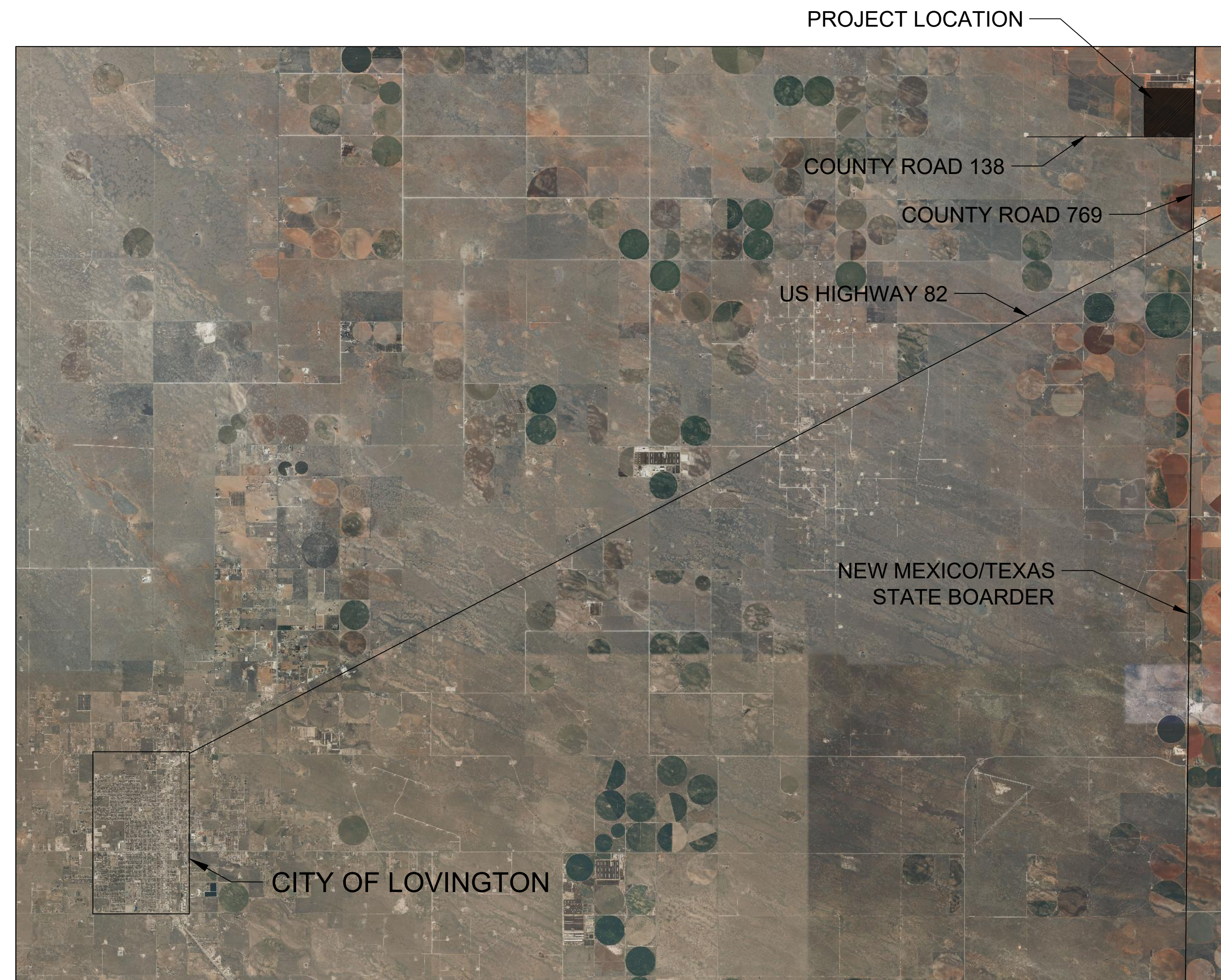


LOVINGTON, NM SOLAR ARRAY

SPEARS RD & STATE LINE RD, LOVINGTON, NM 88260



PROJECT LOCATION MAP

PROJECT EQUIPMENT	
TYPE	QUANTITY
ZNSHINE PANEL	143,250
ZBENY COMBINER	360
ABB SKID INVERTER	15
#10 AWG	100,000'
400 MCM	50,000'

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
E100	PROJECT TITLE
S100	SITE PLAN
S101	SITE KEYPLAN
S102	SITE WIRING
PV100	SOLAR KEY PLAN
PV101	OVERALL ARRAY LAYOUT
PV102	ARRAYS 1 - 12 LAYOUT
PV103	ARRAYS 13 - 15 LAYOUT
PV104	WIRING ARRAYS 1 - 12
PV105	WIRING ARRAYS 13 - 15
PV106	SOLAR DESIGN DETAILS
PV107	AC ONE LINE
PV108	DC ONE LINE
PV109	STRING ONE LINE
PV110	PANEL DATASHEET
PV111	COMBINER BOX DATASHEET
PV112	SKID INVERTER DATASHEET

General Notes

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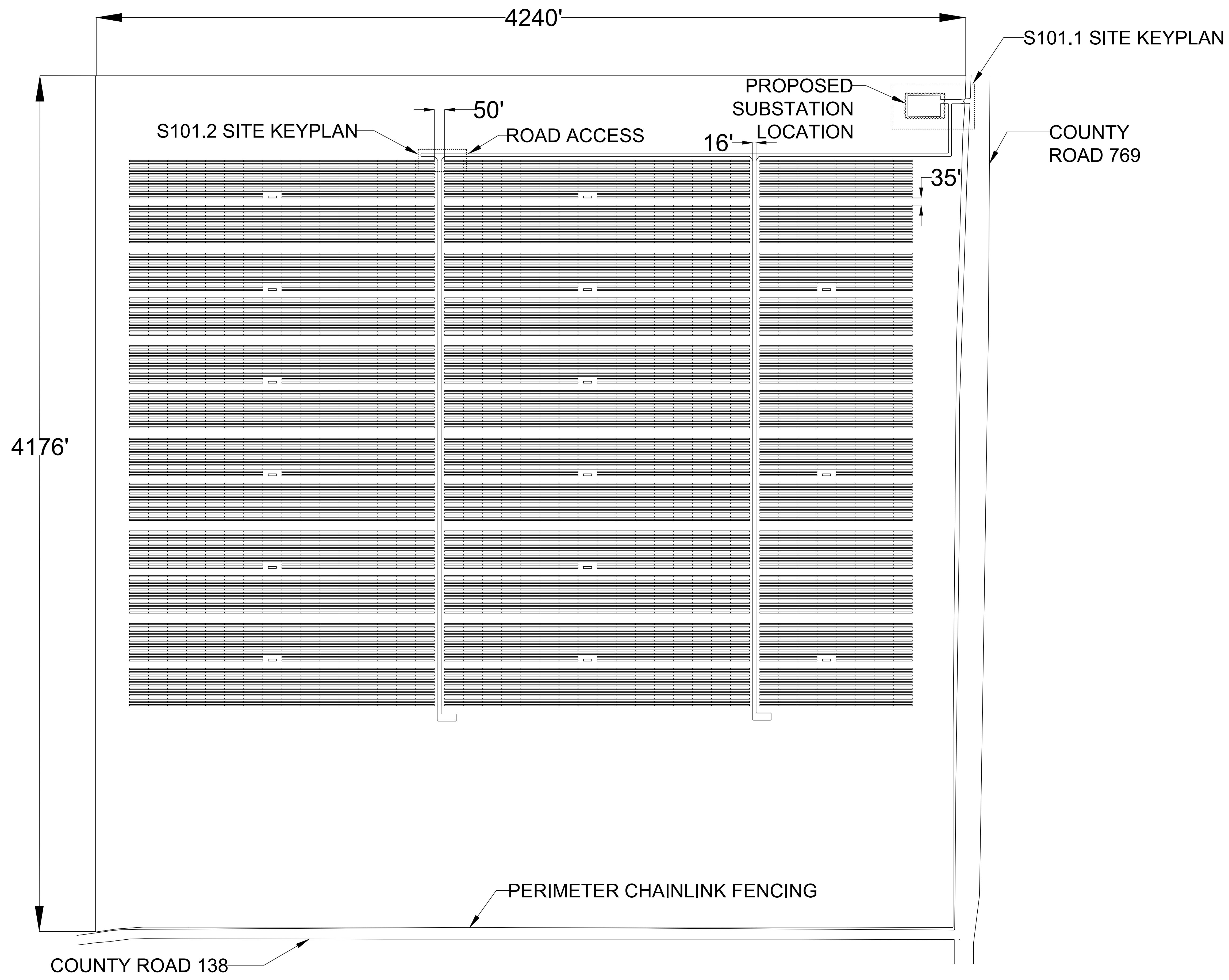
NO.	DESCRIPTION	DATE
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533 MORRILL ROAD
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LOVINGTON, NM 88260
(LEA COUNTY)

Project	Sheet
60MW SOLAR POWER PLANT	E100
Date	PROJECT TITLE
11/7/2023	
Scale	
N/A	



ELECTRICAL SITE PLAN

General Notes

- Perimeter fencing to be 8' chain link fence.

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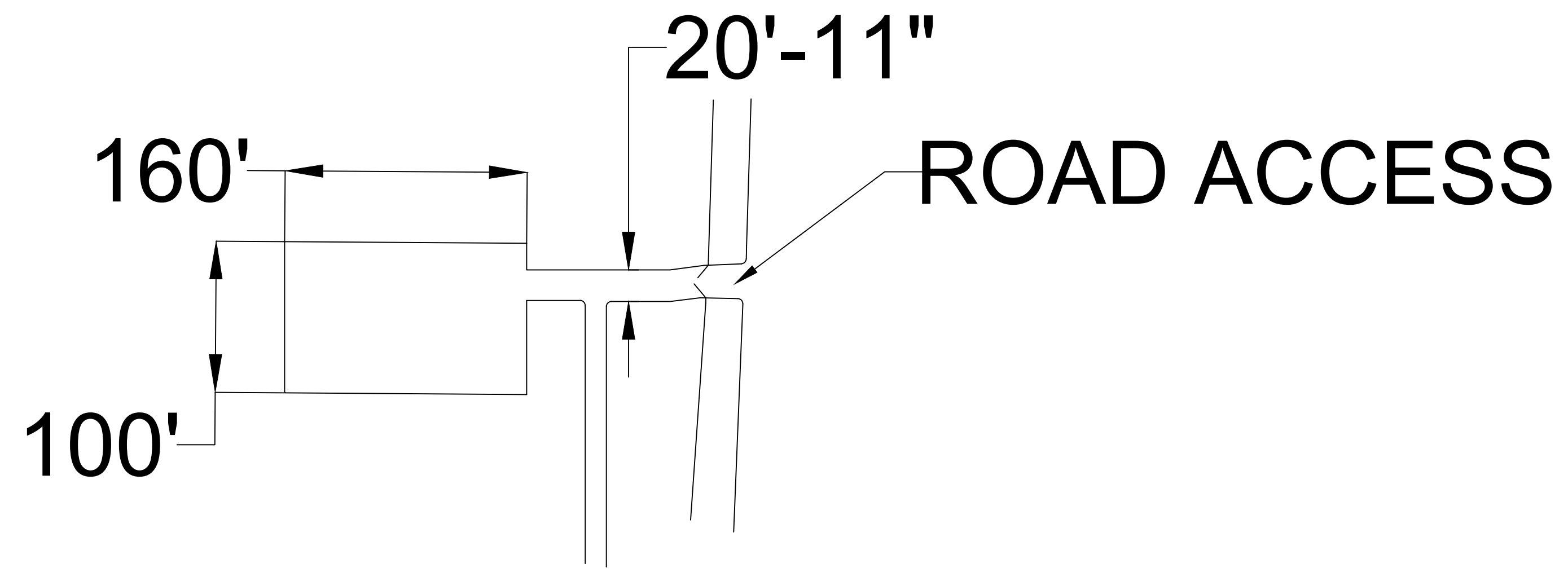
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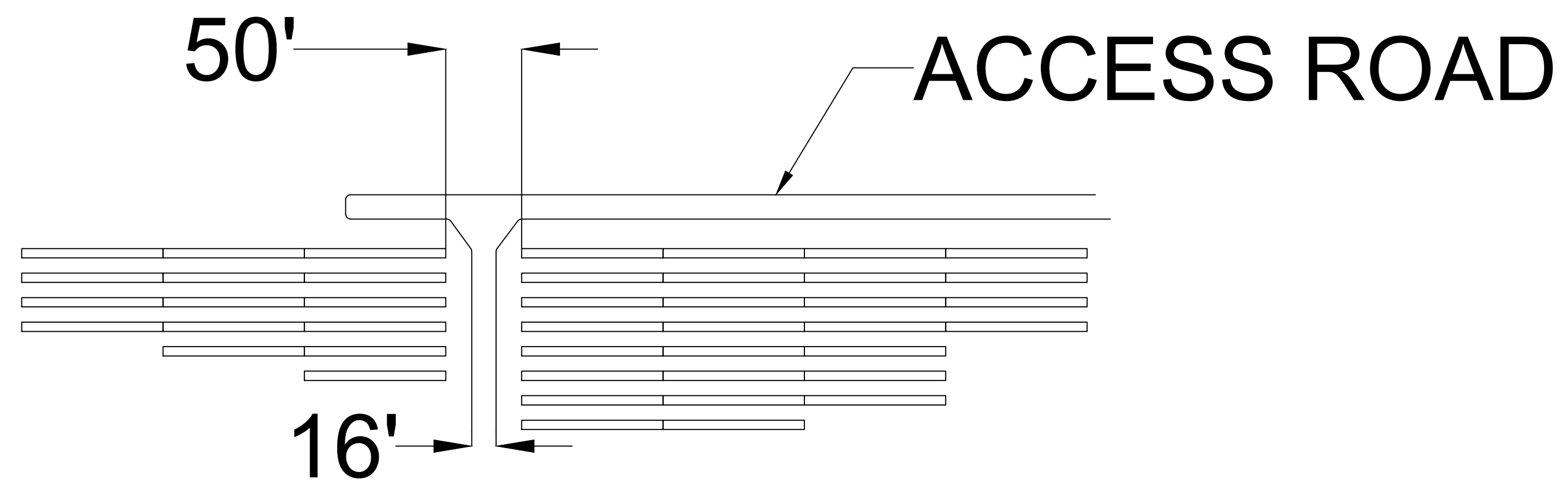
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 (LEA COUNTY)

Project	60MW SOLAR POWER PLANT	Sheet	S100
Date	11/07/23	SITE PLAN	
Scale	1" = 50'		



① SUBSTATION OVERVIEW



② SUBSTATION OVERVIEW

General Notes

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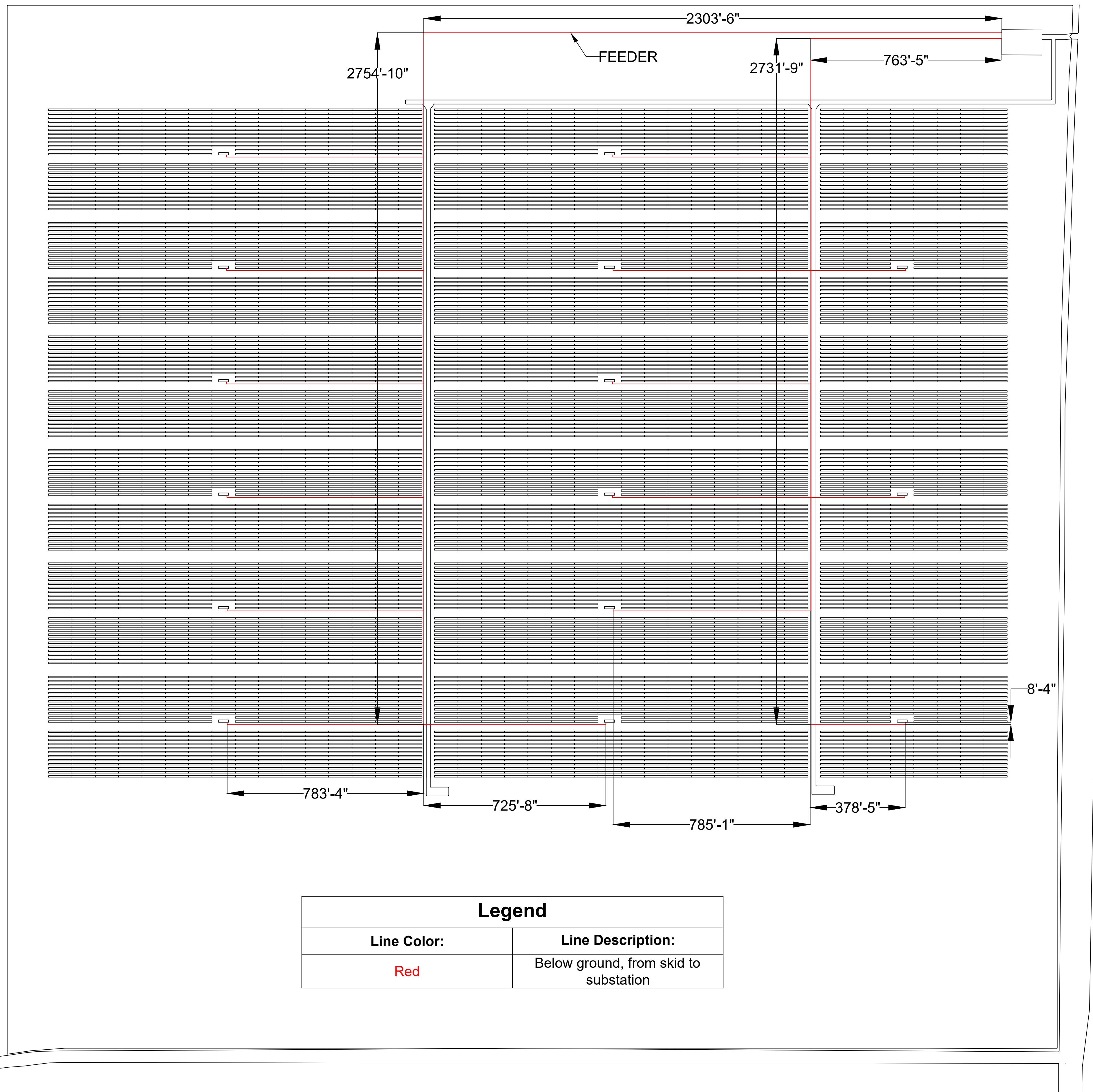
NO.	DESCRIPTION	DATE
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Project	60MW SOLAR POWER PLANT	Sheet	S101
Date	11/07/23	SITE KEYPLAN	
Scale	N/A		



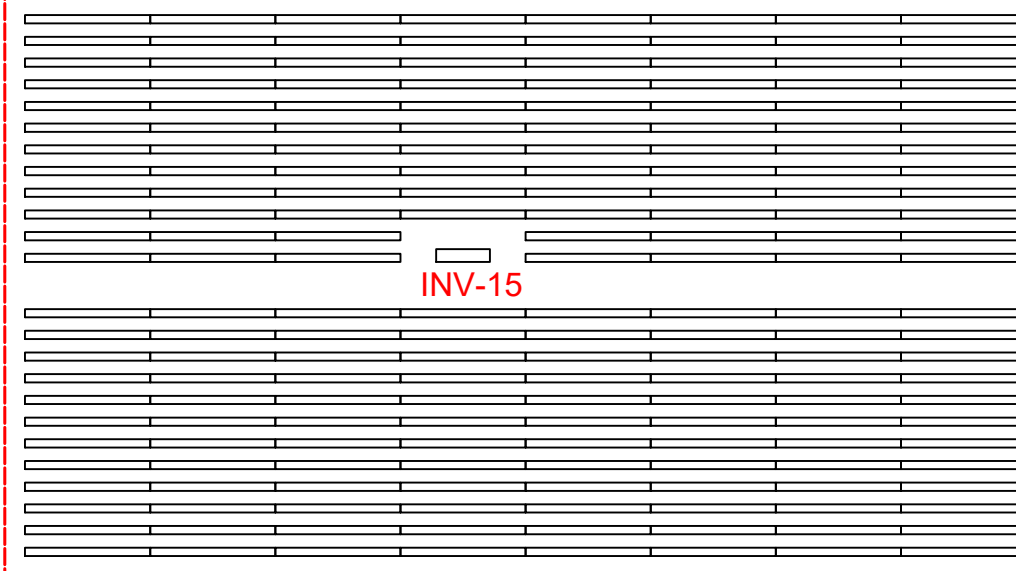
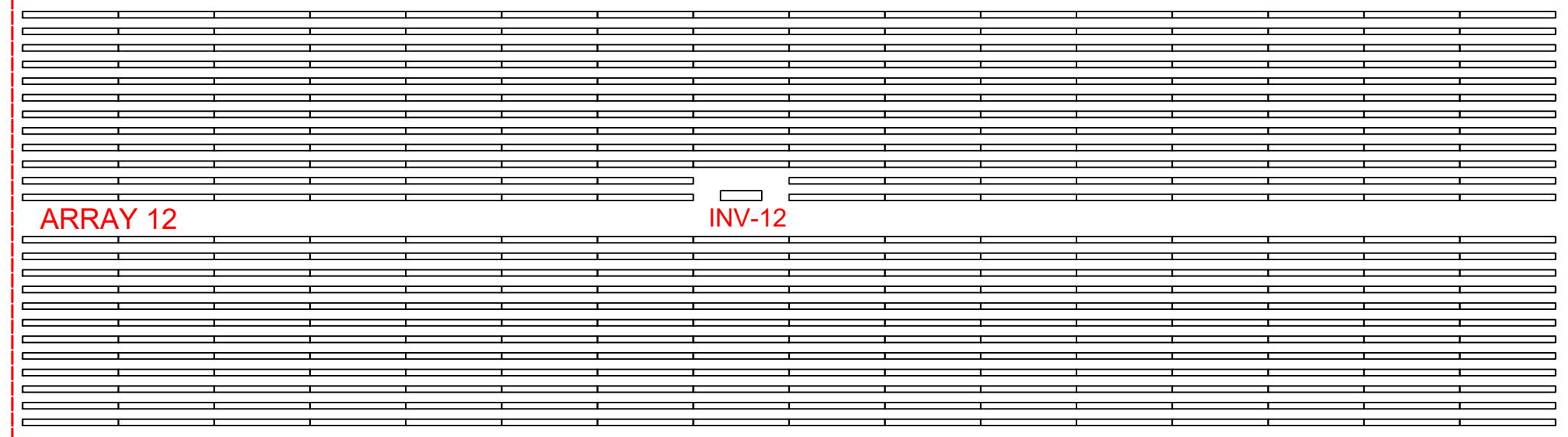
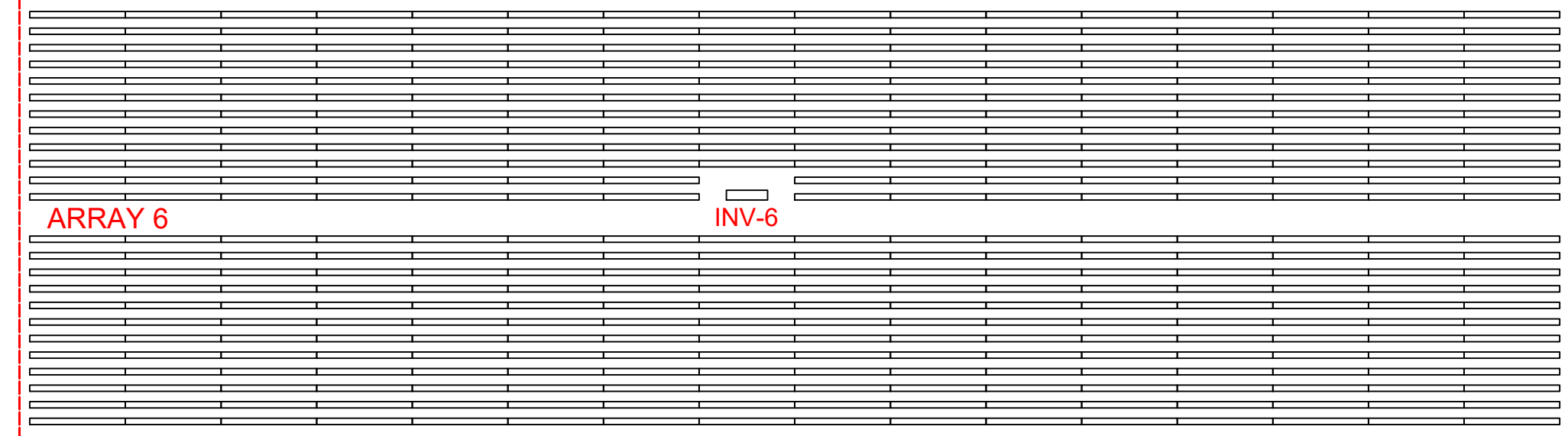
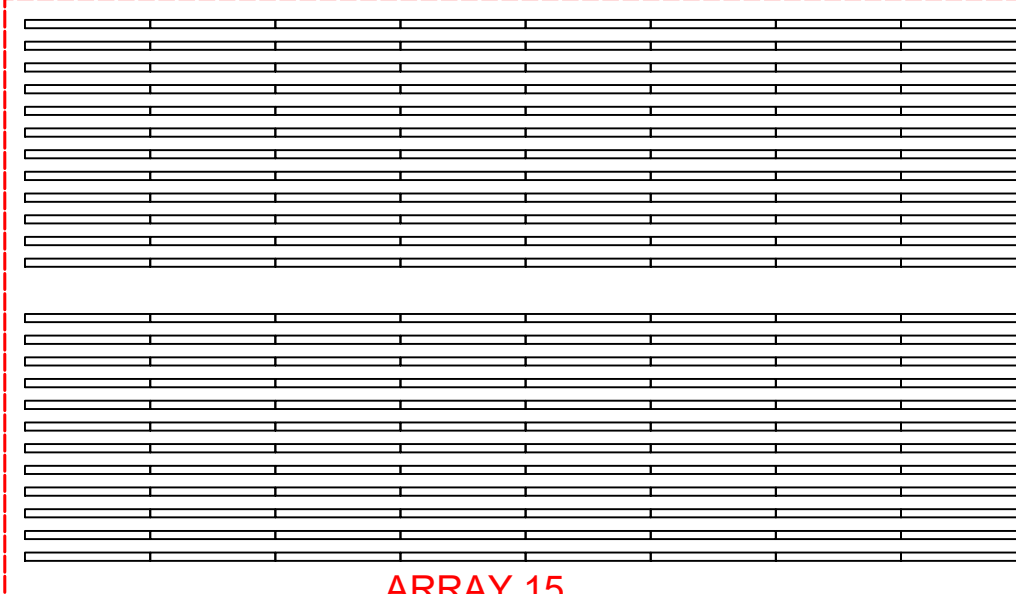
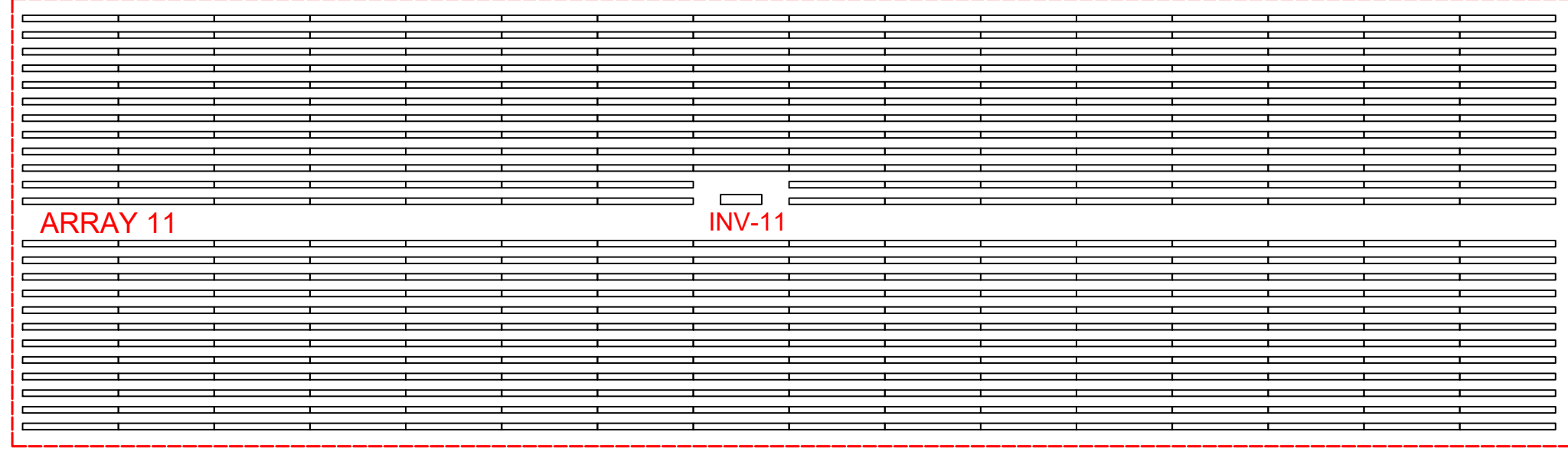
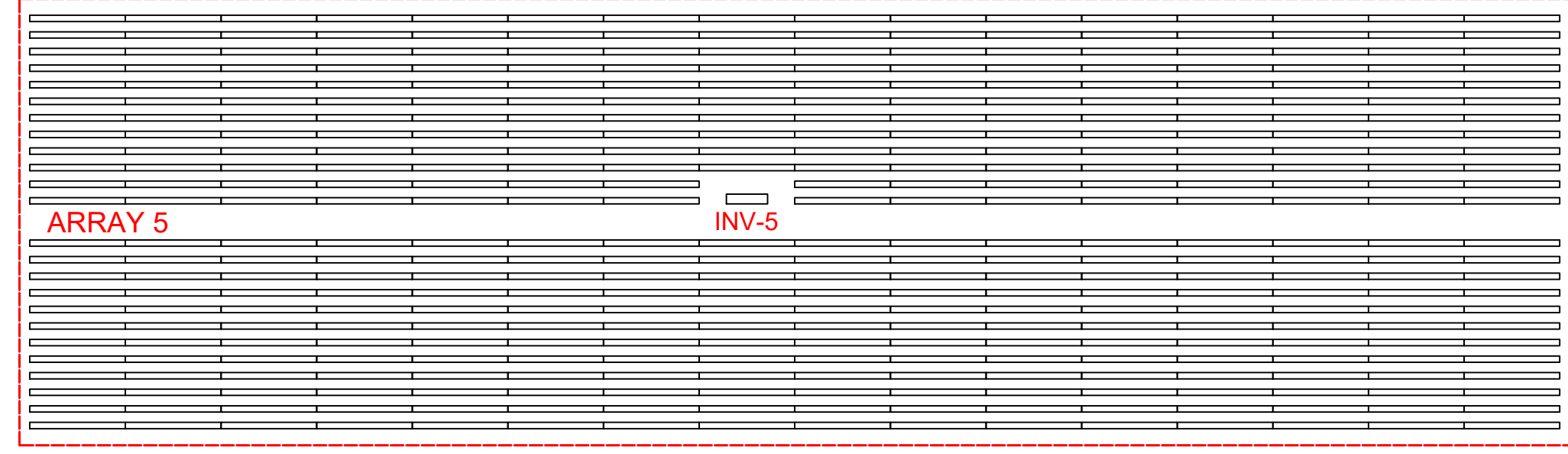
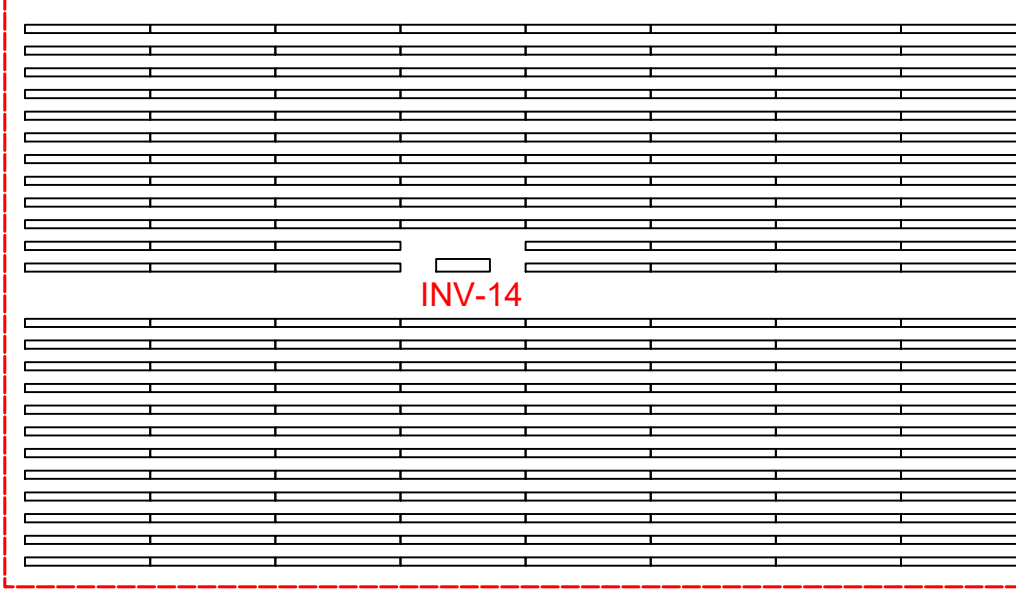
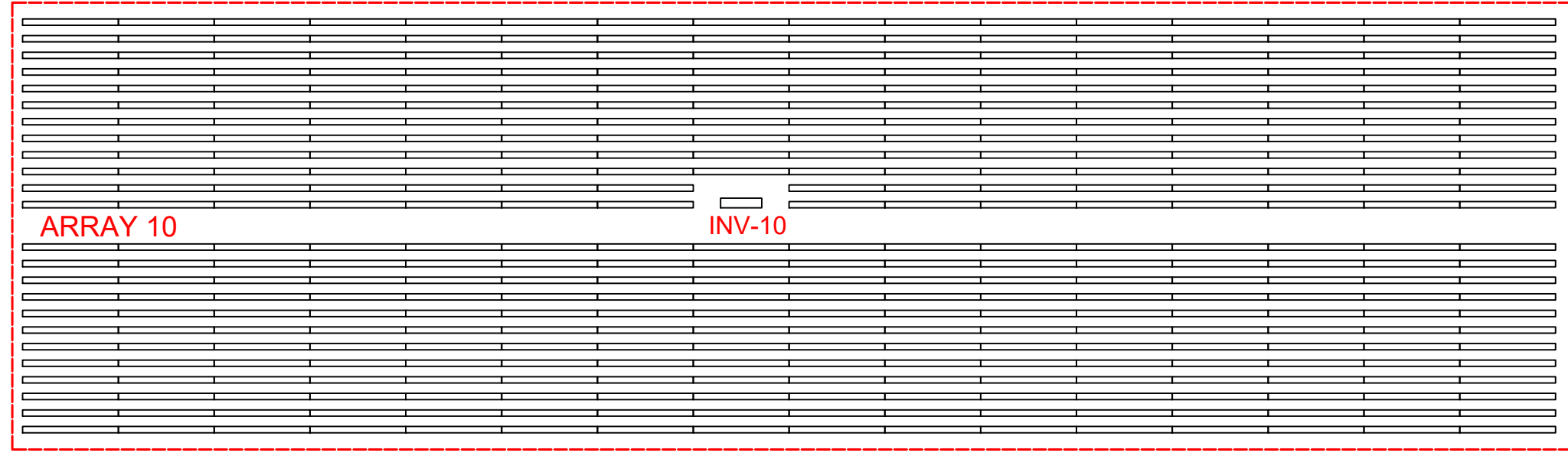
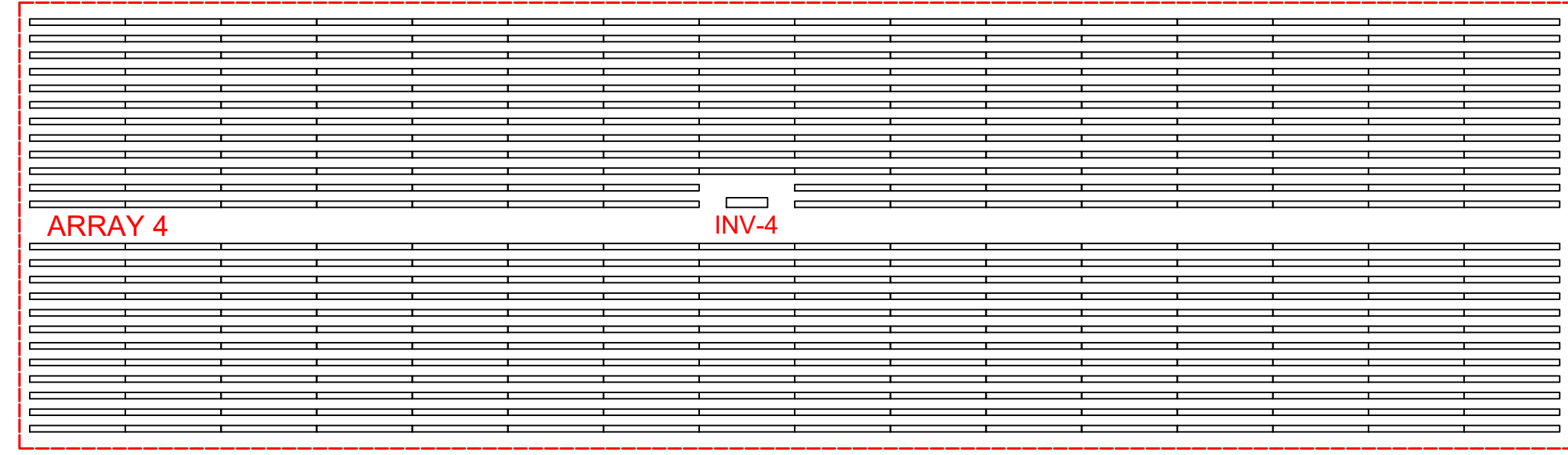
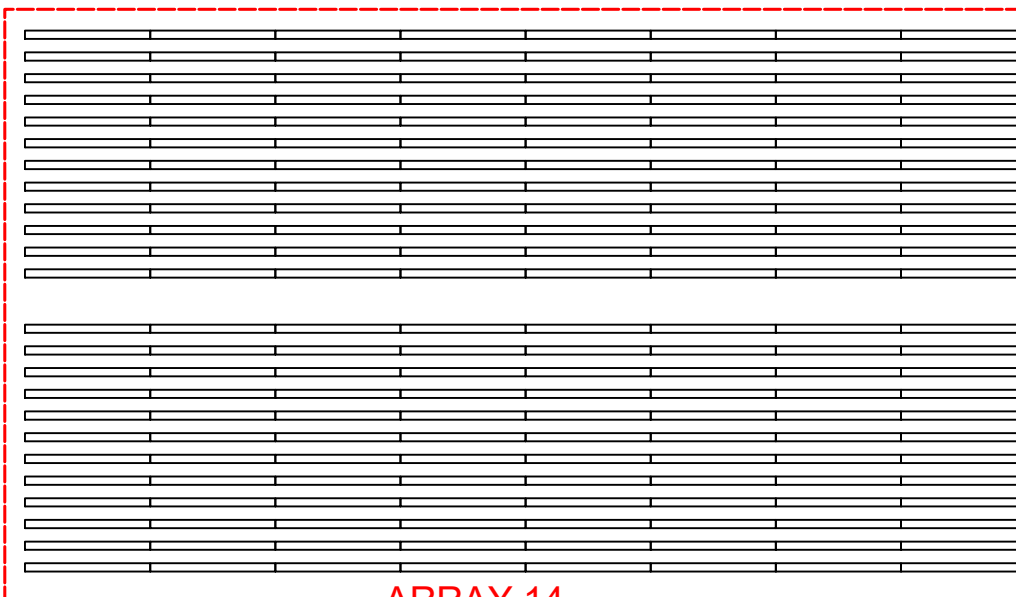
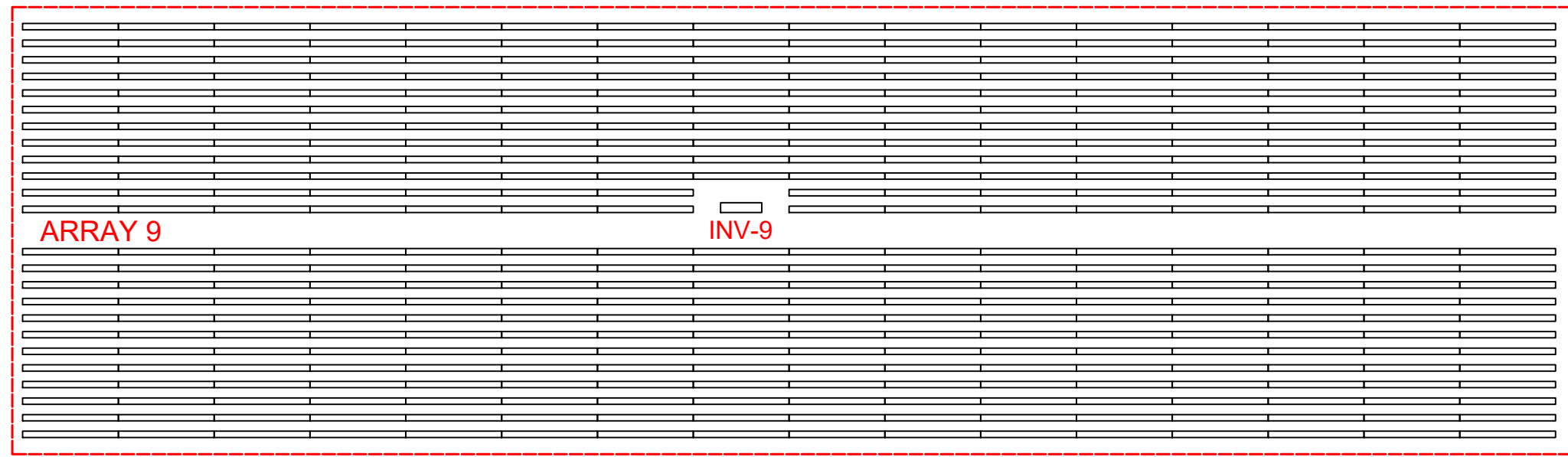
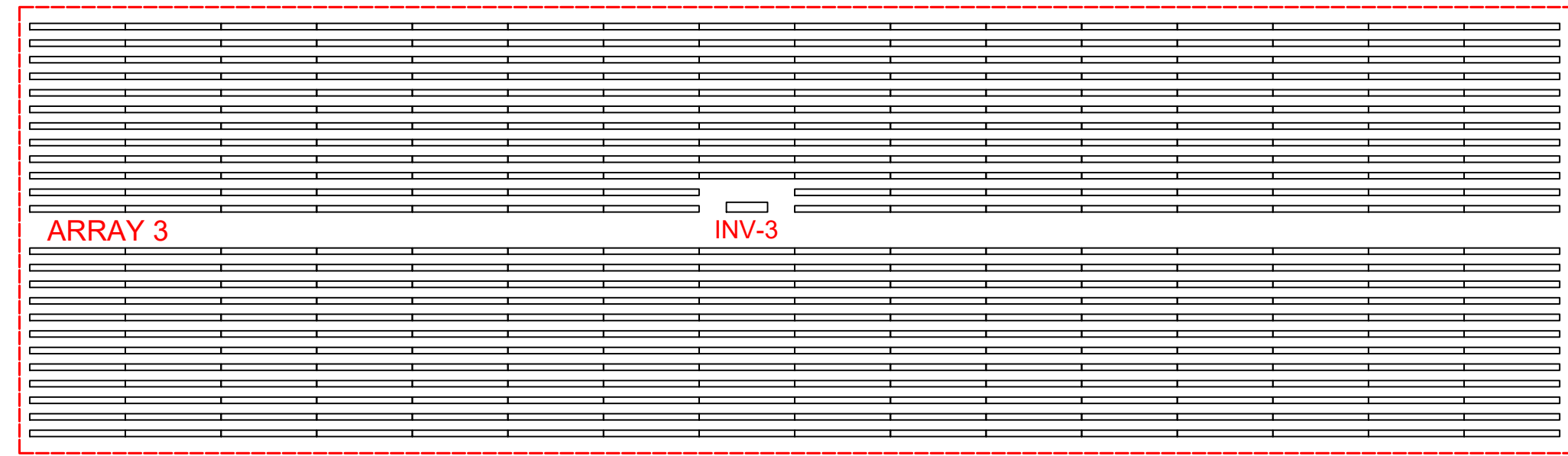
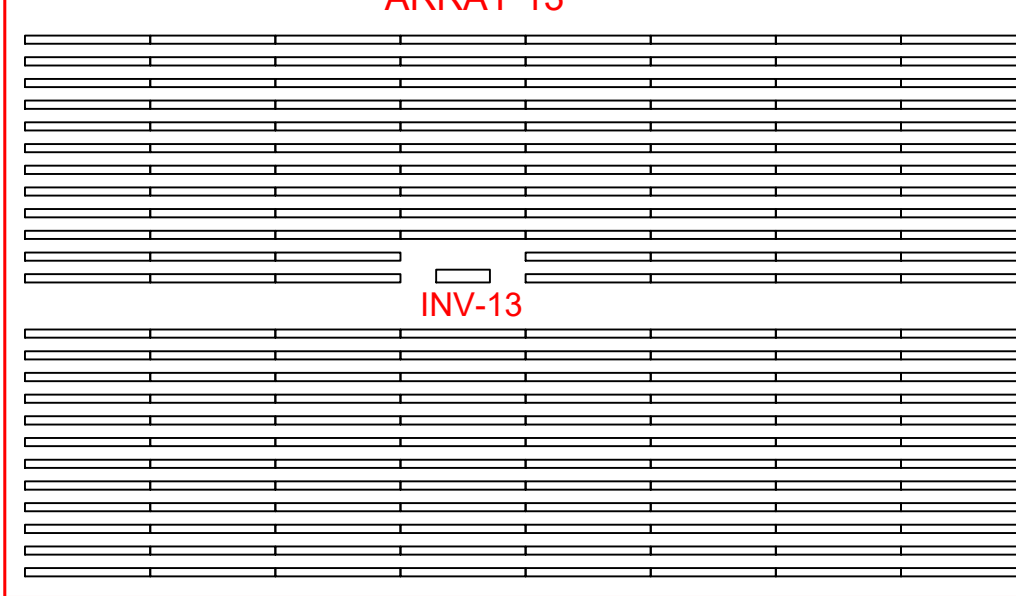
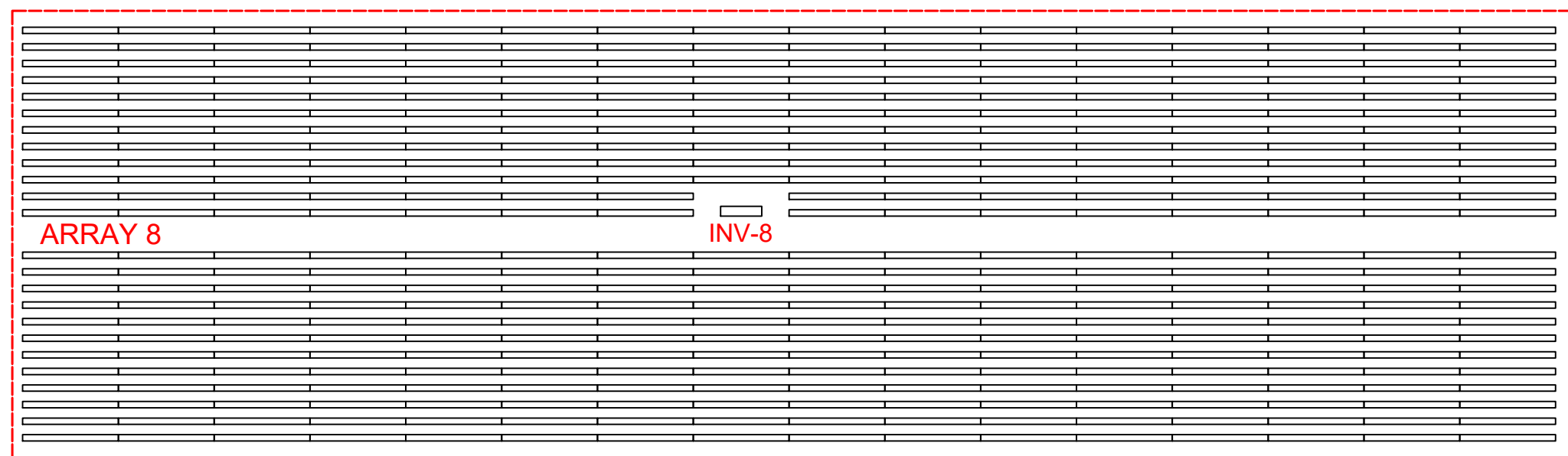
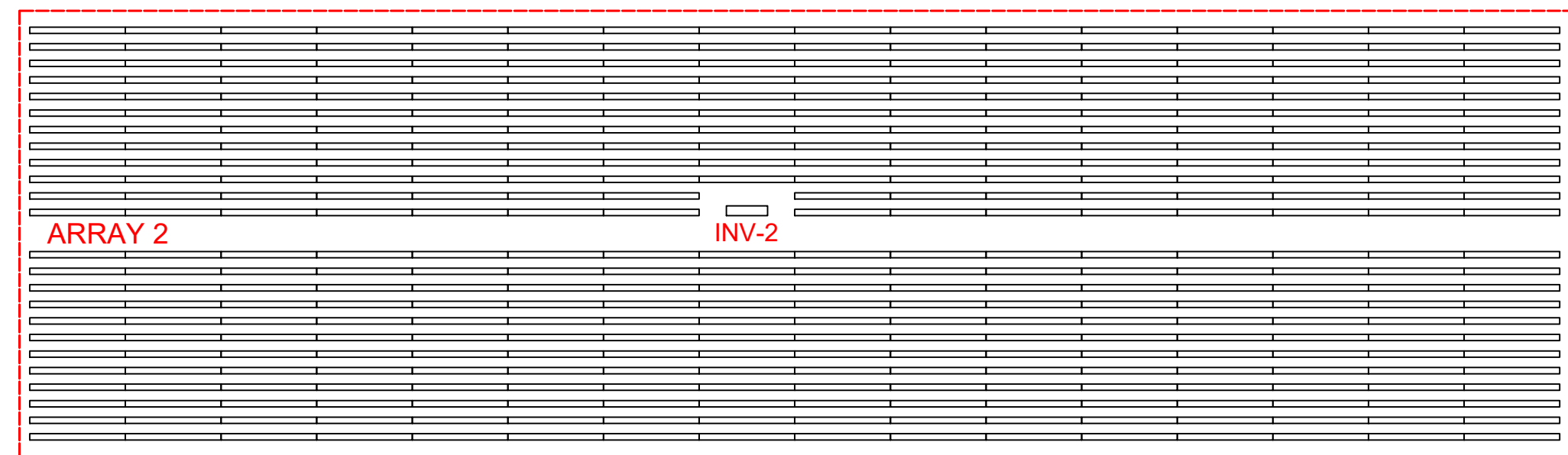
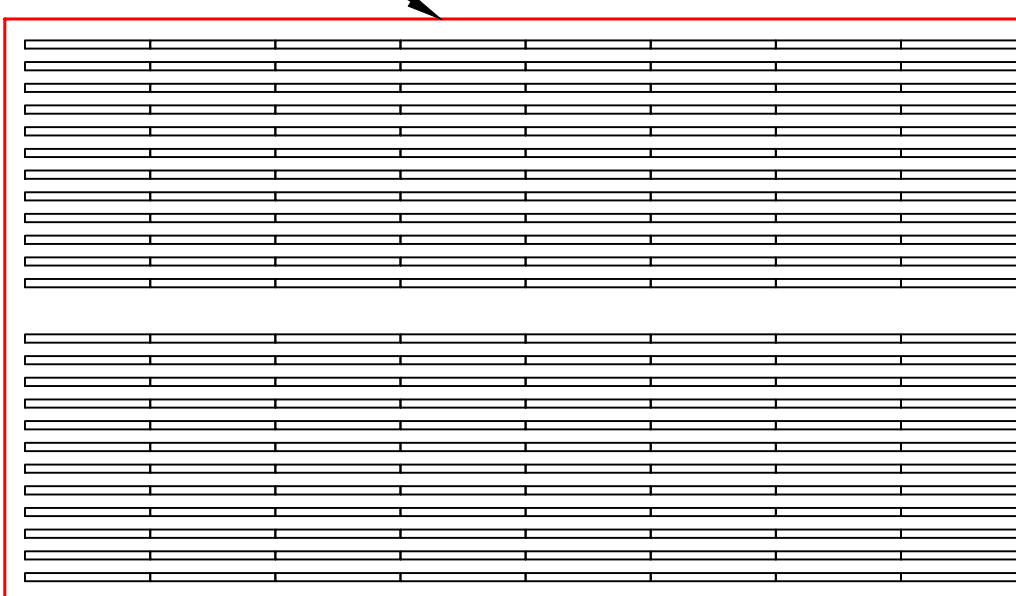
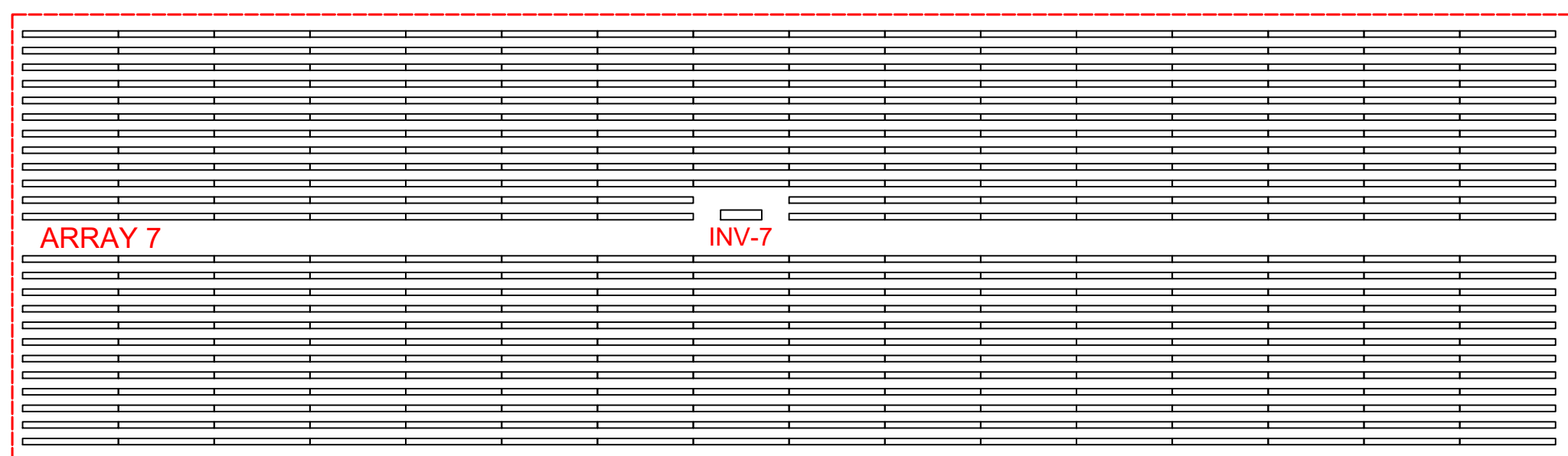
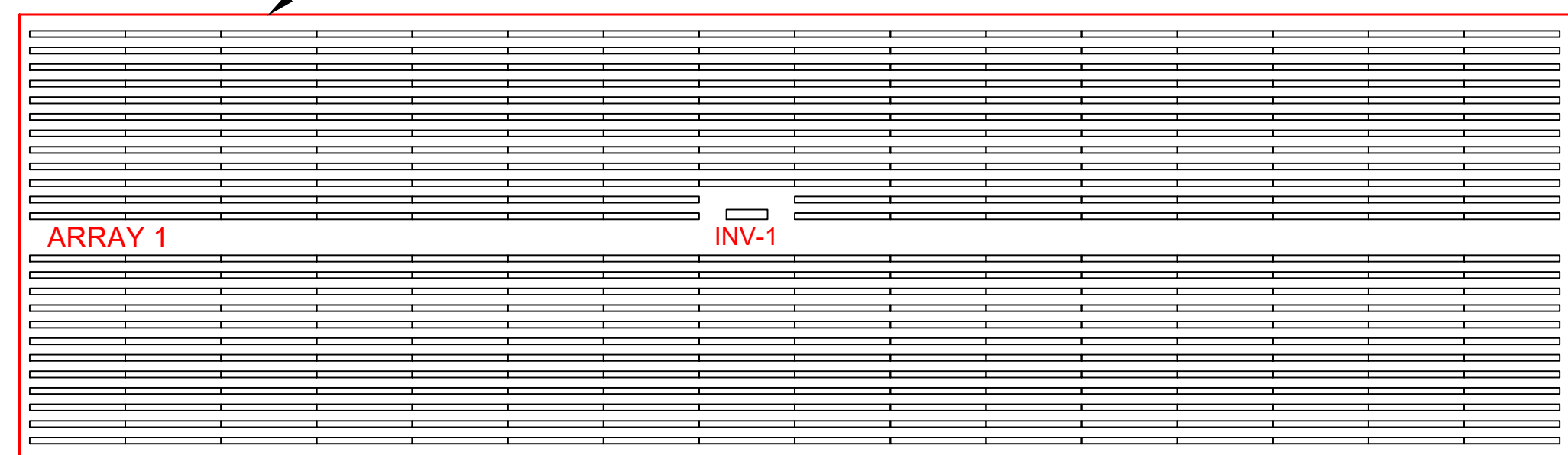
Legend	
Line Color:	Line Description:
Red	Below ground, from skid to substation

FEEDER SITE PLAN

General Notes		
SIGNATURE & SEAL		
REVISIONS		
NO.	DESCRIPTION	DATE
A	ISSUED FOR CLIENT REVIEW	11/08/23
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BLACK & VEATCH		
LOVINGTON, NM 88260 (LEA COUNTY)		
Project	60MW SOLAR POWER PLANT	Sheet
Date	11/07/23	S102
Scale	1"=50'	SITE WIRING

SEE PV102 FOR MORE INFORMATION ON ARRAYS 1-12

SEE PV103 FOR MORE INFORMATION ON ARRAYS 13-15



General Notes

SIGNATURE & SEAL

REVISIONS

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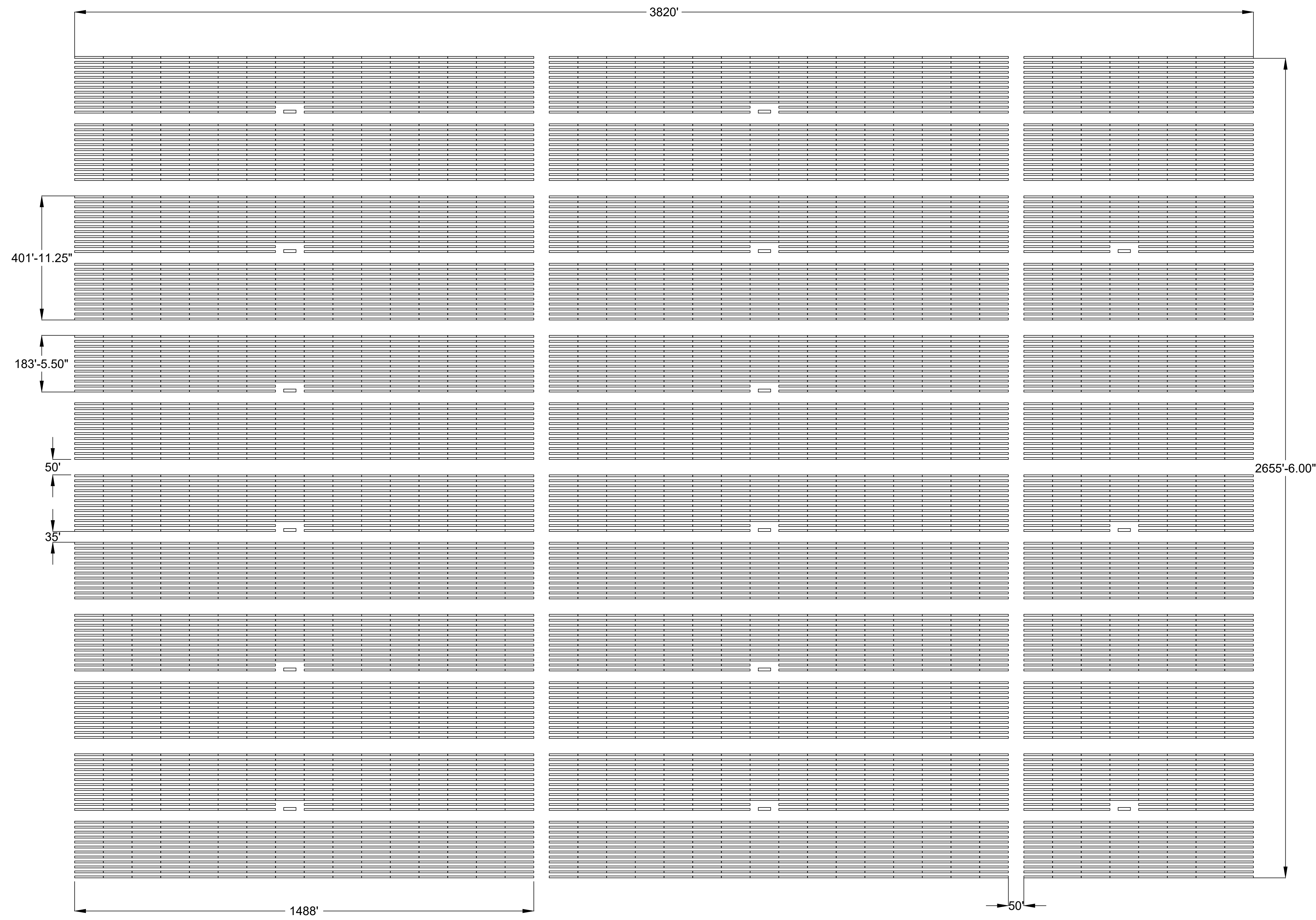
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(LEA COUNTY)

Project	60MW SOLAR POWER PLANT	Sheet	PV100
Date	11/07/23	SOLAR KEYPLAN	
Scale	N/A		

SOLAR FARM KEY PLAN



OVERALL ARRAY LAYOUTS

General Notes

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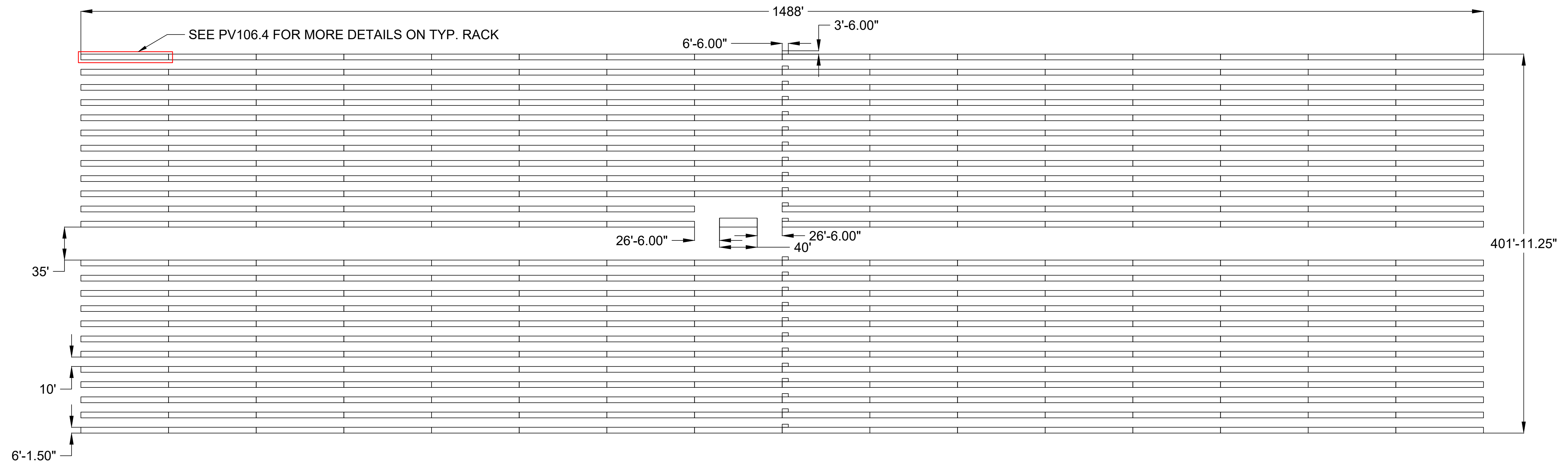
NO.	DESCRIPTION	DATE
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 (LEA COUNTY)

Project	60MW SOLAR POWER PLANT	Sheet	PV101 OVERALL ARRAY LAYOUT
Date	11/07/23	Scale	1" = 150'



ARRAYS 1-12 LAYOUT

General Notes

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REVISIONS

NO.	DESCRIPTION	DATE
A	ISSUED FOR CLIENT REVIEW	11/08/23

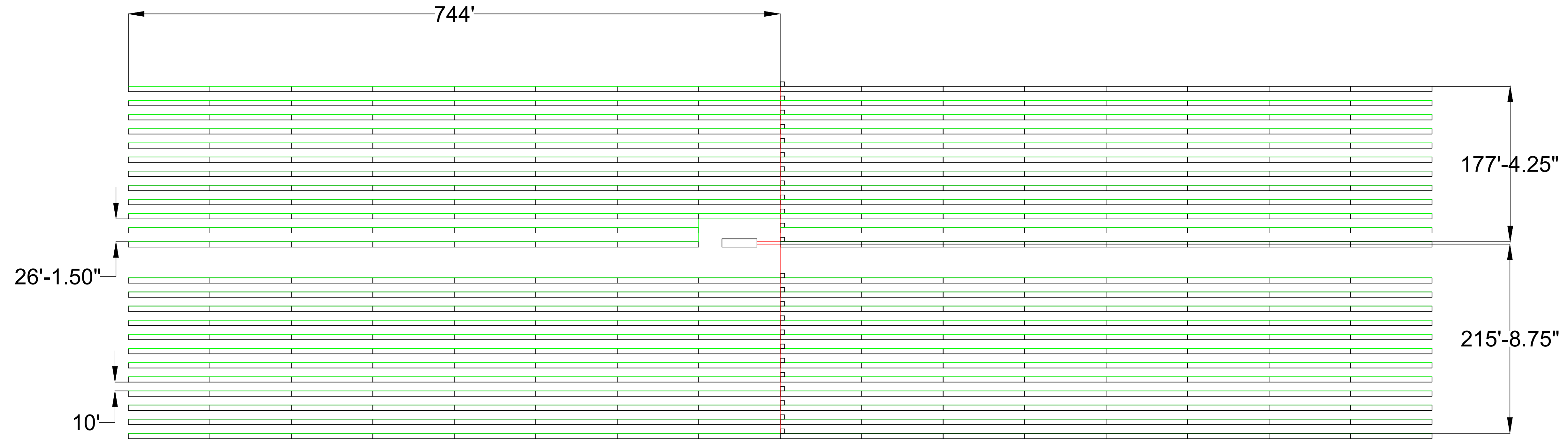
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 (LEA COUNTY)

Project	60MW SOLAR POWER PLANT	Sheet	PV102 ARRAYS 1 - 12 LAYOUT
Date	11/07/23	Scale	1" = 60'

Legend	
Line Color:	Line Description:
Red	Below ground, from CB to skid
Green	Above ground, from racks to CB



General Notes

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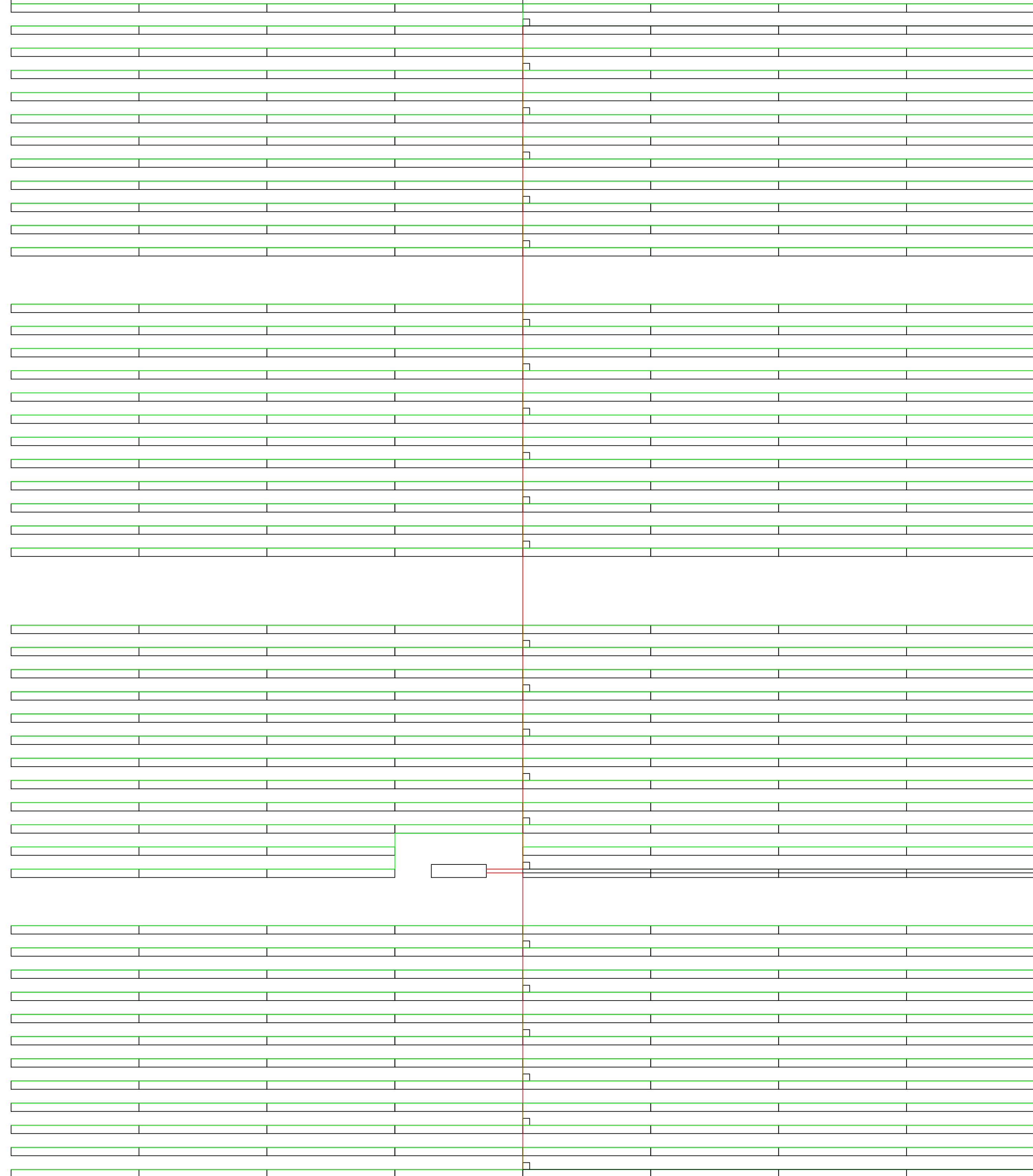
BLACK & VEATCH

LOVINGTON, NM 88260
(LEA COUNTY)

Project	60MW SOLAR POWER PLANT	Sheet	PV104 ARRAYS 1-12 WIRING
Date	11/07/23	Scale	1" = 70'

ARRAYS 1-12 WIRING

372'



Legend	
Line Color:	Line Description:
Red	Below ground, from CB to skid
Green	Above ground, from racks to CB

613'-2.00"

215'-8.75"

ARRAYS 13-15 WIRING

General Notes

SIGNATURE & SEAL

REVISIONS

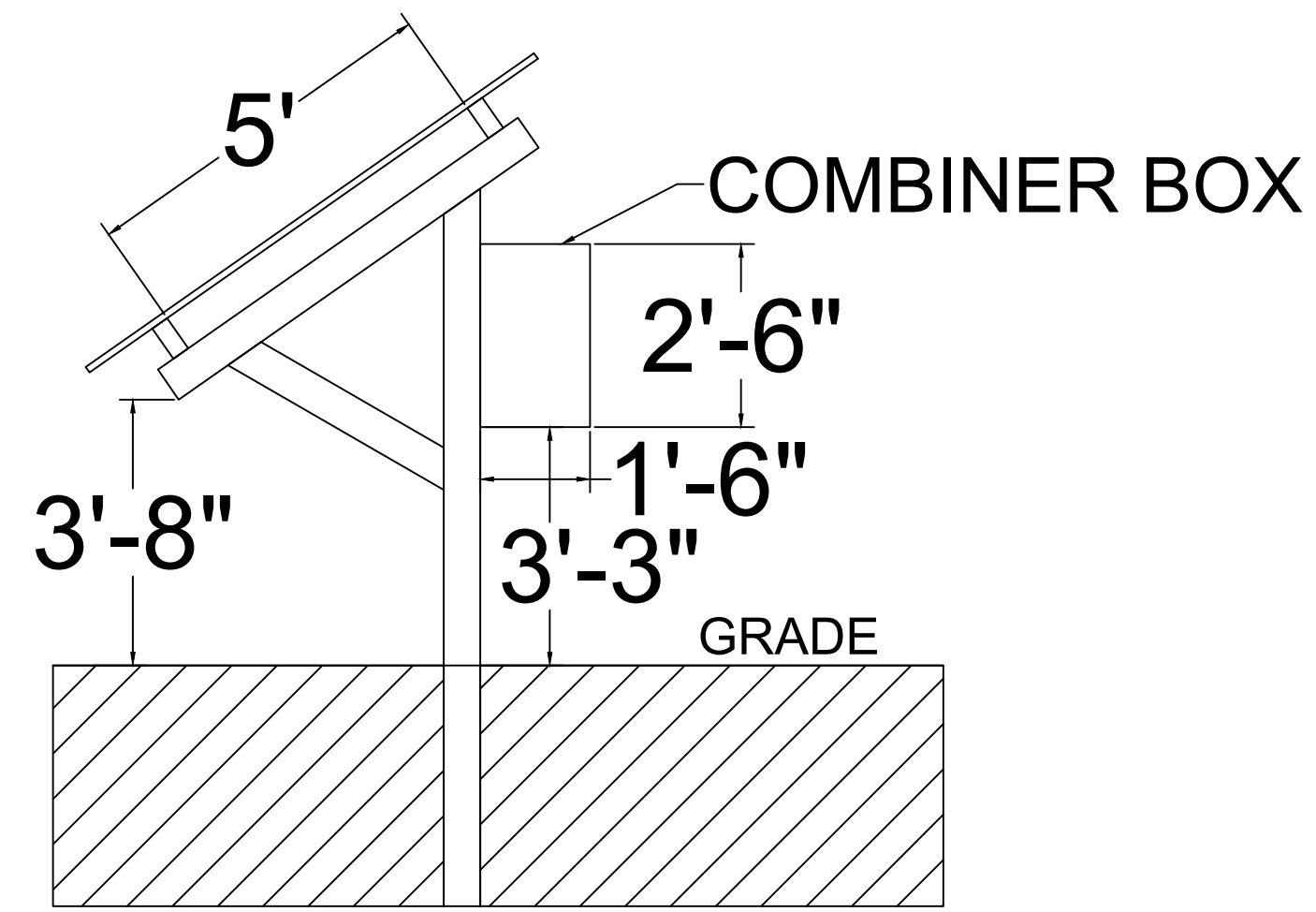
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A	ISSUED FOR CLIENT REVIEW	11/08/23

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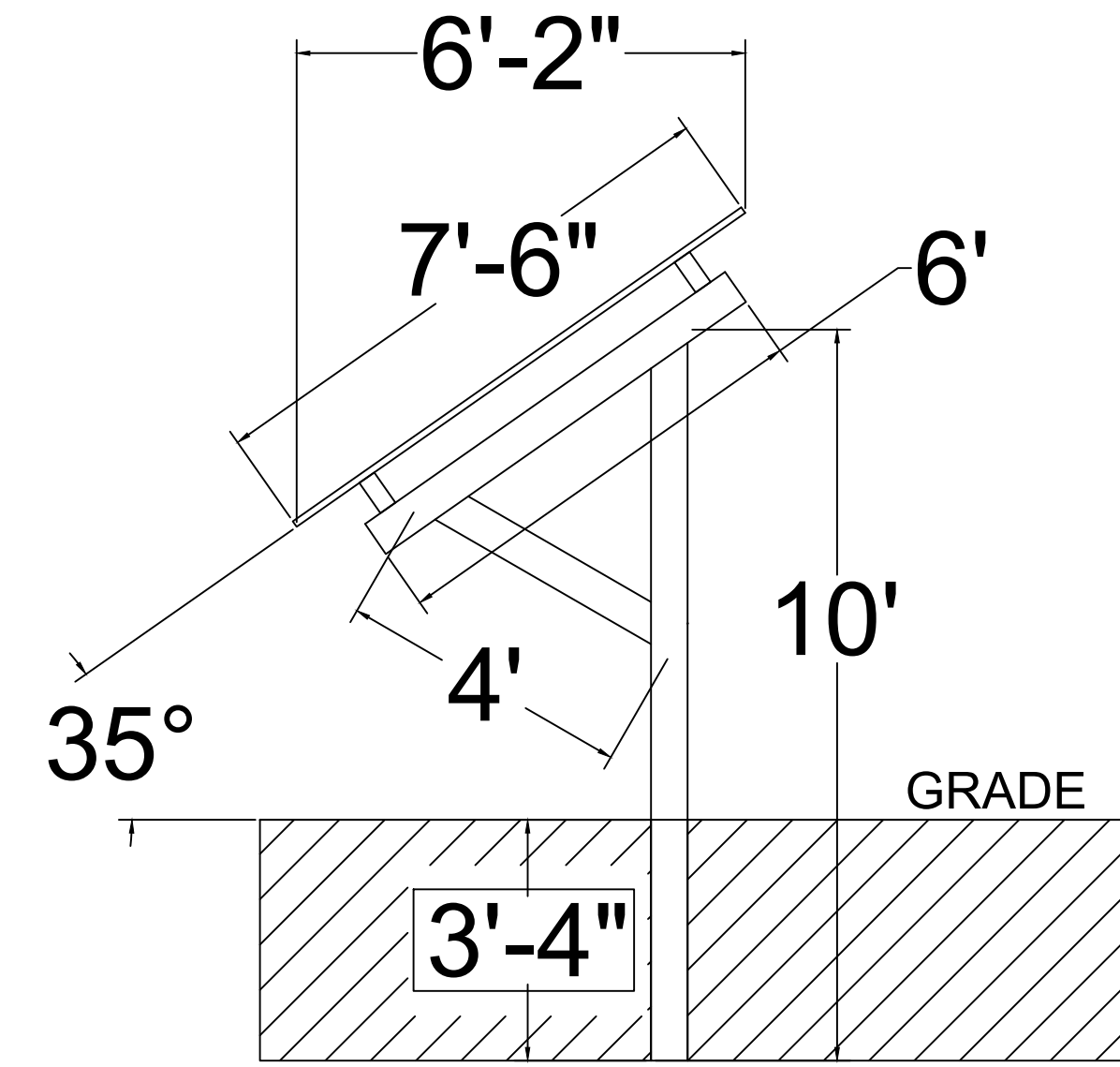
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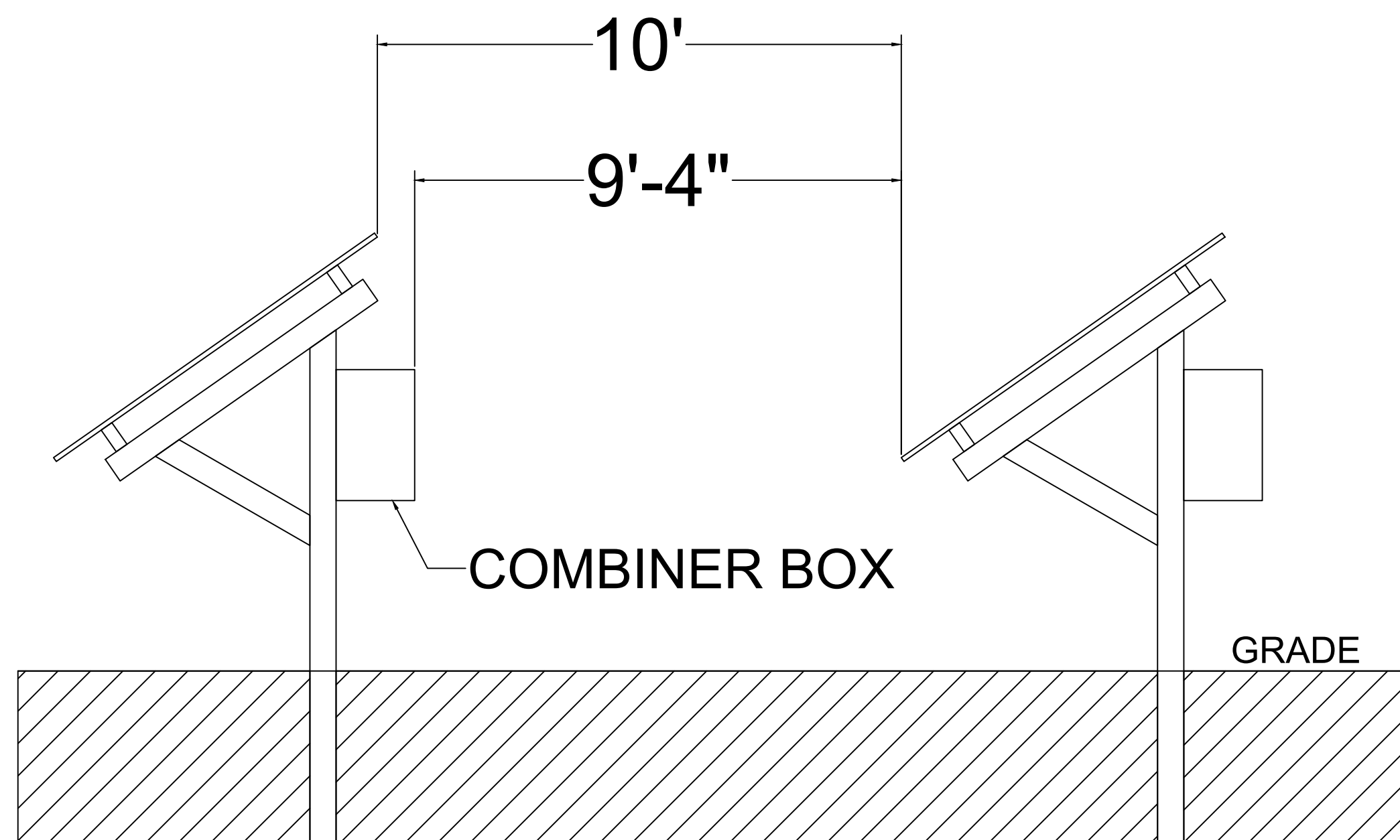
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Date	11/07/23		ARRAYS 13 - 15 WIRING
Scale	1" = 50'		



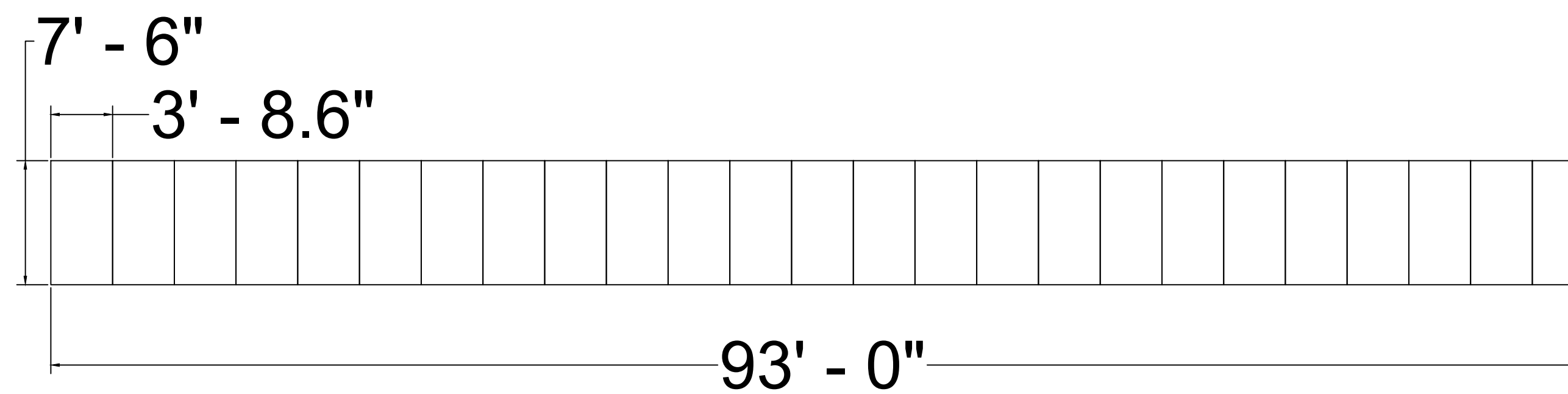
1 COMBINER BOX MOUNTING PROFILE
SCALE: 1" - 2.5'



2 PANEL MOUNTING PROFILE
SCALE: 1" - 2.5'



3 GENERAL ARRAY MOUNTING PROFILE
SCALE: 1" - 2.5' SOLAR DESIGN DETAILS



4 TYP. RACK LAYOUT
SCALE: 1" - 7.75'

General Notes

SIGNATURE & SEAL

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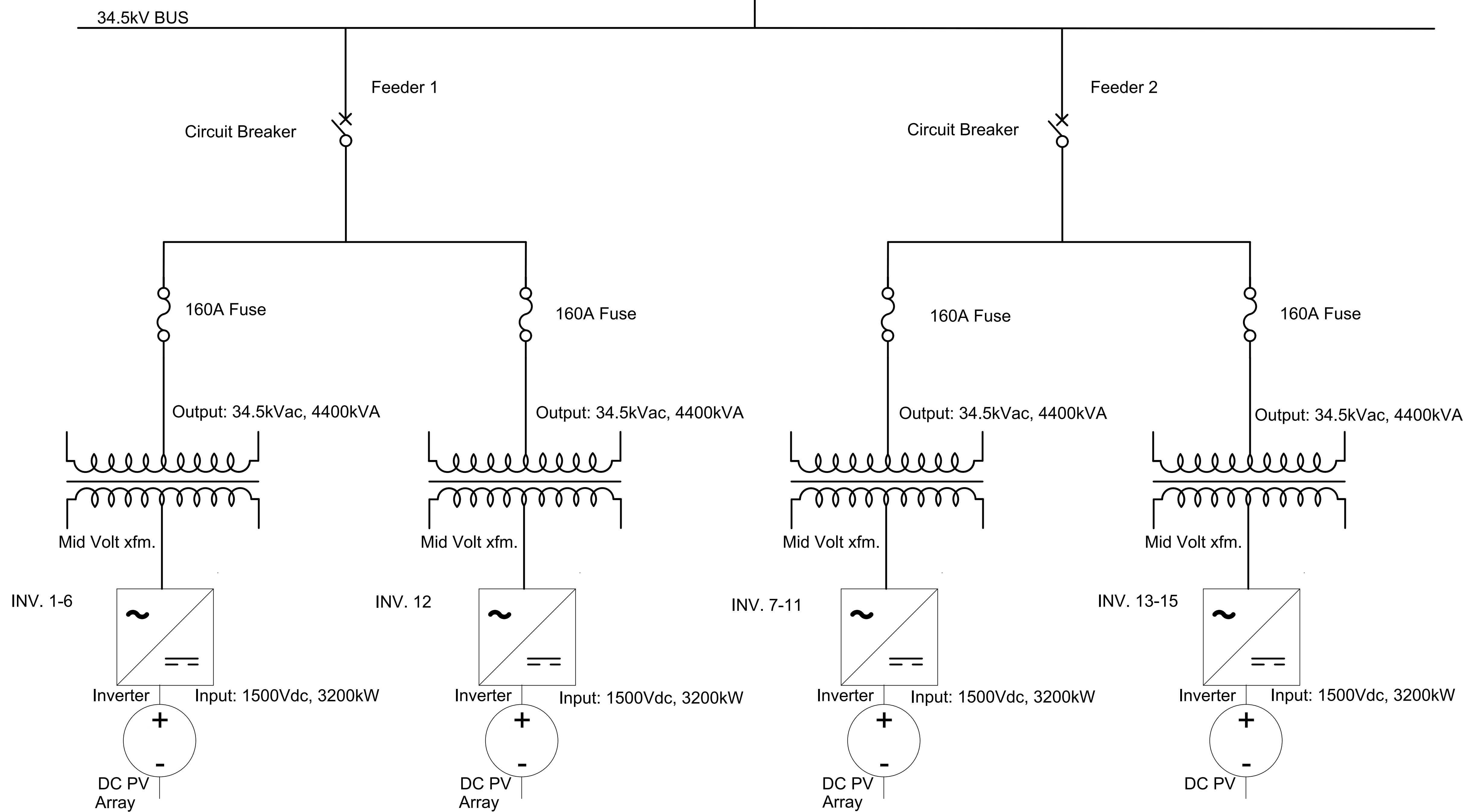
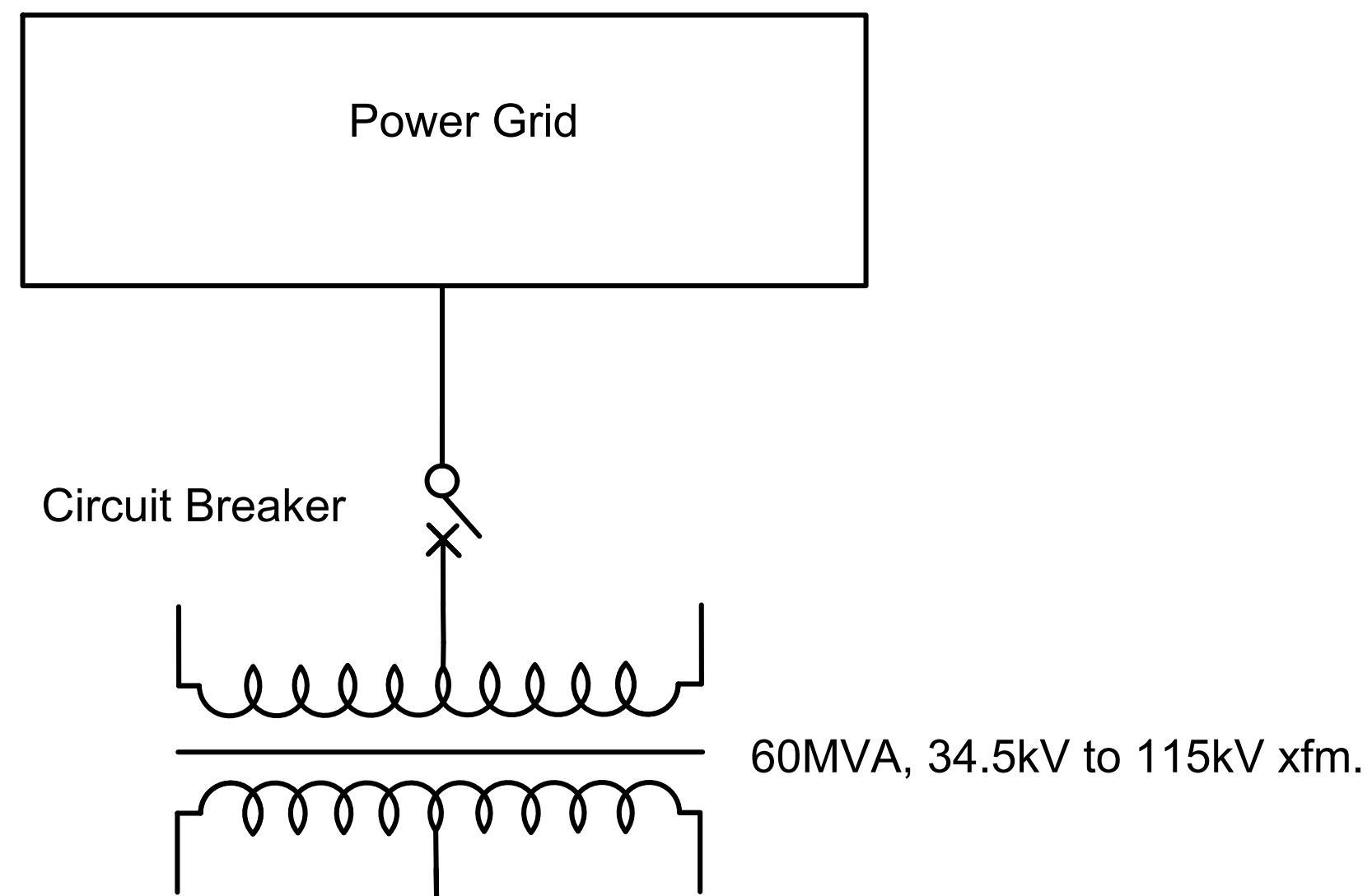
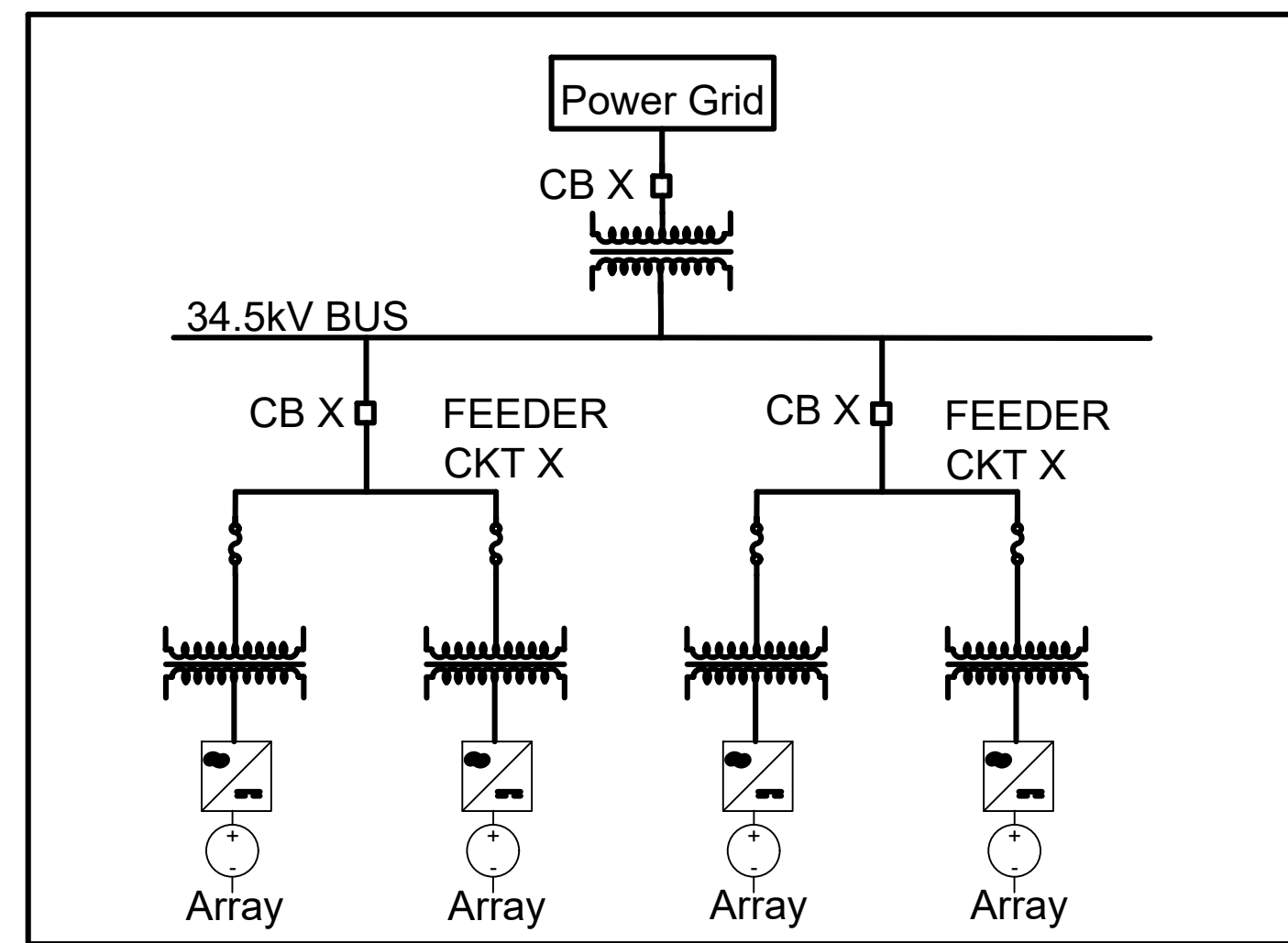
NO.	DESCRIPTION	DATE
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LOVINGTON, NM 88260
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Project	60MW SOLAR POWER PLANT	Sheet	PV106 SOLAR DESIGN DETAILS
Date	11/07/23	Scale	N/A



AC ONE LINE

General Notes

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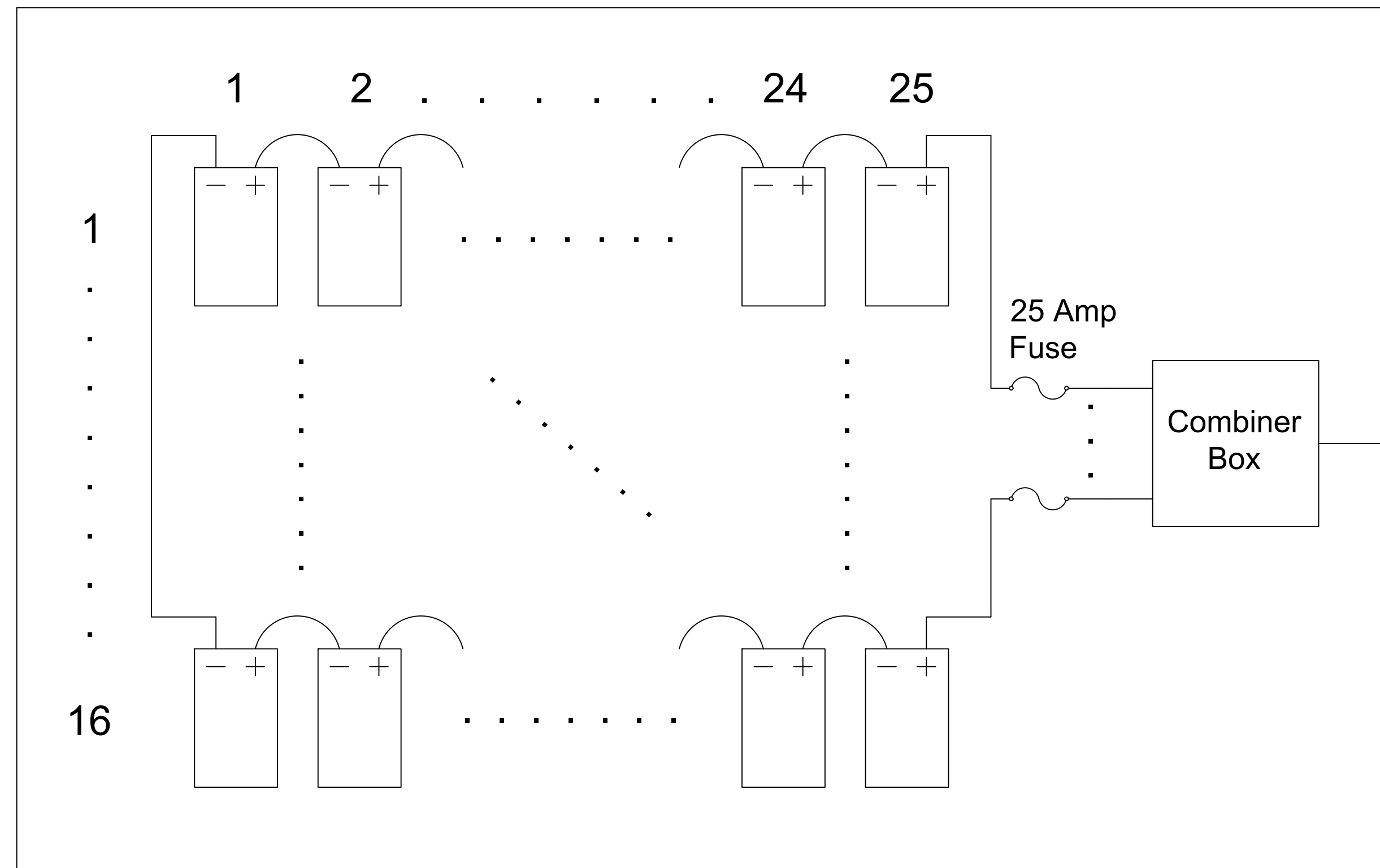
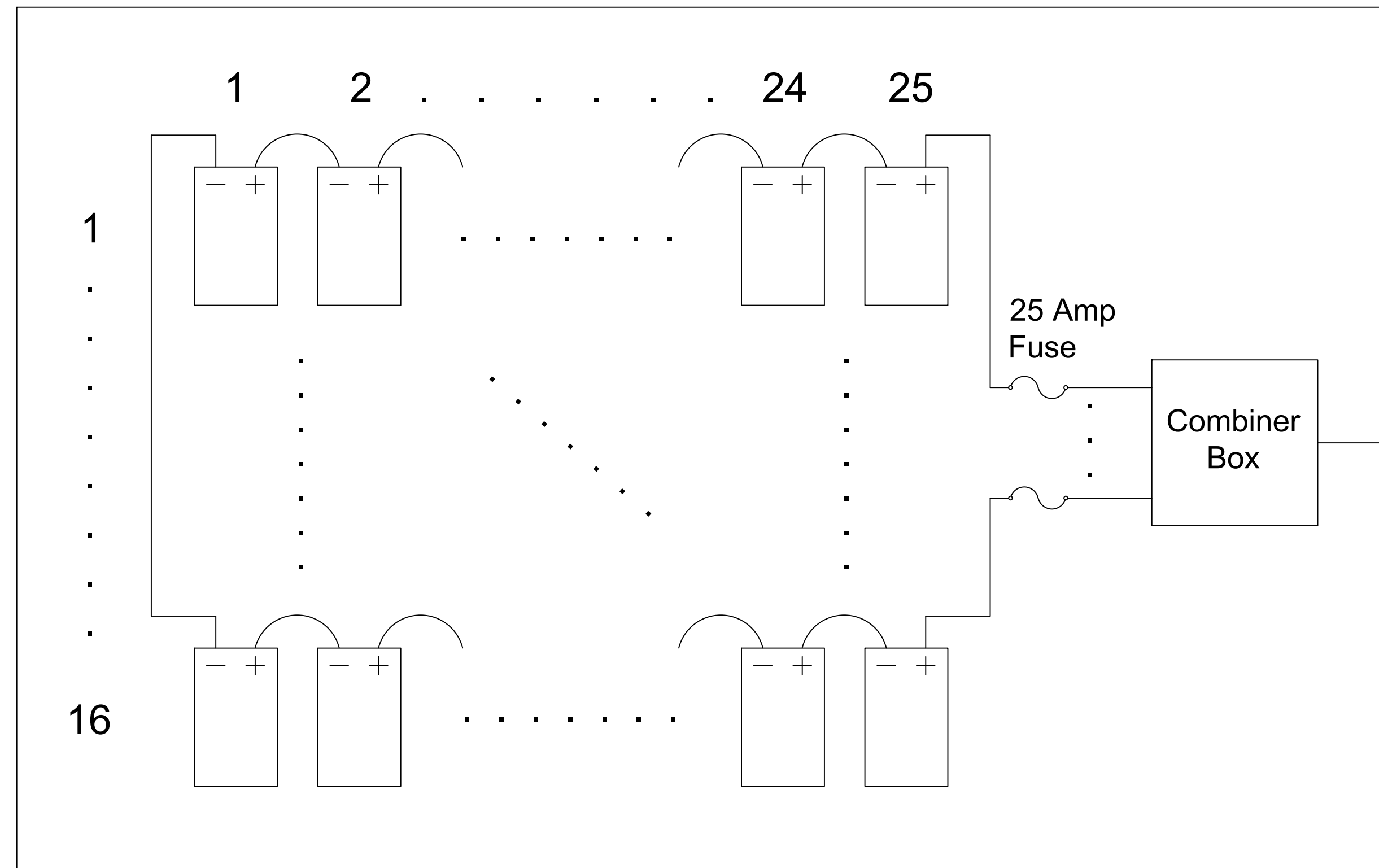
NO.	DESCRIPTION	DATE
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Project	60MW SOLAR POWER PLANT	Sheet	PV107
Date	11/07/23		AC ONE LINE
Scale	N/A		



DC ONE LINE

350 Amp Fuse

350 Amp Fuse

Combiner Box

Combiner Box

Inverter

To Feeder

General Notes

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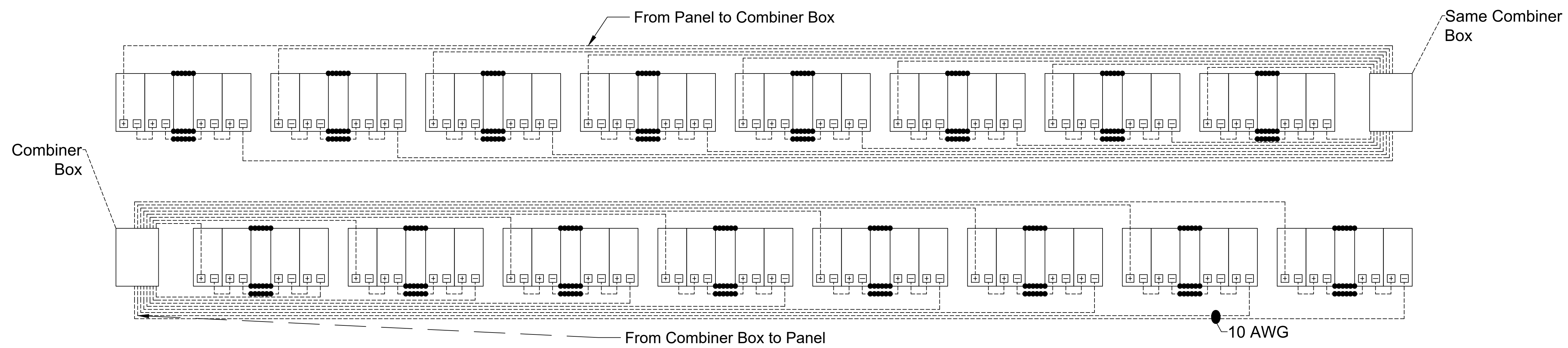
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 (LEA COUNTY)

Project	60MW SOLAR POWER PLANT	Sheet	PV108
Date	11/07/23	DC ONE LINE	
Scale	N/A		

1

24



Not to Scale

STRING DIAGRAM

General Notes

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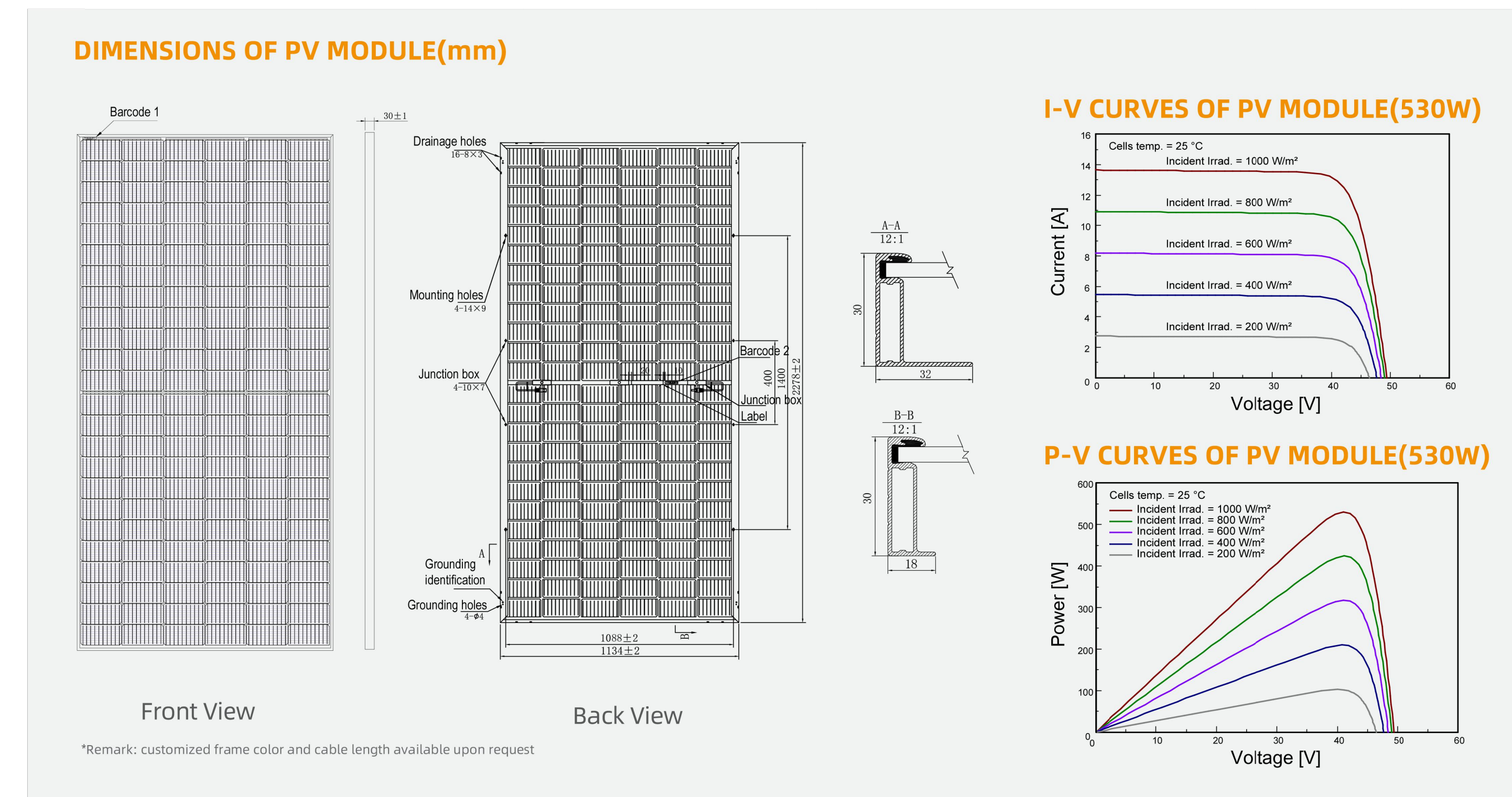
NO.	DESCRIPTION	DATE
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LOVINGTON, NM 88260
 (LEA COUNTY)

Project	Sheet
60MW SOLAR POWER PLANT	PV109
Date	STRING ONE LINE
11/07/23	
Scale	
N/A	



ELECTRICAL CHARACTERISTICS | STC*

Nominal Power Watt Pmax(W)*	530	535	540	545	550	555
Maximum Power Voltage Vmp(V)	41.10	41.30	41.50	41.70	41.90	42.10
Maximum Power Current Imp(A)	12.91	12.96	13.02	13.07	13.13	13.19
Open Circuit Voltage Voc(V)	49.40	49.60	49.80	50.00	50.20	50.40
Short Circuit Current Isc(A)	13.65	13.71	13.77	13.83	13.89	13.95
Module Efficiency (%)	20.52	20.71	20.90	21.10	21.29	21.48

*The data above is for reference only and the actual data is in accordance with the practical testing
 *STC (Standard Test Condition): Irradiance 1000W/m², Module Temperature 25±2°C, AM 1.5
 *Measuring uncertainty: ±3%, all the electrical characteristics such as Power, Im, Vm and FF are within ±3% tolerance.

MECHANICAL DATA

Solar cells	Mono PERC
Cells orientation	144 (6×24)
Module dimension	2278×1134×30mm (With Frame)
Weight	25.5±1 kg
Glass	3.2mm, High Transmission, AR Coated Tempered Glass
Junction box	IP 68, 3 diodes
Cables	4 mm², 350 mm (With Connectors)
Connectors*	MC4-compatible

*Please refer to regional datasheet for specified connector

ELECTRICAL CHARACTERISTICS | NMOT*

Maximum Power Pmax(Wp)	396.40	399.90	403.60	406.80	410.80	414.60
Maximum Power Voltage Vmpp(V)	38.20	38.40	38.50	38.80	38.90	39.10
Maximum Power Current Impp(A)	10.38	10.42	10.47	10.49	10.56	10.61
Open Circuit Voltage Voc(V)	46.20	46.30	46.50	46.70	46.90	47.10
Short Circuit Current Isc(A)	11.02	11.07	11.12	11.17	11.22	11.27

*NMOT: Irradiance 800W/m², Ambient Temperature 20°C, AM 1.5, Wind Speed 1m/s

TEMPERATURE RATINGS

NMOT	44°C ±2°C	Maximum system voltage	1500 V DC
Temperature coefficient of Pmax	-0.35%/°C	Operating temperature	-40°C~+85°C
Temperature coefficient of Voc	-0.29%/°C	Maximum series fuse	30 A
Temperature coefficient of Isc	0.05%/°C	Front Side Maximum Static Loading	Up to 5400Pa
Refer. Bifacial Factor	70±5%	Rear Side Maximum Static Loading	Up to 2400Pa

*Remark: Do not connect Fuse in Combiner Box with two or more strings in parallel connection

ELECTRICAL CHARACTERISTICS WITH 25% REAR SIDE POWER GAIN*

Front power Pmax/W	530	535	540	545	550	550
Total power Pmax/W	663	669	675	681	688	694
Vmp/V(Total)	41.20	41.40	41.60	41.80	42.00	42.20
Imp/A(Total)	16.08	16.15	16.23	16.30	16.37	16.44
Voc/V(Total)	49.50	49.70	49.90	50.10	50.30	50.50
Isc/A(Total)	17.02	17.10	17.17	17.25	17.32	17.39

*Bifacial Gain: The additional gain from the back 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.

PACKAGING CONFIGURATION*

Piece/Box	36
Piece/Container(40'HQ)	720

*Customized packaging is available upon request.
 *Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.
 *Caution: Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

Add : 1#, Zhixi Industrial Zone, jintanjiangsu 213251, P.R. China | Tel: +86 519 6822 0233 | E-mail: info@znshinesolar.com

Note: Specifications included in this datasheet are subject to change without notice. ZNSHINE reserves the right of final interpretation © ZNSHINE SOLAR 2022 | Version: ZXM7-SHDB144 2203.E
 No special undertaking or warranty for the suitability of special purpose or being installed in extraordinary surroundings is granted unless as otherwise specifically committed by manufacturer in contract document

General Notes

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REVISIONS

NO.	DESCRIPTION	DATE
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 533 MORRILL ROAD
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 (LEA COUNTY)

Project	60MW SOLAR POWER PLANT	Sheet	PV110
Date	11/07/23	PANEL DATASHEET	
Scale	N/A		

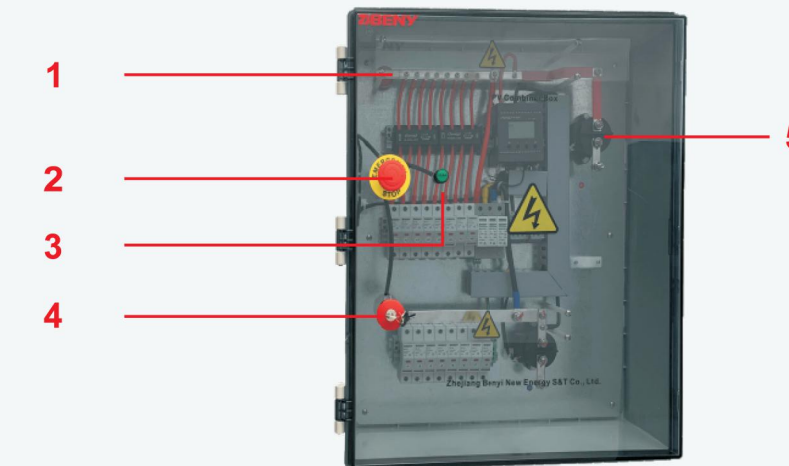
BHSZ 1500V AFCI Combiner BOX



Application

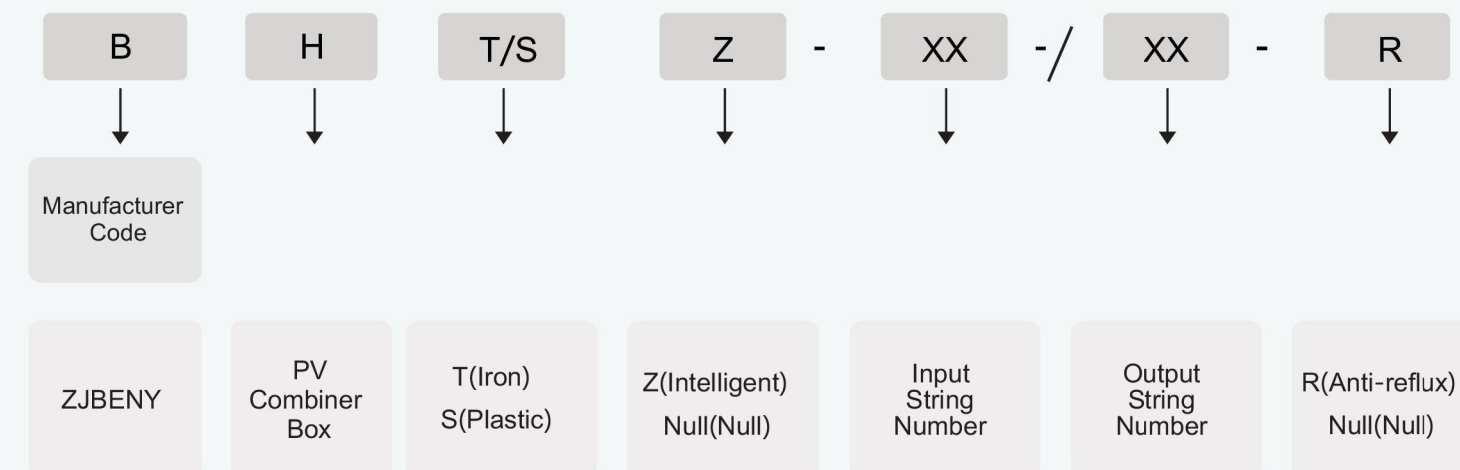
ZBENY The Arc Fault Circuit Interruption Combiner Boxes monitor the current and voltage of each strings and the temperature in enclosure, the integrated automatic contactors triggered when there is arc fault detected. So the PV DC strings will be shut down rapidly. The solution provides solar PV system safety. The DC contactors can be remotely controlled for easier system maintain.

Appearance Introduction



- 1 Brand
- 2 Emergency button
- 3 Indicating light
- 4 Start/Stop(Lockable)
- 5 Contactor

Type Instruction



Model No.	BHSZ-8/1	BHSZ-12/1	BHSZ-16/1
Max Rated Voltage	1500VDC		
Number of Input	8	12	16
Max Input Current Per Each String	10A / 15A / 20A / 25A / 30A		
Connection Type of Input	PG09 MC4		
Input Cable Size	Ø4-8mm		
Max Output Current	100A / 125A / 250A	125A / 160A / 200A / 250A	200A / 250A / 315A / 350A
Connection Type of Output	PG 36, Ø22-32mm Customizable		
DC Surge Arrester	T2/T1+2, In=12.5KA, I _{max} =30KA, U _{cpv} =1500VDC		
Voltage of Monitoring Device	450VDC ~ 1500VDC		
Voltage of Contactor	24VDC (Built-in Power Supply) Plastic		
Enclosure	Powder Coated Stainless Steel		
Protection Degree	NEMA13 (IP65)		
Ambient Temperature	-20°C ~ +60°C		
Humidity	0-99%		
Altitude	≤2000m (derating > 2000m)		
Installation method	Vertical / Horizontal		
Standard	IEC62109 / IEC61439 (EN62109 / EN61439)		

General Notes

SIGNATURE & SEAL

REVISIONS

NO.	DESCRIPTION	DATE
A	ISSUED FOR CLIENT REVIEW	11/08/23

**IOWA STATE UNIVERSITY
COLLEGE OF ENGINEERING**
SDMAY24-18
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(LEA COUNTY)

Project	Sheet
60MW SOLAR POWER PLANT	PV111 COMBINER BOX DATASHEET
Date 11/07/23	
Scale N/A	

PVS980-MWS

Solar inverters

Like other ABB central inverters, the PVS980 has been developed on the basis of decades of experience in the industry and proven technology platform. Unrivalled expertise from the world's market and technology leader in frequency converters is the hallmark of this solar inverter series. The PVS980 inverter is one of the most efficient and cost-effective ways of converting the direct current (DC) generated by solar modules into high quality and CO₂-free alternating current (AC) that can be fed into the power distribution network. Two ABB central inverters are used in the ABB megawatt station. The inverters provide high conversion efficiency with low auxiliary power consumption with very low maintenance need.

Transformer

The ABB megawatt station includes an ABB vacuum cast coil dry-type- or alternatively ABB oil immersed transformer. The transformer is designed to meet the reliability, durability, and efficiency required in PV applications. It is specifically designed and optimized for ABB solar inverters to provide the best performance throughout the lifetime of the plant.

As a major global transformer manufacturer, ABB offers a wide range of transformers. Alternate power transformers are available to meet customer requirements. All ABB's transformers are manufactured in accordance with the most demanding industry and international standards.

Switchgear

ABB offers a complete range of medium voltage switchgear for secondary distribution, including air-insulated and gas-insulated switchgear.

The ABB megawatt station is equipped, as standard, with the widely proven ABB SafeRing, SF₆-insulated switchgear.

A sealed steel tank with constant atmospheric conditions ensures a high level of reliability as well as personnel safety. The virtually maintenance-free system comes in a compact and flexible design that allows for a versatile switchgear configuration. As an option ABB's gas-insulated SafePlus and air insulated Unisec switchgear are also available.

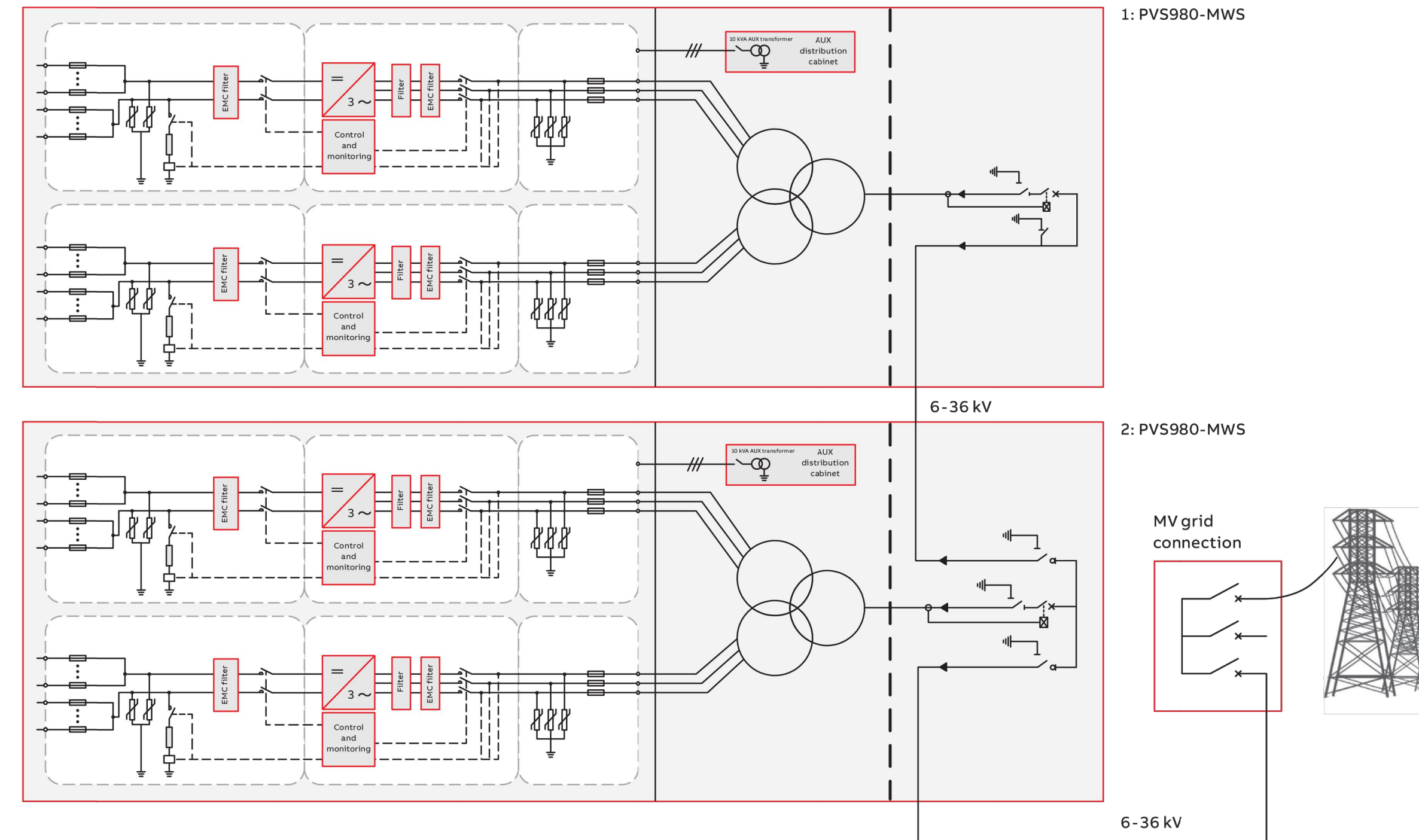
Technical data and types

Type designation ¹⁾	-3636kVA-I-xx-zzz	-3818kVA-J-xx-zzz	-4000kVA-K-xx-zzz	-4182kVA-L-xx-zzz
PVS980-MWS-				
Maximum rating	4000 kVA	4200 kVA	4400 kVA	4600 kVA
Input (DC)				
Maximum input power (P _{PV,max})	2x2909 kWp	2x3056 kWp	2x3200 kWp	2x3346
DC voltage range, mpp (U _{DC,mppt}) @ 35 °C (122°F)	850...1500 V	893...1500 V	935...1500 V	978...1500 V
(@ S _{nom}) @ 50 °C (122°F)	850...1100 V	893...1100 V	935...1100 V	978...1100 V
Maximum operational DC voltage (U _{DC,max})	1500 V			
Number of protected DC inputs (parallel)	2x8 (up to 24 as option)			
Number of mppt trackers	2			
Output (AC)				
Inverter type (2x ABB central inverter)	PVS980-58-1818kVA-I	PVS980-58-1909kVA-J	PVS980-58-2000kVA-K	PVS980-58-2091kVA-L
Nominal AC output power (S _{N(AC)}) @ 50 °C (122°F)	3636 kVA	3818 kVA	4000 kVA	4182 kVA
Maximum AC output power (S _{MAX(AC)}) @ 35 °C (122°F)	4000 kVA	4200 kVA	4400 kVA	4600 kVA
Medium voltage range (U _{N(AC)})	12 kV to 36 kV ²⁾			
Output frequency	50/60 Hz			
Harmonic distortion, current ³⁾	< 3%			
Power factor compensation (cosφ)	Yes			
Transformer type	ABB Vacuum cast coil dry type (AF), or ABB Oil immersed type (ONAN)			
Medium voltage switchgear type ⁴⁾	ABB SafeRing, SF ₆ -insulated, DeV, CV or CCV			
Enclosure	Painted steel outdoor enclosure, IP54, C4 corrosion protection			
Efficiency				
Maximum (inverter only)	98.8%			
Euro-eta (inverter only)	98.6%			

¹⁾ Where xx-medium voltage level, zzz-transformer type, oil or dry
²⁾ Nominal voltage 12 kV to 36 kV, from 6 kV on as option

³⁾ At nominal power
⁴⁾ Other ABB switchgear types available as an option

ABB megawatt station design and grid connection



Technical data and types

Type designation ¹⁾	-3636kVA-I-xx-zzz	-3818kVA-J-xx-zzz	-4000kVA-K-xx-zzz	-4182kVA-L-xx-zzz
PVS980-MWS-				
Maximum rating	4000 kVA	4200 kVA	4400 kVA	4600 kVA
Power consumption				
Own consumption in operation	≤ 5500 W / ≤ 7700 W ²⁾			
Standby operation consumption	≤ 800 W			
Auxiliary voltage for customer use	3 ~ 400 V/50 Hz, up to 40 kVA			
Dimensions and weight				
Width/Height/Depth, mm	12190 mm/2900 mm/2440 mm (40' HC container dimensions)			
Weight approx.	< 30 t			
Environmental limits				
Degree of protection	Inverter IP56/IP66, UL Type 3R, IP44/54 RMU and dry type transformer housing			
Ambient temperature range (nominal ratings) ⁶⁾	-20 °C to +50 °C			
Maximum altitude (above sea level) ⁷⁾	1000 m			
Relative humidity, non condensing	5% to 95%			
User interface and communications				
Local user interface	Inverter's control panel and PC interface through ABB Drive Studio			
Fieldbus connectivity	Modbus RTU, -TCP, Ethernet IP, Profinet			
Product compliance				
Conformity	IEC 60364, IEC 61936-1, IEC 60502-1			
Grid support	Reactive power compensation ⁸⁾ , Power reduction, LVRT, HVRT, FqRT			

²⁾ ≤ 5500 W with oil type transformer, ≤ 7700 W with dry type transformer
⁶⁾ Extended range upon request

⁷⁾ Higher altitude upon request
⁸⁾ Also during the night

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Project	Sheet
60MW SOLAR POWER PLANT	PV112 SKID INVERTER DATASHEET
Date	11/07/23
Scale	N/A