CROTON-HARMON
METRO NORTH STATION
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

SITE INFORMATION:

SITE NAME: CROTON-HARMON METRO NORTH STATION
SITE ADDRESS: 4 VETERANS PLAZA, CROTON-ON-HUDSON, NY 10520
PROPERTY OWNER NAME: VILLAGE OF CROTON-ON-HUDSON
PROPERTY OWNER ADDRESS: 1 VAN WYCK ST, CROTON-ON-HUDSON, NY10520
POWER COMPANY: CONSOLIDATED EDISON, INC.



CODE REVIEW:

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH CURRENT EDITIONS OTH THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES, NOTHING IN THESE PLANS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES:

ELECTRICAL CODE: 2017 NATIONAL ELECTRIC CODE
BUILDING CODE: 2018 INTERNATIONAL BUILDING CODE
FIRE CODE: 2018 INTERNATIONAL FIRE CODE

GENERAL NOTES:

CONTRACTOR IS RESPONSIBLE FOR ANY NECESSARY REPAIRS OF REPLACEMENT OF EXISTING CONDITIONS.
CONTRACTOR IS RESPONSIBLE TO UTILIZE "CALL BEFORE YOU DIG" PRIOR TO CONSTRUCTION AND TO COMPLY WITH ALL LOCAL AND SAFETY RULES AND REGULATIONS.
DO NOT SCALE DRAWINGS. THESE DRAWINGS ARE FORMATTED TO BE FULL SIZE AT 24"X36". CONTRACTOR SHALL VERIFY ALL PLANS WITH EXISTING FIELD DIMENSIONS AND NOTIFY ENGINEER IN WRITING OF ANY DISCREPANCIES PRIOR TO PRECEDING WITH CONSTRUCTION.

DRAWING INDEX:

		ISSUE FOR PERMIT 09/26/2022			
GENERAL					
G001	ELECTRICAL TITLE SHEET	X			
G100	SITE PLAN	X			
G200	PARTIAL ARRAY PLAN	X			
G201	PARTIAL ARRAY PLAN	X			
ELECTRICAL					
E001	ELECTRICAL NOTES & SYMBOLS LIST	X			
E002	ELECTRICAL NOTES & SYMBOLS LIST	X			
E100	OVERALL AC ELECTRICAL PLAN	X			
E101	BESS YARD ELECTRICAL PLAN	X			
E110	BESS YARD EQUIPMENT PAD PLANS	X			
E111	BESS YARD EQUIPMENT PAD PLANS	X			
E115	PV EQUIPMENT PAD PLANS	X			
E150	PARTIAL PHOTOMETRICS PLAN	X			
E151	PARTIAL PHOTOMETRICS PLAN	X			
E152	PARTIAL LIGHTING PLAN	X			
E153	PARTIAL LIGHTING PLAN	X			
E200	PARTIAL DC ELECTRIC PLAN	X			
E201	PARTIAL DC ELECTRIC PLAN	X			
E202	PARTIAL DC ELECTRIC PLAN	X			
E300	ONE LINE DIAGRAM - MEDIUM VOLTAGE	X			
E301	ONE LINE DIAGRAM - BATTERY STORAGE SYSTEM	X			
E302	ONE LINE DIAGRAM - PV SYSTEM	X			
E303	THREE LINE DIAGRAM - MEDIUM VOLTAGE	X			
E304	THREE LINE DIAGRAM - BATTERY STORAGE SYSTEM	X			
E305	THREE LINE DIAGRAM - PV SYSTEM A	X			
E306	THREE LINE DIAGRAM - PV SYSTEM B	X			
E307	RELAY/INVERTER SETTINGS	X			
E310	SCHEDULES & CALCULATIONS	X			
E311	SCHEDULES & CALCULATIONS	X			
E401	GROUNDING DETAILS	X			
E402	GROUNDING DETAILS	X			
E403	ELECTRICAL DETAILS	X			
E404	ELECTRICAL DETAILS	X			
E500	LABELS & SIGNAGE	X			
E501	LABELS & SIGNAGE	X			
E600	EQUIPMENT DATA SHEETS	X			
E601	EQUIPMENT DATA SHEETS	X			
STRUCTURAL					
S1 - NORTH	SOLAR CARPORT SITE PLAN	X			
S2 - NORTH	SOLAR CARPORT SITE PLAN	X			
S3 - NORTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S4 - NORTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S5 - NORTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S6 - NORTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S7 - NORTH	CARPORT #1 SECTIONS & DETAILS	X			

DRAWING INDEX:

		ISSUE FOR PERMIT 09/26/2022			
STRUCTURAL					
S8 - NORTH	CARPORT #2 SECTIONS & DETAILS	X			
S9 - NORTH	CARPORT #2 & #4 FRAME PROFILES	X			
S10 - NORTH	CARPORT #3 SECTIONS & DETAILS	X			
S11 - NORTH	CARPORT #4 SECTIONS & DETAILS	X			
S12 - NORTH	ICE RAIL/GUTTER SECTION & DETAILS	X			
S1 - SOUTH	SOLAR CARPORT SITE PLAN	X			
S2 - SOUTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S3 - SOUTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S4 - SOUTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S5 - SOUTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S6 - SOUTH	SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS	X			
S7 - SOUTH	SECTIONS & DETAILS	X			
S8 - SOUTH	ICE RAIL/GUTTER SECTION & DETAILS	X			
FOUNDATION					
1	NORTH CANOPY FOUNDATION DETAILS	X			
2	SOUTH CANOPY FOUNDATION DETAILS	X			
3	EQUIPMENT PLATFORM NORTH - FOUNDATION DETAILS	X			
4	EQUIPMENT PLATFORM SOUTH - FOUNDATION DETAILS	X			
5	EQUIPMENT PLATFORM BESS - FOUNDATION DETAILS	X			

SOLSYSTEMS
SCS VAN WYCK
CORE DEVELOPMENT GROUP
860 WYCKOFF AVE, SUITE 200
MAHWAH, NJ 07430
201.825.2195
WWW.COREDEVUSA.COM

CROTON-HARMON
METRO NORTH STATION
4 VETERANS PLAZA
CROTON-ON-HUDSON,
NY 10520

REV	DATE	DESCRIPTION
1	10/7/22	PERMIT SET

Designed	AS NOTED
Drawn:	AS NOTED
Reviewed:	AS NOTED
Scale:	AS NOTED
Project No.	N/A
Date:	10/7/2022

Title:
COVER SHEET

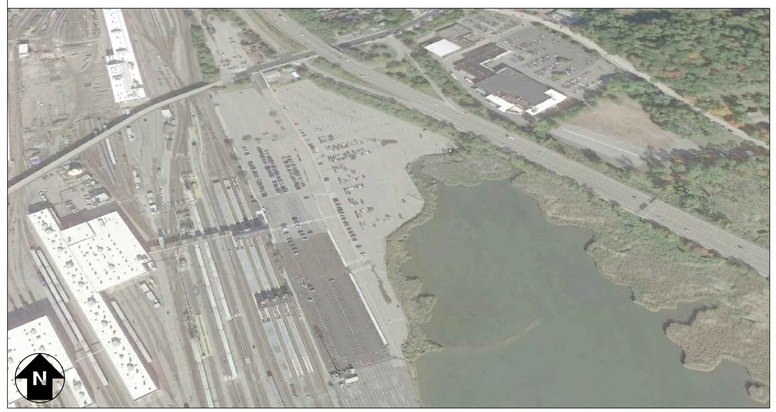
Sheet No.
CS001

PLOT DATE: 9/26/2022 2:41 PM

BESS + SOLAR CARPORT SYSTEM AT
CROTON–HARMON
4 VETERANS PLAZA, CROTON–ON–HUDSON, NEW YORK 10520



LOCATION MAP
SCALE: 1" = 5000'



BIRDS–EYE VIEW FROM SOUTH
SCALE: 1" = 150'



SYSTEM PLAN
SCALE: 1" = 300'

DEVELOPER:

SOLSYSTEMS

1101 CONNECTICUT AVE NW
WASHINGTON, DC 20036

EPC:

CORE DEVELOPMENT GROUP

860 WYCKOFF AVENUE, SUITE 200
MAHWAH, NEW JERSEY 07430

ENGINEERED BY:

PUREPOWER ENGINEERING

111 RIVER STREET, SUITE 1110
HOBOKEN, NEW JERSEY, 07030

BESS SUMMARY:

TOTAL AC SYSTEM SIZE:	3,750.00 kWAC
TOTAL ENERGY:	15,000.00 kWh–AC
INVERTER MANUFACTURER:	POWER ELECTRONICS
(QTY) INVERTER TYPE 1:	PCSK FP4390K2
BESS MANUFACTURER:	POWIN ENERGY
(QTY) BESS MODEL:	(52) STACK360 E
(QTY) BESS ENCLOSURE:	(4) 53' ISO CONTAINERS

PV SYSTEM SUMMARY:

TOTAL DC SYSTEM SIZE:	4,225.65 kWDC
TOTAL AC SYSTEM SIZE:	3,240.00 kWAC
MODULE MANUFACTURER:	HT–SAAE
(QTY) MODULE TYPE 1:	(7,683) HT72–18X 550W
MODULE TILT:	3°
MODULE AZIMUTH:	159° & 249°
INVERTER MANUFACTURER:	SOLAREDGE TECHNOLOGIES
(QTY) INVERTER TYPE 1:	(27) SE120KUS
OPTIMIZER MANUFACTURER:	SOLAREDGE TECHNOLOGIES
(QTY) OPTIMIZER TYPE 1:	(3,842) P1100

SCOPE OF WORK SUMMARY

BATTERY ENERGY STORAGE SYSTEM (BESS):
- INSTALL BESS INVERTER(S), BATTERIES, AND ELECTRICAL DISTRIBUTION EQUIPMENT.
- INTERCONNECT AT NEW ELECTRICAL DISTRIBUTION EQUIPMENT.

CARPORT PV ARRAY:
- INSTALL SOLAR MODULES AND CARPORT STRUCTURE AT EXISTING PARKING LOT.
- INSTALL INVERTERS AND ELECTRICAL DISTRIBUTION EQUIPMENT.
- INTERCONNECT AT NEW ELECTRICAL DISTRIBUTION EQUIPMENT.

DRAWING INDEX

		50% DESIGN DEVELOPMENT 04/22/2022	90% DESIGN DEVELOPMENT 08/12/2022	ISSUE FOR PERMIT 09/26/2022		
GENERAL						
G001	TITLE SHEET	●	●	●		
G100	SITE PLAN	●	●	●		
G200	PARTIAL ARRAY PLAN	●	●	○		
G201	PARTIAL ARRAY PLAN	●	●	○		
ELECTRICAL						
E001	ELECTRICAL NOTES & SYMBOLS LIST	●	●	○		
E002	ELECTRICAL NOTES & SYMBOLS LIST	●	●	○		
E100	OVERALL AC ELECTRICAL PLAN	●	●	○		
E101	BESS YARD ELECTRICAL PLAN	●	●	●		
E110	BESS YARD EQUIPMENT PAD PLANS		●	○		
E111	BESS YARD EQUIPMENT PAD PLANS		●	○		
E115	PV EQUIPMENT PAD PLANS	●	●	○		
E150	PARTIAL PHOTOMETRICS PLAN		●	○		
E151	PARTIAL PHOTOMETRICS PLAN		●	○		
E152	PARTIAL LIGHTING PLAN		●	○		
E153	PARTIAL LIGHTING PLAN		●	○		
E200	PARTIAL DC ELECTRICAL PLAN		●	●		
E201	PARTIAL DC ELECTRICAL PLAN		●	●		
E202	PARTIAL DC ELECTRICAL PLAN		●	●		
E300	ONE LINE DIAGRAM – MEDIUM VOLTAGE	●	●	●		
E301	ONE LINE DIAGRAM – BATTERY STORAGE SYSTEM	●	●	○		
E302	ONE LINE DIAGRAM – PV SYSTEM	●	●	●		
E303	THREE LINE DIAGRAM – MEDIUM VOLTAGE	●	●	●		
E304	THREE LINE DIAGRAM – BATTERY STORAGE SYSTEM	●	●	○		
E305	THREE LINE DIAGRAM – PV SYSTEM A	●	●	○		
E306	THREE LINE DIAGRAM – PV SYSTEM B	●	●	○		
E307	RELAY/INVERTER SETTINGS	●	●	○		
E310	SCHEDULES & CALCULATIONS	●	●	○		
E311	SCHEDULES & CALCULATIONS		●	●		
E401	GROUNDING DETAILS	●	●	●		
E402	GROUNDING DETAILS	●	●	●		
E403	ELECTRICAL DETAILS	●	●	●		
E404	ELECTRICAL DETAILS	●	●	●		
E500	LABELS & SIGNAGE	●	●	●		
E501	LABELS & SIGNAGE	●	●	○		
E600	EQUIPMENT DATA SHEETS	●	●	○		
E601	EQUIPMENT DATA SHEETS	●	○	○		
STRUCTURAL						
S100	EQUIPMENT RACK DESIGN					

LEGEND:

UPDATED DRAWING ISSUED	●
UNCHANGED, PREVIOUSLY ISSUED DRAWING STILL CURRENT	○
DRAWING REMOVED FROM SET	×

DRAWING TITLE	DRAWING #
TITLE SHEET	G001

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
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PUREPOWER ENGINEERING
111 RIVER STREET, HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

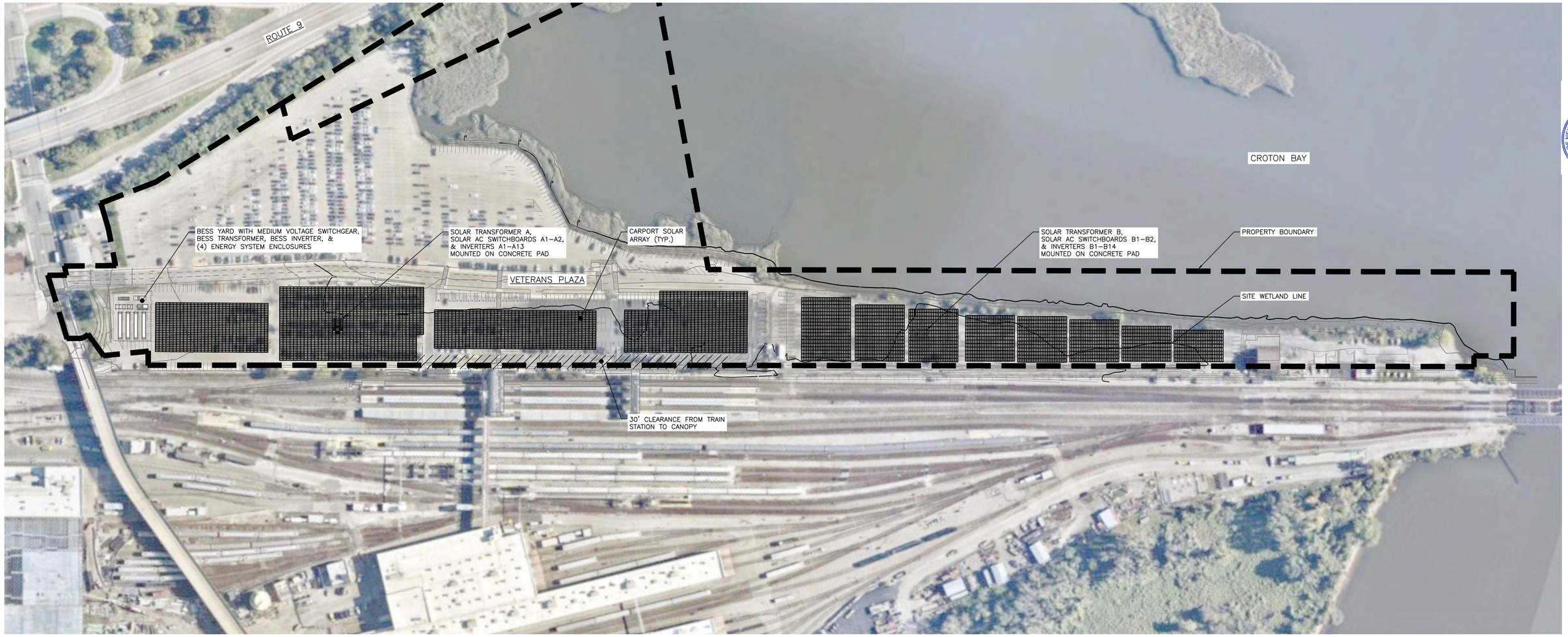
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PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT–SAAE HT72–18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON–HARMON
4 VETERANS PLAZA
CROTON–ON–HUDSON, NY 10520

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



1 G100 SITE PLAN
SCALE: 1" = 100'

DRAWING TITLE	DRAWING #
SITE PLAN	G100

PROJECT
BESS + SOLAR CARPORT SYSTEM AT
CROTON–HARMON
4 VETERANS PLAZA
CROTON–ON–HUDSON, NY 10520

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MODULE QUANTITY: 7,683
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PAGE SIZE 36" x 24"
PROJECT # 04001

EPC
CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

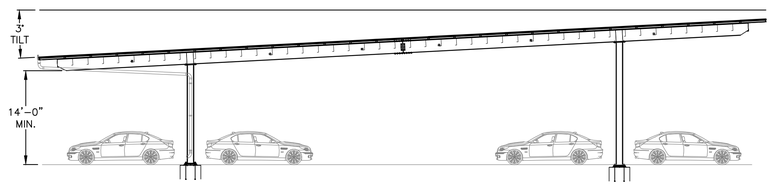
PURE POWER ENGINEERING
111 WATER STREET NEWBURGH, NY
WWW.PUREPOWER.COM
RICHARD A. WINS
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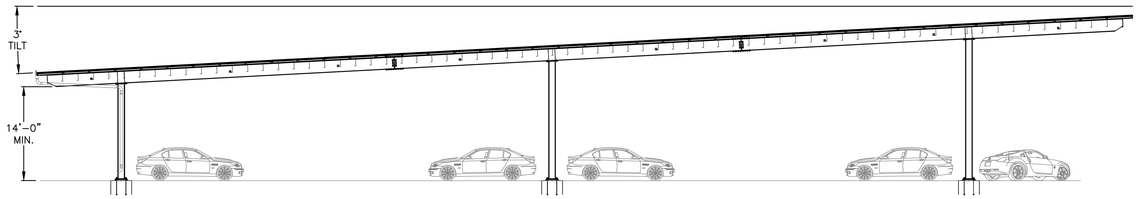
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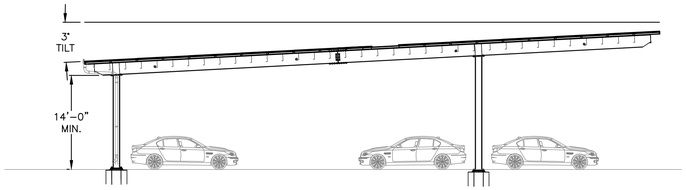
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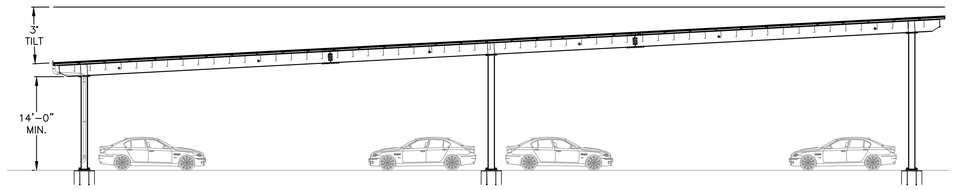
2 G200 RACKING DETAIL



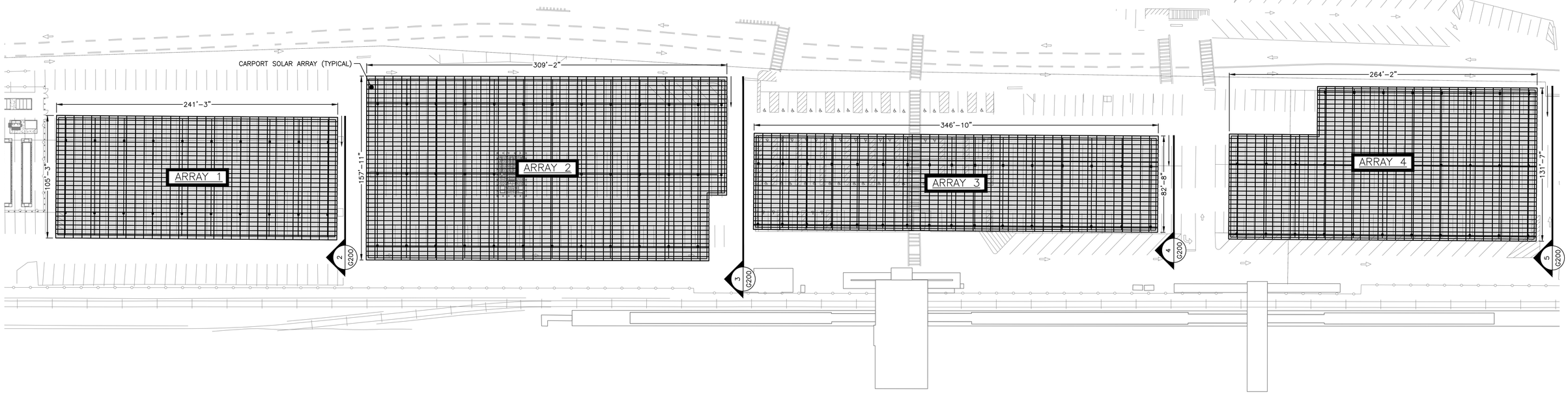
3 G200 RACKING DETAIL
SCALE: NONE



4 G200 RACKING DETAIL



5 G200 RACKING DETAIL
SCALE: NONE



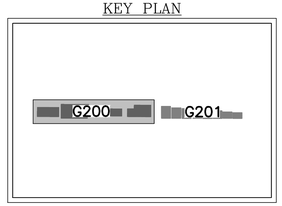
PV ARRAY SUMMARY					
ARRAY	ORIENTATION	TILT	AZIMUTH	MODULE QTY	DC SIZE (kW)
1	LANDSCAPE	3°	249°	896	492.80
2	LANDSCAPE	3°	249°	1692	930.60
3	LANDSCAPE	3°	249°	1012	556.60
4	LANDSCAPE	3°	249°	1115	613.25

IMPORTANT:
DO NOT STEP OR KNEEL ON PV MODULES

IMPORTANT:
VERIFY DIMENSIONS WITH RACKING DRAWINGS

1 G200 PARTIAL ARRAY PLAN
SCALE: 1" = 40'

KEY PLAN



NOTES:
1. DIMENSIONS ARE APPROXIMATE AND SHOWN TO MODULES.
2. REFER TO RACKING DRAWINGS FOR MORE DETAILS.

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860 WYCKOFF AVENUE, SUITE 200
MAHWAH, NJ 07430
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PAGE SIZE: 36" x 24"
PROJECT # 04001

PV DC SYSTEM SIZE: 4,225.65 kW
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MODULE TYPE: HT-SAEE HT72-18X 550W
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ORIENTATION: 3° TILT, 159° & 249° AZI

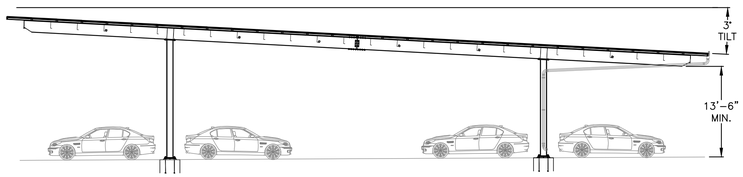
PROJECT
BESS + SOLAR CARPORT SYSTEM AT
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DRAWING TITLE
PARTIAL ARRAY PLAN

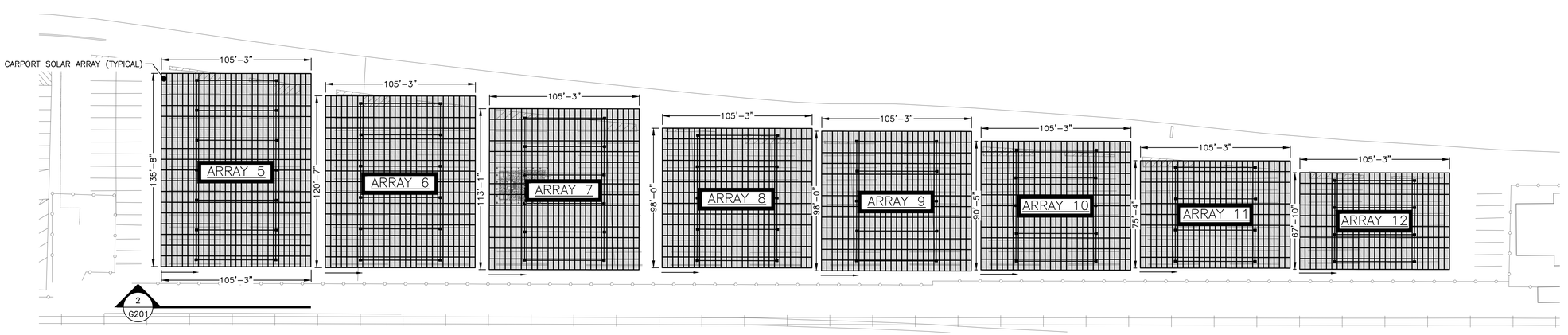
DRAWING #
G200

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:41 PM



2 G201 RACKING DETAIL
SCALE: NONE



PV ARRAY SUMMARY					
ARRAY	ORIENTATION	TILT	AZIMUTH	MODULE QTY	DC SIZE (kW)
5	LANDSCAPE	3°	159°	504	277.20
6	LANDSCAPE	3°	159°	448	246.40
7	LANDSCAPE	3°	159°	420	231.00
8	LANDSCAPE	3°	159°	364	200.20
9	LANDSCAPE	3°	159°	364	200.20
10	LANDSCAPE	3°	159°	336	184.80
11	LANDSCAPE	3°	159°	280	154.00
12	LANDSCAPE	3°	159°	252	138.60

IMPORTANT:
DO NOT STEP OR KNEEL ON PV MODULES

IMPORTANT:
VERIFY DIMENSIONS WITH RACKING DRAWINGS

1 G201 PARTIAL ARRAY PLAN
SCALE: 1" = 40'

KEY PLAN



NOTES:
1. DIMENSIONS ARE APPROXIMATE AND SHOWN TO MODULES.
2. REFER TO RACKING DRAWINGS FOR MORE DETAILS.

DRAWING TITLE
PARTIAL ARRAY PLAN

DRAWING #
G201

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BESS + SOLAR CARPORT SYSTEM AT
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PLOT DATE: 9/29/2022 2:41 PM

ELECTRICAL NOTES

1. GENERAL
 1.A. ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) TO APPLICABLE UL STANDARDS. THE CONTRACTOR SHALL PROCURE ALL NECESSARY CERTIFICATIONS FOR ALL WORK INSTALLED, PAY ALL FEES AND CHARGES CONNECTED THEREWITH AND DELIVER ALL CERTIFICATES AND INSPECTION APPROVALS TO THE OWNER THROUGH THE ENGINEER, BEFORE WORK WILL BE FINALLY ACCEPTED.
 1.B. ALL INVERTERS SHALL BE IEEE 1547 COMPLIANT AND SHALL BE INSPECTED BY LOCAL UTILITY BEFORE COMMISSIONING, TESTING AND OPERATION OF THE SYSTEM.
 1.C. UNLESS OTHERWISE NOTED, NEW EQUIPMENT SHALL HAVE AN INTERRUPT RATING (kAIC) OR SHORT CIRCUIT CURRENT RATING (SCCR) GREATER THAN OR EQUAL TO THE EXISTING EQUIPMENT.

2. MANNER OF INSTALLATION
 2.A. ALL WORK SHALL BE INSTALLED IN A FIRST CLASS, NEAT AND WORKMANLIKE MANNER BY MECHANICS SKILLED IN THE TRADE INVOLVED. ALL DETAILS OF THE INSTALLATION SHALL BE MECHANICALLY AND ELECTRICALLY CORRECT.
 2.B. TORQUE AND MARK ALL RACKING AND MECHANICAL LUGS.

3. CONDUCTORS AND CONDUCTOR INSTALLATION
 3.A. WHERE POSSIBLE, ALUMINUM CABLE TERMINATIONS SHALL BE MADE WITH COMPRESSION LUGS OR MECHANICAL LUGS WITH COMPRESSION PIN ADAPTORS. REQUEST CLIENT APPROVAL FOR ALTERNATIVES.
 3.B. IF ALUMINUM MC CABLE IS USED, THHN/THWN-2 INSULATION IS ACCEPTABLE. FOR ALUMINUM CONDUCTORS, XHHW-2 SHALL BE USED.
 3.C. ANTI-OXIDANT COMPOUND SHALL BE USED WITH ALL ALUMINUM LUGS. CLEAN OXIDATION FROM WIRE STRANDS WITH STEEL WIRE BRUSH PRIOR TO APPLICATION OF COMPOUND.
 3.D. PV SYSTEM CONDUCTORS SHALL BE MARKED AND IDENTIFIED PER NEC 690.31(B).
 3.E. INSTALL WIRE AND CABLE IN ACCORDANCE WITH THE NEC AND AS HEREINAFTER SPECIFIED. USE THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION'S "STANDARD OF INSTALLATION", THE MANUFACTURER'S WRITTEN INSTRUCTIONS, UNLESS SUPERSEDED BY THESE SPECIFICATIONS. IN ALL CASES THE INSTALLATION SHALL BE IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES.
 3.F. THE USE OF WIRE SPLICES AT ANY POINT IN THE INSTALLATION IS STRICTLY PROHIBITED
 3.G. THE USE OF WIRE LUBE IS REQUIRED FOR ALL WIRE PULLS THROUGH CONDUIT RUNS OF 20' OR LONGER, OR WITH BENDS IN 180° OR MORE. WIRE LUBE IS REQUIRED EVEN WHEN USING SELF LUBRICATING CABLES SUCH AS SOUTHWIRE 'SIMPULL'.
 3.H. STRING WIRING & HOMERUNS SHALL BE SECURED TO UNDERSIDE OF THE RACKING & MODULES USING SUNBUNDLERS OR EQUIVALENT APPROVED BY EEOR. TRANSITION TO EMT OUTSIDE OF ARRAY. NEGATIVE HOMERUN SHALL BE RUN PARALLEL TO POSITIVE HOMERUN.
 3.I. ALL PV SOURCE CIRCUITS WHICH WOULD BE EXPOSED TO PHYSICAL DAMAGE SHALL BE PROTECTED IN CONDUIT OR CABLE TRAY.
 3.J. ALL PV SOURCE CIRCUITS WITH DIRECT EXPOSURE TO SUNLIGHT SHALL BE PROTECTED THROUGH THE USE OF CONDUIT, PROTECTIVE WRAP, SPLIT LOOM, OR EQUIVALENT, WHICH ARE DURABLE FOR THE ENVIRONMENT AND RATED FOR THE APPLICATION.
 3.K. ALL PLUG AND SOCKET CONNECTORS MATED TOGETHER SHALL BE OF THE SAME TYPE AND OF THE SAME MANUFACTURER. "COMPATIBLE" CONNECTORS SHALL NOT BE ACCEPTED (IEC 62446-1).
 3.L. ALL FIELD-MADE PLUG & SOCKET CONNECTORS SHALL BE INSTALLED USING MANUFACTURER APPROVED TOOLS AND METHODS, AND CABLE GLANDS SHALL BE TIGHTENED TO MANUFACTURER'S SPECIFIED TORQUE VALUE.
 3.M. ALL CONDUCTORS AND CABLES RATED OVER 1000V SHALL NOT BE BENT AT RADIUS LESS THAN 12X THEIR DIAMETER, OR AS SPECIFIED BY DATASHEET.

4. PHASE RELATIONSHIP
 4.A. CONNECT FEEDERS TO MAINTAIN PHASE RELATIONSHIP THROUGH SYSTEM. PHASE LEGS OF FEEDERS SHALL MATCH BUS OR CABLE ARRANGEMENTS IN EQUIPMENT TO WHICH THE FEEDERS ARE CONNECTED. COLOR CODING SHALL BE AS FOLLOWS:

 208/120 VAC
 A PHASE: BLACK, B PHASE: RED, C PHASE: BLUE

 277/480 VAC OR 346/600 VAC
 A PHASE: BROWN, B PHASE; ORANGE, C PHASE: YELLOW

 1500 VDC, 1000 VDC, OR 600 VDC
 UNGROUNDED POSITIVE CONDUCTOR: RED
 UNGROUNDED NEGATIVE CONDUCTOR: BLACK

 AC AND DC SYSTEMS:
 GROUNDED CONDUCTOR: WHITE
 GROUND: GREEN

 4.B. GROUNDED CONDUCTORS (NEUTRAL) AND EQUIPMENT GROUNDING CONDUCTORS SMALLER THAN #4 MUST HAVE COLOR CODED INSULATION. WHERE COLOR CODED CABLE IS NOT USED, TAPE CONDUCTOR WITH OVERLAPPED COLORED TAPE FOR A MINIMUM OF 6" IN ACCESSIBLE LOCATIONS. COLOR CODING MUST BE USED CONSISTENTLY FOR THE ENTIRE PROJECT.

5. CONDUITS AND RACEWAYS
 5.A. PROVIDE RACEWAYS MINIMUM SIZE 3/4".
 5.B. CONDUITS SHALL BE EMT WHERE NOT SUBJECT TO PHYSICAL DAMAGE. CONDUITS SHALL BE IMC OR RMC WHERE SUBJECT TO PHYSICAL DAMAGE. PVC CONDUITS ONLY PERMITTED IN BELOW GRADE DUCT BANKS.
 5.C. DRAWINGS SHOW RACEWAY LOCATIONS DIAGRAMMATICALLY. CONTRACTOR SHALL ADJUST ROUTING TO SUIT FIELD LOCATIONS. ANY CHANGES TO PROPOSED ROUTING SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL.
 5.D. FURNISH AND INSTALL ALL FITTINGS AND SPECIAL DEVICES NECESSARY FOR THE PROPER INSTALLATION, CONNECTION AND OPERATION OF THE SYSTEM. CONDUIT ELBOWS SHALL BE OF THE SAME MAKE, QUALITY AND FINISH AS THE CONDUIT USED.
 5.E. A PROTECTIVE COATING OF ASPHALT COMPOUND, PLASTIC SHEATH, OR OTHER EQUIVALENT PROTECTION SHALL BE APPLIED TO ANY GALVANIZED STEEL CONDUITS DIRECTLY BURIED IN EARTH.
 5.F. EMT CONDUIT SHALL USE COMPRESSION RAINTIGHT CONNECTORS, FACTORY STAMPED RAINTIGHT WITH COMPONENTS PROPERLY INSTALLED.
 5.G. PROVIDE EXPANSION FITTINGS WITH BONDING JUMPERS FOR EVERY 100' OF STRAIGHT METAL CONDUIT RUN.
 5.H. CONDUIT EXPANSION AND DEFLECTION FITTINGS WITH BONDING JUMPERS SHALL BE USED WHENEVER CROSSING BUILDING EXPANSION AND SEISMIC SEPARATION JOINTS.
 5.I. LEAVE WIRE SUFFICIENTLY LONG TO PERMIT MAKING FINAL CONNECTIONS. ALL EMPTY CONDUITS OVER 10' IN LENGTH SHALL BE PROVIDED WITH SYNTHETIC FIBER ROPE PULL WIRE.
 5.J. PATCH AND REPAIR ALL SURFACES DAMAGED BY TRENCHING TO MATCH THE PREVIOUSLY EXISTING CONDITIONS.
 5.K. ALL PENETRATIONS SHALL BE SEALED TO MAINTAIN THE EXISTING FIRE RATING.
 5.L. ALL ROOFTOP CONDUITS SHALL BE MARKED PER LOCAL FIRE CODES.
 5.M. ALL CONDUITS ENTERING ENCLOSURES SHALL BE FITTED WITH PROTECTIVE BUSHINGS, INCLUDING CONDUIT WITH CONDUCTOR SIZES SMALLER THAN #4 AWG. METALLIC CONDUIT/BUSHINGS SHALL BE BONDED PER NEC.
 5.N. ALL CONDUIT ENTERING ENCLOSURES SHALL BE SEALED WITH AN APPROVED SEALANT.

6. ELECTRICAL ENCLOSURES
 6.A. ALL OUTDOOR ENCLOSURES (PANELBOARDS, DISCONNECT SWITCHES, JUNCTION BOXES, COMBINER BOXES, ETC.) SHALL BE NEMA 3R, 4, OR 4X. INDOOR ENCLOSURES SHALL BE NEMA 1.
 6.B. PANELBOARD DOORS SHALL BE QUARTER TURN LATCHES OR EXTERNAL HANDLE WITH INTERNAL LATCHES, NO SETS OF EXTERNAL SCREW DOWN CLAMPS.
 6.C. CONDUIT TERMINATING IN OUTDOOR ENCLOSURES SHALL USE MYERS-TYPE HUBS WITH GROUND SCREW. UTILIZE RAINTIGHT FITTINGS FOR ALL CABLE ENTRIES.
 6.D. NO PENETRATIONS OR CABLE ENTRIES IN THE TOP OF OUTDOOR ENCLOSURES. ENTER OUTDOOR ENCLOSURES FROM THE BOTTOM (PREFERRED) OR SIDE.
 6.E. ALL ELECTRICAL EQUIPMENT SHALL BE LISTED OR LABELED BY A RECOGNIZED TESTING AGENCY.
 6.F. ARC FLASH HAZARD WARNING LABELS SHALL BE PROVIDED AND MOUNTED ON EVERY COMBINER BOX, TERMINAL BOX, INVERTER, AC AND DC SWITCH, PANELBOARD, TRANSFORMER, AND SWITCHGEAR.
 6.G. HAND HOLES, PULL BOXES, OR CONDUIT BODIES SHALL BE INSTALLED (WHETHER OR NOT SHOWN ON DRAWINGS) WHEN THE RACEWAY HAS MORE THAN 360° OF BENDS, OR AS NECESSARY TO NOT EXCEED MANUFACTURER'S MAXIMUM CABLE PULLING TENSION.
 6.H. SWITCHBOARDS AND SWITCHGEARS SHALL BE PROVIDED WITH TEMPORARY INTERNAL HEATERS DURING LONG TERM STORAGE WHILE NOT ENERGIZED AS REQUIRED BY THE MANUFACTURER. ALL OTHER EQUIPMENT SHALL BE STORED IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS.

7. GROUNDING
 7.A. THE CONTRACTOR SHALL FURNISH AND INSTALL GROUNDING NECESSARY IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

8. TESTS
 8.A. FINAL TESTS AND INSPECTION SHALL BE HELD IN THE PRESENCE OF OWNER'S REPRESENTATIVES AND TO THEIR SATISFACTION.
 8.B. MEGGER TEST ALL DC STRING WIRING, DC COMBINER BOX OUTPUT FEEDERS, AND AC FEEDERS. SUBMIT RESULTS TO OWNER FOR REVIEW.
 8.C. HI-POT TEST ALL MEDIUM VOLTAGE FEEDERS IN ACCORDANCE WITH CABLE MANUFACTURER INSTRUCTIONS.
 8.D. IV CURVE TRACES OF STRINGS SHALL BE GENERATED USING THE SOLMETRIC PV ANALYZER (OR EQUIVALENT DEVICE) AND SUBMITTED TO OWNER FOR APPROVAL.
 8.E. OPEN-CIRCUIT VOLTAGE (Voc) MEASUREMENTS OF ALL DC STRING CONDUCTORS.
 8.F. GROUND FAULT PROTECTION SYSTEMS SHALL BE FUNCTIONAL TESTED IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS (NEC 230.95(C))
 8.G. MEDIUM VOLTAGE EQUIPMENT SHALL BE TESTED IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS.

GENERAL NOTES

1. THE GENERAL NOTES APPLY TO ALL DRAWINGS UNDER THE CONTRACT. REFER TO INDIVIDUAL DRAWINGS FOR ADDITIONAL NOTES.
2. DRAWINGS ARE DIAGRAMS AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWINGS IN LAYING OUT OF WORK AND CHECK DRAWINGS OF OTHER TRADES TO VERIFY SPACE CONDITIONS. MAINTAIN HEADROOM, SPACE CONDITIONS, AND REQUIRED CLEARANCES.
3. PV SYSTEM CONTRACTOR SHALL COORDINATE ALL THE WORK WITH THE ENGINEER, THE CONSTRUCTION MANAGER AND ALL OTHER CONTRACTORS TO INSURE THAT THE PV SYSTEM IS INSTALLED AS SPECIFIED IN THESE DRAWINGS.
4. PERSONAL PROTECTIVE EQUIPMENT (PPE) SHALL BE PROVIDED AS REQUIRED IN ACCORDANCE WITH NEC 70E AND OSHA REQUIREMENTS.
5. UNFORSEEN OBSTRUCTIONS ON THE SITE MAY NECESSITATE A CHANGE IN THE LAYOUT. ANY CHANGES TO THE RACKING LAYOUT SHOULD BE REPORTED TO THE ENGINEER. CHANGES IN UP TO 5% OF THE MODULES SHOULD BE ANTICIPATED. CHANGES TO THE ARRAY LAYOUT SHOULD BE MADE AS TO NOT IMPACT THE NUMBER OF MODULES ON A COMBINER BOX OR INVERTER.
6. LANDSCAPING: RESTORE TO ORIGINAL CONDITIONS.
7. ALL STRUCTURAL AND MISCELLANEOUS EXTERIOR STEEL, INCLUDING STRUT CHANNEL (SUCH AS UNISTUT OR KINDORF) SHALL BE CORROSION RESISTANT, HOT DIP GALVANIZED OR GALVANNEALED WITH A COATED FINISH MINIMUM.

LEGEND – GENERAL

	LIGHT LINE INDICATES EXISTING OR BEYOND THE SCOPE OF PROJECT
	DARK LINE INDICATES NEW OR WITHIN THE SCOPE OF PROJECT
	DASHED LINE INDICATES EQUIPMENT AT A DIFFERENT ELEVATION
EXISTING TEXT	LIGHT TEXT INDICATES EXISTING OR BEYOND THE SCOPE OF PROJECT
NEW TEXT	DARK TEXT INDICATES NEW OR WITHIN THE SCOPE OF PROJECT

LEGEND – PLAN SYMBOLS

	SOLAR MODULE
	RACEWAY TURNING UP OR TOWARDS OBSERVER
	RACEWAY TURNING DOWN OR AWAY FROM OBSERVER
	CABLE TRAY
P OR P	PULLBOX
J OR J	JUNCTION BOX
	PANEL BOARD
	LOCAL DISCONNECT SWITCH
	SIMPLEX RECEPTACLE, RATED: 125-VOLTS AC, 20A
	DUPLEX RECEPTACLE, RATED: 125-VOLTS AC, 20A
W	WEATHERPROOF DUPLEX RECEPTACLE, RATED: 125-VOLTS AC, 20A
GFCI	GROUND FAULT CIRCUIT INTERRUPTER DUPLEX RECEPTACLE, RATED: 125-VOLTS AC, 20A
	DOUBLE DUPLEX (QUAD) RECEPTACLE
	CEILING/PENDANT-MOUNT LIGHT, SEE FIXTURE SCHEDULE FOR TYPE
	WALL-MOUNT LIGHT, SEE FIXTURE SCHEDULE FOR TYPE
	GROUND ROD
	GROUND ROD W/ TEST WELL

LEGEND – ONE LINE DIAGRAM AND WIRING DIAGRAM SYMBOLS

	CIRCUIT BREAKER, FRAME SIZE AND TRIP SETTING AS NOTED
	DISCONNECT SWITCH
	INVERTER
	BUS CONNECTION POINT
	CROSSING POINT (NO CONNECTION)
	NORMALLY CLOSED – NORMALLY OPEN CONTACTS
	TRANSFORMER CONTROL/POWER, SIZE AND RATING AS NOTED
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	FUSE, SIZE/RATING AS NOTED
	FUSED DISCONNECT SWITCH
	EARTH GROUND
NC NO	PUSHBUTTON SWITCHES; NUMBER AND TYPE OF CONTACT BLOCKS MAY VARY
NC NO	PUSHBUTTON SWITCHES MUSHROOM HEAD; NUMBER AND TYPE OF CONTACT BLOCKS MAY VARY
K	KEYED INTERLOCK (KIRK KEY OR EQ.)
ST	SHUNT TRIP COIL

ABBREVIATIONS

A	AMPERES
AERMS	ARC ENERGY REDUCING MAINTENANCE SWITCH
AF	AMPERE FRAME
A.F.F.	ABOVE FINISH FLOOR
A.F.G.	ABOVE FINISH GRADE
AFDI	ARC FAULT DETECTION & INTERRUPTER
AIC	AMPS INTERRUPTING CAPACITY
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BESS	BATTERY ENERGY STORAGE SYSTEM
BKR	CIRCUIT BREAKER
C	CONDUIT
CB	COMBINER BOX
CKT	CIRCUIT
COU	CONDITIONS OF USE
CP	CONTROL PANEL
CT	CURRENT TRANSFORMER
CU	COPPER
DISC	DISCONNECT
EGC	EQUIPMENT GROUNDING CONDUCTOR
ELEC	ELECTRIC, ELECTRICAL
EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ESE	ENERGY STORAGE ENCLOSURE
EQUIP	EQUIPMENT
EXIST	EXISTING
G, GND	GROUND
GEC	GROUNDING ELECTRODE CONDUCTOR
GFCI	GROUND-FAULT CIRCUIT INTERRUPTER
GFPE	GROUND-FAULT PROTECTION OF EQUIPMENT
HID	HIGH-INTENSITY DISCHARGE (LIGHTING)
HZ	HERTZ
IMC	INTERMEDIATE METALLIC CONDUIT
kAIC	1000 AMPS INTERRUPT CAPACITY
kCMIL	1000 CIRCULAR MILLS
kVA	KILO-VOLT AMPERE
kW	KILOWATT
LA	LIGHTNING & SURGE ARRESTOR
LED	LIGHT-EMITTING DIODE
LSIG	LONG, SHORT, INSTANTANEOUS, & GROUND FAULT
LTG	LIGHTING
MAX	MAXIMUM
MFG	MANUFACTURER
MLO	MAIN LUGS ONLY
MLPE	MODULE LEVEL POWER ELECTRONICS
MPPT	MAXIMUM POWER POINT TRACKING
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NTS	NOT TO SCALE
P	POLE
PF	POWER FACTOR
PLC	PROGRAMMABLE LOGIC CONTROLLER
POA	PLANE OF ARRAY
POI	POINT OF INTERCONNECTION
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
PWR	POWER
RAC	RIGID ALUMINUM CONDUIT
RCPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL CONDUIT
RMC	RIGID METAL CONDUIT
SA	SURGE ARRESTOR
SEC	SECONDARY
SPD	SURGE PROTECTION DEVICE
SSBJ	SUPPLY SIDE BONDING JUMPER
ST	SHUNT TRIP
STP	SHIELDED TWISTED PAIR
SW	SWITCH
TBD	TO BE DETERMINED
TP	TWISTED PAIR
TYP	TYPICAL
V	VOLT
VA	VOLT-AMPERE
W	WATT
WR	WEATHER RESISTANT
XFMR	TRANSFORMER
ø	DIAMETER OR PHASE

NOTES SPECIFIC TO NEW YORK

ADOPTED NEC VERSION: 2017
ADOPTED IBC VERSION: 2018
ADOPTED IFC VERSION: 2018

UTILITY: CON-EDISON

UTILITY DISCONNECT SWITCH REQUIREMENTS:
GENERATING EQUIPMENT WITH SYSTEM SIZE LARGER THAN 25 KW SHALL BE CAPABLE OF BEING ISOLATED FROM THE UTILITY SYSTEM BY MEANS OF AN EXTERNAL, MANUAL, VISIBLE, GANG-OPERATED, LOAD BREAK DISCONNECTING SWITCH. THE DISCONNECT SWITCH SHALL BE LOCATED WITHIN 10 FEET OF THE UTILITY'S EXTERNAL ELECTRIC SERVICE METER. DISCONNECT SWITCHES MUST BE VISIBLE, LOAD BREAK, GANG-OPERATED AND MUST BE LOCKABLE IN BOTH THE OPEN AND CLOSED POSITIONS WITH A STANDARD COMPANY PADLOCK. THE DISCONNECT SWITCH MUST BE KEY INTERLOCKED WITH ITS ASSOCIATED CIRCUIT BREAKER. THE DISCONNECT SWITCH MUST BE LOCKABLE IN THE OPEN POSITION WITH A STANDARD UTILITY PADLOCK WITH A 3/8" SHANK.

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PUREPOWER ENGINEERING
111 RIVER STREET HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE SUITE 200
WWW.COREDEVUSA.COM

EPC

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAAE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: ELECTRICAL NOTES & SYMBOLS LIST

DRAWING #: E001

RULER IN INCHES: 0 1/4 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:41 PM

BATTERY ENERGY STORAGE SYSTEM (BESS) NOTES

1. ESS SHALL BE LISTED IN ACCORDANCE WITH UL 9540, UNLESS SPECIFICALLY EXEMPTED IN NFPA 855.
2. A PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ESS POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ENERGY SOURCES CAPABLE OF BEING INTERCONNECTED.
3. ESS SHALL BE LOCATED OR PROTECTED TO PREVENT PHYSICAL DAMAGE FROM IMPACT WHERE SUCH RISKS ARE IDENTIFIED.
4. ESS SHALL BE SECURED AGAINST UNAUTHORIZED ENTRY AND SAFEGUARDED IN AN APPROVED MANNER.
5. CLEARANCES AROUND OUTDOOR ESS HOUSINGS SHALL COMPLY WITH NFPA 855 SECTION 4.4.3.3.
6. ESS INSTALLED OUTDOORS ON EXTERIOR WALLS OF BUILDINGS SHALL COMPLY WITH NFPA 855 SECTION 4.4.3.10
7. ROOFTOP AND OPEN PARKING GARAGE ESS INSTALLATIONS SHALL COMPLY WITH NFPA 855 SECTION 4.4.4.
8. ESS AND ASSOCIATED EQUIPMENT THAT ARE LOCATED ON ROOFTOPS AND NOT ENCLOSED BY BUILDING CONSTRUCTION SHALL COMPLY WITH NFPA 855 SECTION 4.4.4.4.2(1)–(9)
9. ESS AND ASSOCIATED EQUIPMENT THAT ARE LOCATED IN OPEN PARKING GARAGES SHALL COMPLY WITH NFPA 855 SECTION 4.4.4.5(1)–(5)
10. ESS LOCATED IN WALK–IN ENCLOSURES ON ROOFTOPS, IN OPEN PARKING GARAGES, IN AREAS CONTAINING ESS OTHER THAN WALK–IN UNITS IN OPEN PARKING STRUCTURES NOT OPEN ABOVE TO THE SKY SHALL BE PROVIDED WITH AN AUTOMATIC FIRE SUPPRESSION SYSTEM COMPLYING WITH NFPA 855 SECTION 4.11.
11. OUTDOOR WALK–IN CONTAINERS OR ENCLOSURES HOUSING ESS SHALL NOT EXCEED 53 FT × 8.5 FT × 9.5 FT (16.2 M × 2.6 M × 2.9 M), NOT INCLUDING HVAC AND OTHER EQUIPMENT. OUTDOOR WALK–IN CONTAINERS OR ENCLOSURES EXCEEDING THIS SIZE SHALL BE TREATED AS INDOOR INSTALLATIONS UNDER NFPA 855
12. CONTRACTOR SHALL SUPPLY A FIRE ALARM PANEL CAPABLE OF RECEIVING ALARMS FROM THE BESS EMS AND SENDING COMMUNICATIONS DIRECT TO THE LOCAL FIRE DEPARTMENT AS REQUIRED PER THE LOCAL FIRE AHJ.

LIGHTING NOTES

1. LED LIGHTING WILL BE INCLUDED ON THE UNDERSIDES OF THE CANOPIES FOR EVENING SECURITY. LIGHT LEVELS AFTER SUNDOWN SHALL BE NO LESS THAN 2 (TWO) FOOT–CANDLES (AVERAGE) AT THE PAVED SURFACE WITH A MAXIMUM RATIO OF 3:1 FOR LEVELS BENEATH AND BETWEEN LIGHT FIXTURES.
2. EXISTING LIGHTING CIRCUIT(S) SUPPLYING EXISTING LIGHT POLES TO BE REPURPOSED FOR NEW CANOPY LIGHTING SYSTEM.
3. SEE CIVIL DRAWINGS FOR DEMOLITION SCOPE OF EXISTING LIGHT POLES AND FOUNDATIONS.

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PUREPOWER ENGINEERING
111 RIVER STREET HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197



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860 WYCKOFF AVENUE SUITE 200
MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

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PAGE SIZE: 36" x 24"

PROJECT #: 04001

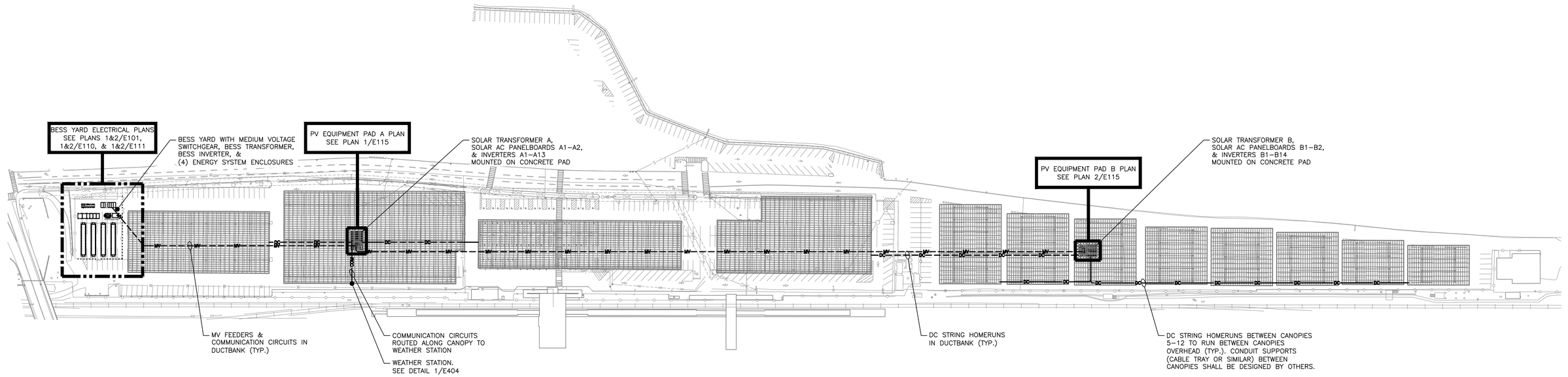
PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: ELECTRICAL NOTES & SYMBOLS LIST

DRAWING #: E002

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



1 E100 OVERALL ELECTRICAL PLAN
SCALE: 1" = 80'

EXISTING LINETYPE LEGEND

UGE	EXISTING UNDERGROUND ELECTRIC
OHE	EXISTING OVERHEAD ELECTRIC
T	EXISTING TELEPHONE LINES
W	EXISTING WATER LINES
S	EXISTING STORMWATER LINES

NOTES:
1. CONDUIT ROUTING IS DIAGRAMMATIC. CONTRACTOR TO VERIFY PATH IN THE FIELD.

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PUREPOWER ENGINEERING
POWER. STEP. FORWARD.
111 WASHINGTON AVENUE, SUITE 2M
ALBANY, NY 12210
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

EPC
CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

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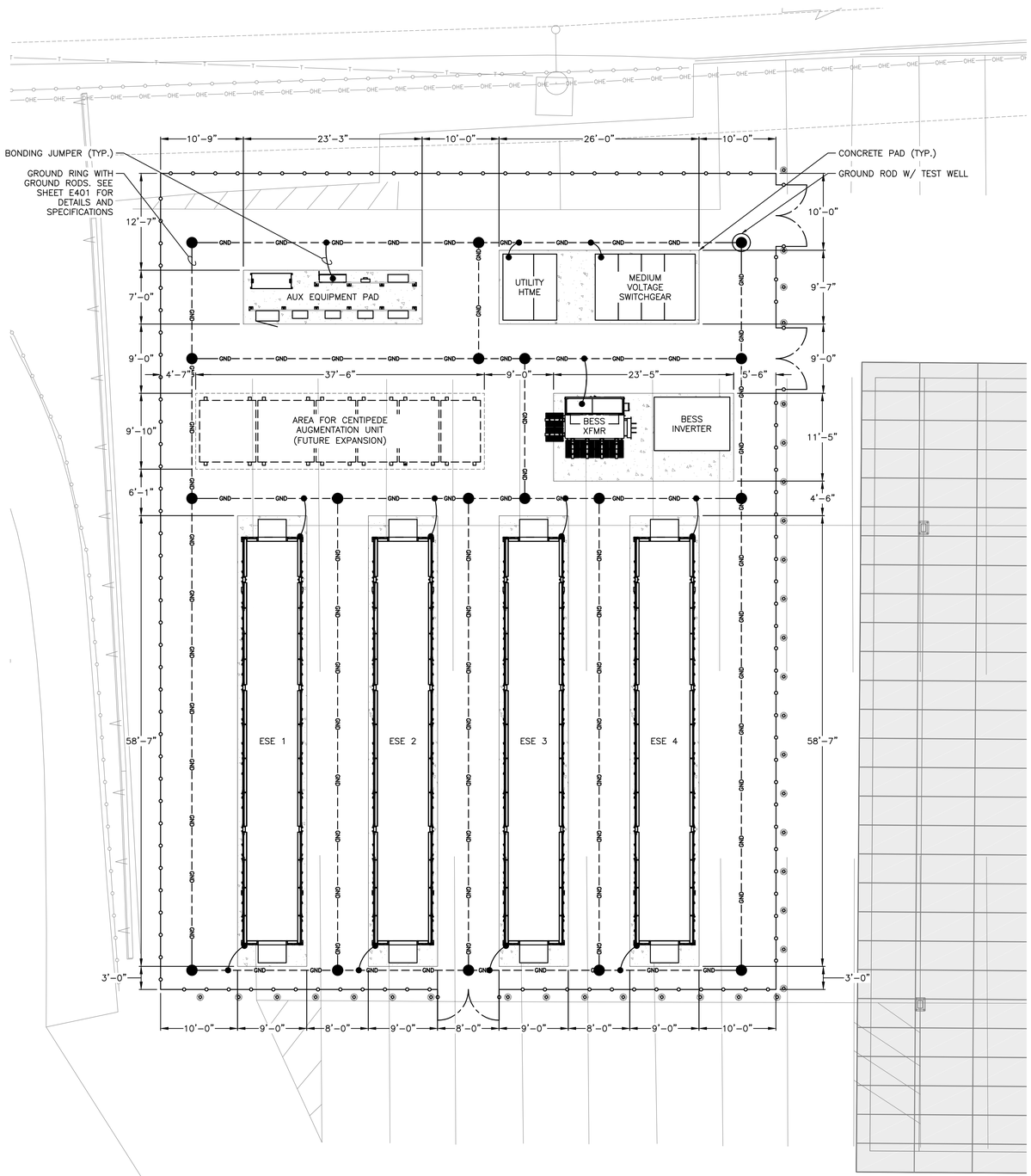
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OVERALL ELECTRICAL PLAN

DRAWING #
E100

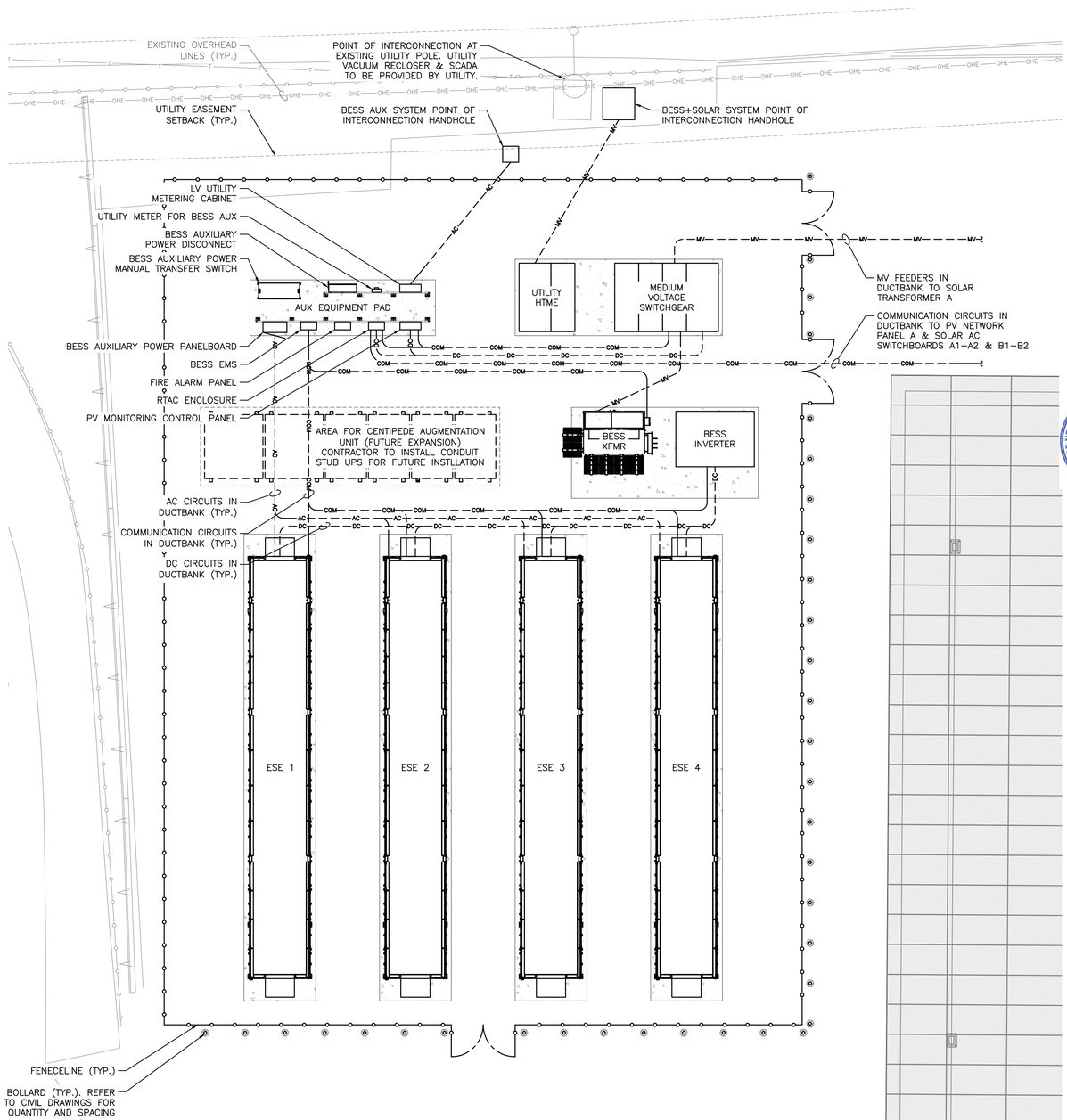
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PLOT DATE: 9/26/2022 2:42 PM



1 E101 BESS YARD DIMENSIONAL & GROUND RING PLAN
SCALE: 1/8" = 1'-0"



2 E101 BESS YARD ELECTRICAL PLAN
SCALE: 1/8" = 1'-0"

SHEET NOTES:
1. CONDUIT ROUTING & STUB-UP LOCATIONS ARE DIAGRAMMATIC. REFER TO EQUIPMENT SUBMITTALS FOR EXACT LOCATIONS.
2. DIMENSIONS & PAD SIZE ARE APPROXIMATE. CONTRACTOR TO COORDINATE WITH EQUIPMENT SHOP DRAWINGS.

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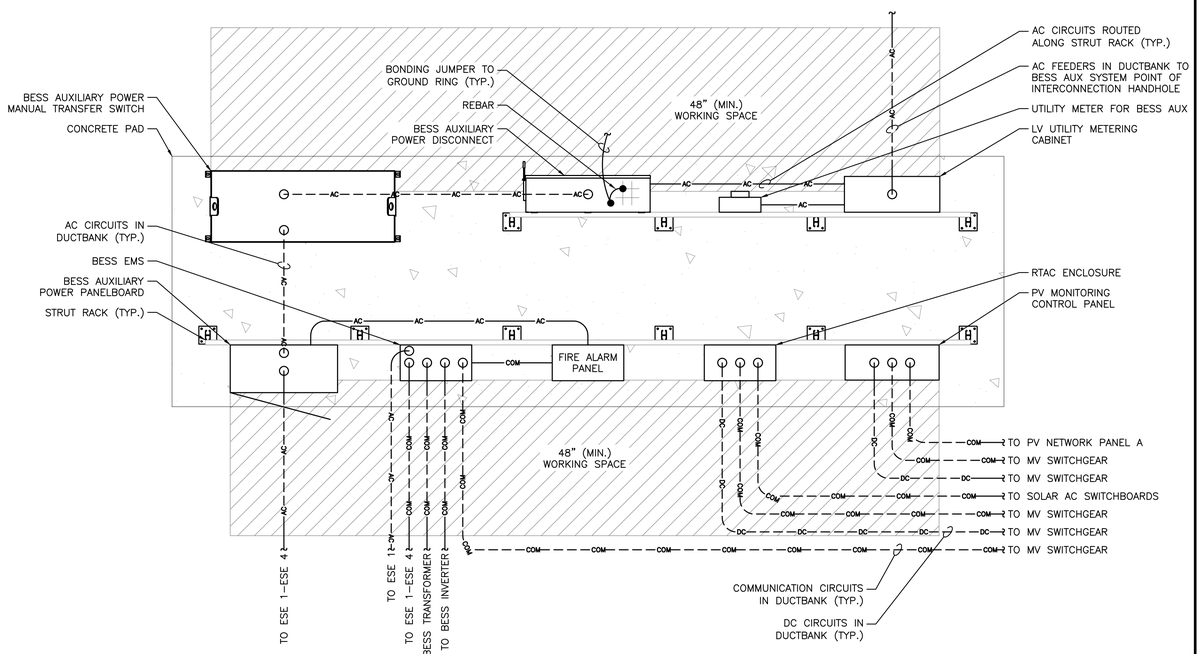
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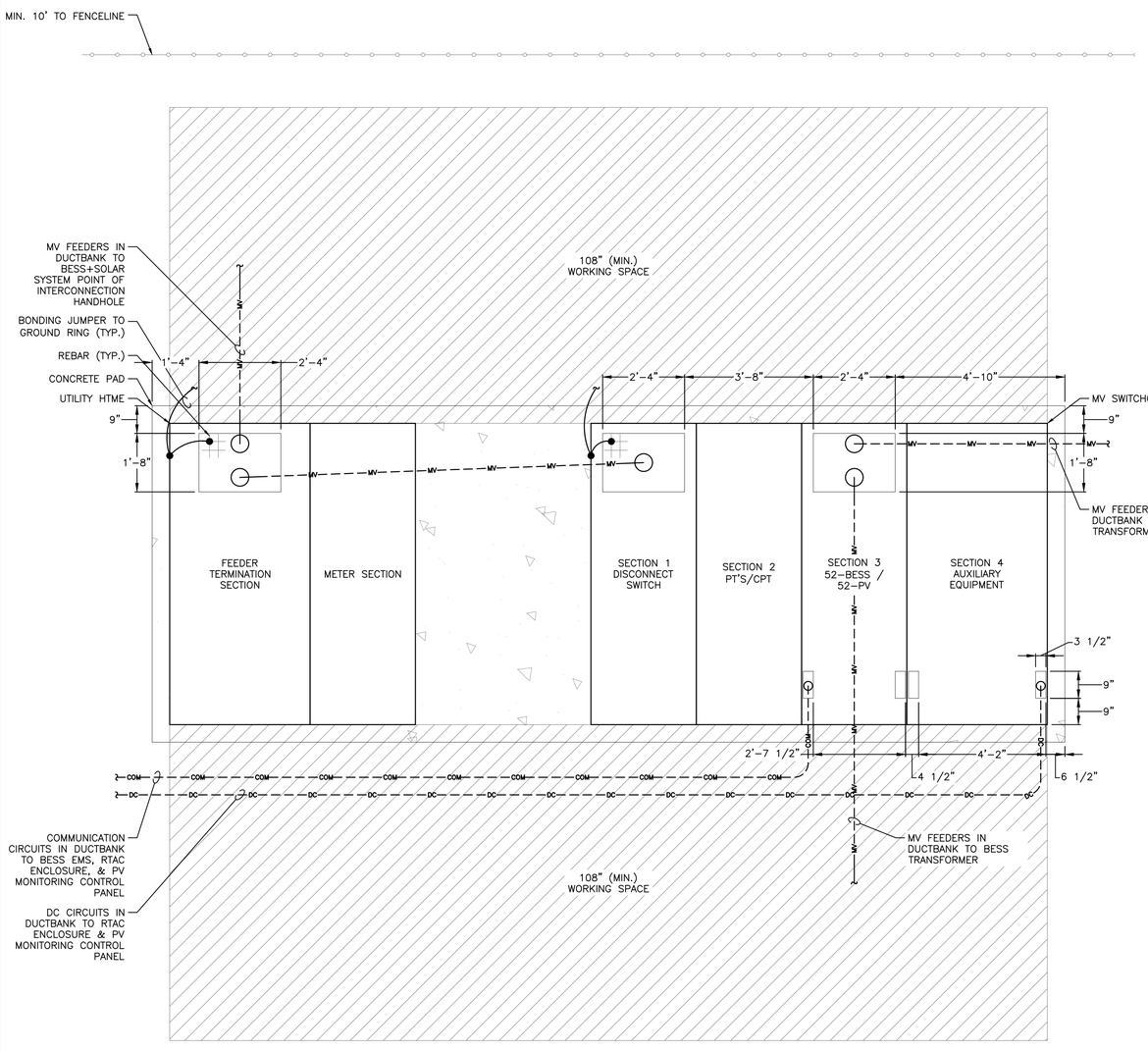
DRAWING TITLE: BESS YARD ELECTRICAL PLAN

DRAWING #: E101

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



1 E111 AUX EQUIPMENT PAD PLAN
SCALE: 1/2" = 1'-0"



2 E111 MV SWITCHGEAR & UTILITY HTME PAD PLAN
SCALE: 1/2" = 1'-0"

SHEET NOTES:
1. ALL PAD MOUNTED EQUIPMENT SHALL BE BOLTED AND SECURED TO EQUIPMENT PAD WITH SUITABLE CONCRETE ANCHORS AT FOUR CORNERS.
2. STUB-UP LOCATIONS ARE DIAGRAMMATIC. REFER TO EQUIPMENT SUBMITTALS FOR EXACT LOCATIONS.
3. PAD SIZE IS APPROXIMATE. CONTRACTOR TO COORDINATE WITH EQUIPMENT SHOP DRAWINGS.
4. ADHERE TO ALL MANUFACTURER REQUIRED EQUIPMENT CLEARANCES. REFER TO EQUIPMENT MANUALS & SHOP DRAWINGS.
5. CONDUIT WINDOW DIMENSIONS ARE PRELIMINARY.

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111 RIVER STREET, HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

EPC CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAGE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

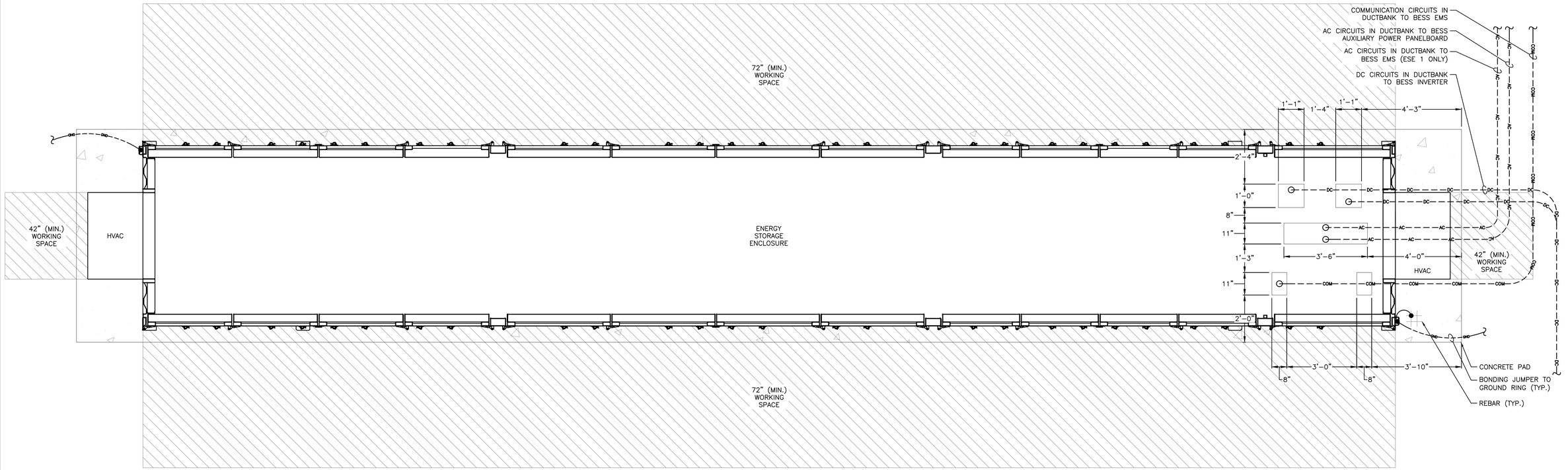
PROJECT
BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE
BESS YARD
EQUIPMENT PAD PLANS

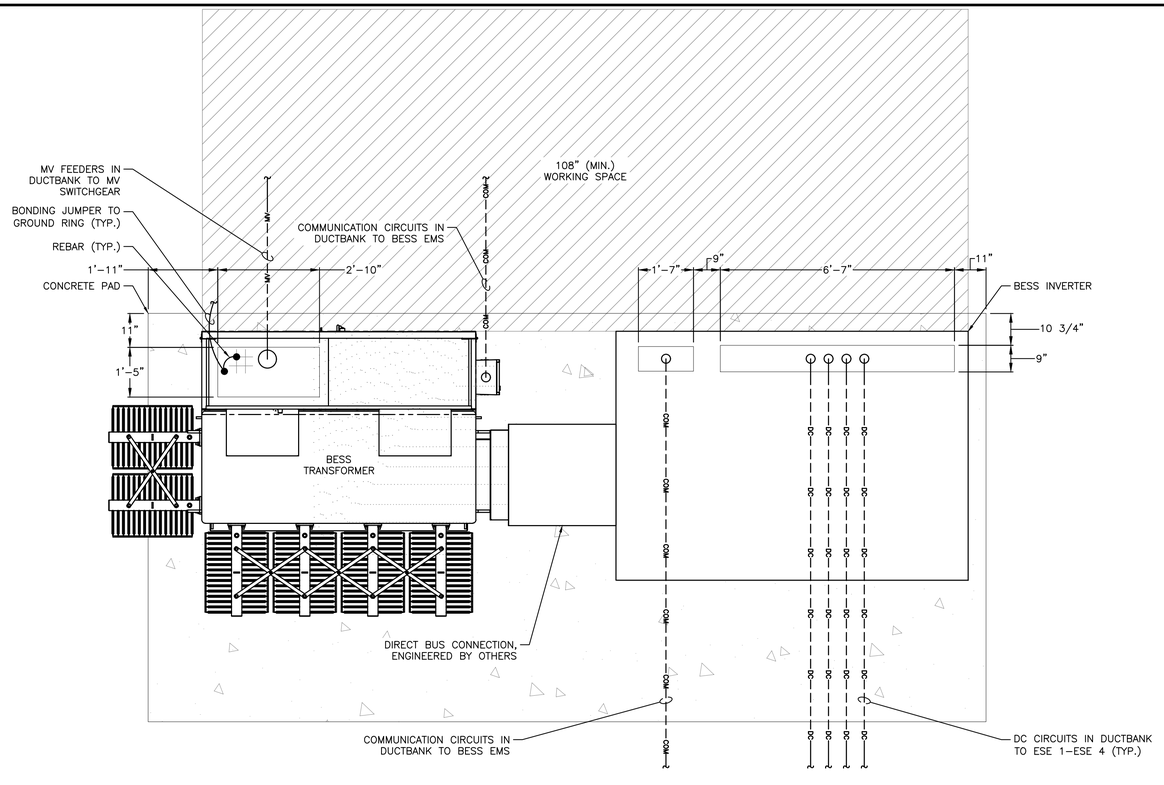
DRAWING #
E111

PLOT DATE: 9/26/2022 2:42 PM

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



1 / E112 TYPCIAL ENERGY STORAGE ENCLOSURE PAD PLAN
SCALE: 1/2" = 1'-0"



2 / E112 BESS INVERTER PAD PLAN
SCALE: 1/2" = 1'-0"

SHEET NOTES:
1. ALL PAD MOUNTED EQUIPMENT SHALL BE BOLTED AND SECURED TO EQUIPMENT PAD WITH SUITABLE CONCRETE ANCHORS AT FOUR CORNERS.
2. STUB-UP LOCATIONS ARE DIAGRAMMATIC. REFER TO EQUIPMENT SUBMITTALS FOR EXACT LOCATIONS.
3. PAD SIZE IS APPROXIMATE. CONTRACTOR TO COORDINATE WITH EQUIPMENT SHOP DRAWINGS.
4. ADHERE TO ALL MANUFACTURER REQUIRED EQUIPMENT CLEARANCES. REFER TO EQUIPMENT MANUALS & SHOP DRAWINGS.
5. CONDUIT WINDOW DIMENSIONS ARE PRELIMINARY.

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

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MAHWAH, NJ 07430
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EPC: CORE DEVELOPMENT GROUP

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PROJECT: BESS + SOLAR CARPORT SYSTEM AT
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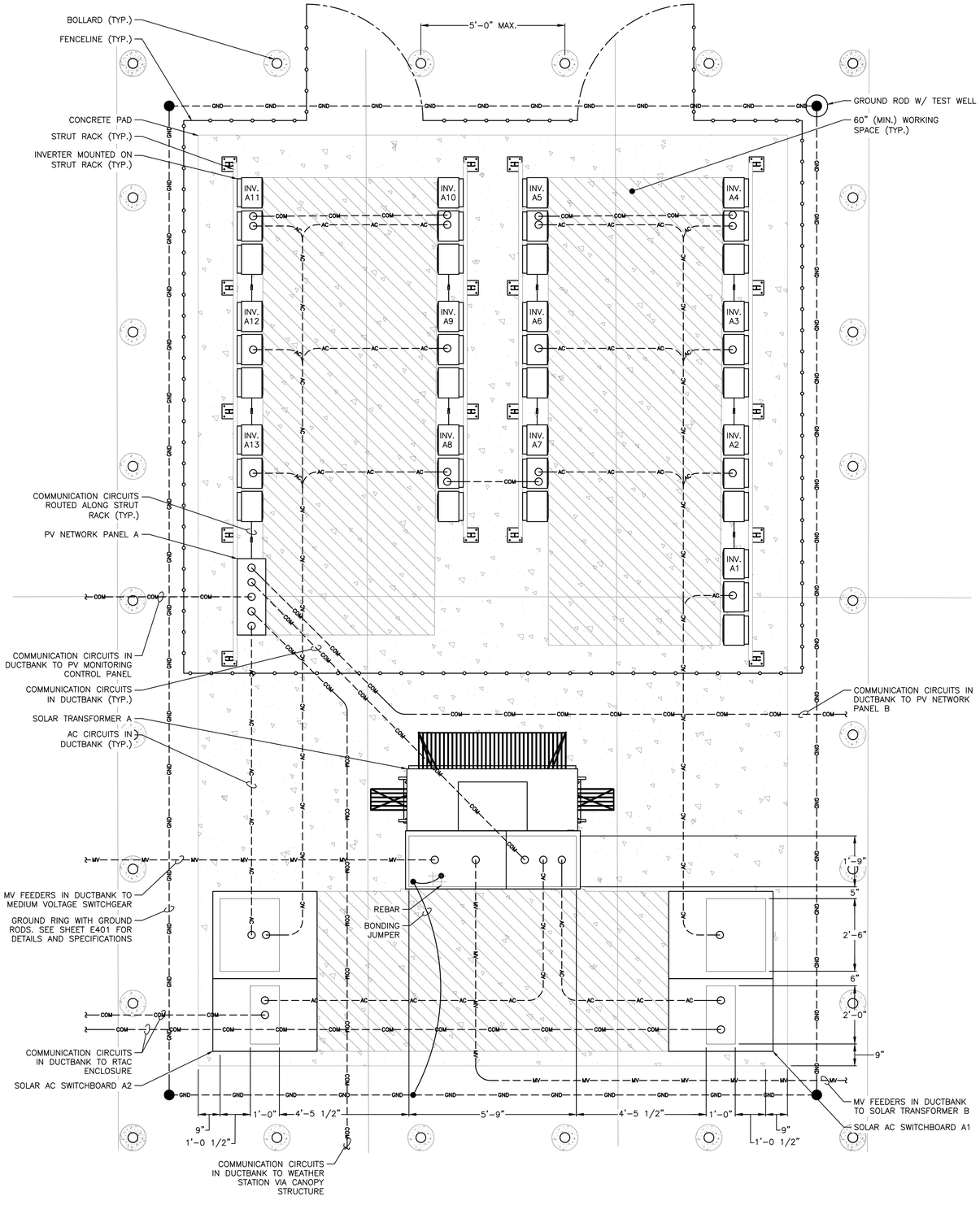
DRAWING TITLE
BESS YARD
EQUIPMENT PAD PLANS

DRAWING #
E112

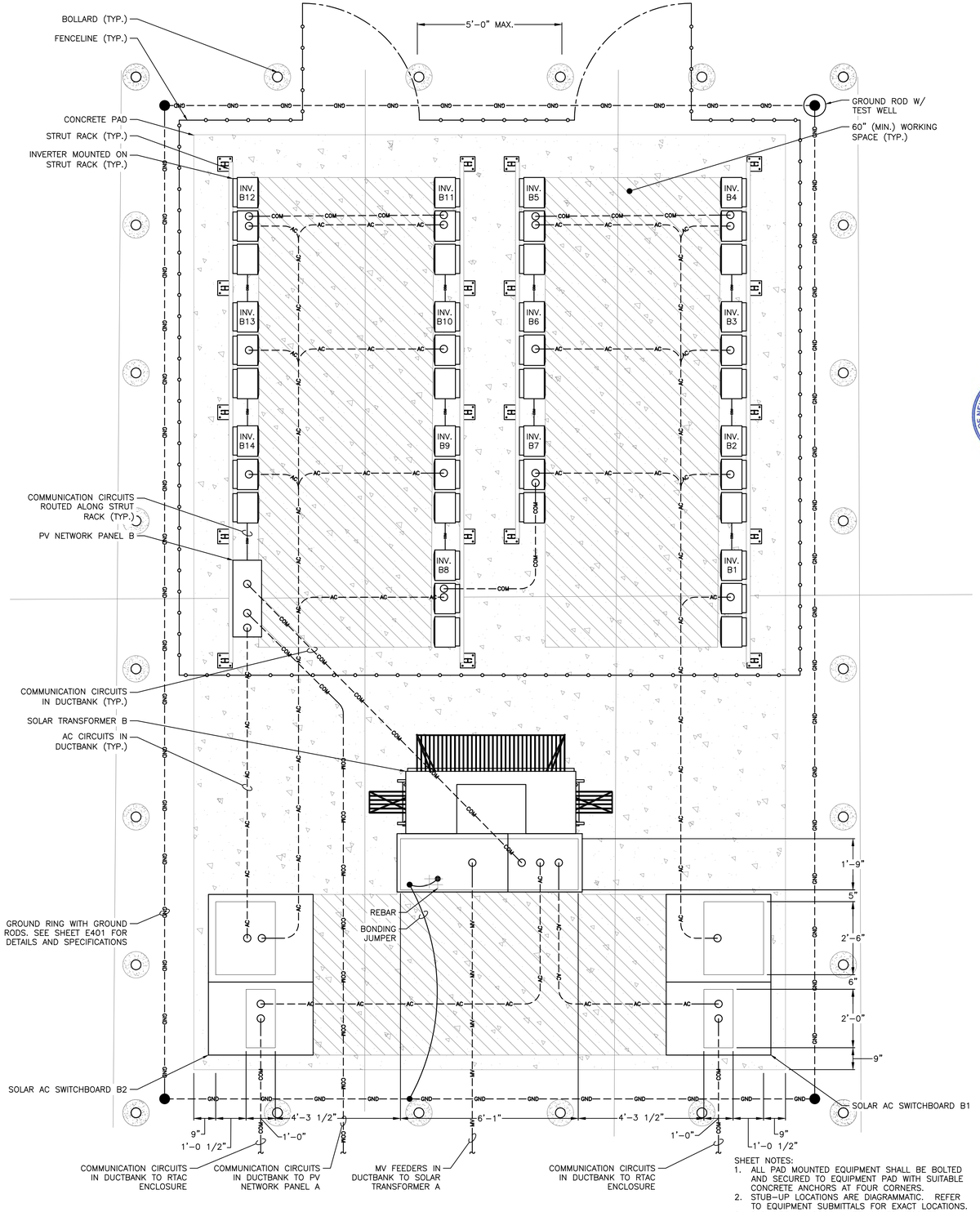
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PLOT DATE: 9/26/2022 2:42 PM



1 E115 PV EQUIPMENT PAD A PLAN
SCALE: 1/2" = 1'-0"



2 E115 PV EQUIPMENT PAD B PLAN
SCALE: 1/2" = 1'-0"

SHEET NOTES:
1. ALL PAD MOUNTED EQUIPMENT SHALL BE BOLTED AND SECURED TO EQUIPMENT PAD WITH SUITABLE CONCRETE ANCHORS AT FOUR CORNERS.
2. STUB-UP LOCATIONS ARE DIAGRAMMATIC. REFER TO EQUIPMENT SUBMITTALS FOR EXACT LOCATIONS.
3. PAD SIZE IS APPROXIMATE. CONTRACTOR TO COORDINATE WITH EQUIPMENT SHOP DRAWINGS.
4. ADHERE TO ALL MANUFACTURER REQUIRED EQUIPMENT CLEARANCES. REFER TO EQUIPMENT MANUALS & SHOP DRAWINGS.
5. CARPORT CANOPY COLUMNS & NOT SHOWN FOR CLARITY. CONTRACTOR TO VERIFY EQUIPMENT PAD & DUCTBANK LOCATIONS DO NOT INTERFERE WITH STRUCTURAL FOUNDATIONS.
5. CONDUIT WINDOW DIMENSIONS ARE PRELIMINARY.

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860 WYCKOFF AVENUE, SUITE 200
HAWTHORNE, NJ 07507
WWW.COREDEVUSA.COM

EPC: CORE DEVELOPMENT GROUP

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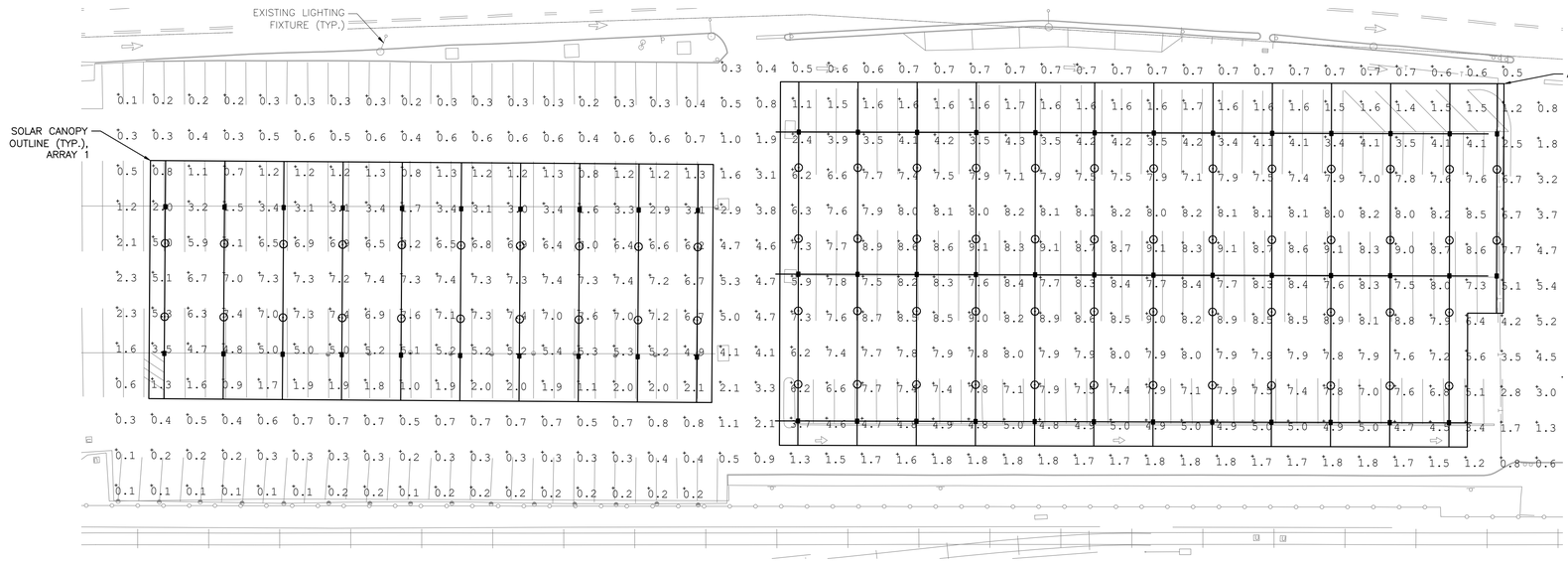
PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: PV EQUIPMENT PAD PLANS

DRAWING #: E115

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM



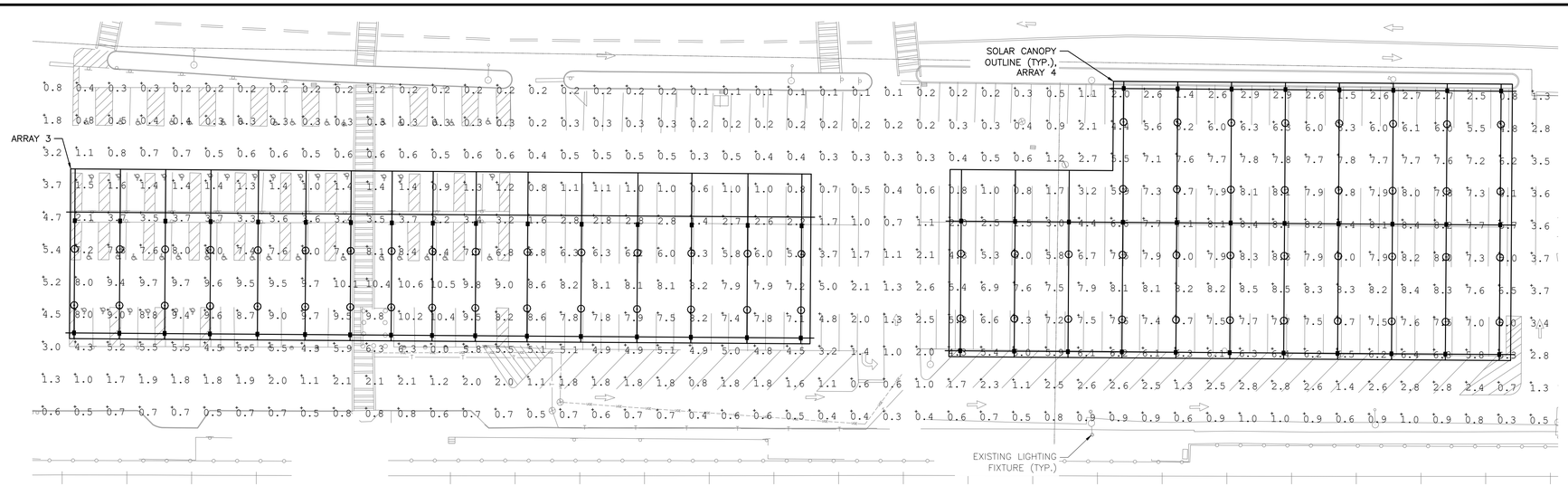
ARRAY 1 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	4.47
MAXIMUM	7.6
MINIMUM	0.7
MAX. RATIO	10.86

ARRAY 2 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	6.05
MAXIMUM	9.1
MINIMUM	1.1
MAX. RATIO	8.27

1 E150 PHOTOMETRICS PLAN – ARRAY 1 & 2
SCALE: 1" = 30'

LIGHTING LEGEND:

⊕ NEW FIXTURE TO BE INSTALLED UNDERNEATH SOLAR CANOPY



ARRAY 3 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	5.70
MAXIMUM	10.6
MINIMUM	0.6
MAX. RATIO	17.67

ARRAY 4 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	6.33
MAXIMUM	8.5
MINIMUM	0.8
MAX. RATIO	10.63

2 E150 PHOTOMETRICS PLAN – ARRAY 3 & 4
SCALE: 1" = 30'

LIGHTING LEGEND:

⊕ NEW FIXTURE TO BE INSTALLED UNDERNEATH SOLAR CANOPY

EIKO

SCRG SURFACE CANOPY, ROUND GARAGE

project name	type
catalog number	
comments	voltage
approved by	date



DESCRIPTION
A cost-effective, multipurpose fixture for garage and canopy lighting. It provides unmatched versatility with multiple mounting options, durable construction and an optional sensor for use in a wide range of indoor and outdoor applications.

FEATURES
- 130 lpw ultra-high efficiency delivers superior performance
- Optional integrated microwave motion sensor with photocell offers fully adjustable on/off and bi-level dimming capabilities
- Optional remote control commissioning device available for integrated sensors
- 0-10V dimming control

LISTINGS
- UL Listed for wet locations
- IP65 Rated
- DesignLights Consortium® Premium Qualified - meets the requirements for the highest DLC qualification for efficacy and lumen maintenance

PERFORMANCE
- Rated lifetime L90: >50,000 hours
- 4000K, 5000K CCT
- CRI: 80+

ELECTRICAL
- Input voltage: 120-277V
- Dimmable power supply (0-10V)
- Power Factor: >.9
- THD: <20%

THERMAL
- -40ºF to 104ºF (-40ºC to 40ºC) operating temperature

CONSTRUCTION
- Diecast aluminum heatsink
- Optional integrated microwave motion and photocell sensor
- Impact-resistant polycarbonate lens
- 1/2" NPS entry point for conduit and accessories
- 3/4" NPS pendant mount
- Quick mount surface bracket included

WARRANTY
- 5 year limited warranty; see eiko.com for warranty details

APPLICATIONS
- Strip malls
- Entryways
- Educational facilities
- Plazas
- Canopies
- Eaves
- Public rest areas
- Cold storage
- Bridges, tunnels, and overpasses (with 3G bracket)
- Lowbay

IP65 DESIGN LISTED · cULus · RoHS Compliant · DLC PREMIUM

ORDERING INFORMATION
EXAMPLE: SCRG-75/DO/840-DIM-U-W

Model	Package	LPW	CCT/CRI	Dimming	Voltage	Sensor	Finish
SCRG : Surface Canopy Round, Garage	**50** - 40W, 5,000 lm **75** - 60W, 8,000 lm	**DO** - 130	**840** - 4000K, 80CRI **850** - 5000K, 80CRI	**DIM** - 0-10V Dimming	**U** - Universal	**S1B** - Sensor (Blank) - No sensor	**W** - White

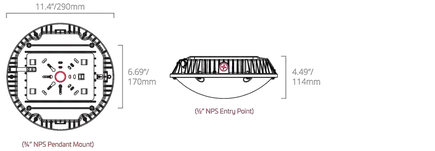
1 EIKO USA: 1.800.852.2217 / EIKO Canada: 1.888.410.8151 / eiko.com

PERFORMANCE SUMMARY

Order Code	Item #	Watts	Lumens	CCT	CRI	Dimming	Volts	DLC
09955	SCRG-50/DO/840-DIM-U-W	40W	5000	4000K	80+	0-10V	120-277V	✓
09956	SCRG-50/DO/850-DIM-U-W	40W	5000	5000K	80+	0-10V	120-277V	✓
09957	SCRG-75/DO/840-DIM-U-W	60W	8000	4000K	80+	0-10V	120-277V	✓
09958	SCRG-75/DO/850-DIM-U-W	60W	8000	5000K	80+	0-10V	120-277V	✓
09959	SCRG-50/DO/840-DIM-U-S1B-W	40W	5000	4000K	80+	0-10V	120-277V	✓
09960	SCRG-50/DO/850-DIM-U-S1B-W	40W	5000	5000K	80+	0-10V	120-277V	✓
09961	SCRG-75/DO/840-DIM-U-S1B-W	60W	8000	4000K	80+	0-10V	120-277V	✓
09962	SCRG-75/DO/850-DIM-U-S1B-W	60W	8000	5000K	80+	0-10V	120-277V	✓

✓DesignLights Consortium® Premium Qualified

DIMENSIONS



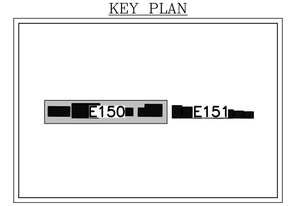
AVAILABLE ACCESSORIES

Order Code	Item #	Description
10113	SEN-S1-RC2	Remote Control for S1B Sensors
09963	SCRG-3G-BRK	Quick Mount Bracket for SCRG 3G applications
09908	SEN-S1A-KO	Sensor, OCCP/DRC, IP65, 1/2" Knock Out Mount, Remote Controllable

Rev. 10/7/20
2 EIKO USA: 1.800.852.2217 / EIKO Canada: 1.888.410.8151 / eiko.com

3 E150 LAMP DATA SHEET
SCALE: NONE

KEY PLAN



DRAWING TITLE: PARTIAL PHOTOMETRICS PLAN

DRAWING #: E150

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
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WWW.PUREPOWER.COM
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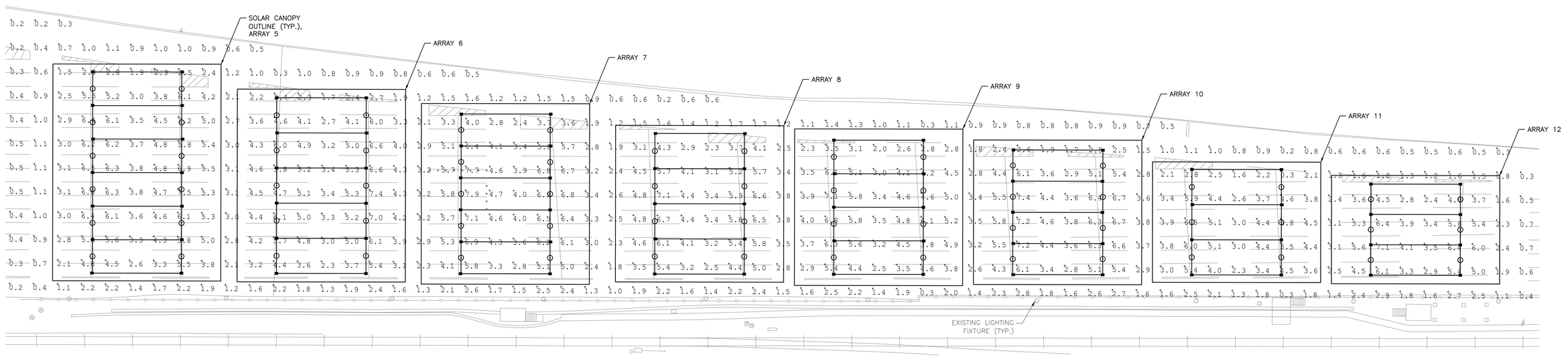
EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,215.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
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MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



1 E151 PHOTOMETRICS PLAN – ARRAY 5–12
SCALE: 1" = 30'

LIGHTING LEGEND:

⊙ NEW FIXTURE TO BE INSTALLED UNDERNEATH SOLAR CANOPY

ARRAY 5 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	4.27
MAXIMUM	7.5
MINIMUM	1.1
MAX. RATIO	6.82

ARRAY 6 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	4.31
MAXIMUM	7.4
MINIMUM	1.7
MAX. RATIO	4.35

ARRAY 7 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	4.79
MAXIMUM	7.9
MINIMUM	1.9
MAX. RATIO	4.16

ARRAY 8 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	4.42
MAXIMUM	7.1
MINIMUM	2.3
MAX. RATIO	3.09

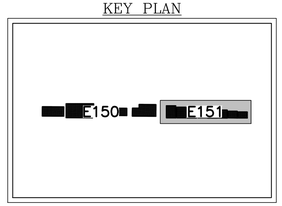
ARRAY 9 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	3.90
MAXIMUM	7.1
MINIMUM	0.3
MAX. RATIO	23.67

ARRAY 10 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	4.49
MAXIMUM	7.4
MINIMUM	1.5
MAX. RATIO	4.93

ARRAY 11 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	3.36
MAXIMUM	6.5
MINIMUM	0.3
MAX. RATIO	21.67

ARRAY 12 CALCULATION SUMMARY	
CALC. TYPE	ILLUMINANCE
UNITS	FOOT CANDLES (Fc)
AVERAGE	4.08
MAXIMUM	7.1
MINIMUM	1.6
MAX. RATIO	4.44

KEY PLAN



DRAWING TITLE: PARTIAL PHOTOMETRICS PLAN

DRAWING #: E151

DATE	REVISION DESCRIPTION	PM	ENG	CHK
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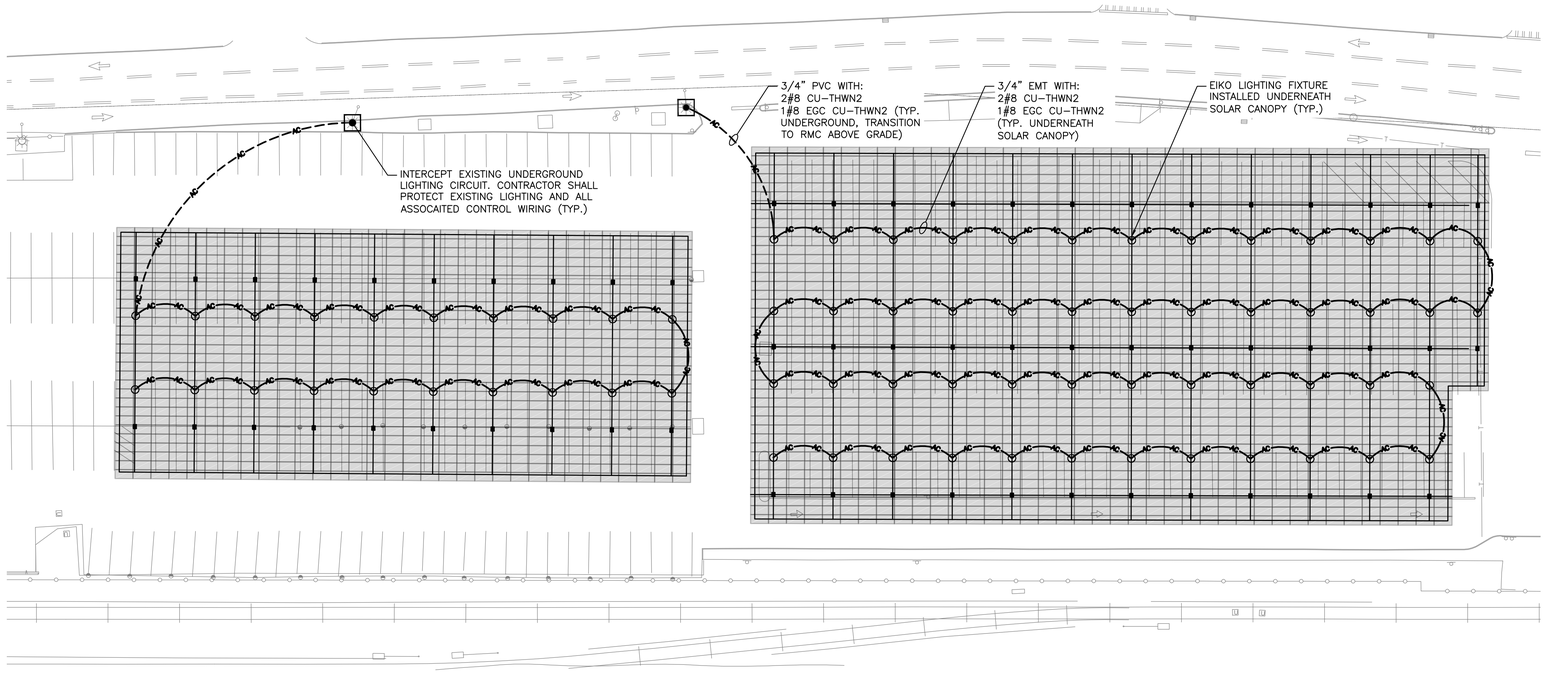
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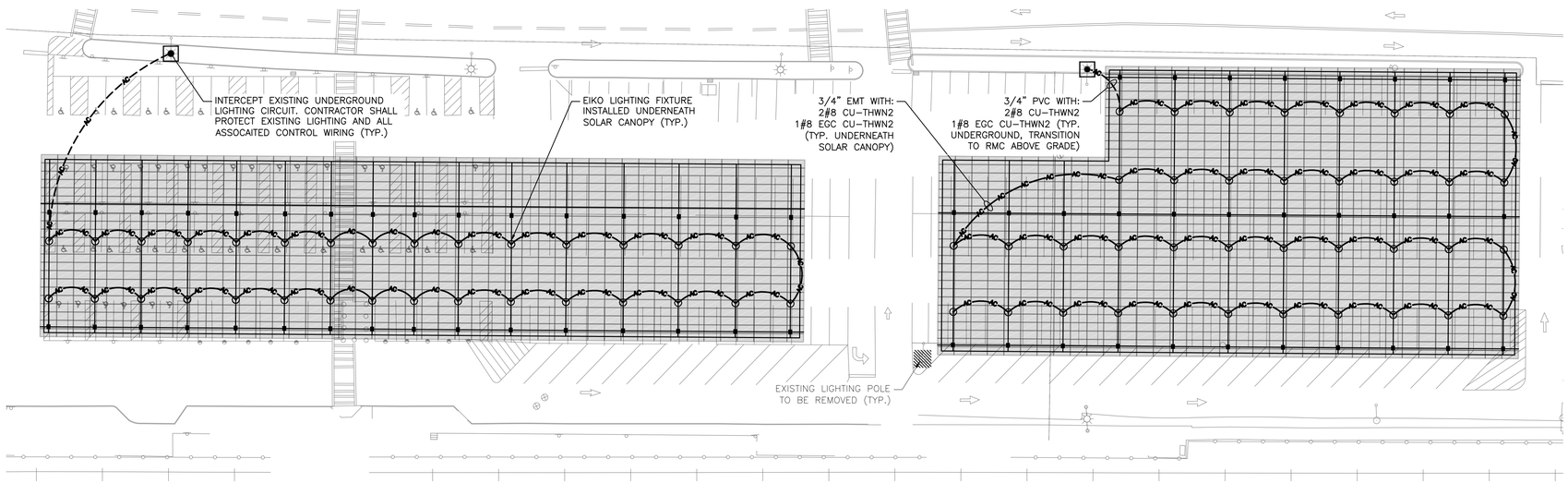
1 E152 LIGHTING PLAN – ARRAY 1 & 2
SCALE: 1" = 30'

FIXTURE SCHEDULE	
ARRAY #	(QTY) NEW FIXTURES
1	20
2	50

LIGHTING LEGEND:
- NEW FIXTURE TO BE INSTALLED UNDERNEATH SOLAR CANOPY
- EXISTING FIXTURE TO BE REMOVED
- EXISTING FIXTURE TO REMAIN
- TAP TO EXISTING LIGHTING CIRCUIT

LIGHTING GENERAL NOTES:

1. CONDUIT RUN PATHS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY LOCATION, ROUTE OF CONDUIT RUNS AND ALL EXISTING UNDERGROUND UTILITIES AND CIRCUITRY AS REQUIRED, PRIOR TO STARTING WORK.
2. PROVIDE IN-GRADE TRAFFIC-RATED BOX LOCATIONS FOR DEMOLISHED LIGHT POLES IF REQUIRED TO MAINTAIN CONTINUITY TO ANY EXISTING LIGHTING FIXTURES OUTSIDE OF THE ARRAYS. COORDINATE NEW ARRAY LIGHTING REQUIREMENTS WITH EXISTING PARKING LOT LIGHTING INFRASTRUCTURE. NEW LIGHTING MUST BE TIED INTO EXISTING CIRCUIT. AT THE CONCLUSION OF PROJECT, PROVIDE AS-BUILT DRAWINGS SHOWING THE REVISED CIRCUITING AND BOX LOCATIONS TO OWNER.
3. CONTRACTOR TO VERIFY PRESENCE OF (E) LIGHTING CIRCUIT CONTROLS. CONTRACTOR TO PROCURE AND INSTALL IF NO CIRCUIT CONTROLLER EXISTS.
4. CONTRACTOR TO VERIFY ALL LIGHTING FIXTURES ON EXISTING LIGHTING CIRCUIT. CONTRACTOR TO VERIFY EXISTING LIGHTING CIRCUIT CONDUCTORS ARE ADEQUATELY SIZED TO ACCOMMODATE NEW LIGHTING CIRCUITS AND CONTRACTOR TO VERIFY THE VOLTAGE OF EXISTING LIGHTING CIRCUITS PRIOR TO ORDERING AND INSTALLATION OF LIGHTING FIXTURES. CONTRACTOR TO SUBMIT FINDINGS TO ENGINEER OF RECORD (EOR) FOR REVIEW AND APPROVAL.
5. CONTRACTOR TO VERIFY COLOR TEMPERATURE OF EXISTING LIGHTING FIXTURES TO REMAIN AND NOTIFY EOR BEFORE PROCUREMENT OF NEW LIGHTING FIXTURES.
6. EXISTING LIGHTING FIXTURES TO BE REMOVED SHALL BE TURNED OVER TO THE OWNER.
7. WHEREVER EXISTING PRE-SOLAR LIGHT POLES MUST BE REMOVED: THE LIGHT POLE BASES SHALL BE DEMOLISHED AND BROUGHT TO GRADE AND EXISTING WIRING SHALL BE MAINTAINED IN APPROPRIATE ENCLOSURE.
8. BALANCE ALL NEW LIGHTING FIXTURE WIRING ON THE EXISTING CIRCUIT. DISTRIBUTE LIGHTING FIXTURE QUANTITIES EVENLY ON ALL PHASE CONFIGURATIONS.

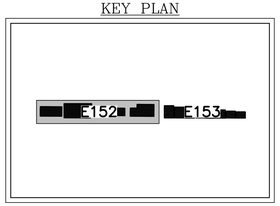


2 E152 LIGHTING PLAN – ARRAY 3 & 4
SCALE: 1" = 30'

FIXTURE SCHEDULE	
ARRAY #	(QTY) NEW FIXTURES
3	32
4	38

LIGHTING LEGEND:
- NEW FIXTURE TO BE INSTALLED UNDERNEATH SOLAR CANOPY
- EXISTING FIXTURE TO BE REMOVED
- EXISTING FIXTURE TO REMAIN
- TAP TO EXISTING LIGHTING CIRCUIT

KEY PLAN



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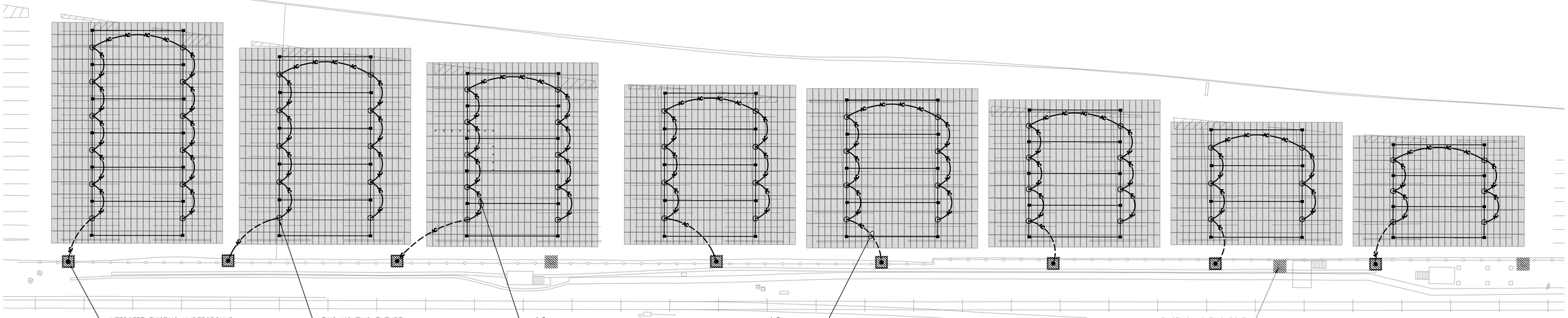
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DRAWING TITLE: PARTIAL LIGHTING PLAN

DRAWING #: E152

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM



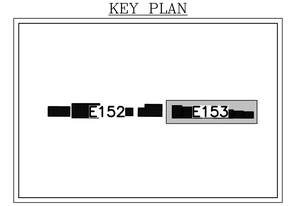
1 E153 LIGHTING PLAN – ARRAY 5-12
SCALE: 1" = 30'

FIXTURE SCHEDULE	
ARRAY #	(QTY) NEW FIXTURES
5	12
6	10
7	10
8	8
9	8
10	8
11	6
12	6

LIGHTING LEGEND:

- NEW FIXTURE TO BE INSTALLED UNDERNEATH SOLAR CANOPY
- EXISTING FIXTURE TO BE REMOVED
- EXISTING FIXTURE TO REMAIN
- TAP TO EXISTING LIGHTING CIRCUIT

KEY PLAN



DATE	REVISION DESCRIPTION	PM	ENG	CHK
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08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

PUREPOWER ENGINEERING
POWER. STEP. FORWARD.
111 WATER STREET, NEWBURGH, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

EPC
CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: PARTIAL LIGHTING PLAN

DRAWING #: E153

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM

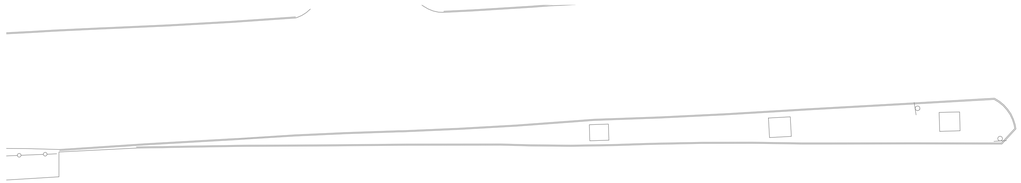
INVERTER SUMMARY					
INVERTER NAME	AC SIZE (KW)	MODULES PER STRING	STRING QUANTITY	# MODULES	DC SIZE (KW)
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A5	120	30	9	270	148.50
A6	120	30	9	270	148.50
A7	120	30	9	270	148.50
A8	120	30	9	270	148.50
A9	120	30	9	270	148.50
A10	120	30	3	282	155.10
		32	6		
A11	120	30	4	280	154.00
		32	5		
A12	120	30	9	270	148.50
A13	120	30	9	270	148.50

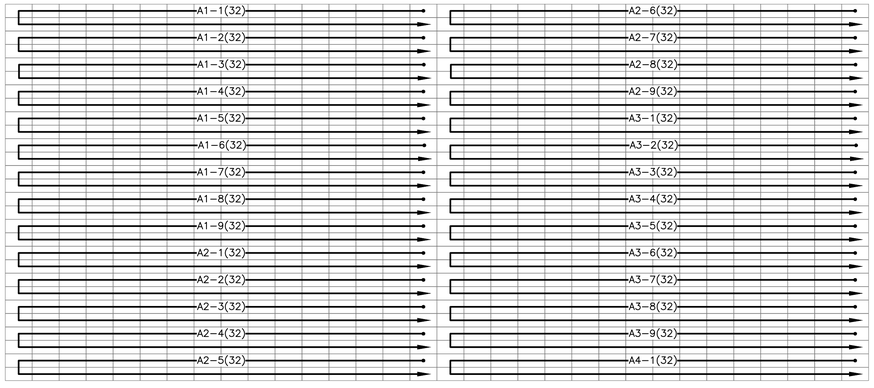
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3.5"	67	40
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TABLE ASSUMING: RMC/PVC80 CONDUIT AND CU #8 PV WIRE WITH 0.31in O.D., 0.96 TEMP. DERATE		
DC OPTIMIZER OUTPUT CIRCUIT WITH 18A OUTPUT, 1 IN PARALLEL, AND 25A FUSES		

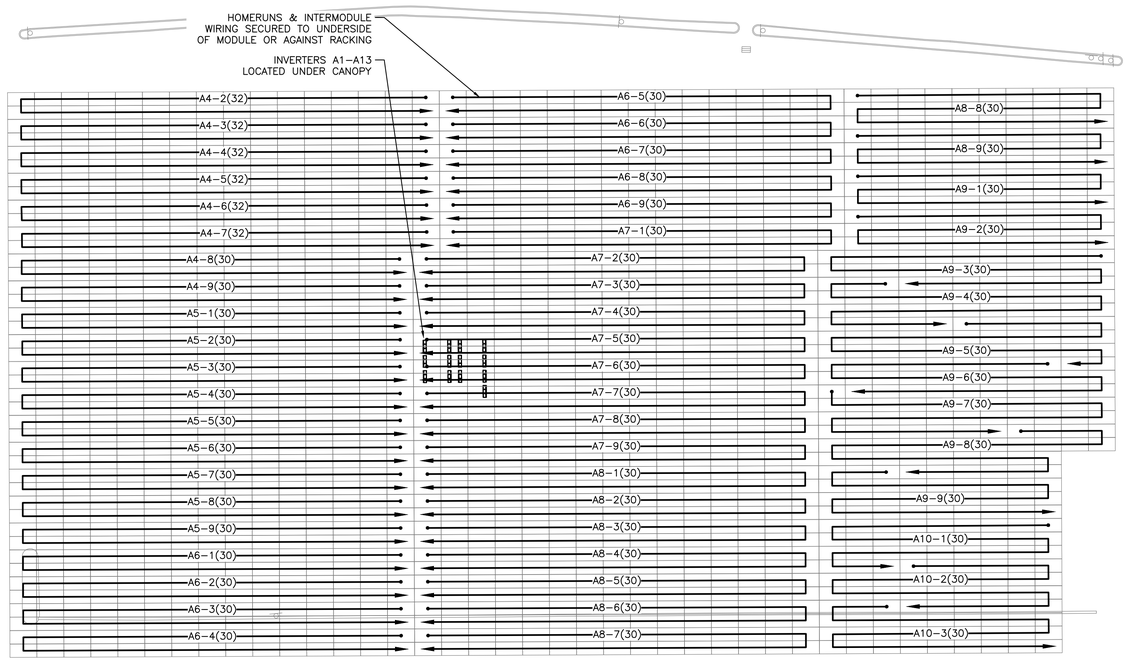
CONDUIT FILL TABLE (PVWIRE, 2000VDC MAX) - #10 WIRE GAUGE		
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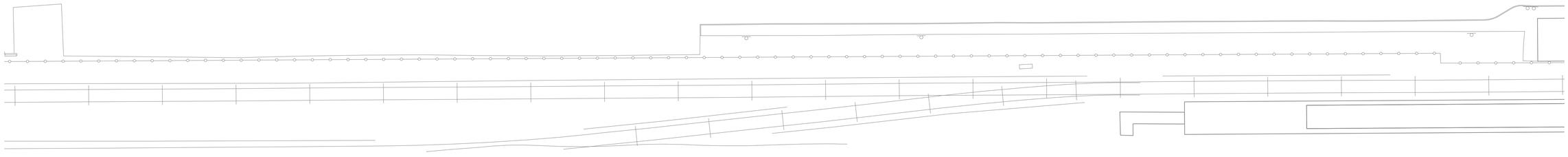
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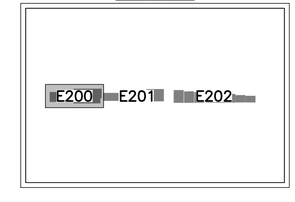








KEY PLAN



IMPORTANT

CONTRACTOR MUST:
1. REDLINE DRAWINGS TO REFLECT EXACT AS-BUILT STRINGING AND RETURN TO PURE POWER.
2. CREATE MAP OF SOLAREDGE POWER OPTIMIZER ADDRESSING AND RETURN TO SOLAREDGE.

1 / E200 PARTIAL DC ELECTRICAL PLAN
SCALE: 1" = 20'

STRING LABEL KEY

A2-3(32)
- MODULES/STRING
- STRING #
- INVERTER #

NEC 690.12 RAPID SHUTDOWN NOTE:
THIS SYSTEM INCLUDES MODULE-LEVEL POWER ELECTRONICS WHICH SHUTDOWN DC VOLTAGE AT THE MODULE LEVEL WHEN AC POWER GOES OUT. TIMING AND VOLTAGE LEVELS ARE IN COMPLIANCE WITH NEC 690.12 RAPID SHUTDOWN.

SOLAREDGE OPTIMIZER NOTES:
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DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
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MAHWAH, NJ 07430
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EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

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PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: PARTIAL DC ELECTRICAL PLAN

DRAWING #: E200

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM

INVERTER SUMMARY					
INVERTER NAME	AC SIZE (KW)	MODULES PER STRING	STRING QUANTITY	# MODULES	DC SIZE (KW)
A1	120	32	9	288	158.40
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A4	120	30	2	284	156.20
		32	7		
A5	120	30	9	270	148.50
A6	120	30	9	270	148.50
A7	120	30	9	270	148.50
A8	120	30	9	270	148.50
A9	120	30	9	270	148.50
A10	120	30	3	282	155.10
		32	6		
A11	120	30	4	280	154.00
		32	5		
A12	120	30	9	270	148.50
A13	120	30	9	270	148.50

INVERTER SUMMARY					
INVERTER NAME	AC SIZE (KW)	MODULES PER STRING	STRING QUANTITY	# MODULES	DC SIZE (KW)
B1	120	30	8	272	149.60
		32	1		
B2	120	32	9	288	158.40
B3	120	30	2	284	156.20
		32	7		
B4	120	30	8	271	149.05
		31	1		
B5	120	34	9	306	168.30
B6	120	32	6	294	161.70
		34	3		
B7	120	32	9	288	158.40
B8	120	30	7	274	150.70
		32	2		
B9	120	30	7	274	150.70
		32	2		
B10	120	32	3	300	165.00
		34	6		
B11	120	32	5	296	162.80
		34	4		
B12	120	32	2	302	166.10
		34	7		
B13	120	34	7	310	170.50
		36	2		
B14	120	36	9	324	178.20

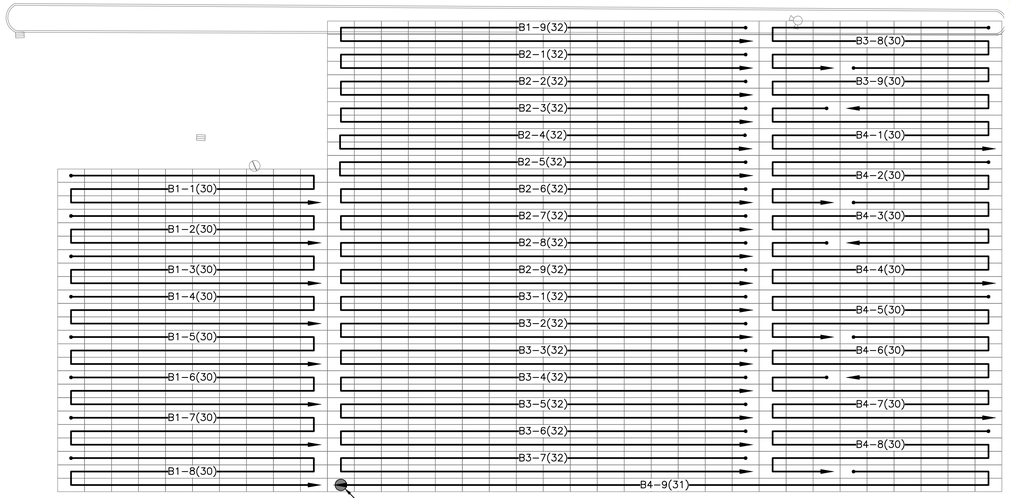
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3.5"	67	40
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DC OPTIMIZER OUTPUT CIRCUIT WITH 18A OUTPUT, 1 IN PARALLEL, AND 25A FUSES		

CONDUIT FILL TABLE (PVWIRE, 2000VDC MAX) - #10 WIRE GAUGE		
MAXIMUM NUMBER OF CU #10 PV WIRES. (WITH ALLOWANCE FOR AN ADDITIONAL GROUND WIRE)		
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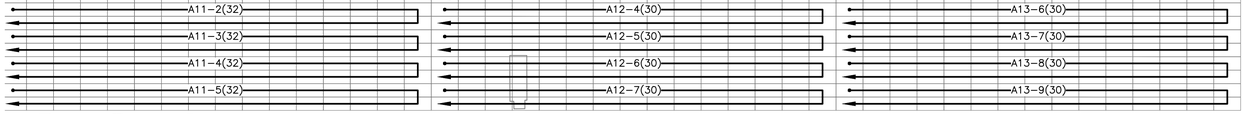
CABLE TRAY FILL TABLE - #8 WIRE GAUGE	
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2"	23
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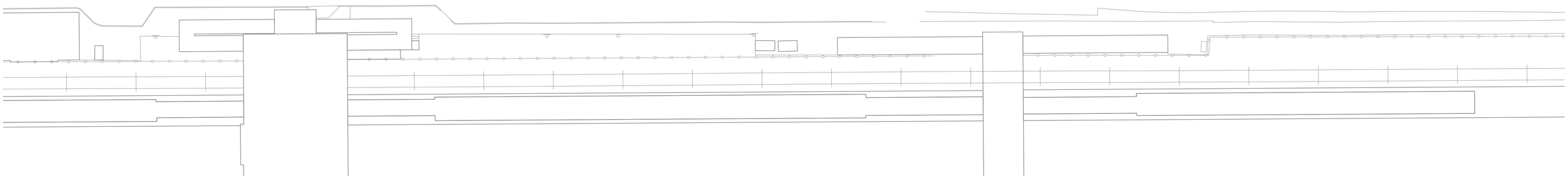
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8"	144





HOMERUNS & INTERMODULE WIRING SECURED TO UNDERSIDE OF MODULE OR AGAINST RACKING





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1 / E201 PARTIAL DC ELECTRICAL PLAN
SCALE: 1" = 20'

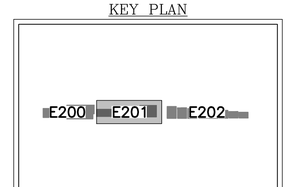
STRING LABEL KEY

A2-3(32)
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KEY PLAN



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08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
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MAHWAH, NJ 07430
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EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"

PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
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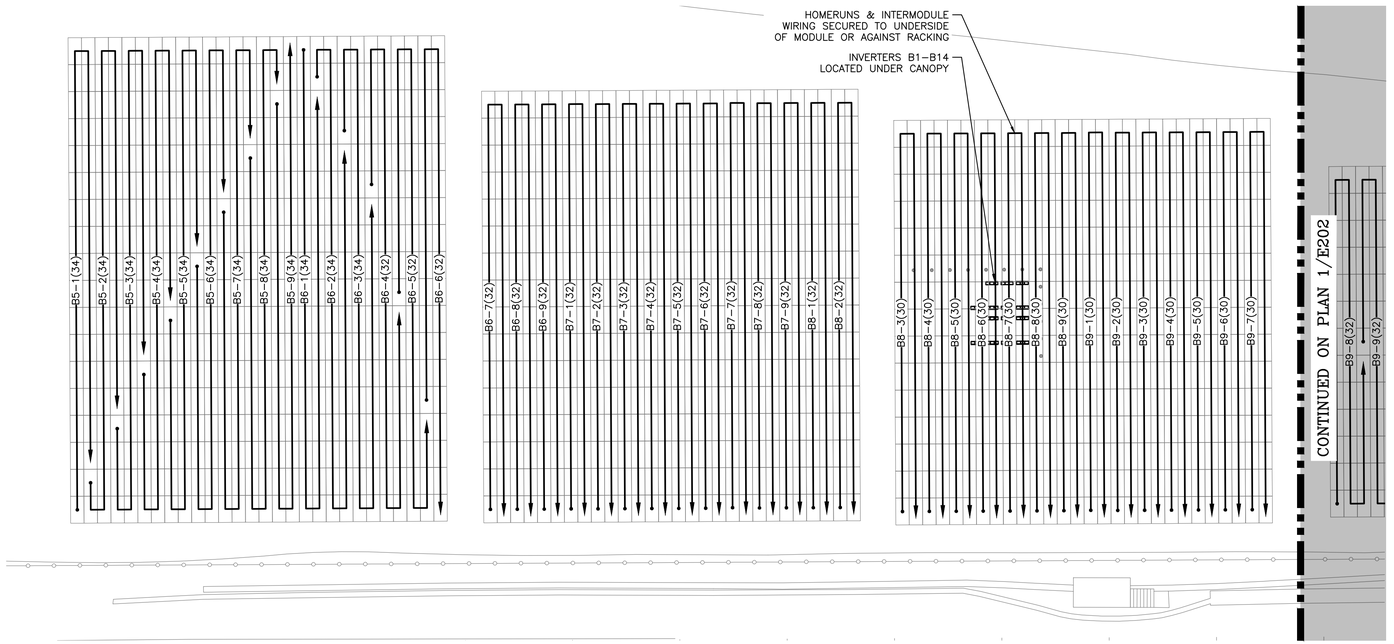
DRAWING TITLE: PARTIAL DC ELECTRICAL PLAN

DRAWING #: E201

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM

INVERTER SUMMARY					
INVERTER NAME	AC SIZE (KW)	MODULES PER STRING	STRING QUANTITY	# MODULES	DC SIZE (KW)
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B14	120	36	9	324	178.20



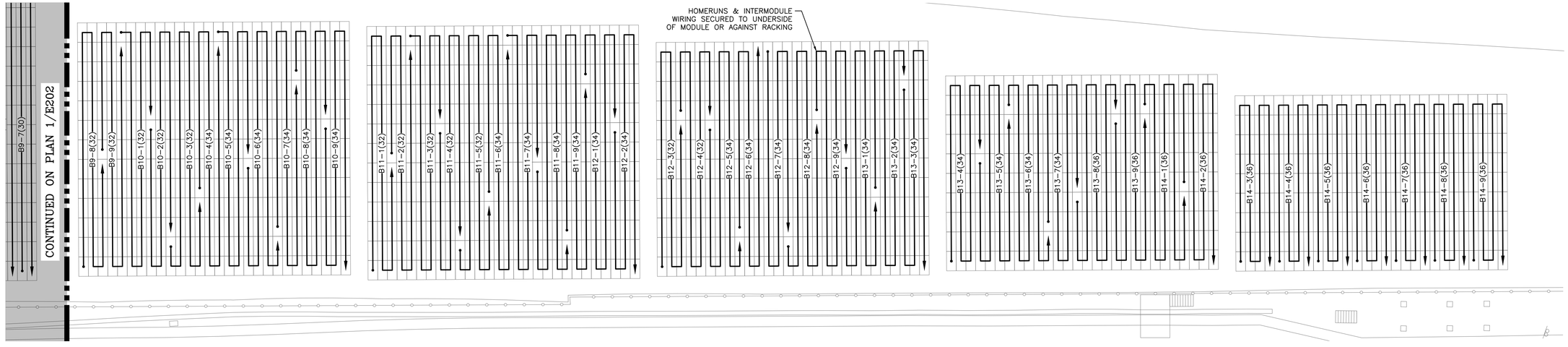
1 E202 PARTIAL DC ELECTRICAL PLAN
SCALE: 1" = 20'

CONDUIT FILL TABLE (PVWIRE, 2000VDC MAX) - #10 WIRE GAUGE		
MAXIMUM NUMBER OF CU #10 PV WIRES. (WITH ALLOWANCE FOR AN ADDITIONAL GROUND WIRE)		
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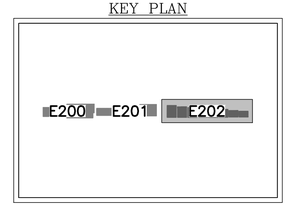
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2 E202 PARTIAL DC ELECTRICAL PLAN
SCALE: 1" = 20'

KEY PLAN



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STRING LABEL KEY

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- STRING #
- INVERTER #

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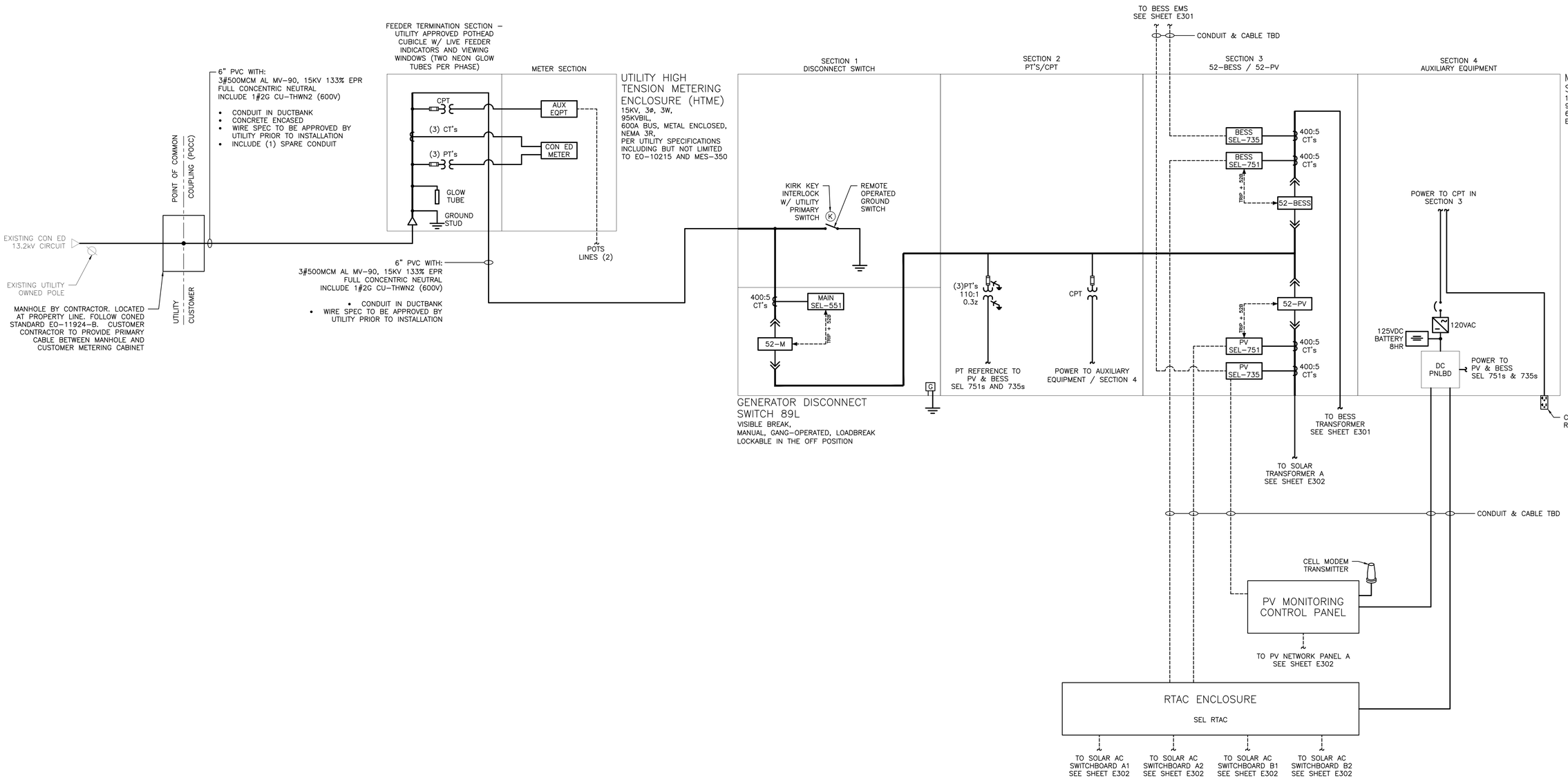
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4 VETERANS PLAZA
CROTON–ON–HUDSON, NY 10520

DRAWING TITLE: PARTIAL DC ELECTRICAL PLAN

DRAWING #: E202

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



GENERAL NOTES
1. EMS OF THE BATTERY SYSTEM WILL LIMIT TOTAL BATTERY OUTPUT TO 5.0MW–AC AT ANY TIME.
2. HTME FOLLOWS CONED EO–10215 AND MS350

POWIN STACK OS EMS OPERATION AND NET–EXPORT CONTROL NOTES
1. POWIN STACK OS EMS SHALL MAINTAIN THE HEALTH AND SAFETY OF THE BESS AND ITS COMPONENT BATTERY CELLS PER THE STANDARD POWIN PRODUCT GUIDELINES
2. POWIN STACK OS EMS IS THE PRIMARY CONTROLLER TO LIMIT THE NET–EXPORT OF THE FACILITY TO 5.0MW–AC OR LESS. IF THE POWIN STACK OS FAILS TO LIMIT EXPORT, THEN THE SECONDARY NET–EXPORT CONTROL WILL BE MANAGED BY THE SEPARATE SEL RTAC (OR EQUIVALENT) LOCATED AT THE MAIN SWITCHGEAR.
3. POWIN STACK OS EMS SHALL MEASURE INSTANTANEOUS POWER READING AT PV AND BESS INTERCONNECTION BREAKER POWER METERS (SEL–735) AND LIMIT BATTERY EXPORT SO THAT PV + BESS EXPORT DOES NOT EXCEED A SET THRESHOLD (5.0MW–AC). TWO EXAMPLES ARE TO LIMIT PROJECT AGGREGATE EXPORT TO 5.0MW–AC TO COMPLY WITH THE NY VDER PROGRAM AND TO LIMIT EXPORT TO SATISFY LOCAL GRID HOSTING CAPACITY REQUIREMENTS.
4. POWIN STACK OS EMS SHALL AUTONOMOUSLY OPERATE ON A SET DISPATCH SCHEDULE, PROVIDED IT DOES NOT VIOLATE THE POWER EXPORT THRESHOLD OR HEALTH AND SAFETY OF THE BESS.

SEL RTAC (OR EQUIVALENT) NET–EXPORT CONTROL NOTES
1. PV + BESS SUM TOTAL OUTPUT MUST NEVER EXCEED 5.0MW–AC. THE PV AND BESS SEL–751 PROVIDE A DATA INPUT TO A SEPARATE AUTOMATION DEVICE (SEL RTAC OR EQUIVALENT). THE SEL RTAC SUMS THE TOTAL POWER FROM THE TWO CURRENT INPUTS AND COMPARES AGAINST THE 5.0MW–AC SET POINT.
2. IF THE SUM TOTAL POWER EXCEEDS 5.0MW–AC, THE SEL RTAC TRIPS OFF LINE THE SOLAR AC DISCONNECTS "A1" & "A2". AFTER SOME DELAY, IF THE SUM TOTAL POWER STILL EXCEEDS 5.0MW–AC, THE SEL RTAC TRIPS OFF LINE THE SOLAR AC DISCONNECTS "B1" & "B2". THIS SCHEME WILL TRIP OFF LINE 1/2 OF THE PV PLANT AS THE FIRST PROTECTION RESPONSE AFTER EXCEEDING 5.0MW–AC, AND THE 2ND 1/2 OF THE PV PLANT AS THE SECOND PROTECTION RESPONSE.
3. FINAL RELAY SETTINGS WILL BE COORDINATED WITH UTILITY IN ACCORDANCE WITH THE RESULTS OF THE INTERCONNECTION STUDIES.

SHEET NOTES:
1. CONTRACTOR SHALL FIELD–VERIFY INTERCONNECTION MEANS/METHODS PRIOR TO INSTALLATION. COORDINATED SHUTDOWN MAY BE REQUIRED.
2. PROVIDE TORQUE MARKS INSIDE INVERTERS.
3. ALL GROUND BARS AND LUGS SHALL BE DUAL RATED AL/CU
4. SET ELECTRONIC–TRIP BREAKERS TO THE SETTINGS BELOW, UNLESS OTHERWISE NOTED IN POWER STUDY. "NOMINAL TRIP" REFERS TO BREAKER TRIP RATING INDICATED ON ONELINE. SETTINGS BELOW ARE NOT FOR COORDINATION PURPOSES.
   - L = 100% OF NOMINAL TRIP (EXACT) MINIMUM TIME DELAY
   - S = 125% OF NOMINAL TRIP (OR NEXT HIGHER) MINIMUM TIME DELAY
   - I = 150% OF NOMINAL TRIP (OR NEXT HIGHER)
   - G = 20% OF NOMINAL TRIP (OR NEXT HIGHER) 0.5 SEC TIME DELAY

1 E300 ONE LINE DIAGRAM – MEDIUM VOLTAGE
SCALE: NONE

DRAWING TITLE: ONE LINE DIAGRAM MEDIUM VOLTAGE

DRAWING # E300

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

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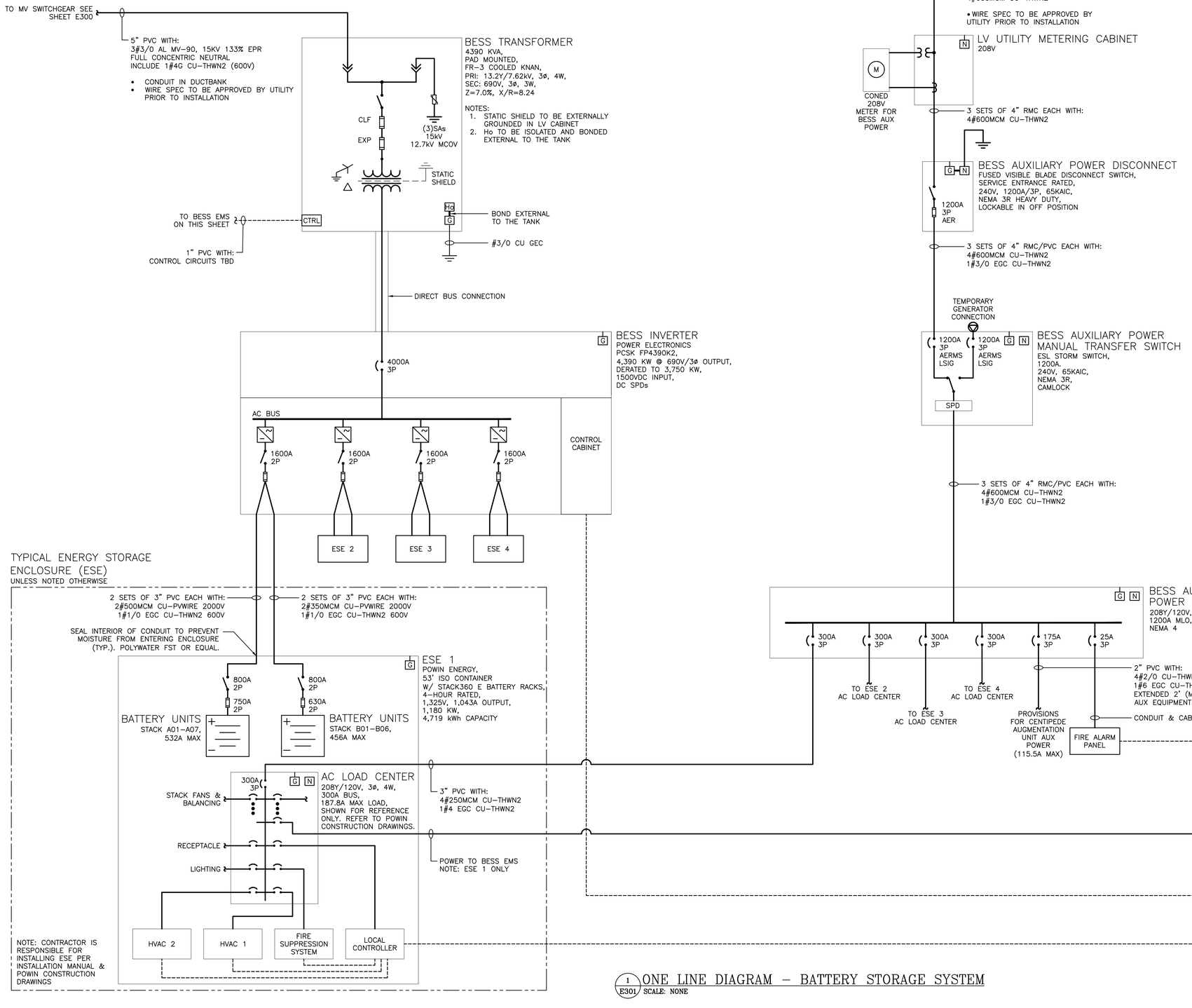
PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT–SAEE HT72–18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON–HARMON
4 VETERANS PLAZA
CROTON–ON–HUDSON, NY 10520

PLOT DATE: 9/26/2022 2:43 PM
RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM



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1 E301 ONE LINE DIAGRAM - BATTERY STORAGE SYSTEM
SCALE: NONE

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

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PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.85 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAAE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: ONE LINE DIAGRAM BATTERY STORAGE SYSTEM

DRAWING #: E301

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM

PV EQUIPMENT PAD A | PV EQUIPMENT PAD B

TO MV SWITCHGEAR SEE SHEET E300

5" PVC WITH:
3#2/0 AL MV-90, 15KV 133% EPR
FULL CONCENTRIC NEUTRAL
INCLUDE 1#4G CU-THWN2 (600V)

- CONDUIT IN DUCTBANK
- WIRE SPEC TO BE APPROVED BY UTILITY PRIOR TO INSTALLATION

SOLAR TRANSFORMER A

1875 KVA,
PAD MOUNTED,
FR-3 COOLED KNAN,
PRI: 13.2Y/7.62kV, 3ø, 4W,
SEC: 480Y/277V, 3ø, 4W,
Z=5.75%, X/R=7.25

NOTES:
1. STATIC SHIELD TO BE EXTERNALLY GROUNDED IN LV CABINET
2. Ho AND Xo TO BE ISOLATED AND BONDED EXTERNAL TO THE TANK

CLF
EXP
STATIC SHIELD
Ho
Xo
G
BOND EXTERNAL TO THE TANK
#3/0 CU GEC

TO PV NETWORK PANEL A ON THIS SHEET
CTRL
1" PVC WITH:
CONTROL CIRCUITS TBD

TO SEL RTAC SEE SHEET E300
4 SETS OF 4" PVC EACH WITH:
4#600MCM AL-XHHW2
1#3/0 SSBJ AL-XHHW2

SOLAR AC SWITCHBOARD A1

480Y/277V, 3ø, 4W,
1200A BUS, 65KAIC,
100% CONTINUOUS RATED,
MCB LOCKABLE IN OFF POSITION,
NEMA 3R

1200A 3P AERMS, LSI
ST
G N
SPD

52IT-A1 200A 3P
52IT-A2 200A 3P
52IT-A3 200A 3P
52IT-A4 200A 3P
52IT-A5 200A 3P
52IT-A6 200A 3P
52IT-A7 200A 3P

INVERTER A1
INVERTER A2
INVERTER A3
INVERTER A4
INVERTER A5
INVERTER A6

TO SEL RTAC SEE SHEET E300
4 SETS OF 4" PVC EACH WITH:
4#600MCM AL-XHHW2
1#3/0 SSBJ AL-XHHW2

SOLAR AC SWITCHBOARD A2

480Y/277V, 3ø, 4W,
1200A BUS, 65KAIC,
100% CONTINUOUS RATED,
MCB LOCKABLE IN OFF POSITION,
NEMA 3R

1200A 3P AERMS, LSI
ST
G N
SPD

52IT-A8 200A 3P
52IT-A9 200A 3P
52IT-A10 200A 3P
52IT-A11 200A 3P
52IT-A12 200A 3P
52IT-A13 200A 3P
15A 2P

1" EMT WITH:
2#12 CU-THWN2
1#12 EGC CU-THWN2

INVERTER A8
INVERTER A9
INVERTER A10
INVERTER A11
INVERTER A12 #8 PV WIRE
INVERTER A13 #8 PV WIRE

SOLAR TRANSFORMER A ON THIS SHEET
1" PVC WITH: FIBER
PV NETWORK PANEL A
PV MONITORING CONTROL PANEL. SEE SHEET E300
PV NETWORK PANEL B ON THIS SHEET
3/4" PVC WITH: BELDEN 3106DB (DATA)
3/4" PVC/RMC WITH: BELDEN 3106DB (DATA), 2#12 & 1#12 EGC CU-THWN2 (24VDC)
DAISY CHAIN TO SYSTEM A INVERTERS. LAST DEVICE IN THE DAISY CHAIN WITH EOL RESISTOR PER MONITORING & INVERTER INSTRUCTIONS.
WEATHER STATION

4" PVC WITH:
3#2 AL MV-90, 15KV 133% EPR
FULL CONCENTRIC NEUTRAL
INCLUDE 1#4G CU-THWN2 (600V)

- CONDUIT IN DUCTBANK
- WIRE SPEC TO BE APPROVED BY UTILITY PRIOR TO INSTALLATION

SOLAR TRANSFORMER B

1875 KVA,
PAD MOUNTED,
FR-3 COOLED KNAN,
PRI: 13.2Y/7.62kV, 3ø, 4W,
SEC: 480Y/277V, 3ø, 4W,
Z=5.75%, X/R=7.25

NOTES:
1. STATIC SHIELD TO BE EXTERNALLY GROUNDED IN LV CABINET
2. Ho AND Xo TO BE ISOLATED AND BONDED EXTERNAL TO THE TANK

CLF
EXP
(3)SAs 15kV 12.7kV MCOV
STATIC SHIELD
Ho
Xo
G
BOND EXTERNAL TO THE TANK
#3/0 CU GEC

TO PV NETWORK PANEL B ON THIS SHEET
CTRL
1" PVC WITH:
CONTROL CIRCUITS TBD

TO SEL RTAC SEE SHEET E300
4 SETS OF 4" PVC EACH WITH:
4#600MCM AL-XHHW2
1#3/0 SSBJ AL-XHHW2

SOLAR AC SWITCHBOARD B1

480Y/277V, 3ø, 4W,
1200A BUS, 65KAIC,
100% CONTINUOUS RATED,
MCB LOCKABLE IN OFF POSITION,
NEMA 3R

1200A 3P AERMS, LSI
ST
G N
SPD

52IT-B1 200A 3P
52IT-B2 200A 3P
52IT-B3 200A 3P
52IT-B4 200A 3P
52IT-B5 200A 3P
52IT-B6 200A 3P
52IT-B7 200A 3P

INVERTER B1 #8 PV WIRE
INVERTER B2 #8 PV WIRE
INVERTER B3 #8 PV WIRE
INVERTER B4 #8 PV WIRE
INVERTER B5
INVERTER B6
INVERTER B7

TO SEL RTAC SEE SHEET E300
4 SETS OF 4" PVC EACH WITH:
4#600MCM AL-XHHW2
1#3/0 SSBJ AL-XHHW2

SOLAR AC SWITCHBOARD B2

480Y/277V, 3ø, 4W,
1200A BUS, 65KAIC,
100% CONTINUOUS RATED,
MCB LOCKABLE IN OFF POSITION,
NEMA 3R

1200A 3P AERMS, LSI
ST
G N
SPD

52IT-B8 200A 3P
52IT-B9 200A 3P
52IT-B10 200A 3P
52IT-B11 200A 3P
52IT-B12 200A 3P
52IT-B13 200A 3P
52IT-B14 200A 3P
15A 2P

1" EMT WITH:
2#12 CU-THWN2
1#12 EGC CU-THWN2

INVERTER B8
INVERTER B9
INVERTER B10
INVERTER B11
INVERTER B12 #8 PV WIRE
INVERTER B13 #8 PV WIRE
INVERTER B14 #8 PV WIRE

PV NETWORK PANEL B
PV NETWORK PANEL A ON THIS SHEET
SOLAR TRANSFORMER B ON THIS SHEET
3/4" PVC WITH: BELDEN 3106DB (DATA)
DAISY CHAIN TO SYSTEM B INVERTERS. LAST DEVICE IN THE DAISY CHAIN WITH EOL RESISTOR PER MONITORING & INVERTER INSTRUCTIONS.

TYPICAL PV INVERTER

UNLESS NOTED OTHERWISE

SWITCH TO LFMC FOR FINAL 24" AT CONNECTION TO INVERTER
2.5" PVC/EMT WITH: 3#4/0 AL-XHHW2 1#4 EGC AL-XHHW2
INSTALL WIRES WITH S-CURVE OR LOOP TO ALLOW SLACK FOR TENSION RELIEF
FACTORY INSTALLED JUMPER FOR OPERATION WITH NO N CONDUCTOR

INVERTER A7

SOLAREDGE SE120KUS,
120KW/120KVA @ 480V/3ø OUTPUT,
1000VDC INPUT,
FUNCTIONAL GROUND,
DC GFCI & AFCI,
DC & AC SPDs

INTEGRAL COMBINER BOX & DC SWITCH
SAFETOUCH FUSE HOLDERS WITH 25A FUSES
DC SPRING CLAMP TERMINALS
INSTALL WITH 3" DIAMETER LOOP TO FACILITATE CLAMP METER ACCESS.
A7-1 A7-2 A7-3 A7-4 A7-5 A7-6 A7-7 A7-8 A7-9 A7-10 A7-11 A7-12

INVERTER INSTALLATION NOTES:
1. TORQUE AC & DC TERMINALS PER INSTALL MANUAL, APPLY TORQUE MARKS.
2. AC OUTPUT CONDUCTORS MUST BE LANDED IN THE INVERTER WITH ONE-HOLE COMPRESSION LUGS. VERIFY MANUAL FOR SIZING.

TYPICAL STRING WIRING

REFER TO E200 FOR STRING LENGTHS AND OPTIMIZER QUANTITY

#10 (UNLESS OTHERWISE NOTED) CU PV WIRE 1000V, 90°C, +RED, -BLACK WITH #10 EGC CU GREEN THWN. RUN #6 EGC WHERE NOT PROTECTED FROM PHYSICAL DAMAGE. SEE E001 FOR CONDUCTOR INSTALLATION NOTES.

INSTALL STRING # LABELS (TYPICAL) ON BOTH ENDS OF POSITIVE AND NEGATIVE HOMERUNS USING HEAT SHRINK LABELS SUITABLE FOR THE ENVIRONMENT

MODULE LEVEL POWER ELECTRONICS SOLAREDGE P1100

FIELD INSTALLED CONNECTOR, 1000V RATED, MATCH MFG & MODEL ON MODULE. RECONFIRM UPON MODULE & OPTIMIZER DELIVERY TO SITE, DATA SHEETS MAY NOT BE ACCURATE (TYPICAL)

NOTE: BOND MLPE TO RACKING OR MODULE FRAME PER MANUFACTURERS INSTRUCTIONS.

SHEET NOTES:
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3. ALL GROUND BARS AND LUGS SHALL BE DUAL RATED AL/CU
4. SET ELECTRONIC-TRIP BREAKERS TO THE SETTINGS BELOW, UNLESS OTHERWISE NOTED IN POWER STUDY. "NOMINAL TRIP" REFERS TO BREAKER TRIP RATING INDICATED ON ONELINE. SETTINGS BELOW ARE NOT FOR COORDINATION PURPOSES.
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   - I = 150% OF NOMINAL TRIP (OR NEXT HIGHER)
   - G = 20% OF NOMINAL TRIP (OR NEXT HIGHER) 0.5 SEC TIME DELAY

1 E302 ONE LINE DIAGRAM - PV SYSTEM
SCALE: NONE

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

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CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
WALDWICK, NJ 07463
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EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

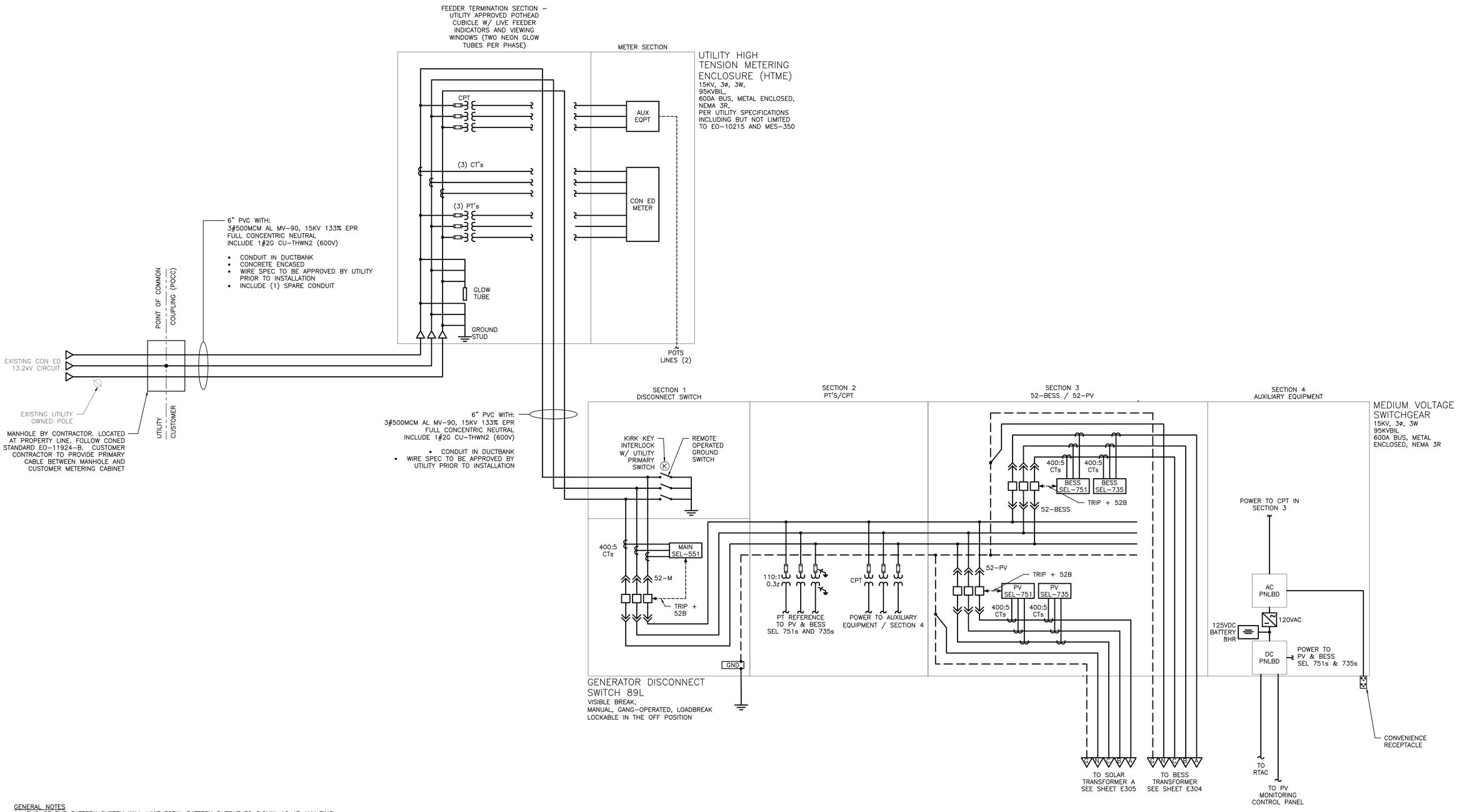
PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: ONE LINE DIAGRAM PV SYSTEM

DRAWING #: E302

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM



GENERAL NOTES
1. EMS OF THE BATTERY SYSTEM WILL LIMIT TOTAL BATTERY OUTPUT TO 5.0MW–AC AT ANY TIME.
2. HTME FOLLOWS CONED EO–10215 AND MS350

POWIN STACK OS EMS OPERATION AND NET–EXPORT CONTROL NOTES
1. POWIN STACK OS EMS SHALL MAINTAIN THE HEALTH AND SAFETY OF THE BESS AND ITS COMPONENT BATTERY CELLS PER THE STANDARD POWIN PRODUCT GUIDELINES
2. POWIN STACK OS EMS IS THE PRIMARY CONTROLLER TO LIMIT THE NET–EXPORT OF THE FACILITY TO 5.0MW–AC OR LESS. IF THE POWIN STACK OS FAILS TO LIMIT EXPORT, THEN THE SECONDARY NET–EXPORT CONTROL WILL BE MANAGED BY THE SEPARATE SEL RTAC (OR EQUIVALENT) LOCATED AT THE MAIN SWITCHGEAR.
3. POWIN STACK OS EMS SHALL MEASURE INSTANTANEOUS POWER READING AT PV AND BESS INTERCONNECTION BREAKER POWER METERS (SEL–735) AND LIMIT BATTERY EXPORT SO THAT PV + BESS EXPORT DOES NOT EXCEED A SET THRESHOLD (5.0MW–AC). TWO EXAMPLES ARE TO LIMIT PROJECT AGGREGATE EXPORT TO 5.0MW–AC TO COMPLY WITH THE NY VDER PROGRAM AND TO LIMIT EXPORT TO SATISFY LOCAL GRID HOSTING CAPACITY REQUIREMENTS.
4. POWIN STACK OS EMS SHALL AUTONOMOUSLY OPERATE ON A SET DISPATCH SCHEDULE, PROVIDED IT DOES NOT VIOLATE THE POWER EXPORT THRESHOLD OR HEALTH AND SAFETY OF THE BESS.

SEL RTAC (OR EQUIVALENT) NET–EXPORT CONTROL NOTES
1. PV + BESS SUM TOTAL OUTPUT MUST NEVER EXCEED 5.0MW–AC. THE PV AND BESS SEL–751 PROVIDE A DATA INPUT TO A SEPARATE AUTOMATION DEVICE (SEL RTAC OR EQUIVALENT). THE SEL RTAC SUMS THE TOTAL POWER FROM THE TWO CURRENT INPUTS AND COMPARES AGAINST THE 5.0MW–AC SET POINT.
2. IF THE SUM TOTAL POWER EXCEEDS 5.0MW–AC, THE SEL RTAC TRIPS OFF LINE THE SOLAR AC DISCONNECTS "A1" & "A2". AFTER SOME DELAY, IF THE SUM TOTAL POWER STILL EXCEEDS 5.0MW–AC, THE SEL RTAC TRIPS OFF LINE THE SOLAR AC DISCONNECTS "B1" & "B2". THIS SCHEME WILL TRIP OFF LINE 1/2 OF THE PV PLANT AS THE FIRST PROTECTION RESPONSE AFTER EXCEEDING 5.0MW–AC, AND THE 2ND 1/2 OF THE PV PLANT AS THE SECOND PROTECTION RESPONSE.
3. FINAL RELAY SETTINGS WILL BE COORDINATED WITH UTILITY IN ACCORDANCE WITH THE RESULTS OF THE INTERCONNECTION STUDIES.

SHEET NOTES:
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1 E303 THREE LINE DIAGRAM – MEDIUM VOLTAGE
SCALE: NONE

DATE	REVISION DESCRIPTION	PM	ENG	CHK
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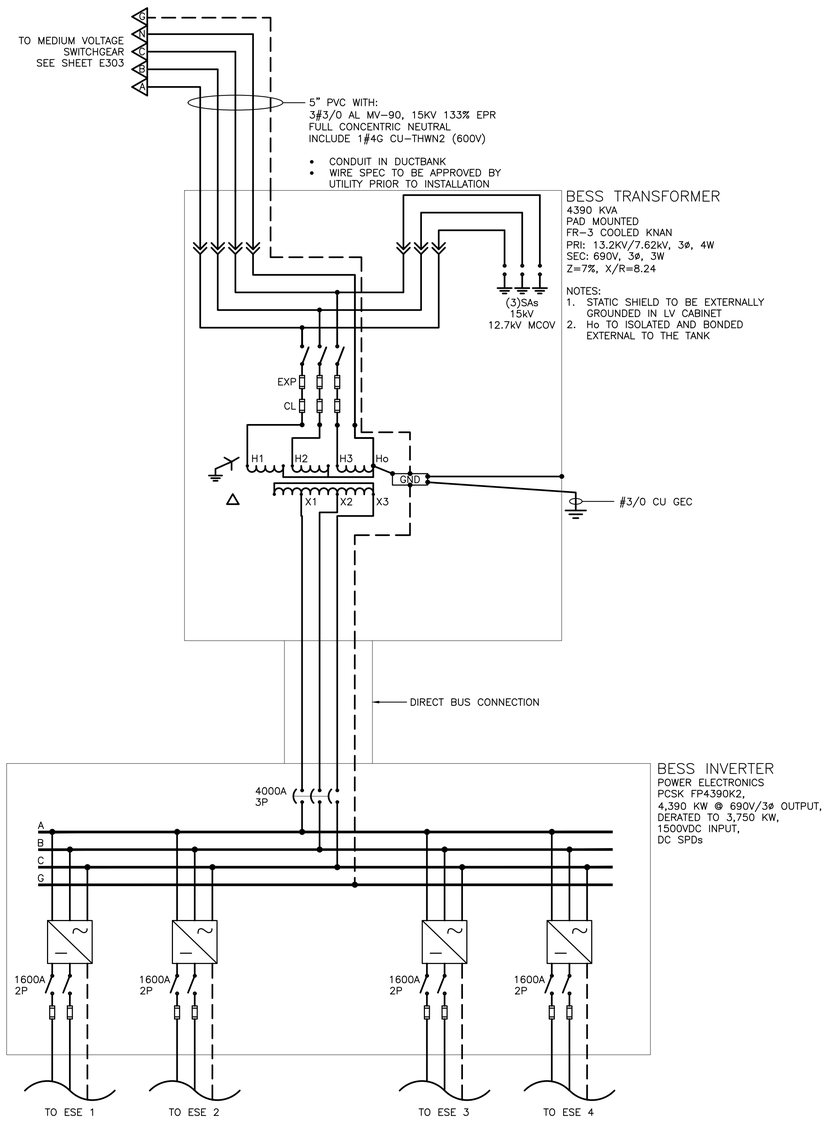
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MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

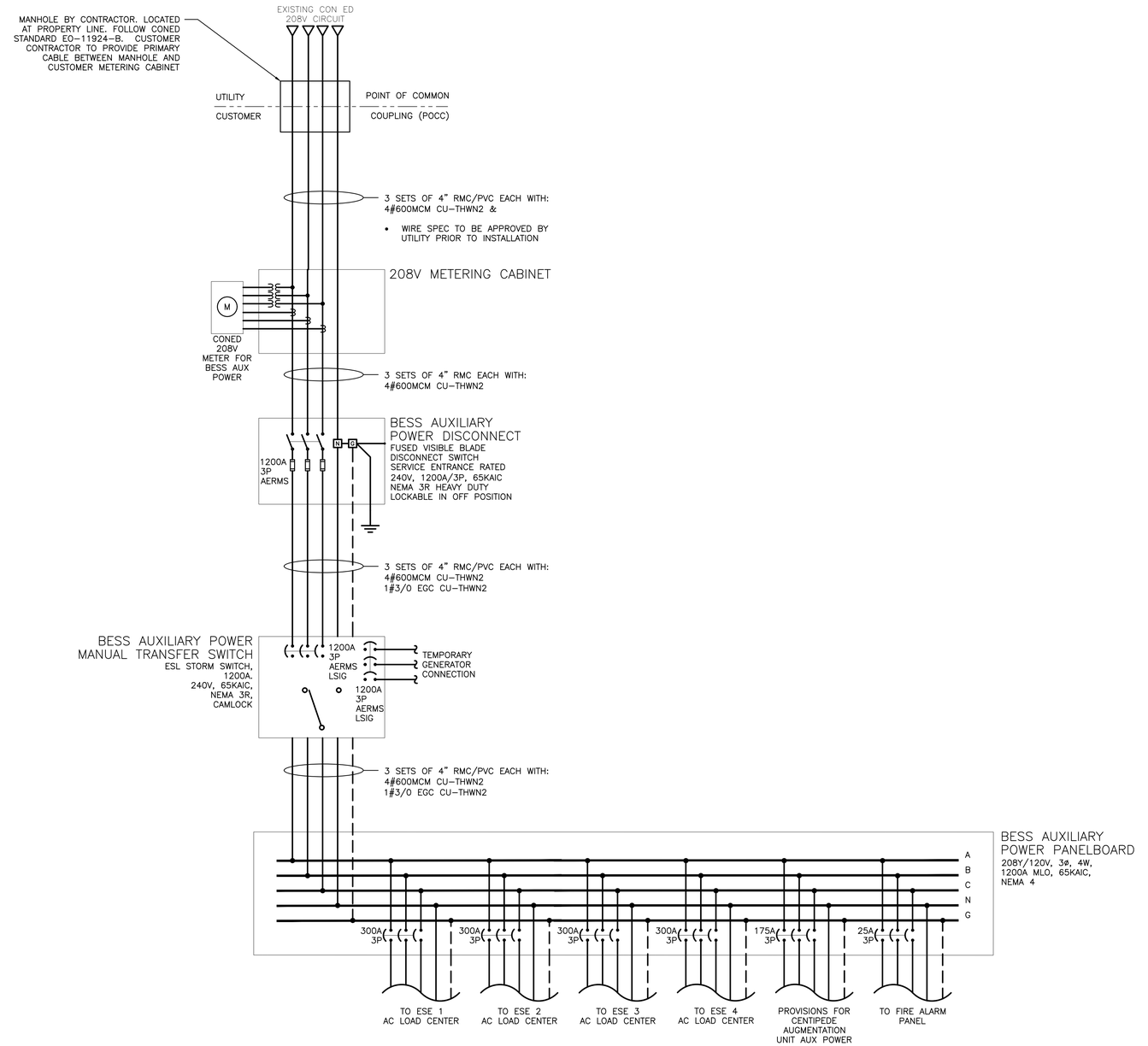
PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON–HARMON
4 VETERANS PLAZA
CROTON–ON–HUDSON, NY 10520

DRAWING TITLE: THREE LINE DIAGRAM MEDIUM VOLTAGE

DRAWING #: E303

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18





SHEET NOTES:
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1 / E304 THREE LINE DIAGRAM – BATTERY STORAGE SYSTEM
SCALE: NONE

DRAWING TITLE	DRAWING #
THREE LINE DIAGRAM BATTERY STORAGE SYSTEM	E304

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
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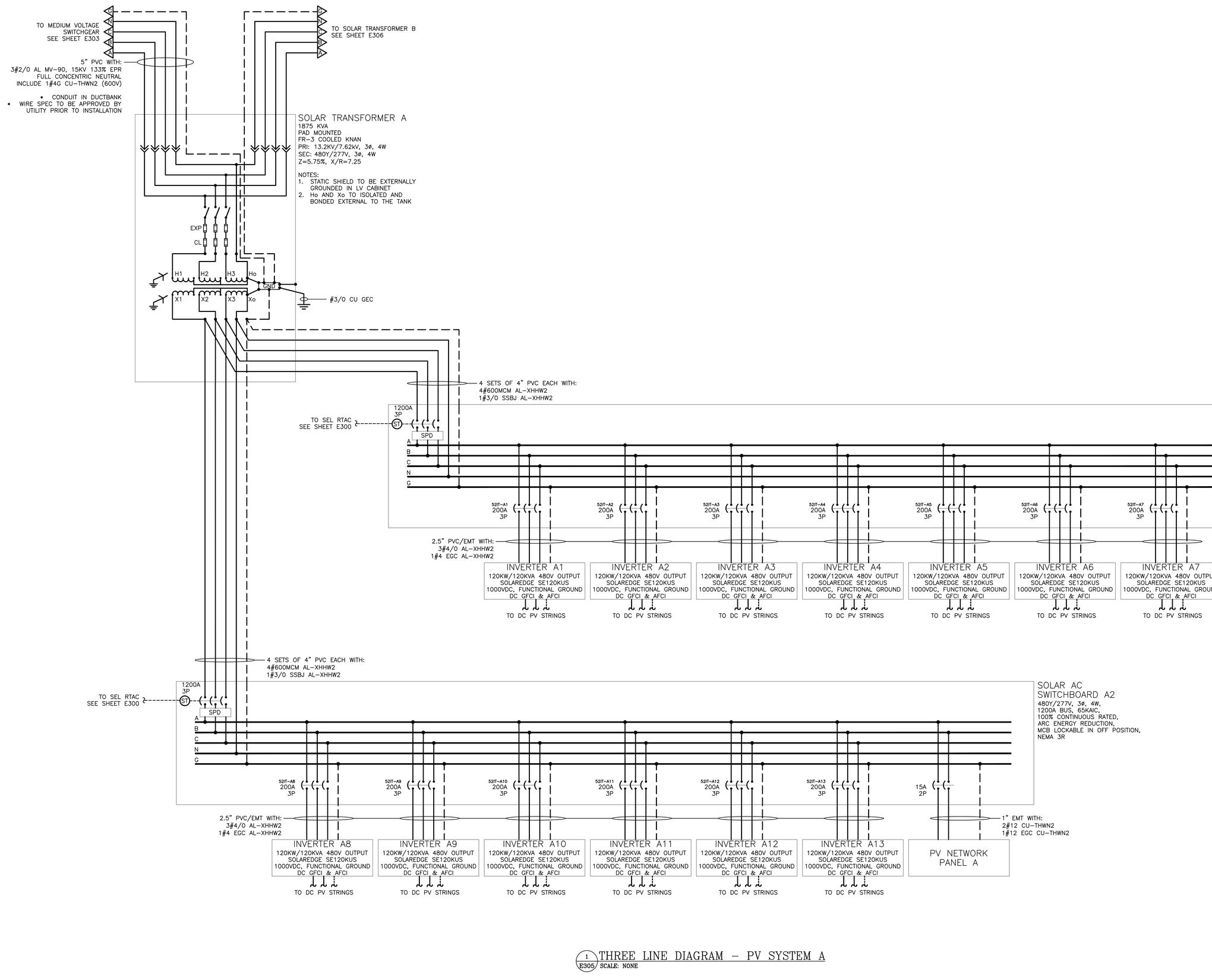
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PV DC SYSTEM SIZE: 4,325.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

RULER IN INCHES:

PLOT DATE: 9/26/2022 2:43 PM



1 E305 THREE LINE DIAGRAM – PV SYSTEM A
SCALE: NONE

SHEET NOTES:
1. CONTRACTOR SHALL FIELD-VERIFY INTERCONNECTION MEANS/METHODS PRIOR TO INSTALLATION. COORDINATED SHUTDOWN MAY BE REQUIRED.
2. PROVIDE TORQUE MARKS INSIDE INVERTERS.
3. ALL GROUND BARS AND LUGS SHALL BE DUAL RATED AL/CU
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   - S = 125% OF NOMINAL TRIP (OR NEXT HIGHER) MINIMUM TIME DELAY
   - I = 150% OF NOMINAL TRIP (OR NEXT HIGHER)
   - G = 20% OF NOMINAL TRIP (OR NEXT HIGHER) 0.5 SEC TIME DELAY

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

PUREPOWER ENGINEERING
111 RIVER STREET HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE SUITE 200
MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

PAGE SIZE: 36" x 24"
PROJECT # 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

DRAWING TITLE: THREE LINE DIAGRAM PV SYSTEM A

DRAWING # E305

PLOT DATE: 9/26/2022 2:43 PM

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM

TO SOLAR TRANSFORMER A SEE SHEET E305

4" PVC WITH:
3#2 AL MV-90, 15KV 133% EPR
FULL CONCENTRIC NEUTRAL
INCLUDE 1#4G CU-THWN2 (600V)

- CONDUIT IN DUCTBANK
- WIRE SPEC TO BE APPROVED BY UTILITY PRIOR TO INSTALLATION

SOLAR TRANSFORMER A

1875 KVA
PAD MOUNTED
FR-3 COOLED KNAN
PRI: 13.2KV/7.62kV, 3ø, 4W
SEC: 480Y/277V, 3ø, 4W
Z=5.75%, X/R=7.25

NOTES:
1. STATIC SHIELD TO BE EXTERNALLY GROUNDED IN LV CABINET
2. Ho AND Xo TO ISOLATED AND BONDED EXTERNAL TO THE TANK

(3)SAs
15kV
12.7kV MCOV

EXP
CL
H1 H2 H3 Ho
X1 X2 X3 Xo
GND

#3/0 CU GEC

4 SETS OF 4" PVC EACH WITH:
4#600MCM AL-XHHW2
1#3/0 SSBJ AL-XHHW2

TO SEL RTAC SEE SHEET E300

1200A 3P
ST
SPD
A
B
C
N
G

SOLAR AC SWITCHBOARD B1

480Y/277V, 3ø, 4W,
1200A BUS, 65KAIC,
100% CONTINUOUS RATED,
ARC ENERGY REDUCTION,
MCB LOCKABLE IN OFF POSITION,
NEMA 3R

52IT-B1 200A 3P
52IT-B2 200A 3P
52IT-B3 200A 3P
52IT-B4 200A 3P
52IT-B5 200A 3P
52IT-B6 200A 3P
52IT-B7 200A 3P

2.5" PVC/EMT WITH:
3#4/0 AL-XHHW2
1#4 EGC AL-XHHW2

INVERTER B1	INVERTER B2	INVERTER B3	INVERTER B4	INVERTER B5	INVERTER B6	INVERTER B7
120KW/120KVA 480V OUTPUT SOLAREDGE SE120KUS 1000VDC, FUNCTIONAL GROUND DC GFCI & AFCI						
TO DC PV STRINGS						

4 SETS OF 4" PVC EACH WITH:
4#600MCM AL-XHHW2
1#3/0 SSBJ AL-XHHW2

TO SEL RTAC SEE SHEET E300

1200A 3P
ST
SPD
A
B
C
N
G

SOLAR AC SWITCHBOARD B2

480Y/277V, 3ø, 4W,
1200A BUS, 65KAIC,
100% CONTINUOUS RATED,
ARC ENERGY REDUCTION,
MCB LOCKABLE IN OFF POSITION,
NEMA 3R

52IT-B8 200A 3P
52IT-B9 200A 3P
52IT-B10 200A 3P
52IT-B11 200A 3P
52IT-B12 200A 3P
52IT-B13 200A 3P
52IT-B14 200A 3P
15A 2P

2.5" PVC/EMT WITH:
3#4/0 AL-XHHW2
1#4 EGC AL-XHHW2

1" EMT WITH:
2#12 CU-THWN2
1#12 EGC CU-THWN2

INVERTER B8	INVERTER B9	INVERTER B10	INVERTER B11	INVERTER B12	INVERTER B13	INVERTER B14	PV NETWORK PANEL B
120KW/120KVA 480V OUTPUT SOLAREDGE SE120KUS 1000VDC, FUNCTIONAL GROUND DC GFCI & AFCI							
TO DC PV STRINGS							

SHEET NOTES:
1. CONTRACTOR SHALL FIELD-VERIFY INTERCONNECTION MEANS/METHODS PRIOR TO INSTALLATION. COORDINATED SHUTDOWN MAY BE REQUIRED.
2. PROVIDE TORQUE MARKS INSIDE INVERTERS.
3. ALL GROUND BARS AND LUGS SHALL BE DUAL RATED AL/CU
4. SET ELECTRONIC-TRIP BREAKERS TO THE SETTINGS BELOW, UNLESS OTHERWISE NOTED IN POWER STUDY. "NOMINAL TRIP" REFERS TO BREAKER TRIP RATING INDICATED ON ONELINE. SETTINGS BELOW ARE NOT FOR COORDINATION PURPOSES.
   - L = 100% OF NOMINAL TRIP (EXACT) MINIMUM TIME DELAY
   - S = 125% OF NOMINAL TRIP (OR NEXT HIGHER) MINIMUM TIME DELAY
   - I = 150% OF NOMINAL TRIP (OR NEXT HIGHER)
   - G = 20% OF NOMINAL TRIP (OR NEXT HIGHER) 0.5 SEC TIME DELAY

1 E306 THREE LINE DIAGRAM - PV SYSTEM B
SCALE: NONE

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
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EPC CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT # 04001

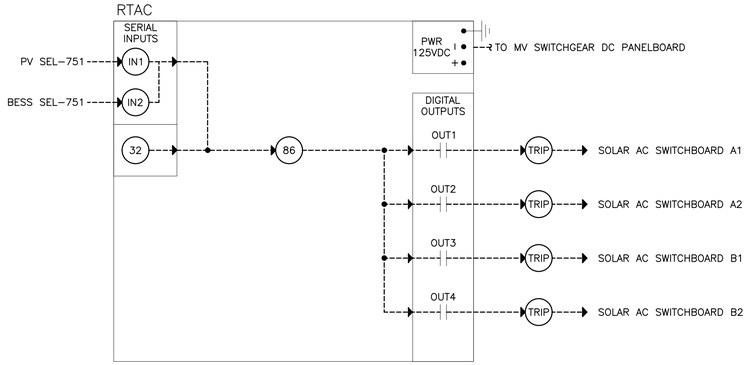
PV DC SYSTEM SIZE: 4,225.65 kW
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MODULE TYPE: HT-SAEE HT72-18X 550W
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PROJECT
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CROTON-HARMON
4 VETERANS PLAZA
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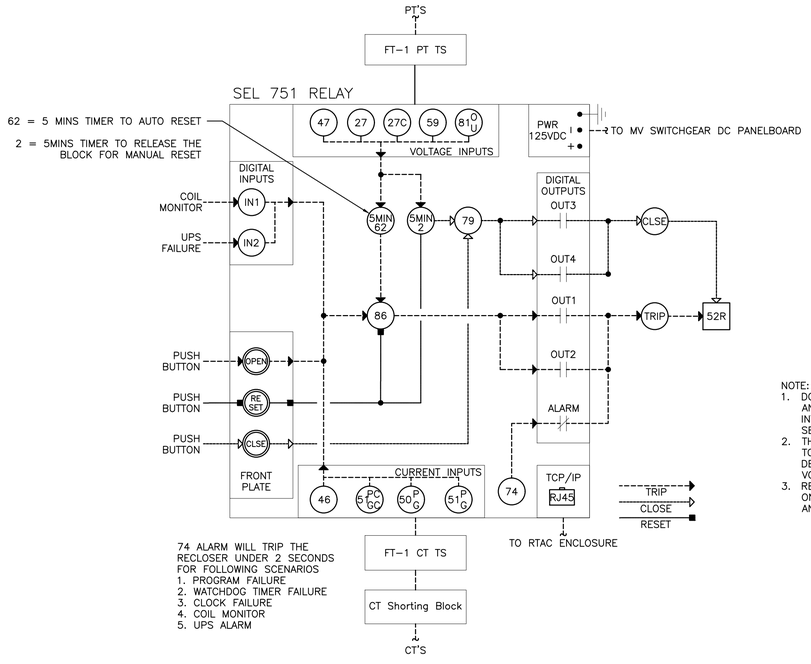
DRAWING TITLE
THREE LINE DIAGRAM
PV SYSTEM B

DRAWING #
E306

PLOT DATE: 9/26/2022 2:43 PM



1 E307 RTAC FUNCTIONAL DIAGRAM
SCALE: NONE



2 E307 RELAY FUNCTIONAL DIAGRAM
SCALE: NONE

NOTE:
1. DG MUST CHECK FOR HEALTHY VOLTAGE AND FREQUENCY FOR 5 MINUTES BEFORE INTERCONNECTING AS INDICATED IN RELAY SETTING TABLE.
2. THE DG SHALL NOT CONNECT OR RETURN TO SERVICE FOLLOWING A TRIP UNTIL DETECTING 5 MINUTES OF HEALTHY UTILITY VOLTAGE AND FREQUENCY.
3. RELAY WILL TRIP THE CUSTOMER BREAKER ON LOSS OF DC POWER, HARDWARE FAULT AND PROGRAM FAULT UNDER 2 SECONDS.

GENERAL NOTES
1. EMS OF THE BATTERY SYSTEM WILL LIMIT TOTAL BATTERY OUTPUT TO 5.0MW-AC AT ANY TIME.
2. HTME FOLLOWS CONED EO-10215 AND MS350

POWIN STACK OS EMS OPERATION AND NET-EXPORT CONTROL NOTES
1. POWIN STACK OS EMS SHALL MAINTAIN THE HEALTH AND SAFETY OF THE BESS AND ITS COMPONENT BATTERY CELLS PER THE STANDARD POWIN PRODUCT GUIDELINES
2. POWIN STACK OS EMS IS THE PRIMARY CONTROLLER TO LIMIT THE NET-EXPORT OF THE FACILITY TO 5.0MW-AC OR LESS. IF THE POWIN STACK OS FAILS TO LIMIT EXPORT, THEN THE SECONDARY NET-EXPORT CONTROL WILL BE MANAGED BY THE SEPARATE SEL RTAC (OR EQUIVALENT) LOCATED AT THE MAIN SWITCHGEAR.
3. POWIN STACK OS EMS SHALL MEASURE INSTANTANEOUS POWER READING AT PV AND BESS INTERCONNECTION BREAKER POWER METERS (SEL-735) AND LIMIT BATTERY EXPORT SO THAT PV + BESS EXPORT DOES NOT EXCEED A SET THRESHOLD (5.0MW-AC). TWO EXAMPLES ARE TO LIMIT PROJECT AGGREGATE EXPORT TO 5.0MW-AC TO COMPLY WITH THE NY VDER PROGRAM AND TO LIMIT EXPORT TO SATISFY LOCAL GRID HOSTING CAPACITY REQUIREMENTS.
4. POWIN STACK OS EMS SHALL AUTONOMOUSLY OPERATE ON A SET DISPATCH SCHEDULE, PROVIDED IT DOES NOT VIOLATE THE POWER EXPORT THRESHOLD OR HEALTH AND SAFETY OF THE BESS.

SEL RTAC (OR EQUIVALENT) NET-EXPORT CONTROL NOTES
1. PV + BESS SUM TOTAL OUTPUT MUST NEVER EXCEED 5.0MW-AC. THE PV AND BESS SEL-751 PROVIDE A DATA INPUT TO A SEPARATE AUTOMATION DEVICE (SEL RTAC OR EQUIVALENT). THE SEL RTAC SUMS THE TOTAL POWER FROM THE TWO CURRENT INPUTS AND COMPARES AGAINST THE 5.0MW-AC SET POINT.
2. IF THE SUM TOTAL POWER EXCEEDS 5.0MW-AC, THE SEL RTAC TRIPS OFF LINE THE SOLAR AC DISCONNECTS "A1" & "A2". AFTER SOME DELAY, IF THE SUM TOTAL POWER STILL EXCEEDS 5.0MW-AC, THE SEL RTAC TRIPS OFF LINE THE SOLAR AC DISCONNECTS "B1" & "B2". THIS SCHEME WILL TRIP OFF LINE 1/2 OF THE PV PLANT AS THE FIRST PROTECTION RESPONSE AFTER EXCEEDING 5.0MW-AC, AND THE 2ND 1/2 OF THE PV PLANT AS THE SECOND PROTECTION RESPONSE.
3. FINAL RELAY SETTINGS WILL BE COORDINATED WITH UTILITY IN ACCORDANCE WITH THE RESULTS OF THE INTERCONNECTION STUDIES.

RTAC UNIT										
ANSI ELEMENT #	Unit	Pickup (Secondary)	Real (Primary)	Level	Def. Time Delay (S)	Time Dial (M=1.1)	Total Clear Time (s)*	Total Clear Time (cyc)*	Curve	Description
32	3PH kW	5000.00	5000.00	100.0%	0.05	-	0.10	6.00	-	Reverse/Export Power
32	3PH kW	5000.00	5000.00	100.0%	4.95	-	5.00	300.00	-	Reverse/Export Power
Solar&Storage System Base AC Size = 5000KVA							*Total Clear Time = 3 Cycle Breaker Plus Delay (Time Dial or DEF Time)			

3 E307 RTAC SETTINGS
SCALE: NONE

SEL 751 Relay										
ANSI ELEMENT #	Unit	Pickup (Secondary)	Real (Primary)	Level	Def. Time Delay (S)	Time Dial (M=1.1)	Total Clear Time (s)*	Total Clear Time (cyc)*	Curve	Description
27-1	L-N Volt	60.97	6706.50	88.0%	1.95	-	2.00	120.00	-	Slow UV
27-2	L-N Volt	34.64	3810.51	50.0%	1.05	-	1.10	66.00	-	Fast UV
59-1	L-N Volt	76.21	8383.13	110.0%	1.95	-	2.00	120.00	-	Slow OV
59-2	L-N Volt	77.60	8535.55	112.0%	0.11	-	0.16	9.60	-	Fast OV
79	L-N Volt	65.82	7239.97	95.0%	299.95	-	300.00	18000.00	-	Min Permissive Close Voltage
79	L-N Volt	72.75	8002.07	105.0%	299.95	-	300.00	18000.00	-	Max Permissive Close Voltage
81U-1	Hz	56.50	56.50	94.2%	0.11	-	0.16	9.60	-	Fast UF
81U-2	Hz	58.50	58.50	97.5%	299.95	-	300.00	18000.00	-	Slow UF
81O-1	Hz	62.00	62.00	103.3%	0.11	-	0.16	9.60	-	Fast OF
81O-2	Hz	61.20	61.20	102.0%	299.95	-	300.00	18000.00	-	Slow OF
79	Hz	59.50	59.50	99.2%	299.95	-	300.00	18000.00	-	Min Permissive Close Frequency
79	Hz	60.50	60.50	100.8%	299.95	-	300.00	18000.00	-	Max Permissive Close Frequency
51P	A	3.00	240.30	125.0%	-	2.0	54.12	3247.22	U4	Time Phase OC
50P	A	28.84	2306.88	1200.0%	0.00	-	0.05	3.00	-	Instantaneuos P OC
Battery System Base AC Size = 4390KVA			192.24A BASE PRIMARY USED FOR 50/51 ELEMENTS				*Total Clear Time = 3 Cycle Breaker Plus Delay (Time Dial or DEF Time)			
2.4A BASE SECONDARY 50/51P,G,Q							7621.02V BASE PRIMARY USED FOR 27/59 ELEMENTS			
P,G,Q CT RATIO FACTOR = 80							69.28V BASE SECONDARY USED FOR 27/59 ELEMENTS			
P CT = 400:5 1B0.2 C20 RF = 1 @ 30C							PT RATIO FACTOR = 110			

4 E307 BESS SYSTEM RELAY SETTINGS
SCALE: NONE

SEL 751 Relay										
ANSI ELEMENT #	Unit	Pickup (Secondary)	Real (Primary)	Level	Def. Time Delay (S)	Time Dial (M=1.1)	Total Clear Time (s)*	Total Clear Time (cyc)*	Curve	Description
27-1	L-N Volt	60.97	6706.50	88.0%	1.95	-	2.00	120.00	-	Slow UV
27-2	L-N Volt	34.64	3810.51	50.0%	1.05	-	1.10	66.00	-	Fast UV
59-1	L-N Volt	76.21	8383.13	110.0%	1.95	-	2.00	120.00	-	Slow OV
59-2	L-N Volt	77.60	8535.55	112.0%	0.11	-	0.16	9.60	-	Fast OV
79	L-N Volt	65.82	7239.97	95.0%	299.95	-	300.00	18000.00	-	Min Permissive Close Voltage
79	L-N Volt	72.75	8002.07	105.0%	299.95	-	300.00	18000.00	-	Max Permissive Close Voltage
81U-1	Hz	56.50	56.50	94.2%	0.11	-	0.16	9.60	-	Fast UF
81U-2	Hz	58.50	58.50	97.5%	299.95	-	300.00	18000.00	-	Slow UF
81O-1	Hz	62.00	62.00	103.3%	0.11	-	0.16	9.60	-	Fast OF
81O-2	Hz	61.20	61.20	102.0%	299.95	-	300.00	18000.00	-	Slow OF
79	Hz	59.50	59.50	99.2%	299.95	-	300.00	18000.00	-	Min Permissive Close Frequency
79	Hz	60.50	60.50	100.8%	299.95	-	300.00	18000.00	-	Max Permissive Close Frequency
51P	A	2.57	205.27	125.0%	-	2.0	54.12	3247.22	U4	Time Phase OC
50P	A	24.63	1970.57	1200.0%	0.00	-	0.05	3.00	-	Instantaneuos P OC
Solar System Base AC Size = 3750KVA			164.21A BASE PRIMARY USED FOR 50/51 ELEMENTS				*Total Clear Time = 3 Cycle Breaker Plus Delay (Time Dial or DEF Time)			
2.05A BASE SECONDARY 50/51P,G,Q							7621.02V BASE PRIMARY USED FOR 27/59 ELEMENTS			
P,G,Q CT RATIO FACTOR = 80							69.28V BASE SECONDARY USED FOR 27/59 ELEMENTS			
P CT = 400:5 1B0.2 C20 RF = 1 @ 30C							PT RATIO FACTOR = 110			

5 E307 PV SYSTEM RELAY SETTINGS
SCALE: NONE

INVERTER UL1741-SA Compliant						
ANSI ELEMENT #	Pickup	Real	Level	Delay (sec)	Curve	Description
27	243.87	422.4V	88.0%	2.00		Slow UV
27	138.56	240V	50.0%	1.10		Fast UV
59	304.84	528V	110.0%	2.10		Slow OV
59	332.55	576V	120.0%	0.16		Fast OV
81U-1	56.50	56.5Hz	94.2%	0.16		Fast UF
81U-2	58.50	58.5Hz	97.5%	300.00		Slow UF
81O-1	62.00	62Hz	103.3%	0.16		Fast OF
81O-2	60.50	60.5Hz	100.8%	300.00		Slow OF
PF Set Point		1.00				Power Factor Control
Var Control		OFF				Reactive Power Control
Ramp Rate		10%/1 sec				dkw / dt
Freq Control		OFF				Speed Control
Factory Settings						

6 E307 PV INVERTER SETTINGS
SCALE: NONE

SHEET NOTES:
1. RELAY SETTINGS SUBJECT TO CHANGE BASED ON COORDINATION WITH UTILITY.

REVISION	DESCRIPTION	PM	ENG	CHK
DATE				
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
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ORIENTATION: 3° TILT, 159° & 249° AZI

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4 VETERANS PLAZA
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DRAWING TITLE: RELAY/INVERTER SETTINGS

DRAWING #: E307

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

MV FEEDER CALCULATIONS

EQUIPMENT SUPPLIED	FED FROM	CIRCUIT ROUTING	VOLTAGE [V]	APPARENT POWER [KVA]	FEEDER LENGTH [FT]	FULL LOAD AMPS 'FLA' [A]	OCPD TYPE	OCPD TRIP RATING [A]	OCPD TRIP % OF FLA	CONDUCTOR MATERIAL	CONDUCTOR SIZE	NEC TABLE REFERENCE	TEMPERATURE ADJUSTMENT	ADJUSTED CONDUCTOR AMPACITY [A]	CHECK CONDUCTOR AMPACITY > FLA?	CHECK OCPD RATING > FLA x 1.25?	CHECK OCPD COMPLIANT WITH 240.101(A)?	SEGMENT VOLTAGE DROP AT FLA	TOTAL VOLTAGE DROP AT FLA	PVC CONDUIT SIZE	ADDITIONAL GROUND CABLE	FULL CONDUCTOR SPEC
UTILITY HTME	POI HANDHOLE	UNDERGROUND IN CONDUIT	13,200	5,000	25	218.7				AL	500MCM	310.60(C)(78)	1.00	370	PASS	PASS	PASS	0.00%	0.00%	6"	CU #2	(3) 500MCM AL MV90 15KV 133% EPR 1/3 CONCENTRIC NEUTRAL. INCLUDE (1)CU #2 EGC (600V)
MEDIUM VOLTAGE SWITCHGEAR	UTILITY HTME	UNDERGROUND IN CONDUIT	13,200	5,000	25	218.7	BREAKER	328	150%	AL	500MCM	310.60(C)(78)	1.00	370	PASS	PASS	PASS	0.00%	0.01%	6"	CU #2	(3) 500MCM AL MV90 15KV 133% EPR FULL CONCENTRIC NEUTRAL. INCLUDE (1)CU #2 EGC (600V)
BESS TRANSFORMER	MEDIUM VOLTAGE SWITCHGEAR	UNDERGROUND IN CONDUIT	13,200	4,390	50	192.0	BREAKER	288	150%	AL	#3/0	310.60(C)(78)	1.00	200	PASS	PASS	PASS	0.02%	0.02%	5"	CU #4	(3) #3/0 AL MV90 15KV 133% EPR FULL CONCENTRIC NEUTRAL. INCLUDE (1)CU #4 EGC (600V)
SOLAR TRANSFORMER A	MEDIUM VOLTAGE SWITCHGEAR	UNDERGROUND IN CONDUIT	13,200	3,750	500	164.0	BREAKER	246	150%	AL	#2/0	310.60(C)(78)	1.00	175	PASS	PASS	PASS	0.17%	0.18%	5"	CU #4	(3) #2/0 AL MV90 15KV 133% EPR FULL CONCENTRIC NEUTRAL. INCLUDE (1)CU #4 EGC (600V)
SOLAR TRANSFORMER B	SOLAR TRANSFORMER A	UNDERGROUND IN CONDUIT	13,200	1,875	1,300	82.0				AL	#2	310.60(C)(78)	1.00	120	PASS	PASS	PASS	0.45%	0.63%	4"	CU #4	(3) #2 AL MV90 15KV 133% EPR FULL CONCENTRIC NEUTRAL. INCLUDE (1)CU #4 EGC (600V)

SEE NOTE 2

DC FEEDER CALCULATIONS - BESS

CIRCUIT DESCRIPTION		FEEDER SIZING					90° AMPACITY CHECK			90° AMPACITY WITH C.O.U. CHECK					TERMINAL CHECK			OCPD CHECK				VOLTAGE DROP		
ENERGY STORAGE ENCLOSURE	OPERATING VOLTAGE Vmp [V]	FEEDER MAX CURRENT FLA	CONDUCTORS PER POLE	CONDUCTOR SIZE	GROUND SIZE	OCPD SIZE [A]	90° AMPACITY [A]	FEEDER CONTINUOUS CURRENT FLA X 1.25	PASS?	C.O.U DERATE FOR AMBIENT TEMPERATURE	C.O.U. DERATE FOR NUMBER OF CURRENT-CARRYING CONDUCTORS	90° AMPACITY WITH C.O.U. ADJUSTMENT [A]	FEEDER CONTINUOUS CURRENT FLA X 1.25	PASS?	75° AMPACITY [A]	FEEDER CONTINUOUS CURRENT FLA X 1.25	PASS?	90° AMPACITY WITH C.O.U. ADJUSTMENT [A]	75° AMPACITY [A]	MAX ALLOWABLE OCPD [A]	PASS?	FEEDER OPERATING CURRENT [A]	FEEDER LENGTH (ONE WAY) [FT]	FEEDER VOLTAGE DROP
ESE 1A	1500	532	2	CU 500MCM	CU #1/0	750	860	665	PASS	0.96	1	826	665	PASS	760	665	PASS	826	760	800	PASS	665	50	0.1%
ESE 1B	1500	456	2	CU 350MCM	CU #1/0	630	700	570	PASS	0.96	1	672	570	PASS	620	570	PASS	672	620	700	PASS	570	50	0.1%
ESE 2A	1500	532	2	CU 500MCM	CU #1/0	750	860	665	PASS	0.96	1	826	665	PASS	760	665	PASS	826	760	800	PASS	665	60	0.1%
ESE 2B	1500	456	2	CU 350MCM	CU #1/0	630	700	570	PASS	0.96	1	672	570	PASS	620	570	PASS	672	620	700	PASS	570	60	0.1%
ESE 3A	1500	532	2	CU 500MCM	CU #1/0	750	860	665	PASS	0.96	1	826	665	PASS	760	665	PASS	826	760	800	PASS	665	80	0.1%
ESE 3B	1500	456	2	CU 350MCM	CU #1/0	630	700	570	PASS	0.96	1	672	570	PASS	620	570	PASS	672	620	700	PASS	570	80	0.1%
ESE 4A	1500	532	2	CU 500MCM	CU #1/0	750	860	665	PASS	0.96	1	826	665	PASS	760	665	PASS	826	760	800	PASS	665	100	0.1%
ESE 4B	1500	456	2	CU 350MCM	CU #1/0	630	700	570	PASS	0.96	1	672	570	PASS	620	570	PASS	672	620	700	PASS	570	100	0.1%

AVERAGE DC VOLTAGE DROP FROM INVERTER TO ESE'S: 0.10%

AC FEEDER CALCULATIONS - PV SYSTEM A

EQUIPMENT SUPPLIED	FED FROM	VOLTAGE	FULL LOAD AMPS 'FLA'	FLA x 1.25	OCPD SIZE	GROUND SIZE	CONDUCTORS PER PHASE	PHASE CONDUCTOR SIZE	NEUTRAL CONDUCTOR SIZE	75° AMPACITY	90° AMPACITY	90° AMPACITY WITH C.O.U.	C.O.U DERATE AMBIENT TEMP	C.O.U. DERATE CONDUIT FILL	FEEDER LENGTH (FEET)	SEGMENT VOLTAGE DROP AT FLA	TOTALVOLTAGE DROP AT FLA
SOLAR AC PANELBOARD A1	SOLAR TRANSFORMER A	480	1010.1	1263.0	1200	AL #3/0 SSBJ	4	AL 600MCM	AL 600MCM	1360	1540	1478.4	0.96	1.00	20	0.07%	0.25%
SOLAR AC PANELBOARD A2	SOLAR TRANSFORMER A	480	865.8	1082.0	1200	AL #3/0 SSBJ	4	AL 600MCM	AL 600MCM	1360	1540	1478.4	0.96	1.00	30	0.09%	0.27%
INVERTER A1	SOLAR AC PANELBOARD A1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.40%
INVERTER A2	SOLAR AC PANELBOARD A1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.40%
INVERTER A3	SOLAR AC PANELBOARD A1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.46%
INVERTER A4	SOLAR AC PANELBOARD A1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.46%
INVERTER A5	SOLAR AC PANELBOARD A1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	50	0.26%	0.51%
INVERTER A6	SOLAR AC PANELBOARD A1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.46%
INVERTER A7	SOLAR AC PANELBOARD A1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.46%
INVERTER A8	SOLAR AC PANELBOARD A2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.48%
INVERTER A9	SOLAR AC PANELBOARD A2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.48%
INVERTER A10	SOLAR AC PANELBOARD A2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	50	0.26%	0.53%
INVERTER A11	SOLAR AC PANELBOARD A2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.48%
INVERTER A12	SOLAR AC PANELBOARD A2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.42%
INVERTER A13	SOLAR AC PANELBOARD A2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.42%

NOTE:
100% RATED OCPD PERMITTED TO BE SIZED BASED ON 100% FLA OF CONTINUOUS CURRENT.

AVERAGE AC VOLTAGE DROP FROM POI TO INVERTERS: 0.46%

AC FEEDER CALCULATIONS - PV SYSTEM B

EQUIPMENT SUPPLIED	FED FROM	VOLTAGE	FULL LOAD AMPS 'FLA'	FLA x 1.25	OCPD SIZE	GROUND SIZE	CONDUCTORS PER PHASE	PHASE CONDUCTOR SIZE	NEUTRAL CONDUCTOR SIZE	75° AMPACITY	90° AMPACITY	90° AMPACITY WITH C.O.U.	C.O.U DERATE AMBIENT TEMP	C.O.U. DERATE CONDUIT FILL	FEEDER LENGTH (FEET)	SEGMENT VOLTAGE DROP AT FLA	TOTALVOLTAGE DROP AT FLA
SOLAR AC PANELBOARD B1	SOLAR TRANSFORMER B	480	1010.1	1263.0	1200	AL #3/0 SSBJ	4	AL 600MCM	AL 600MCM	1360	1540	1478.4	0.96	1.00	20	0.07%	0.70%
SOLAR AC PANELBOARD B2	SOLAR TRANSFORMER B	480	1010.1	1263.0	1200	AL #3/0 SSBJ	4	AL 600MCM	AL 600MCM	1360	1540	1478.4	0.96	1.00	30	0.10%	0.73%
INVERTER B1	SOLAR AC PANELBOARD B1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.85%
INVERTER B2	SOLAR AC PANELBOARD B1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.85%
INVERTER B3	SOLAR AC PANELBOARD B1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.90%
INVERTER B4	SOLAR AC PANELBOARD B1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.90%
INVERTER B5	SOLAR AC PANELBOARD B1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	50	0.26%	0.96%
INVERTER B6	SOLAR AC PANELBOARD B1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.90%
INVERTER B7	SOLAR AC PANELBOARD B1	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.90%
INVERTER B8	SOLAR AC PANELBOARD B2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.89%
INVERTER B9	SOLAR AC PANELBOARD B2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.94%
INVERTER B10	SOLAR AC PANELBOARD B2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.94%
INVERTER B11	SOLAR AC PANELBOARD B2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	50	0.26%	0.99%
INVERTER B12	SOLAR AC PANELBOARD B2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	40	0.21%	0.94%
INVERTER B13	SOLAR AC PANELBOARD B2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.89%
INVERTER B14	SOLAR AC PANELBOARD B2	480	144.3	180.0	200	AL #4	1	AL #4/0	NONE	180	205	196.8	0.96	1.00	30	0.16%	0.89%

NOTE:
100% RATED OCPD PERMITTED TO BE SIZED BASED ON 100% FLA OF CONTINUOUS CURRENT.

AVERAGE AC VOLTAGE DROP FROM POI TO INVERTERS: 0.91%

NOTES:
1. DISTANCES ARE ESTIMATES GENERATED FOR ENGINEER'S CALCULATIONS, CONTRACTOR IS RESPONSIBLE FOR OWN MEASUREMENTS AND TAKEOFFS.
2. MEDIUM VOLTAGE SWITCHGEAR OUTPUT LIMITED TO 5,000 kVA BY RTAC.

DRAWING TITLE: SCHEDULES & CALCULATIONS

DRAWING #: E310

REVISION	DESCRIPTION	DATE	PM	ENG	CHK
A	ISSUE FOR PERMIT	09/26/2022	RK	JT	RI
B	90% DESIGN DEVELOPMENT	08/10/2022	RK	JT	RI
C	50% DESIGN DEVELOPMENT	04/22/2022	RK	JT	RI

PUREPOWER ENGINEERING
111 RIVER STREET, HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

EPC: CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

PROJECT: BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PLOT DATE: 9/26/2022 2:43 PM

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:43 PM

MODULE SPECIFICATIONS	
MAKE/MODEL	HT-SAEE HT72-18X 550W
POWER [W]	550
ISC [A]	14.00
IMP [A]	13.12
VOC [V]	49.80
VMP [V]	41.95
β VOC [%/degC]	-0.290%
SITE CLIMATE CRITERIA	
ASHRAE HIGH [°C]	32
ASHRAE LOW [°C]	-17
STRING SPECIFICATIONS AT STC	
MODULES/STRING	2
POWER [W]	1100
STRING ISC [A]	14.00
STRING IMP [A]	13.12
STRING VMP [V]	83.90
STRING MAX VOLTAGE CALCULATION	
VOC TEMP ADJUSTMENT @ -17 °C	1.12
VOC @ -17 °C [V]	55.87
MAX STRING VOC [V]	111.7
STRING CALCULATIONS REFER TO THE PV SIDE OF DC OPTIMIZERS, NOT TO THE OPTIMIZER OUTPUT CIRCUIT	

DC STRING WIRING CALCULATION - #10 WIRE GAUGE	
OPTIMIZER OUTPUT [AMPS]	18.00
MAX CONTINUOUS FAULT CURRENT FROM PARALLEL SOURCES [AMPS]	18.00
1.25x MAX CONTINUOUS FAULT CURRENT [AMPS]	22.50
MAX # OF WIRES PER CONDUIT	9
CONDUIT FILL DERATE	0.7
MAX AMBIENT TEMPERATURE	32
TEMPERATURE DERATE	0.96
WIRE GAUGE	CU #10
75DEG AMPACITY WITHOUT COU ADJUSTMENT [AMPS]	35
IS 75 DEG AMPACITY WITHOUT COU ADJUSTMENT >= 1.25x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.8(B)(1)
90DEG AMPACITY WITH COU ADJUSTMENT [AMPS]	26.88
IS 90DEG AMPACITY WITH COU ADJUSTMENT >= 1.0x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.8(B)(2)
DC OPTIMIZER OUTPUT CIRCUIT FUSE RATING [AMPS]	25
AVAILABLE FAULT CURRENT FROM ALL PARALLEL SOURCES [AMPS]	18
IS FUSE RATING >= 1.25x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.9(B)

DC STRING WIRING CALCULATION - #8 WIRE GAUGE	
OPTIMIZER OUTPUT [AMPS]	18.00
MAX CONTINUOUS FAULT CURRENT FROM PARALLEL SOURCES [AMPS]	18.00
1.25x MAX CONTINUOUS FAULT CURRENT [AMPS]	22.50
MAX # OF WIRES PER CONDUIT	40
CONDUIT FILL DERATE	0.4
MAX AMBIENT TEMPERATURE	32
TEMPERATURE DERATE	0.96
WIRE GAUGE	CU #8
75DEG AMPACITY WITHOUT COU ADJUSTMENT [AMPS]	50
IS 75 DEG AMPACITY WITHOUT COU ADJUSTMENT >= 1.25x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.8(B)(1)
90DEG AMPACITY WITH COU ADJUSTMENT [AMPS]	21.12
IS 90DEG AMPACITY WITH COU ADJUSTMENT >= 1.0x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.8(B)(2)
DC OPTIMIZER OUTPUT CIRCUIT FUSE RATING [AMPS]	25
AVAILABLE FAULT CURRENT FROM ALL PARALLEL SOURCES [AMPS]	18
IS FUSE RATING >= 1.25x MAX CIRCUIT CURRENT?	YES. COMPLIES WITH 690.9(B)

SYSTEM A DC VOLTAGE DROP CALCULATIONS		MAX TOTAL VOLTAGE DROP	2.43%
		AVERAGE TOTAL VOLTAGE DROP	1.36%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP
A1-1	#10AWG-CU	415	2.27%
A1-2	#10AWG-CU	410	2.24%
A1-3	#10AWG-CU	400	2.19%
A1-4	#10AWG-CU	395	2.16%
A1-5	#10AWG-CU	385	2.10%
A1-6	#10AWG-CU	380	2.08%
A1-7	#10AWG-CU	370	2.02%
A1-8	#10AWG-CU	380	2.08%
A1-9	#10AWG-CU	385	2.10%
A2-1	#10AWG-CU	395	2.16%
A2-2	#10AWG-CU	405	2.21%
A2-3	#10AWG-CU	410	2.24%
A2-4	#10AWG-CU	420	2.29%
A2-5	#10AWG-CU	425	2.32%
A2-6	#10AWG-CU	290	1.58%
A2-7	#10AWG-CU	285	1.56%
A2-8	#10AWG-CU	275	1.50%
A2-9	#10AWG-CU	270	1.48%
A3-1	#10AWG-CU	260	1.42%
A3-2	#10AWG-CU	250	1.37%
A3-3	#10AWG-CU	260	1.42%
A3-4	#10AWG-CU	265	1.45%
A3-5	#10AWG-CU	275	1.50%
A3-6	#10AWG-CU	280	1.53%
A3-7	#10AWG-CU	290	1.58%
A3-8	#10AWG-CU	295	1.61%
A3-9	#10AWG-CU	305	1.67%
A4-1	#10AWG-CU	315	1.72%
A4-2	#10AWG-CU	175	0.96%
A4-3	#10AWG-CU	165	0.90%
A4-4	#10AWG-CU	160	0.87%
A4-5	#10AWG-CU	150	0.82%
A4-6	#10AWG-CU	145	0.79%
A4-7	#10AWG-CU	135	0.74%
A4-8	#10AWG-CU	135	0.74%
A4-9	#10AWG-CU	125	0.68%
A5-1	#10AWG-CU	110	0.60%
A5-2	#10AWG-CU	105	0.57%
A5-3	#10AWG-CU	110	0.60%
A5-4	#10AWG-CU	115	0.63%
A5-5	#10AWG-CU	125	0.68%
A5-6	#10AWG-CU	130	0.71%
A5-7	#10AWG-CU	140	0.76%
A5-8	#10AWG-CU	145	0.79%
A5-9	#10AWG-CU	155	0.85%
A6-1	#10AWG-CU	155	0.85%
A6-2	#10AWG-CU	165	0.90%
A6-3	#10AWG-CU	170	0.93%
A6-4	#10AWG-CU	180	0.98%
A6-5	#10AWG-CU	155	0.85%
A6-6	#10AWG-CU	150	0.82%
A6-7	#10AWG-CU	140	0.76%
A6-8	#10AWG-CU	135	0.74%
A6-9	#10AWG-CU	125	0.68%
A7-1	#10AWG-CU	125	0.68%
A7-2	#10AWG-CU	110	0.60%
A7-3	#10AWG-CU	100	0.55%
A7-4	#10AWG-CU	95	0.52%
A7-5	#10AWG-CU	85	0.46%
A7-6	#10AWG-CU	80	0.44%
A7-7	#10AWG-CU	80	0.44%
A7-8	#10AWG-CU	90	0.49%
A7-9	#10AWG-CU	95	0.52%

SYSTEM A DC VOLTAGE DROP CALCULATIONS		MAX TOTAL VOLTAGE DROP	2.43%
		AVERAGE TOTAL VOLTAGE DROP	1.36%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP
A8-1	#10AWG-CU	105	0.57%
A8-2	#10AWG-CU	115	0.63%
A8-3	#10AWG-CU	120	0.66%
A8-4	#10AWG-CU	130	0.71%
A8-5	#10AWG-CU	135	0.74%
A8-6	#10AWG-CU	145	0.79%
A8-7	#10AWG-CU	150	0.82%
A8-8	#10AWG-CU	255	1.39%
A8-9	#10AWG-CU	245	1.34%
A9-1	#10AWG-CU	230	1.26%
A9-2	#10AWG-CU	220	1.20%
A9-3	#10AWG-CU	205	1.12%
A9-4	#10AWG-CU	195	1.07%
A9-5	#10AWG-CU	180	0.98%
A9-6	#10AWG-CU	180	0.98%
A9-7	#10AWG-CU	190	1.04%
A9-8	#10AWG-CU	200	1.09%
A9-9	#10AWG-CU	210	1.15%
A10-1	#10AWG-CU	225	1.23%
A10-2	#10AWG-CU	235	1.28%
A10-3	#10AWG-CU	250	1.37%
A10-4	#10AWG-CU	325	1.78%
A10-5	#10AWG-CU	320	1.75%
A10-6	#10AWG-CU	310	1.69%
A10-7	#10AWG-CU	305	1.67%
A10-8	#10AWG-CU	310	1.69%
A10-9	#10AWG-CU	320	1.75%
A11-1	#10AWG-CU	330	1.80%
A11-2	#10AWG-CU	340	1.86%
A11-3	#10AWG-CU	345	1.88%
A11-4	#10AWG-CU	355	1.94%
A11-5	#10AWG-CU	360	1.97%
A11-6	#10AWG-CU	445	2.43%
A11-7	#10AWG-CU	440	2.40%
A11-8	#10AWG-CU	430	2.35%
A11-9	#10AWG-CU	425	2.32%
A12-1	#8AWG-CU	430	1.47%
A12-2	#8AWG-CU	435	1.49%
A12-3	#8AWG-CU	445	1.52%
A12-4	#8AWG-CU	450	1.54%
A12-5	#8AWG-CU	460	1.58%
A12-6	#8AWG-CU	465	1.59%
A12-7	#8AWG-CU	475	1.63%
A12-8	#8AWG-CU	565	1.94%
A12-9	#8AWG-CU	560	1.92%
A13-1	#8AWG-CU	555	1.90%
A13-2	#8AWG-CU	545	1.87%
A13-3	#8AWG-CU	540	1.85%
A13-4	#8AWG-CU	545	1.87%
A13-5	#8AWG-CU	555	1.90%
A13-6	#8AWG-CU	560	1.92%
A13-7	#8AWG-CU	570	1.95%
A13-8	#8AWG-CU	575	1.97%
A13-9	#8AWG-CU	585	2.00%

SYSTEM B DC VOLTAGE DROP CALCULATIONS		MAX TOTAL VOLTAGE DROP	2.38%
		AVERAGE TOTAL VOLTAGE DROP	1.46%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP
B1-1	#8AWG-CU	680	2.33%
B1-2	#8AWG-CU	665	2.28%
B1-3	#8AWG-CU	655	2.24%
B1-4	#8AWG-CU	650	2.23%
B1-5	#8AWG-CU	635	2.18%
B1-6	#8AWG-CU	630	2.16%
B1-7	#8AWG-CU	645	2.21%
B1-8	#8AWG-CU	660	2.26%
B1-9	#8AWG-CU	625	2.14%
B2-1	#8AWG-CU	625	2.14%
B2-2	#8AWG-CU	615	2.11%
B2-3	#8AWG-CU	610	2.09%
B2-4	#8AWG-CU	600	2.06%
B2-5	#8AWG-CU	595	2.04%
B2-6	#8AWG-CU	585	2.00%
B2-7	#8AWG-CU	575	1.97%
B2-8	#8AWG-CU	570	1.95%
B2-9	#8AWG-CU	560	1.92%
B3-1	#8AWG-CU	560	1.92%
B3-2	#8AWG-CU	550	1.88%
B3-3	#8AWG-CU	545	1.87%
B3-4	#8AWG-CU	540	1.85%
B3-5	#8AWG-CU	550	1.88%
B3-6	#8AWG-CU	555	1.90%
B3-7	#8AWG-CU	565	1.94%
B3-8	#8AWG-CU	535	1.83%
B3-9	#8AWG-CU	525	1.80%
B4-1	#8AWG-CU	515	1.76%
B4-2	#8AWG-CU	500	1.71%
B4-3	#8AWG-CU	490	1.68%
B4-4	#8AWG-CU	475	1.63%
B4-5	#8AWG-CU	465	1.59%
B4-6	#8AWG-CU	455	1.56%
B4-7	#8AWG-CU	460	1.58%
B4-8	#8AWG-CU	470	1.61%
B4-9	#8AWG-CU	540	1.85%
B5-1	#10AWG-CU	305	1.67%
B5-2	#10AWG-CU	300	1.64%
B5-3	#10AWG-CU	290	1.58%
B5-4	#10AWG-CU	285	1.56%
B5-5	#10AWG-CU	275	1.50%
B5-6	#10AWG-CU	270	1.48%
B5-7	#10AWG-CU	260	1.42%
B5-8	#10AWG-CU	255	1.39%
B5-9	#10AWG-CU	245	1.34%
B6-1	#10AWG-CU	240	1.31%
B6-2	#10AWG-CU	230	1.26%
B6-3	#10AWG-CU	225	1.23%
B6-4	#10AWG-CU	215	1.17%
B6-5	#10AWG-CU	210	1.15%
B6-6	#10AWG-CU	200	1.09%
B6-7	#10AWG-CU	220	1.20%
B6-8	#10AWG-CU	210	1.15%
B6-9	#10AWG-CU	205	1.12%
B7-1	#10AWG-CU	195	1.07%
B7-2	#10AWG-CU	185	1.01%
B7-3	#10AWG-CU	180	0.98%
B7-4	#10AWG-CU	170	0.93%
B7-5	#10AWG-CU	165	0.90%
B7-6	#10AWG-CU	155	0.85%
B7-7	#10AWG-CU	150	0.82%
B7-8	#10AWG-CU	140	0.76%
B7-9	#10AWG-CU	135	0.74%

SYSTEM B DC VOLTAGE DROP CALCULATIONS		MAX TOTAL VOLTAGE DROP	2.38%
		AVERAGE TOTAL VOLTAGE DROP	1.46%
STRING NUMBER	STRING WIRE GAUGE	TOTAL STRING DISTANCE [FT]	STRING VOLTAGE DROP
B8-1	#10AWG-CU	125	0.68%
B8-2	#10AWG-CU	115	0.63%
B8-3	#10AWG-CU	105	0.57%
B8-4	#10AWG-CU	95	0.52%
B8-5	#10AWG-CU	90	0.49%
B8-6	#10AWG-CU	85	0.46%
B8-7	#10AWG-CU	90	0.49%
B8-8	#10AWG-CU	100	0.55%
B8-9	#10AWG-CU	105	0.57%
B9-1	#10AWG-CU	110	0.60%
B9-2	#10AWG-CU	115	0.63%
B9-3	#10AWG-CU	125	0.68%
B9-4	#10AWG-CU	130	0.71%
B9-5	#10AWG-CU	140	0.76%
B9-6	#10AWG-CU	145	0.79%
B9-7	#10AWG-CU	155	0.85%
B9-8	#10AWG-CU	140	0.76%
B9-9	#10AWG-CU	150	0.82%
B10-1	#10AWG-CU	155	0.85%
B10-2	#10AWG-CU	165	0.90%
B10-3	#10AWG-CU	175	0.96%
B10-4	#10AWG-CU	185	1.01%
B10-5	#10AWG-CU	190	1.04%
B10-6	#10AWG-CU	200	1.09%
B10-7	#10AWG-CU	215	1.17%
B10-8	#10AWG-CU	220	1.20%
B10-9	#10AWG-CU	230	1.26%
B11-1	#10AWG-CU	245	1.34%
B11-2	#10AWG-CU	255	1.39%
B11-3	#10AWG-CU	265	1.45%
B11-4	#10AWG-CU	275	1.50%
B11-5	#10AWG-CU	285	1.56%
B11-6	#10AWG-CU	290	1.58%
B11-7	#10AWG-CU	305	1.67%
B11-8	#10AWG-CU	315	1.72%
B11-9	#10AWG-CU	320	1.75%
B12-1	#8AWG-CU	335	1.15%
B12-2	#8AWG-CU	345	1.18%
B12-3	#8AWG-CU	370	1.27%
B12-4	#8AWG-CU	380	1.30%
B12-5	#8AWG-CU	390	1.34%
B12-6	#8AWG-CU	400	1.37%
B12-7	#8AWG-CU	410	1.40%
B12-8	#8AWG-CU	420	1.44%
B12-9	#8AWG-CU	430	1.47%
B13-1	#8AWG-CU	445	1.52%
B13-2	#8AWG-CU	460	1.58%
B13-3	#8AWG-CU	465	1.59%
B13-4	#8AWG-CU	490	1.68%
B13-5	#8AWG-CU	505	1.73%
B13-6	#8AWG-CU	515	1.76%
B13-7	#8AWG-CU	525	1.80%
B13-8	#8AWG-CU	540	1.85%
B13-9	#8AWG-CU	555	1.90%
B14-1	#8AWG-CU	570	1.95%
B14-2	#8AWG-CU	585	2.00%
B14-3	#8AWG-CU	605	2.07%
B14-4	#8AWG-CU	620	2.12%
B14-5	#8AWG-CU	635	2.18%
B14-6	#8AWG-CU	650	2.23%
B14-7	#8AWG-CU	665	2.28%
B14-8	#8AWG-CU	680	2.33%
B14-9	#8AWG-CU	695	2.38%

NOTE: DISTANCES ARE ESTIMATES GENERATED FOR ENGINEER'S CALCULATIONS, CONTRACTOR IS RESPONSIBLE FOR OWN MEASUREMENTS AND TAKEOFFS.

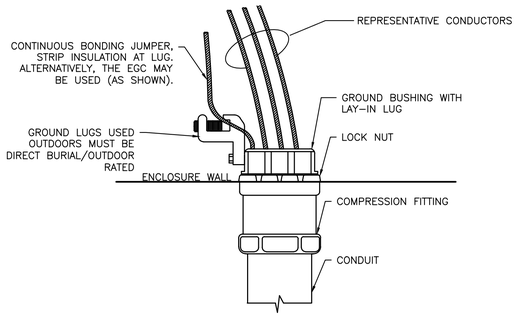
DRAWING TITLE	DRAWING #
SCHEDULES & CALCULATIONS	E311

PROJECT	BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON 4 VETERANS PLAZA CROTON-ON-HUDSON, NY 10520
PV DC SYSTEM SIZE:	4,225.65 kW
PV AC SYSTEM SIZE:	3,240.00 kW
MODULE TYPE:	HT-SAEE HT72-18X 550W
MODULE QUANTITY:	7,683
ORIENTATION:	3° TILT, 59° & 249° AZI
PAGE SIZE	36" x 24"
PROJECT #	04001
EPC	CORE DEVELOPMENT GROUP 860 WYCKOFF AVENUE, SUITE 200 MAHWAH, NJ 07430 WWW.COREDEVUSA.COM

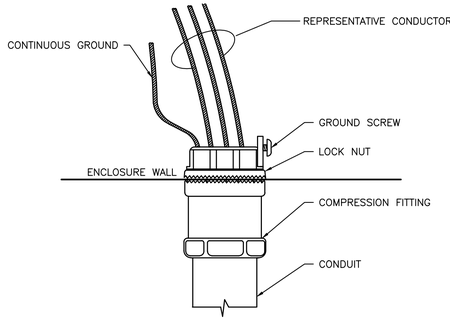
DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

PURE POWER ENGINEERING 111 RIVER STREET HOBOKEN, NJ WWW.PUREPOWER.COM RICHARD A. WINS NY LICENSE No. 091197

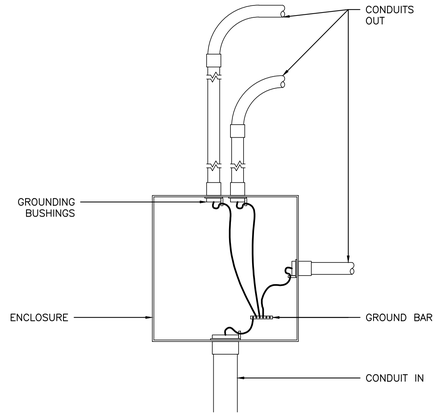
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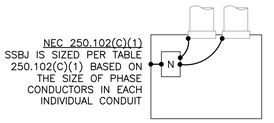
1 E401 CONDUIT BUSHING GROUNDING
SCALE: NONE



2 E401 MYERS HUB GROUNDING
SCALE: NONE



3 E401 PULL BOX/TROUGH GROUNDING
SCALE: NONE



NEC 250.102(C)(1)
SSBJ IS SIZED PER TABLE 250.102(C)(1) BASED ON THE SIZE OF PHASE CONDUCTORS IN EACH INDIVIDUAL CONDUIT

NEC 250.102(C)(2)
SSBJ IS SIZED PER TABLE 250.102(C)(1) BASED ON THE COMBINED AREA OF PARALLEL PHASE CONDUCTORS

TABLE 250.102(C)(1)			
SIZE OF LARGEST UNGROUNDED CONDUCTOR OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS (AWG/KCMIL)		SIZE OF GROUNDED CONDUCTOR OR BONDING JUMPER (AWG/KCMIL)	
COPPER	ALUMINUM OR COPPER-CLAD ALUMINUM	COPPER	ALUMINUM OR COPPER-CLAD ALUMINUM
2 OR SMALLER	1/0 OR SMALLER	8	6
1 OR 1/0	2/0 OR 3/0	6	4
2 OR 2/0	4/0 OR 250	4	2
OVER 3/0 THROUGH 350	OVER 250 THROUGH 500	2	1/0
OVER 350 THROUGH 600	OVER 500 THROUGH 900	1/0	3/0
OVER 600 THROUGH 1100	OVER 900 THROUGH 1750	2/0	4/0
OVER 1100	OVER 1750	REFER TO NOTES IN NEC TABLE 250.102(C)(1)	

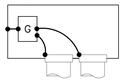
4 E401 SUPPLY SIDE BONDING JUMPERS (SSBJ)
SCALE: NONE

A) FOR CONCENTRIC KNOCKOUTS, USE BONDING JUMPERS AS FOLLOWS:

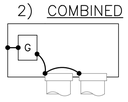
TABLE 250.122		
OVERCURRENT DEVICE CIRCUIT NOT EXCEEDING (AMPERES)	SIZE (AWG OR KCMIL)	
	COPPER	ALUMINUM
15	14	12
20	12	10
60	10	8
100	8	6
200	6	4
300	4	2
400	3	1
500	2	1/0
600	1	2/0
800	1/0	3/0
1000	2/0	4/0
1200	3/0	250
1600	4/0	350
2000	250	400
2500	350	600
3000	400	600
4000	500	750

FOR PARALLEL FEEDERS – NEC 250.102(D)
EQUIPMENT BONDING JUMPER IS SIZED PER TABLE 250.122, REGARDLESS IF COMBINED OR INDIVIDUAL BONDING JUMPERS ARE USED

1) INDIVIDUAL



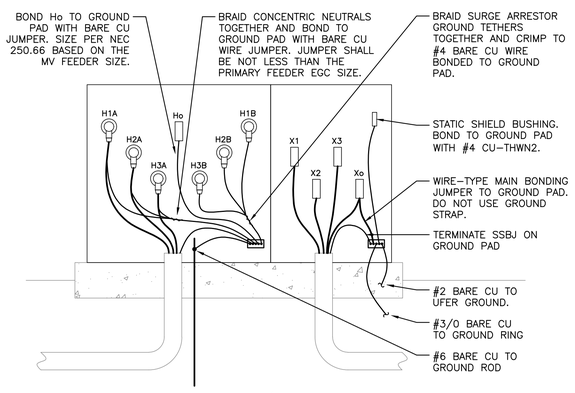
2) COMBINED



B) FOR NON-CONCENTRIC KNOCKOUTS, THE FOLLOWING METHODS SHALL BE PERMITTED (PER NEC 250.97)

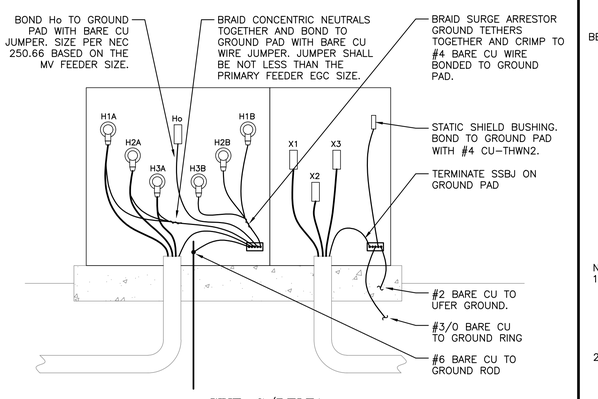
1) THREADLESS COUPLINGS AND CONNECTORS FOR CABLES WITH METAL SHEATHS
2) TWO LOCKNUTS, ON RIGID METAL CONDUIT OR INTERMEDIATE METAL CONDUIT, ONE INSIDE AND ONE OUTSIDE OF BOXES AND CABINETS
3) FITTINGS WITH SHOULDERS THAT SEAT FIRMLY AGAINST THE BOX OR CABINET, SUCH AS ELECTRICAL METALLIC TUBING CONNECTORS, FLEXIBLE METAL CONDUIT CONNECTORS, AND CABLE CONNECTORS, WITH ON LOCKNUT ON THE INSIDE OF BOXES AND CABINETS
4) LISTED FITTINGS (SUCH AS MYERS HUB)

5 E401 LOAD SIDE EQUIPMENT BONDING JUMPER
SCALE: NONE



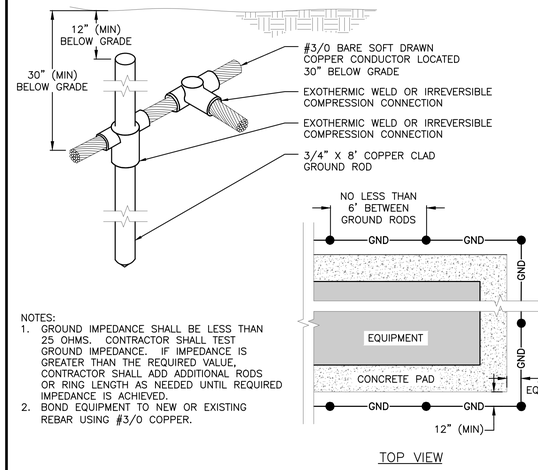
WYE-G/WYE-G

6 E401 SOLAR TRANSFORMER GROUNDING
SCALE: NONE



WYE-G/DELTA

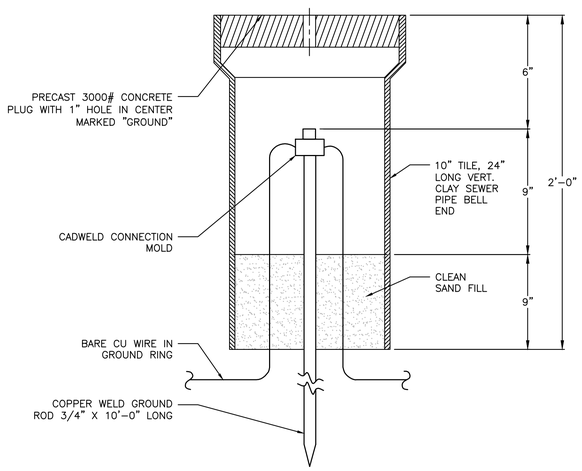
7 E401 BESS TRANSFORMER GROUNDING
SCALE: NONE



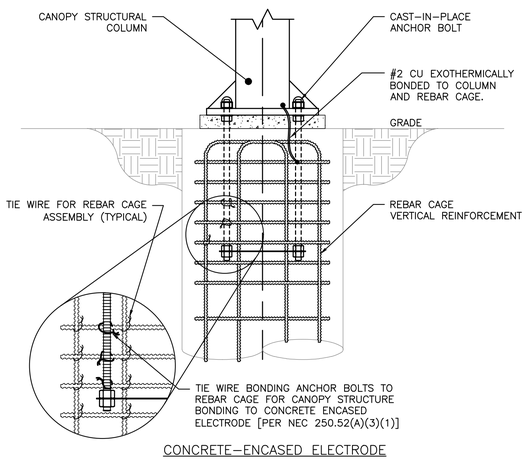
NOTES:
1. GROUND IMPEDANCE SHALL BE LESS THAN 25 OHMS. CONTRACTOR SHALL TEST GROUND IMPEDANCE. IF IMPEDANCE IS GREATER THAN THE REQUIRED VALUE, CONTRACTOR SHALL ADD ADDITIONAL RODS OR RING LENGTH AS NEEDED UNTIL REQUIRED IMPEDANCE IS ACHIEVED.
2. BOND EQUIPMENT TO NEW OR EXISTING REBAR USING #3/0 COPPER.

TOP VIEW

8 E401 GROUND RING
SCALE: NONE

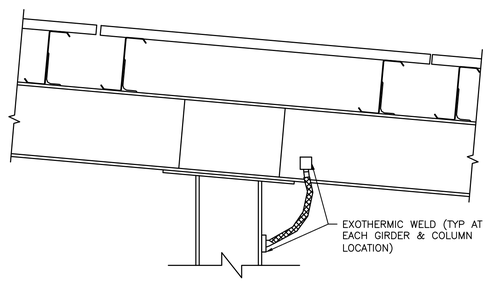


9 E401 GROUND WELL TEST STATION
SCALE: NONE



CONCRETE-ENCASED ELECTRODE

10 E401 CANOPY COLUMN GROUNDING
SCALE: NONE



11 E401 GIRDER TO COLUMN GROUNDING
SCALE: NONE

NO.	DATE	REVISION DESCRIPTION	PM	ENG	CHK
	09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
	08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
	04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

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CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

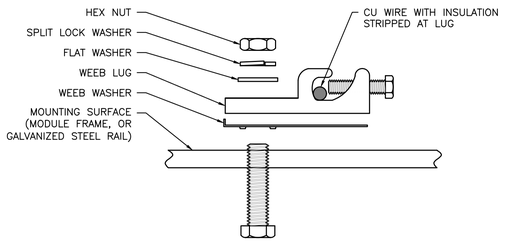
DRAWING TITLE: GROUNDING DETAILS

DRAWING #: E401

PLOT DATE: 9/26/2022 2:44 PM

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:44 PM

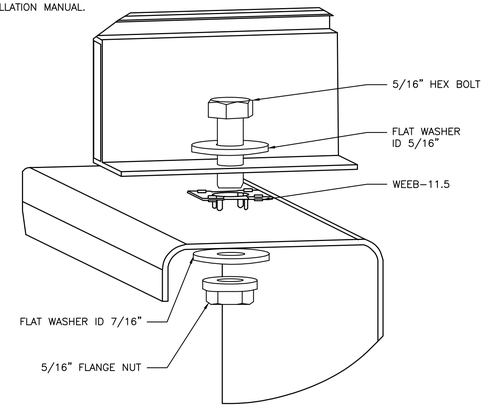


NOTES
1. ALL HARDWARE TO BE STAINLESS STEEL.
2. REFER TO WEEB LUG MANUAL FOR ADDITIONAL REQUIREMENTS AND TORQUE VALUES

WEEBLUG

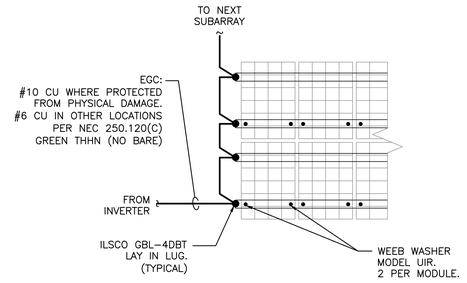
1 GROUND LUG
E402 SCALE: NONE

NOTES:
1. CONTRACTOR TO REVIEW PROPER INSTALLATION METHODS FROM THE RACKING INSTALLATION MANUAL.



2 MODULE GROUNDING ON RACK
E402 SCALE: NONE

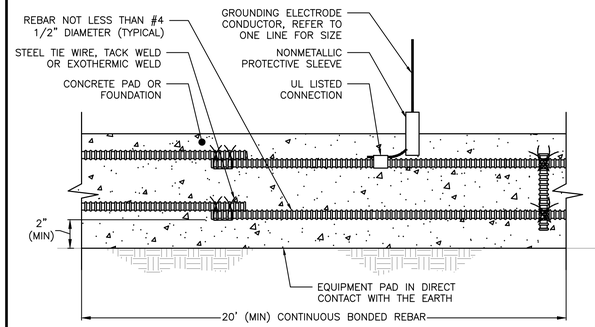
NOTES:
1. EACH SUBARRAY CONNECTED TO AN INVERTER SHALL HAVE AN EGC RUN TO THAT INVERTER
2. PV MODULES AND RAILS GROUNDED PER NEC 690.43



CANOPY

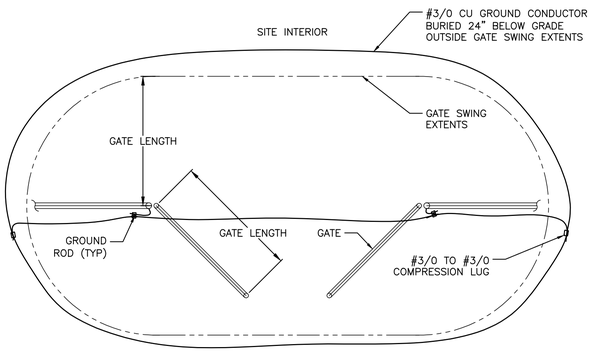
3 ARRAY GROUNDING
E402 SCALE: NONE

NOTE:
SHORTER LENGTHS OF REBAR CAN BE CONNECTED TOGETHER TO FORM AN ELECTRODE OF AT LEAST 20' BY STEEL TIE WIRES, EXOTHERMIC WELDING, OR WELDING.



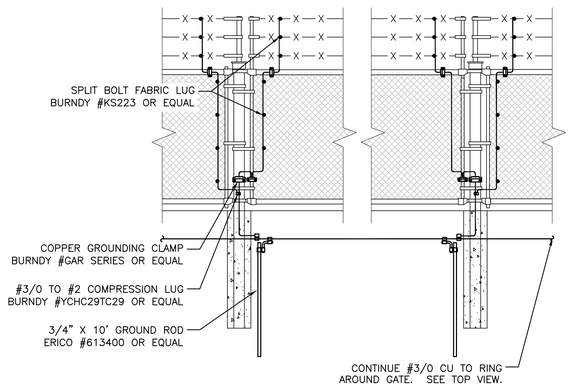
4 EQUIPMENT PAD GROUNDING - UFER
E402 SCALE: NONE

NOTES:
(1) COORDINATE EXACT GROUNDING HARDWARE REQUIREMENTS WITH FENCE CONTRACTOR. GROUNDING HARDWARE SHALL BE COMPATIBLE WITH PHYSICAL ASPECTS OF THE FENCE DESIGN (I.E. POST DIAMETER).



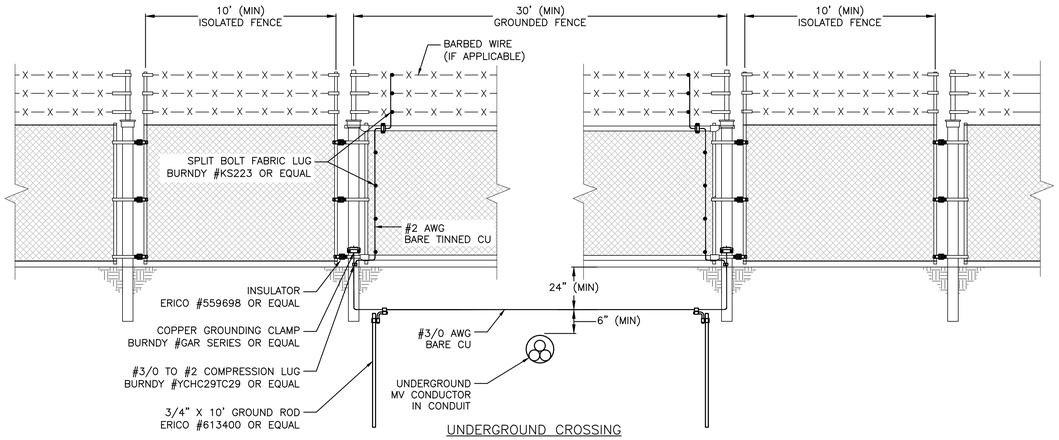
TOP VIEW

5 GROUNDED FENCE GATE
E402 SCALE: NONE



ELEVATION

6 GROUNDED FENCE GATE
E402 SCALE: NONE



UNDERGROUND CROSSING

7 GROUNDED FENCE - MV CROSSING
E402 SCALE: NONE

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
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ORIENTATION: 3° TILT, 159° & 249° AZI

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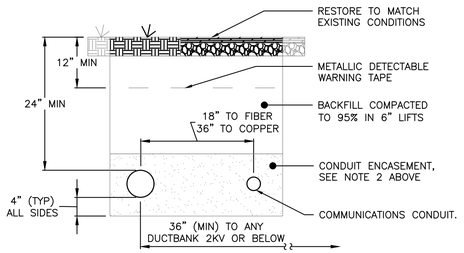
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DRAWING #: E402

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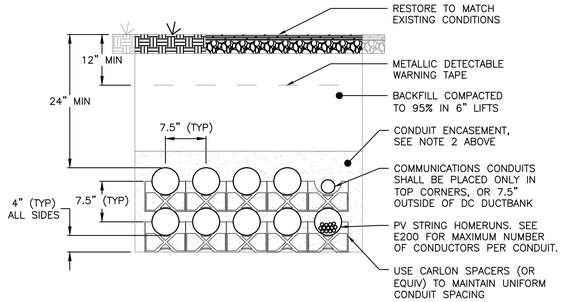
PLOT DATE: 9/26/2022 2:44 PM

NOTES:
1. ALL UNDERGROUND CONDUIT SHALL BE PVC AND TRANSITION TO RMC FOR ELBOW. RMC ELBOW DOES NOT NEED TO BE BONDED IF THE ENTIRE ELBOW IS >= 18" DEEP (NEC 250.86 EXCEPTION 3)
2. UNDER ROADS AND PARKING AREAS ENCASEMENT SHALL BE 2500 PSI CONCRETE. UNDER GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC ENCASEMENT SHALL BE SAND.
3. CALL BEFORE YOU DIG, DIAL 811 TO BE CONNECTED TO THE LOCAL ON-CALL CENTER. YOU MUST CALL AT LEAST 48 HOURS BEFORE EXCAVATING.
4. IF DUCTBANK SLOPES SUCH THAT ANY PART OF THE DUCTBANK IS ABOVE STUB UP ELEVATION, INCLUDE HAND HOLE WITH GRAVEL BASE TO ALLOW DRAINAGE AT LOWEST ELEVATION.



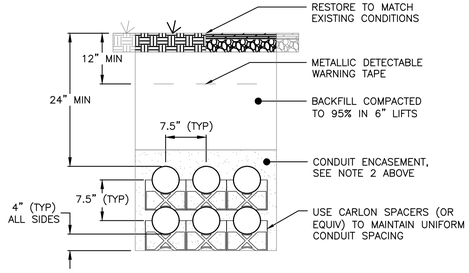
1 TYPICAL MV DUCTBANK
E403 SCALE: NONE

NOTES:
1. ALL UNDERGROUND CONDUIT SHALL BE PVC AND TRANSITION TO RMC FOR ELBOW. RMC ELBOW DOES NOT NEED TO BE BONDED IF THE ENTIRE ELBOW IS >= 18" DEEP (NEC 250.86 EXCEPTION 3)
2. UNDER ROADS AND PARKING AREAS ENCASEMENT SHALL BE 2500 PSI CONCRETE. UNDER GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC ENCASEMENT SHALL BE SAND.
3. CALL BEFORE YOU DIG, DIAL 811 TO BE CONNECTED TO THE LOCAL ON-CALL CENTER. YOU MUST CALL AT LEAST 48 HOURS BEFORE EXCAVATING.
4. IF DUCTBANK SLOPES SUCH THAT ANY PART OF THE DUCTBANK IS ABOVE STUB UP ELEVATION, INCLUDE HAND HOLE WITH GRAVEL BASE TO ALLOW DRAINAGE AT LOWEST ELEVATION.
5. CONDUIT SPACING NOT FINAL. TO BE VERIFIED VIA DUCTBANK STUDY.



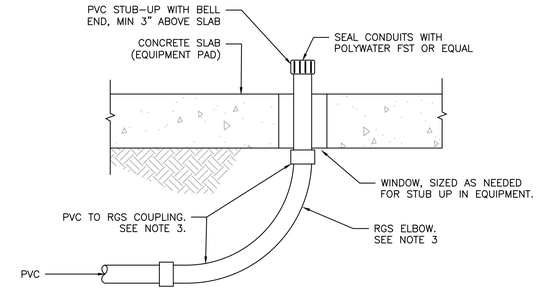
2 TYPICAL DC DUCTBANK
E403 SCALE: NONE

NOTES:
1. ALL UNDERGROUND CONDUIT SHALL BE PVC AND TRANSITION TO RMC FOR ELBOW. RMC ELBOW DOES NOT NEED TO BE BONDED IF THE ENTIRE ELBOW IS >= 18" DEEP (NEC 250.86 EXCEPTION 3)
2. UNDER ROADS AND PARKING AREAS ENCASEMENT SHALL BE 2500 PSI CONCRETE. UNDER GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC ENCASEMENT SHALL BE SAND.
3. CALL BEFORE YOU DIG, DIAL 811 TO BE CONNECTED TO THE LOCAL ON-CALL CENTER. YOU MUST CALL AT LEAST 48 HOURS BEFORE EXCAVATING.
4. IF DUCTBANK SLOPES SUCH THAT ANY PART OF THE DUCTBANK IS ABOVE STUB UP ELEVATION, INCLUDE HAND HOLE WITH GRAVEL BASE TO ALLOW DRAINAGE AT LOWEST ELEVATION.
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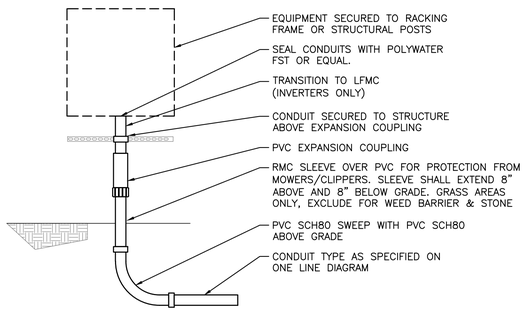


3 TYPICAL AC DUCTBANK
E403 SCALE: NONE

NOTES:
1. INITIALLY INSTALL COUPLING CAP TO PREVENT DAMAGE TO STUB-UP UNTIL GEAR IS SET.
2. INSTALL ROUNDED FITTING BEFORE PULLING CABLES TO AVOID DAMAGE TO CABLES.
3. RMC ELBOW ONLY REQUIRED ON ONE SIDE OF EACH PULL NEAREST THE LOCATION OF THE PULLING MACHINE. ON OPPOSITE SIDE, PVC SCH80 ELBOWS ARE PERMITTED.

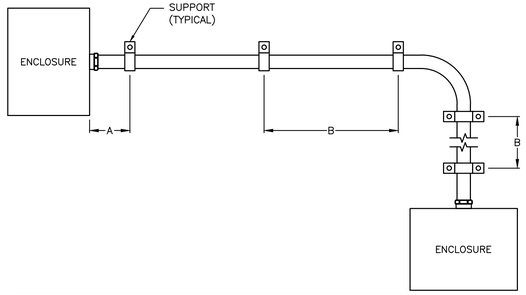


4 EQUIPMENT PAD STUB-UP
E403 SCALE: NONE



NOTES:
1. EXPANSION FITTINGS SHALL BE PROVIDED FOR ALL CONDUITS EXITING FROM GRADE THAT TERMINATE ON FIXED EQUIPMENT. CONDUITS THAT TERMINATE AT WEATHER HEADS DO NOT REQUIRE PROVISION FOR EARTH MOVEMENT.
2. PVC SWEEPS SHALL ONLY BE USED AT END WHERE WIRE REEL IS LOCATED. RMC SWEEPS SHALL BE USED AT END WHERE THE PULLING MACHINE IS LOCATED.

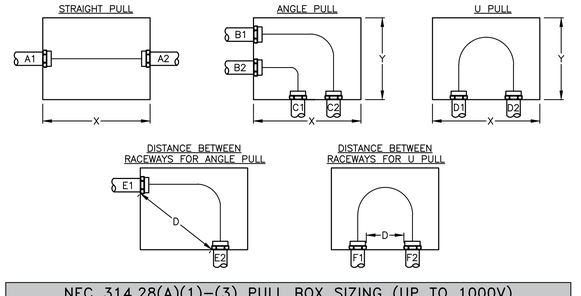
5 TRANSITION FROM GRADE
E403 SCALE: NONE



MAXIMUM CONDUIT HARDWARE SPACING

CONDUIT TYPE	ENCLOSURE TO SUPPORT (A)	SUPPORT TO SUPPORT (B)	NEC ARTICLE
ELECTRICAL METALLIC TUBING (EMT)	3'	10'	358
INTERMEDIATE METAL CONDUIT (IMC)	3'	10'	342
RIGID METAL CONDUIT (RMC)	3'	10'	344
LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)	1'	4.5'	350
PVC (SCH40 & 80) [0.5" - 1"]	3'	3'	352
PVC (SCH40 & 80) [1.25" - 2"]	3'	5'	352
PVC (SCH40 & 80) [2.5" - 3"]	3'	6'	352
PVC (SCH40 & 80) [3.5" - 5"]	3'	7'	352
PVC (SCH40 & 80) [6"]	3'	8'	352

6 CONDUIT SUPPORT SPACING
E403 SCALE: NONE



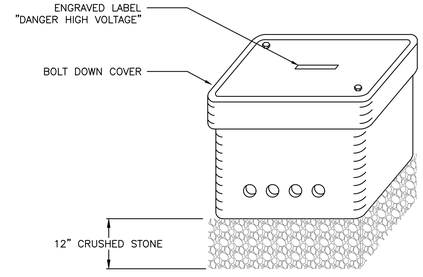
NEC 314.28(A)(1)-(3) PULL BOX SIZING (UP TO 1000V)

BOX TYPE	LENGTH (X)	HEIGHT (Y)	DISTANCE (D)
STRAIGHT PULL	8 X LARGEST OF A1 & A2	AS NEEDED	N/A
ANGLE PULL	6 X (LARGEST OF B1 & B2) + SUM OF OTHER CONDUIT ENTERING THE SAME WALL	6 X (LARGEST OF C1 & C2) + SUM OF OTHER CONDUIT ENTERING THE SAME WALL	6 X LARGEST OF E1 & E2
U PULL	AS NEEDED	6 X (LARGEST OF D1 & D2) + SUM OF OTHER CONDUIT ENTERING THE SAME WALL	6 X LARGEST OF F1 & F2

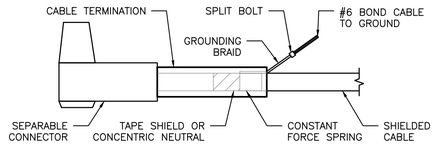
NOTE:
REFER TO NEC 314.28 FOR ADDITIONAL REQUIREMENTS.

7 PULL BOX & JUNCTION BOX SIZING
E403 SCALE: NONE

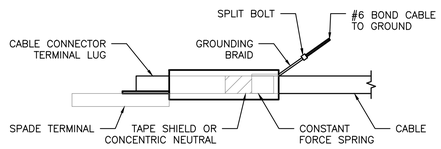
NOTES:
1. BOX SHALL BE RATED T8 FOR USE IN GRASSY AREAS NOT SUBJECT TO VEHICULAR TRAFFIC, OR RATED T22 FOR USE IN SIDEWALKS OR PARKING LOTS SUBJECT TO OCCASIONAL NON-DELIBERATE HEAVY VEHICULAR TRAFFIC. BOXES TO BE USED IN ROADWAYS OR AREAS FREQUENTLY SUBJECT HEAVY VEHICULAR TRAFFIC SHALL BE SUBMITTED TO EEOR FOR APPROVAL
2. CONDUITS SHALL ENTER ON SIDES. MINIMUM BURIAL DEPTHS OF CONDUITS IS 24" BELOW FINISHED GRADE.
3. CONDUIT KNOCKOUTS SHALL BE DRILLED OR PUNCHED ON SITE, QUANTITIES AND SIZES TO MATCH TRENCH PLAN AND COMBINER SCHEDULE.



8 HANDHOLE
E403 SCALE: NONE



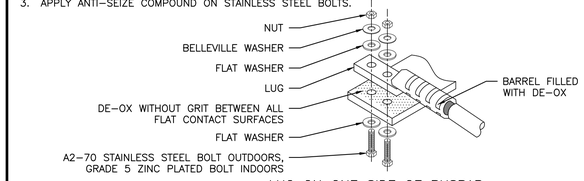
DEAD FRONT MV TERMINATION



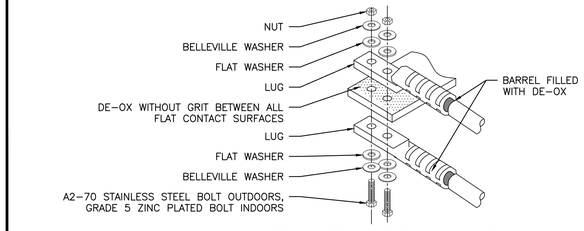
LIVE FRONT MV TERMINATION

9 MV CABLE TERMINATION
E403 SCALE: NONE

NOTES:
1. USE ALUMINUM LUG FOR ALUMINUM CONDUCTORS, TIN-PLATED COPPER LUG FOR COPPER CONDUCTORS.
2. ALL HARDWARE SHALL BE FINE THREAD AND MATCH BOLT MATERIAL.
3. APPLY ANTI-SEIZE COMPOUND ON STAINLESS STEEL BOLTS.



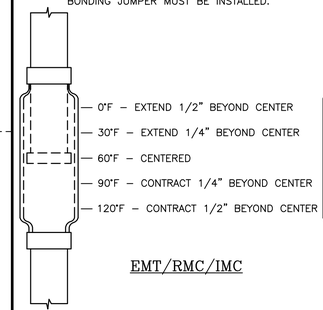
LUG ON ONE SIDE OF BUSBAR



LUGS ON BOTH SIDES OF BUSBAR

10 COMPRESSION LUG TERMINATION
E403 SCALE: NONE

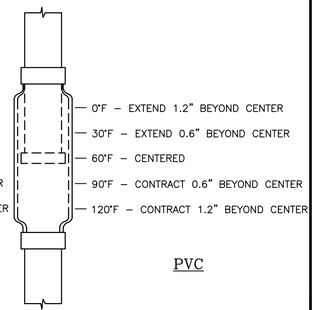
NOTES:
1. INSTALL EXPANSION COUPLING EVERY 100' OF STRAIGHT CONDUIT RUN.
2. IF EXPANSION COUPLINGS ARE INSTALLED AT LENGTHS GREATER OR LESS THAN 100', THE OFFSET FROM CENTER SHALL BE ADJUSTED PROPORTIONALLY.
3. IF EXPANSION JOINT IS NOT PROVIDED WITH INTERNAL BONDING JUMPER, AN EXTERNAL BONDING JUMPER MUST BE INSTALLED.



EMT/RMC/IMC

NOTE: THE COEFFICIENT OF THERMAL EXPANSION IN STEEL CONDUIT= 0.65 X 10^{-5}IN./IN./°F FOR EVERY 120°F CHANGE IN TEMPERATURE, THE LENGTH CHANGE IS 0.94 INCHES PER 100 FEET OF CONDUIT RUN.

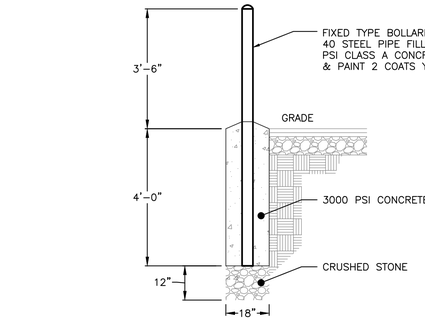
NOTES:
1. INSTALL EXPANSION COUPLING EVERY 50' OF STRAIGHT CONDUIT RUN.
2. IF EXPANSION COUPLINGS ARE INSTALLED AT LENGTHS GREATER OR LESS LESS THAN 50', THE OFFSET FROM CENTER SHALL BE ADJUSTED PROPORTIONALLY.
3. EXPANSION JOINT MUST HAVE AT LEAST 4" OF FREE MOVEMENT (END TO END).



PVC

NOTE: THE COEFFICIENT OF THERMAL EXPANSION IN PVC CONDUIT= 3.38 X 10^{-5}IN./IN./°F. FOR EVERY 30°F CHANGE IN TEMPERATURE, THE CHANGE IN LENGTH IS 0.6 INCHES PER 50 FEET OF CONDUIT RUN.

11 EXPANSION COUPLING
E403 SCALE: NONE



NOTE:
BOLLARD DESIGNED TO PROTECT EQUIPMENT FROM VEHICLES TRAVELLING 25MPH OR LESS.

12 TYPICAL BOLLARD
E403 SCALE: NONE

DATE	REVISION DESCRIPTION	PM	ENG	CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

PUREPOWER ENGINEERING
111 WASHINGTON AVE, ALBANY, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197



CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

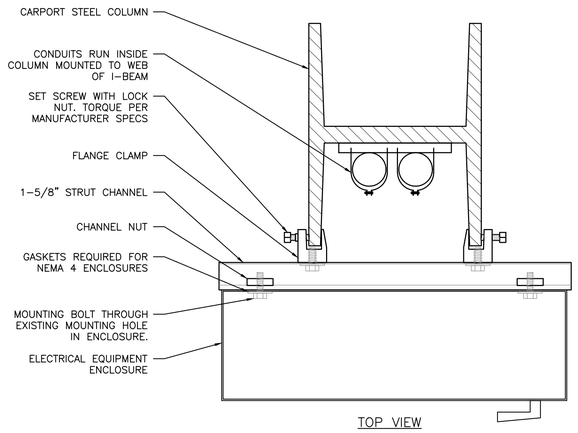
PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE H172-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

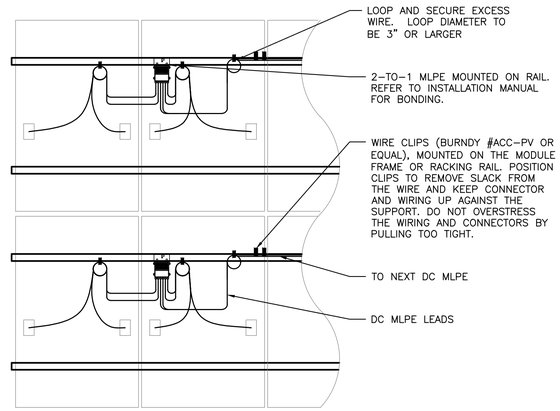
DRAWING TITLE: ELECTRICAL DETAILS

DRAWING #: E403

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

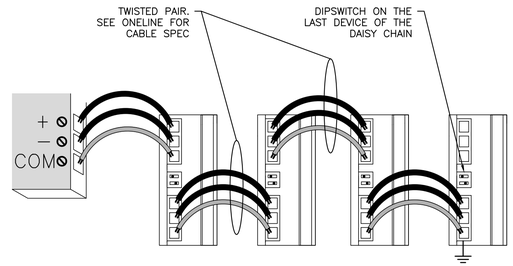


1 E404 WEATHER STATION ATTACHMENT
SCALE: NONE



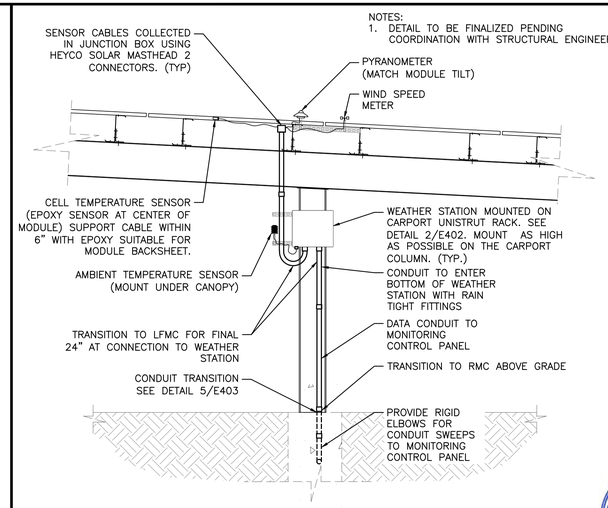
2 E404 STRING WIRING - RAIL
SCALE: NONE

MONITORING NOTES:
1. REFER TO MONITORING SYSTEM INSTALLATION MANUAL FOR DETAILS ON TERMINAL BLOCKS, CABLE TERMINATIONS, AND SYSTEM CONFIGURATION.
2. WIRELESS TRANSCEIVERS MUST HAVE LINE-OF-SIGHT BETWEEN EACH OTHER.
3. PYRANOMETER MUST BE INSTALLED IN UNSHADED LOCATION.



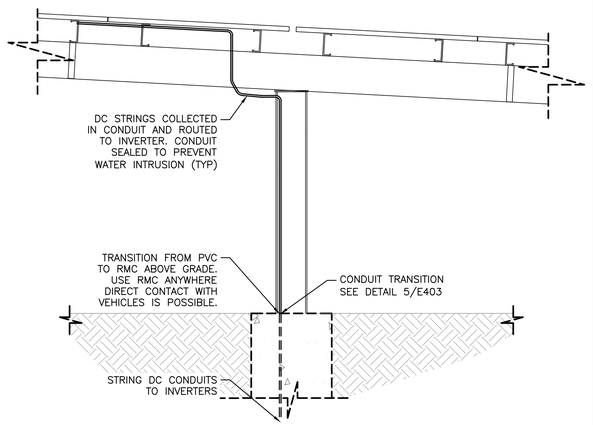
3 E404 MODBUS COMMUNICATIONS
SCALE: NONE

NOTES:
1. DETAIL TO BE FINALIZED PENDING COORDINATION WITH STRUCTURAL ENGINEER



4 E404 WEATHER STATION WIRING DETAIL
SCALE: NONE

NOTES:
1. DETAIL TO BE FINALIZED PENDING COORDINATION WITH STRUCTURAL ENGINEER



5 E404 CARPORT DC WIRE MANAGEMENT DETAIL
SCALE: NONE

DATE	REVISION DESCRIPTION	PM	ENG CHK
09/26/2022	ISSUE FOR PERMIT	RK	JT RI
08/10/2022	90% DESIGN DEVELOPMENT	RK	JT RI
04/22/2022	50% DESIGN DEVELOPMENT	RK	JT RI

PURE POWER ENGINEERING
111 WATER STREET, NEWBURGH, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
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CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
MAHWAH, NJ 07430
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EPC CORE DEVELOPMENT GROUP

PAGE SIZE 36" x 24"
PROJECT # 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT
BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE
ELECTRICAL DETAILS

DRAWING #
E404

PLOT DATE: 9/26/2022 2:44 PM

RULER IN INCHES:

PLOT DATE: 9/26/2022 2:44 PM

GENERAL NOTES FOR LABELS:
1. LABEL SCALE 1:2 UNLESS NOTED
2. LETTERING ON SIGNS SHALL BE CAPITAL LETTERS
3. CLEARLY LABEL ALL CIRCUIT BREAKERS IN THE PANELBOARD(S). THE LABEL SHALL INDICATE THE NAME OF THE DEVICE IT SERVES.

LABEL FORMAT NOTES:
1. FORMAT 1: ENGRAVED MELAMINE, WHITE TEXT ON RED BACKGROUND. TEXT HEIGHT: TITLES 3/8", ALL OTHER TEXT 5/32".
2. FORMAT 2: ENGRAVED MELAMINE, BLACK TEXT ON WHITE BACKGROUND. TEXT HEIGHT: 3/8".
3. FORMAT 3: REFLECTIVE UV RATED LABEL. RED BACKGROUND WITH WHITE CAPITAL LETTERS AT LEAST 3/8" TALL. LABELS SHALL BE SUITABLE FOR THE ENVIRONMENT IN WHICH THEY ARE INSTALLED.
4. FORMAT 4: ENGRAVED MELAMINE, WHITE TEXT ON RED BACKGROUND. TEXT HEIGHT: TITLES 5/32", ALL OTHER TEXT 3/32".
5. FORMAT 5: VINYL FILM, BLACK TEXT ON WHITE BACKGROUND. TEXT HEIGHT: 3/8"

PER 2017 NEC 690.31(B)(1), PV SYSTEM CIRCUIT CONDUCTORS SHALL BE IDENTIFIED AT ALL ACCESSIBLE POINTS OF TERMINATION, CONNECTION, AND SPLICES.

1. STRING HOMERUNS AT ARRAY
2. DC INPUT TERMINALS OF COMBINER BOX
3. DC OUTPUT TERMINALS OF COMBINER BOX
4. DC INPUT TERMINALS OF INVERTER
5. AC OUTPUT TERMINALS OF INVERTER
6. AC INPUT & OUTPUT TERMINALS OF EACH SUCCESSIVE DEVICE (WHERE APPLICABLE)

4"
PV SYSTEM INSTALLER INFORMATION
INSTALLATION COMPANY: XXXXX SOLAR COMPANY
EMERGENCY PHONE #: (XXX)XXX-XXXX
1"
NFPA1 11.12.2.1.5, INSTALL ON MAIN PV SYSTEM DISCONNECT, FORMAT 4

4"
WARNING
ARC FLASH AND SHOCK HAZARD
Appropriate PPE and Tools Required when working on this equipment.
2"
OUTDOOR RATED STICKER MOUNTED ON ALL EQUIPMENT

3 — 6" — GENERATOR DISCONNECT SWITCH 89L — 3"
WARNING:
SUPPLIED BY UTILITY, PV, & BESS SOURCES
OPERATING CURRENT: **218.7A**
NOMINAL VOLTAGE: **13.2kV**
NEC 690.54, NFPA 11.12.2.1.1, FORMAT 1

4 — 6" — BESS MV DISCONNECT — 3"
WARNING:
SUPPLIED BY UTILITY, PV, & BESS SOURCES
OPERATING CURRENT: **192A**
NOMINAL VOLTAGE: **13.2kV**
FORMAT 1

5 — 6" — SOLAR SYSTEM MV DISCONNECT — 3"
WARNING:
SUPPLIED BY UTILITY, PV, & BESS SOURCES
OPERATING CURRENT: **164.0A**
NOMINAL VOLTAGE: **13.2kV**
NEC 690.54, NFPA 11.12.2.1.1, FORMAT 1

6 — 6" — BESS TRANSFORMER — 3 1/4"
WARNING:
SUPPLIED BY UTILITY, PV, & BESS SOURCES
TRANSFORMER KVA: **4000KVA**
PRIMARY VOLTAGE: **13.2KV**
SECONDARY VOLTAGE: **690V**
FORMAT 2

7 — 8" — BESS INVERTER — 3 1/4"
DC DISCONNECT: MAXIMUM VOLTAGE: **1500V**
AC DISCONNECT: MAXIMUM AC OPERATING CURRENT: **3167A**, NOMINAL AC OPERATING VOLTAGE: **690V**
FORMAT 1

TYPICAL FOR ESE(S) 1–4

8 — 6" — ENERGY STORAGE ENCLOSURE 1 — 3"
WARNING:
SUPPLIED BY UTILITY, PV, & BESS SOURCES
DC DISCONNECT LOCATED INSIDE ENCLOSURE
MAXIMUM DC VOLTAGE: **1500V**
FORMAT 1

9 — 6" — BESS AUXILIARY POWER DISCONNECT — 3"
WARNING:
SUPPLIED BY UTILITY SOURCES
OPERATING CURRENT: **1200A**
NOMINAL VOLTAGE: **208kV**
FORMAT 1

10 — 6" — BESS AUX METER — 3/4"
FORMAT 2

11 — 6" — BESS AUX MTS — 3/4"
FORMAT 2

12 — 6" — BESS AUX PNL — 3/4"
FORMAT 2

14 — 6" — BESS EMS — 3/4"
FORMAT 2

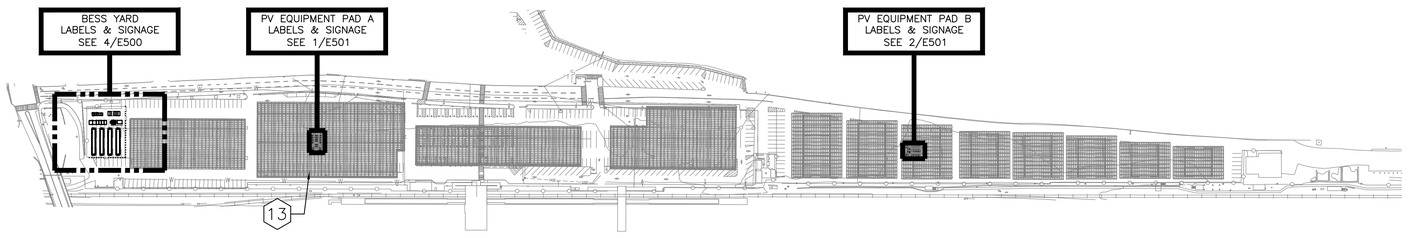
16 — 6" — RTAC ENCLOSURE
FORMAT 2

13 — 6" — WEATHER STATION — 3/4"
FORMAT 2

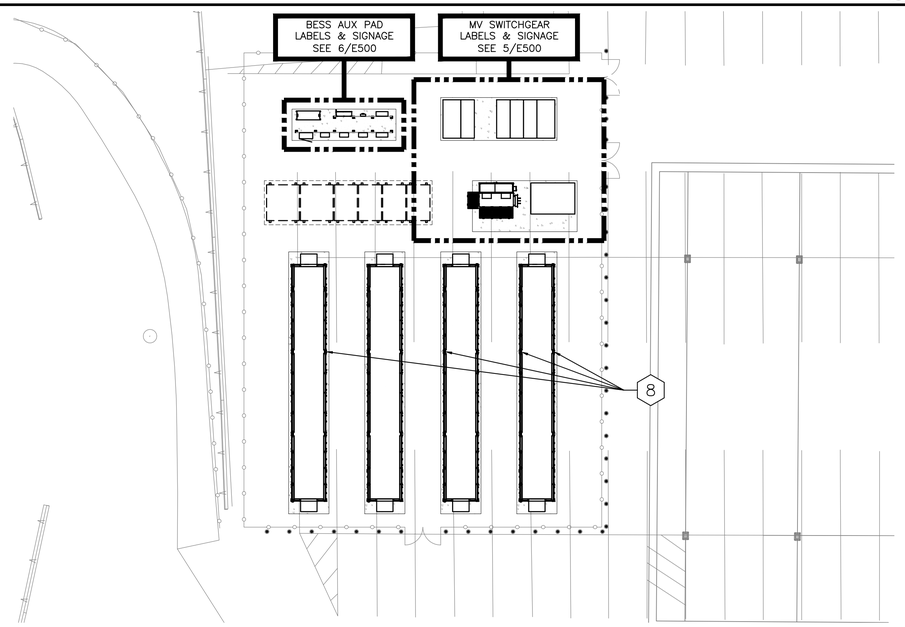
15 — 6" — BESS FIRE PNL — 3/4"
FORMAT 2

17 — 6" — SOLAR MONITORING — 3/4"
FORMAT 2

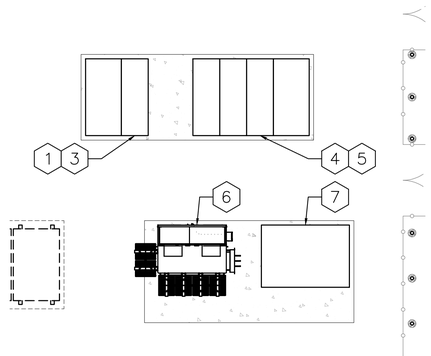
7"
DANGER
HIGH VOLTAGE AUTHORIZED PERSONNEL ONLY
5"
NOTE: LOCATIONS TO BE DETERMINED IN THE FIELD. INSTALL SIGNAGE 25' FROM EVERY CORNER AND EVERY 50' OF FENCELINE



1 / E500 — LABELS & SIGNAGE
SCALE: 1" = 150'



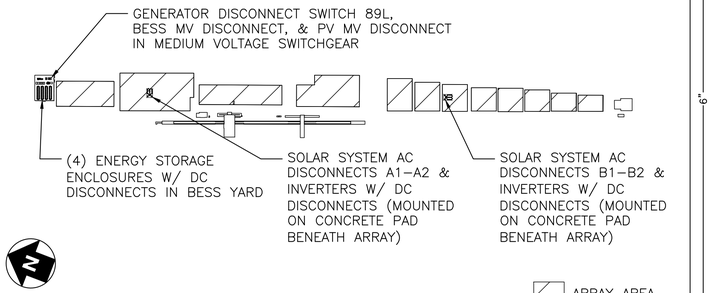
4 / E500 — BESS YARD – LABELS & SIGNAGE
SCALE: 1/16" = 1'-0"



5 / E500 — MV SWITCHGEAR – LABELS & SIGNAGE
SCALE: 1/8" = 1'-0"

1 — 10" — CAUTION:

MULTIPLE POWER SOURCES ARE CONNECTED TO THIS SERVICE WITH DISCONNECTS AS SHOWN:

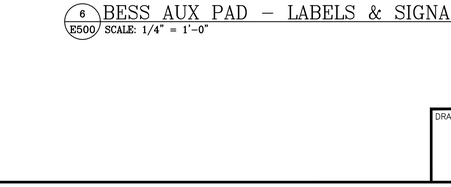


6"
NEC 705.10 & 690.56(B)
INSTALL AT MAIN DISCONNECT OF ALL POWER SOURCES. ENGRAVED MELAMINE, WHITE TEXT ON RED BACKGROUND, TITLE MIN. 1/2", DESCRIPTION 5/16", ALL OTHER TEXT 1/8"

2 / E500 — DIRECTORY LABEL
SCALE: 1:1

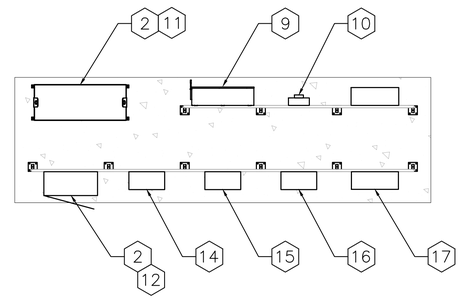
2 — 10" — CAUTION:

MULTIPLE POWER SOURCES ARE CONNECTED TO THIS SERVICE WITH DISCONNECTS AS SHOWN:



6"
NEC 705.10 & 690.56(B)
INSTALL AT MAIN DISCONNECT OF ALL POWER SOURCES. ENGRAVED MELAMINE, WHITE TEXT ON RED BACKGROUND, TITLE MIN. 1/2", DESCRIPTION 5/16", ALL OTHER TEXT 1/8"

3 / E500 — DIRECTORY LABEL
SCALE: 1:1



6 / E500 — BESS AUX PAD – LABELS & SIGNAGE
SCALE: 1/4" = 1'-0"

		DATE	REVISION DESCRIPTION	PM	ENG	CHK
		09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
		08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
		04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

PUREPOWER ENGINEERING
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MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE: LABELS & SIGNAGE

DRAWING #: E500

RULER IN INCHES: 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 ½ 0

PLOT DATE: 9/26/2022 2:44 PM

GENERAL NOTES FOR LABELS:
1. LABEL SCALE 1:2 UNLESS NOTED
2. LETTERING ON SIGNS SHALL BE CAPITAL LETTERS
3. CLEARLY LABEL ALL CIRCUIT BREAKERS IN THE PANELBOARD(S). THE LABEL SHALL INDICATE THE NAME OF THE DEVICE IT SERVES.

LABEL FORMAT NOTES:
1. FORMAT 1: ENGRAVED MELAMINE, WHITE TEXT ON RED BACKGROUND. TEXT HEIGHT: TITLES 3/8", ALL OTHER TEXT 5/32".
2. FORMAT 2: ENGRAVED MELAMINE, BLACK TEXT ON WHITE BACKGROUND. TEXT HEIGHT: 3/8".
3. FORMAT 3: REFLECTIVE UV RATED LABEL. RED BACKGROUND WITH WHITE CAPITAL LETTERS AT LEAST 3/8" TALL. LABELS SHALL BE SUITABLE FOR THE ENVIRONMENT IN WHICH THEY ARE INSTALLED.
4. FORMAT 4: ENGRAVED MELAMINE, WHITE TEXT ON RED BACKGROUND. TEXT HEIGHT: TITLES 5/32", ALL OTHER TEXT 3/32".
5. FORMAT 5: VINYL FILM, BLACK TEXT ON WHITE BACKGROUND. TEXT HEIGHT: 3/8"

PER 2017 NEC 690.31(B)(1), PV SYSTEM CIRCUIT CONDUCTORS SHALL BE IDENTIFIED AT ALL ACCESSIBLE POINTS OF TERMINATION, CONNECTION, AND SPLICES.

1. STRING HOMERUNS AT ARRAY
2. DC INPUT TERMINALS OF COMBINER BOX
3. DC OUTPUT TERMINALS OF COMBINER BOX
4. DC INPUT TERMINALS OF INVERTER
5. AC OUTPUT TERMINALS OF INVERTER
6. AC INPUT & OUTPUT TERMINALS OF EACH SUCCESSIVE DEVICE (WHERE APPLICABLE)

4" × 1"
PV SYSTEM INSTALLER INFORMATION
INSTALLATION COMPANY: XXXXX SOLAR COMPANY
EMERGENCY PHONE #: (XXX)XXX-XXXX
NFPA1 11.12.2.1.5, INSTALL ON MAIN PV SYSTEM DISCONNECT, FORMAT 4

4" × 2"
WARNING
ARC FLASH AND SHOCK HAZARD
Appropriate PPE and Tools Required when working on this equipment.
OUTDOOR RATED STICKER MOUNTED ON ALL EQUIPMENT

CIRCUIT BREAKER AND SWITCH LABELS:
UNLESS LABELLED OTHERWISE, ALL CIRCUIT BREAKERS AND SWITCHES SHALL BE LABELLED WITH THE NAME OF THE EQUIPMENT SUPPLIED.

INVERTER 52IT–A1
TYPICAL FOR INVERTER BRANCH CIRCUIT BREAKERS. FORMAT 5

SOLAR AC PANELBOARD MAIN CIRCUIT BREAKER
TYPICAL FOR PANELBOARD MAIN CIRCUIT BREAKERS. FORMAT 5

6 1/2" × 1"
WARNING: PHOTOVOLTAIC POWER SOURCE
NEC 690.31(G)(3)(4), NFPA11.12.2.1.3.2, HELLERMANNTYTON #: 596–00206 OR EQUAL, FORMAT 3. SHALL BE PERMANENTLY AFFIXED ON ALL DC EXPOSED RACEWAYS, CABLE TRAYS, PULL BOXES, AND JUNCTION BOXES. LABELS SHALL BE SPACED NO GREATER THAN 10 FEET APART.

TYPICAL FOR SOLAR TRANSFORMER(S): A–B

18 — 6" × 3 1/4"
SOLAR TRANSFORMER A
WARNING: SUPPLIED BY UTILITY, PV, & BESS SOURCES
TRANSFORMER KVA: 1875KVA
PRIMARY VOLTAGE: 13.2KV
SECONDARY VOLTAGE: 480V
FORMAT 2

TYPICAL FOR SOLAR AC SWITCHBOARD(S) A1 & B1–B2

19 — 5" × 3 1/4"
SOLAR AC SWITCHBOARD A1
WARNING: SUPPLIED BY UTILITY & PV SOURCES.
OPERATING CURRENT: 1010.1A
OPERATING VOLTAGE: 480V
DO NOT CONNECT NON–SOLAR LOADS TO THIS PANEL
FORMAT 1

20 — 5" × 3 1/4"
SOLAR AC SWITCHBOARD A2
WARNING: SUPPLIED BY UTILITY & PV SOURCES.
OPERATING CURRENT: 865.8A
OPERATING VOLTAGE: 480V
DO NOT CONNECT NON–SOLAR LOADS TO THIS PANEL
FORMAT 1

TYPICAL FOR INVERTER(S): A1–A13 & B1–B14

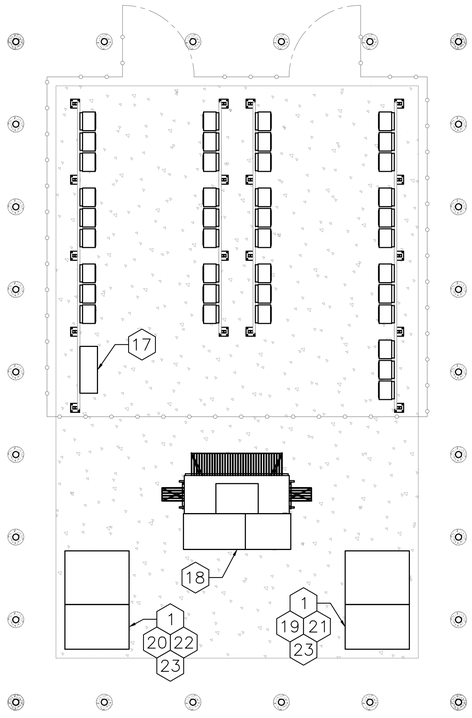
6" × 2 3/4"
INVERTER A1
DC DISCONNECT
MAXIMUM CURRENT: 144.75A
MAXIMUM VOLTAGE: 1000V
NEC 2017 690.53, NFPA 11.12.2.1.1 FORMAT 1

TYPICAL FOR SOLAR AC PANELBOARD(S): A1 & B1–B2

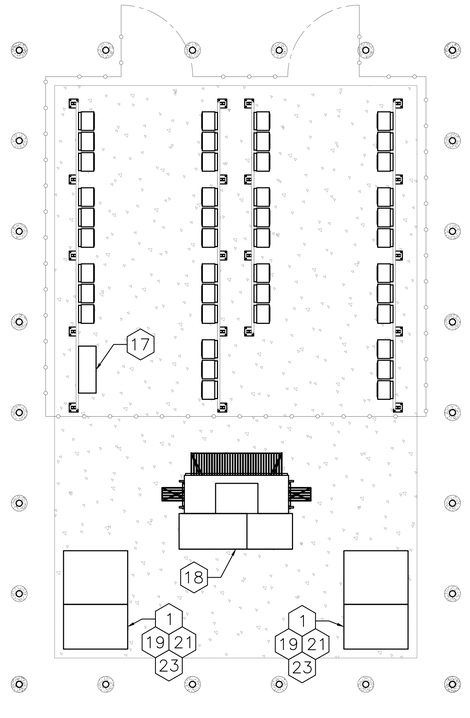
21 — 6" × 3"
SOLAR SYSTEM AC DISCONNECT A1
WARNING: PHOTOVOLTAIC POWER SOURCE.
OPERATING CURRENT: 1010.1A
NOMINAL VOLTAGE: 480V
NEC 690.54, NFPA 11.12.2.1.1, FORMAT 1

22 — 6" × 3"
SOLAR SYSTEM AC DISCONNECT A2
WARNING: PHOTOVOLTAIC POWER SOURCE.
OPERATING CURRENT: 865.8OA
NOMINAL VOLTAGE: 480V
NEC 690.54, NFPA 11.12.2.1.1, FORMAT 1

23 — 6"
DEVICE 52IT PANEL
FORMAT 2



1 / E501 PV EQUIPMENT PAD A – LABELS & SIGNAGE
SCALE: 1/4" = 1'–0"



2 / E501 PV EQUIPMENT PAD B – LABELS & SIGNAGE
SCALE: 1/4" = 1'–0"

NO.	DATE	REVISION DESCRIPTION	PM	ENG	CHK
	09/26/2022	ISSUE FOR PERMIT	RK	JT	RI
	08/10/2022	90% DESIGN DEVELOPMENT	RK	JT	RI
	04/22/2022	50% DESIGN DEVELOPMENT	RK	JT	RI

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WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

EPC: CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT #: 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT–SAEE HT72–18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT: BESS + SOLAR CARPORT SYSTEM AT CROTON–HARMON
4 VETERANS PLAZA
CROTON–ON–HUDSON, NY 10520

DRAWING TITLE: LABELS & SIGNAGE

DRAWING #: E501

RULER IN INCHES: 0 ½ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:40 PM

POWIN



BATTERY ENERGY STORAGE SYSTEM

PRODUCT LINE: Powin Stacks

Powin Stacks are modular, flexible, purpose-built battery arrays that are easily and cost-effectively scalable from kilowatts to megawatts. Powin's patented StackOS™ — the only seamlessly integrated EMS and BMS platform in the energy storage industry — comes installed in every Stack module. This cutting-edge battery system utilizes LFP cell technology, minimizing system footprint while maintaining a high level of safety. Powin Stacks can perform a full spectrum of advanced applications to fulfill today's energy storage requirements, and are flexible enough to support future use cases as markets change.

StackOS™ SOFTWARE PLATFORM

Stack230 & Stack360

- Specially designed for stationary storage applications
- Can be flexibly scaled to accommodate any energy need
- Optional Energy Management System for intelligent battery dispatch
- Controls interface can connect directly to any SCADA system
- Range of converter options available depending on application and best possible price
- Battery pack design can utilize cylindrical or prismatic cells
- Available in indoor & outdoor configurations

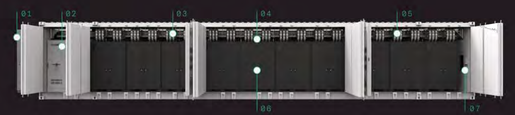
StackOS™ CONTROLS

- A dynamic energy management system that can serve myriad revenue streams simultaneously.
- Provides behind and in-front-of-the-meter applications that can optimize cell-level and balancing awareness, all observable through Powin and/or customer NOCs.
- Can be configured with 3rd party EMS allowing customersto still enjoy Powin's industry leading cell fidelity, global monitoring, deep analytics and advanced balancing function.
- Advanced applications include primary response to react to grid conditions, firming to forecast, peak shaving, PV smoothing, demand response and microgrid support.
- MESA 802 / SunSpec 103 & 123 compliant.

StackOS™ BATTERY MANAGEMENT & SAFETY

- Unprecedented depth of real-time battery system monitoring down to the cell level
- Patented battery management system aggregates battery data collected from Stacks for reporting to other systems, such as the EMS.
- 3-levels of control executing balancing configurations for health & safety among battery strings, packs and cells.
- Uses a distributed intelligence approach to build its battery system control hierarchy.
- Ensures that DC components of the system operate within safe margins and core battery reporting is performed correctly.
- Includes a standardized API Modbus TCP and MESA 802/SunSpec for compliance.

POWIN | SMART ENCLOSURES



01. One Wall mounted HVAC unit installed on each end of the enclosure

02. Powin Control Powin DC Disconnect Cabinet, AC Load Panel, HVAC Controls, Fire Detection, Hydrogen Detection, Comms and Controls

03. Pre-integrated Cable Tray that collects the DC Cable, AC Cable and Comms to each Stack

04. Fire Suppression Canisters strategically placed above each grouping of Stacks

05. Cold HVAC Air is ducted directly to the intake fans of each Stack

06. Up to 20 Stacks in a 53' Enclosure

07. Optional roof-mounted deflagration vents (not required for NFPA 855 compliance)

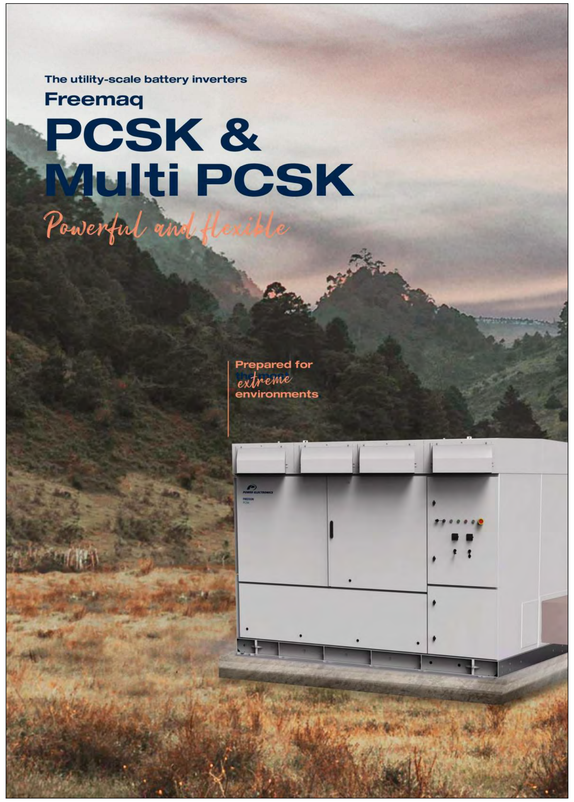
Powin's cost effective smart enclosures are a scalable purpose-built battery solution that includes all of the balance of system (BOS) equipment that can be modified to meet local Authority Having Jurisdiction (AHJ) requirements. The thermal management of this enclosure has been meticulously designed through air ducting and HVAC, providing an optimal temperature controlled environment for the battery enabling deployment in many different geographical climate types. Powin Smart Enclosures come in 40' and 53' sizes.

FULLY INTEGRATED

- Up to 20 Stack230s or 14 Stack360s per enclosure in parallel
- Powin's patented StackOS integrated Battery Management and Energy Management Platform
- HVAC & forced air with ducting that directly targets the stacks
- Fire suppression system that also provides detection and monitoring
- AC breaker panel for coms and aux loads
- DC Collection, cable and tray
- IP 54 rated
- Insulation options for hot and cold climates
- Isolation, and over current and fault protection
- Minimal on site installation requirements

COMMUNICATION CABINET

- Full state of awareness monitoring for fire suppression/HVAC/inverter and transformer status/E stop/UPS aux
- Switch
- Router
- UPS – Control
- Linux computer
- HMI
- Controls interface can connect to any SCADA system



StormSwitch® Manual Transfer Switch

ESL POWER SYSTEMS

UL 1008 Listed

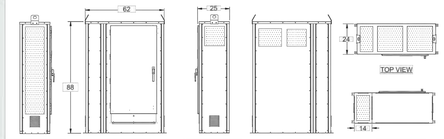
1200A, up to 600VAC
Series: 3012

Features



- Quick connect solution for a backup portable generator
- Mechanically interlocked mechanism prevents cross-connecting power sources
- Door & dead front panel for safe generator connection and operation
- Primary and alternate power disconnects are 3-pole circuit breakers as standard (optional 4-pole breakers or molded case switches available)
- Type 3R freestanding 12 gauge galv. steel enclosure with gray powdercoat RAL 7035 (stainless steel & colors optional)
- Suitable for Use as Service Equipment (SUSE) option available
- Color-coded 16 series cam style male connectors for easy portable generator connection
- Direct wire connection available for indoor installations (TempTap Generator Docking Station Required)
- Left side wireway extension for bottom conduit entry (Right side, (2) wireways, no wireway optional)
- Operating instructions on inside of enclosure
- Hinged plate secures generator cord entry opening when not in use
- ERMS available for 1200A and above

Drawing



Available incoming conduit entry locations shown shaded

Approvals

- UL/cUL 1008 Listed assembly
- UL 1691 Listed receptacles
- UL 489 Listed / CSA certified molded case circuit breaker
- UL 1087 Listed molded case switch
- OSHPD seismic certification (OSP)
- ICC-ES 156 shake-table tested/certified
- IBC 2015/ASCE 7-10 compliant

ESL Power Systems, Inc. | 2800 Palisades Dr. | Corona, CA 92880 | 800.922.4188 | +1.951.739.7000 | www.eslpwr.com | infoll@eslpwr.com

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3012
210408

POWIN STACK TECHNICAL SPECIFICATIONS

		STACK230P	STACK230E	STACK360E
Electrical	DC Voltage	760 - 937 V		1,193 - 1,470 V
	Duration	1.5+ hrs	3+ hrs	3+ hrs
	Maximum DC Energy Capacity	230 kWh	235 kWh	365 kWh
	Rated DC Power	150 kW	58.3 kW	90.8 kW
	DC Energy Capacity @ Rated Power[1,2]	225 kWh	233kWh	363 kWh
	Duration @ Rated Power	1.5 hrs	4 hrs	4 hrs
	Aux Load per Stack (Standby/Peak)[3]	84 W / 1,221 W		168 W / 2,045 W
	Daily Aux Energy per Stack[4, 5]	7.0 kWh	8.8 kWh	13 kWh
	Daily Aux Energy per Stack, Net of Balancing[6]	5 - 6 kWh		6 - 7 kWh
Performance & Safety	Cycle Life[8]	4,745 cycles / 6,789 cycles	7,300 cycles	7,300 cycles / 7,300 cycles
	Calendar Life	20 years		20 years
	Cell Model	EVE LF280K / CATL CB2W0	CATL CB310	EVE LF280K / CATL CB310
	DC Round Trip Efficiency @ Rated Power	93%	95%	96%
	Cell Chemistry	Lithium Iron Phosphate (LFP)		
	Cell Operating Temperature Range[7]	20 - 35° C		
	Depth of Discharge	100%		
	Codes & Compliance[8]	UL9540A, UL1973, UN3480, UN38.3		
Mechanical	Weight (Approximate)	5,000 lbs (2,273 kg)		7,500 lbs (3,409 kg)
	Enclosure Dimensions	4'4" W x 3'2" D x 6'5" H (1,321 mm x 965 mm x 1,956 mm)		6'2" W x 3'2" D x 6'5" H (1,880 mm x 965 mm x 1,956 mm)
	Enclosure Type / Rating	NEMA 1 / IP20		
	Ambient Operating Temperature Range	-10° C to +45° C		
Software	BMS + EMS + Solar + Environmental Controls	StackOS™		
	Reporting + Optimization + Data Warehouse	StackOS+™		
	First Responder HMI	Powin for First Responders™		
	Communications Interface	Modbus TCP (MESA/Sunspec) & REST API		

1 Energy capacity is recorded at the DC bus and varies by use case; contact Powin for an accurate estimate
2 Power / Energy for 3-hr applications: Stack230E = 77 kW / 231 kWh & Stack360E = 120.3 kW / 361 kWh
3 Peak values are atypical and assume maximum active cell balancing current within a Stack
4 Includes recoverable active balancing energy during charge / discharge
5 Assumes 1 full cycle per day; includes Stack-level fans but not HVAC
6 Assumes 1 full cycle per day and includes calendar aging for the day; cycle EOL Soh: EVE LF280L = 80.0% (1.5hrs+) or 60.0% (3hrs+), CATL CB2W0 = 60.0%, CATL CB310 = 66.6%.
7 HVAC designed to maintain all cells near 25° C; full operating range 5 - 45° C; power derated at low temperatures
8 Current and expected

POWIN SMART ENCLOSURE | TECHNICAL SPECIFICATIONS

		40' ENCLOSURE		53' ENCLOSURE		
		STACK230P	STACK230E	STACK230P	STACK230E	STACK360E
Electrical	DC Voltage	760 - 937 V		760 - 937 V		1,193 - 1,470 V
	Duration	1.5+ hrs	3+ hrs	1.5+ hrs	3+ hrs	3+ hrs
	Maximum DC Energy Capacity	3,188 kWh	3,257 kWh	4,554 kWh	4,652 kWh	5,029 kWh
	Rated DC Power	2,100 kW	805 kW	2,850 kW	1,150 kW	1,260 kW
	DC Energy Capacity @ Rated Power[1, 2]	3,119 kWh	3,229 kWh	4,455 kWh	4,613 kW	5,031 kWh
	Duration @ Rated Power	1.5 hrs	4 hrs	1.5 hrs	4 hrs	4 hrs
	Aux Load per Enclosure (Standby / Peak)[3]	1.5 kW / 63 kW	1.5 kW / 52 kW	2.0 kW / 69 kW	2.1 kW / 59 kW	2.7 kW / 65 kW
	Daily Aux Energy per Enclosure[4, 5]	167 - 196 kWh	152 - 186 kWh	181 - 215 kWh	211 - 240 kWh	234 - 263 kWh
	Daily Aux Energy per Enclosure, Net of Balancing[6]	124 - 153 kWh	124 - 158 kWh	143 - 177 kWh	149 - 178 kWh	142 - 171 kWh
Performance & Safety	DC Round Trip Efficiency @ Rated Power	92%	94%	92%	94%	94%
	Energy Density	9.96 kWh/ft²	10.18 kWh/ft²	10.74 kWh/ft²	10.97 kWh/ft²	11.86 kWh/ft²
	Battery Chemistry	Lithium Iron Phosphate (LFP)				
	Cycle Life	4,745 - 7,300 cycles				
	Calendar Life	20 years				
	Explosion Prevention & Mitigation[6]	Hydrogen detection with redundant active ventilation; deflagration panels optional				
	Fire Suppression	Clean agent fire suppression system with UPS backup, strobes, horn, and FDC dry standpipe connection				
	Heating & Cooling	Dual forced air HVAC with thermostat, humidity control, & economizer				
	Codes & Compliance[7]	NFPA 855, NFPA 68/69, UL 1973				
	Max Number of Stacks	14		19	20	14
	Weight (Approximate)	90,500 lbs (41,050 kg)		126,415 lbs (57,461 kg)		136,315 lbs (61,691 kg)
	Enclosure Dimensions	40' L x 8' W x 9'6" H		53' L x 8' W x 9'6" H		
	Enclosure Type / Rating	NEMA 3R / IP54				
	Ambient Operating Temperature Range	-10° C to +50° C				
Software	BMS + EMS + Solar + Environmental Controls	StackOS™				
	Reporting + Optimization + Data Warehouse	StackOS+™				
	First Responder HMI	Powin for First Responders™				
	Communications Interface	Modbus TCP (MESA/Sunspec) & REST API				

1 Energy capacity is recorded at the DC bus and varies by use case; contact Powin for an accurate estimate
2 DC Energy Capacity for 3-hr applications: Stack230E = 3160 kWh (40 ft) | 4514 kWh (53 ft) & Stack360E = 4948 kWh (53 ft)
3 Peak values are atypical and assume maximum active cell balancing current within a Stack
4 Includes recoverable active balancing energy during charge/discharge
5 Assumes 1 full cycle per day; accounts for Stack-level and enclosure-level loads, including HVAC
6 Deflagration panels not required for NFPA 855 compliance
7 Current and expected

Freemaq Multi PCSK

		FRAME 2	FRAME 3	FRAME 4	
690 V					
REFERENCES		FP2195K2	FP3290K3	FP4390K2	FP4390K4
AC	AC Output Power (kVA/kW) @40°C[1]	2195	3290	4390	
	AC Output Power (kVA/kW) @50°C[1]	2035	3055	4075	
	Operating Grid Voltage (VAC)		690V ±10%		
DC	DC Voltage Range[2]		976V - 1500V		
	Maximum DC Voltage		1500V		
EFFICIENCY	Efficiency (Max) (η)	98.84%	98.87%	98,93%	
	Euroeta (η)	98.45%	98.48%	98.65%	
660 V		**FRAME 2**	**FRAME 3**	**FRAME 4**	
REFERENCES		FP2101K2	FP3151K3	FP4200K2	FP4200K4
AC	AC Output Power (kVA/kW) @40°C[1]	2100	3150	4200	
	AC Output Power (kVA/kW) @50°C[1]	1950	2925	3900	
	Operating Grid Voltage (VAC)		660V ±10%		
DC	DC Voltage Range[2]		934V - 1500V		
	Maximum DC Voltage		1500V		
EFFICIENCY	Efficiency (Max) (η)	98.81%	98.84%	98,90%	
	Euroeta (η)	98.45%	98.48%	98,65%	
645 V		**FRAME 2**	**FRAME 3**	**FRAME 4**	
REFERENCES		FP2055K2	FP3080K3	FP4105K2	FP4105K4
AC	AC Output Power (kVA/kW) @40°C[1]	2055	3080	4105	
	AC Output Power (kVA/kW) @50°C[1]	1905	2855	3810	
	Operating Grid Voltage (VAC)		645V ±10%		
DC	DC Voltage Range[2]		913V - 1500V		
	Maximum DC Voltage		1500V		
EFFICIENCY	Efficiency (Max) (η)	98.78%	98.87%	98,87%	
	Euroeta (η)	98.40%	98.60%	98,60%	
630 V		**FRAME 2**	**FRAME 3**	**FRAME 4**	
REFERENCES		FP2005K2	FP3080K3	FP4010K2	FP4010K4
AC	AC Output Power (kVA/kW) @40°C[1]	2005	3005	4010	
	AC Output Power (kVA/kW) @50°C[1]	1860	2790	3720	
	Operating Grid Voltage (VAC)		630V ±10%		
DC	DC Voltage Range[2]		891V - 1500V		
	Maximum DC Voltage		1500V		
EFFICIENCY	Efficiency (Max) (η)	98.76%	98.79%	98,85%	
	Euroeta (η)	98.39%	98,42%	98,59%	
615 V		**FRAME 2**	**FRAME 3**	**FRAME 4**	
REFERENCES		FP1955K2	FP2935K3	FP3915K2	FP3915K4
AC	AC Output Power (kVA/kW) @40°C[1]	1955	2935	3915	
	AC Output Power (kVA/kW) @50°C[1]	1815	2725	3635	
	Operating Grid Voltage (VAC)		615V ±10%		
DC	DC Voltage Range[2]		870V - 1500V		
	Maximum DC Voltage		1500V		
EFFICIENCY	Efficiency (Max) (η)	98.76%	98.79%	98,84%	
	Euroeta (η)	98.38%	98,41%	98,57%	

NOTES

[1] Values at 1.00 Vac nom and cosφ=1. Consult Power Electronics for charging mode and derating curves.
[2] Consult Power Electronics for derating curves.

Specifications

ESL POWER SYSTEMS

UL 1008 Listed

StormSwitch® Manual Transfer Switch
Series: 3012

Ordering Information

System Voltage	208Y/120 (3-Phases + Neutral + Ground) 208 (3-Phases + Ground) (no Neutral) 240 Delta (3-Phases + Ground) (no Neutral) 240/120 Delta (3-Phases + Neutral + Ground) (High Leg) 480 Delta (3-Phases + Ground) (no Neutral) 480Y/277 (3-Phases + Neutral + Ground) 600 Delta (3-Phases + Ground) (no Neutral) 600Y/347 (3-Phases + Neutral + Ground)
Disconnect Poles	**Standard:** 3 Optional: 4
Assembly Rating	65kAIC @ 240VAC,35kAIC @ 480VAC with Circuit Breakers (10kA with Switches)
Trip Type	**Standard:** LI Optional: Basic Electronic, LI Ammeter, LSI, LSI Ammeter, LSI Power, LSIG Ammeter, LSIG Power, Automatic Switch
Circuit Breaker kAIC/ Interrupting Rating kAIC	**Standard:** (65@240, 35@480, 18@600) Other options available
Circuit Breaker Rating	**Standard:** 80% Rated, Optional: 100% Rated
Energy Reduction Maintenance Switch	Optional
Optional Shunt Trip Voltage	12 VDC, 24 VDC, 48 VDC, 125 VDC, 250 VDC, 24 VAC, 48 VAC, 120 VAC, 240 VAC, 277 VAC, 380 VAC, 480 VAC
Terminals	Disconnect line terminals: (4) 300 - 800kcmil per phase & neutral Load terminals: (4) 300 - 800kcmil per phase & neutral Ground lug: (9) #2 - 600kcmil Other options available
Optional Disconnect Aux Contact	(1) N.O. / (1) N.C., (2) N.O. / (2) N.C.
Optional Disconnect Bell Alarm	(1) N.O. / (1) N.C.
Enclosure Material	**Standard:** Galvanneal Optional: 304SS, 316SS
Environmental Rating	**Standard:** 3R Optional: 3RX for stainless steel
Enclosure Color Options (additional cost may be required)	**Standard:** RAL-7035 – Wrinkle Light Gray Optional: RAL-1015 – Wrinkle Light Ivory RAL-1023 – Wrinkle Traffic Yellow RAL-2004 – Wrinkle Pure Orange RAL-3020 – Wrinkle Traffic Red RAL-5002 – Wrinkle Ultramarine Blue RAL-6024 – Wrinkle Traffic Green RAL-7004 – Wrinkle Signal Gray RAL-7038 – Wrinkle Agate Gray RAL-8017 – Wrinkle Chocolate Brown RAL-9003 – Wrinkle Signal White RAL-9005 – Wrinkle Jet Black
Optional Accessories	Pilot Light - Primary Source (Red) Pilot Light - Primary Source (Green) Pilot Light - Alternate Source (Red) Pilot Light - Alternate Source (Green) Infrared Window Phase Monitor Remote Start: 4 Point TB ERMS (energy reduction maintenance switch) Surge Protection Device (SPD) Heater/Thermostat/De-Humidistat Receptacle - 20A, 120V Duplex Receptacle - 20A, 120V GFCI Duplex Receptacle - 20A, 120V Twist Lock Receptacle - 30A, 120V Twist Lock Receptacle - 20A, 120V Straight Blade
Side Wireways	Left Side Effective Conduit Area (20"D x 10"W) Other options available
Service Entrance Rating	Yes as an option
Aproximate Product Weight: Aproximate Shipping Weight:	1600 lbs. 1680 lbs.

Note: Most Options have an additional cost.

ESL Power Systems, Inc. | 2800 Palisades Dr. | Corona, CA 92880 | 800.922.4188 | +1.951.739.7000 | www.eslpwr.com | info@eslpwr.com

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3012-00
210326

REVISION	DESCRIPTION	DATE	PM	ENG	CHK
	ISSUE FOR PERMIT	09/26/2022	RK	JT	RI
	90% DESIGN DEVELOPMENT	08/10/2022	RK	JT	RI
	50% DESIGN DEVELOPMENT	04/22/2022	RK	JT	RI

PUREPOWER ENGINEERING
111 RIVER STREET, HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
WALDWICK, NJ 07463
WWW.COREDEVUSA.COM

EPC CORE DEVELOPMENT GROUP

PAGE SIZE: 36" x 24"
PROJECT # 04001

PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAGE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT
BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE
EQUIPMENT DATA SHEETS

DRAWING #
E600

RULER IN INCHES: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PLOT DATE: 9/26/2022 2:40 PM

Reliable State-owned Enterprise Deliver Solar Power since 1960s

HT-SAAE

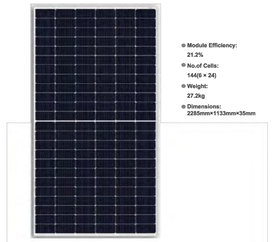
HT72-18X Transparent

High Efficiency Low LID Bifacial PERC with Half-cut Technology

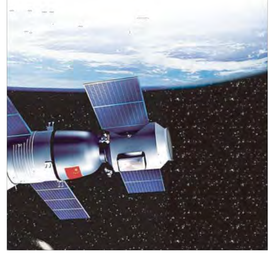
NEW | Big Size: Cell 182*91 | Monocrystalline

530W / 535W
540W / 545W / 550W

MULTIWAY+



- Module Efficiency: 21.2%
- No.of Cells: 144(6 × 24)
- Weight: 27.2kg
- Dimensions: 2285mm×1133mm×35mm



Shanghai Aerospace Automobile Electromechanical Co., Ltd. website: www.htsolar.com.tr

Factory : Turkey HT Solar Energy Joint Stock Company Lianyungang ShenZhou New Energy Co., Ltd.

Half cut cell technology can reduce the internal power loss and improve component overall power. Excellent heat dissipation avoids hot spot production.

10BB The optimized number and width of main gate lines, Maximize the light receiving area of components and Reduce component power consumption

12 Ys — Products Warranty

Designed for high voltage systems of up to 1500 VDC, increas-ing the string length of solar systems and saving on BOS costs

30 Ys — Warranty on power output

2%

EL — Microcrack resistant high performance transparent backsheet structure enhance reliability, triple EL tested of high quality control.

All the modules are sorted and packaged by amperage, reducing mismatch losses and maximizing system output.

5W — Positive tolerance 0/+5W guaranteed

Entire module certified to with stand extreme wind (2400 Pa) and snow loads (5400 Pa)

PID — PID Resistant

Comprehensive and first-rate certification system

IEC61215: 2016,IEC61730: 2016 Latest Standard

and UL 61730 Latest Standard, ISO9001, ISO14001 and ISO45001, meeting the highest international standards Strict quality control

* Copyright@2021 V2 Plus Specifications are subject to change without further notification

Three Phase Inverter with Synergy Technology

For the 277/480V Grid for North America

SE80KUS / SE100KUS / SE110KUS / SE120KUS

INVERTERS



Powered by unique pre-commissioning process for rapid system installation

- Pre-commissioning feature for automated validation of system components and wiring during the site installation process and prior to grid connection
- Easy 2-person installation with lightweight, modular design (each inverter consists of 2 or 3 Synergy units and one Synergy Manager)
- Independent operation of each Synergy unit enables higher uptime and easy serviceability
- Built-in thermal sensors detect faulty wiring ensuring enhanced protection and safety
- Built-in arc fault protection and rapid shutdown
- Built-in PID mitigation for maximized system performance
- Monitored* and field-replaceable surge protection devices, to better withstand surges caused by lightning or other events
- Built-in module-level monitoring with Ethernet or cellular communication for full system visibility

*Applicable only for DC and AC SPDs

solaredge.com

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Power Optimizer

For North America

P801 / P850 / P950 / P1100

POWER OPTIMIZER



PV power optimization at the module-level
The most cost-effective solution for commercial and large field installations

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Balance of System cost reduction; 50% less cables, fuses and combiner boxes, over 2x longer string lengths possible
- Fast installation with a single bolt
- Advanced maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety
- Use with parallel PV modules connected in series

solaredge.com

solaredge

MULTIWAY+

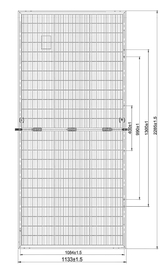
Better Choice For Higher Efficiency!

1500V module HT72-18X Transparent

530W/ 535W/ 540W/ 545W/ 550W

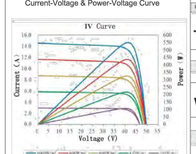
MULTIWAY+

Engineering Drawing



I-V Curves

Current-Voltage & Power-Voltage Curve



Electrical Characteristics

Module	HT72-18X				
Maximum Power at STC(Pmax)	530W	535W	540W	545W	550W
Open-Circuit Voltage(Voc)	49.20V	49.30V	49.50V	49.65V	49.80V
Short-Circuit Current(Isc)	13.78A	13.83A	13.90A	13.95A	14.00A
Optimum Operating Voltage (Vmp)	41.35V	41.50V	41.60V	41.80V	41.95V
Optimum Operating Current(Imp)	12.83A	12.90A	12.97A	13.05A	13.12A
Module Efficiency	20.5%	20.7%	20.9%	21.1%	21.2%
Power Tolerance	0 ~ +5W				
Maximum System Voltage	1500V DC(UL/IEC)				
Maximum Series Fuse Rating	25A				
Operating Temperature	-40℃ to + 85℃				

*STC:Irradiance 1000W/m², module temperature25, AM=1.5
Optional black frame or white frame module according to customer requirements

BIFACIAL REARSIDE POWER GAIN

Electrical characteristics with different rear side power gain for reference (reference to 535W front)

Module		HT72-18X		Bifaciality：70±5%	
Maximum Power	Pmax Gain	Voc/V	Isc/A	Vmp/V	Imp/A
562W	5%	49.35	14.52	41.50	13.54
588W	10%	49.35	15.21	41.50	14.19
615W	15%	49.35	15.90	41.50	14.82
642W	20%	49.35	16.59	41.50	15.47
669W	25%	49.35	17.29	41.50	16.12

*(Actual 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 theground.

NMOT

Module	HT72-18X				
Maximum Power	396W	400W	404W	408W	412W
Open Circuit Voltage （Voc）	45.25V	45.40V	45.55V	45.70V	45.85V
Short Circuit Current (Isc)	11.22A	11.28A	11.36A	11.43A	11.50A
Maximum Power Voltage (Vmp)	37.49V	37.64V	37.79V	37.94V	38.09V
Maximum Circuit Current (Imp)	10.56A	10.63A	10.69A	10.75A	10.81A
NMOT	45℃±2℃				

*NMOT：Irradiance 800W/m², ambient temperature 20℃，wind speed 1 m/s

Mechanical Characteristics

Solar Cells	Monocrystalline 182 × 91 mm
No.of Cells	144 (6 × 24)
Dimensions	2285mm×1133mm×35mm
Weight	27.2kg
Front Glass	High transmission tempered glass
Frame	Anodized aluminium alloy
Junction Box	IP68
Cable	4mm²(UL/IEC) Length: (+) : 400mm, (-) : 200mm-length can be customized
Connectors	MC-I MC-Compatible
Packaging Configuration	31pcs / box, 620pcs / 40'HQ Container

Temperature Characteristics

Temperature Coefficient of Pmax	γ (Pm)	-0.39%/℃
Temperature Coefficient of Voc	β (Voc)	-0.29%/℃
Temperature Coefficient of Isc	α (Isc)	0.049%/℃

Warranty

12-year product warranty

30-year warranty on power output

Specific information is referred to the product quality guarantee



The module recycling should be carried out by the professional institutions at the the end of module life cycle

Three Phase Inverter with Synergy Technology

For the 277/480V Grid for North America

SE80KUS / SE100KUS / SE110KUS/ SE120KUS

Applicable to inverter with Part Numbers	SExxK-USxBIxxxx SE80KUS	SE100KUS	SE110KUS	SE120KUS	
OUTPUT					
Rated AC Active Output Power	80000	100000	110000	120000	W
Maximum AC Apparent Output Power	80000	100000	120000	120000	VA
AC Output Line Connections	3W + PE, 4W + PE				
Supported Grids	WYE: TN-C, TN-S, TN-C-S, TT, IT; Delta: IT				
AC Output Voltage Minimum-Nominal-Maximum[1] (L-N)	244 - 277 - 305				Vac
AC Output Voltage Minimum-Nominal-Maximum[1] (L-L)	422.5 - 480 - 529				Vac
AC Frequency Min-Nom-Max[2]	59.5 - 60 - 60.5				Hz
Maximum Continuous Output Current (per Phase, PF=1)	96.5	120	144.3		Aac
GFDI Threshold	1				A
Utility Monitoring, Islanding Protection, Configurable Power Factor, Country Configurable Thresholds	Yes				
Total Harmonic Distortion	≤ 3				%
Power Factor Range	+/-0.2 to 1				
INPUT					
Maximum DC Power (Module STC) Inverter / Synergy Unit	120000 / 60000	150000 / 50000	180000 / 60000		W
Transformer-less, Ungrounded	Yes				
Maximum Input Voltage DC+ to DC-	1000				Vdc
Operating Voltage Range	850 - 1000				Vdc
Maximum Input Current	2 x 48.25	3 x 40	3 x 48.25		Adc
Reverse-Polarity Protection	Yes				
Ground-Fault Isolation Detection	167kΩ sensitivity per Synergy Unit[3]				
CEC Weighted Efficiency	98.5				%
Nighttime Power Consumption	< 8	< 12			W
ADDITIONAL FEATURES					
Supported Communication Interfaces[3]	2xRS485, Ethernet, Wi-Fi (optional), Cellular (optional)				
Smart Energy Management	Export Limitation				
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi access point for local connection				
Arc Fault Protection	Built-in, User Configurable (According to UL1699B)				
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 and 2020, Built-in				
PID Rectifier	Nighttime, built-in				
RS485 Surge Protection (ports 1+2)	Type II, field replaceable, integrated				
AC, DC Surge Protection	Type II, field replaceable, integrated				
DC Fuses (Single Pole)	25A, integrated				
DC SAFETY SWITCH					
DC Disconnect	Built-in				
STANDARD COMPLIANCE					
Safety	UL1699B, UL1741, UL1741 SA, UL1998, CSA C22.2#107.1, Canadian AFCI according to T.I.L. M-07				
Grid Connection Standards	IEEE 1547, Rule 21, Rule 14 (HI)				
Emissions	FCC part 15 class A				

(1) For other regional settings please contact SolarEdge support
(2) Where permitted by local regulations
(3) For specifications of the optional communication options, visit https://www.solaredge.com/products/communication or the Resource Library webpage: https://www.solaredge.com/downloadsft, to download the relevant product datasheet

Power Optimizer For North America

P801 / P850 / P950 / P1100

Power Optimizer Model (Typical Module Compatibility)	P801 (for up to 2 x 72-cell PV modules)	P850 (for up to 2 x high power or bi-facial modules)	P950 (for up to 2 x high power or bi-facial modules)	P1100 (for up to 2 x high power or bi-facial modules)	
INPUT					
Rated Input DC Power[(5)]	800	850	950	1100	W
Connection Method	Single input for series connected modules				
Absolute Maximum Input Voltage (Voc at lowest temperature)	125				Vdc
MPPT Operating Range	12.5 - 105				Vdc
Maximum Short Circuit Current per input (Isc)	11.75	14.1*		14.1	Adc
Maximum Efficiency	99.5				%
Weighted Efficiency	98.6				%
Overvoltage Category	II				
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)					
Maximum Output Current	15	18			Adc
Maximum Output Voltage	80				Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)					
Safety Output Voltage per Power Optimizer	1 ± 0.1				Vdc
STANDARD COMPLIANCE					
Photovoltaic Rapid Shutdown System	NEC 2014				
EMC	FCC Part 15 Class A, IEC61000-6-2, IEC61000-6-3				
Safety	IEC62109-1 (class II safety), UL1741				
Material	UL 94 V-0, UV Resistant				
RoHS	Yes				
INSTALLATION SPECIFICATIONS					
Compatible SolarEdge Inverters	SE9K & larger		SE20K & larger	SE30K & larger	
Maximum Allowed System Voltage	1000				Vdc
Dimensions (W x L x H)	129 x 153 x 49.5 / 5.1 x 6 x 1.9		129 x 162 x 59 / 5.1 x 6.4 x 2.3		mm / in
Weight	933 / 2.05		1064 / 2.34		gr / lb
Input Connector	MC4[(6)]				
Input Wire Length	0.16 / 0.52 / 1.3 / 4.27	0.16 / 0.52 / 1.6 / 5.24	1.3 / 4.27	1.6 / 5.24	m / ft
Output Wire Length	2.2 / 7.2	2.1 / 6.9	2.2 / 7.2	2.4 / 7.8	m / ft
Output Wire Type / Connector	Double Insulated / MC4				
Operating Temperature Range[(3)]	-40 to +85 / -40 to +185				°C / °F
Protection Rating	IP68 / NEMA6P				
Relative Humidity	0 - 100				%

* For P850/P950 models manufactured in work week 06/2020 or earlier, the maximum Isc per input is 12.5A. The manufacture code is indicated in the Power Optimizer's serial number example: S/N: 5J062A-xxxxxxxx (work week 06 in 2020)
(1) Rated power of the module at STC will not exceed the Power Optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed
(2) For other connector types please refer to: https://www.solaredge.com/sites/default/files/optimizer-input-connector-compatibility.pdf
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf for more

PV System Design Using a SolarEdge Inverter[4][5][6]		208V Grid SE3K-4K*	208V Grid SE7.7K*		277/480V Grid SE20K, SE30K, SE33.3K*, SE40K*	277/480V Grid SE20K, SE30K	277/480V Grid SE33.3K*, SE40K*	
Compatible Power Optimizers		P801	P850, P950, P1100	P801	P850, P950, P1100	P801	P850, P950, P1100	P850, P950, P1100	
Minimum String Length	Power Optimizers	8	8	9	9	14	14	14	
	PV Modules	15	15	17	17	27	27	27	
Maximum String Length	Power Optimizers	30	30	30	30	30	30	30	
	PV Modules	60	60	60	60	60	60	60	
Maximum Continuous Power per String		6000	7200	7275	8730	12750	15300	15300	W
Maximum Allowed Connected Power per String[(7)] (Permitted only when the difference in connected power between strings is up to 2,000W for the 277/480V grid, or 1,000W for the 208V grid)		2 strings or less - 7200	1 string - 8400	2 strings or less - 8475	1 string - 9930	15000	1 string 17550	2 strings or less - 17550	W
		3 strings or more - 7800	2 strings or more - 9000	3 strings or more - 9075	2 strings or more - 10530		2 strings or more - 20300	3 strings or more - 20300	
Parallel Strings of Different Lengths or Orientations		Yes							

* The same rules apply for Synergy units of equivalent power ratings, that are part of the modular Synergy Technology inverter
(4) P850/P950/P1100 can be mixed in one string only with P850/P950/P1100. P801 cannot be mixed with any other Power Optimizer in the same string
(5) For each string, a Power Optimizer may be connected to a single PV module if 1) each Power Optimizer is connected to a single PV module or 2) it is the only Power Optimizer connected to a single PV module in the string
(6) Design with three phase 208V inverters is limited. Use the SolarEdge Designer for verification
(7) To connect more STC power per string, design your project using SolarEdge Designer

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RoHS | Intertek

REVISION	DESCRIPTION	DATE	PM	ENG	CHK
	ISSUE FOR PERMIT	09/26/2022	RK	JT	RI
	90% DESIGN DEVELOPMENT	08/10/2022	RK	JT	RI
	50% DESIGN DEVELOPMENT	04/22/2022	RK	JT	RI

PUREPOWER ENGINEERING
111 RIVER STREET, HOBOKEN, NJ
WWW.PUREPOWER.COM
RICHARD A. WINS
NY LICENSE No. 091197

CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE, SUITE 200
MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

EPC CORE DEVELOPMENT GROUP

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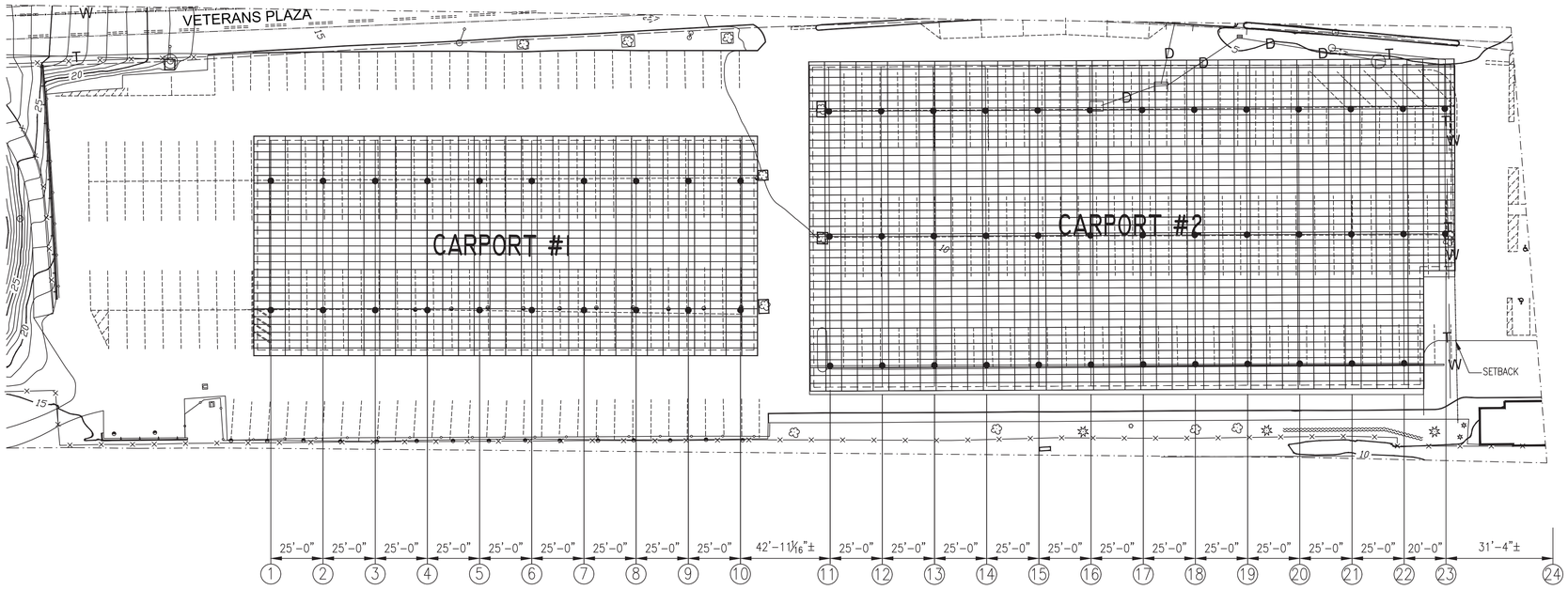
PV DC SYSTEM SIZE: 4,225.65 kW
PV AC SYSTEM SIZE: 3,240.00 kW
MODULE TYPE: HT-SAEE HT72-18X 550W
MODULE QUANTITY: 7,683
ORIENTATION: 3° TILT, 159° & 249° AZI

PROJECT
BESS + SOLAR CARPORT SYSTEM AT
CROTON-HARMON
4 VETERANS PLAZA
CROTON-ON-HUDSON, NY 10520

DRAWING TITLE
EQUIPMENT DATA SHEETS

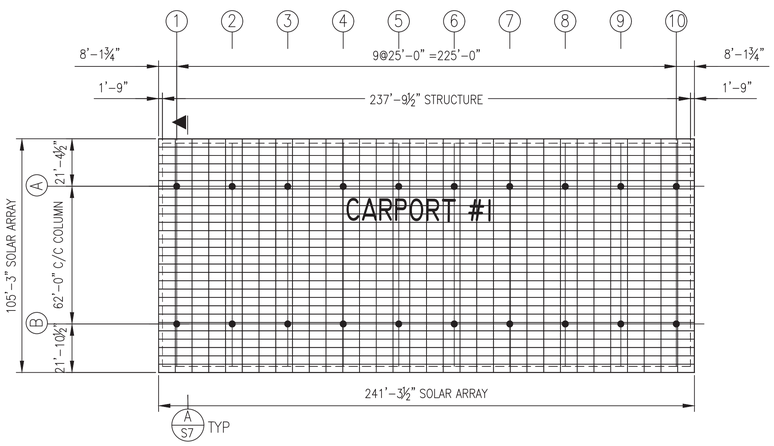
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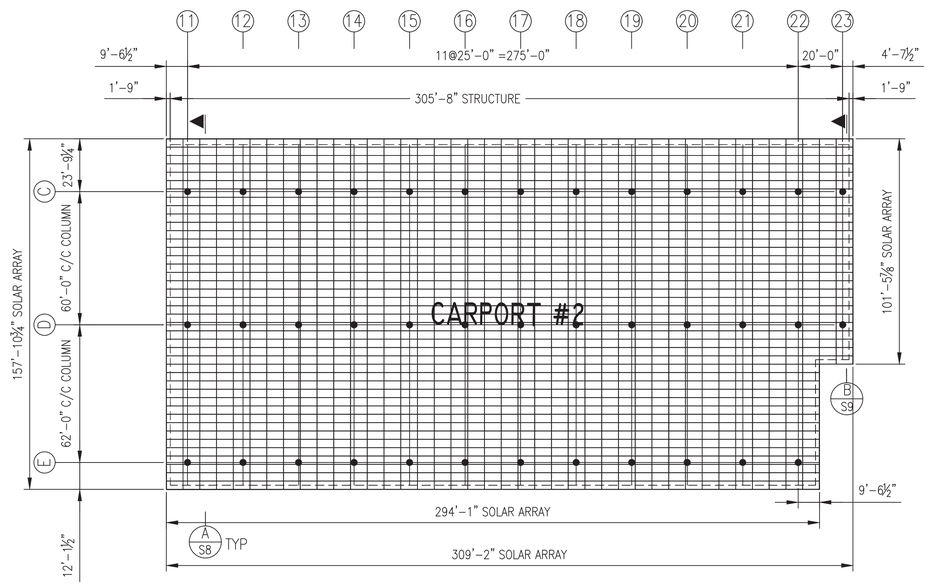
RULER IN INCHES:



SOLAR CARPORT SITE PLAN

SOLAR MODULE SCHEDULE			
CARPORT #1	(ARRAY #1)	28 ROWS X 32 COLS MODULES	(896)– HT72–18X TRANSPARENT 550W
CARPORT #2	(ARRAY #2)	42 ROWS X 41 COLS MODULES	(1722)– HT72–18X TRANSPARENT 550W
		LESS 2 ROWS X 15 COLS	(–30) – HT72–18X TRANSPARENT 550W
			2,588 TOTAL MODULES







Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI 48371
TEL. (248) 628–5571
FAX (248) 628–5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906–6970

Project
CROTON–HARMON SOLAR READY CARPORT PROJECT
4 VETERANS PLAZA
CROTON–ON–HUDSON, N.Y. 10520

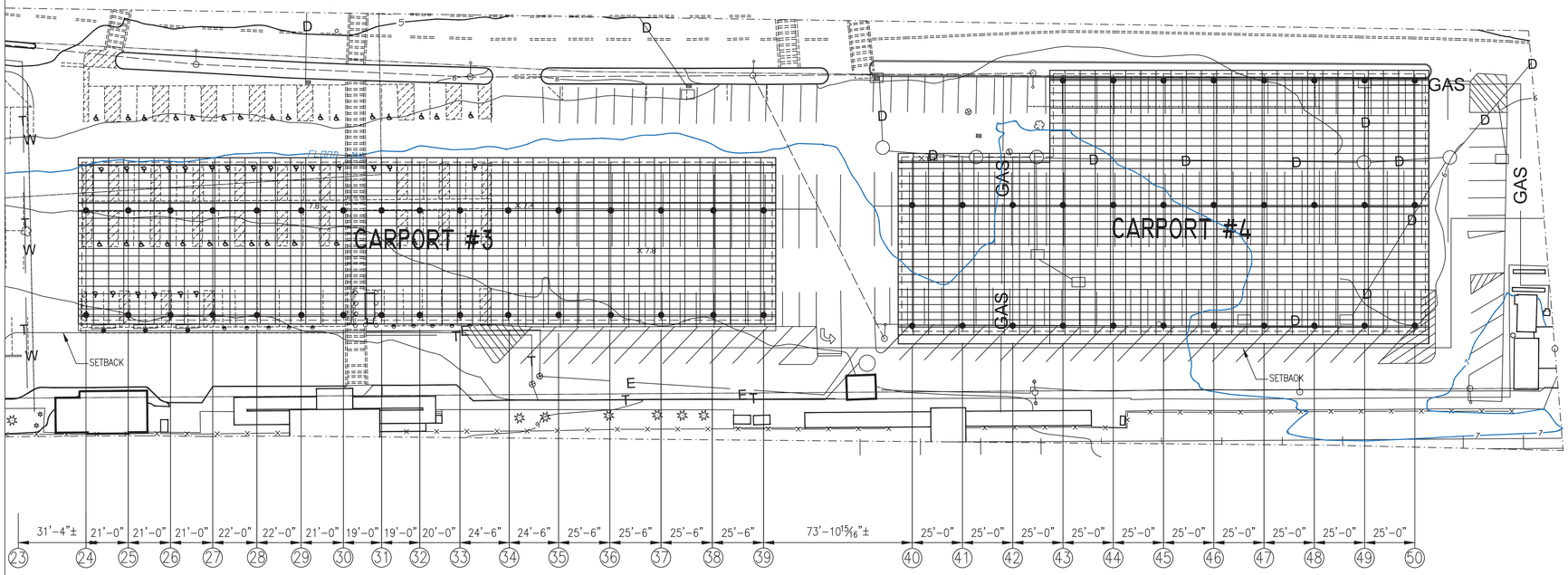
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SOLAR CARPORT SITE PLAN

REVISION

Drawn By B.MARTIN
Checked By J.NASH
Approved By C.KRUS

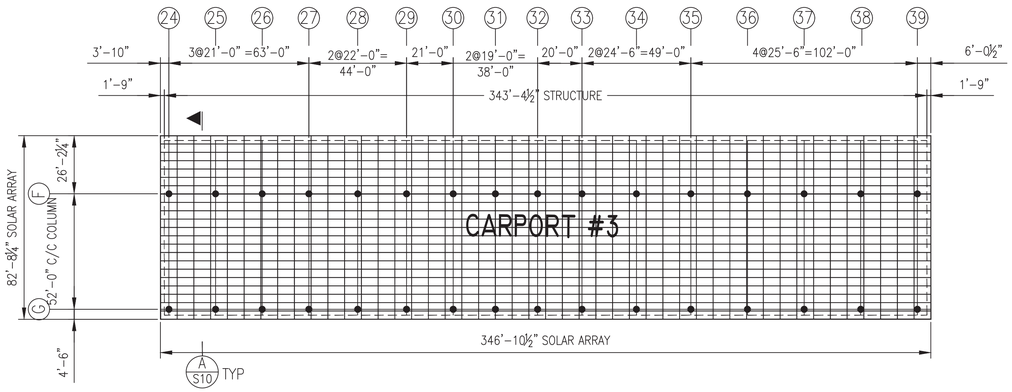
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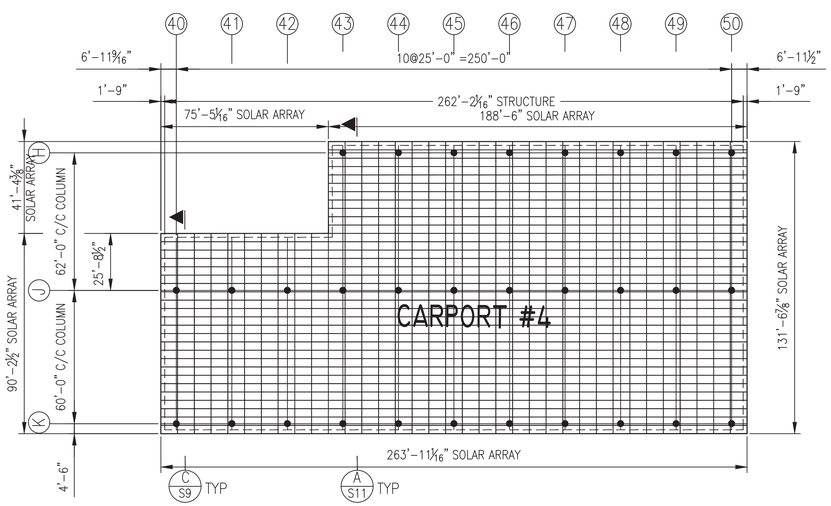
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S1–NORTH



SOLAR CARPORT SITE PLAN

SOLAR MODULE SCHEDULE			
CARPORT #3	(ARRAY #3)	22 ROWS X 46 COLS MODULES	(1012)– HT72–18X TRANSPARENT 550W
CARPORT #4	(ARRAY #4)	35 ROWS X 35 COLS MODULES	(1225)– HT72–18X TRANSPARENT 550W
		LESS 11 ROWS X 10 COLS	(–110)– HT72–18X TRANSPARENT 550W
			2,127 TOTAL MODULES





STATE OF NEW YORK
CHRISTOPHER S. KRUS
091315
LICENSED PROFESSIONAL ENGINEER

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION

1825 Metamora Rd. Oxford, MI 48371
TEL. (248) 628–5571
FAX (248) 628–5260

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Holt, Michigan 48842
TEL. (517) 906–6970

Project

CROTON–HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
CROTON–ON–HUDSON, N.Y. 10520

Sheet

SOLAR CARPORT SITE PLAN

REVISION

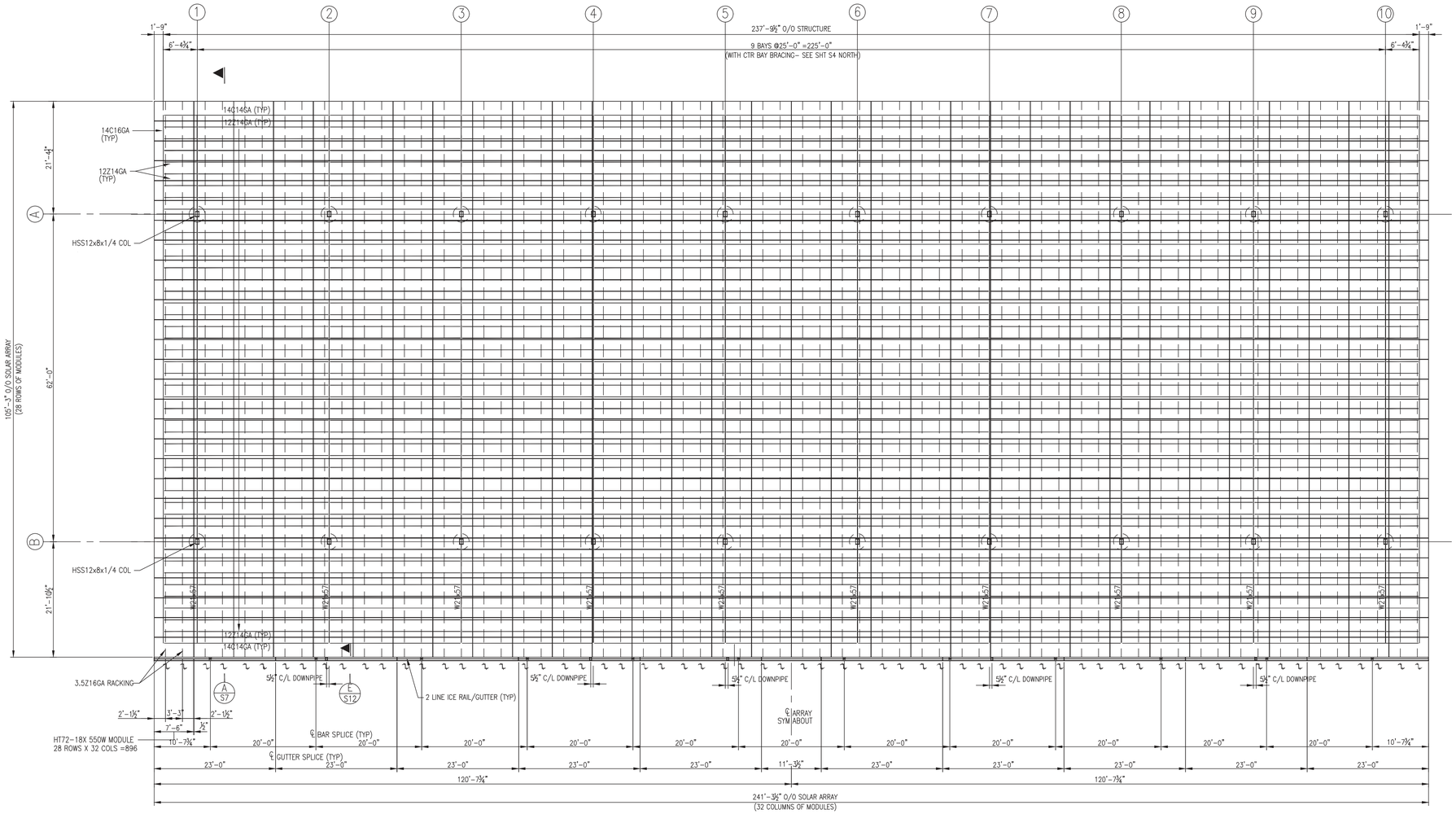
Drawn By B.MARTIN
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Approved By C.KRUS

Project no.

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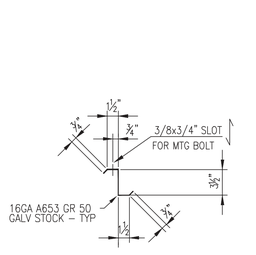
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S2–NORTH



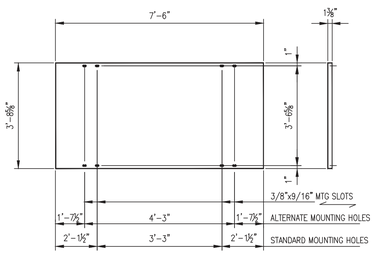
CARPORT #1 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"



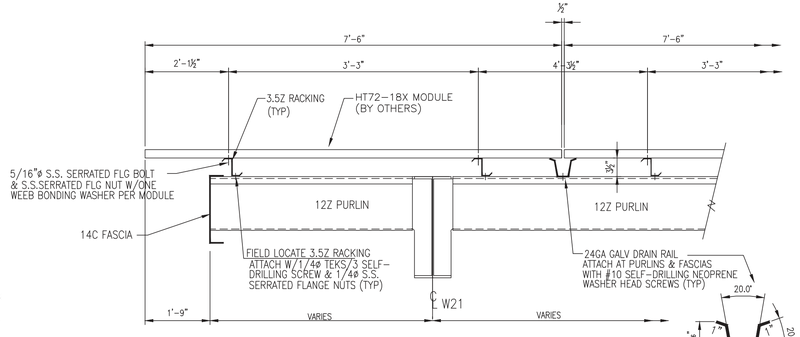
3.5Z16GA RACKING DETAIL

1 1/2" = 1'-0"



HT72-18X TRANSPARENT 550W MODULE

N.T.S.



TYPICAL SOLAR MODULE ARRANGEMENT

N.T.S.

DESIGN TABLE	
CODE: SEE GENERAL NOTES	
LIVE LOAD	
ROOF LIVE LOAD	20.0 PSF
SNOW LOAD	
GROUND SNOW LOAD (Pg)	30.0 PSF
IMPORTANCE FACTOR (Is)	1.0
EXPOSURE FACTOR (Ce)	1.0
THERMAL FACTOR (Ct)	1.2
UNIFORM ROOF DESIGN SNOW LOAD	25.2 PSF
WIND DESIGN DATA	
ULTIMATE WIND SPEED	130 MPH
OCCUPANCY CATAGORY	II
EXPOSURE CATAGORY	C
EARTHQUAKE DESIGN DATA	
SPECTRAL RESPONSE ACCELERATION (S1)	0.259
SPECTRAL RESPONSE ACCELERATION (Ss)	0.071
SITE CLASS	E
SEISMIC DESIGN CATAGORY	C
SEISMIC FORCE RESISTANCE SYSTEM	CANTILEVER COLUMN
RESPONSE MOD. FACTOR	1.25
SEISMIC REPONSE COEFFICIENT (Cs)	0.326



Christopher S. Krus
10/6/2022

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Project
CROTON-HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

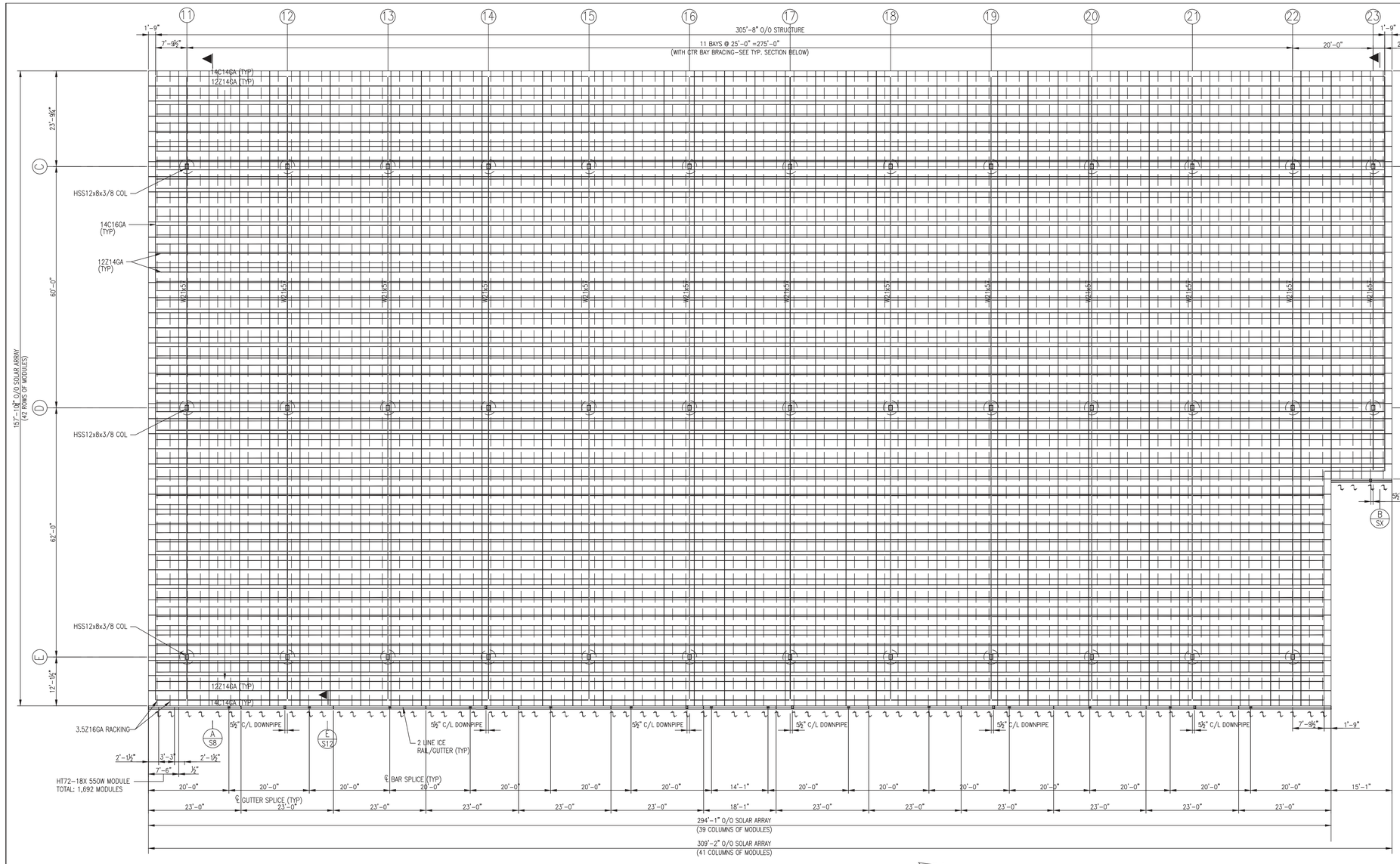
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SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS

Revision
△

Drawn By B.MARTIN
Checked By J.NASH
Approved By C.KRUS

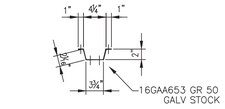
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22 2154

Sheet no.
S3-NORTH



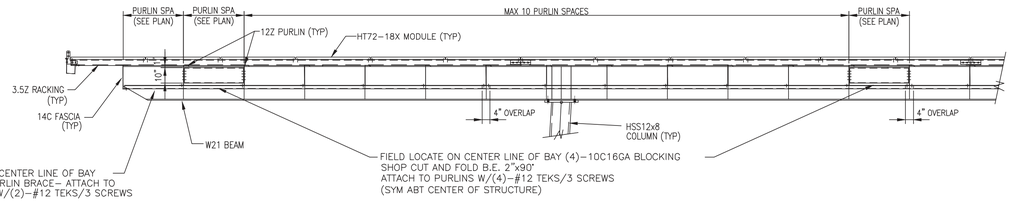
CARPORT #2 SOLAR ARRAY & FRAMING PLAN

1"=12'-0"



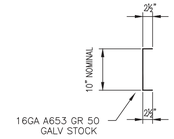
2HC16GA DETAIL

1" = 1'-0"



TYPICAL CENTER BAY PURLIN BRACING SECTION

5/16"=1'-0"



10C16GA DETAIL

N.T.S.

STATE OF NEW YORK
CHRISTOPHER S. KRUS
391311
LICENSED PROFESSIONAL ENGINEER

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project

CROTON-HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

Sheet

SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS

Revision

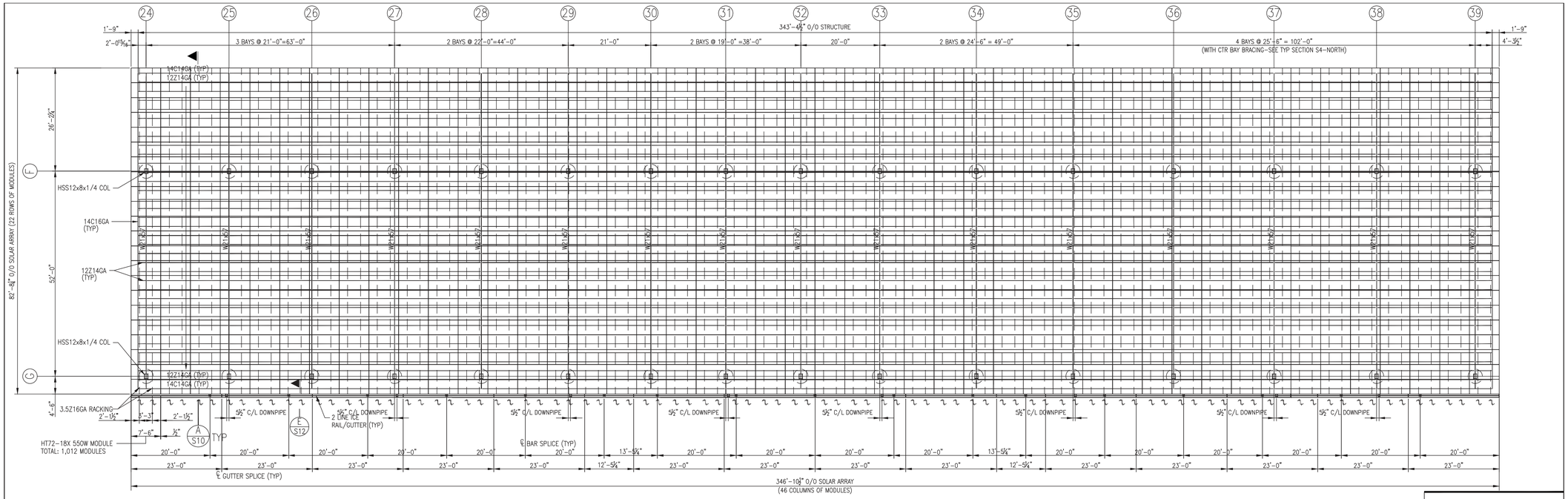
Drawn By B.MARTIN
Checked By J.NASH
Approved By C.KRUS

Project no.

22 2154

Sheet no.

S4-NORTH



CARPORT #3 SOLAR ARRAY & FRAMING PLAN

1"=12'-0"

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE MOST RESTRICTIVE STANDARDS OF THE FOLLOWING CODES:
   - A.) 2020 BUILDING CODE OF NEW YORK STATE
   - B.) ANSI/AISC 360-16 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" AND AISC 303-16 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
   - C.) AISI S100-2016 EDITION "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS".
   - D.) WELDING SHALL BE IN ACCORDANCE WITH A.W.S LATEST EDITION "STRUCTURAL WELDING WELDING CODE" AND A.W.S. LATEST EDITION "SHEET METAL WELDING CODE".
2. THE CONTRACTOR-ERECTOR SHALL MAKE ALL NECESSARY FIELD MEASUREMENTS AS REQUIRED AND SHALL VERIFY EXISTING FIELD CONDITIONS, ALL DIMENSIONS, AND ELEVATIONS SHOWN ON THE DESIGN DRAWINGS BEFORE COMMENCING WORK- ANY DISCREPANCIES SHALL BE REPORTED TO CARPORT STRUCTURES CORP.
3. ALL CONSTRUCTION SHALL COMPLY FULLY WITH THE APPLICABLE PROVISIONS OF NATIONAL OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS.
4. ALL WORK SHOWN ON THESE DRAWINGS MAY BE CHECKED BY AN INDEPENDENT TESTING AGENCY RETAINED AT OWNERS EXPENSE TO ENSURE COMPLIANCE WITH THE REQUIREMENTS SHOWN ON THE DRAWINGS.

STRUCTURAL STEEL

1. STRUCTURAL SHAPES SHALL CONFORM TO ASTM A992 GRADE 50 (Fy=50 KSI), PLATES AND ANGLES SHALL CONFORM TO ASTM A-36 (Fy=36KSI), COLD FORMED SHAPE SHALL CONFORM TO ASTM A-653 (Fy=50 KSI) OR 780 DP (Fy=58 KSI) STRUCTURAL TUBING SHALL CONFORM TO ASTM A-500 GRADE "C" (Fy=50 KSI).
2. ALL STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM A123 SPECS- COLD-FORMED PURLINS AND CHANNELS TO BE GALVANIZED. ALL HARDWARE- BOLTS, NUTS, & WASHERS SHALL BE GALVANIZED PER ASTM A153 SPECS OR HAVE AN ELECTRODEPOSITED ZINC COATING PER ASTM F1941-2016 SPECS.
3. STRUCTURAL STEEL SHALL NOT BE ALTERED IN THE FIELD FROM THAT SHOWN ON THE DESIGN DRAWINGS. MISMATCHED HOLES SHALL BE REAMED TO A LARGER DIAMETER. CUTTING, BURNING, OR WELDING NOT SHOWN ON DESIGN DRAWINGS SHALL NOT BE PERFORMED WITHOUT THE PRIOR WRITTEN APPROVAL CARPORT STRUCTURES CORP.

WELDING

1. WELDS SHALL BE MADE BY CERTIFIED WELDERS AND WELDING EQUIPMENT OPERATORS WHO HAVE BEEN QUALIFIED BY TESTS AS PRESCRIBED BY THE STRUCTURAL WELDING CODE OF THE AMERICAN WELDING SOCIETY.

ERECTOR NOTE

1. UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE TENSIONED TO A "SNUG TIGHT" CONDITION. A "SNUG TIGHT" CONDITION EXISTS WHEN ALL OF THE PLIES IN A CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS IN THE JOINT AND ALL BOLTS IN THE JOINT HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT USE OF THE WRENCH. THE "SNUG TIGHT" CONDITION IS TYPICALLY ACHIEVED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A WORKER ON A ORDINARY SPUD WRENCH.

STATE OF NEW YORK
CHRISTOPHER S. KRUS
391317
LICENSED PROFESSIONAL ENGINEER

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project
CROTON-HARMON SOLAR READY CARPORT PROJECT
4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

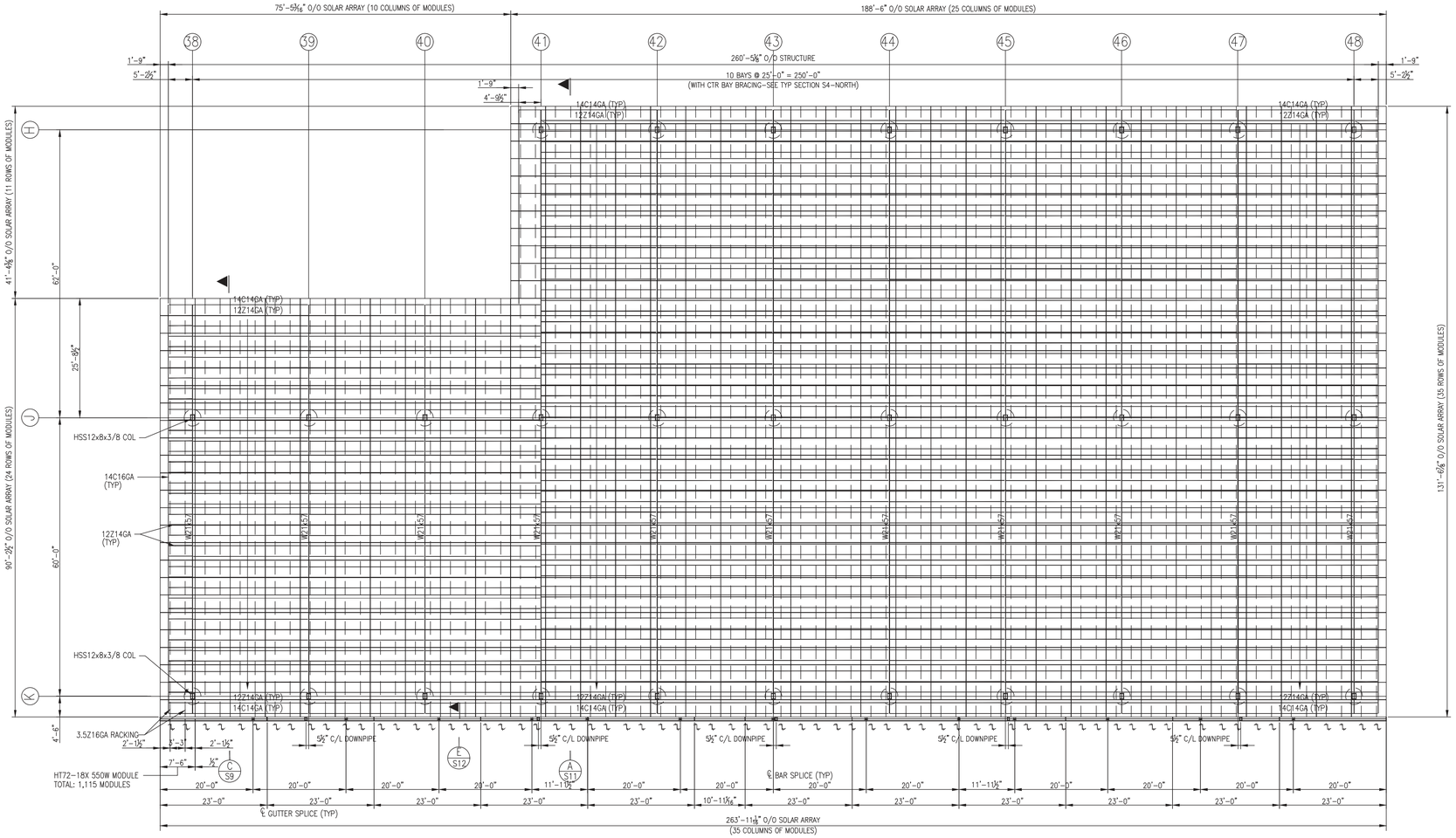
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SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS

Revision
△

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Checked By J.NASH
Approved By C.KRUS

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Sheet no.
S5-NORTH



CARPORT #4 SOLAR ARRAY & FRAMING PLAN

1"=12'-0"

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

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CROTON-ON-HUDSON, N.Y. 10520

Sheet
SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS

Revision △

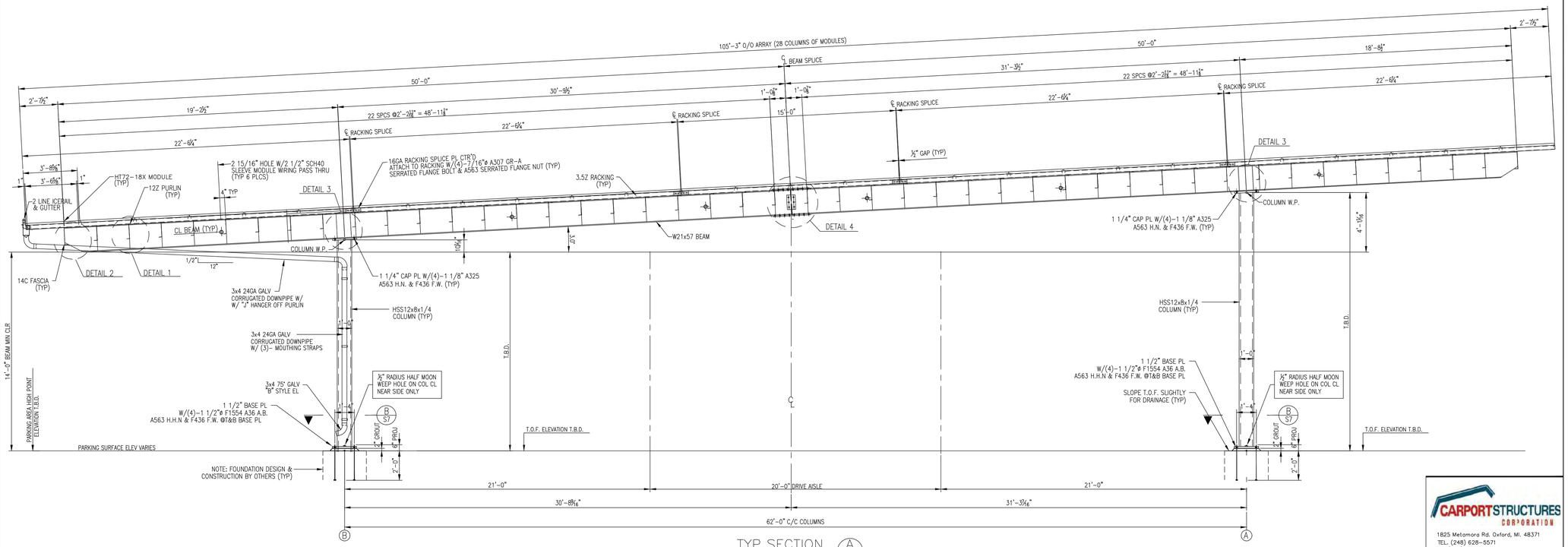
Drawn By B.MARTIN
Checked By J.NASH
Approved By C.KRUS

Project no.
22 2154

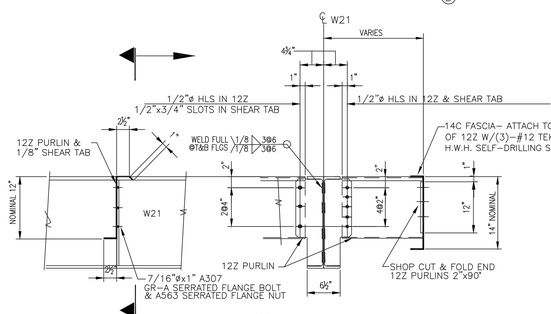
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S6-NORTH

STATE OF NEW YORK · CHRISTOPHER S. KRUS · 091315 · LICENSED PROFESSIONAL ENGINEER

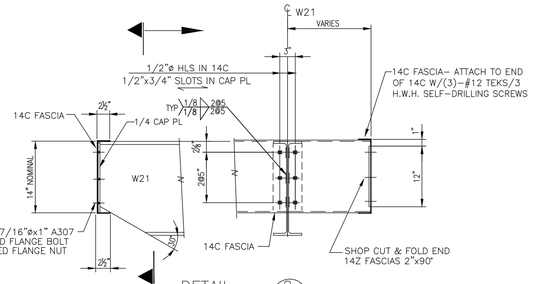
Christopher S. Krus
10/6/2022



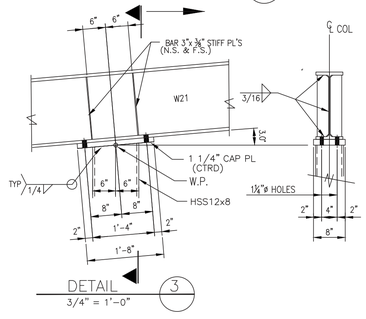
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5/16" = 1'-0"



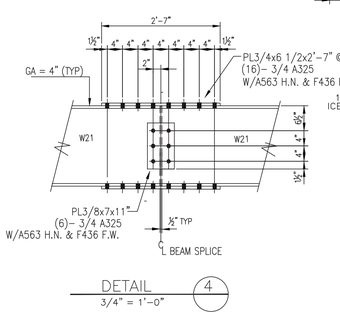
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1"=1'-0"



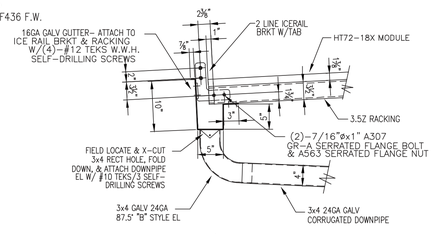
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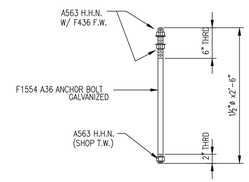
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3/4" = 1'-0"



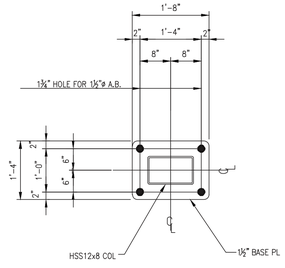
DETAIL (4)
3/4" = 1'-0"



ICE RAIL/GUTTER DETAIL
1"=1'-0"



ANCHOR BOLT DETAIL (XXX REQD)



SECTION (B)
1/2" = 1'-0"

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
091315

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

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CROTON-HARMON SOLAR READY CARPORT PROJECT
4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

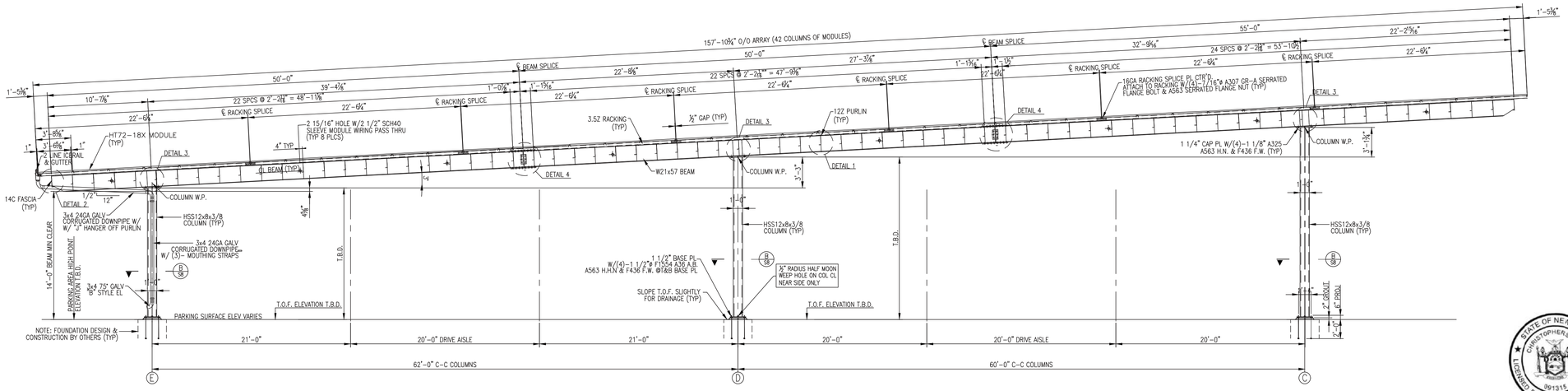
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CARPORT #1 SECTIONS & DETAILS

Revision

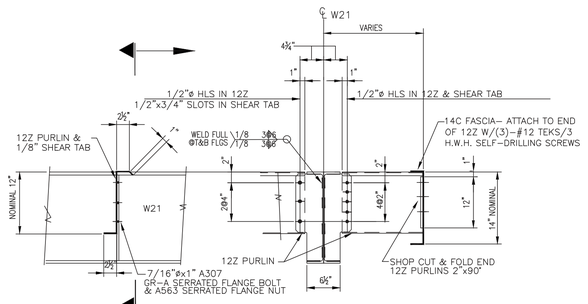
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Checked By J.NASH
Approved By C.KRUS

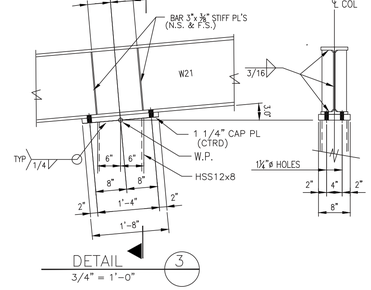
Project no.
22 2154

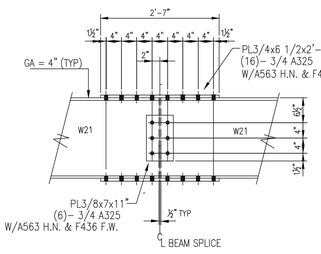
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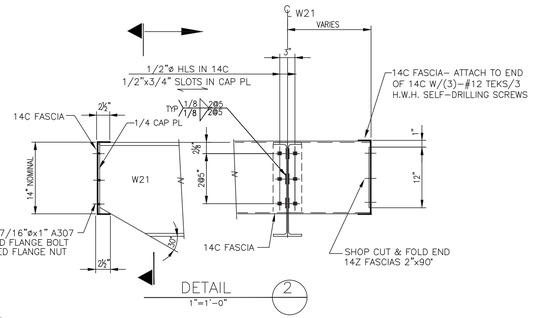


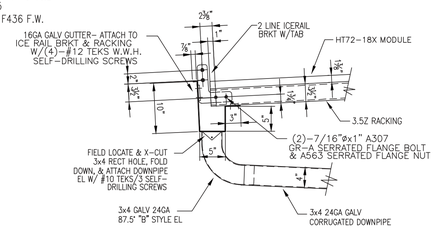
TYP SECTION (A / S8)
3/16" = 1'-0"

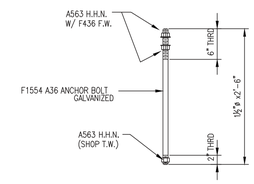




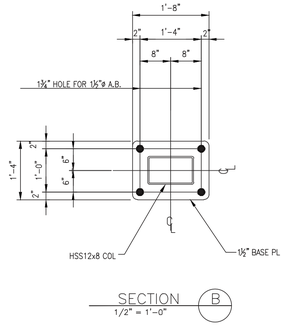








ANCHOR BOLT DETAIL (XXX REQD)



SECTION (B / S8)
1/2" = 1'-0"

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
991315

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project
CROTON-HARMON SOLAR READY CARPORT PROJECT
4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

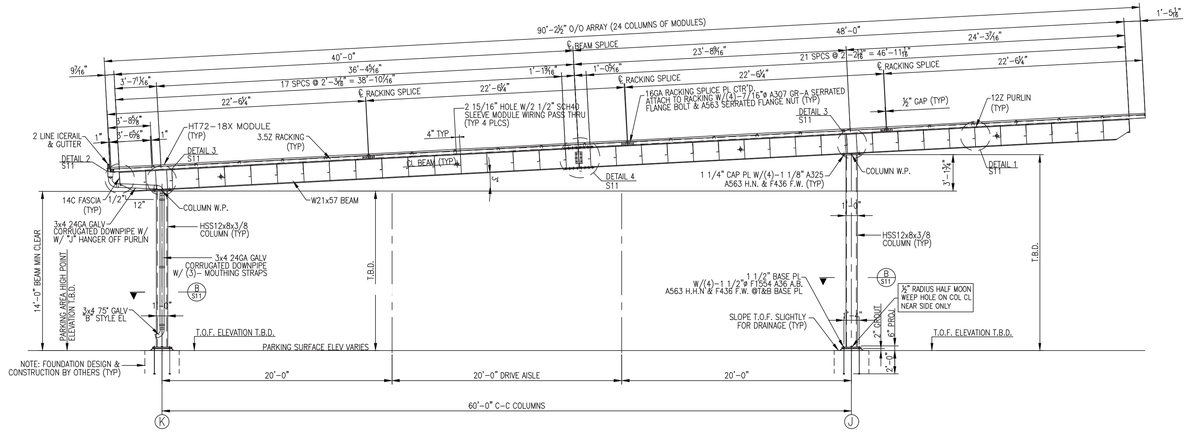
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CARPORT #2 SECTIONS & DETAILS

Revision

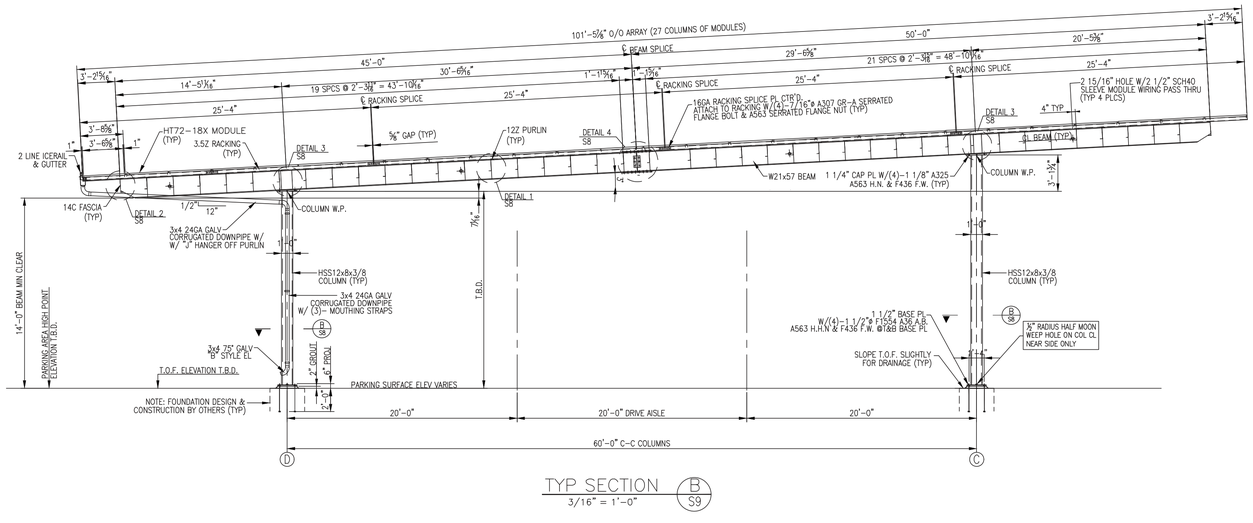
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22 2154

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S8-NORTH



TYP SECTION C / S9
3/16" = 1'-0"



TYP SECTION B / S9
3/16" = 1'-0"

STATE OF NEW YORK
CHRISTOPHER S. KRUS
091316
LICENSED PROFESSIONAL ENGINEER

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

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4 VETERANS PLAZA
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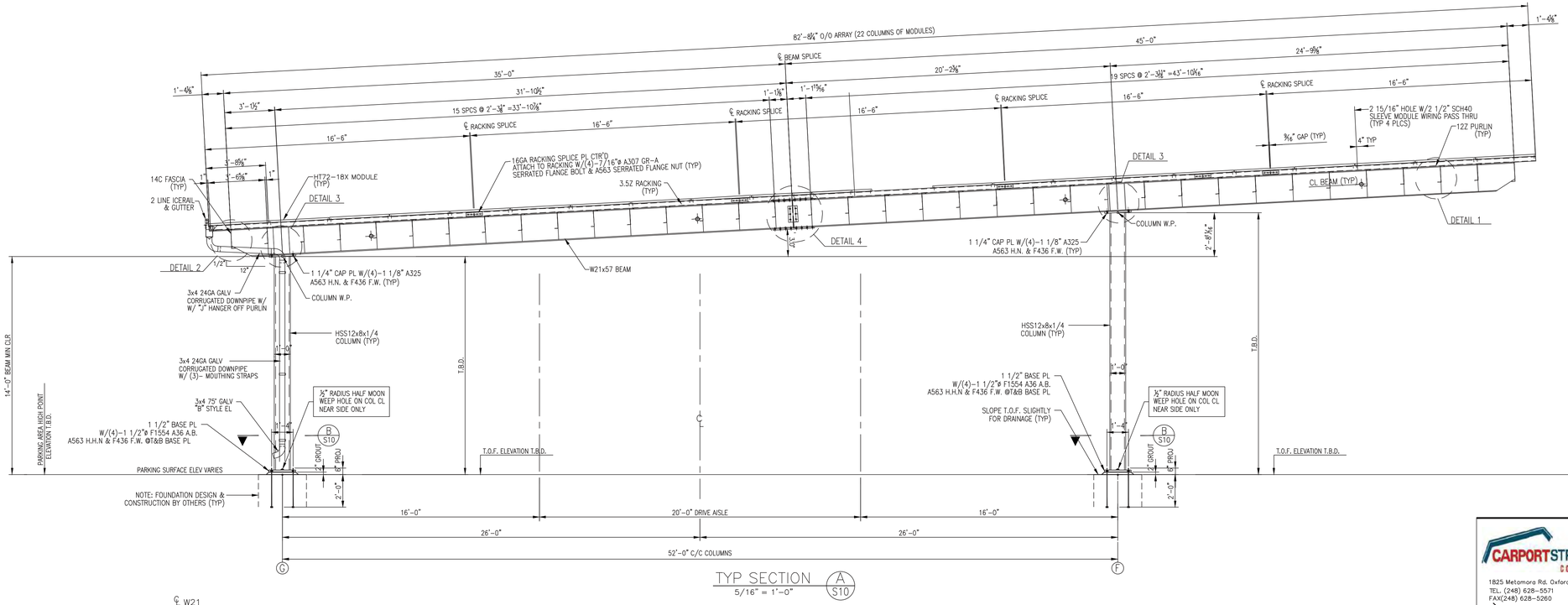
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CARPORT #2 & #4 FRAME PROFILES

Revision

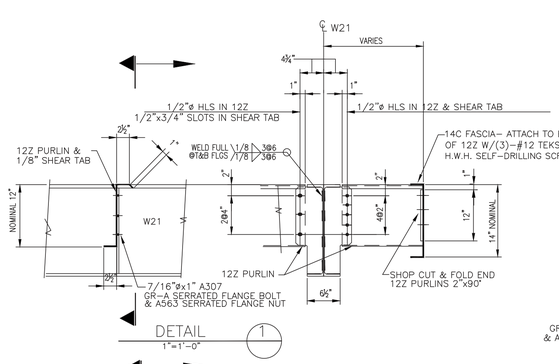
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Checked By J.NASH
Approved By C.KRUS

Project no.
22 2154

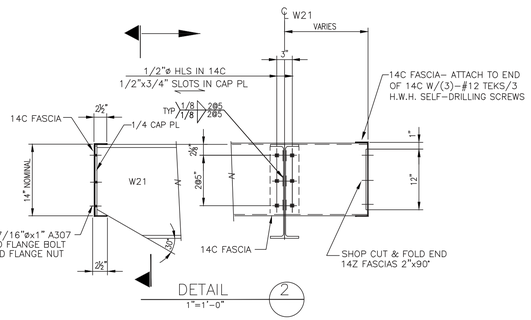
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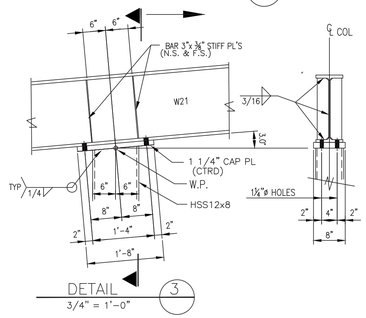
TYP SECTION (A S10)
5/16" = 1'-0"



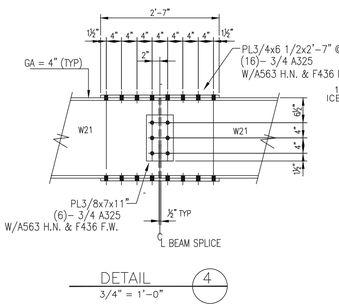
DETAIL 1
1"=1'-0"



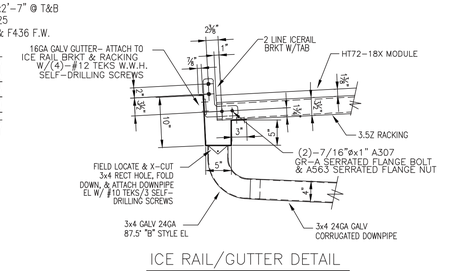
DETAIL 2
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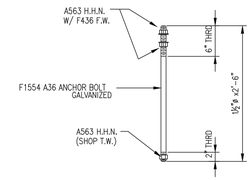
DETAIL 3
3/4" = 1'-0"



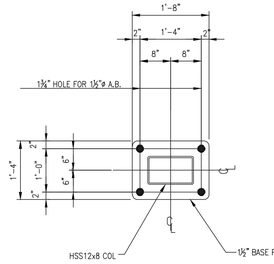
DETAIL 4
3/4" = 1'-0"



ICE RAIL/GUTTER DETAIL
1"=1'-0"



ANCHOR BOLT DETAIL (XXX REQD)



SECTION (B S10)
1/2" = 1'-0"

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
081315

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
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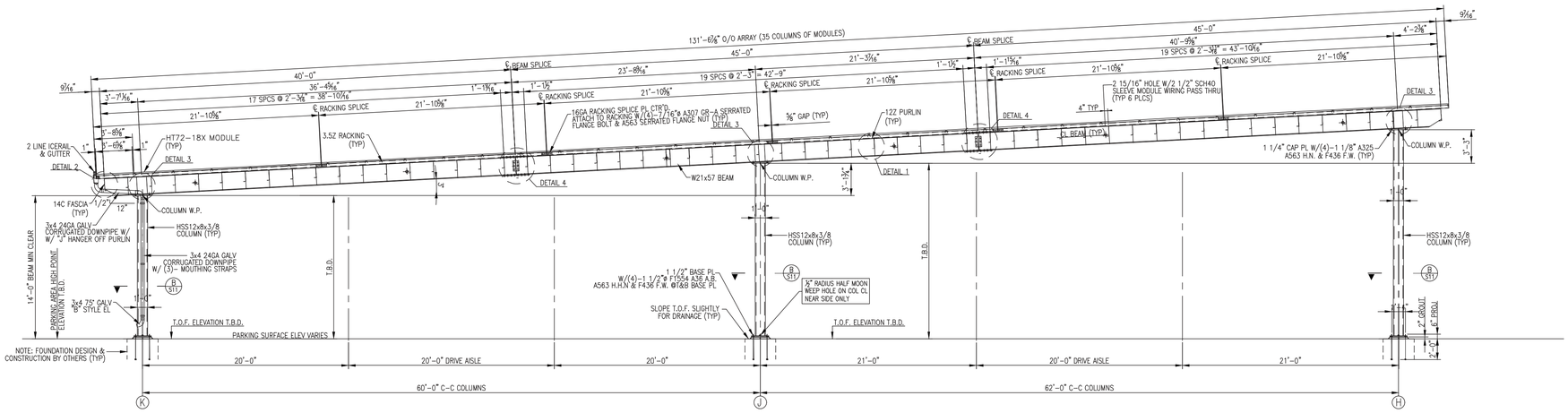
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CARPORT #3 SECTIONS & DETAILS

Revision

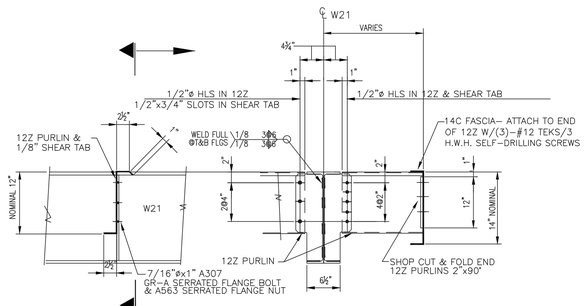
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Checked By J.NASH
Approved By C.KRUS

Project no.
22 2154

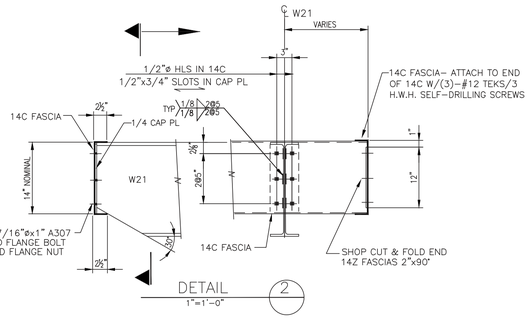
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S10-NORTH



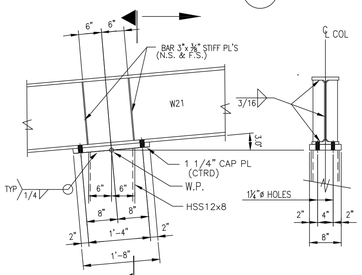
TYP SECTION (A / S11)
3/16" = 1'-0"



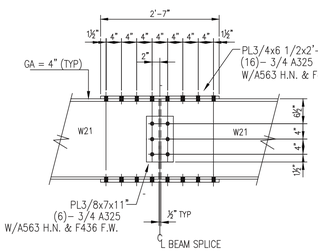
DETAIL 1 (1"=1'-0")



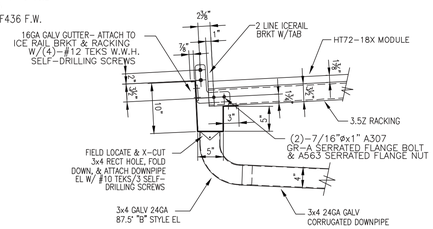
DETAIL 2 (1"=1'-0")



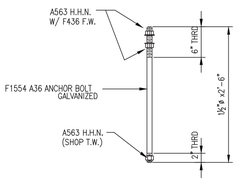
DETAIL 3 (3/4" = 1'-0")



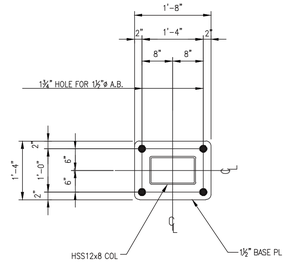
DETAIL 4 (3/4" = 1'-0")



ICE RAIL/GUTTER DETAIL
1"=1'-0"



ANCHOR BOLT DETAIL (XXX REQD)



SECTION (B / S11)
1/2" = 1'-0"

STATE OF NEW YORK · CHRISTOPHER S. KRUS · 091315 · LICENSED PROFESSIONAL ENGINEER

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project
CROTON-HARMON SOLAR READY CARPORT PROJECT
4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

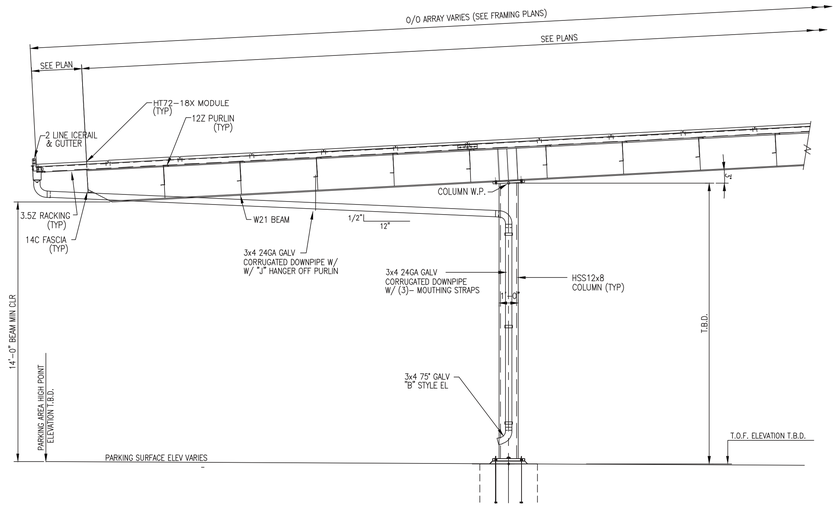
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CARPORT #4 SECTIONS & DETAILS

Revision

Drawn By B.MARTIN
Checked By J.NASH
Approved By C.KRUS

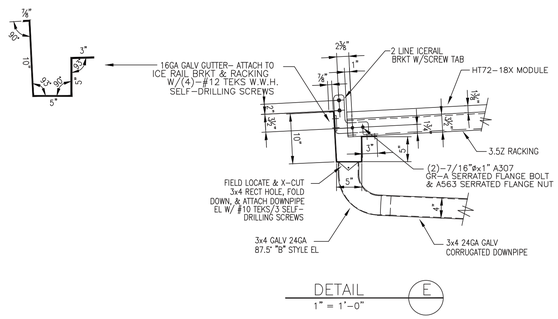
Project no.
22 2154

Sheet no.
S11-NORTH



DOWNPIPE SCHEDULE	
CARPORT	LOCATION
1	B2, B4, B5, B7, B9
2	E12, E14, E16, E17, E19, E21, D23
3	G25, G27, G29, G31, G33, G35, G37, G38
4	K39, K41, K43, K45, K47

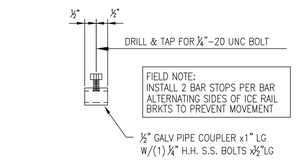
TYP GUTTER/DOWNPIPE DETAIL
5/16" = 1'-0"



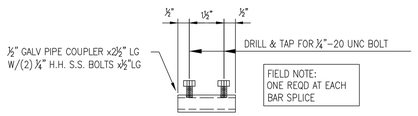
DETAIL E
1" = 1'-0"

ICE RAIL BAR DETAIL (85 REQD)
N.T.S.

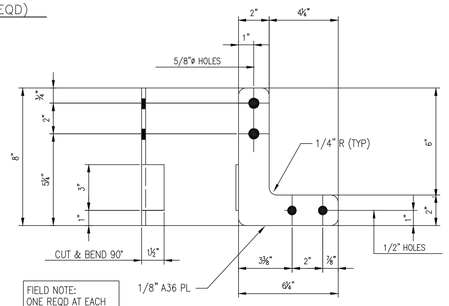
ICE RAIL COMPONENTS



ICE RAIL BAR STOPPER DETAIL (172 REQD)
N.T.S.



ICE RAIL BAR COUPLER DETAIL (70 REQD)
N.T.S.



ICE RAIL BAR BRACKET DETAIL W/SCREW TAB (212 REQD)
3" = 1'-0"

E:\HDES LN\CorpStruc_logo_withroof_NEW.jpg

1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project
CROTON-HARMON SOLAR READY CARPORT PROJECT

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Sheet
ICE RAIL/GUTTER SECTIONS & DETAILS

Revision

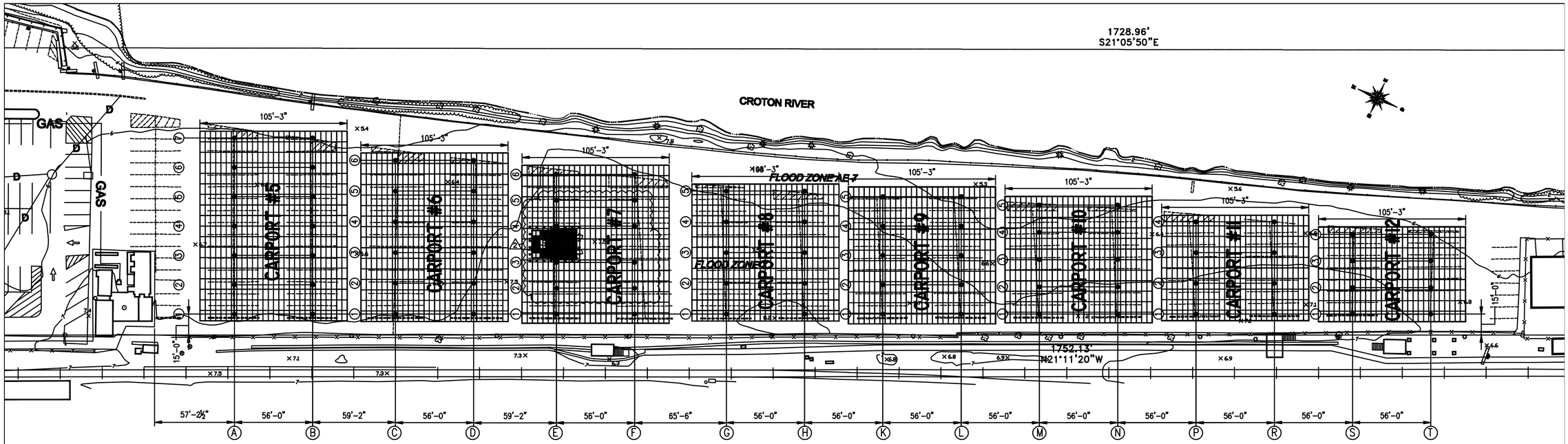
Drawn By S.FLYNN
Checked By J.NASH
Approved By C.KRUS

Project no.
22 2154

Sheet no.
S12-NORTH

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
091319

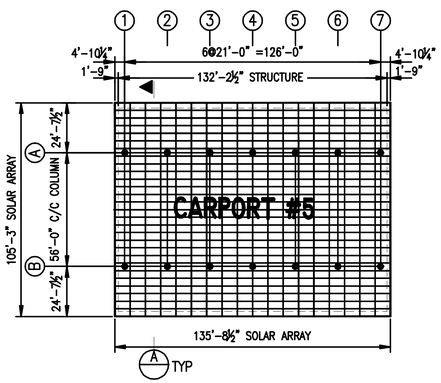
Christopher S. Krus
10/6/2022

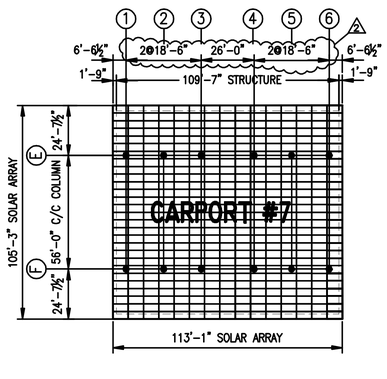


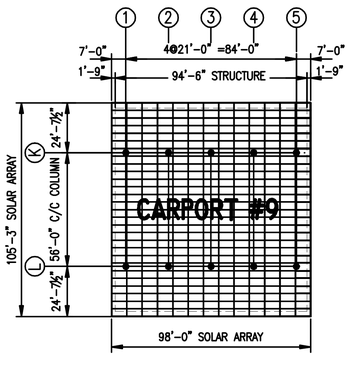
SOLAR CARPORT SITE PLAN

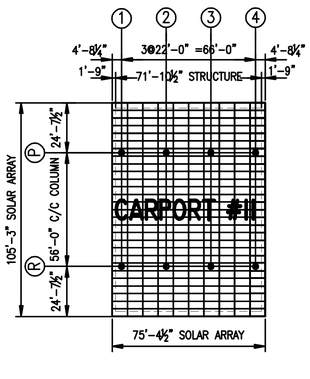
SOLAR MODULE SCHEDULE			
CARPORT #5	(ARRAY #5)	28 ROWS X 18 COLS MODULES	(504)– HT72–18X TRANSPARENT 550W
CARPORT #6	(ARRAY #6)	28 ROWS X 16 COLS MODULES	(448)– HT72–18X TRANSPARENT 550W
CARPORT #7	(ARRAY #7)	28 ROWS X 15 COLS MODULES	(420)– HT72–18X TRANSPARENT 550W
CARPORT #8	(ARRAY #8)	28 ROWS X 13 COLS MODULES	(364)– HT72–18X TRANSPARENT 550W
CARPORT #9	(ARRAY #9)	28 ROWS X 13 COLS MODULES	(364)– HT72–18X TRANSPARENT 550W
CARPORT #10	(ARRAY #10)	28 ROWS X 12 COLS MODULES	(336)– HT72–18X TRANSPARENT 550W
CARPORT #11	(ARRAY #11)	28 ROWS X 10 COLS MODULES	(280)– HT72–18X TRANSPARENT 550W
CARPORT #12	(ARRAY #12)	28 ROWS X 9 COLS MODULES	(252)– HT72–18X TRANSPARENT 550W

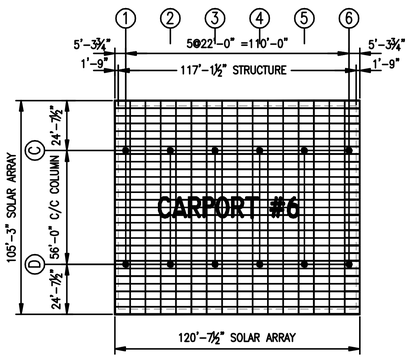
2,968 TOTAL MODULES

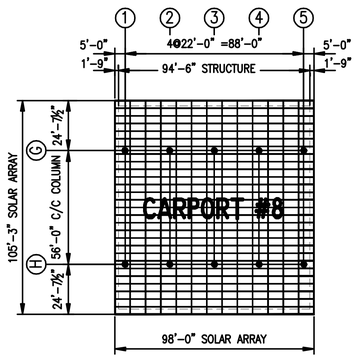


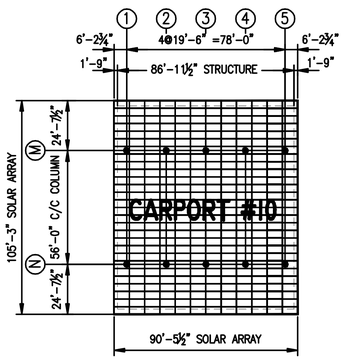


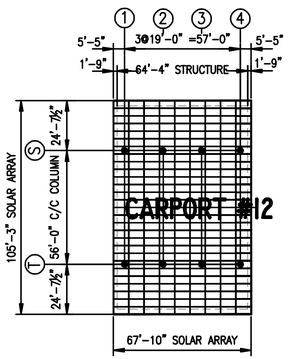












STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
091315

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI 48371
TEL. (248) 628–5571
FAX (248) 628–5280

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906–6970

Project
CROTON–HARMON
SOLAR READY
CARPORT PROJECT

4 VETERANS PLAZA
CROTON–ON–HUDSON, N.Y.
10520

Sheet
SOLAR CARPORT
SITE PLAN

REVISION
07–15–22 SURVEY DWG UPDATE 1
09–27–22 ELEC EQUIP PAD REV 2

Drawn By S.FLYNN
Checked By J.NASH
Approved By

Project no.
22 2154

Sheet no.
S1–SOUTH

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE MOST RESTRICTIVE STANDARDS OF THE FOLLOWING CODES:
   A.) 2020 BUILDING CODE OF NEW YORK STATE
   B.) ANSI/AISC 360-16 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" AND AISC 303-16 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
   C.) AISI S100-2016 EDITION "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS".
   D.) WELDING SHALL BE IN ACCORDANCE WITH A.W.S LATEST EDITION "STRUCTURAL WELDING WELDING CODE" AND A.W.S. LATEST EDITION "SHEET METAL WELDING CODE".
2. THE CONTRACTOR-ERECTOR SHALL MAKE ALL NECESSARY FIELD MEASUREMENTS AS REQUIRED AND SHALL VERIFY EXISTING FIELD CONDITIONS, ALL DIMENSIONS, AND ELEVATIONS SHOWN ON THE DESIGN DRAWINGS BEFORE COMMENCING WORK- ANY DISCREPANCIES SHALL BE REPORTED TO CARPORT STRUCTURES CORP.
3. ALL CONSTRUCTION SHALL COMPLY FULLY WITH THE APPLICABLE PROVISIONS OF NATIONAL OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS.
4. ALL WORK SHOWN ON THESE DRAWINGS MAY BE CHECKED BY AN INDEPENDENT TESTING AGENCY RETAINED AT OWNERS EXPENSE TO ENSURE COMPLIANCE WITH THE REQUIREMENTS SHOWN ON THE DRAWINGS.

STRUCTURAL STEEL

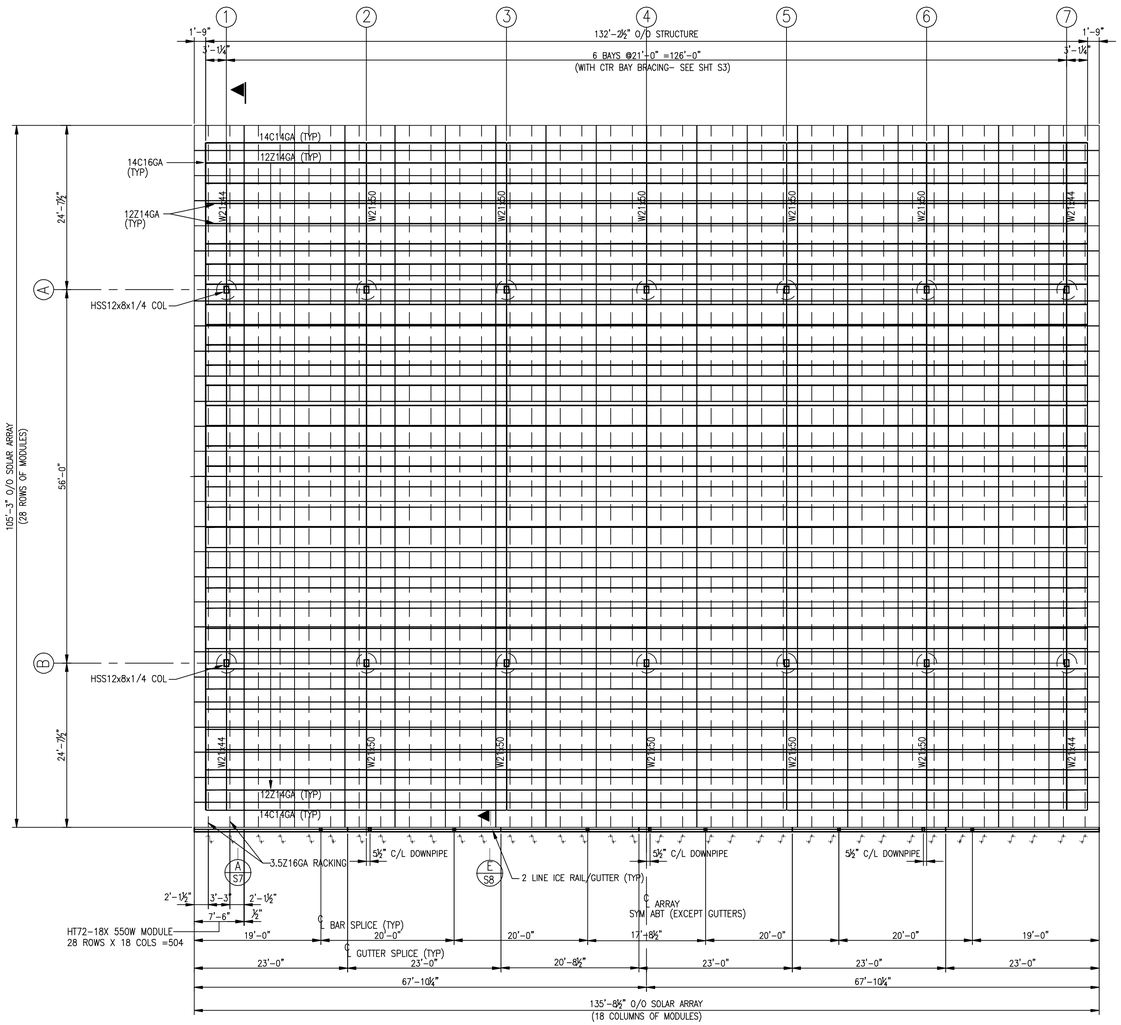
1. STRUCTURAL SHAPES SHALL CONFORM TO ASTM A992 GRADE 50 (Fy=50 KSI), PLATES AND ANGLES SHALL CONFORM TO ASTM A-36 (Fy=36KSI), COLD FORMED SHAPE SHALL CONFORM TO ASTM A-653 (Fy=50 KSI) OR 780 DP (Fy=58 KSI) STRUCTURAL TUBING SHALL CONFORM TO ASTM A-500 GRADE "B" (Fy=46 KSI MIN).
2. ALL STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM A123 SPECS- COLD-FORMED PURLINS AND CHANNELS TO BE GALVANIZED. ALL HARDWARE- BOLTS, NUTS, & WASHERS SHALL BE GALVANIZED PER ASTM A153 SPECS, OR HAVE AN ELECTRODEPOSITED ZINC COATING PER ASTM F1941-2016 SPECS.
3. STRUCTURAL STEEL SHALL NOT BE ALTERED IN THE FIELD FROM THAT SHOWN ON THE DESIGN DRAWINGS. MISMATCHED HOLES SHALL BE REAMED TO A LARGER DIAMETER. CUTTING, BURNING, OR WELDING NOT SHOWN ON DESIGN DRAWINGS SHALL NOT BE PERFORMED WITHOUT THE PRIOR WRITTEN APPROVAL CARPORT STRUCTURES CORP.

WELDING

1. WELDS SHALL BE MADE BY CERTIFIED WELDERS AND WELDING EQUIPMENT OPERATORS WHO HAVE BEEN QUALIFIED BY TESTS AS PRESCRIBED BY THE STRUCTURAL WELDING CODE OF THE AMERICAN WELDING SOCIETY.

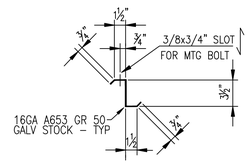
ERECTOR NOTE

1. UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE TENSIONED TO A "SNUG TIGHT" CONDITION. A "SNUG TIGHT" CONDITION EXISTS WHEN ALL OF THE PLIES IN A CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS IN THE JOINT AND ALL BOLTS IN THE JOINT HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT USE OF THE WRENCH. THE "SNUG TIGHT" CONDITION IS TYPICALLY ACHIEVED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A WORKER ON A ORDINARY SPUD WRENCH.



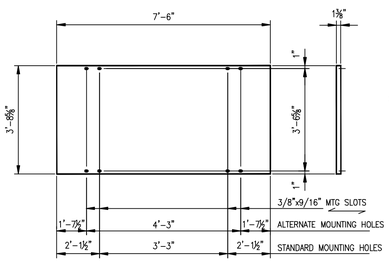
CARPORT #5 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"



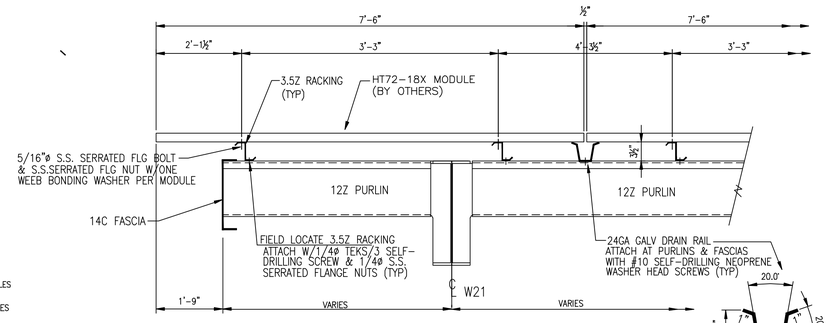
3.5Z16GA RACKING DETAIL

1 1/2" = 1'-0"



HT72-18X TRANSPARENT 550W MODULE

N.T.S.



TYPICAL SOLAR MODULE ARRANGEMENT

N.T.S.

DESIGN TABLE	
CODE: SEE GENERAL NOTES	
LIVE LOAD	
ROOF LIVE LOAD	20.0 PSF
SNOW LOAD	
GROUND SNOW LOAD (P_g)	30.0 PSF
IMPORTANCE FACTOR (Is)	1.0
EXPOSURE FACTOR (Ce)	1.0
THERMAL FACTOR (Ct)	1.2
UNIFORM ROOF DESIGN SNOW LOAD	25.2 PSF
WIND DESIGN DATA	
ULTIMATE WIND SPEED	130 MPH
OCCUPANCY CATAGORY	II
EXPOSURE CATAGORY	C
EARTHQUAKE DESIGN DATA	
SPECTRAL RESPONSE ACCELERATION (S1)	0.259
SPECTRAL RESPONSE ACCELERATION (Ss)	0.071
SITE CLASS	E
SEISMIC DESIGN CATAGORY	C
SEISMIC FORCE RESISTANCE SYSTEM	CANTILEVER COLUMN
RESPONSE MOD. FACTOR	1.25
SEISMIC REPONSE COEFFICIENT (Cs)	0.328

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
091315

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project

CROTON-HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

Sheet

SOLAR ARRAY, FRAMING PLANS, NOTES, & DETAILS

Revision

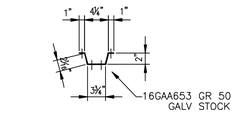
Drawn By S.FLYNN
Checked By J.NASH
Approved By

Project no.

22 2154

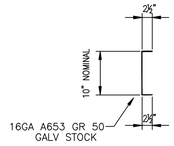
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S2-SOUTH

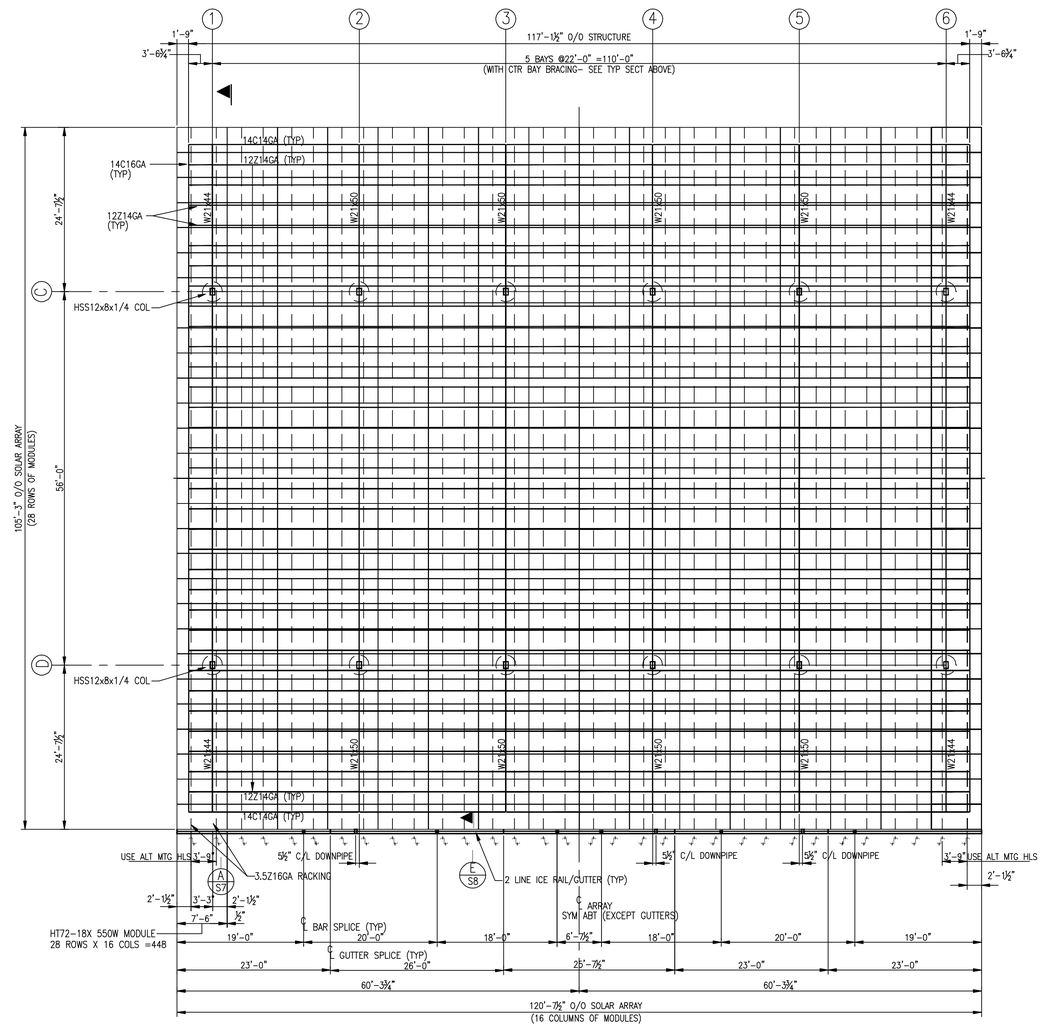


2HC16GA DETAIL
1" = 1'-0"

TYPICAL CENTER BAY PURLIN BRACING SECTION
5/16"=1'-0"



10C16GA DETAIL
N.T.S.



CARPORT #6 SOLAR ARRAY & FRAMING PLAN
1"=10'-0"

N



Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

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CROTON-HARMON
SOLAR READY
CARPORT PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y.
10520

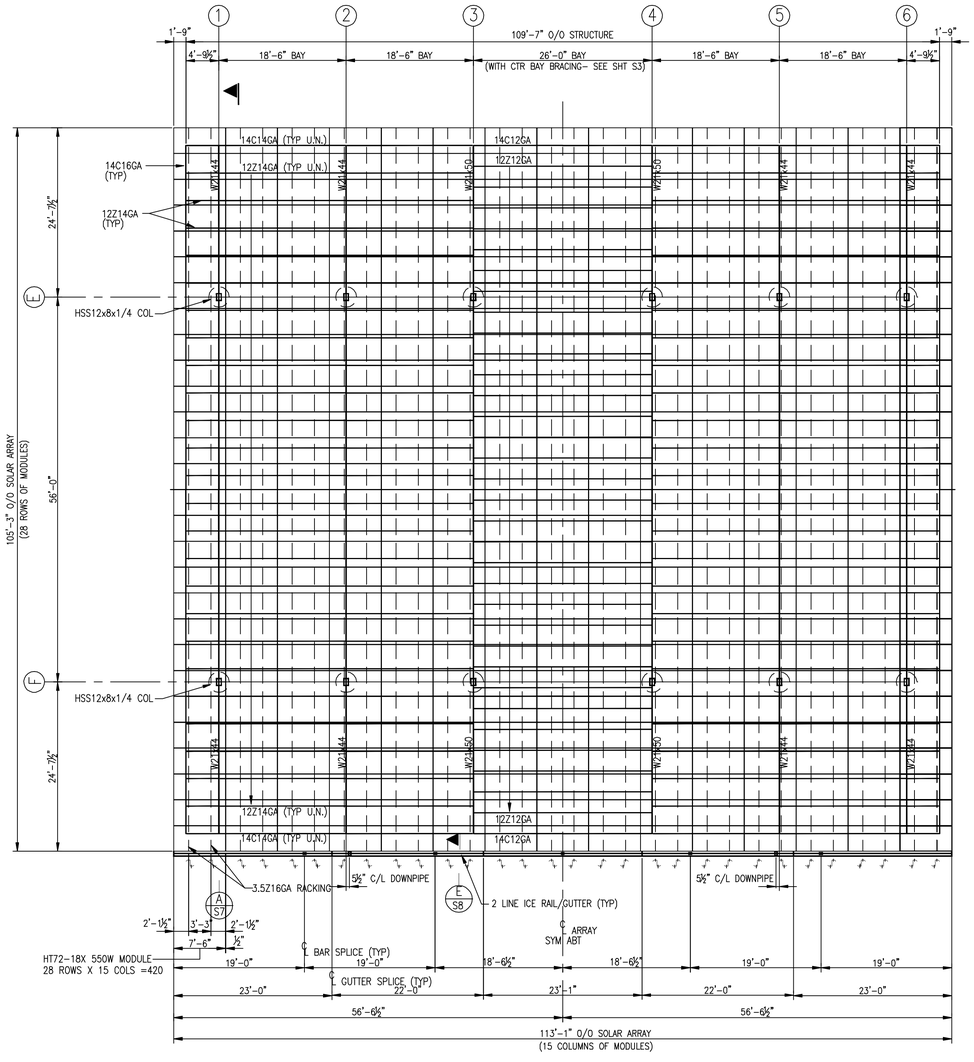
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SOLAR ARRAY,
FRAMING PLANS,
& DETAILS

Revision
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Checked By J.NASH
Approved By

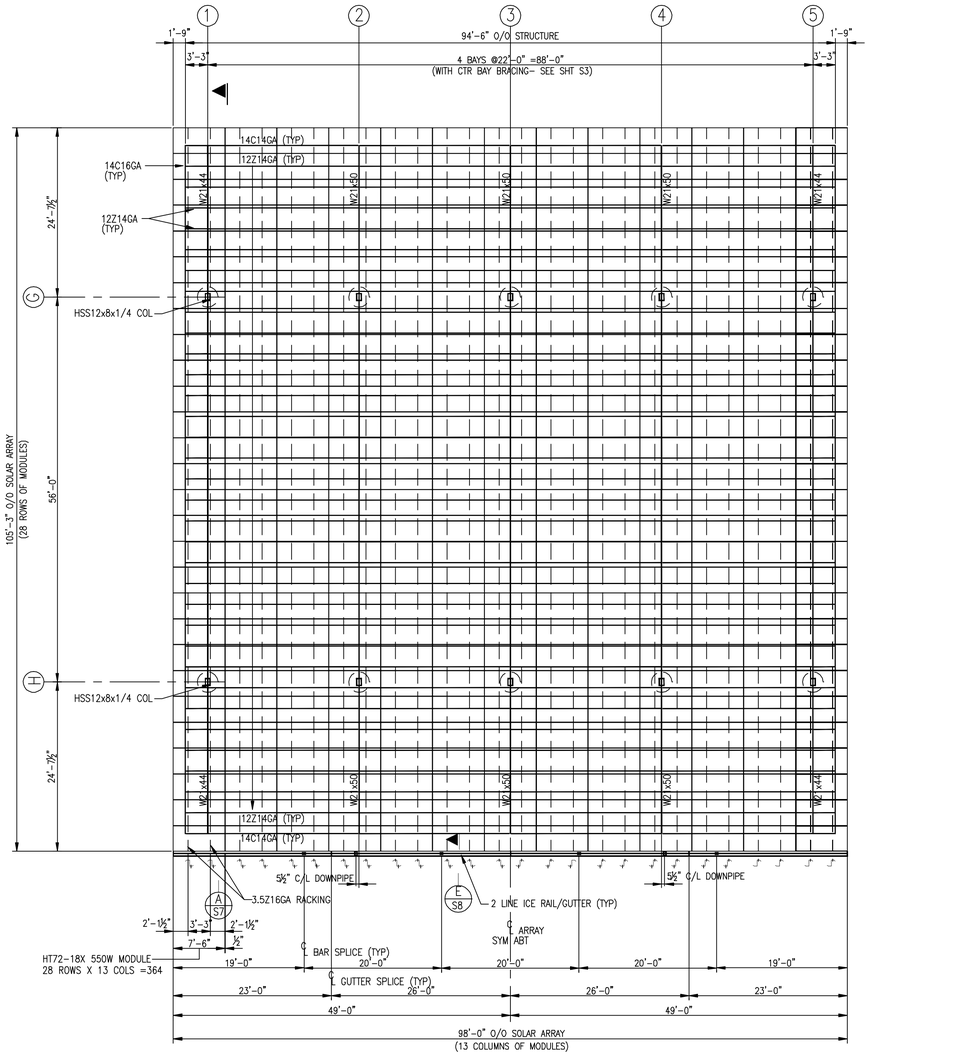
Project no.
22 2154

Sheet no.
S3-SOUTH



CARPORT #7 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"



CARPORT #8 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"

STATE OF NEW YORK
CHRISTOPHER S. KRUS
091315
LICENSED PROFESSIONAL ENGINEER

Christopher S. Krus
10/6/2022

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
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Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project

CROTON-HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

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SOLAR ARRAY, FRAMING PLANS, & DETAILS

Revision

09-28-22 CARPORT 7 REV 1

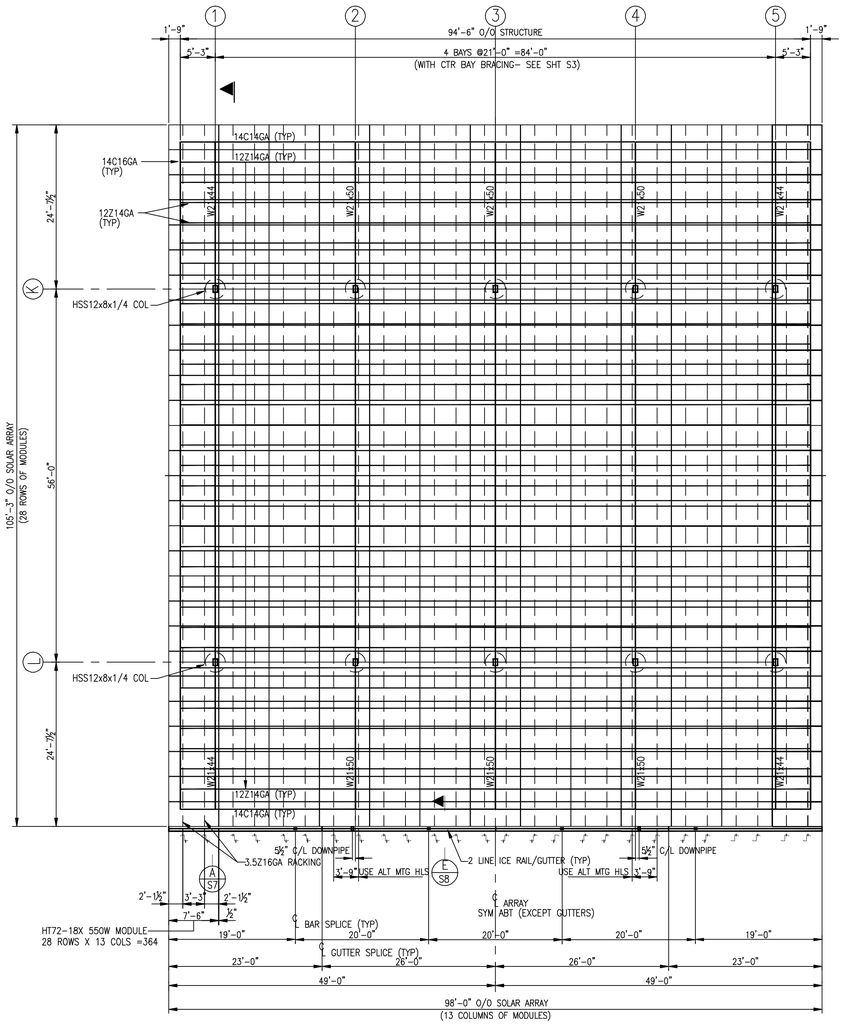
Drawn By S.FLYNN
Checked By J.NASH
Approved By

Project no.

22 2154

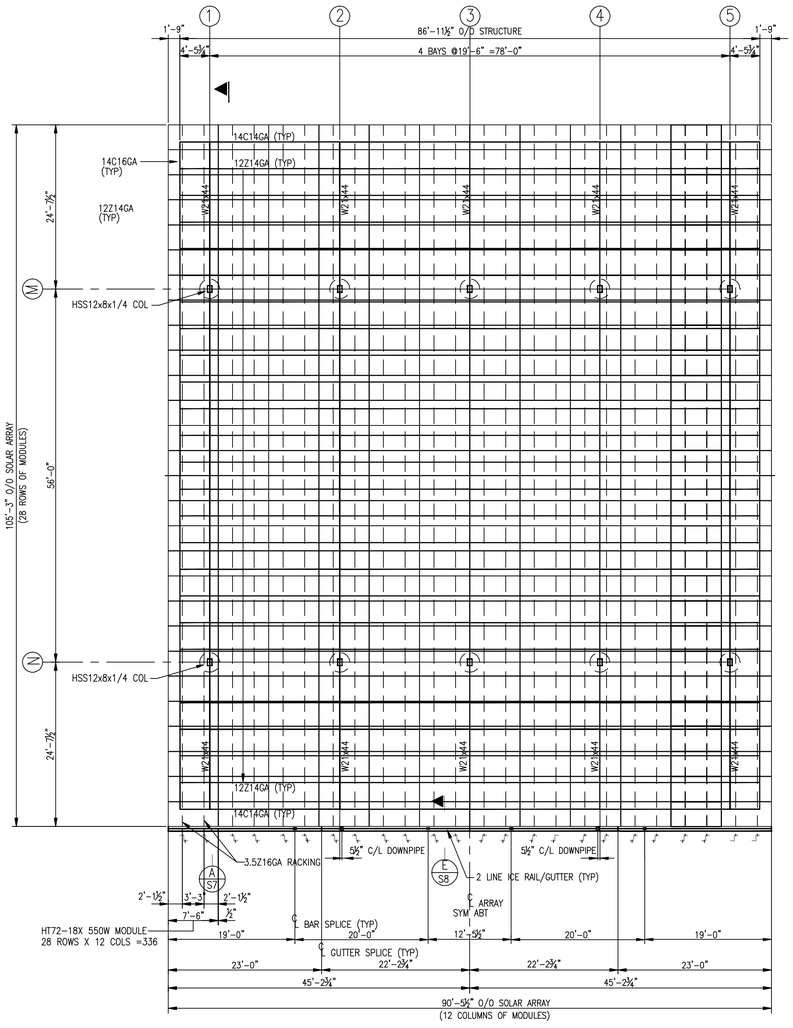
Sheet no.

S4-SOUTH



CARPORT #9 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"



CARPORT #10 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"

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091315
LICENSED PROFESSIONAL ENGINEER

Christopher S. Krus
10/6/2022

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FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

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CROTON-HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
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SOLAR ARRAY, FRAMING PLANS, & DETAILS

Revision

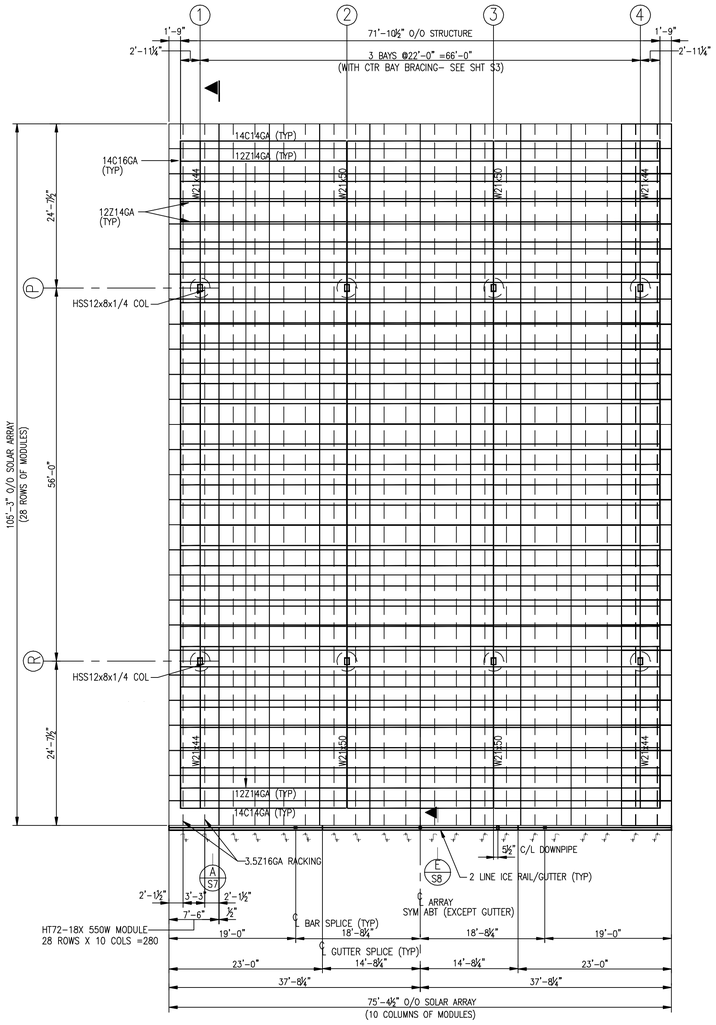
Drawn By S.FLYNN
Checked By J.NASH
Approved By

Project no.

22 2154

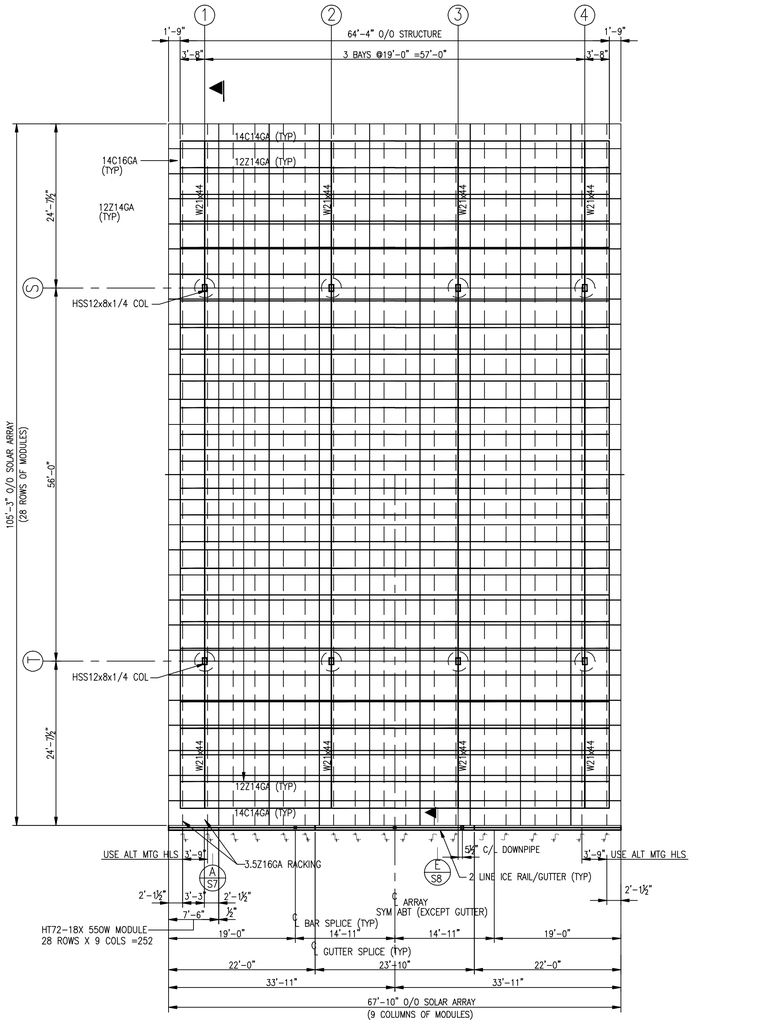
Sheet no.

S5-SOUTH



CARPORT #11 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"



CARPORT #12 SOLAR ARRAY & FRAMING PLAN

1"=10'-0"

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
091315

Christopher S. Krus
10/6/2022

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Sheet

SOLAR ARRAY, FRAMING PLANS, & DETAILS

Revision △

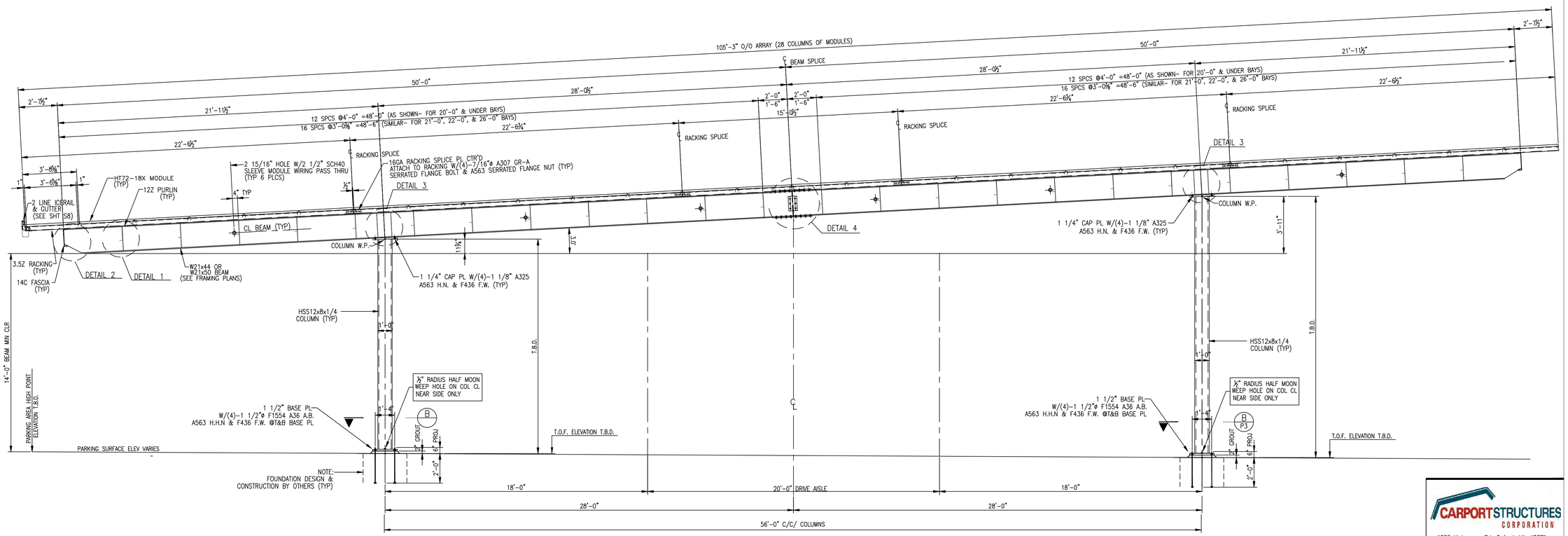
Drawn By S.FLYNN
Checked By J.NASH
Approved By

Project no.

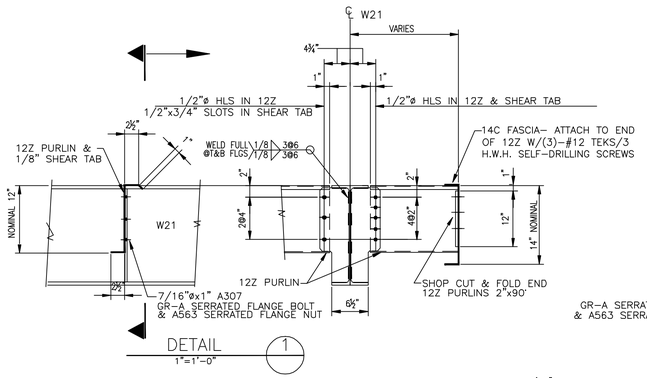
22 2154

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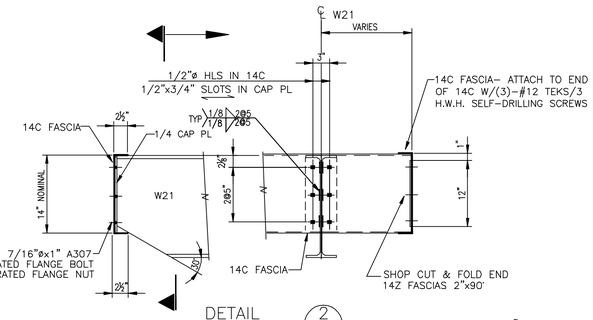
S6-SOUTH



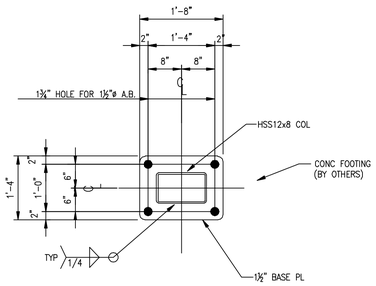
TYP SECTION (A)
5/16" = 1'-0"



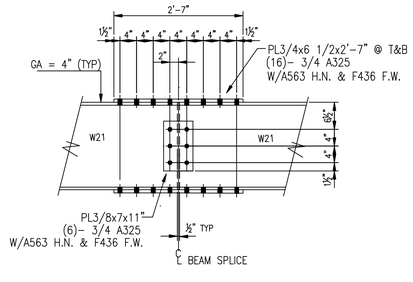
DETAIL (1)
1"=1'-0"



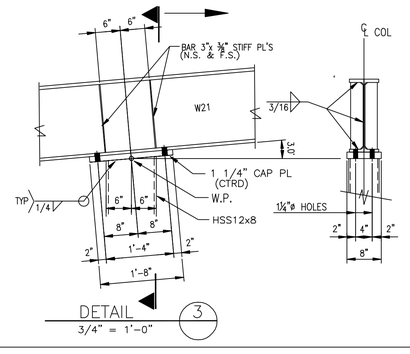
DETAIL (2)
1"=1'-0"



SECTION (B)
1/2" = 1'-0"



DETAIL (4)
3/4" = 1'-0"



DETAIL (3)
3/4" = 1'-0"

CARPORT STRUCTURES CORPORATION
1825 Metamora Rd. Oxford, MI. 48371
TEL. (248) 628-5571
FAX(248) 628-5260

Structural Engineer
Christopher S. Krus, P.E.
3771 Keller Road
Holt, Michigan 48842
TEL. (517) 906-6970

Project
CROTON-HARMON SOLAR READY CARPORT PROJECT
4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

Sheet
SECTIONS & DETAILS

Revision
09-27-22 CARPORT 7 REV 1

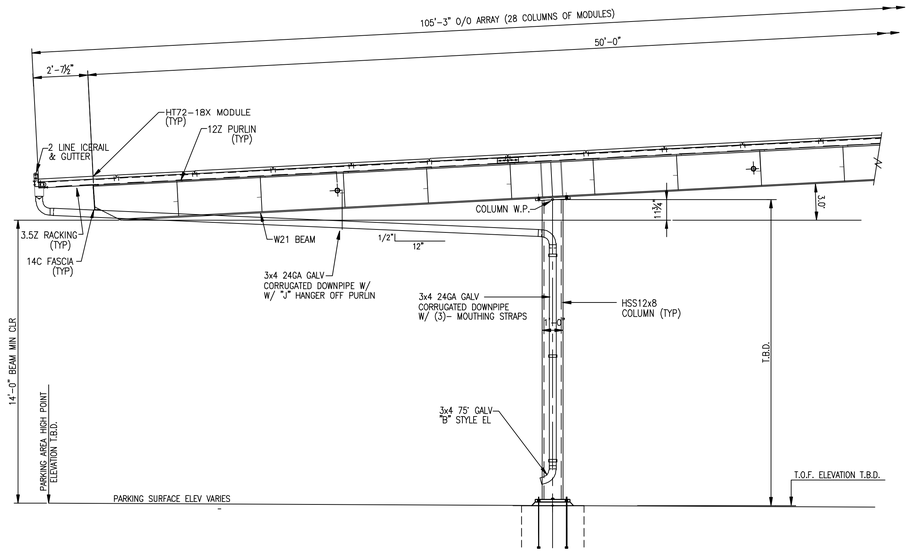
Drawn By S.FLYNN
Checked By J.NASH
Approved By

Project no.
22 2154

Sheet no.
S7-SOUTH

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
091315

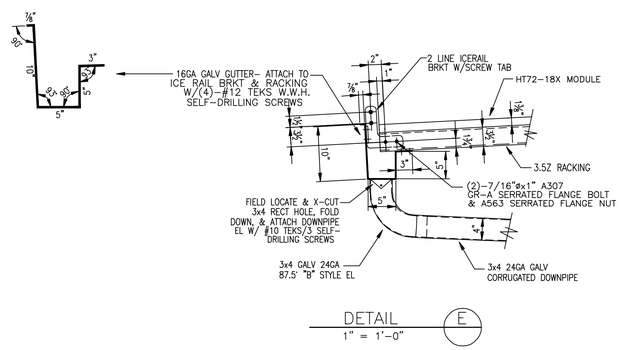
Christopher S. Krus
10/6/2022



DOWNPIPE SCHEDULE	
CARPORT	LOCATION
5	B2, B4, B6
6	D2, D4, D5
7	F2, F4, F5
8	H2, H4
9	L2, L4
10	N2, N4
11	R3
12	T3

TYP GUTTER/DOWNPIPE DETAIL

5/16" = 1'-0"



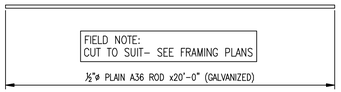
DETAIL E

1" = 1'-0"



Christopher S. Krus

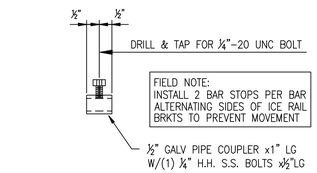
10/6/2022



ICE RAIL BAR DETAIL (85 REQD)

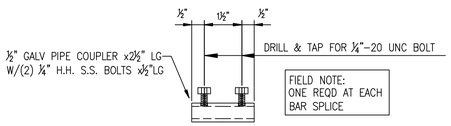
N.T.S.

ICE RAIL COMPONENTS



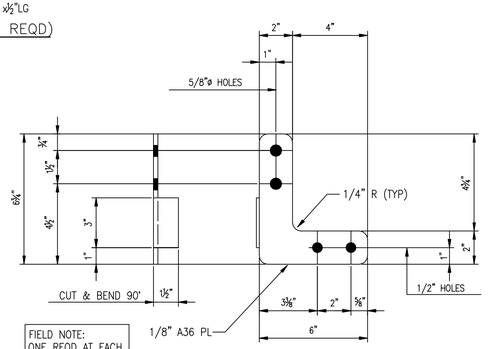
ICE RAIL BAR STOPPER DETAIL (172 REQD)

N.T.S.



ICE RAIL BAR COUPLER DETAIL (70 REQD)

N.T.S.



ICE4 BRACKET DETAIL W/SCREW TAB (212 REQD)

3" = 1'-0"

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Project

CROTON-HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

Sheet

ICE RAIL/GUTTER SECTIONS & DETAILS

Revision

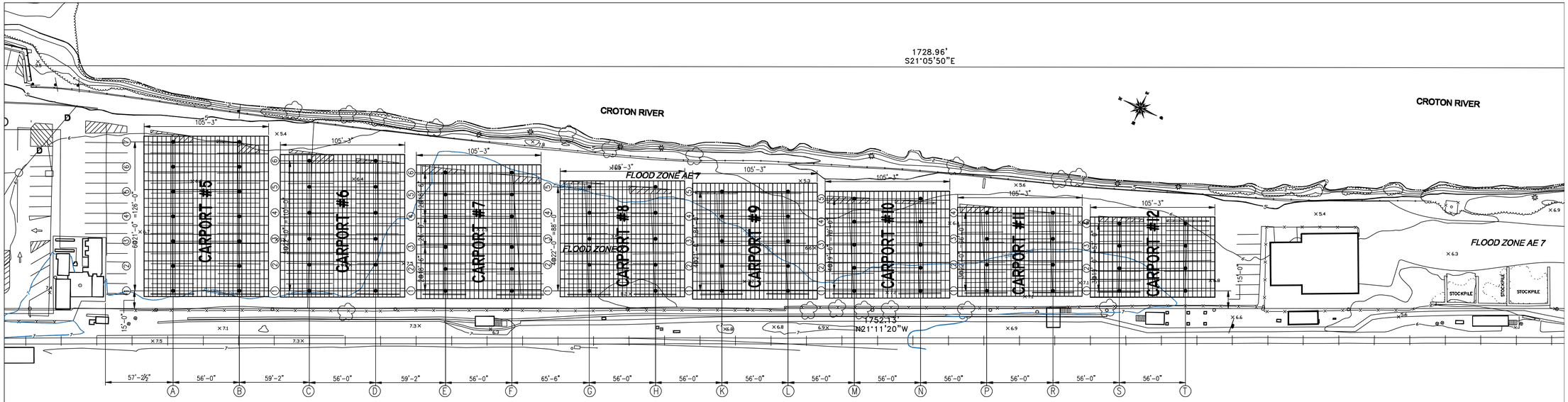
Drawn By S.FLYNN
Checked By J.NASH
Approved By

Project no.

22 2154

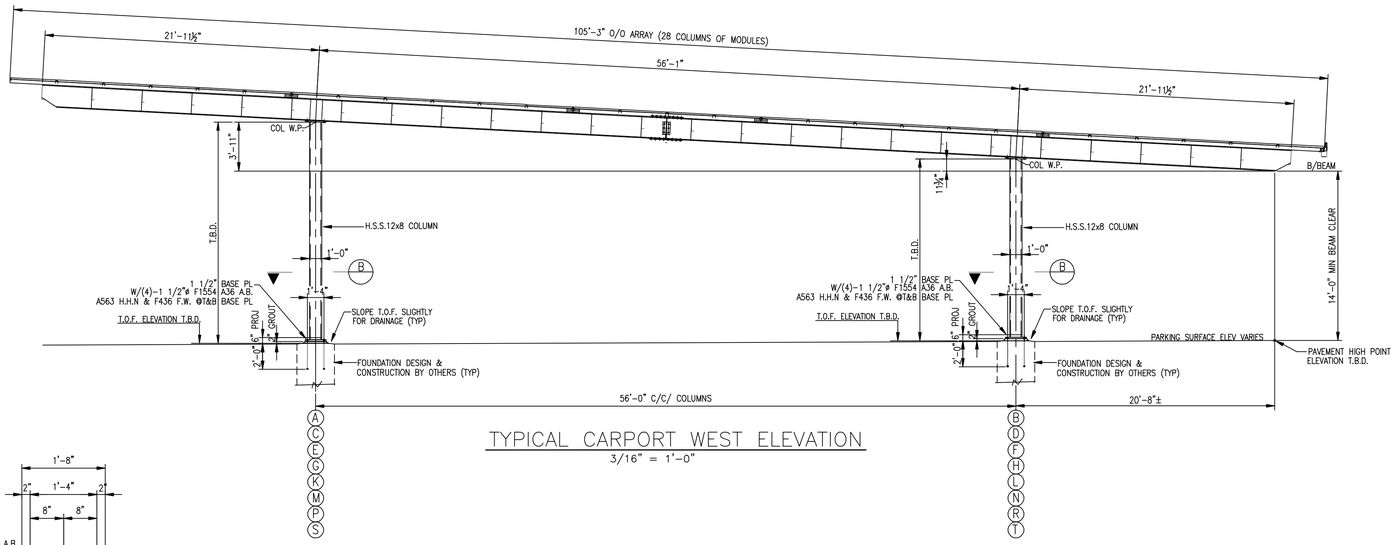
Sheet no.

S8-SOUTH



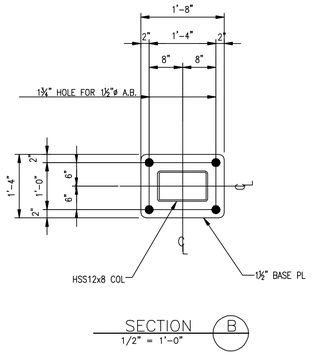
SOLAR CARPORT FOUNDATION PLAN

1" =40'-0"



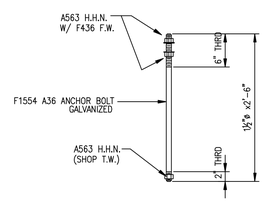
TYPICAL CARPORT WEST ELEVATION

3/16" = 1'-0"



SECTION B

1/2" = 1'-0"



ANCHOR BOLT DETAIL (336 REQD)

STATE OF NEW YORK
CHRISTOPHER S. KRUS
LICENSED PROFESSIONAL ENGINEER
091315

Christopher S. Krus
10/6/2022

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Project

CROTON-HARMON SOLAR READY CARPORT PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

Sheet

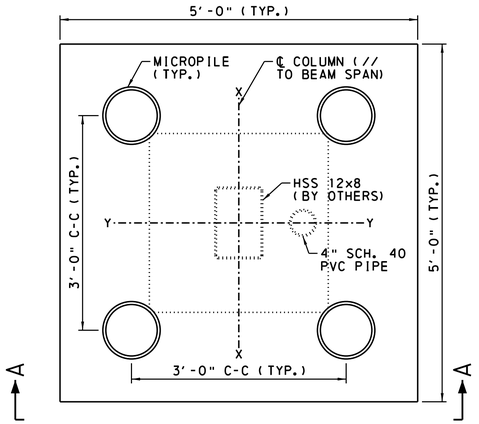
FOUNDATION PLAN & DETAILS

Revision
07-16-22 SURVEY DWG UPDATE 1
09-27-22 CARPORT 7 FTG REV 2

Drawn By S.FLYNN
Checked By J.NASH
Approved By

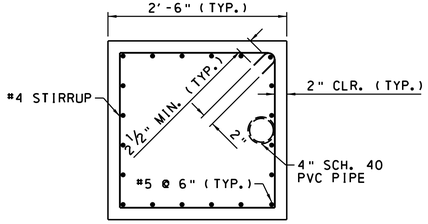
Project no.
22 2154

Sheet no.
S9-SOUTH



PILE CAP PLAN

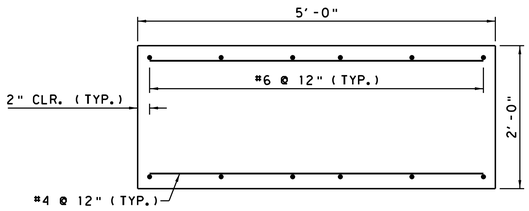
12" 6" 0 12"
SCALE : 1" = 1'-0"



SECTION B-B

NOTE: ANCHOR BOLTS OMITTED FOR CLARITY

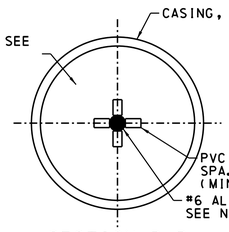
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SECTION C-C

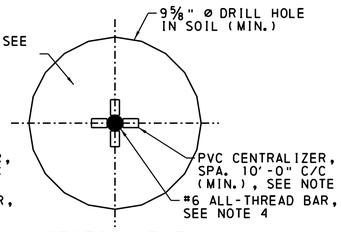
NOTE: 4" SCH. 40 PVC PIPE OMITTED FOR CLARITY

12" 6" 0 12"
SCALE : 1" = 1'-0"



SECTION D-D

3" 0 3"
SCALE : 3" = 1'-0"



SECTION E-E

3" 0 3"
SCALE : 3" = 1'-0"

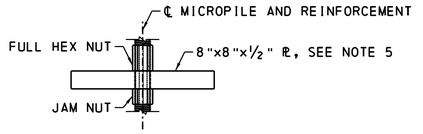


PLATE DETAIL 1

3" 0 3"
SCALE : 3" = 1'-0"

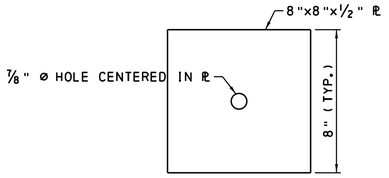
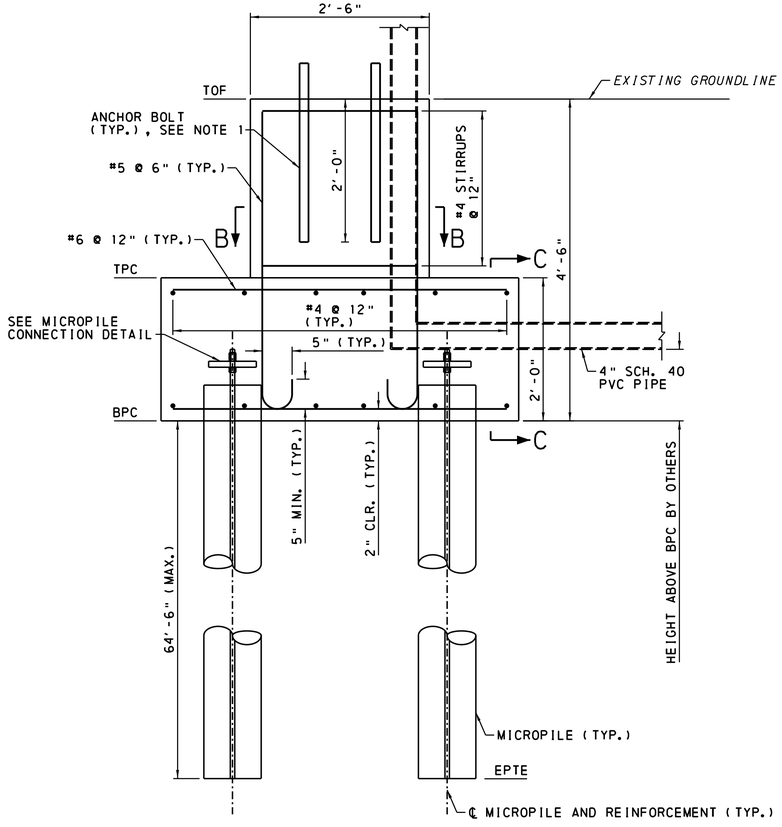


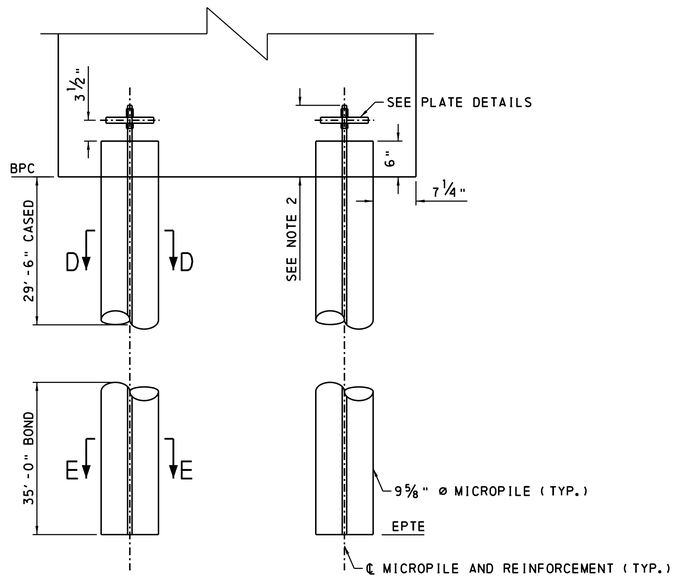
PLATE DETAIL 2

3" 0 3"
SCALE : 3" = 1'-0"



VIEW A-A: FOUNDATION PARTIAL ELEVATION

12" 6" 0 12"
SCALE : 1" = 1'-0"



MICROPILE CONNECTION DETAIL

12" 6" 0 12"
SCALE : 1" = 1'-0"

LIST OF ABBREVIATIONS

BPC	- BOTTOM OF PILE CAP
BP	- BOTTOM OF PILE
C-C	- CENTER TO CENTER
℄	- CENTERLINE
CLR	- CLEAR COVER
CONC	- CONCRETE
DIA	- DIAMETER
EPTE	- ESTIMATED PILE TIP ELEVATION
MIN	- MINIMUM
NO.	- NUMBER
ø	- OUTSIDE DIAMETER
//	- PARALLEL
ℝ	- PLATE
SCH.	- SCHEDULE
SPA.	- SPACED
TOF	- TOP OF FOUNDATION
TPC	- TOP OF PILE CAP
TYP	- TYPICAL

NOTES

1. ANCHOR BOLTS FOR CONNECTION TO BASE PLATE AND COLUMN BY OTHERS. ANCHOR BOLTS ONLY SHOWN TO DETAIL EMBEDMENT DEPTH INTO FOUNDATION.
2. LENGTH OF REINFORCEMENT ABOVE BPC TO BE DETERMINED BY CONTRACTOR. ENSURE ADEQUATE REINFORCEMENT LENGTH TO INSTALL ALL PILE HARDWARE/CONNECTION COMPONENTS.
3. MICROPILE CASING SHALL BE API 5CT, GRADE N80 TYPE 1/TYPE Q (80 KSI MIN.).
4. NO. 6 ALL-THREAD BAR AND ALL HARDWARE SHALL BE GRADE 75 (MIN.) CONFORMING TO ASTM A615M/A615M.
5. BEARING PLATE SHALL BE GRADE 50 (MIN.) CONFORMING TO ASTM A572/A572M.
6. GROUT SHALL CONSIST OF 5,000 PSI (MIN.) NEAT CEMENT GROUT WITH TYPE II PORTLAND CEMENT CONFORMING TO AASHTO M 85.
7. PROVIDE ONE PVC CENTRALIZER AT BASE OF ALL-THREAD BAR IN ADDITION TO CENTRALIZERS SPACED AT 10'-0" C/C (MIN).

PROJECT NUMBER: -

PREPARED BY:
DOMINION ENGINEERING, LLC.
STATE OF NEW YORK
JOHN W. SPENCER
103992
LICENSED PROFESSIONAL ENGINEER

CROTON-HARMON METRONORTH STATION SOLAR AND BESS PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

-
-
-

NORTH CANOPY FOUNDATION DETAILS

RECOMMENDED _____

PERMIT

10/07/2022 5:01:26 PM

SHEET 1 OF 1

-

Mark	Description	By	Chk'd.	Recm'd.	Date

REVISIONS

ENGINEER

DOMINION ENGINEERING LLC
STRUCTURAL | GEOTECHNICAL | CONSTRUCTION ENGINEERS
WWW.DOMINION-ENGINEERING.COM

PREPARED BY:
DOMINION ENG.INEERING, LLC.
20397 RT 19, SUITE 228
CRANBERRY TOWNSHIP, PA 16066

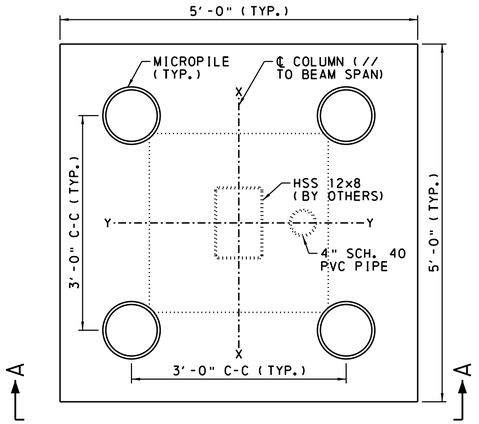
CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE SUITE 200
MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

CORE DEVELOPMENT GROUP
coredevusa.com
Clean Energy that Inspires

EPC

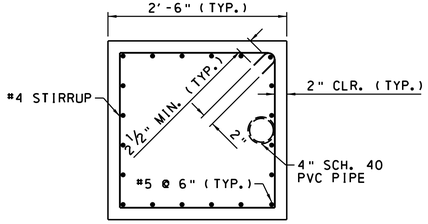
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PILE CAP PLAN

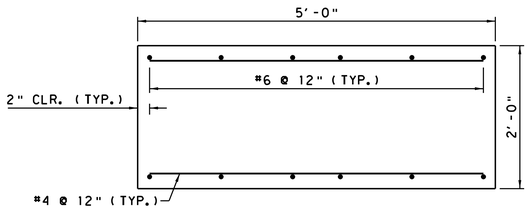
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SCALE : 1" = 1'-0"



SECTION B-B

NOTE: ANCHOR BOLTS OMITTED FOR CLARITY

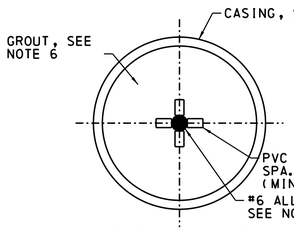
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SECTION C-C

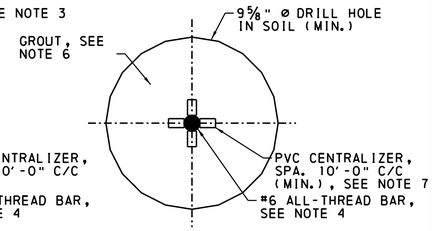
NOTE: 4" SCH. 40 PVC PIPE OMITTED FOR CLARITY

12" 6" 0 12"
SCALE : 1" = 1'-0"



SECTION D-D

3" 0 3"
SCALE : 3" = 1'-0"



SECTION E-E

3" 0 3"
SCALE : 3" = 1'-0"

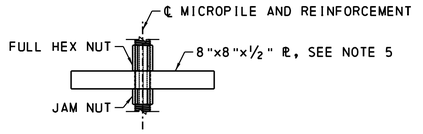


PLATE DETAIL 1

3" 0 3"
SCALE : 3" = 1'-0"

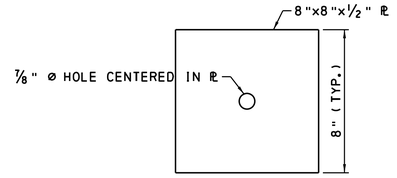
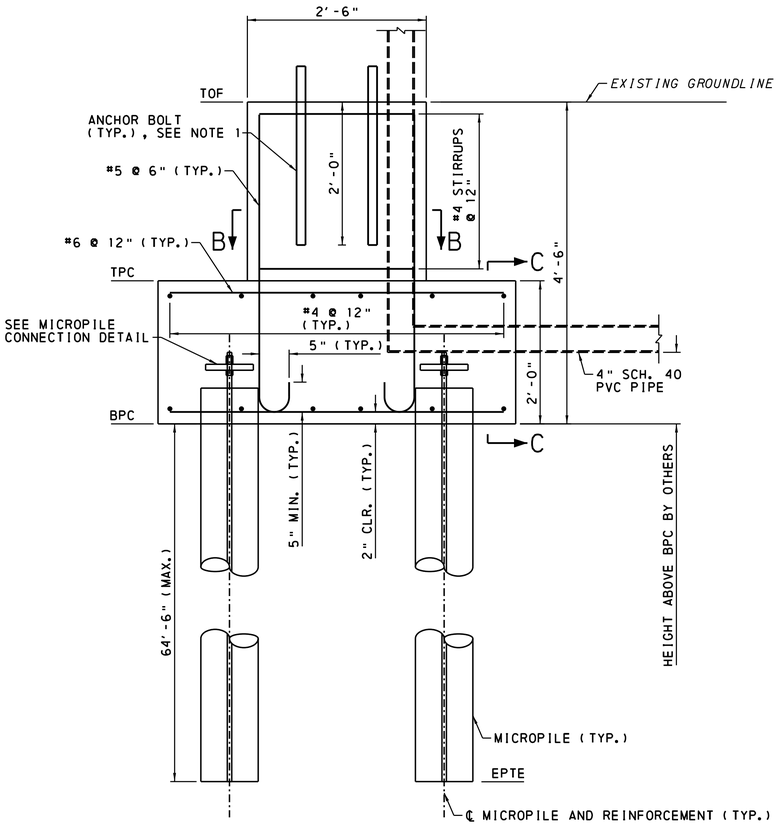


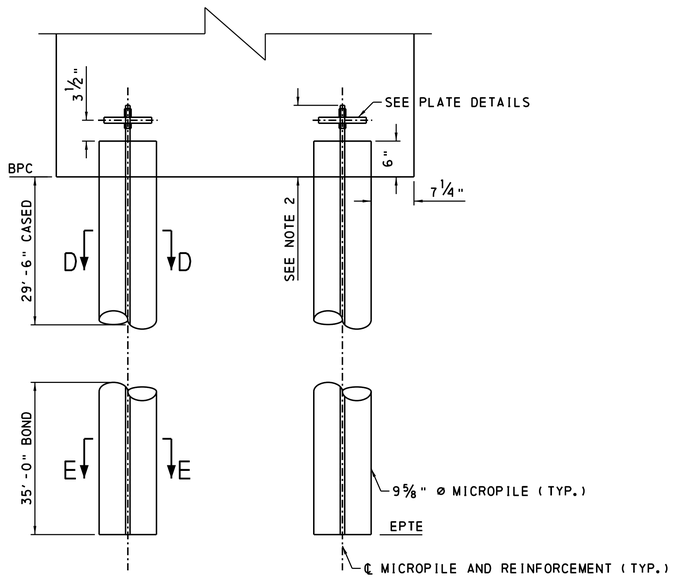
PLATE DETAIL 2

3" 0 3"
SCALE : 3" = 1'-0"



VIEW A-A: FOUNDATION PARTIAL ELEVATION

12" 6" 0 12"
SCALE : 1" = 1'-0"



MICROPILE CONNECTION DETAIL

12" 6" 0 12"
SCALE : 1" = 1'-0"

LIST OF ABBREVIATIONS

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BP	- BOTTOM OF PILE
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//	- PARALLEL
ℝ	- PLATE
SCH.	- SCHEDULE
SPA.	- SPACED
TOF	- TOP OF FOUNDATION
TPC	- TOP OF PILE CAP
TYP	- TYPICAL

NOTES

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PROJECT NUMBER: -

PREPARED BY:
DOMINION ENGINEERING, LLC.



CROTON-HARMON METRONORTH STATION SOLAR AND BESS PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

-
-
-

SOUTH CANOPY
FOUNDATION DETAILS

RECOMMENDED _____

PERMIT

10/07/2022 5:01:51 PM

SHEET 1 OF 1

-

Mark	Description	By	Chk'd.	Recm'd.	Date

REVISIONS

ENGINEER

DOMINION ENGINEERING LLC
STRUCTURAL | GEOTECHNICAL | CONSTRUCTION ENGINEERS
WWW.DOMINION-ENGINEERING.COM

PREPARED BY:
DOMINION ENG.INEERING, LLC.
20397 RT 19, SUITE 228
CRANBERRY TOWNSHIP, PA 16066

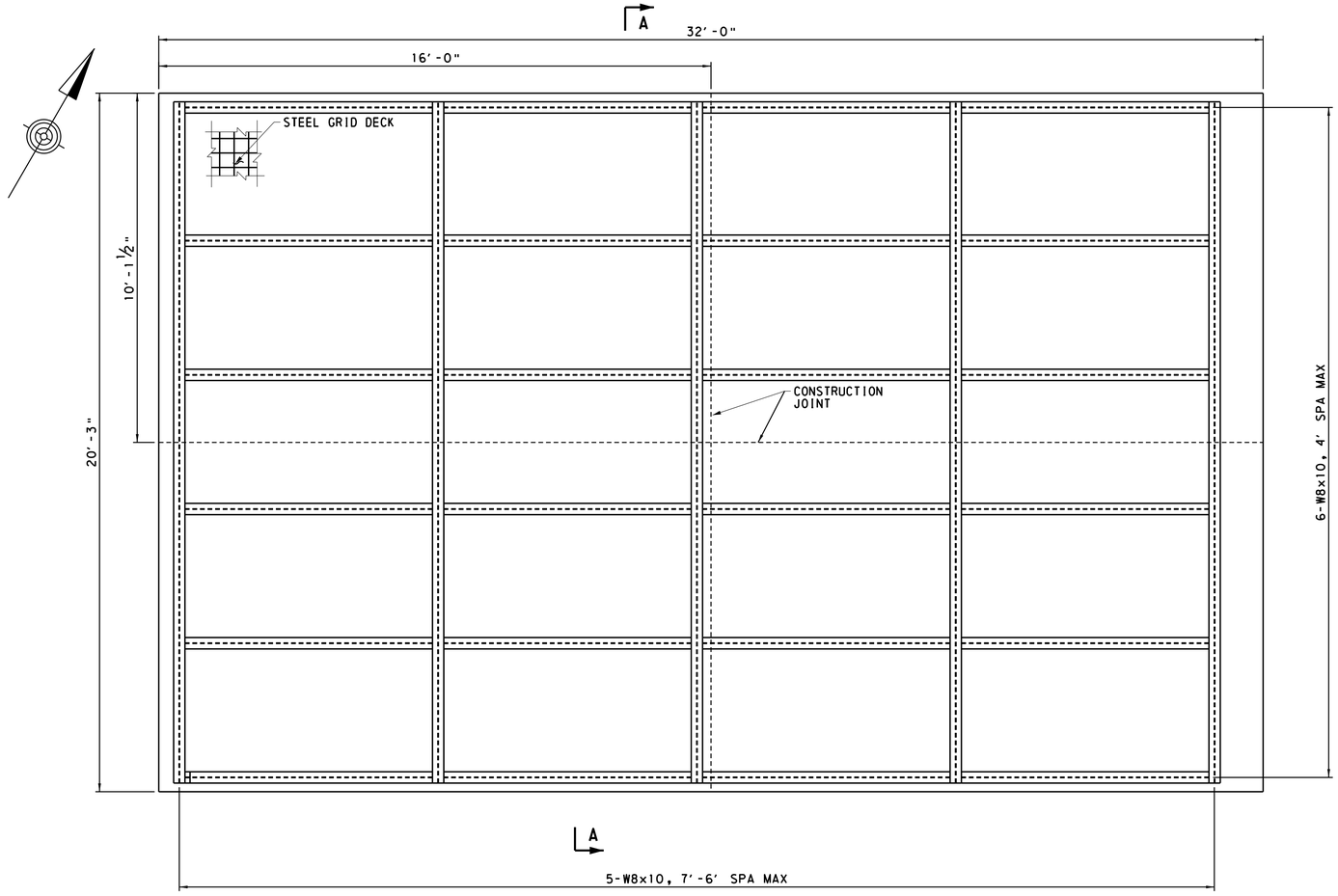
CORE DEVELOPMENT GROUP
860 WYCKOFF AVENUE SUITE 200
MAHWAH, NJ 07430
WWW.COREDEVUSA.COM

CORE DEVELOPMENT GROUP
coredevusa.com
Clean Energy that Inspires

EPC

DES: JMP	CKD: JWS	DWG: JMP	CKD: JWS

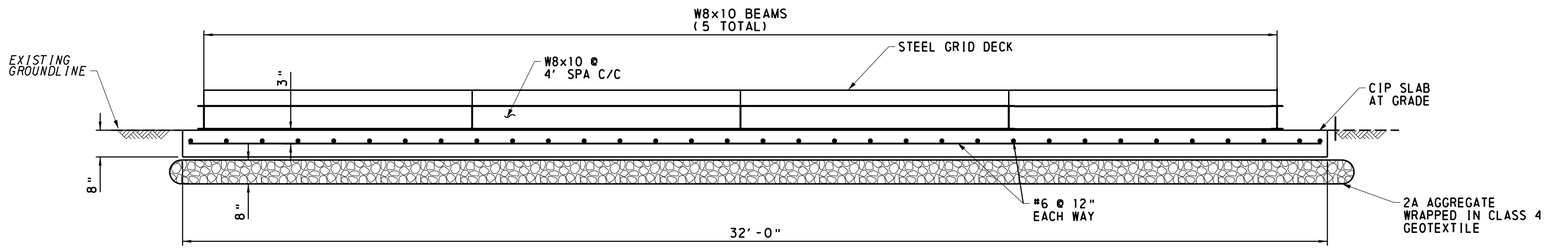
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PLAN

2' 1' 0 2'

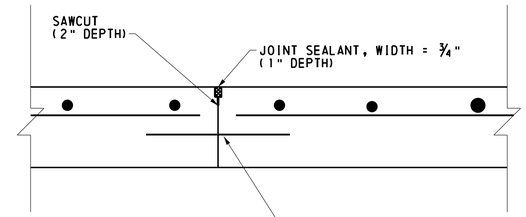
SCALE : ½" = 1'-0"



SECTION A-A

2' 1' 0 2'

SCALE : ½" = 1'-0"



CONSTRUCTION JOINTS

6" 0 6"

SCALE : 1½" = 1'-0"

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STATE OF NEW YORK
JOHN W. SPENCER
103992
LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER: -

CROTON-HARMON METRONORTH STATION SOLAR AND BESS PROJECT

4 VETERANS PLAZA
CROTON-ON-HUDSON, N.Y. 10520

-
-
-

EQUIPMENT PLATFORM - NORTH PLATFORM DETAILS

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SHEET 1 OF 1

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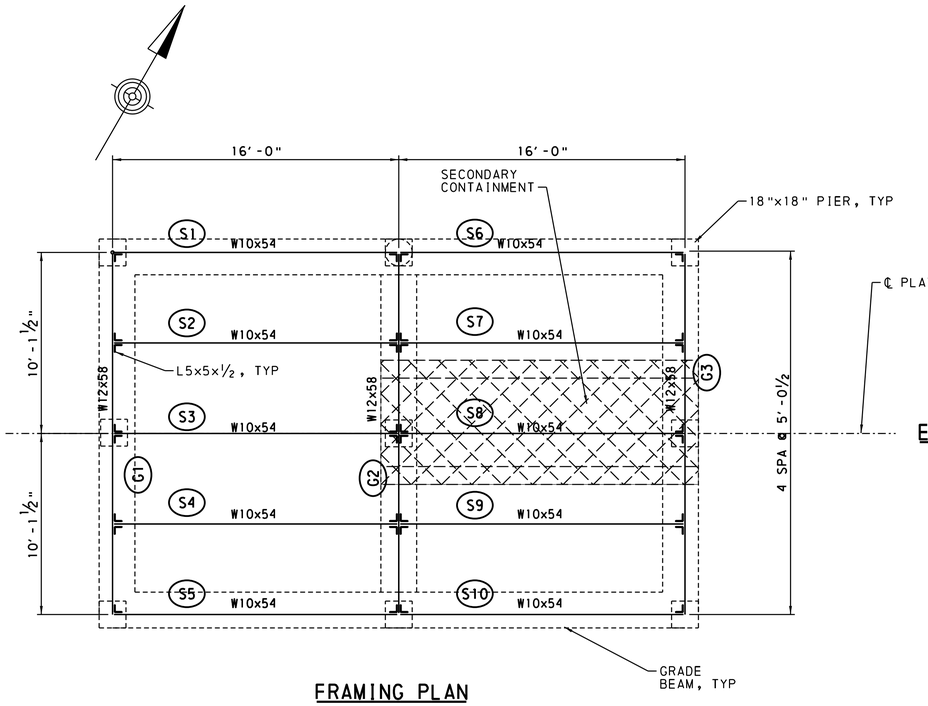
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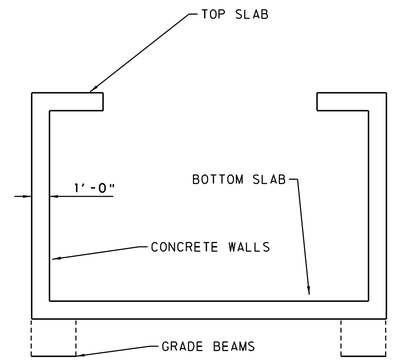
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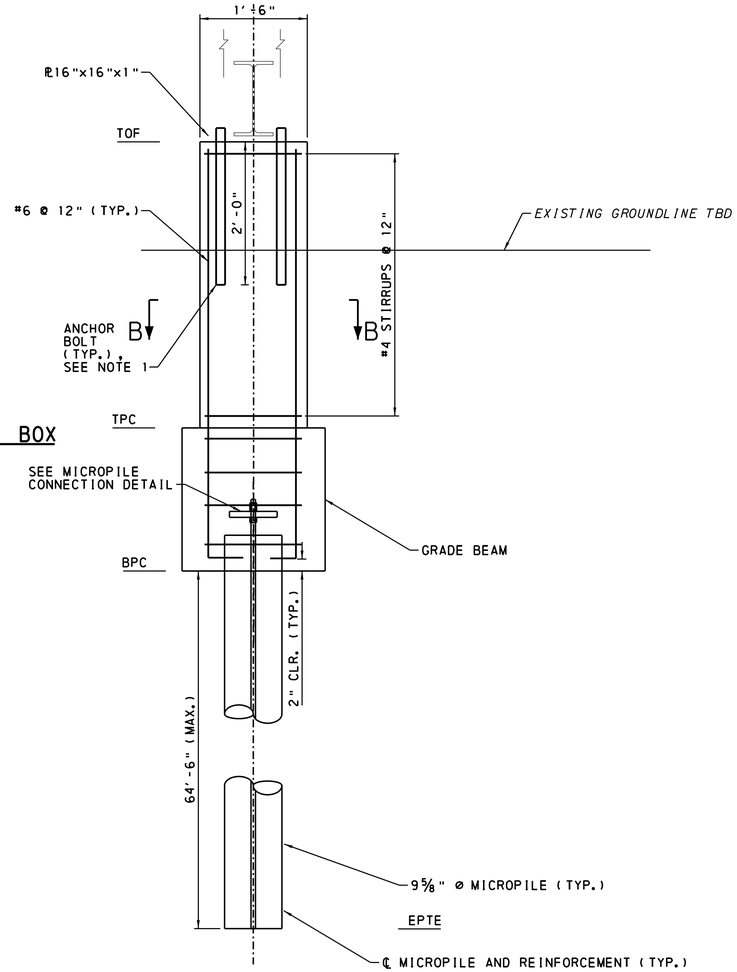
FRAMING PLAN

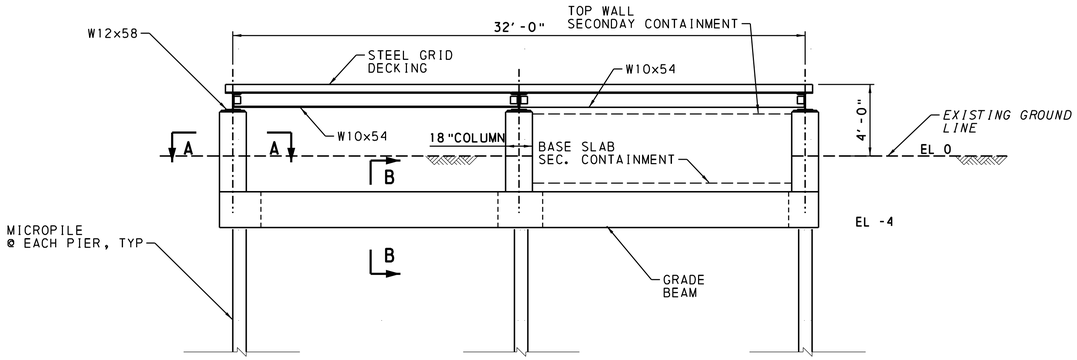
4' 2' 0 4'
SCALE : ¼" = 1'-0"



ELEVATION - SECONDARY CONTAINMENT CONC. BOX

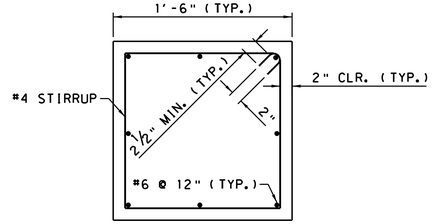
4' 2' 0 4'
SCALE : ¼" = 1'-0"





ELEVATION

4' 2' 0 4'
SCALE : ¼" = 1'-0"

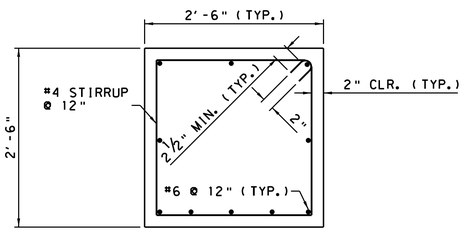


SECTION A-A - COLUMN

12" 6" 0 12"
SCALE : 1" = 1'-0"

VIEW A-A: FOUNDATION PARTIAL ELEVATION

12" 6" 0 12"
SCALE : 1" = 1'-0"



SECTION B-B - GRADE BEAM

12" 6" 0 12"
SCALE : 1" = 1'-0"

LIST OF ABBREVIATIONS

BPC	- BOTTOM OF PILE CAP
BP	- BOTTOM OF PILE
C-C	- CENTER TO CENTER
℄	- CENTERLINE
CLR	- CLEAR COVER
CONC	- CONCRETE
DIA	- DIAMETER
EPTE	- ESTIMATED PILE TIP ELEVATION
MIN	- MINIMUM
NO.	- NUMBER
ø	- OUTSIDE DIAMETER
//	- PARALLEL
PL	- PLATE
TOF	- TOP OF FOUNDATION
TPC	- TOP OF PILE CAP
TYP	- TYPICAL

NOTES

1. ANCHOR BOLTS FOR CONNECTION TO BASE PLATE AND COLUMN BY OTHERS. ANCHOR BOLTS ONLY SHOWN TO DETAIL PENETRATION DEPTH INTO FOUNDATION.
2. LENGTH OF REINFORCEMENT ABOVE BPC TO BE DETERMINED BY CONTRACTOR. ENSURE ADEQUATE REINFORCEMENT LENGTH TO INSTALL ALL PILE HARDWARE/CONNECTION COMPONENTS.
3. MICROPILE CASING SHALL BE API 5CT, GRADE N80 TYPE 1/TYPE Q (80 KSI MIN.).
4. NO. 6 ALL-THREAD BAR AND ALL HARDWARE SHALL BE GRADE 75 (MIN.) CONFORMING TO ASTM A615M/A615M.
5. BEARING PLATE SHALL BE GRADE 50 (MIN.).

DES: JMP	CKD: JWS	DWG: JMP	CKD: JWS

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4 VETERANS PLAZA
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-

EQUIPMENT PLATFORM - SOUTH PLATFORM DETAILS

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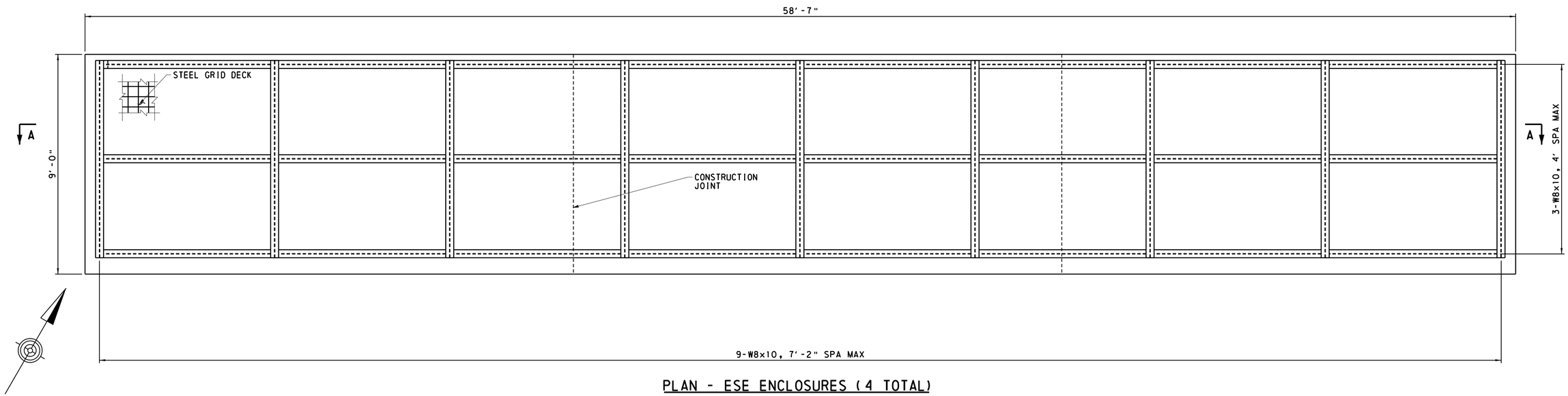
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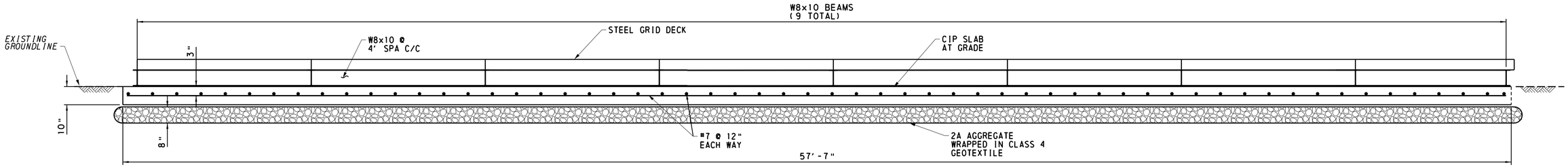
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PLAN - ESE ENCLOSURES (4 TOTAL)

2' 1' 0 2'

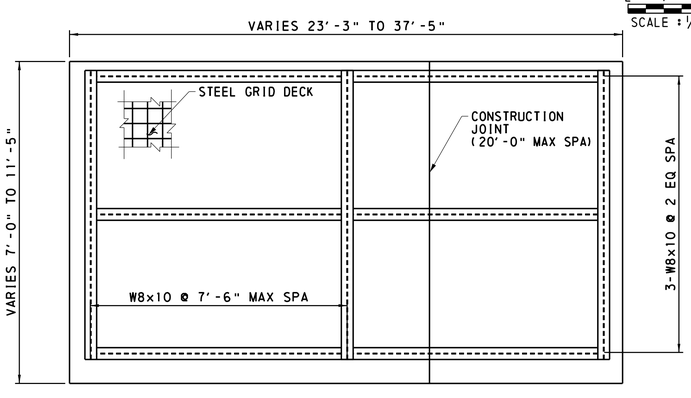
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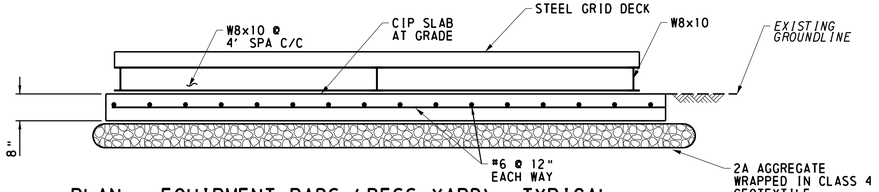


SECTION A-A

2' 1' 0 2'

SCALE : 1/2" = 1'-0"

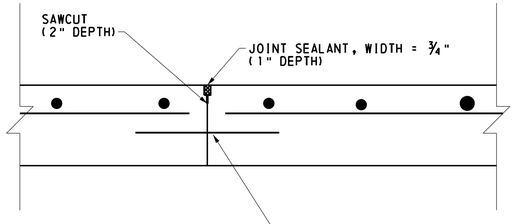




PLAN - EQUIPMENT PADS (BESS YARD) - TYPICAL

2' 1' 0 2'

SCALE : 1/2" = 1'-0"



CONSTRUCTION JOINTS

6" 0 6"

SCALE : 1 1/2" = 1'-0"

DES: JMP	CKD: JWS	DWG: JMP	CKD: JWS

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EQUIPMENT PLATFORM - BESS STRUCTURE PLATFORM DETAILS

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CRANBERRY TOWNSHIP, PA 16066

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