redacted] million. As mentioned above, the solar PV industry in Ohio is rapidly developing, consisting of approximately 292 companies providing solar-related goods and services (SEIA 2019b). The modeled economic output presented in Table 4-1 was based on the general construction industry. The widespread presence of solar-specific companies in Ohio increases confidence that the forecasted indirect and induced expenditures would, indeed, be captured in Madison County and Ohio.

Table 4-1 Total Economic Output from Project Construction in Madison County and Ohio[1]

	Direct Expenditures	Indirect and Induced Expenditures	Total Economic Output
Madison County	$[redacted]	[redacted]	$[redacted]
Ohio	$[redacted]	$[redacted]	$[redacted]

Note:
[1] Bureau of Economic Analysis RIMS II final demand multiplier for the construction industry was used to calculate the Project's output impact.

During construction, project development staff and on-site labor would consist of 453 workers in Madison County and approximately 596 workers statewide. These are considered the direct jobs impacts of the Project in Ohio. As of 2018, Ohio was ranked 7th among all U.S. states for the number of solar jobs (SEIA 2019b), ensuring that trained local workers will be able to take advantage of the employment opportunities with the Project and the Project's local suppliers and service providers.

Table 4-2 shows the estimated multiplying effect of the Project's job creation across industries, which could be any of more than 60 aggregated industry categories considered in the RIMS II model. Relevant examples include truck transportation, miscellaneous manufacturing, and food and beverage stores. In Ohio, 768 additional jobs would be created across industries, for a total of 1,364 jobs related to Project construction. As presented in Table 2-1, Madison County had over 1,000 unemployed workers in 2017, some of whom could benefit from the Project's job creation.

Table 4-2 Employment Impacts of Project Construction in Madison County and Ohio[1,2]

	Project Construction Jobs (Direct)	Additional Jobs Across Industries (Indirect and Induced)	Total Jobs Output
Madison County	453	107	560
Ohio	596	768	1,364

Notes:
[1] Jobs are counted as full-time equivalents.
[2] Bureau of Economic Analysis RIMS II direct effect multiplier for the construction industry was used to calculate the Project's jobs impact.

Madison Fields Solar expects the Project's operations and maintenance staff and payroll would be 19.9 FTEs and around $1.4 million annually. Tables 4-3 and 4-4 show the multiplier effects of the Project's utility industry jobs and earnings statewide, which would result in four times as many jobs and over twice as much in earnings across the state. RIMS II direct effect multipliers were not available for the utility industry in Madison County because the county lacks sufficient utility industry analogues from which to derive multipliers. Nevertheless, some portion of total jobs and earnings impacts would be captured in Madison County as the entirety of the Project is located there.

Table 4-3 Employment Impacts of Project Operation in Madison County and Ohio[1,2]

	Project Operation Jobs (Direct)	Additional Jobs Across Industries (Indirect and Induced)	Total Jobs Impact
Madison County	19.9	n/a	n/a
Ohio	19.9	61.6	81.5

Key: n/a = not available
Notes:
[1] Jobs are counted as full-time equivalents.
[2] Bureau of Economic Analysis RIMS II direct effect multiplier for the utility industry was used to calculate the Project's jobs impact.

Table 4-4 Earnings Impacts from Project Operation in Madison County and Ohio[1,2]

	Project Operation Earnings (Direct)	Additional Earnings Across Industries (Indirect and Induced)	Total Earnings Impact
Madison County	$699,082	n/a	n/a
Ohio	$1,394,702	$1,929,849	$3,324,551

Key: n/a = not available
Note:
[1] Bureau of Economic Analysis RIMS II direct effect multiplier for the utility industry was used to calculate the Project's earnings impact.

Based on a set of assumptions about the constructed size of the Project, the property tax payment agreement, and the taxing entities' jurisdiction and relative share, the Project would generate local government revenues of around $1.62 million annually and $48.6 million over the projected 30-year duration of the Project (see Table 4-5). These assumptions include:

- Madison Fields Solar would execute a payment in lieu of taxes (PILOT) agreement with Madison County. For the purposes of this report, the PILOT is estimated to be an annual payment of $7,000 per MW to the local taxing district and an additional annual payment of up to $2,000 per MW directly to the Madison County general fund. These estimates are subject to change based on the final PILOT agreement.
- The constructed Project would be 180 MWs, located wholly within Pike Township.
- The taxing entities within the local district and their apportioned shares would be those specified for Pike Township taxing district in the 2019 Tax Rates for Madison County (Madison County Auditor 2019).

As shown in Table 4-5, the Fairbanks local school district, the Madison County general fund, and Pike Township would be the top three recipients of the Project's annual PILOT payment. Fairbanks local school district could expect around $888,851 annually, and Madison County's general fund would receive about $425,038. Pike Township would receive a little over $100,000 each year. Overall, the Project would substantially increase local property tax revenues compared with its current agricultural status.

Table 4-5 Estimated Local Government Revenues Paid by the Madison Fields Solar Project

Taxing Entity or Fund in the Pike Township Taxing District of Madison County	Estimated Annual Local Property Tax Revenue[1]	Estimated 30-Year Local Property Tax Revenue[1]
Madison County Veterans Relief	$10,840	$325,189
Madison County Mental Health	$10,840	$325,189
Madison County Senior Citizens	$17,343	$520,303
Madison County Health Services	$21,679	$650,379
911 Services	$21,679	$650,379
Joint Vocational School District	$34,687	$1,040,606
Board of Developmental Disabilities	$86,717	$2,601,514
Pike Township	$102,326	$3,069,787
Madison County General Fund	$425,038	$12,751,136
Fairbanks Local School District	$888,851	$26,665,520
Total	**$1,620,000**	**$48,600,000**

Note:
[1] Constituent revenues based on taxing apportionment for Pike Township specified in the 2019 Tax Rates for Madison County (Madison County Auditor 2019).

5 References

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Exhibit H
Complaint Resolution Plan

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
(Counsel of Record)
William Vorys (0093479)
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wvorys@dickinsonwright.com

Attorneys for Madison Fields Solar Project, LLC

MADISON FIELDS
SOLAR PROJECT

Month Day, Year

LANDOWNER/TENANT
ADDRESS
CITY, STATE ZIP

Re: Madison Fields Solar Project, Ohio Power Siting Board Case No. 19-1881-EL-BGN

Dear Pike Township Landowner,

The Madison Fields Solar Project (Madison Fields) plans to start construction of a 180-megawatt (MW) utility scale solar project on or around Month Day, Year. Civil construction work is scheduled to continue through Month Year. Equipment installation is planned between Month Year and Month Year, with testing and commissioning occurring into Month Year OR Quarter Year. Finally, site restoration will occur in the Quarter of Year.

General construction activities will be limited to the hours of 7:00 a.m. to 7:00 p.m. or until dusk when sunset occurs after 7:00 p.m. Construction activities that do not involve sound increases above ambient levels at nonparticipating residences are permitted outside of daylight hours when necessary.

Attached to this letter is the Madison Fields Solar Project Complaint Resolution Plan.

Please do not hesitate to reach out with questions, concerns, or complaints during construction or operation of the facility.

Thank you,

Name Here
Contact Information

Enclosure: Attachment A, Madison Fields Solar Project Complaint Resolution Plan

MADISON FIELDS SOLAR PROJECT COMPLAINT RESOLUTION PLAN

Madison Fields Solar Project, LLC is proposing to construct the Madison Fields Solar Project (Project) on approximately 1,006 acres in Madison County. The Project is sited on private property in a rural agricultural area; however, there are several public roadways and residences in the vicinity of the Project. Madison Fields endeavors to ensure that the Project is constructed and operated in a responsible manner to minimize its impact on nearby residents or those passing through the area.

Madison Fields will construct and operate the Project in accordance with all applicable federal, state, and local laws and permits. However, if residents observe issues during construction or operation, a defined complaint resolution plan has been established to define a process for receiving, investigating, and addressing complaints.

COMPLAINT FILING PROCESS

Individuals wishing to file a complaint will be provided four options, including:

1. The Applicant will establish a "hotline" phone number that will be included in this plan and provided to Madison County and Pike Township once it is established. Individuals may call the hotline at any time to report emergencies or submit complaints.
2. Individuals may visit the temporary onsite management office during construction or the permanent onsite operations and maintenance (O&M) building during normal business hours to file a written complaint with the construction manager or O&M staff, respectively.
3. Individuals may submit written complaints by mail to:

   Madison Fields Solar Project, LLC
   422 Admiral Boulevard
   Kansas City, Missouri 64106

4. Individuals may submit complaints via email to the construction manager or O&M staff during construction and operations, respectively. Email addresses will be included in this plan and provided to Madison County and Pike Township once they are established.

The following information should be provided for Madison Fields to accurately and thoroughly address complaints:

- Name and contact information of the complainant;
- Date of complaint;
- Detailed description of the complaint, including, if possible, the location, date, and time that the issue occurred, and any other details that can help identify and resolve the issue.

COMPLAINT REVIEW PROCESS

Madison Fields will coordinate with the complainant to quickly and effectively address issues such that both parties are satisfied. Madison Fields will enter complaints into a complaint log, document the details of the complaint, and assign a point of contact to investigate the complaint. The construction manager, or alternative designee, will be responsible for initiating the review of complaints received during the construction process. On-site O&M staff will be responsible for initiating the review of complaints reported during the operational phase.

Madison Fields will first determine if complaints violate federal, state, or local laws or permit conditions, and if there are notifications or required steps to address those violations. Madison Fields will also determine if outside resources are necessary to address issues. Madison Fields is committed to resolving reasonable complaints within 30 days, unless extenuating circumstances necessitate a longer time period, or it is determined that the complaint is unresolvable. Madison Fields will provide an explanation to the complainant for the extended period and the timeline for addressing the complaint should complaint resolution take longer than 30 days.

CONFIDENTIAL
A portion filed under seal

Exhibit I
Certificate of Liability Insurance

Madison Fields Solar Project, LLC has requested confidential treatment of a portion of this document in accordance with OAC Rule 4906-2-21.

This document contains policy numbers and certificate numbers that are entitled to confidential treatment under state and/or federal statutes and regulations.

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

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
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Attorneys for Madison Fields Solar Project, LLC

CERTIFICATE OF LIABILITY INSURANCE

7/26/2020

DATE (MM/DD/YYYY) 6/11/2020

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
LOCKTON COMPANIES
3657 BRIARPARK DRIVE, SUITE 700
HOUSTON TX 77042
866-260-3538

CONTACT NAME:
PHONE (A/C, No, Ext):
FAX (A/C, No):
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Federal Insurance Company	20281
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
[redacted]
Savion, LLC
422 Admiral Boulevard
Kansas City MO 64106

COVERAGES **CERTIFICATE NUMBER:** [redacted] **REVISION NUMBER:** XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [X] PRO-JECT [X] LOC OTHER:	N	N	[redacted]	7/26/2019	7/26/2020	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG 	$ 1,000,000 $ 1,000,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
A	AUTOMOBILE LIABILITY ANY AUTO OWNED AUTOS ONLY SCHEDULED AUTOS X HIRED AUTOS ONLY X NON-OWNED AUTOS ONLY	N	N	[redacted]	7/26/2019	7/26/2020	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) 	$ 1,000,000 $ XXXXXXX $ XXXXXXX $ XXXXXXX $ XXXXXXX
A	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $	N	N	[redacted]	7/26/2019	7/26/2020	EACH OCCURRENCE AGGREGATE 	$ 20,000,000 $ 20,000,000 $ XXXXXXX
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	N	[redacted]	7/26/2019	7/26/2020	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
RE: Madison Fields Solar Project

CERTIFICATE HOLDER

[redacted]
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus OH 43215

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Exhibit J
Construction Route Study

Burns & McDonnell Engineering Company, Inc.
May 12, 2020

Respectfully submitted,

/s/ *Christine M.T. Pirik*
Christine M.T. Pirik (0029759)
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Attorneys for Madison Fields Solar Project, LLC

BURNS McDONNELL

Madison Fields Solar Project
Construction Route Study

SAVION
A RENEWABLE ENERGY COMPANY

Savion Energy

Madison Fields Solar Project
Project No. 119430

Revision 2
5/12/2020

Madison Fields Solar Project
Construction Route Study

prepared for

Savion Energy
Madison Fields Solar Project
Madison County, Ohio

Project No. 119430

Revision 2
5/12/2020

prepared by

Burns & McDonnell Engineering Company, Inc.
Richmond, Virginia

INDEX

Savion Energy
Madison Fields Solar Project
Construction Route Study
Project No. 119430

Report Index

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1.0 NARRATIVE

Project Description

The Madison Fields Solar Project is located in Madison County, Ohio. As shown in Appendix A on the Exhibit 1 - Location Map, the project is located in Pike Township. The project boundary is shown in Appendix A. The footprint of the project is approximately 1,000 acres.

The purpose of this project is to harness the renewable energy of the sun in order to supply energy into the transmission and distribution power grid. The proposed construction brings with it the possibility of roadway damages, due to the increased construction traffic. This study has been prepared to satisfy the relevant portions of the Ohio Power Siting Board (OPSB) requirements specified in the Ohio Administrative Code, Sections 4906-4-06(F)(3) and 4906-4-06(F)(4).

Section 4906-4-06(F)(3) states: "The applicant shall evaluate and describe the anticipated impact to roads and bridges associated with construction vehicles and equipment delivery. Describe measures that will be taken to improve inadequate roads and repair roads and bridges to at least the condition present prior to the project."

Section 4906-4-06(F)(4) states: "The applicant shall list all transportation permits required for construction and operation of the project, and describe any necessary coordination with appropriate authorities for temporary or permanent road closures, lane closures, road access restrictions, and traffic control necessary for construction and operation of the proposed facility."

Site Description

The Madison Fields Solar Project is on cultivated lands within the aforementioned jurisdictions. Construction of the solar arrays will require minimal clearing or grubbing of existing vegetation. The fields are relatively gentle sloping and rely on sheet flow into swales to convey stormwater runoff from the project site. The existing topography and drainage patterns will generally remain unchanged with addition of the project.

Adjacent Property

The properties adjacent to the project area are mostly agricultural and residential. There are three water courses that surround the project. Little Darby Creek is located north of the project, while Barron Creek is to the east and Spring Fork is to the south. There are no planned direct discharges to any creek associated with this project.

It should be noted that there are several industrial operations in the area. Buckeye Concrete is located 17 miles southeast of the project boundary on State Highway 29. Shelly Materials operates the Ostrander Quarry located approximately 20 miles northeast of the project boundary and Martin Marietta operates Cedarville Quarry located approximately 40 miles southwest of the project boundary.

Transportation Access Points

The developer has designated two (2) site access points for construction. One of the access points will be on County Road 11 (Rosedale Milford Center Road) with the other access point on County Route 25 (Rosedale Road). While it is possible for the construction equipment, concrete, aggregate, supplies, and general construction traffic to approach the project area from multiple directions, it is anticipated that the concentrated construction traffic will be limited to County Route 25 (Rosedale Road) and County Route 11 (Rosedale Milford Center Road). Proposed internal site access to the solar panels is shown on the exhibits in Appendix A.

The jurisdictions associated with the public roads proposed to be used for the project, as shown in Appendix A, are:

Pike Township – Route T-140 (Van Ness Road), Route T-85 (Irwin Road), Route T-84 (Bates Road)

Madison County – County Route 26 (Irwin Road), County Route 11 (Rosedale Milford Center Road), County Route 123 (Rosedale Road/Finley Guy Road NW), County Road 25 (Rosedale Road), County Road 122 (Guy Cemetery Road)

Ohio Department of Transportation (ODOT) – State Route 161, State Route 4

2.0 PRE-CONSTRUCTION ROADWAY CHARACTERISTICS

Existing Data

Existing data on vehicle traffic volumes and crashes within the study area, defined on Exhibit 2 in Appendix A, was obtained from the ODOT Transportation Information Mapping System (TIMS) and is shown on Exhibit 3 in Appendix A. Annual Average Daily Traffic (AADT) for the State and County roads is listed within that data. Detailed capacity analysis was not completed for this study. However, field observation of the transportation network did not reveal any locations where traffic flow and/or capacity appeared to create undue delay for the traveling public.

Table 1 below summarizes the traffic conditions on the roads within the study area.

Table 1: Traffic Conditions			
Roadway Name	**Lanes**	**Total Road Widths**	**AADT***
County Route 26 (Irwin Road)	2	18 feet	74
Route T-243 (Van Ness Road)	2	12.5 feet	50
State Route 4	2	24 feet	3775
Township T-85 (Irwin Road)	2	18 feet	444
State Route 161	2	24 feet	1514
Township T-84 (Bates Road)	2	20 feet	323
County Route 11 (Rosedale Milford Center Road)	2	20 feet	507
County Route 25 (Rosedale Road)	2	20 feet	509
County Route 123 (Rosedale Road/Finley Guy Road NW)	2	21 feet	707
County Route 122 (Guy Cemetery Road)	2	16 feet	74

* AADT = Average Annual Daily Traffic

According to TIMS, in 2018 there were four (4) accidents within the study area. Two of the accidents occurred on State Route 161. One accident occurred on County Route 11 (Rosedale Milford Center Road), and one accident occurred on County Route 25 (Rosedale Road). One of the two accidents on State Route 161 was fatal.

The roadways within the project area have good sight distance along their alignment, are in rural areas, and do not carry a high volume of traffic. A standard level of care should be taken to properly construct and sign the proposed construction entrances per the ODOT Traffic Control in Work Zone Standards.

School Bus Route and Mass Transit Systems

The public-school district for the project area is the Fairbanks Local School System. The high school, middle school, and elementary school are all located on the same campus, about 5 miles northeast of the project boundary. The transportation supervisor is Beth Wyckoff. Due to the geographic region served by the school system and the rural nature of the surrounding area, the students are picked-up/dropped-off individually at their place of residence. The number of stops and buses is limited due to the low density of houses within and around the project area. Ms. Wyckoff requested that deliveries for the project only occur between 7:30AM and 3:30PM during the school year.

There are no rail or bus mass transit systems in the project area.

Route Load Bearing, Structural Rating and Other Route Restrictions

A field review of existing conditions along the roads within the project area was conducted by Burns & McDonnell on October 22 and 23, 2019.

Road and Bridge Load Posting Restrictions

As shown in Appendix A, there are four (4) bridges along the transportation study roads. Bridge number 4930584 is located on Township Route T-243 (Van Ness Road). Bridge 4931491 is located on County Route 26 (Irwin Road). Bridges 4931033 and 4932609 are located on County Route 122 (Guy Cemetery Road). All bridges all appear to be in good condition and do not have posted loading restrictions.

There is a 60-inch corrugated metal pipe culvert under County Route 26 (Irwin Road). The culvert has adequate cover and is in good condition.

There is one permanently load restricted road in the project area. Township Route T-84 (Bates Road)/County Route 11 (Rosedale Milford Center Road) has a weight restriction of 11 tons. County Route 11 was surface treated in the Spring of 2019 and will be upgraded to 2-inch hot mix asphalt in 2021.

There are several temporarily load reduced roads in the project area. Township Road T-24 (Rosedale Plain City Road NW), County Route 25 (Rosedale Road), and County Route 123 (Finley Guy Road NW) have a 25% weight reduction for freeze-thaw observed from February 1 through June 1 depending on the weather. For this reason, transformer delivery should occur outside of this restriction.

Road Surface Type and Conditions

The road surface types along the transport route are all asphalt. Table 2 summarizes the road conditions within the study area.

Table 2: Road Conditions	
Roadway Name	**Road Condition**
County Route 26 (Irwin Road)	County maintained surface treatment over plant mix surface, good condition. New surface treatment in 2018.
Route T-243 (Van Ness Road)	Township maintained surface treatment, good condition
State Route 4	State maintained plant mix surface, good condition
Township T-85 (Irwin Road)	State maintained surface treatment over plant mix surface, good condition
State Route 161	State maintained plant mix surface, good condition
Township T-84 (Bates Road)	Township maintained surface treatment, good condition.
County Route 11 (Rosedale Milford Center Road)	Township maintained new surface treatment surface, good condition
County Route 25 (Rosedale Road)	County maintained surface treatment surface, good condition
County Route 123 (Rosedale Road)	County maintained surface treatment over plant mix surface, good condition. New surface treatment in 2018.
County Route 122 (Guy Cemetery Road)	County maintained surface treatment surface, good condition

The roadways within the study area are generally well-maintained rural routes. County Route 26 (Irwin Road) showed minor cracking, but no potholes and should be closely monitored to verify that no further cracking or potholes form. The other routes within the study area do not appear to exhibit any underlying issues, but rather normal aging that requires routine maintenance. Road Use Maintenance Agreements must be prepared between the County and the Developer prior to construction to address any potential issues with the existing roads. There are no significant concerns for the existing roads from a transportation perspective.

Overhead Clearance

There should not be any issues with vehicle clearance to overhead electric crossings and tree overhang locations because the construction vehicles for the project will be legal heights and no intersection improvements are proposed.

3.0 PROJECT IMPACTS TO THE TRANSPORTATION NETWORK

Projected Future Traffic Conditions

While construction vehicles are traveling along the project area and delivery route roadways, the existing traffic may experience minor delays to allow for the safe passage of these vehicles.

A Road Use Maintenance Agreement (RUMA) is required for Madison County. During development of the RUMA, the Developer or the Developer's Designee shall coordinate with Madison County to determine the applicable thresholds and procedures for implementing appropriate work zone measures for the safety of the commuting public and members of the construction team. As part of the RUMA, procedures for corrective action on any damaged elements of the roadway caused by vehicle trips generated by the construction of the site will be developed.

Roadway widths will be a challenge for the construction traffic. Drivers should be encouraged to stay on the pavement surface to minimize rutting of the shoulders and rutting or heaving of the pavement along the edges. Cold and wet conditions that correspond to winter construction could lead to premature pavement failures that would require remediation by the Developer.

During operation and maintenance, the facility will not generate a significant volume of traffic. Therefore, any projected additional future traffic will be negligible.

Adequacy of the Road System to Accommodate Projected Traffic

Truck load assumptions are based on typical solar projects that will need to be finalized in conjunction with the Madison County RUMA. The planned construction entrances enter from roadways that appear to be well maintained and structurally sound, therefore no improvements beyond the construction entrance is required for access. An extra wide construction entrance should be utilized to support the roadway edge of pavement and allow for the wide swing of the trucks, allowing them to stay on the paved surface throughout the entire turn movement into the site. If construction traffic starts to utilize the load reduced roadways, the roads should be monitored for deterioration. Particular attention should be given to the intersections, where the larger tractor trailers tend to track off the pavement. These shoulder areas deteriorate quickly under the construction loadings. Other transport roads within the study area do not appear to exhibit any obvious structural issues, beyond normal aging requiring routine maintenance.

During development of the RUMA the applicant will coordinate with Madison County to determine any pre-construction road maintenance needed. However, there does not appear to be any areas of significant concern on the existing roads.

It is anticipated that the construction traffic will consist of WB-50s (8.5 feet wide x 42.5 feet long x 10 feet high), standard concrete trucks, standard dump trucks, and pick-up trucks. One overweight permit, submitted to Madison County, is expected for this project for transport and delivery of the transformer. The construction traffic, apart from the transformer delivery, should be legally loaded and not oversized.

Roads will need to be monitored during construction and reviewed again upon completion of construction to determine if repairs are required. Roads will be returned to pre-construction conditions or better. If work is scheduled during favorable weather patterns, the pavement structure remains supported along the edges, construction traffic is kept to the construction entrances noted in the report and off of the shoulders of the road, there should be minimal remedial asphalt removal, subgrade compaction, or asphalt patching required.

During operation and maintenance, the facility will not generate a significant volume of traffic. Therefore, improvements to the road system are not necessary to accommodate projected operations traffic.

Traffic and Transportation Mitigation Measures

All roads should be monitored during construction for potholing and deterioration of the pavement to verify that they are safe for general construction and local roadway traffic. The volume and weight of the general construction traffic may cause accelerated distress that could require temporary repair, especially at the construction entrances. Constant monitoring of the roadway conditions is vital to minimizing damages. Identifying an issue and taking immediate temporary corrective action prior to failure can dramatically reduce final repair costs. After completion of construction activities, the temporary corrective measure may need to be removed and replaced with a permanent solution. Repairing the roadways to pre-construction conditions will be part of the RUMA.

Road Use and Restoration Agreements

Special hauling permits, with the exception of transformer delivery, are not anticipated for the project because the construction vehicles will be legal heights, widths, and weights. As previously stated, a RUMA is required with Madison County where the County roads are being used for

delivery of equipment. There are no temporary or permanent road closures, lane closures, or road access restrictions expected with this project. All necessary traffic control for construction and operation of the proposed facility shall be in accordance with ODOT standards and specifications. A Driveway Permit from the County will be required for each of the two temporary construction access points to the project site. A Stormwater and Sediment Control Plan will be issued after approval of the Stormwater and Sediment Control plan. An overweight permit will be required for delivery of the Transformer. Although no work is anticipated, Work in Right-of-Way permits will be required for any work done in the right-of-way.

APPENDIX A - SITE LOCATION/ROAD STUDY MAP

Irwin

Route 161

Irwin Road

Little Darby Creek

Bates Road

Union
Madison

Madison County

Union
Madison

Solar Arrays

Rosedale Milford
Center Road

Van Ness Road

Construction
Entrance

Pike Township

Project Boundary

Irwin Road

Rosedale Road

Construction
Entrance

Spring Fork

Rosedale Road

N

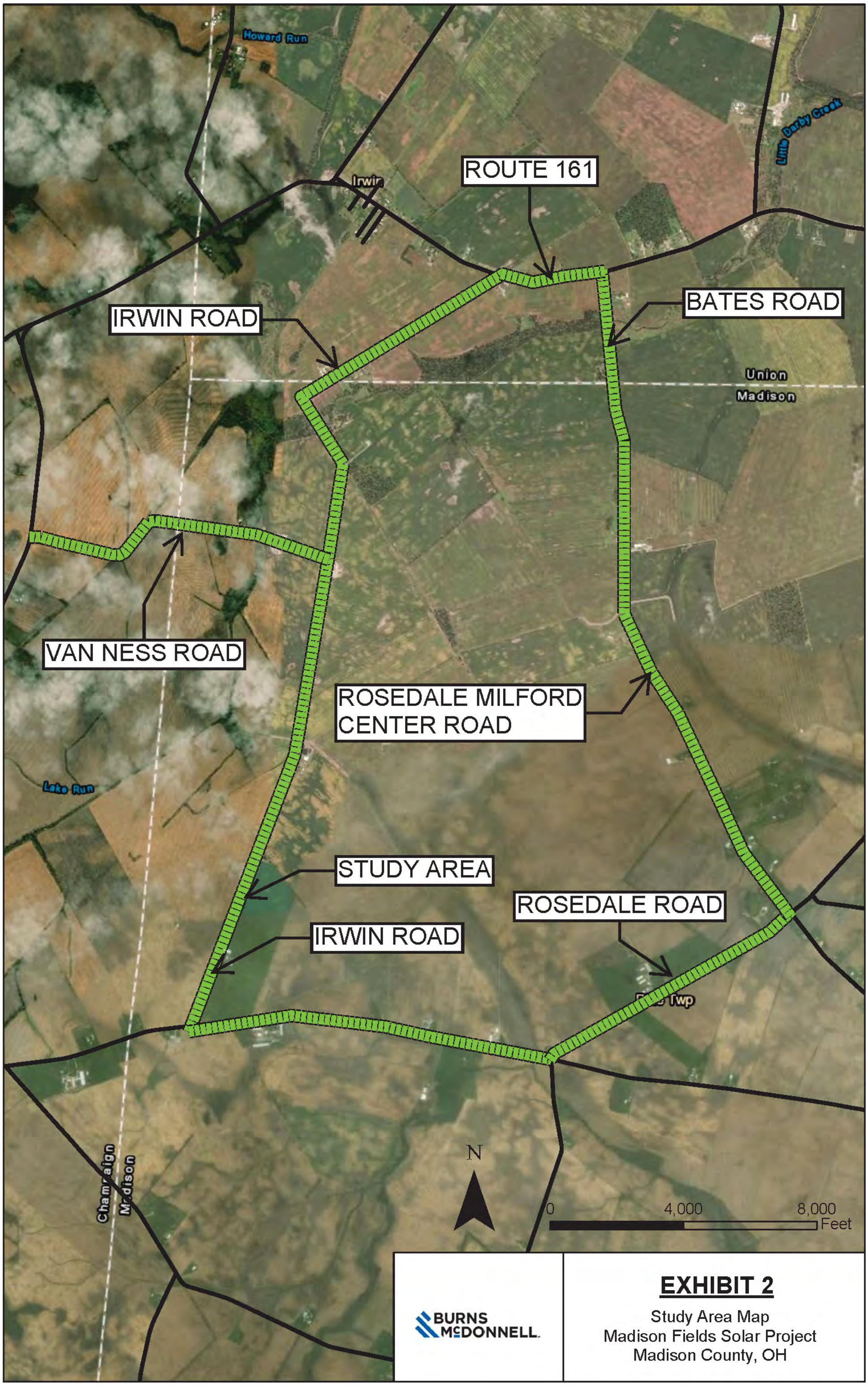
0 1,250 2,500
Feet

Guy Cemetery Road

Source: Esri, DigitalGlobe, Geo
AeroGRID, IGN, and the GIS U
and the GIS user community

EXHIBIT 1

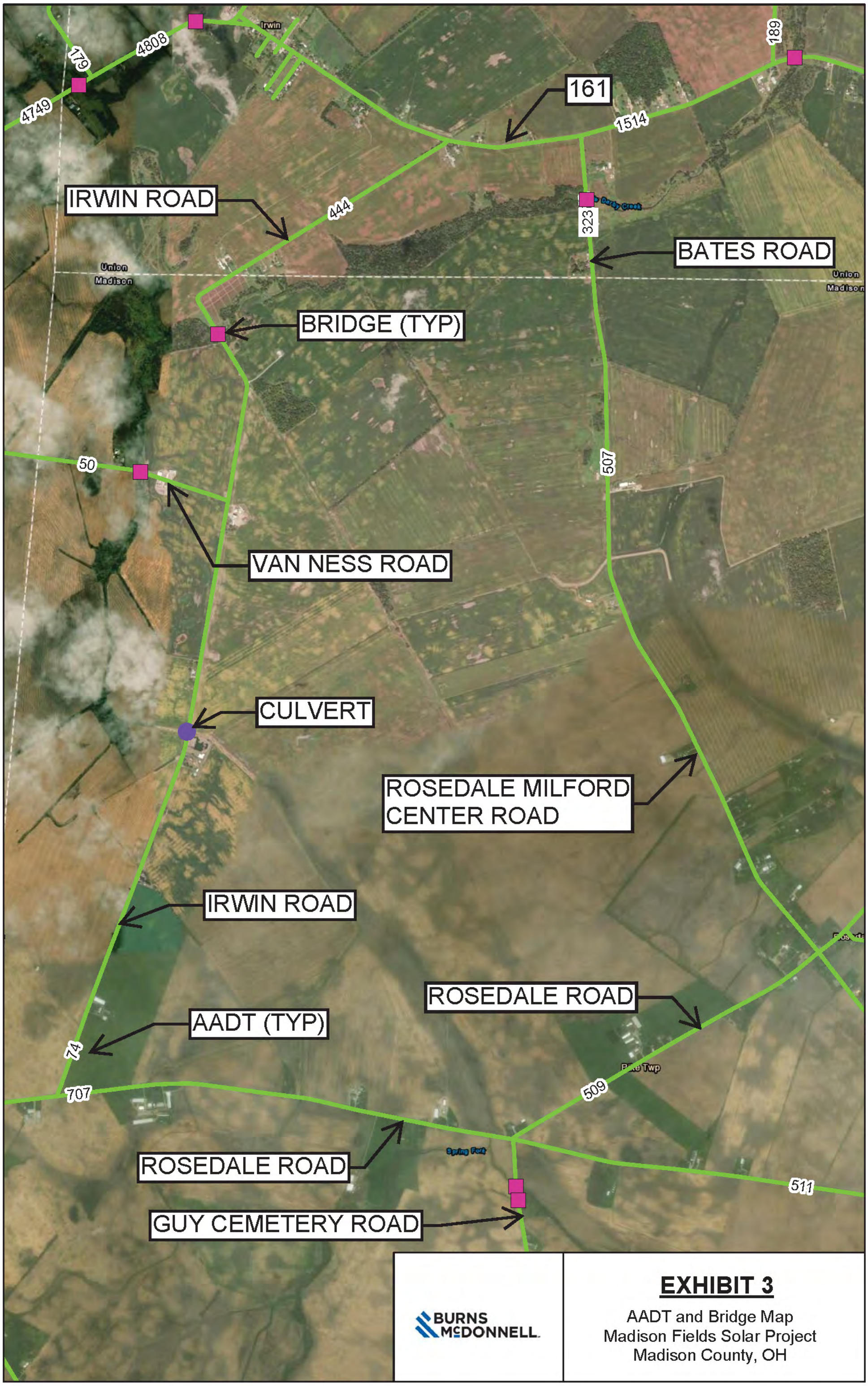
Site Location Map
Madison Fields Solar Project
Madison County, OH



BURNS McDONNELL

EXHIBIT 2

Study Area Map
Madison Fields Solar Project
Madison County, OH



BURNS McDONNELL

EXHIBIT 3

AADT and Bridge Map
Madison Fields Solar Project
Madison County, OH

MADISON COUNTY

MADISON COUNTY ENGINEERING AND PLANNING

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OHIO DOT

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PLANNING ENGINEER, ODOT DISTRICT 6
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BURNS McDONNELL

EXHIBIT 4

Local Contacts
Madison Fields Solar Project
Madison County, OH

Madison County

Limited Access
US Highway
State Highway
County Highway
Township Road
City Road
Private Road
Freeway Ramp
Recreation Trail
Railroad
State Line
County Line
Zip Code Boundary
43064 Zip Code Number

Interstate Highway
U.S. Highway
State Highway
County Route
House Numbering System
Community
School
Point of Interest
Hospital
Police Station
Fire Station

Park
Golf Course
Airport
Shopping Center
University
Cemetery
Water
Correctional Facility
Trail Marker
Library
Post Office

N

0 1 2 3 mile
0 1 2 3 4 5 kilometer

GM Johnson & Associates Ltd.
4562 Dawson Street
Burnaby, BC V5C 4C1

MS

GIS CARTOGRAPHY & PUBLISHING SERVICES
WWW.GISCARTO.COM

County Engineer's Office Building
825 US Route 42NE
London Ohio 43140

Phone: (740)852-9404
Fax: (740)852-9530

Office Hours 7:30 a.m. - 4:00 p.m.

Email: engineer@co.madison.oh.us
www.co.madison.oh.us

Named after James Madison, 4th President of the United States, Madison County is located in central Ohio between Columbus and Springfield. Primarily an agricultural area, 88% of the land consist of farms. Madison County ranks fourth in both soybean and corn production throughout the state of Ohio.

Annually in September the Ohio State University hosts the Farm Science Review, one of the largest farm exhibitions in the world, at the Molly Caren Agricultural Center near London, Ohio. Madison County Attractions include Madison Lake State Park, the Red Brick Tavern, Rails to Trails, the Jonathan Alder Cabin, and the State and National Scenic River Big Darby Creek.

Madison County Statistics

Area	467 Sq Miles
Populations (2005)	41,802
Road Mileage	
State and Federal	196.61
County	343.55
Township	127.43

PROJECT LOCATION

Amity Pike Bridge over Big Darby Creek State & National Scenic River in Canaan Township (Opened in 2009)

2010-2011 Highway Map of Madison County Ohio

David P. Brand, P.E., P.S
County Engineer

County Commissioners
David Dhume
Mark Forrest
Chris Snyder

Madison County Engineer's Office
825 US 42 NE London, OH 43140

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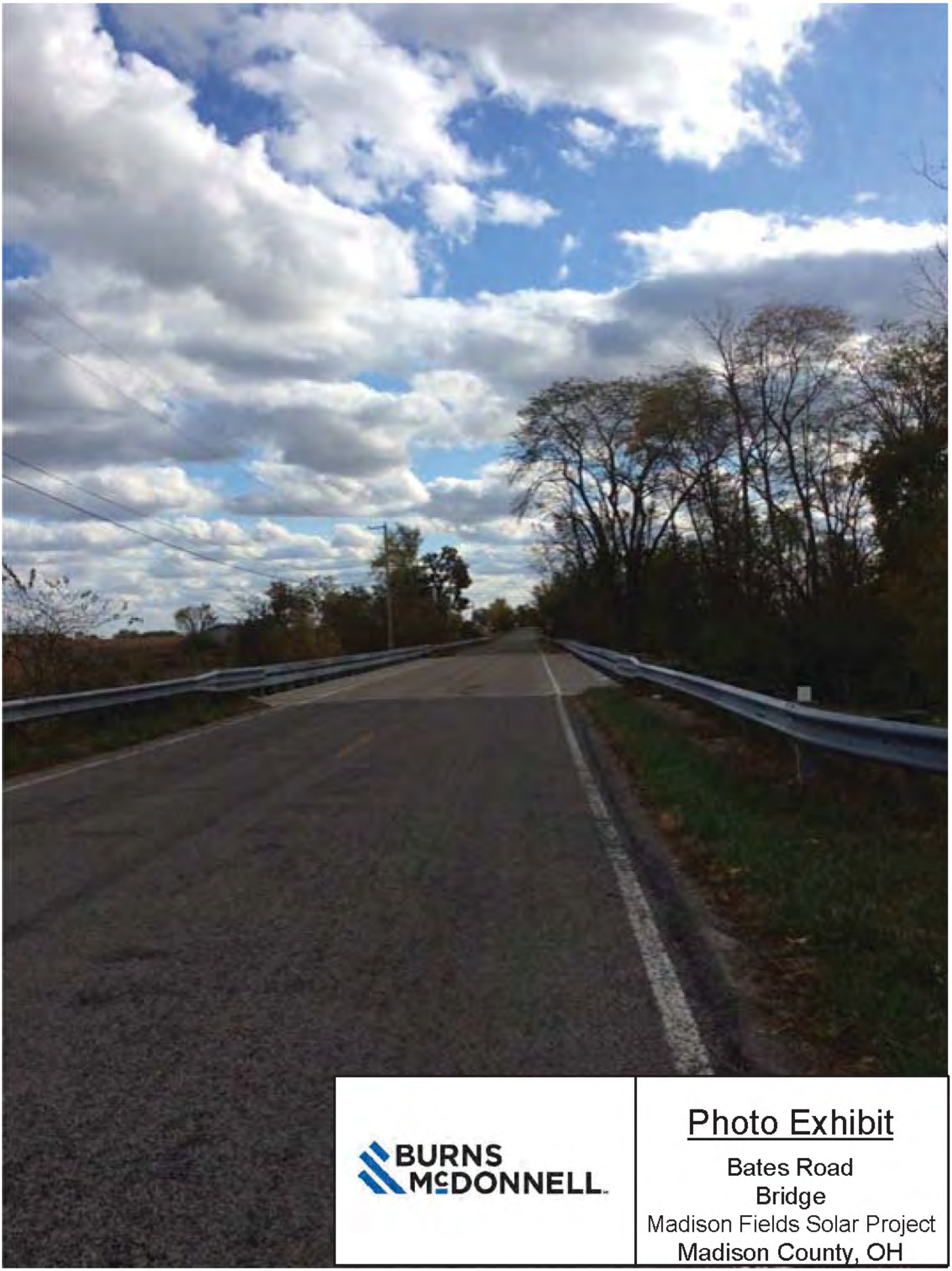
TO:

Place Stamp Here

STREET INDEX

NAME	ROAD #	MILES	KMS	GRID
A				
ALKIRE RD	11	0.14	0.22	T26
AMISH RD	30A	3.16	5.06	D22
AMITY PIKE NE	36	4.25	6.84	D26,E29
ANDERSON ANTIOCH RD	59	2.36	3.82	AB27,AC26
ANDERSON ANTIOCH RD SE	59	1.60	2.57	AD25
ARBUCKLE RD	110	6.01	9.67	L19,N17
ARMSTRONG RD	63	2.69	4.33	X17
ARTHUR BRADLEY RD	132	1.68	2.70	H16
ASHTON CT	0.03	0.05		P26
ASHTON RD	1103	0.04	0.06	O26
AW WILSON RD	31	3.29	5.30	H22
B				
BALDWIN RD	121	0.73	1.18	AI21
BATES RD	94	0.47	0.76	A14
BEACH RD	150	0.19	0.30	J26
BEALE RD	122	0.91	1.46	A24
BECKER RD	120	1.71	2.75	G14
BEECH CT	1	0.02	0.03	O28
BETHEL RD	79	0.26	0.42	AF19
BETTY WILSON RD	135	1.80	2.90	P17
BIG PLAIN CIRCLEVILLE RD	4	9.32	15	V19,X26
BLAUGHER AVE	1035	0.23	0.37	W13
BONNER RD	145	1.82	2.93	V9
BOOKWALTER RD	78	1.25	2.01	AH10
BOTKIN RD	112	1.32	2.13	W7
BOYD NORTH RD	61	0.21	0.34	B22
BOYD RD	42	1.66	2.99	B23
BOYD RD	163	0.24	0.39	Z28
BRAGG RD	68	2.13	3.42	AG22,AH22
BRIGHTON RD	106	0.94	1.52	R9
W BROAD ST	40	0.26	5.25	O25,O29
BUTLER AVE	3	0.47	0.75	A27
BYERLY MILL RD	157	0.92	1.49	L21,M21
BYERLYRD	115	1.30	2.09	N21
C				
CANAAN BLVD	273	0.05	0.08	I26
CARTERS MILL RD	39	1.91	3.06	E30,F30
CEDAR CIR	277	0.04	0.06	L19
CEDAR CT	276	0.04	0.06	L19
CEDAR DR	275	0.04	0.07	L19
CEDARWOOD LN	279	0.05	0.08	L19
CEMETERY PIKE	34	1.69	2.72	C26
CENTER CT	2	0.05	0.07	E29
E CENTER ST	665	1.17	1.89	T16
W CENTER ST	38	0.73	1.18	T15
CHAMBERLIN RD	246	0.54	0.86	Y26
CHARLESTON CHILLICOTHE RD	15B	3.09	4.97	AG12
CHARLESTON CHILLICOTHE RD	15A	4.05	6.51	AB6,AD6
CHESELDINE RD	133A	0.77	1.25	U20
N CHILLICOTHE ST	42	0.07	0.11	A27
CHRISMAN RD	20	3.33	5.36	AD17
CIRCLE DR	1015	0.06	0.10	T26
CIRCLE DR	1013	0.06	0.10	T26
CIRCLE DR	1014	0.07	0.11	T26
COLUMBUS - CINCINNATI RD	42	2.56	4.12	O22
COLUMBUS - CINCINNATI RD	42	0.13	0.20	T14
COLUMBUS - CINCINNATI RD NW	42	2.24	3.60	R20
COLUMBUS - CINCINNATI RD SW	42	5.51	8.86	W7
COLUMBUS - WASHINGTON C.H. RD SE	62	2.50	4.02	AG27,AJ24
E COLUMBUS ST	62	0.41	0.67	AH26
COLVIN DR	1111	0.30	0.49	J27
COMMUNITY RD	269	0.10	0.16	I28
COMPTON RD	99	0.75	1.21	AH6
CONVERSE CHAPEL RD NE	41	1.13	1.82	C24
CONVERSE HUFF RD	30	3.50	5.63	C25,C26
COOK AVE	1043	0.27	0.44	AH25
COOK YANKEETOWN RD	34	0.96	1.55	AI21
CORRELL MAXEY RD	97	2.26	3.66	Y15,Y16
COUNTS RD	75	2.63	4.55	AG15
CRAWFORD RD	19	2.47	3.97	AD14
CREEK RD	12	0.49	0.74	G26
CUMBERLAND RD E	40	2.02	3.26	O23
CUMBERLAND RD NE	40	3.90	6.26	O19,P15
CUMBERLAND RD NW	40	4.66	7.49	P13
CUMBERLAND RD SW	40	3.13	5.03	P11D
CURRY RD	61	2.30	3.71	AF3
D				
DANVILLE RD	8	9.75	15.69	Z15,AD15,AG17
DARBY DR	1100	0.07	0.10	O26
DARBY LAKES DR	3	0.20	0.33	I27
DARBYMOOR DR	4	0.25	0.40	H27
DARBYTON DR	6	0.22	0.35	I27
DAVID BROWN RD	119	1.26	2.03	G13
DAVIDSON RD	147	1.02	1.64	X27
DAVIS RD	95	2.39	3.84	T10,U10
DEBOLT RD	54	0.37	0.59	A21
DEBUTLER RD	129	1.56	2.51	C21
DECK RD	144	1.51	2.43	X16
DEER CREEK LN	306	0.23	0.36	U20
DEER RUN LN	1106	0.50	0.81	Q16
DENNIS DR	267	0.15	0.24	O26
DIXIE AVE	1041	0.26	0.42	AH25
DOGWOOD CT	1131	0.38	0.60	O26
DORN RD	76	1.10	1.77	AG15
DRURY RD	23	3.91	6.30	Y12,AA11
DUN RD	114	1.64	2.63	L16
DYER RD	66	4.02	6.48	AE20,AE26
E				
EAST DR	7	0.12	0.19	E26
EAST ST	1047	0.09	0.15	AF26
EDGEMONT DR	6	0.09	0.14	J26
EDGINGTON DR	10	0.07	0.12	H27
ELM CT	13	0.02	0.04	P26
ELM ST	38	1.84	2.96	R15
ERA RD	500	0.65	1.36	AF25
F				
FAIRWOOD DR	14	0.06	0.12	P26
FEDERAL RD SW	2	1.52	2.99	AE3
SE FEDERAL ST	323	0.19	0.31	AF13
FEDERAL ST SE	323	0.06	0.10	AF12
FINLEY GUY RD NE	123	3.15	5.07	G20
FINLEY GUY RD NW	123	3.57	5.75	E15
FIRST AVE	1012	0.08	0.12	U26
FIRST ST	1038	0.16	0.29	AH25
FITZGERALD OUTLET RD	157	0.30	0.49	AF26
FLORANCE AVE	1036	0.08	0.13	W9
FLORENCE AVE	1042	0.27	0.44	AH25
FOODY RD	87	2.05	3.31	AB10
FORD RD	143	0.20	0.32	AG13
FORRESTWOOD AVE	310	0.43	0.69	N25
FOSTER REDMAN RD	74	3.09	4.96	AE17
FOURTH ALY	1071	0.17	0.26	T26
FOURTH ALY	1115	0.10	0.16	X25
FOURTH ALY	1070	0.07	0.12	T26
FOURTH AVE	303	0.06	0.10	I19
FRALICK RD	66	2.25	3.62	AE10
G				
GARDNER RD	281	0.73	1.17	O28
GARFIELD AVE	196	0.72	1.15	S15
GATES LN	97	0.27	0.43	A16
GENESIS AVE	266	0.12	0.20	I26
GERICH LILLY CT SE	1016	0.09	0.14	O26
GERICH LILLY RD SE	1065	0.10	0.16	T26
GERICH LILLY RD SE	52	0.44	0.71	R27,S26
GLADE RUN RD	70	6.60	10.94	P21,T21
GLENVIEW DR	1124	0.31	0.50	I27
GOODSON RD	48	1.53	2.46	M22
GRAPE GROVE RD	0026	1.33	2.14	AG1
GREEN LN	112	4.21	6.77	J14,M16
GREENE RD	105	0.26	0.42	AH13
GREENWOOD DR	1102	0.04	0.06	O26
GREENWOOD DR	1104	0.10	0.16	O26
GREGG MILL RD	150	1.14	1.83	X20
GREGG RD	43	2.62	4.22	R23
GREWELL RD	131	1.43	2.31	I20
GUY AVE	126	1.56	2.55	D21
GUY CEMETERY RD	122	1.56	2.51	F14
GWYNNE RD	111	1.71	2.76	O14
H				
HARROLD RD	98	2.47	3.97	AC6
HAYDEN RUN RD	38	2.49	4.01	F29
HAYMARKET ST	303	0.06	0.10	O25
HERON DR	1132	0.45	0.72	P27
HICKS RD	67	2.36	3.80	AG23
HIDDEN CREEK DR	1126	0.24	0.39	P27
HIGH FREE PKE	26	0.46	0.73	L26
HIGH ST	142	2.35	3.79	S17
HIGH ST	1055	0.18	0.29	AE5
HIGH ST	1046	0.10	0.16	AF26
E HIGH ST	142	0.39	0.63	S16
E HIGH ST	42	0.20	0.31	T15
W HIGH ST	42	1.71	2.75	T13,T14
HUME LEVER RD	63	4.79	7.71	X24
HUNTINGTON RD	370	3.02	4.87	X5
HUNTINGTON RD	159	0.07	0.12	Y7
HUTSON RD	91	1.35	2.16	Z9
I				
IAMS RD	35	2.19	3.52	C30
INNER DR	17	0.04	0.06	E29
IRWIN RD	26	3.01	4.84	C13
IRWIN RD	66	0.66	1.36	A13
J				
JACOB RD	269	0.13	0.21	I27
JEFFERSON ST	42	0.29	0.46	B26
JERICHO WAY	264	0.20	0.32	J27
JOHNSTON RD	65	1.86	3	AA18
JONES MARSH RD SE	133B	1.07	1.72	U21
JOSIAH MORRIS RD	126	1.01	1.62	G16
JUNK RD	21	3.89	6.25	AD21
K				
KADEN CT	0.23	0.36		Q26
KAREN DR	305	0.20	0.33	O12
KAUFMAN RD	153	0.67	1.39	D23
KELLOUGH RD	136	1.03	1.35	A20
KILE RD	5	0.66	1.06	A30
KILE WARNER RD	142	0.19	0.31	B31
KILLBURY HUBER RD	33	2.41	3.88	E24
KILLBURY RD	130	1.29	2.07	F25
KING PIKE	47	2.26	3.64	K24
KIOUSVILLE				
GEORGESVILLE RD	53	5.26	8.46	W27,Z25
KIOUSVILLE PALESTINE RD	54	0.65	1.04	AD27
KIOUSVILLE				
PALESTINE RD SE	54	4.03	6.48	AB25
KLEINVIEW DR	1010	0.13	0.21	T26
KRAMER RD	42	0.39	0.63	B24
L				
LAFAYETTE				
PLAIN CITY RD NE	5	13.67	22.32	G21,H20,N16
LAFAYETTE ST	42	2.05	3.29	R16
LAKE RD	161	0.72	1.16	U20
LAKEVIEW DR	311	0.17	0.27	N25
LANGEN RD	151	1.91	3.07	AB16
LANGSTON RD	152	0.88	1.50	Q20
LARKSPUR DR SE	1126	0.53	0.86	P27
LEWIS RD	117	2.33	3.75	H12
LILLY CHAPEL				
OPOSSUM RUN RD	72	0.92	1.48	X27
LILLY CHAPEL				
GEORGESVILLE RD SE	102	4.35	7.01	T25
LILLY CHAPEL				
OPOSSUM RUN RD SE	72	1.01	1.63	U26
LILLY CHAPEL RD	295	0.26	0.46	P26
LINSON RD	17	4.75	7.65	AA10
LITTLE DARBY RD	116	2.79	4.49	K20,L20
LOCUST CT	265	0.03	0.05	L19
LOCUST DR	266	0.06	0.10	K19
LOCUST PARK	263	0.07	0.11	K19
LOCUST PL NE	262	0.02	0.03	L19
LOCUST WAY	264	0.06	0.10	K19
LOMBARD CHUCKERY RD	29	9.9	15.93	B26
LOMBARD RD	59	0.15	0.24	A19
LONDON - CIRCLEVILLE RD	56	1.11	1.78	T16
LONDON - CIRCLEVILLE RD SE	56	14.09	22.68	W19,Z22,AE25
LONDON - DELAWARE RD	42	0.16	0.26	C26
LONDON - DELAWARE RD NE	42	13.65	21.96	D26,I24,M21
LONDON - DELAWARE RD SE	42	2.09	3.34	O17
LONDON - LOCKBORNE RD	665	1.59	2.56	V26
LONDON - LOCKBORNE RD SE	665	9.42	15.16	T16,T20,U24
LONDON RD	3	0.17	0.26	Z26
LONDON RD	142	2.41	3.67	P25
LONDON ST	56	0.46	0.75	AH27
LUCAS RD	45	2.97	4.78	I26
LUNDY LN	377	1.07	1.72	M10
LUTHER RD	1101	0.05	0.07	O26
LYNN CT	35	0.03	0.05	O26
M				
MADDEN HIGGINS RD	62	2.77	4.47	Y17
MAIN ST	161	0.36	0.59	B26
MAIN ST	1002	0.11	0.17	B30
MAIN ST	36	0.23	0.37	AF13
MAIN ST	62	0.49	0.76	AG26
MAIN ST	40	0.45	0.73	O27
MAIN ST	161	0.57	0.91	B27
MAIN ST	323	0.18	0.29	AE5
MAIN ST	56	0.97	1.56	R14,S15
MAIN ST	56	0.49	0.79	T15
MAIN ST	62	0.64	1.03	AH26
MAIN ST	2	0.10	0.16	AE4
MAIN ST	161	0.40	0.64	A26
MAIN ST	40	3.16	5.08	O26
MAIN ST S	38	0.29	0.47	AF13
MANTLE RD	164	1.23	1.99	AA28
MAPLE WAY	267	0.07	0.11	L19
MARKLEY RD	105	3.03	4.87	Q10
MARYSVILLE - LONDON RD N	36	12.91	20.76	G16,M16
MARYSVILLE - LONDON RD S	36	1.32	2.12	Q15
MCCUMMINSVILLE				
CEMETERY RD SE	57	1.32	2.12	AF26
MCGUIRE RD	64	5.13	5.04	U23
MCKENDREE RD	55	1.23	1.98	AA25,AB26
MEADOW LN	304	0.08	0.13	N25
MECHANICSBURG				
SANFORD RD	27	4.04	6.50	F14
MIDDLE PIKE	10	5.16	8.30	K25
MIDWAY RD	390	2.08	3.34	AA5
MIDWAY ST	38	0.06	0.09	U15
MINISHALL RD	98	1.93	3.11	AE12
MOON RD	80	1.63	2.62	AF6
MOORMAN RD	69	4.06	6.54	Z20,AB19
MORGAN RD	46	1.26	2.03	K26
MOUNT STERLING -				
WATERLOO RD SE	207	2.19	3.53	AI26
MY HIGH RD NE	44	2.21	3.56	H25
N				
NATIONAL RD	40	2.52	4.05	P3
NEAD ST	1044	0.10	0.16	AH26
NEIL EAST RD	93	1.98	3.03	W10
NEIL RD	92	2.35	3.78	W9,X10
NEIL WEST RD	94	1.77	2.85	X8
NIOGA TOOPS RD	60	3.13	5.04	AA27,AB26
NORTH HOUSTON PIKE	375	0.34	0.54	L10
NORTH RD	301	0.42	0.68	M23
O				
O'DAY HARRISON RD	18	6.69	10.76	AG24,AH20
O'HARA RD	43	0.30	0.49	A22
OAK CT	36	0.03	0.05	P28
ODNIR RD	15	0.14	0.22	R11
OLD 729 RD	250	0.04	0.07	AF9
OLD COLUMBUS RD	582	1.42	2.29	N9
OLD SPRINGFIELD RD	13	5.05	8.13	S12
OLD SR 56	1116	0.17	0.28	O12
OLD US 40	1052	0.01	0.01	O13
OLD XENIA RD SE	12	3.26	5.29	W15
OLD XENIA RD SW	12	6.72	10.82	W13,Y9
OLIVE BRANCH RD	261	0.04	0.07	I26
OLMSTEAD RD	51	3.63	5.83	P26,R27
OPOSSUM RUN RD	72	0.23	0.36	Z28
OPOSSUM RUN RD	136	0.63	1.02	Y26
OUTER DR	38	0.19	0.30	E26
P				
PANCAKE SELSOR RD	90	2.46	3.96	AB6
PARK LN	309	0.08	0.13	U19
PARKWOOD DR	1096	0.06	0.09	P28
PATRICK RD	198	0.73	1.16	E11
PAYNE THOMPSON RD SE	101	2.83	4.55	T16
PERRY PIKE	40	0.55	0.89	B26
PLAIN CITY -				
DUBLIN RD NE	161	2.56	4.12	B29
PLAIN CITY				
GEORGESVILLE RD NE	7	8.21	13.21	C26,G27,I27
PLAIN CITY				
GEORGESVILLE RD SE	7	1.88	3.03	P28
PLATTSBURG RD	364	0.16	0.29	R9
PLEASANT VIEW RD	95	0.21	0.34	AG2
PLUMWOOD MHP	41	0.05	0.06	AG22
POTEE RD	267	0.07	0.11	L19
PRAIRIE RD	25	0.74	1.19	AI11
PRAIRIE RD SW	77	2.07	3.33	AG12
PRICE HILLIARDS RD NE	32	5.43	8.74	G26,G27
PRINGLE BENJAMIN RD SE	65	1.68	2.71	V26
R				
RANGE ST	1050	0.11	0.17	AF17
REID RD	23	0.39	0.62	AH10
RESACA ST	1026	0.22	0.35	F19
RINGS RD	33	0.61	0.96	E31
RIVERSIDE DR	1099	0.44	0.71	O29
ROBERTS MILL RD	96	6.39	10.28	Q12,S12,V12
ROBERTS RD	148	1.04	1.67	Q27,R27
ROBISON RD	62	1.34	2.16	AB23
ROSEDALE				
MILFORD CENTER RD	11	6.35	13.44	B15,G16
ROSEDALE				
PLAIN CITY RD NE	24	4.68	7.53	C21,D18
ROSEDALE				
PLAIN CITY RD NW	24	2.57	4.14	D17
ROSEDALE RD	25	0.09	0.90	E14
ROSEDALE RD	197	0.58	0.94	E11
RUSTIC CT	57	0.05	0.09	P26
S				
SCENIC DR	302	0.09	0.12	N25
SCHADEL RD	1037	0.21	0.35	AH25
SECOND ST	1039	0.16	0.29	AH25
SELSOR MOON RD	16	6.96	11.23	AC11,AE7
SEVENTEENTH ALY	1067	0.03	0.06	T26
SHADY GROVE RD	158	0.05	0.07	AG3
SHEPHERD RD	73	2.62	4.21	AB16
SHOCKLEY RD	0144	0.65	1.05	AB2
SIMPSON RD	104	0.11	0.17	P16
SIMPSON RD SE	104	2.50	4.02	P19
SIXTH ALY	1072	0.06	0.10	T26
SLAUGHTER RD	729	2.13	3.42	AH9
SMITH CALHOUN RD	37	1.14	1.83	D26,E26
SOLON RD	0137	0.70	1.13	AE2
SOUTH DR	60	0.07	0.11	E26
SOUTH HOUSTON PIKE	97	1.22	1.96	P9
SOUTH RD NE	301	0.49	0.80	M24
SOUTH ST	1048	0.10	0.16	AF26
SPARLING RD	152	2.40	3.86	S22
SPRING VALLEY RD	71	5.59	8.99	Q16
SPRINGFIELD -				
WASHINGTON C.H. RD SW	41	5.86	9.43	AA5,AG4
STATE OF OHIO RD	1058	0.17	0.26	U19
SURREY LN	1125	0.30	0.49	E27
SYCAMORE LN	160	0.65	1.04	U20
T				
TAYLOR BLAIR RD	14	8.20	13.20	K22,M25
TENNY RD	165	0.75	1.20	AE28
THIRD ALY	1017	0.21	0.33	X25
THIRD ST	1040	0.18	0.29	AI25
THIRTEENTH ALY	1088	0.03	0.05	T26
THOMAS LN	1116	0.31	0.51	Q26
THOMAS RD	121	2.49	4.01	H15
THOMAS RD	376	1.48	2.38	T7
THORN LOCUST LN	286	0.05	0.06	K18
TIMMONS DR	1121	0.09	0.14	J27
TRADERSVILLE				
BRIGHTON RD	113	3.68	5.92	J13
TRILLIUM DR	1127	0.40	0.64	P27
TWELFTH ALY	1020	0.11	0.18	X25
U				
UNIONVILLE RD	55	0.31	0.50	A22
URBANA - LONDON RD NW	56	3.94	6.34	M11
URBANA - LONDON RD SW	56	2.99	4.81	Q13
URBANA - WEST				
JEFFERSON RD NE	29	7.01	11.29	K17,N23
URBANA - WEST				
JEFFERSON RD NW	29	7.57	12.18	F10
V				
VAL WILSON RD	108	0.96	1.55	N11
VAN WESS RD	243	0.72	1.17	B11
VAN WAGENER RD	94	3.94	6.16	Y19,Z19
VOGLESBURG RD	124	1.05	1.69	E19
W				
WALNUT ST	10	0.21	0.34	O27
WARE RD	119	0.91	1.47	F12
WARNER RD	6	0.27	0.44	B29
WASHINGTON - LONDON RD S	36	11.67	18.78	V14,AA13,AD13
WASHINGTON ST	41	0.15	0.29	AE4
WATSON RD	90	1.46	2.36	AB14
WEST DR	88	0.03	0.05	E29
WEST JEFFERSON				
KIOUSVILLE RD SE	22	9.76	15.71	T26,Y25
WEST RD	301	0.12	0.20	M23
WEST ST	1045	0.10	0.16	AF26
WESTWOOD DR	1097	0.06	0.14	O28
WHITE OAK DR	1105	0.12	0.19	S19
WILLIAM LUCAS RD	60	2.47	3.98	AD3
WILLOWOOD LN	500	0.03	0.06	L19
WILSON RD	103	3.45	5.55	R24
WISSLER RD	115	1.57	2.53	AI19
WOOD LN	307	0.19	0.30	U19
WOODLAND CT	1133	0.57	0.92	O26
WOODS & OPOSSUM RUN RD SE	56	2.04	3.29	AC27,AE27
WOODS WEST AVE	126	4.56	7.34	D20
X				
XENIA LONDON RD	115	2.37	3.82	Z5
Y				
YANKEETOWN CHENOWETH RD	9	11.96	19.25	Z16,AD19,AG19

APPENDIX B - SITE PICTURES



BURNS McDONNELL

Photo Exhibit

Bates Road
Bridge
Madison Fields Solar Project
Madison County, OH

BURNS McDONNELL

Photo Exhibit

Bates Road
161
Madison Fields Solar Project
Madison County, OH

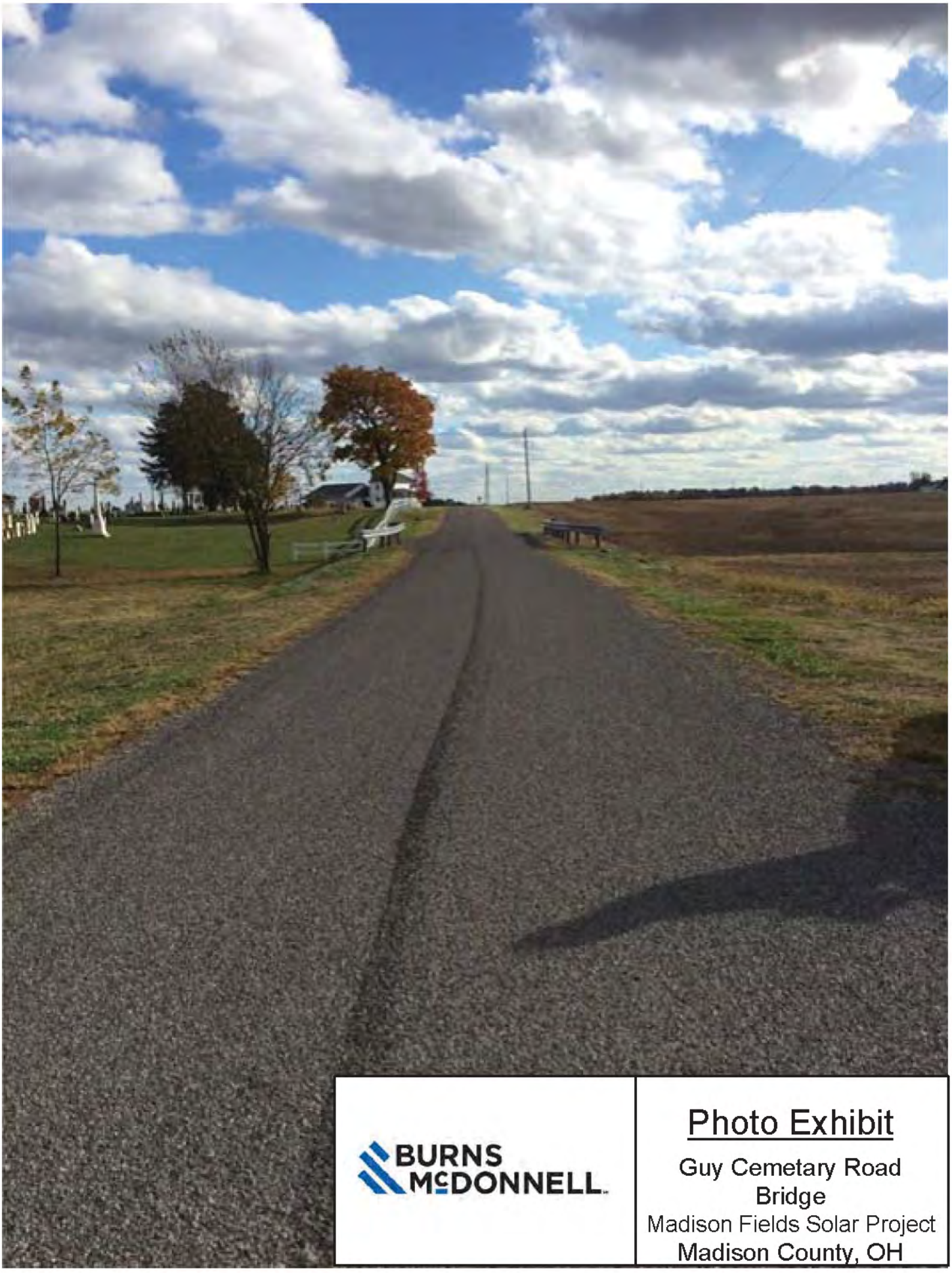


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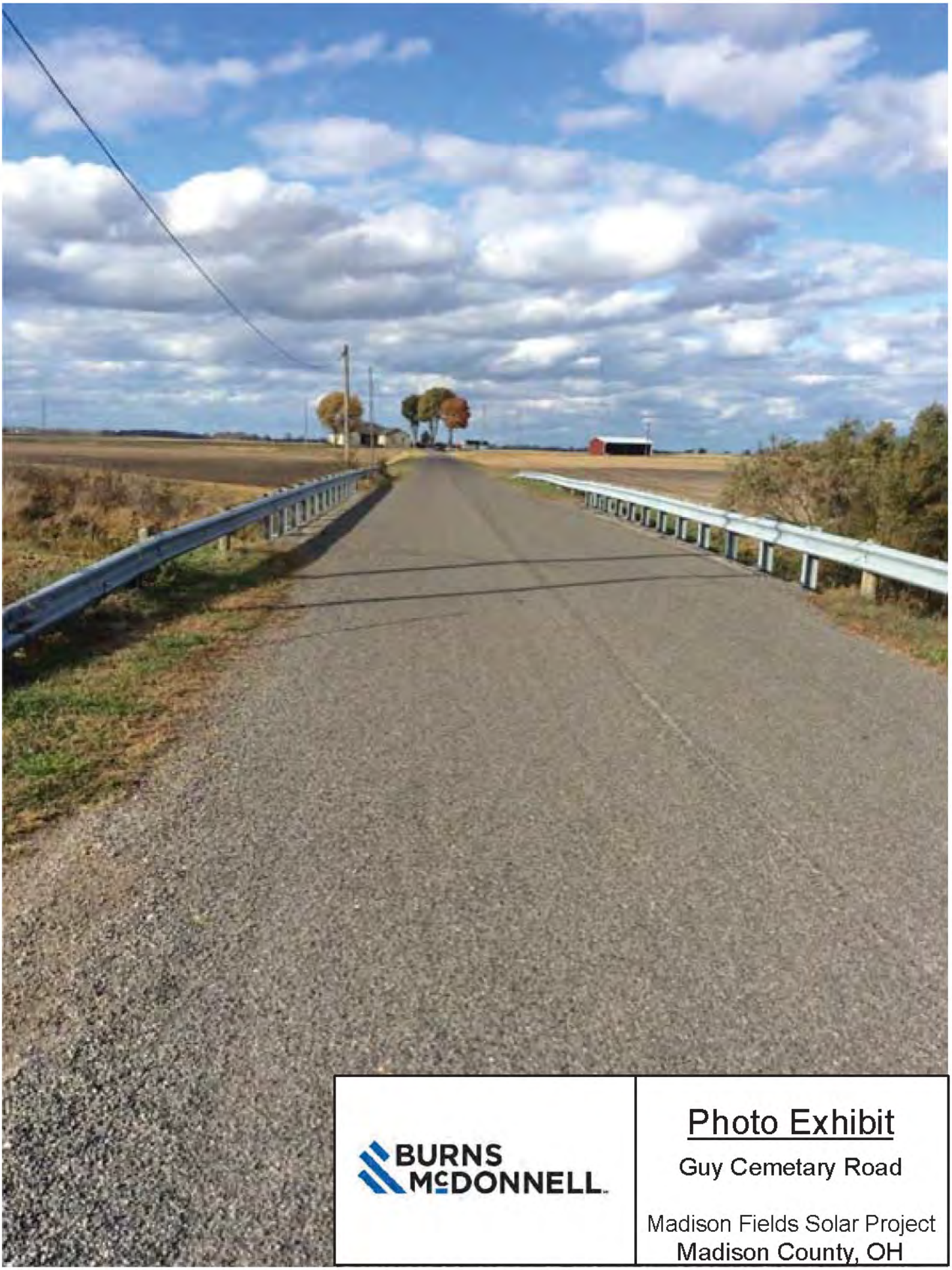
Photo Exhibit

Guy Cemetary Road
Bridge
Madison Fields Solar Project
Madison County, OH



BURNS McDONNELL

Photo Exhibit

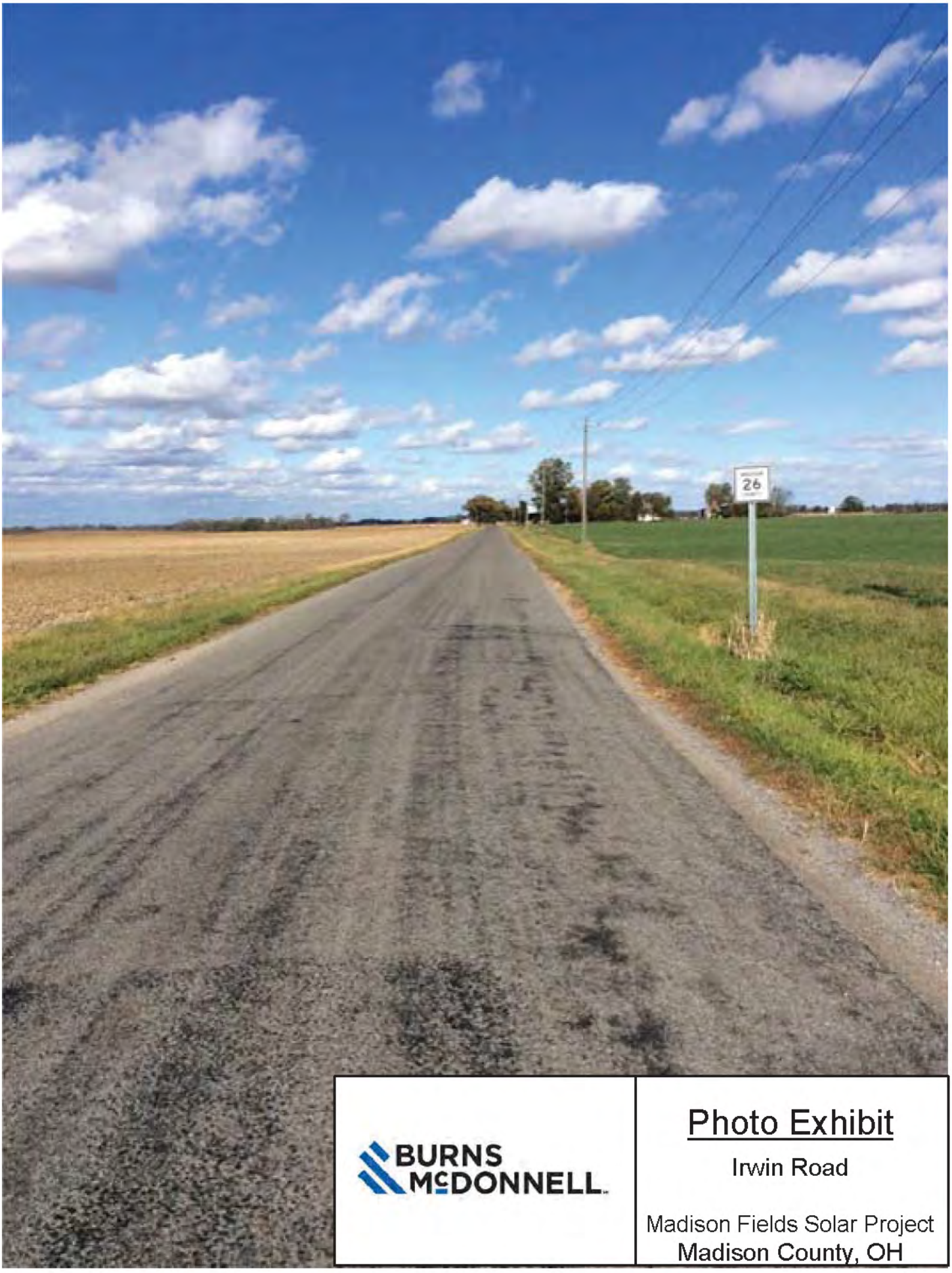
Guy Cemetary Road

Madison Fields Solar Project
Madison County, OH

BURNS McDONNELL

Photo Exhibit

Irwin Road
Rosedale Road
Madison Fields Solar Project
Madison County, OH



BURNS McDONNELL

Photo Exhibit

Irwin Road

Madison Fields Solar Project
Madison County, OH

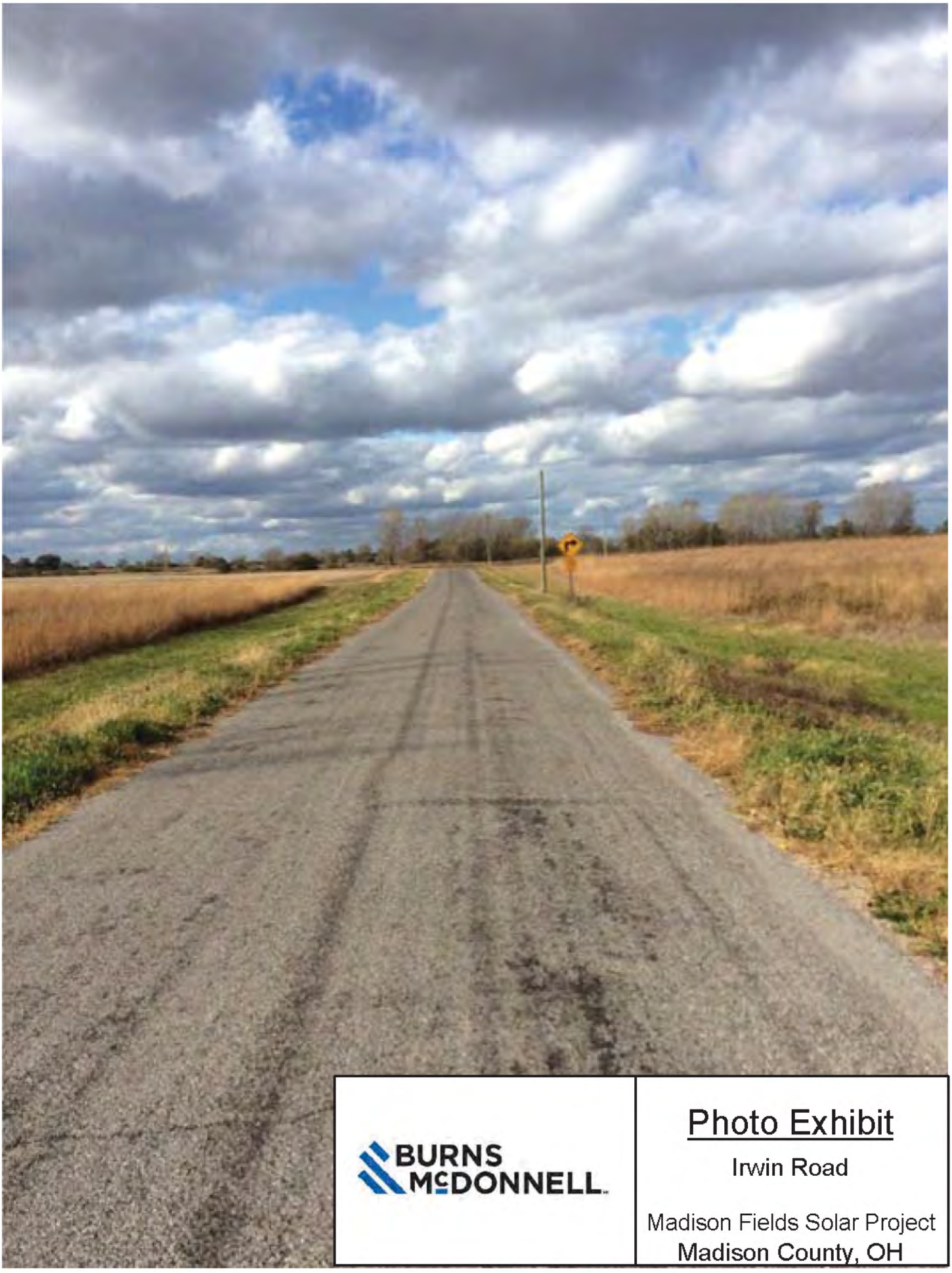


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Photo Exhibit

Irwin Road

Madison Fields Solar Project
Madison County, OH

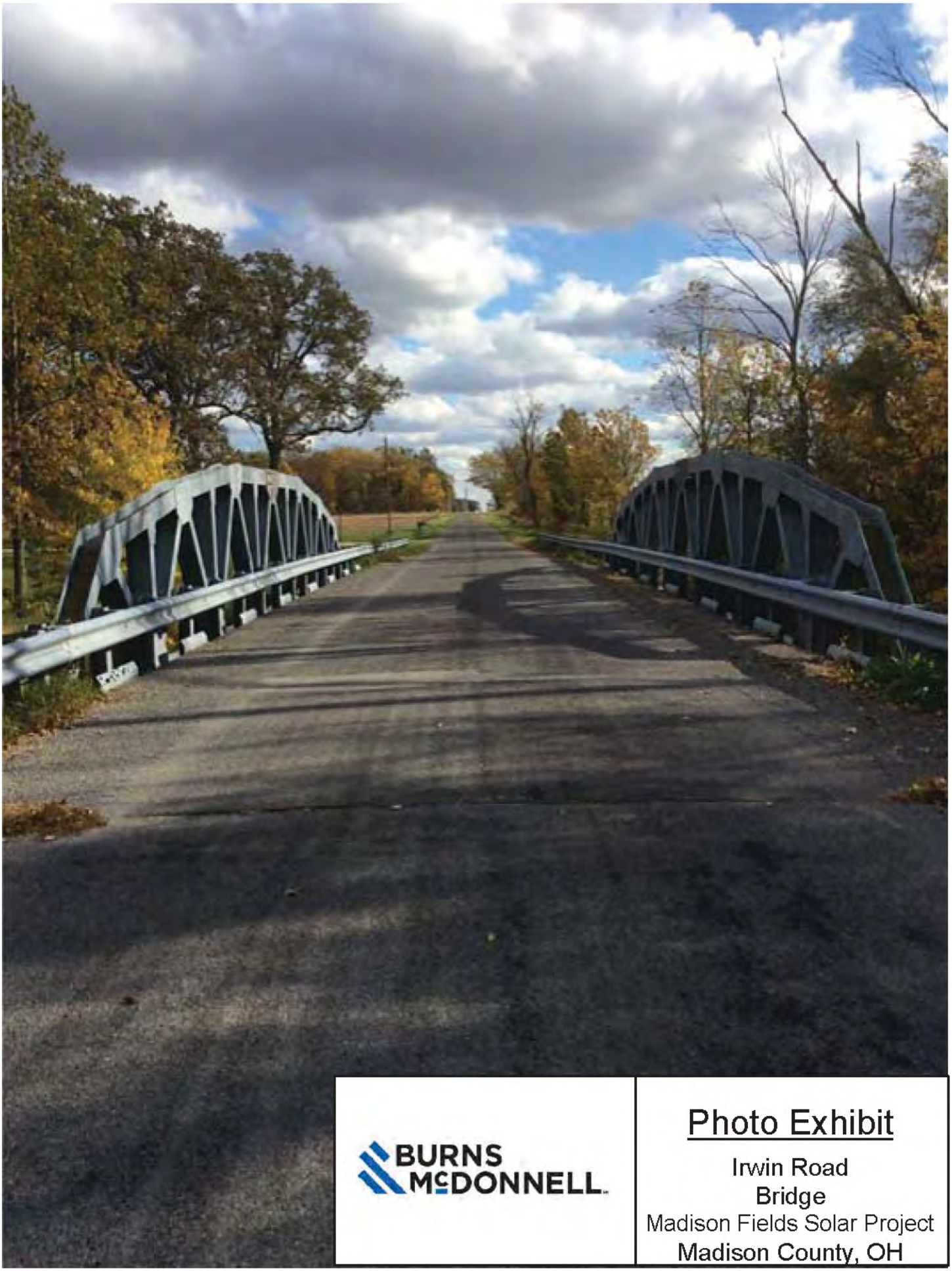

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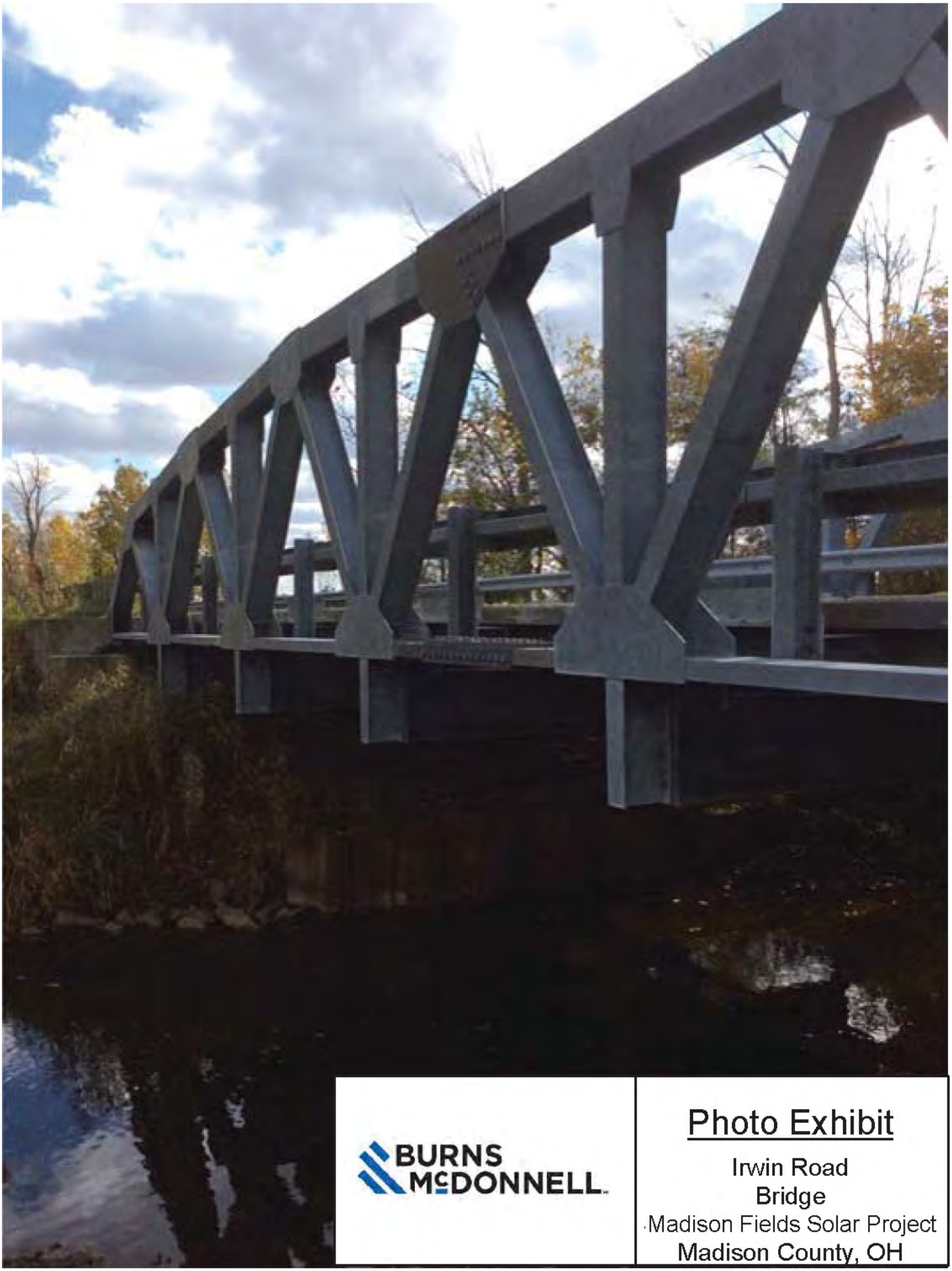
Photo Exhibit

Irwin Road
Bridge
Madison Fields Solar Project
Madison County, OH



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Irwin Road
Bridge
Madison Fields Solar Project
Madison County, OH

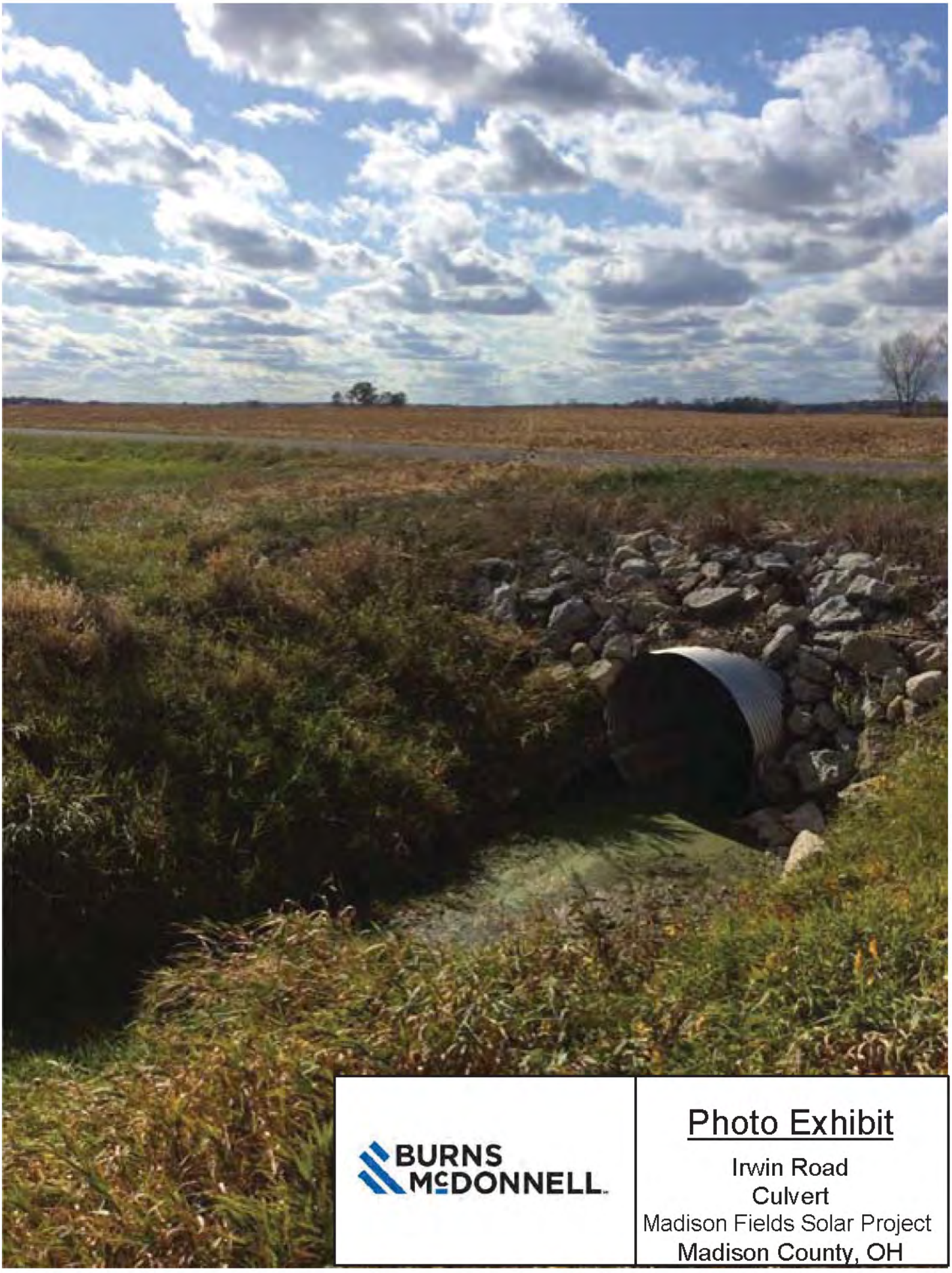

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Photo Exhibit

Irwin Road
Culvert
Madison Fields Solar Project
Madison County, OH

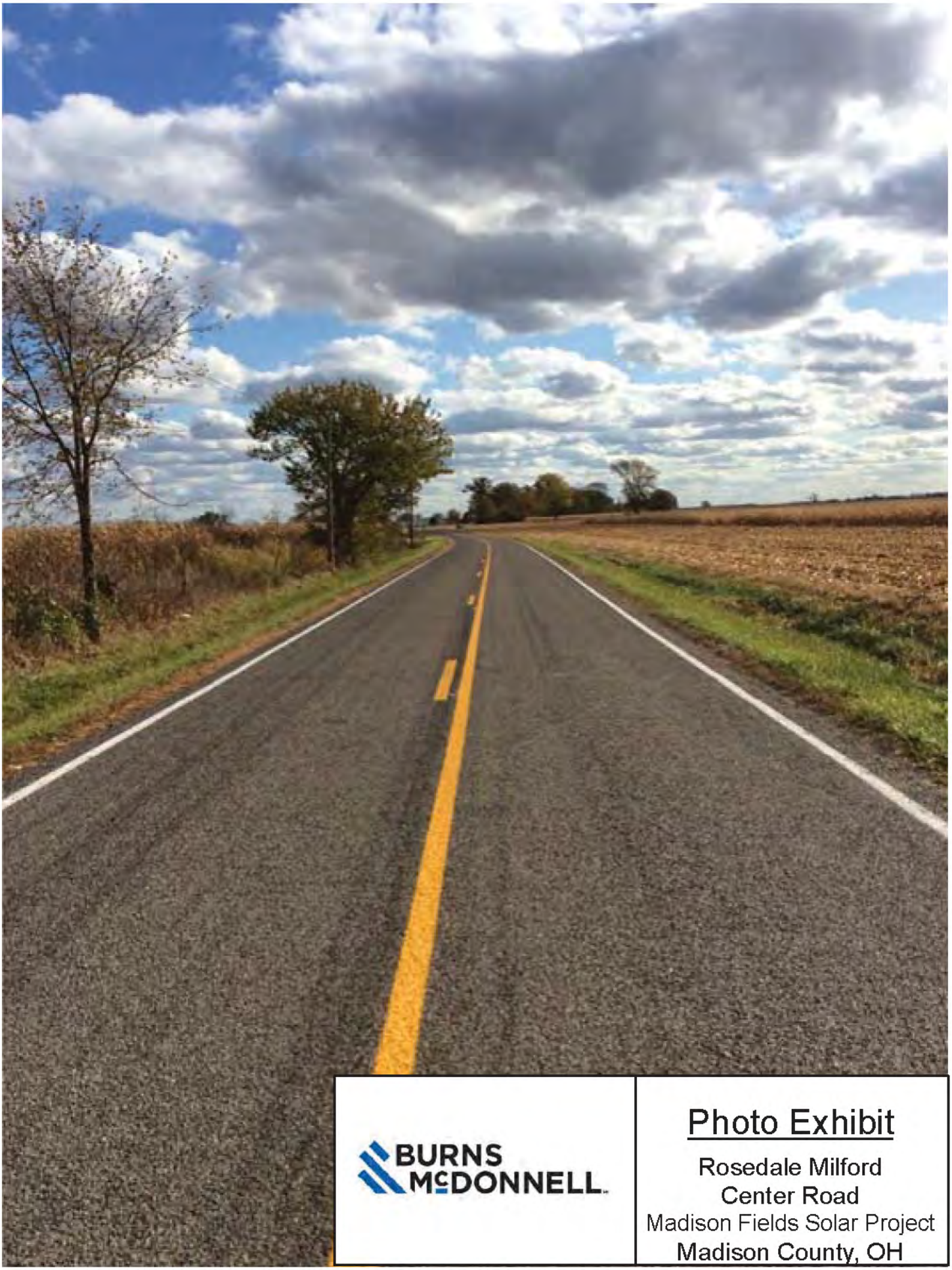

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Photo Exhibit

Rosedale Milford
Center Road
Madison Fields Solar Project
Madison County, OH

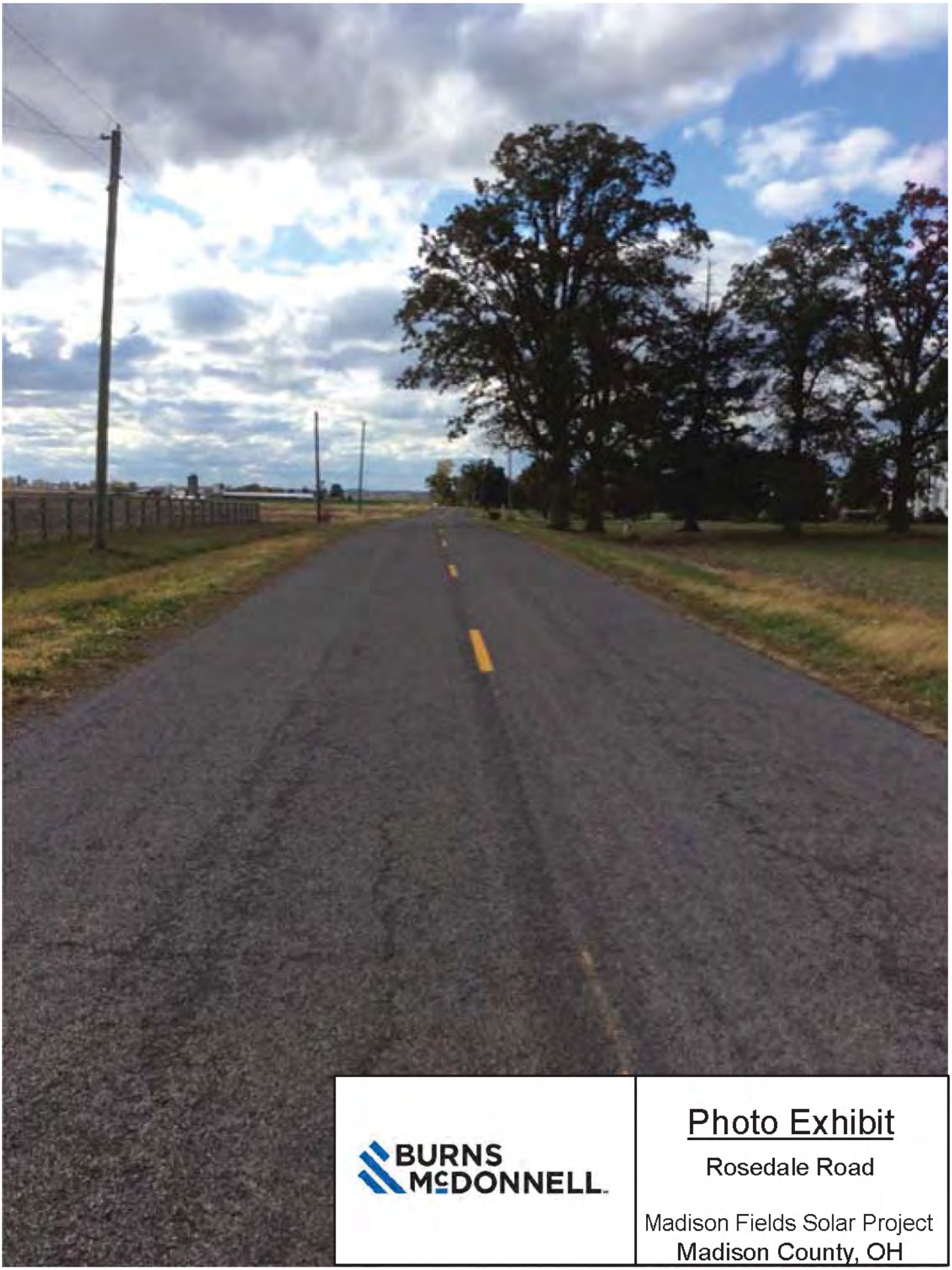

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Photo Exhibit

Rosedale Road

Madison Fields Solar Project
Madison County, OH

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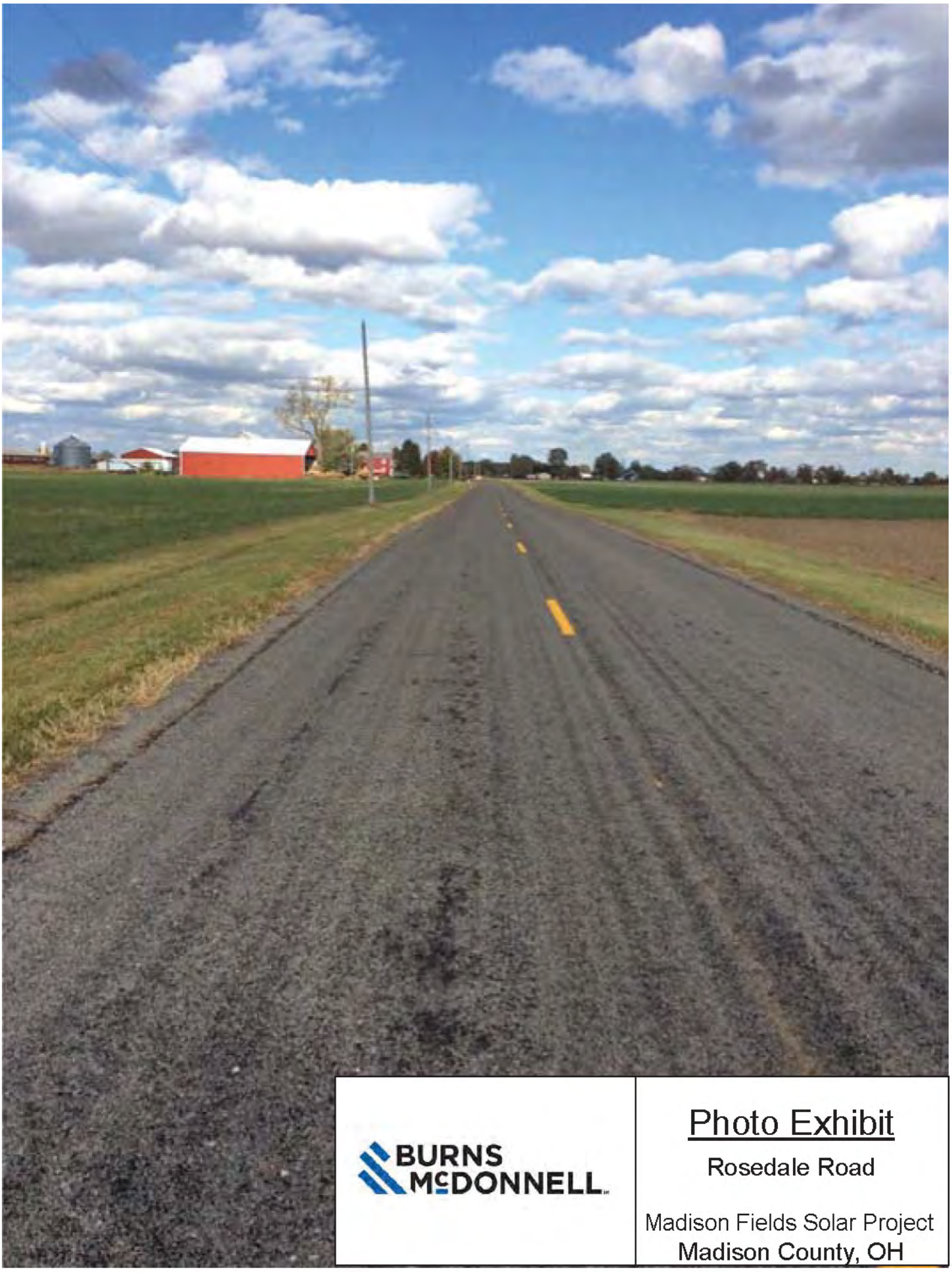
Photo Exhibit

Rosedale Road
Irwin Road
Madison Fields Solar Project
Madison County, OH



BURNS McDONNELL

Photo Exhibit

Rosedale Road

Madison Fields Solar Project
Madison County, OH

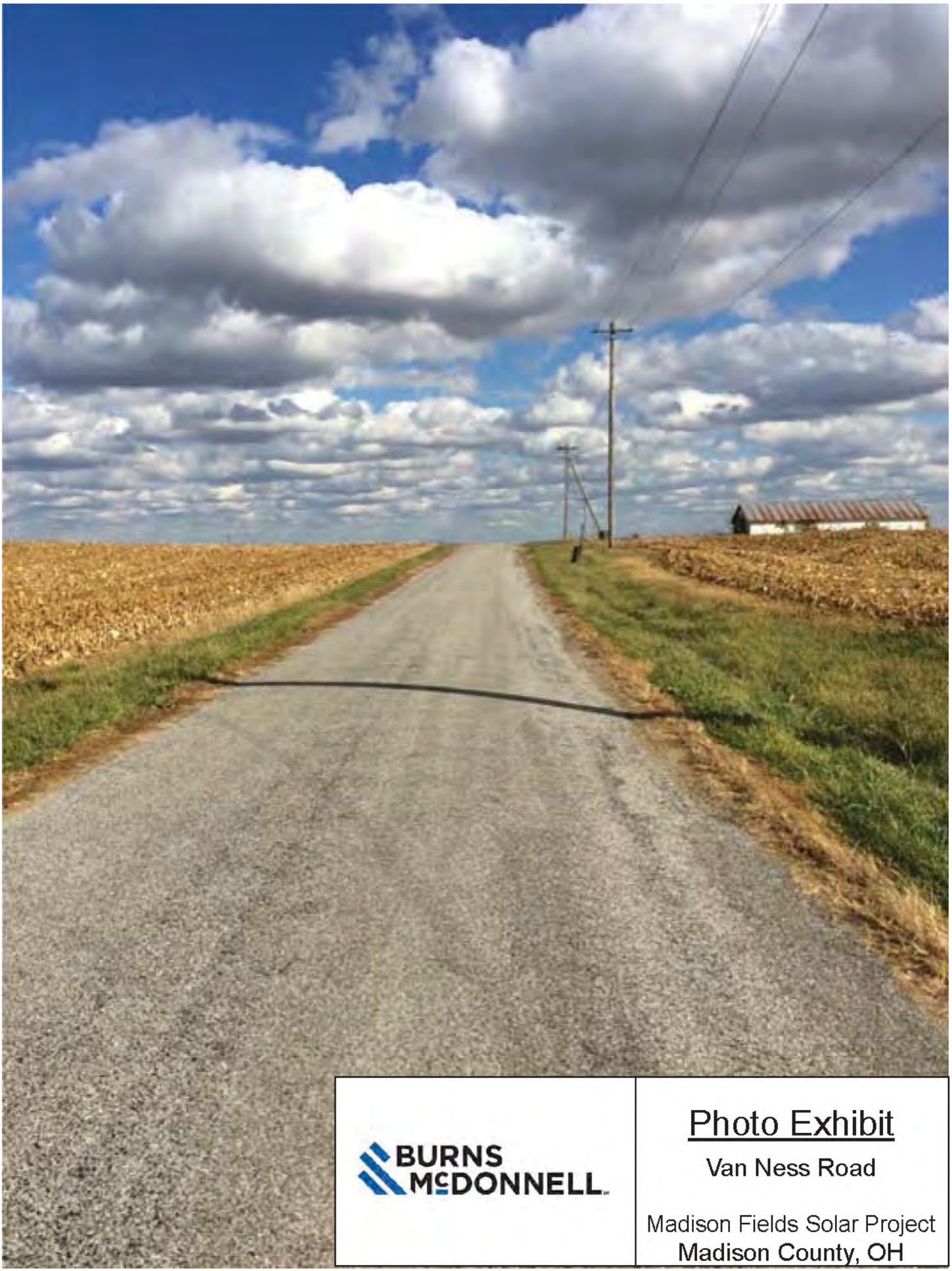


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Photo Exhibit

Van Ness Road

Madison Fields Solar Project
Madison County, OH

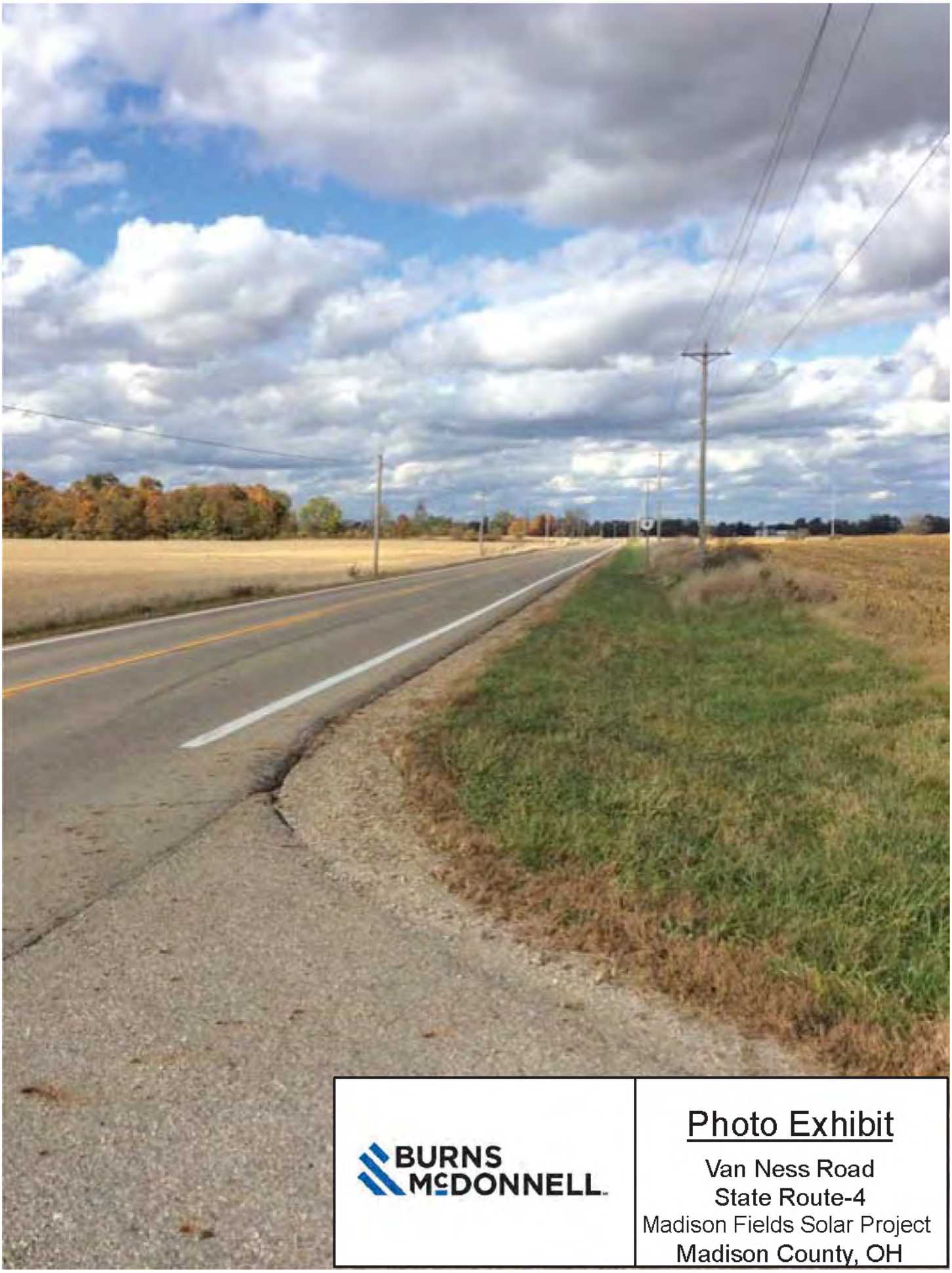

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Photo Exhibit

Van Ness Road
State Route-4
Madison Fields Solar Project
Madison County, OH

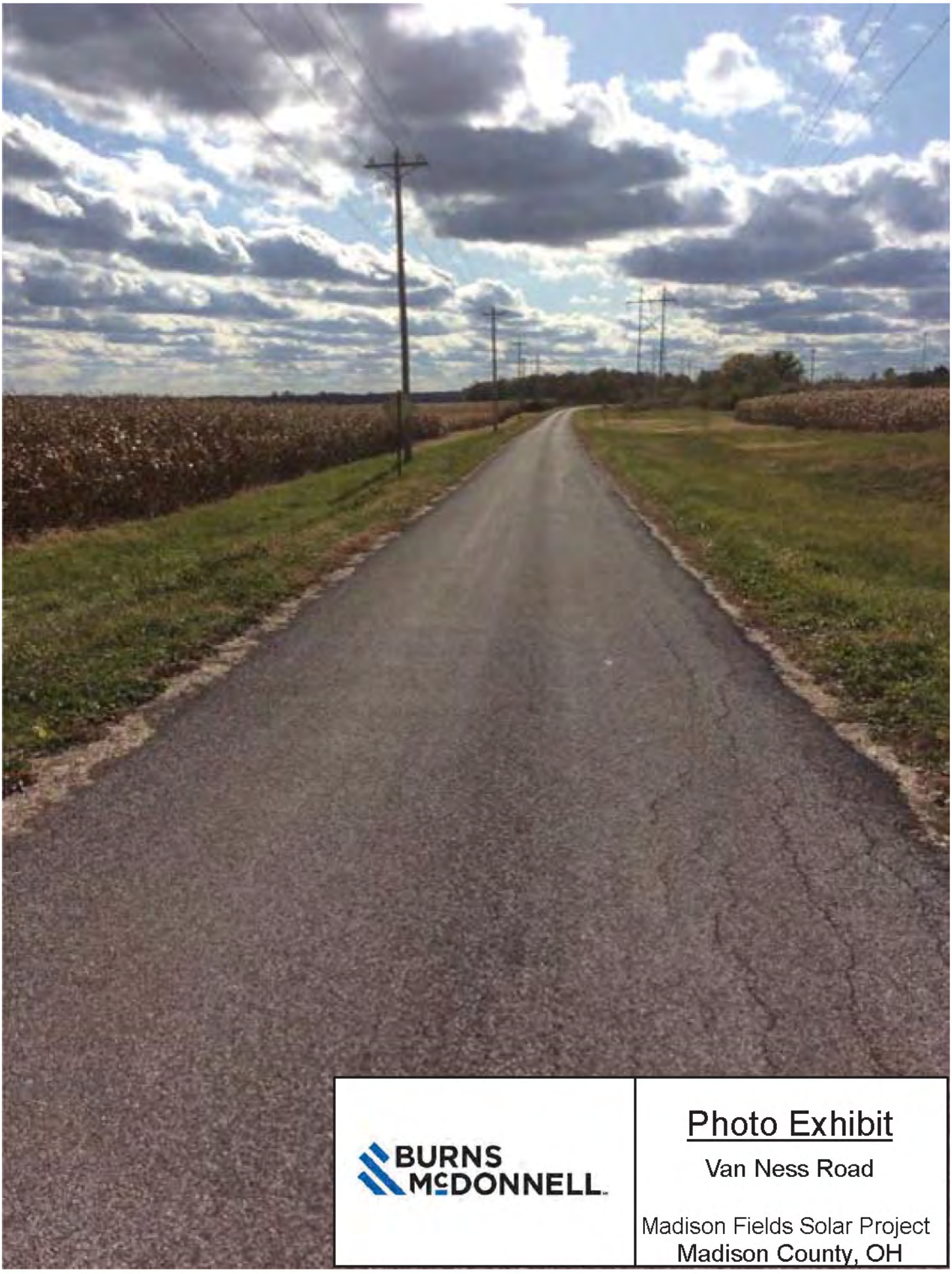

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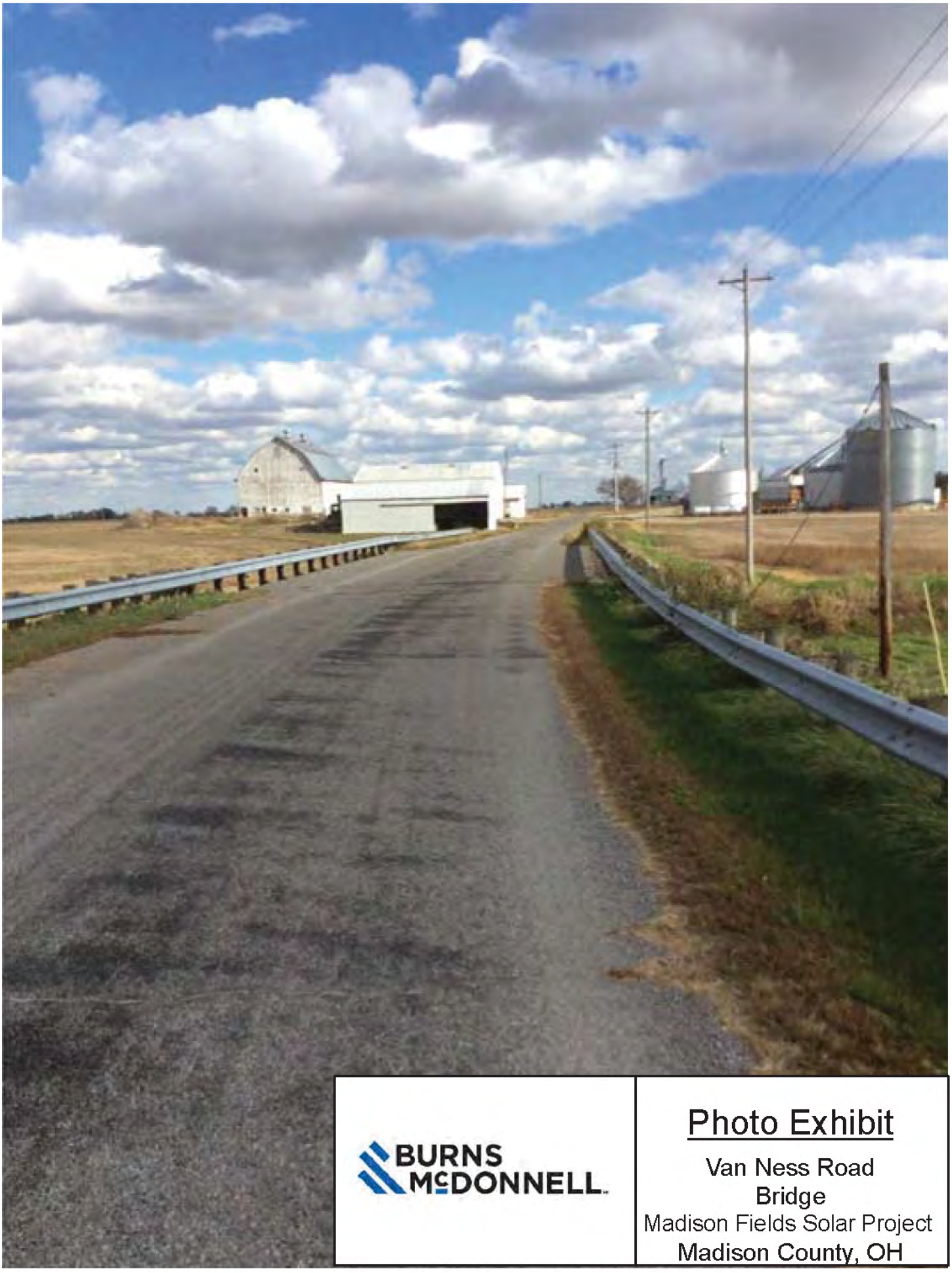
Photo Exhibit

Van Ness Road

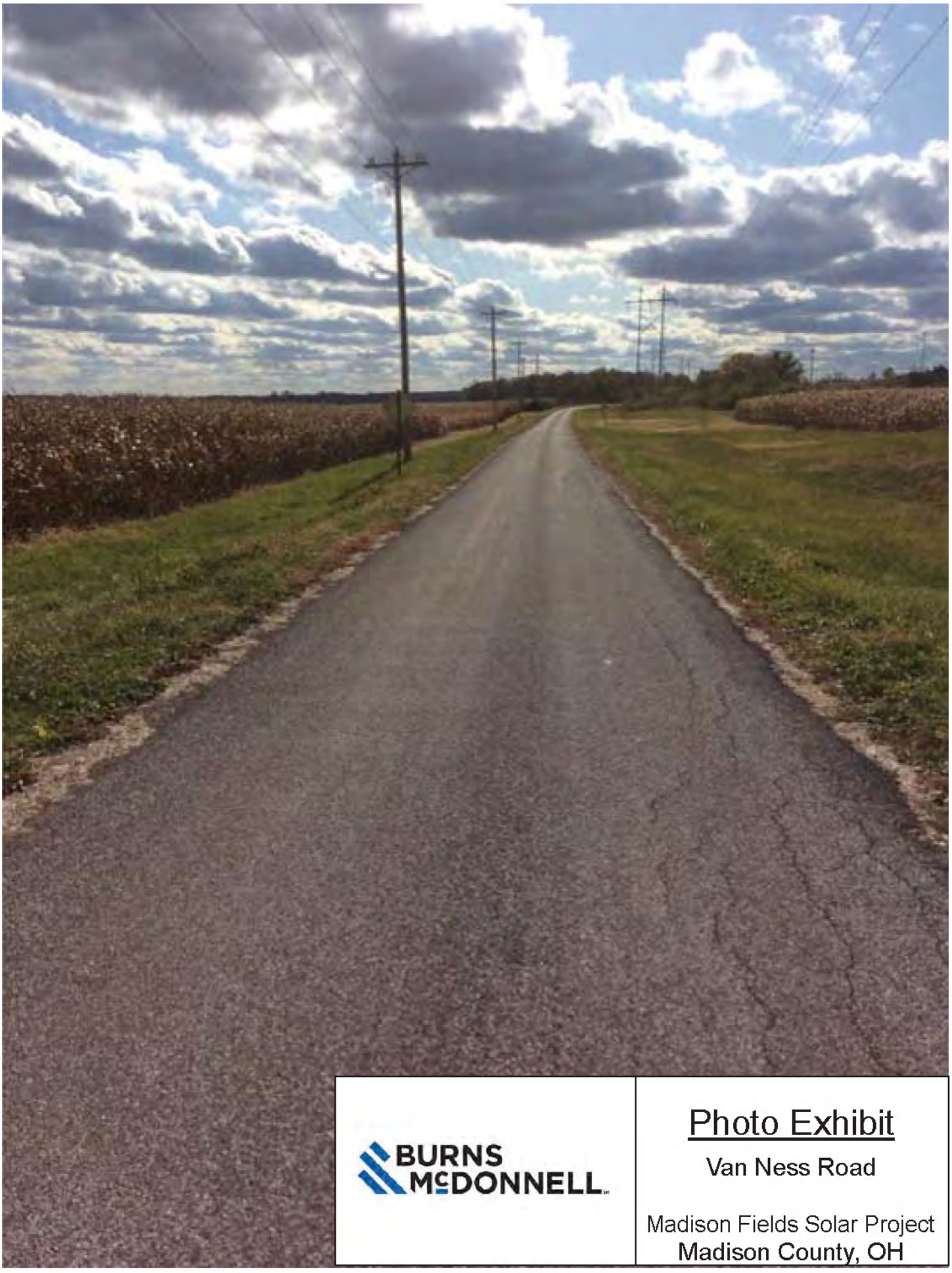
Madison Fields Solar Project
Madison County, OH



BURNS McDONNELL

Photo Exhibit

Van Ness Road
Bridge
Madison Fields Solar Project
Madison County, OH



BURNS McDONNELL

Photo Exhibit

Van Ness Road

Madison Fields Solar Project
Madison County, OH

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CREATE AMAZING.

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Kansas City, MO 64114
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www.burnsmcd.com

Madison Fields Solar Project, LLC
Case No. 19-1881-EL-BGN

Exhibit K
Decommissioning Plan

Environmental Consulting & Technology, Inc.
May 1, 2020

Respectfully submitted,

/s/ Christine M.T. Pirik

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Attorneys for Madison Fields Solar Project, LLC

DECOMMISSIONING PLAN
MADISON FIELDS SOLAR PROJECT
MADISON COUNTY, OHIO

Prepared for:

Madison Fields Solar Project, LLC

Prepared by:

ECT Environmental Consulting & Technology, Inc.
3720 Wilder Road, Unit B, Bay City, MI 48706

ECT No. 20-0234

May 1, 2020

TABLE OF CONTENTS

Tables

1.0 INTRODUCTION

Madison Fields Solar Project, LLC ("Madison Fields") contracted Environmental Consulting & Technology, Inc. ("ECT") to prepare a Decommissioning Plan ("Plan") for the approximately 1,932-acre Madison Fields Solar Project ("Project") in Pike Township, Madison County, Ohio. This Plan was prepared to ensure proper decommissioning of the Project. This Plan provides a description of decommissioning and restoration of the Project and to meet the requirements of the Ohio Power Siting Board ("OPSB".).

The Project is a 180-megawatt alternating current ("MW AC") solar facility capable of providing clean, renewable electricity to approximately 42,600 Ohio homes. The Project components will include photovoltaic ("PV") solar panels (approximately 91,224, 385 Watt ("W") modules and 479,808, 415W modules) that will be mounted on a single-axis tracking system with a 60+/- degree tilt, along with associated infrastructure of approximately 60-2.99 MW electric inverters and 60 transformers, underground electrical collection systems (distribution equipment), electrical collector substations, point of interconnection switchyard (Power control equipment), overhead transmission lines, an operations and maintenance ("O&M") building, SCADA system, control building, private gravel access roads with gated ingress/egress points and security fencing. Temporary facilities associated with construction will include a construction laydown yard. Collectively, the facilities listed in this paragraph comprise the "Project Facilities".

The Project proposes that the 180 MW AC solar facility interconnect to a newly constructed FirstEnergy switchyard. The anticipated start of construction is planned for the first quarter of 2022, with a commercial operation date ("COD") in the fourth quarter of 2022 or first quarter of 2023.

The purpose of this Plan is to ensure that, upon a decommissioning event: expiration of the operational life of the Project or abandonment of the Project, all Project Facilities will be removed, and the Project property will be restored pursuant to the agreement. As required by the OPSB a surety bond or other mutually agreed upon form of financial assurance will be issued prior to commencement of construction in the amount equal to the net cost to decommission the Project and reconstitute the land, as agreed upon by the OPSB. The decommissioning plan, the cost estimate and the bond will be reviewed every five years and will remain in place for the length of the land rights agreements or completion of decommissioning and restoration.

This Plan provides a description of the decommissioning activities for all facilities, including removal procedures, and schedules, and planned restoration of the land. Estimated costs are provided based on the proposed 180-MW AC array design.

1.1 SOLAR FACILITY COMPONENTS

The primary components of the Project include the following solar components and associated infrastructure:

- Solar panels and racking
- Operation and maintenance building
- Electrical substations
- Power control equipment
- Overhead transmission lines
- Tracking system
- Electrical cabling and conduits
- Foundations and steel piles
- Transformers and inverters
- SCADA hardware system
- Control house for protective relay panels and site controllers
- Private gravel access roads
- Gated ingress/egress points
- Security fencing

1.2 ANTICIPATED PROJECT LIFE

Madison Fields, the owner of the Project, or its successors and assigns, is responsible for the decommissioning of the Project. Utility-scale solar facilities are designed to operate for a minimum of thirty (30) years, however, the possibility exists for the Facility to operate past that given future repairs and upgrades to the technology and renewal in the energy contract. The surety bond or financial equivalent will be in place for the length of the land rights agreements with participating property owners or completion of decommissioning and restoration.

2.0 DECOMMISSIONING TASKS AND SEQUENCE

Madison Fields acknowledges that all solar components including Project Facilities as defined, constructed above ground and any structures up to thirty-six (36) inches below-grade will be removed offsite for disposal, except for (i) access roads or driveways on private property if the property owner requests in writing to Madison Fields for such to remain and (ii) switchyard, interconnection facilities and other similar utility facilities not owned by Madison Fields at the time of decommissioning.

Madison Fields anticipates decommissioning and restoration activities will occur over a twelve (12) month period and will coordinate with staff prior to the start of any decommissioning activities.

All required approvals will be obtained prior to the start of decommissioning, and may include, but are not limited to the following:

- United States Army Corps of Engineers ("USACE") maintains jurisdiction over Waters of the U.S. ("WOTUS") maintained under Section 10 of the federal Rivers and Harbors Act of 1899 and their adjacent wetlands. A permit is required from USACE for activities, such as but not limited to, the placement of fill, dredging of material, draining surface water, or removing a structure within these regulated areas.

- Madison Soil and Water Conservation District permit for any activity that involves the crossing, modifying, or discharging of stormwater to a county drain.
- Madison County for any road permits for soil erosion, water quality, construction stormwater, and septic and well, and building permits.
- A Stormwater Pollution Prevention Plan (SWPPP) will be prepared to include best management practices for construction and decommissioning that might include construction entrances, silt fencing, temporary seeding, permanent seeding, mulching (in non-agricultural areas), erosion control matting, filter berms, and filter socks.

The anticipated sequence of decommissioning and removal are described below; however, an overlap of activities is expected.

- Reinforce access roads, if needed, and prepare the site for component removal
- Install temporary fencing and best management practices (BMPs) to protect sensitive resources
- De-energize solar arrays, if not already de-energized
- Dismantle panels and racking
- Remove frame and internal components
- Remove portions of structural foundations up to 36 inches below the surface and backfill sites
- Remove inverters and transformers
- Remove electrical cables and conduits up to 36 inches below the surface
- Remove access and internal roads and grade site
- De-compact subsoils (if required), restore, and revegetate (if desired by landowner at the time of decommissioning) disturbed land to pre-construction conditions to the extent practicable

3.0 SITE RESTORATION AND REVEGETATION

The restoration efforts will return the land to substantially its original topography. Restoration shall include returning the soil to its pre-development state to allow resuming any prior agricultural use upon restoration.

Restoration activities may include regrading to restore land contours, seeding to revegetate disturbed areas, and de-compacting of soils determined to be compacted, repairing of damaged drain tiles, and back-filling with native subsoil or topsoil (as needed).

Madison Fields will comply with the conditions agreed upon by Madison Fields, the Madison County Engineer and the OPSB or as directed by other federal and state regulations applicable to the Project at the time of decommissioning.

4.0 DECOMMISSIONING COST ESTIMATE SUMMARY

Decommissioning costs detailed in **Table 1** include labor and material expenses for removal of solar modules, tracking system, steel posts, transformers and inverters, access roads, perimeter fencing, and cabling up to thirty-six (36) inches below-grade. Labor effort is calculated based on 150 full-time equivalent staff employed over a one-year period. Restoration activities include topsoil replacement, seeding and the overall restoration of the land.

Table 1. Estimated Decommissioning Costs

Task Description	Cost
Project Oversight and Permitting	$270,000
Removal of Solar Components and Project Facilities	$6,537,826
Site Restoration and Revegetation	$307,500
Total Estimated Decommissioning Costs	**$7,115,326**

All solar components will be repurposed, salvaged, recycled or hauled offsite to a licensed solid waste disposal facility. Solar components that are anticipated to have a resale or salvage value that may be used to offset the cost of decommissioning include solar modules, tracking system, steel piles, inverters, and transformers. Materials that have no value at the time of decommissioning will be recycled when possible or hauled offsite to a licensed solid waste disposal facility.

5.0 FINANCIAL ASSURANCE

The decommissioning cost estimate will consider salvage value of the components (Net Decommissioning Cost). If and when the Net Decommissioning Cost is a positive number, Madison Fields will post decommissioning funds in the form of a surety bond, cash, letter of credit, guaranty, including affiliate guaranty or other financial assurance. An updated decommissioning plan and Net Decommissioning Cost estimate will be provided at least thirty (30) days prior to the preconstruction meeting, based on final construction plans and solar components. The decommissioning plan and financial assurance will be reviewed again in year 10 of operations and every five years thereafter to assess the value of the financial assurance per the current Net Decommissioning Cost estimate.

Summary: Application - Part 3 of 8 (Exhibits B - K) electronically filed by Christine M.T. Pirik on behalf of Madison Fields Solar Project, LLC