

SEE DRAWING PV1.0 FOR
NUMBER OF STRINGS AND
MODULES (TYPICAL)

PROVIDE "LITTLEFUSE" 20A
FUSES, 1000VDC RATED
(TYP.)

DC
DISC.

SUNGROW
INVERTER

GND

NEU

L3 / CØ

L2 / BØ

L1 / AØ

EXTEND TO AC AGGREGATION
PANEL "PV" - REFER TO
OVERALL SINGLE LINE
DIAGRAM FOR CONTINUATION

480 3Ø, 4W
GROUNDED-WYE
AC OUTPUT

POWER FACTOR BASIS OF DESIGN 0.95 TO 1.0

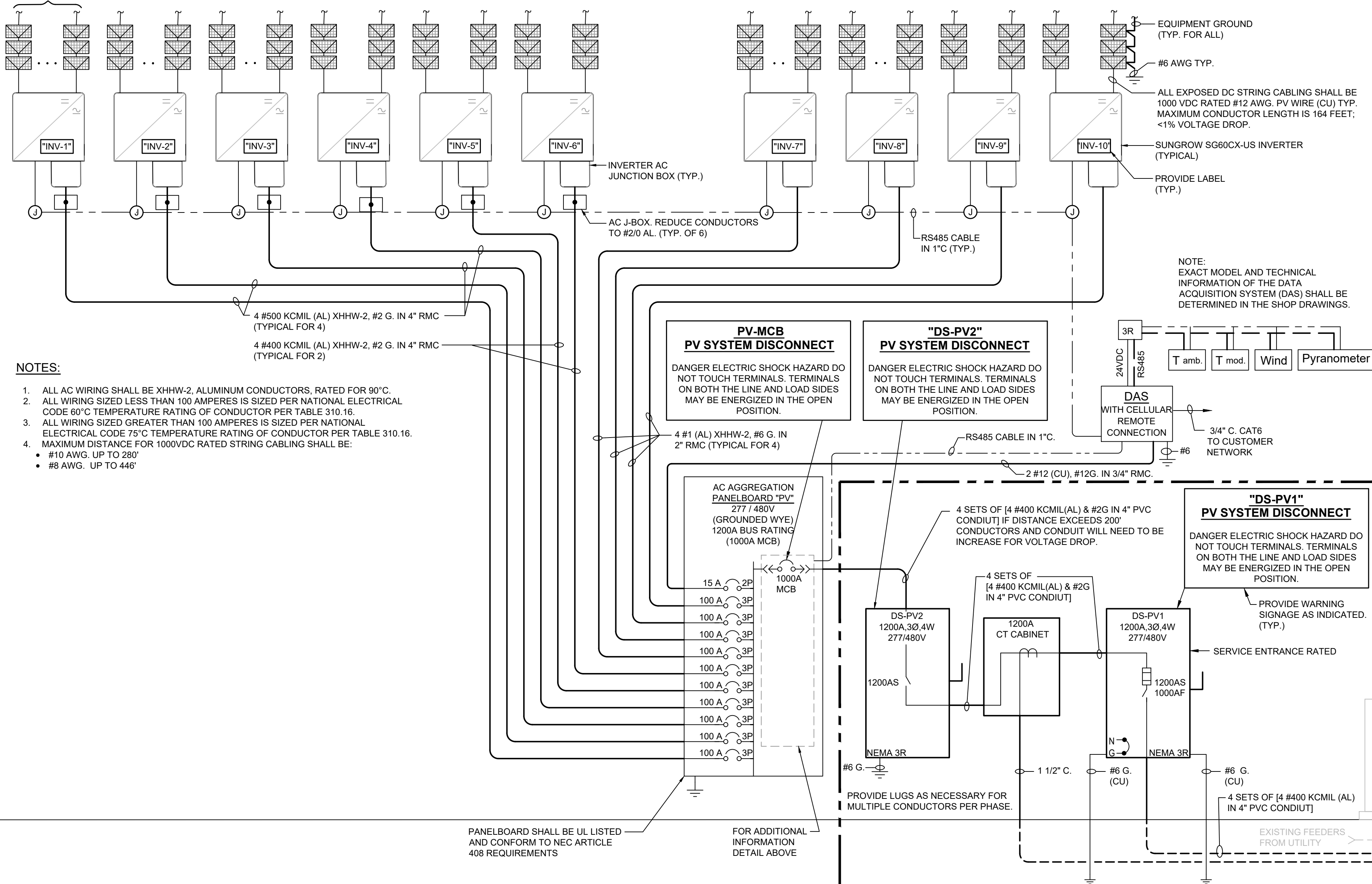
The diagram illustrates a 4x4 grid of PV modules. Each module is labeled 'INV | STRING | ID', where 'INV' is the inverter, 'STRING' is the string number, and 'ID' is the module number. The connections are as follows:

- String 1 (Top Row):** INV | STRING | 05, INV | STRING | 06, INV | STRING | 15, INV | STRING | 16. These are connected in series to the PV+ terminal of the inverter.
- String 2 (Second Row):** INV | STRING | 04, INV | STRING | 07, INV | STRING | 14, INV | STRING | 17. These are connected in series to the PV- terminal of the inverter.
- String 3 (Third Row):** INV | STRING | 03, INV | STRING | 08, INV | STRING | 13, INV | STRING | 18. These are connected in series to the GND terminal of the inverter.
- String 4 (Bottom Row):** INV | STRING | 02, INV | STRING | 09, INV | STRING | 12. These are connected in series to the GND terminal of the inverter.
- String 5 (Bottom Row):** INV | STRING | 01, INV | STRING | 10, INV | STRING | 11. These are connected in series to the GND terminal of the inverter.

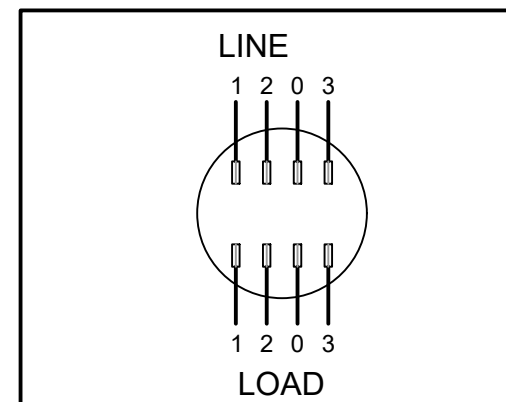
The inverter is labeled 'WAAREE-MODEL' (TYPICAL FOR ALL) and has terminals for PV+, PV-, and GND.

[illegible]

FOR NUMBER OF STRINGS
AND MODULES PER STRING
SEE DWG PV2.0 (TYP.)



MODEL: SUNGROW SG60X-US
QTY: 10
P OUT: 60,000 Watts
I OUT: 72.2 A
V NOM: 480 V - 3Ø

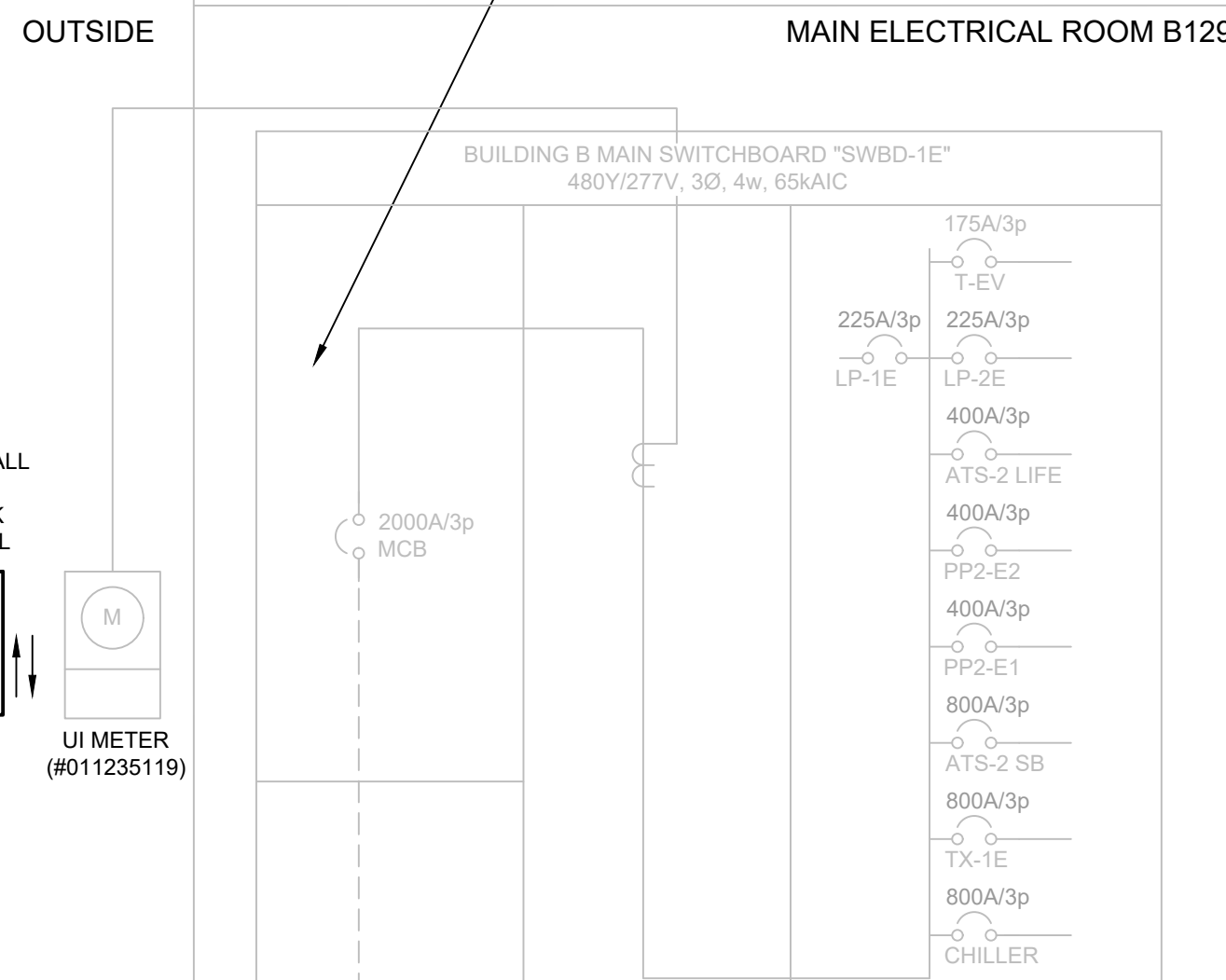
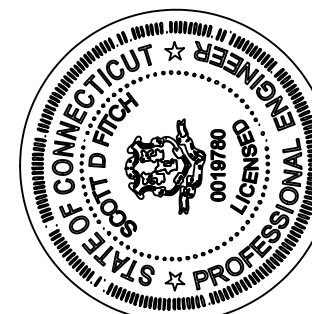


PROTECTION DEVICE	TRIP SETTING	SETTING VALUE	TRIP TIME
27-1	50%	240.0	.16 SEC
27-2	88%	422.4	2.0 SEC
59-1	110%	528.0	1.0 SEC
59-2	120%	576	.16 SEC
81U-1	58.0 Hz	@	32 SEC
81U-2	57.0 Hz	@	.16 SEC
81O	60.5 Hz	@	.16 SEC

NOTES:

1. FOR GENERAL NOTES SEE DRAWING PV2.0

CARPORT PV SYSTEM IS FEED FROM
SEPARATE ELECTRICAL SERVICE.
PV SERVICE DISCONNECT IS LOCATED
ON THE WEST WALL EXTERIOR OF
ELECTRICAL ROOM.

[illegible]

System Size:
726 kW (DC)
600.0 kW (AC)

110 White Wood Lane
N. Branford, CT 06471
Phone: (203) 453-8596
Email: info@icdslc.com
Solutions, LLC

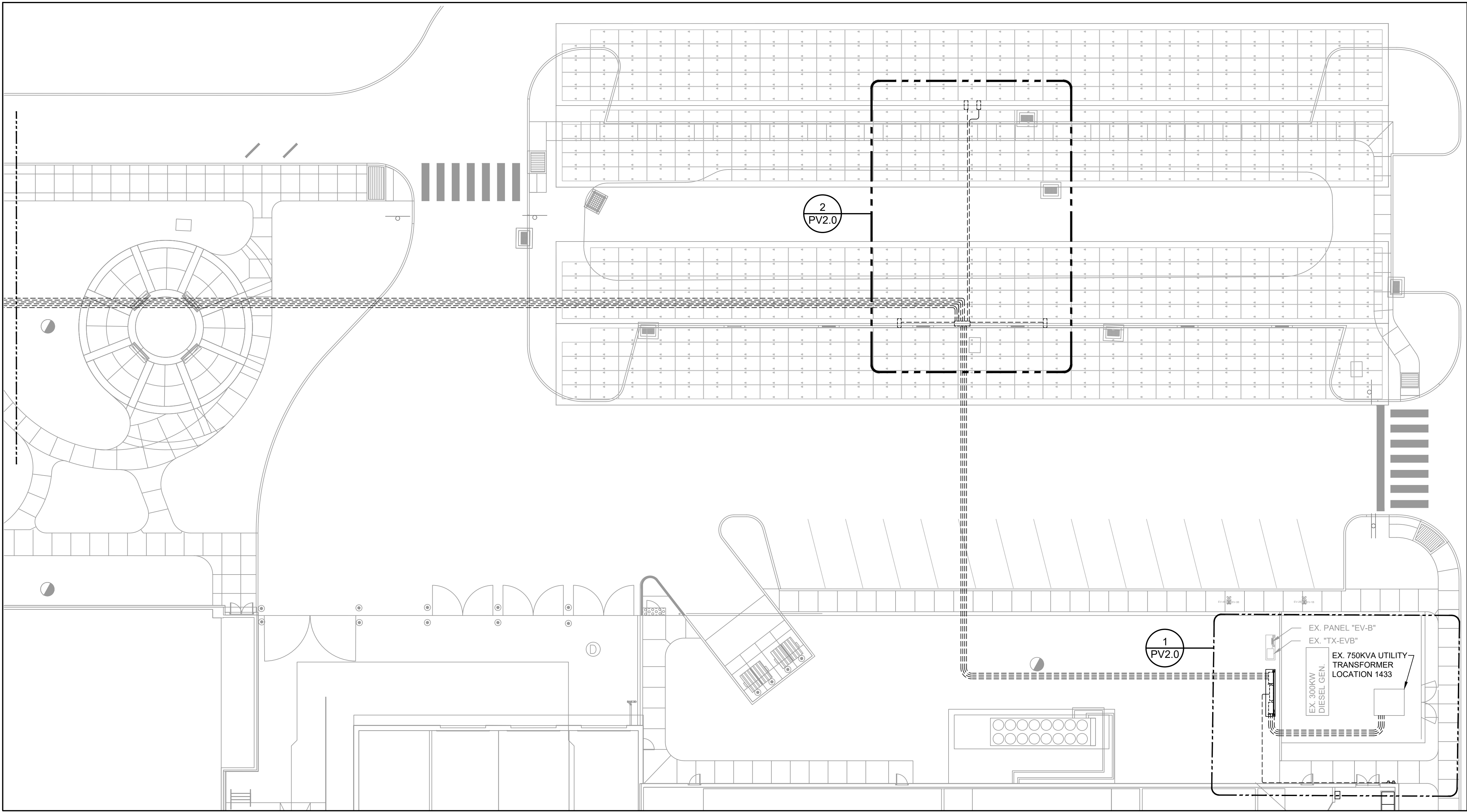
ICDS
Innovative Construction & Design

ACES - WHITNEY ACADEMY
100 LEEDER HILL DRIVE, HAMDEN CT 06430
CARPORT PV SYSTEM
ELECTRICAL SERVICE B
PARTIAL SINGLE LINE DIAGRAM

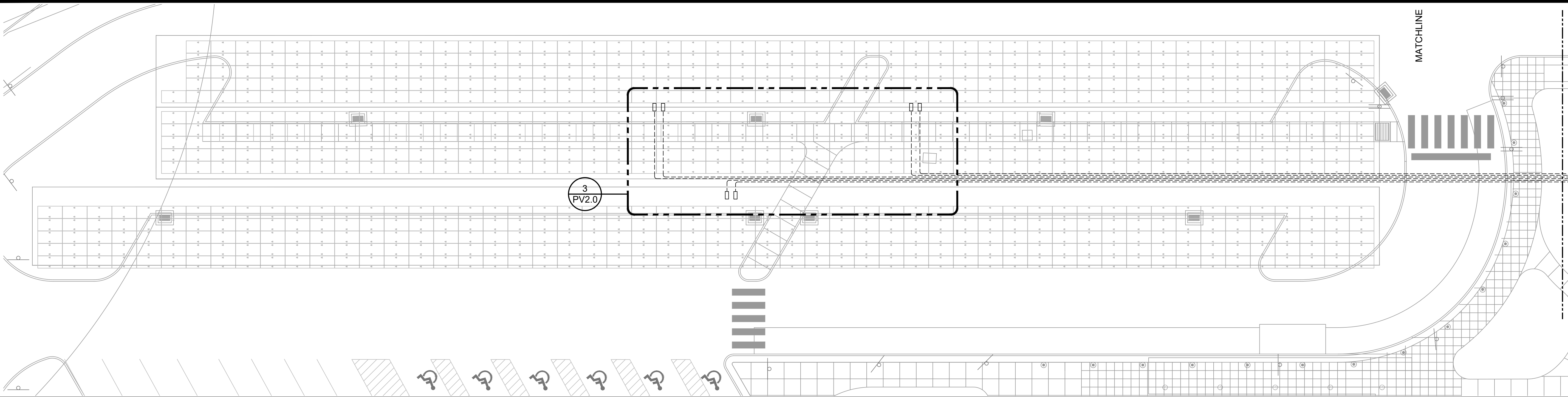
Project No.:	Drawn By: KFH
Date: 03/29/24	Design By: KFH
Scale: N.T.S.	Check By: DSF

Drawing No.

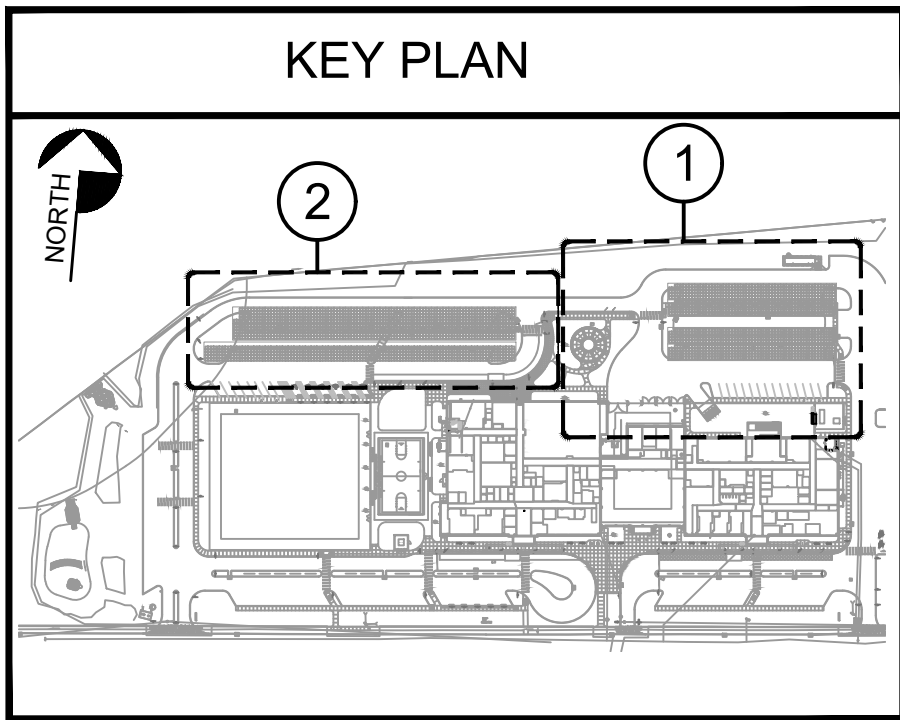
E1.0



1 PARTIAL ELECTRICAL PLAN
Scale: 1/16" = 1'-0"



2 PARTIAL ELECTRICAL PLAN
Scale: 1/16" = 1'-0"



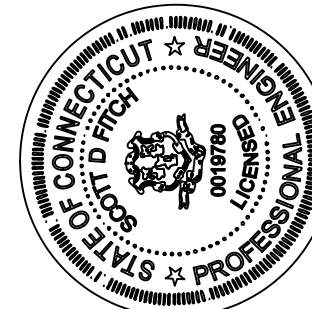
ACES - WHITNEY ACADEMY
130 LEEDER HILL DRIVE, HAMDEN CT

CARPORT PV SYSTEM
ELECTRICAL SERVICE B
PARTIAL ELECTRICAL PLAN

Project No.:	Drawn By: KFH
Date: 03/29/24	Design By: KFH
Scale: AS NOTED	Check By: DSF

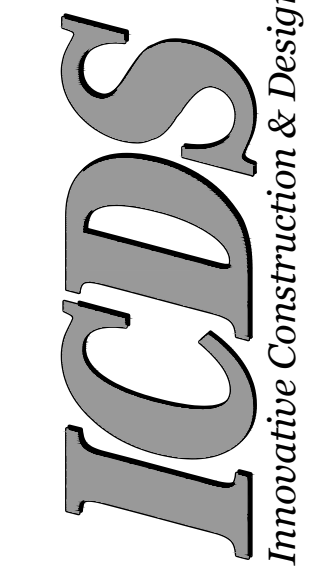
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600.0 kW (AC)

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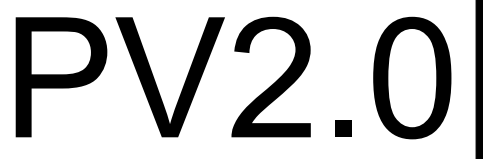


Rev.	Date	Description
2	09/06/24	ISSUED FOR FIELD USE
A	03/29/24	UTILITY INTERCONNECTION

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MAIN FEATURES:		ELECTRICAL CONFIGURATION:	
NOMINAL AC POWER:	600.00 KW AC	MODULES PER STRING:	74 STRINGS OF 18
PEAK DC POWER:	726 KWp		
MODULE TECHNOLOGY:	MONO-CRYSTALLINE		
INVERTER TOPOLOGY:	TL STRING - UL1741	MAX. DC VOLTAGE:	1000 V
		QUANTITY OF STRINGS:	74
PV MODULES:		INVERTER CONFIGURATION:	
MANUFACTURER:	WAAREE ENERGIES LIMITED	DESIGNATION:	"INV-1" thru "INV-10"
MODEL:	WSMD-545	MANUFACTURER:	SUNGROW
PEAK POWER:	545 Wp	MODEL:	SG60CX-US
QUANTITY:	1332 MODULES	NOMINAL POWER:	60 KW AC
		QUANTITY:	10 INVERTERS
		OUTPUT POWER:	480V
PHYSICAL CONFIGURATION:			
METHODOLOGY:	ROOF MOUNT		
TILT / TRACKING :	8° FIXED TILT / AZIMUTH 168°	DC DISCONNECT:	INTEGRAL / LOCKABLE OFF
RACKING SYSTEM:	CARPENT MOUNTING SYSTEMS	AC DISCONNECT:	EXTERNAL

INVERTER No.	MPPT No.	STRING No.	MODULES PER STRING	INVERTER No.	MPPT No.	STRING No.	MODULES PER STRING	INVERTER No.	MPPT No.	STRING No.	MODULES PER STRING	INVERTER No.	MPPT No.	STRING No.	MODULES PER STRING	INVERTER No.	MPPT No.	STRING No.	MODULES PER STRING
INV-1	1	1 2	18 18	INV-2	1	1 2	18 18	INV-3	1	1 2	18 18	INV-4	1	1 2	18 18	INV-5	1	1 2	18 18
	2	3	18		2	3	18		2	3	18		2	3	18				
	3	4	18		3	4	18		3	4	18		3	4	18				
	4	5	18		4	5	18		4	5	18		4	5	18				
	5	6	18		5	6	18		5	6	18		5	6	18				
	6	7	18		6	7	18		6	7	18		6	7	18				
INV-6	1	1 2	18 18	INV-7	1	1 2	18 18	INV-8	1	1 2	18 18	INV-9	1	1 2	18 18	INV-10	1	1 2	18 18
	2	3	18		2	3 4	18 18		2	3 4	18 18		2	3 4	18 18				
	3	4	18		3	5	18		3	5	18		3	5	18				
	4	5	18		4	6	18		4	6	18		4	6	18				
	5	6	18		5	8	18		5	8	18		5	8	18				
	6	7	18		6	8	18		6	8	18		6	8	18				



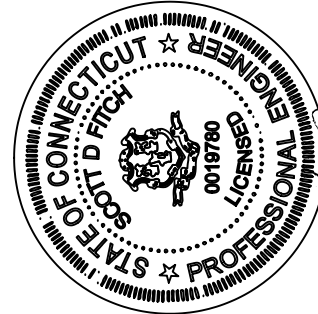
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GENERAL NOTES			
1.	THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL EQUIPMENT AND FOLLOWING ALL MANUFACTURER'S OR ENGINEER'S DIRECTIONS AND INSTRUCTIONS SHOWN HERE.	10.	THIS PHOTOVOLTAIC SYSTEMS UTILITY CONNECTION POINT SHALL MEET THE SPECIFIC REQUIREMENTS OF ARTICLE 705.12, NATIONAL ELECTRICAL CODE PLEASE FOLLOW THE SPECIFIC INSTRUCTIONS IN THIS DRAWING SET TO MEET THIS REQUIREMENT.
2.	THE ELECTRICAL CONTRACTOR IS ADVISED THAT ALL DRAWINGS, COMPONENT MANUALS, ESPECIALLY THE INVERTER MANUALS, ARE TO BE READ AND UNDERSTOOD PRIOR TO INSTALLATION OR ENERGIZING OF ANY EQUIPMENT. THE CONTRACTOR IS ALSO REQUIRED TO HAVE ALL COMPONENTS SWITCHED IN THE OFF (OPEN) POSITION AND FUSES REMOVED PRIOR TO INSTALLATION OF FUSE-BEARING COMPONENTS.	11.	THE GROUNDING OF THE PHOTOVOLTAIC SYSTEM SHALL COMPLY WITH THE NEC 690.45 AND NEC 690.47. IF THE REQUIREMENTS DESCRIBED IN THIS DRAWING SET ARE CLOSELY FOLLOWED, THE GROUNDING REQUIREMENT WILL BE MET. ANY CHANGES WILL NEED TO BE REVIEWED AND DEEMED ACCEPTABLE BY THE ENGINEER, MANUFACTURER AND LISTING AGENCY FOR PRODUCT SAFETY.
3.	THIS SOLAR PHOTOVOLTAIC SYSTEM IS TO BE INSTALLED FOLLOWING THE CONVENTIONS OF THE NATIONAL ELECTRICAL CODE. ANY LOCAL CODE WHICH MAY SUPERCEDE THE NEC SHALL GOVERN.	12.	THE CONTRACTOR IS RESPONSIBLE FOR MOUNTING ALL EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS. IF SPECIFICATIONS ARE NOT APPARENT, THE CONTRACTOR SHALL USE DILIGENT EFFORTS TO MOUNT EQUIPMENT SUCH THAT IT WILL BE CLEAR, LEVEL AND SOLID IN ORDER TO LAST THE LIFETIME OF THIS SOLAR ELECTRIC SYSTEM.
4.	ALL COMPONENTS TO BE INSTALLED WITH THIS SYSTEM ARE TO BE LISTED BY A THIRD PARTY TESTING AGENCY (UL, E.TI, ETC.). EQUIPMENT SHALL BE NEMA 3R OUTDOOR RATED OR BETTER, UNLESS LOCATED INDOORS.	13.	THESE DRAWINGS ARE SCHEMATIC IN NATURE AND ARE NOT INTENDED TO SHOW ALL POSSIBLE CONDITIONS. IT IS INTENDED THAT COMPLETE ELECTRICAL SYSTEMS BE PROVIDED WITH ALL NECESSARY EQUIPMENT, APPURTENANCES, AND CONTROL, COMPLETELY COORDINATED WITH ALL DISCIPLINES.
5.	THE CONTRACTOR IS RESPONSIBLE FOR SELECTING AND PURCHASING EQUIPMENT THAT WILL LAST THE LIFETIME OF THE PV SYSTEM. ALL ENCLOSURES, CONDUIT, STRAPS PAINTED METAL SURFACES, CONCRETE, GROUNDING EQUIPMENT AND OTHER PRODUCTS SHALL BE SELECTED TO LAST THE LIFETIME OF THE PV SYSTEM. THE ENGINEER SPECIFIES THE MINIMUM REQUIRED EQUIPMENT AND SPECIFICATIONS TO ACCOMPLISH THE PROJECT AND THE ELECTRICAL CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THESE SPECIFICATIONS ARE MET OR EXCEEDED WITH GOOD QUALITY EQUIPMENT, WORKMANSHIP AND SKILL.	14.	ALL 1000VDC PHOTOVOLTAIC EQUIPMENT/ CIRCUITS PROVIDED SHALL BE INSTALLED OUTDOORS. AT NO POINT SHALL 1000VDC SYSTEMS PENETRATE THE ENVELOPE OF THE BUILDING. NO EXCEPTIONS. ALL ROOFTOP ACCESS SHALL BE LOCKED AND ACCESSIBLE ONLY TO AUTHORIZED, QUALIFIED PERSONNEL. ALL POINTS OF ACCESS SHALL BE LABELED "DANGER - HIGH VOLTAGE - KEEP OUT" WITH MECHANICALLY AFFIXED, PERMANENT WEATHERPROOF LABEL.
6.	DC VOLTAGE FROM THE ARRAY IS ALWAYS PRESENT AT THE DC DISCONNECT ENCLOSURE AND THE DC TERMINALS OF THE INVERTER DURING DAYLIGHT HOURS. ALL PERSONS WORKING ON OR INVOLVED WITH THIS PHOTOVOLTAIC SYSTEM MUST BE WARNED THAT SOLAR MODULES ARE ENERGIZED WHEN EXPOSED TO DAYLIGHT. THE LINE AND LOAD TERMINALS ON THE DC DISCONNECTS MAY BE ENERGIZED IN THE OPEN POSITION AND THE SWITCH IS TO BE LABELED TO COMPLY WITH ARTICLE 690.17 OF THE NEC REFLECTING THIS.	15.	PULL BOXES, JUNCTION BOXES, CONDUIT BODIES AND GUTTERS OR UTILIZED FOR ROUTING OF 1000VDC CONDUCTORS SHALL BE PROVIDED IN ACCORDANCE WITH NEC ARTICLE 314 PART IV AND MARKED "DANGER - HIGH VOLTAGE" WITH PERMANENT WEATHERPROOF LABEL. TAKE CARE IN AFFIXING THIS LABEL AS NOT TO VOID UL LISTING OF THE BOX, ITSELF. COORDINATE EXACT METHOD WITH MANUFACTURER, PRIOR TO INSTALL.
7.	ALL PORTIONS OF THIS SOLAR ELECTRIC SYSTEM SHALL BE CLEARLY MARKED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE ARTICLE 690 PART VI.	16.	WIRE BEND RADIUS OF 1000VDC CONDUCTORS SHALL BE PERFORMED IN ACCORDANCE WITH NEC ARTICLE 300.34.
8.	THE ELECTRICAL CONTRACTOR SHALL PERFORM INITIAL HARDWARE CHECKS AND PIVWIRING CONTINUITY CHECKS PRIOR TO TERMINATING ANY WIRES.	17.	SUPPORT OF ALL EMT CONDUIT BODIES SHALL BE PERFORMED IN ACCORDANCE WITH NEC ARTICLE 358.30. SUPPORT OF ALL RMC CONDUIT BODIES SHALL BE PERFORMED IN ACCORDANCE WITH NEC ARTICLE 344.30.
9.	FOR PROPER MAINTENANCE AND ISOLATION OF INVERTERS, REFER TO ISOLATION PROCEDURE IN INVERTER MANUAL. CONTRACTOR PERFORMING THE MAINTENANCE IS RESPONSIBLE TO FOLLOW ALL LOCKOUT/TAGOUT PROCEDURES.	18.	PROVIDE GROUNDING BUSHING AT BOTH ENDS OF STRING HOMERUNS, BONDED TO EQUIPMENT GROUNDING CONDUCTOR.
		19.	THE LAYOUT OF CONDUIT IS INDICATIVE ONLY. CONTRACTOR SHALL ROUTE AND LOCATE THE CONDUITS TO SUIT SITE CONDITIONS BUT SHALL NOT EXCEED CONDUCTOR LENGTHS SHOWN ON DRAWINGS. CONTRACTOR SHALL COORDINATE ALL CHANGES IN WIRING AND CONDUIT WITH THE ENGINEER.
		20.	WHERE WIRE AND CABLE ROUTING IS NOT SHOWN, AND DESTINATION ONLY IS INDICATED, CONTRACTOR SHALL DETERMINE EXACT ROUTING AND LENGTHS REQUIRED. A SHOP DRAWING OF PROPOSED INSTALLATION SHALL BE SUPPLIED PRIOR TO INSTALLATION.
		21.	BENDS SHALL NOT DAMAGE RACEWAY OR SIGNIFICANTLY CHANGE THE INTERNAL DIAMETER OF RACEWAYS (NO KINKS).
		22.	SUPPORT CONDUCTORS IN VERTICAL CONDUITS IN ACCORDANCE WITH REQUIREMENTS IN NEC 300.19.
		23.	INSTALL ALL WIRING MATERIALS IN A NEAT WORKMANLIKE MANNER. USE GOOD TRADE PRACTICES AS REQUIRED BY CHAPTER 3 OF THE NEC.
		24.	INSTALL CONDUIT TO MAINTAIN PROPER CLEARANCES AND IN A NEAT INCONSPICUOUS MANNER. RUN PARALLEL AND AT RIGHT ANGLES TO STRUCTURAL MEMBERS OR OTHER CONDUITS. PROVIDE BOXES, FITTINGS AND BENDS FOR CHANGES IN DIRECTION. FASTEN CONDUIT SECURELY IN PLACE.
		25.	SUPPORT CONDUIT USING STEEL PIPE STRAPS, LAY-IN ADJUSTABLE HANGERS, CLEVIS HANGERS OR SPLIT-HANGERS. HANGER SPACING SHALL BE INSTALLED PER NEC REQUIREMENTS FOR THE TYPE OF CONDUIT BEING INSTALLED. USE APPROVED BEAM CLAMPS FOR CONNECTION TO STRUCTURAL MEMBERS.
		26.	PROVIDE PULL, JUNCTION, OR PRECAST CONCRETE UTILITY BOXES WHERE REQUIRED TO FACILITATE THE INSTALLATION OF WIRING IN ADDITION TO THOSE SHOWN ON DRAWINGS. BENDS IN CONDUITS BETWEEN PULL BOXES SHALL NOT EXCEED THE EQUIVALENT OF FOUR 90 DEGREE BENDS.
		27.	WHEN FIELD CUTTING IS REQUIRED, THE CONDUIT SHALL BE CUT SQUARE AND DEBURRED.
		28.	CONDUIT SIZES NOT SPECIFIED SHOULD CONFORM TO NEC SPECIFICATIONS, INCLUDE FILL FACTOR AND DERATING FOR NUMBER OF CONDUCTORS.
		29.	ALL DC CONDUCTORS SHALL CUPPER PV WIRE OR SINGLE CONDUCTOR CABLE MARKED SUNLIGHT RESISTANT AND TYPE USE 2-RHW-2
		30.	ALL AC CONDUCTORS SHALL BE ALUMINUM TYPE XHHW-2
		31.	THE WIRING MINIMUM SIZE SHOULD BE #12 AWG.
		32.	SAFETY REGULATIONS (LOCK OUT - TAG OUT, ETC.) IS THE FULL RESPONSIBILITY OF THE CONTRACTOR DURING CONSTRUCTION.
		33.	THE WIRING SIZE IS BASED ON ESTIMATED CONDUIT ROUTING AS SHOWN IN THIS DRAWING PACKAGE. SHOULD THE CONDUITS LENGTH INCREASE DUE TO RELOCATION OF SOURCE AND/OR ROUTING, THE CONDUITS AND THE CONDUCTORS MAY NEED TO BE RESIZED. PLEASE CONTACT THE ENGINEER PRIOR TO MAKING ANY FIELD CHANGES.
		34.	ELECTRICAL CONTRACTOR TO PROVIDE SIGNAGE TO ALL ELECTRICAL BOXES, JUNCTION BOXES, PULL BOXES, DC DISCONNECTS, CONDUIT RUNS, AC DISCONNECTS, SUB PANELS AND MAIN SERVICES PER NEC ARTICLE 690.
		35.	MODULE INSTALLATION: A. REFER TO THE MODULE MANUAL FOR MORE DETAILS ON RIGGING, UNPACKING, HANDLING, PLANNING & INSTALLATION. B. THE MODULES MAY BE SHIPPED WITH SEVERAL MODULES PER BOX. TAKE CARE WHEN OPENING THE BOX TO ENSURE THAT ALL MODULES ARE SECURELY HANDLED. C. NEVER LEAVE A MODULE UNSUPPORTED OR UNSECURED. CONTRACTOR IS RESPONSIBLE FOR ALL MATERIAL HANDLING ON THE JOB SITE.
		36.	SOLAR COMMISSIONING - BEFORE CLOSING DISCONNECTS OR ATTEMPTING TO ENERGIZE THE INVERTERS, THE FOLLOWING COMMISSIONING PROCEDURE SHALL BE COMPLETED: A. CHECK THE OPEN CIRCUIT VOLTAGE (Voc) AND POLARITY (+/-) OF EACH SOURCE CIRCUIT. RECORD THE VALUES ON COMMISSIONING RECORD DOCUMENTS. B. CHECK THE SHORT CIRCUIT CURRENT (Isc) FOR EACH SOURCE CIRCUIT. RECORD THE VALUES ON COMMISSIONING RECORD DOCUMENTS. C. CHECK THAT ALL FUSES, DISCONNECTS AND OTHER BALANCE OF SYSTEM COMPONENTS ARE RATED FOR 600 VDC AND THE APPROPRIATE CURRENT CAPACITY. D. COMPLETE A VISUAL INSPECTION OF ALL THE MODULES TO CHECK FOR BROKEN GLASS, FRAYED WIRES, EXPOSED CONDUCTORS AND ANY OTHER PROBLEMS THAT MAY CAUSE A FAULT.
		37.	INVERTER COMMISSIONING - BEFORE TURNING ON, OR CLOSING ANY OF THE INVERTER DISCONNECTS, THE FOLLOWING COMMISSIONING PROCEDURE SHALL BE COMPLETED: A. CHECK THAT THE INVERTER IS PROPERLY GROUNDED, AS DESCRIBED BY THE MANUFACTURER & THESE INSTRUCTIONS. B. CHECK THE INVERTER DC INPUT VOLTAGE (Vdc) FROM THE SOLAR ARRAY FOR PROPER POLARITY INSIDE THE INVERTER CABINET. C. CHECK DC INPUT VOLTAGE (Vdc) IS WITHIN THE PROPER RANGE IN THE INVERTER CABINET AS DEFINED BY THE INVERTER RATING LABEL AND ACCOMPANIED MANUAL.
			D. CHECK AC INPUT VOLTAGE IS IN THE PROPER PHASE SEQUENCE (CLOCKWISE) IF APPLICABLE. E. CHECK THAT THE AC GRID VOLTAGE, AT THE INVERTER AC TERMINALS, IS WITHIN THE PROPER RANGE AS DEFINED BY THE INVERTER RATING LABEL AND ACCOMPANIED MANUAL. F. FOLLOW THE START-UP SEQUENCE IN MANUFACTURER'S OPERATION AND MAINTENANCE MANUAL.

INVERTER SPECIFICATION SHEET - 1

INVERTER SPECIFICATION SHEET - 2

PV MODULE SPECIFICATION SHEET

[illegible]

System Size:
726 kW (DC)
600.0 kW (AC)

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CARPORT PV SYSTEM ELECTRICAL SERVICE B

PV DETAIL AND SPECIFICATIONS SHEET

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Date: 03/29/24	Design By: KFH
Scale: N.T.S.	Check By: DSF

Drawing No.:

PV3.0

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