APPLIED AEROSPACE - PHOTOVOLTAIC ENERGY SYSTEM

THIS 1076.70 KWSTC, CARPORT MOUNTED PHOTOVOLTAIC (PV) SYSTEM IS TO BE INSTALLED AT THE OFFICE BUILDING IN [redacted]
THE ENERGY PRODUCED BY THE PV SYSTEM SHALL BE INTERCONNECTED WITH THE UTILITY GRID THROUGH THE EXISTING ON-SITE ELECTRICAL EQUIPMENT VIA A BACK-FED BREAKER IN THE MAIN SWITCHBOARD 'MSBS'.
THIS PROJECT DOES NOT INCLUDE ENERGY STORAGE BATTERIES.

SHEET INDEX

COMPONENTS LIST

ELECTRICAL			ELECTRICAL		
QTY	NAME	DESCRIPTION	QTY	NAME	DESCRIPTION
2220	PV MODULE	HANWHA Q CELLS Q.PEAK DUO XL-G10.3/BFG 485	4	EV CHARGERS	CHARGEPOINT CT4011-GW1 (SINGLE PORT) LEVEL II, 208 VAC, 40A, NEMA 3R
8	PV INVERTER	SOLAREDGE SE120KUS 120 KW, 480 VAC, 144.3 A	29	EV CHARGERS	CHARGEPOINT CT4021-GW1 (DUAL PORT) LEVEL II, 208 VAC, 40A X 2, NEMA 3R
1110	POWER OPTIMIZER	SOLAREDGE P1100	1	DISTRIBUTION PANEL	120/208 VAC, 2000 A, NEMA 3R
1	PV COMBINER PANEL	277/480 VAC, 1600 A, NEMA 3R	33	TRANSFORMER	750 KVA, NEMA 3R EV-SIDE: 120/208 VAC WYE, UTILITY-SIDE: 480 VAC DELTA
1	TRANSFORMER	1500 KVA, NEMA 3R PV-SIDE: 277/480 VAC WYE, UTILITY-SIDE: 12.47 kV DELTA			
1	MAIN SWITCHBOARD	277/480 VAC, 2500 A, NEMA 3R			
1	PANEL SL	277/480 VAC, 200 A, NEMA 3R			

GOVERNING CODES & STANDARDS

2022 CA ELECTRICAL CODE: § 110, 240, 250, 690, 705, 706
2022 CA BUILDING CODE: § 1507.17, 1511.9, 3111
2022 CA RESIDENTIAL CODE: § R324, R908
2022 CA FIRE CODE: § 1205, 1207
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269

SITE SPECIFICATIONS

EXPOSURE CATEGORY: C
RISK CATEGORY: II
WIND SPEED (ASCE 7-16): 93 MPH
SNOW LOAD (ASCE 7-16): 0 PSF

PARCEL MAP 1

AERIAL MAP 2

PROJECT LOCATION

VICINITY MAP 3

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

Sheet Title:
COVER

Sheet Number:
T1.0

Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:
RD

CONTRACTOR NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY THE SYSTEM DESIGN ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND DRAWINGS.
2. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL WORK AS SHOWN IN THE CONSTRUCTION DOCUMENTS UNLESS OTHERWISE NOTED. ALL WORK SHALL BE PERFORMED IN AN ORDERLY, WORKMAN-LIKE AND SAFE MANNER BY WORKERS SKILLED AND EXPERIENCED IN THEIR TRADES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL INSPECTIONS TO BE WITNESSED BY THE AHJ AND/OR THE OWNER. THE CONTRACTOR SHALL WORK WITH THE OWNER'S INSPECTION AGENCY TO PLAN THE INSPECTIONS, AND NOTIFY ALL PARTIES INVOLVED SUFFICIENTLY IN ADVANCE TO ALLOW THE INSPECTIONS TO TAKE PLACE IN A TIMELY MANNER AND NOT DELAY THE PROGRESS OF THE WORK. THE OWNER AND SYSTEM DESIGN ENGINEER WILL NOT BE RESPONSIBLE FOR SCHEDULING, ARRANGING OR COORDINATING THE INSPECTIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE AREAS WHERE WORK IS TAKING PLACE, AS WELL AS ANY ADJOINING AREAS WHICH MAY BE AFFECTED BY THE WORK, TO PREVENT SUBJECTING THE OCCUPANTS, STRUCTURES, VEHICLES, EQUIPMENT, OR ANY OTHER PARTS OR CONTENTS OF THE SITE TO HAZARD OR DAMAGE.
5. CONTRACTOR SHALL FURNISH ALL NECESSARY BOXES, OUTLETS, SUPPORTS, CONDUITS, FITTINGS, AND ACCESSORIES TO FULFILL APPLICABLE CODES, REGULATIONS, BUILDING STANDARDS, AND THE BEST PRACTICE OF THE TRADE FOR THE INSTALLATION OF ELECTRICAL WORK.
6. THE CONTRACTOR SHALL, AT ALL TIMES DURING THE WORK, MAINTAIN ACCESSIBILITY FROM THE STREET TO ALL FIRE HYDRANTS, POWER OR LIGHT POLES, AND SIMILAR UTILITY AND PUBLIC SERVICE ITEMS WITHIN OR ADJACENT TO THE CONSTRUCTION SITE.
7. WORK SHALL NOT RESTRICT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUITION FACILITIES (POWER POLES, PULLBOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO THE LOCATION OF THE HOOKUP.
8. THE OWNERS AND THE AHJ SHALL BE NOTIFIED IN WRITING IN ADVANCE OF ANY REQUIRED CONSTRUCTION OPERATION THAT WILL INVOLVE INTERRUPTION OF THE HEATING, WATER, FIRE PROTECTION SYSTEMS, TELEPHONE, GAS OR ELECTRICAL SERVICES TO THE OTHER BUILDINGS AND AREAS OF THE SITE. THE CONTRACTOR SHALL COORDINATE ANY REQUIRED SHUTDOWN OF THE UTILITIES WITH THE OWNERS, THE AHJ, AND THE UTILITY COMPANY.
9. UPON REVIEW OF ELECTRICAL DRAWINGS, THE ELECTRICAL CONTRACTOR SHALL INFORM THE SYSTEM DESIGN ENGINEER OF ANY DISCREPANCIES OR REQUEST CLARIFICATION, IF NECESSARY, CONCERNING THE INTENT OF THE PLANS AND SPECIFICATIONS TO PROVIDE A COMPLETE ELECTRICAL INSTALLATION.
10. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS WHOSE WORK MIGHT AFFECT THIS INSTALLATION. CONTRACTORS SHALL ARRANGE ALL PARTS OF THIS WORK AND EQUIPMENT IN PROPER RELATION TO THE WORK AND EQUIPMENT OF OTHERS AND WITH BUILDING CONSTRUCTION AND ARCHITECTURAL FINISH SO THAT IT WILL HARMONIZE IN SERVICE AND APPEARANCE.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE OWNER'S INSPECTION AGENCY TO ARRANGE FOR INSPECTIONS RELATED TO ALL SPECIAL INSPECTIONS IN A TIMELY MANNER, AND SHALL BE PRESENT AS REQUIRED AT THE INSPECTIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT THE APPROPRIATE SUBCONTRACTORS ARE PRESENT DURING TESTS AND INSPECTIONS OF THE SYSTEMS FOR WHICH THE SUBCONTRACTORS ARE RESPONSIBLE.

EQUIPMENT NOTES:

1. ALL MATERIALS, SUPPLIES, AND EQUIPMENT SHALL BE LISTED, USED, AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS, AND APPLICABLE NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) REQUIREMENTS.
2. ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.
3. WORKING SPACE AROUND ELECTRIAL EQUPMENT SHALL COMPLY WITH NEC 110.26.
4. THE APPROXIMATE LOCATIONS OF ALL JUNCTION BOXES, COMBINER BOXES, CONDUITS, ETC. SHALL BE DETERMINED FROM THE DRAWINGS, AND VERIFIED BY THE CONTRACTOR FOR INSTALLATION.
5. ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
6. PROVIDE NEMA 3R RATED EQUIPMENT OR BETTER WHERE EXPOSED TO OUTDOORS.
7. WHERE SIZES OF RACEWAYS OR BOXES ARE NOT INDICATED ON THE DRAWINGS, THE CONTRACTOR SHALL SIZE THESE ITEMS AS REQUIRED FOR THE INSTALLATION.
8. ALL VERTICAL RUNS OF CONDUIT OR TUBING TERMINATING IN THE BOTTOM OF WALL BOXES OR CABINETS OR SIMILAR LOCATIONS, SHALL BE PROTECTED FROM THE ENTRANCE OF FOREIGN MATERIAL PRIOR TO THE INSTALLATION OF CONDUCTORS.
9. METAL RACEWAYS, METAL ENCLOSURES OF ELECTRICAL DEVICES AND EQUIPMENT, MODULE FRAMES, AND OTHER EQUIPMENT SHALL BE COMPLETELY GROUNDED IN ACCORDANCE WITH THE NEC.
10. PROPER HARDWARE FOR A COMPLETE GROUNDING AND BONDING SYSTEM SHALL BE INSTALLED BY THE CONTRACTOR, IF NECESSARY.
11. GROUNDING RODS SHALL HAVE A RESISTANCE TO GROUND OF 25 OHMS OR LESS AND SHALL BE 5/8" x 8' MIN, COPPER-BONDED STEEL. ALL GROUND CLAMPS USED SHALL BE UL 467 LISTED.
12. ALL PVC CONDUIT EXPOSED TO SUNLIGHT SHALL BE SCHEDULE 80 AND MARKED AS SUNLIGHT RESISTANT. ALL UNDERGROUND PVC CONDUIT SHALL BE SCHEDULE 40 OR 80.
13. ALL CONDUIT SHALL BE MOUNTED AT A MINIMUM OF 1 INCH ABOVE THE ROOF SURFACE.

ELECTRICAL NOTES:

1. ELECTRICAL POWER MUST BE SHUT OFF PRIOR TO THE CONTRACTOR PERFORMING ANY WORK IN RACEWAYS WITH LIVE ELECTRICAL CIRCUITS OR ANY OTHER EQUIPMENT. WHEN SWITCHES OR CIRCUIT BREAKERS ARE OPENED FOR WORK ON ELECTRICAL EQUIPMENT OR WIRING, SIGNS OR TAGS SHOULD BE INSTALLED AT THE SWITCH OR BREAKER STATING THAT WORK IS BEING PERFORMED ON THEM. INCLUDE THE TIME, DATE, AND CONTRACTOR'S NAME ON THE SIGN OR TAG. IF DEVICE IS LOCKABLE, IT SHOULD BE PADLOCKED.
2. THE ELECTRICAL WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE AHJ, NATIONAL FIRE PROTECTION AGENCY (NFPA), NATIONAL ELECTRICAL CODE (NEC), AND OSHA.
3. PHASING OF NEW CONDUCTORS TO MATCH EXISTING CONDUCTORS. IF INSTALLATING A NEW CIRCUIT, THEN CONTRACTOR SHALL FOLLOW THE PHASING SCHEMES PROVIDED IN THE ELECTRICAL DIAGRAM.
4. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 90°C WET ENVIRONMENT, AND 1000 VOLTS DC OR 600 VOLTS AC, UNLESS OTHERWISE NOTED.
5. GROUNDING ELECTRODE CONDUCTOR (G.E.C.) SHALL BE CONTINUOUS AND/OR IRREVERSIBLY SPLICED/WELDED.
6. FLEXIBLE, FINE-STRANDED CABLES SHALL BE TERMINATED ONLY WITH TERMINALS, LUGS, DEVICES, OR CONNECTORS THAT ARE IDENTIFIED AND LISTED FOR SUCH USE PER NEC 690.31(F).
7. ALL WIRES SHALL BE IDENTIFIED BY CIRCUITS IN ALL CABINETS, BOXES, WIRING TROUGHS, AND OTHER ENCLOSURES, AND AT ALL TERMINAL POINTS, I.E., RECEPTACLES, MECHANICAL LUGS, COMPRESSION FITTINGS. THE CIRCUIT DESIGNATIONS SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS OR AS DIRECTED BY THE SYSTEM DESIGN ENGINEER. LABELS OR TAGS SHALL BE APPLIED TO WIRES SO THAT THEY WILL BE READILY VISIBLE.
8. BREAKERS SHALL BE 80% RATED UNLESS OTHERWISE SPECIFIED.
9. EQUIPMENT TERMINALS SHALL BE 75°C RATED UNLESS OTHERWISE SPECIFIED.
10. FUSES FOR SWITCHES SHALL BE CURRENT-LIMITING TYPE WITH A MINIMUM INTERRUPTING CAPACITY OF 200,000 AMPERES RMS (UNLESS OTHERWISE NOTED) AND OF THE CONTINUOUS CURRENT RATINGS AS INDICATED ON THE DRAWINGS OR AS RECOMMENDED BY THE MANUFACTURER.
11. THE SHORT-CIRCUIT INTERRUPTING RATING OF ALL NEW EQUIPMENT SHALL BE NO LESS THAN THE INTERRUPTING RATING OF THE EXISTING SERVICE EQUIPMENT, UNLESS A MINIMUM VALUE WAS CALCULATED AND SPECIFIED ON THE PLANS FOR THE NEW EQUIPMENT.

PV NOTES:

1. ALL ASPECTS OF WORK RELATED TO THE SOLAR PHOTOVOLTAIC (PV) SYSTEM SHALL BE IN ACCORDANCE WITH ALL STATE AND LOCAL CODES, UTILITY REQUIREMENTS, AND THE NEC, ESPECIALLY ARTICLE 690 AND ARTICLE 705.
2. SOLAR PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER E.G.C. PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
3. SOLAR PV SYSTEMS SHALL BE GROUNDED IN ACCORDANCE WITH NEC 690 PART V: GROUNDING.
4. COMBINER BOXES, FUSING, WIRE SIZES, QUANTITIES AND CONDUIT SIZES BETWEEN SOLAR ARRAYS AND INVERTERS TO BE VERIFIED BY CONTRACTOR WITH SOLAR MODULE AND INVERTER MANUFACTURERS BEFORE INSTALLATION.
5. ALL PV SOURCE CIRCUIT CONDUCTORS AND CONNECTORS SHALL BE SUPPORTED AND SECURED WITHOUT EXCESSIVE STRESS. NO WIRING SHALL BE PERMITTED TO TOUCH THE ROOF SURFACE.
6. PV SOURCE CIRCUIT CONDUCTORS EXPOSED BETWEEN ARRAYS SHALL BE SECURED ON BOTH SIDES, AND BE PROTECTED FROM PHYSICAL DAMAGE AND ABRASION, INCLUDING FROM EDGES OF RACKING, CHANNEL EDGES, WIRE TRAYS, ETC.
7. ANY CABLE TIES USED SHALL BE HEAT STABILIZED (-40°C TO 105°C), UV STABILIZED AND OUTDOOR RATED, SUITABLE AND DURABLE FOR THE ENVIRONMENT AND LIFE OF THE PV SYSTEM.
8. WHERE EXPOSED TO SUNLIGHT, CONDUCTORS SHALL BE LISTED AND MARKED AS SUNLIGHT RESISTANT.
9. ALL EQUIPMENT GROUND CONDUCTORS SMALLER THAN AWG #6 SHALL BE PROTECTED FROM PHYSICAL DAMAGE BY AN IDENTIFIED RACEWAY OR CABLE ARMOR UNLESS INSTALLED WITHIN THE HOLLOW SPACES OF THE FRAMING MEMBERS OF BUILDINGS OR STRUCTURES AND WHERE NOT SUBJECT TO PHYSICAL DAMAGE.

SITE/ARRAY PLAN LEGEND

- = CONDUIT ROUTES
- = CONDUIT ROUTES (UGND OR INDOORS)
- = PV MODULE
- = PV EQUIPMENT
- = RAFTER/TRUSS
- = STANDING SEAM
- = VENT
- = CHIMNEY
- = SKYLIGHT
- = HVAC UNIT
- = ROOF HATCH
- = PV ATTACHMENT FLASHING
- = RACKING RAIL
- = SETBACKS/PATHWAYS
- = SWINGING DOOR
- = TREE/BUSH

ELECTRICAL LEGEND

- = CIRCUIT CONDUCTORS
- = EQUIPMENT GROUNDING CONDUCTORS
- = TERMINAL BLOCK
- = FUSE
- = CIRCUIT BREAKER
- = THROW SWITCH (KNIFE-BLADE)
- = RECLOSING CIRCUIT BREAKER
- = RECLOSING DISCONNECT/RELAY
- = GROUNDING ELECTRODE SYSTEM
- = PV MODULE
- = INVERTER
- = MICROINVERTER
- = POWER OPTIMIZER
- = METER/MONITORING DEVICE
- = TRANSFORMER
- = GENERATOR
- = TRANSFER SWITCH
- = BATTERY
- = CURRENT TRANSFORMER (CT)

ELECTRICAL LEGEND - DC

- = POSITIVE TERMINAL (PHASED RED)
- = NEGATIVE TERMINAL (PHASED BLACK)
- G = GROUND TERMINAL (PHASED GREEN)

ELEC. LEGEND - 208 VAC

- L1 = LINE 1 TERMINAL (PHASED BLACK)
- L2 = LINE 2 TERMINAL (PHASED RED)
- L3 = LINE 3 TERMINAL (PHASED BLUE)
- N = NEUTRAL TERMINAL (PHASED WHITE)
- G = GROUND TERMINAL (PHASED GREEN)

ELEC. LEGEND - 480 VAC

- L1 = LINE 1 TERMINAL (PHASED BROWN)
- L2 = LINE 2 TERMINAL (PHASED ORANGE)
- L3 = LINE 3 TERMINAL (PHASED YELLOW)
- N = NEUTRAL TERMINAL (PHASED WHITE)
- G = GROUND TERMINAL (PHASED GREEN)

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/1 1/2024	A

Sheet Title:
PROJECT NOTES

Sheet Number:
T1.1

Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:
RD

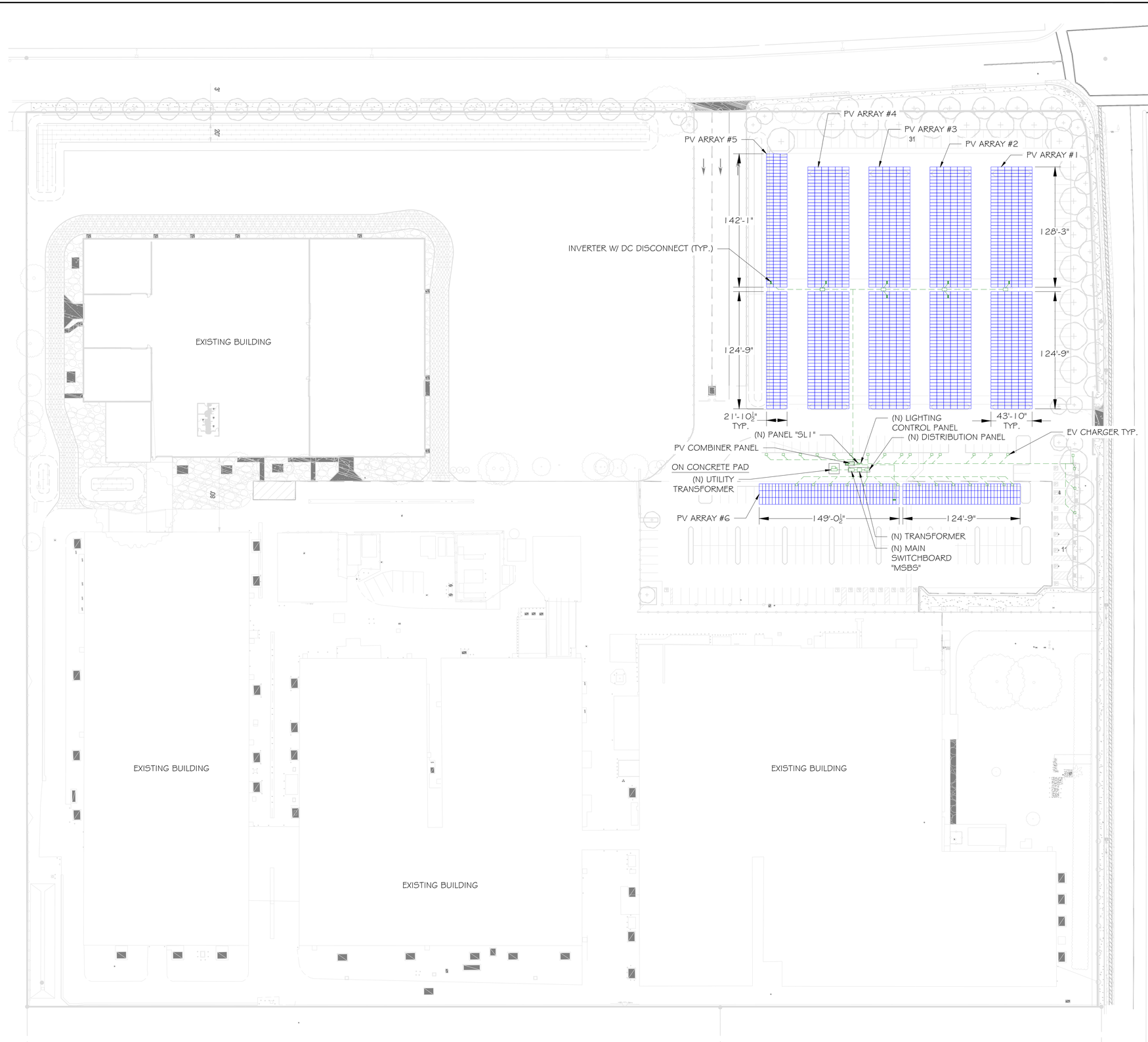
SYMBOL LEGEND		
SYMBOL	NAME	DESCRIPTION
	PV MODULE	HANWHA Q CELLS Q.PEAK DUO XL-G10.3-BFG-485

NOTE:
SITE DIMENSIONS DERIVED FROM AS-BUILT STRUCTURAL OR ARCHITECTURAL DRAWINGS

PV SYSTEM SUMMARY TABLE					
Array ID	Inverter ID	Mod Qty.	kW size	Tilt	Azimuth
1.A	Inv #1	222	107.67	10°	253°
1.B	Inv #1 & 2	216	104.76	10°	253°
2.A	Inv #3	222	107.67	10°	253°
2.B	Inv #2 & 3	216	104.76	10°	253°
3.A	Inv #4	222	107.67	10°	253°
3.B	Inv #4 & 5	216	104.76	10°	253°
4.A	Inv #6	222	107.67	10°	253°
4.B	Inv #5 & 6	216	104.76	10°	253°
5.A	Inv #7	123	59.66	10°	253°
5.B	Inv #7	108	52.38	10°	253°
6.A	Inv #8	129	62.57	10°	163°
6.B	Inv #8	108	52.38	10°	163°
Totals:		2220	1076.7		

SYSTEM SUMMARY:
(2220) Q.PEAK DUO XL-G10.3/BFG 485
(8) SolarEdge SE120KUS (480V)
(1110) SolarEdge P1100
1076.7 kWstc, 960 kW AC

CANOPY COVERAGE TABLE		
Canopy ID	Module Qty.	Canopy Sq Ft
1.A	222	5525.21 ft²
1.B	216	5375.88 ft²
2.A	222	5525.21 ft²
2.B	216	5375.88 ft²
3.A	222	5525.21 ft²
3.B	216	5375.88 ft²
4.A	222	5525.21 ft²
4.B	216	5375.88 ft²
5.A	123	3061.27 ft²
5.B	108	2687.94 ft²
6.A	129	3210.60 ft²
6.B	108	2687.94 ft²



SITE PLAN
SCALE: 1" = 50'

1 — 25 ft — 50 ft — 100 ft

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS		
DESCRIPTION	DATE	REV
PERMIT SET	11/11/2024	A

Sheet Title:
SITE PLAN

Sheet Number:
A1.0

Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:
RD

GENERAL NOTES:

1. GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS SHOWN ON THE PLANS, PRIOR TO COMMENCING WORK.
2. COORDINATE STRUCTURAL DETAILS & DIMENSIONS WITH RELATED REQUIREMENTS ON OTHER DRAWINGS.
3. THE ARCHITECT WILL INTERPRET THE INTENT OF THE DOCUMENTS IN CASE OF A POSSIBLE CONFLICT OR DISCREPANCY BETWEEN STRUCTURAL AND OTHER DISCIPLINES.
4. DETAILS NOTED AS "TYPICAL" OR "TYP" SHALL APPLY IN ALL CASES WHETHER OR NOT SPECIFICALLY REFERENCED.
5. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE 2019 EDITION OF THE CALIFORNIA BUILDING CODE (CBC).
6. FOUNDATION DESIGN IS BASED UPON MINIMUM REQUIREMENTS OF THE CBC:

   A. ALLOWABLE SOIL BEARING PRESSURE: PAD FOOTING = 1500 PSF

7. MATERIAL REQUIREMENTS:

A. CONCRETE:	F'C = 2500 PSI AT 28 DAYS NO SPECIAL INSPECTION REQUIRED
B. REINFORCING STEEL:	ASTM A615, #4 & SMALLER – GRADE 40, #5 & LARGER – GRADE 60
C. STRUCTURAL STEEL:	ALL STRUCTURAL STEEL SHALL COMPLY WITH ASTM A36, TYP U.N.O., STRUCTURAL TUBES SHALL COMPLY WITH ASTM A500, GRADE B. STRUCTURAL PIPES SHALL COMPLY WITH ASTM A53, GRADE B.
D. MACHINE BOLTS:	ASTM A325
E. ANCHOR BOLTS:	ASTM A307
F. METAL STUDS:	METAL STUD MANUFACTURERS ASSOCIATION ICC ESR 4943
G. ROOF PANELS:	PHOTOVOLTAIC SOLAR PANELS

8. STRUCTURAL DESIGN LOADS:

A. ROOF LOADS:	DEAD LOAD = 4.5 PSF LIVE LOAD = 12 PSF
B. SEISMIC DESIGN:	OCCUPANCY CATEGORY = II SEISMIC IMPORTANCE FACTOR = 1.0 S_{DS} = 0.73 S_1 = 0.284 S_{MS} = 0.58 S_{D1} = 0.32 SEISMIC DESIGN CATEGORY = D SEISMIC FORCE RESISTING SYSTEM = CANTILEVER STEEL COLUMN. DESIGN BASE SHEAR = 0.47W R = 1.5 ANALYSIS PROCEDURE = "EQUIVALENT LATERAL FORCE PROCEDURE"
C. WIND DESIGN:	BASIC WIND SPEED = 100 M.P.H. WIND IMPORTANCE FACTOR = 1.0 WIND EXPOSURE = C INTERNAL PRESSURE COEFFICIENT = ±0.18 DESIGN WIND PRESSURE = 21.20 PSF

FOUNDATION NOTES:

1. ALL CONCRETE SHALL HAVE 2500 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS. NO SPECIAL INSPECTION REQUIRED.
2. ALL REINFORCING STEEL SHALL COMPLY WITH MATERIAL REQUIREMENTS NOTED ABOVE. PLACING OF REINFORCING STEEL SHALL COMPLY WITH CHAPTER 19 OF THE CALIFORNIA BUILDING CODE.

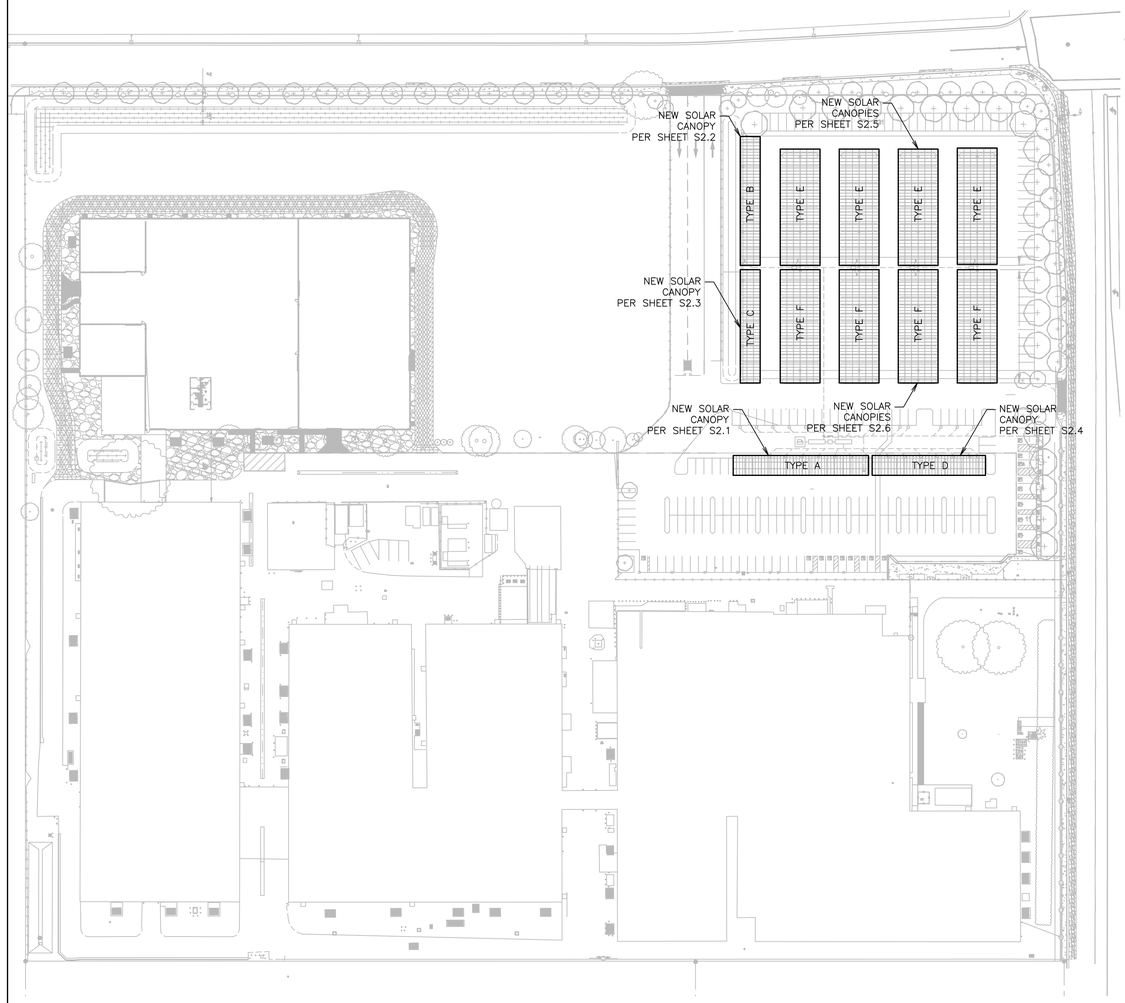
STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH "THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (AISC LATEST EDITION)
2. ALL STRUCTURAL STEEL SHAPES AND PLATES SHALL CONFORM TO ASTM A36, WITH A MINIMUM YIELD STRESS OF 36 KSI.
3. ALL STEEL PIPE SHALL CONFORM TO ASTM A53, GRADE B, WITH A MINIUM YIELD STRENGTH OF 35 KSI.
4. ALL ANCHOR BOLTS AND BOLTS SHALL CONFORM TO ASTM A307, GRADE A, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
5. ALL WELDING OF STRUCTURAL STEEL SHALL BE PERFORMED WITH E70XX ELECTRODES CONFORMING TO AWS D1.1 (LATEST EDITION)
6. ALL WELDERS SHALL BE CERTIFIED BY THE BUILDING DEPARTMENT FOR WELDING OF STRUCTURAL STEEL, OR REINFORCING STEEL, AS APPLICABLE BY AWS STANDARDS.
7. ALL FIELD WELDING & ALL MULTI–PASS WELDS SHALL HAVE CONTINUOUS INSPECTION.
8. ALL STEEL SURFACE ENCASED IN CONCRETE SHALL BE LEFT UNPAINTED.
9. ALL STEEL TUBING SHALL CONFORM TO ASTM A 500, GRADE B, WITH A MINIMUM YIELD STRENGTH OF 46 KSI
10. ALL BOLTS AND THREADED RODS SHALL CONFORM TO ASTM A 307, GRADE A, UNLESS NOTED OTHERWISE. ALL THREADED RODS SHALL BE ZINC–PLATED.
11. ALL STEEL SHALL BE PRIMED AND PAINTED, EXCEPT STEEL SURFACES ENCASED IN CONCRETE SHALL BE LEFT UNPAINTED.
12. VERIFY ALL DIMENSIONS & CONDITIONS AT THE SITE PRIOR TO FABRICATION OF STEEL.

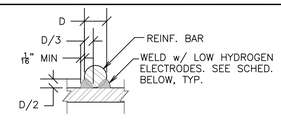
SPECIAL INSPECTIONS

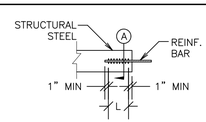
1. SPECIAL INSPECTIONS AND SUBSEQUENT REPORTS SHALL BE REINFORCED IN CONFORMANCE WITH SECTION 1704 OF THE 2016 CBC AT THE OWNERS EXPENSE.
2. ALL SPECIAL INSPECTIONS SHALL BE MADE BY AN INDEPENDENT INSPECTION AGENCY SUBJECT TO APPROVAL BY THE BUILDING DEPARTMENT, AND SHALL BE PAID BY THE OWNER.
3. THE FOLLOWING WORK SHALL BE PERFORMED UNDER CONTINUOUS DEPUTY INSPECTION IN THE PRESENCE OF THE OWNER'S SPECIAL INSPECTOR.
   A. PLACEMENT OF CONCRETE WITH f'c = 3,000 PSI & GREATER
   B. INSTALLATION OF EPOXY GROUTED DOWELS
   C. FIELD WELDING OF STRUCTURAL STEEL.
4. SPECIAL INSPECTION & PROFESSIONAL OBSERVATION REPORTS SHALL BE SUBMITTED TO THE OWNER, ENGINEER, AND DEPARTMENT OF BUILDING & SAFETY NO LATER THAN SEVEN (7) WORKING DAYS FROM THE DATE OF INSPECTION/OBSERVATION.

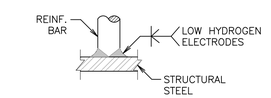
GENERAL NOTES



SITE PLAN (FOR REFERENCE ONLY) 12







BOLT SIZE	"L" WELD LENGTH EA. SIDE OF BAR
#4	3"
#5	3–1/2"
#6	4"
#7	4–1/2"

WELDING OF REINFORCING STEEL:
FIELD WELDING OF REINFORCING SHALL BE PERFORMED BY WELDERS SPECIFICALLY CERTIFIED FOR REINFORCING STEEL. PRIOR TO WELDING, THE "CARBON EQUIVALENT" (CE) OF STEEL SHALL BE DETERMINED. REINFORCING STEEL WHOSE "CE" CANNOT BE IDENTIFIED OR WHOSE "CE" EXCEEDS 0.75% SHALL NOT BE WELDED. EXCEPT FOR REINFORCING STEEL CONFORMING TO ASTM–706, REINFORCING STEEL SHALL NOT BE PRE–HEATED. IN ADDITION, STEEL WITH "CE" BETWEEN 0.66% AND 0.75% SHALL BE WELDED ONLY WHERE PRIOR QUALIFICATION TESTS VERIFY ACCEPTABLE WELDABILITY.

TYPICAL DETAIL OF REINFORCEMENT WELDING 16

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

GENERAL NOTES & DETAILS

FOR CONSTRUCTION

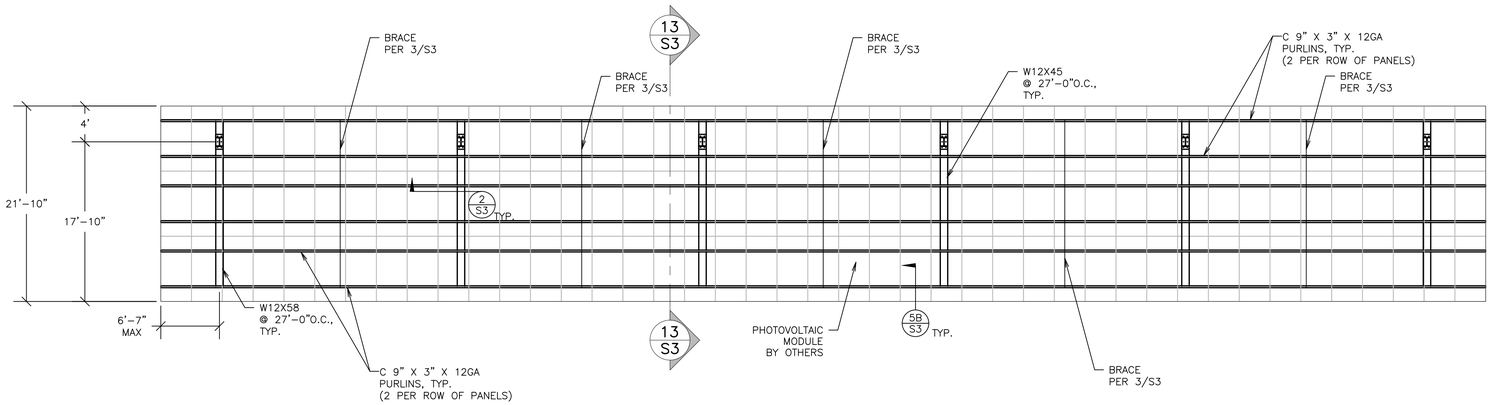
Revision	Description	Date

☐ Project Number:	23-6717
☐ Project Engineer:	JDL
☐ Checked By:	JRV
☐ Drawn By:	JDL
☐ Scale:	1/4"=1'-0"
☐ Date:	12.5.2022

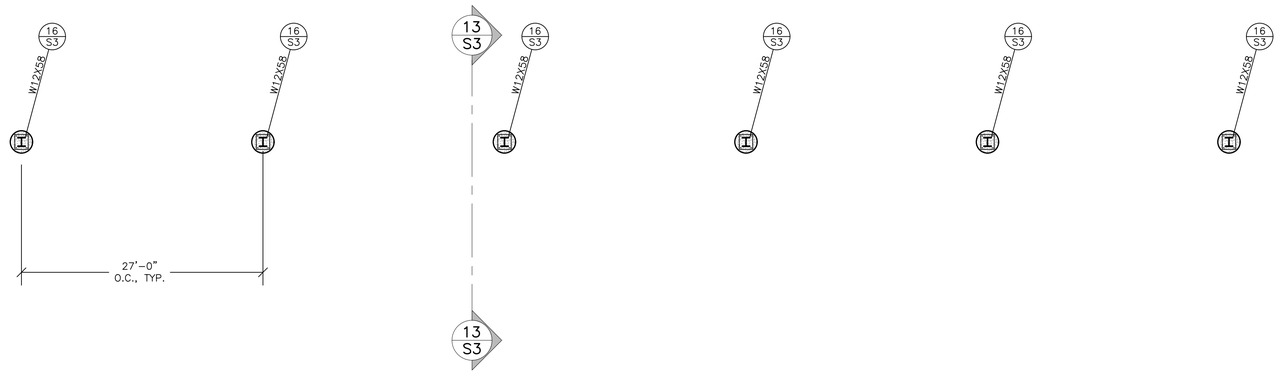
Sheet Number

S1

Sheet __ Of __



SOLAR CANOPY TYPE A FRAMING PLAN — **SCALE: 1/8" = 1'-0"**



SOLAR CANOPY TYPE A FOUNDATION PLAN — **SCALE: 1/8" = 1'-0"**

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

SOLAR CANOPY TYPE A FRAMING AND FOUNDATION PLAN

FOR CONSTRUCTION

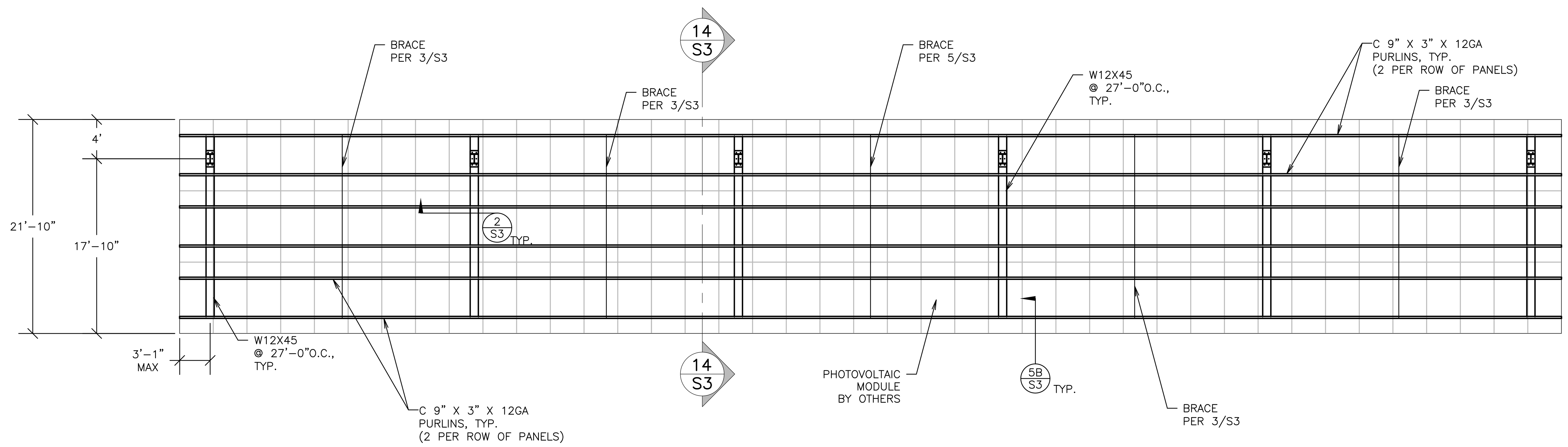
Revision	Description	Date

- Project Number: 23-6717
- Project Engineer: JDL
- Checked By: JRV
- Drawn By: JDL
- Scale: 1/4"=1'-0"
- Date: 12.5.2022

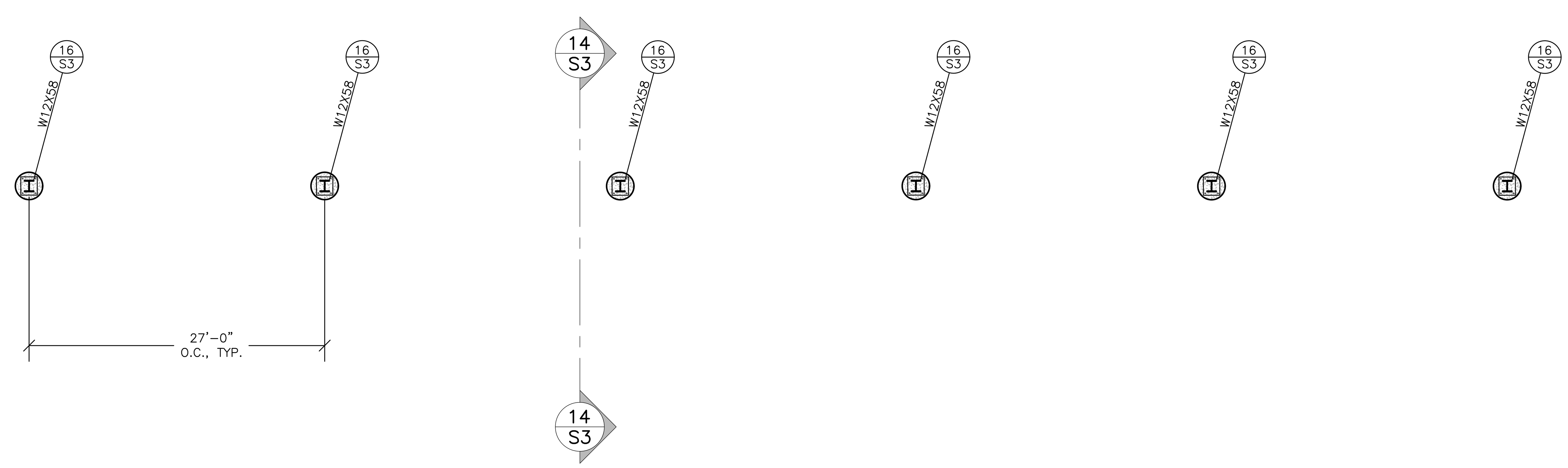
Sheet Number

S2.1

Sheet __ Of __



SOLAR CANOPY TYPE B FRAMING PLAN SCALE: 1/8" = 1'-0"



SOLAR CANOPY TYPE B FOUNDATION PLAN SCALE: 1/8" = 1'-0"

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

SOLAR CANOPY TYPE B FRAMING AND FOUNDATION PLAN

FOR CONSTRUCTION

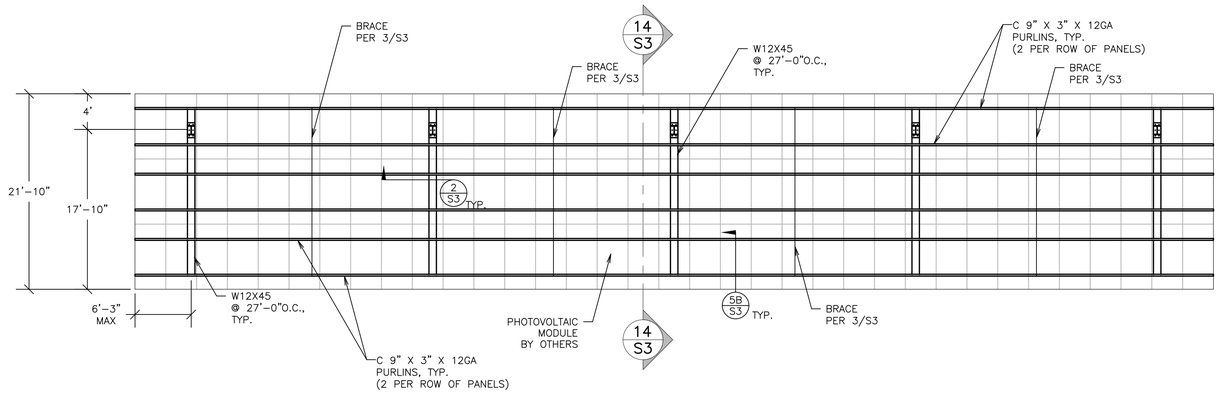
Revision	Description	Date

☐ Project Number:	23-6717
☐ Project Engineer:	JDL
☐ Checked By:	JRV
☐ Drawn By:	JDL
☐ Scale:	1/4"=1'-0"
☐ Date:	12.5.2022

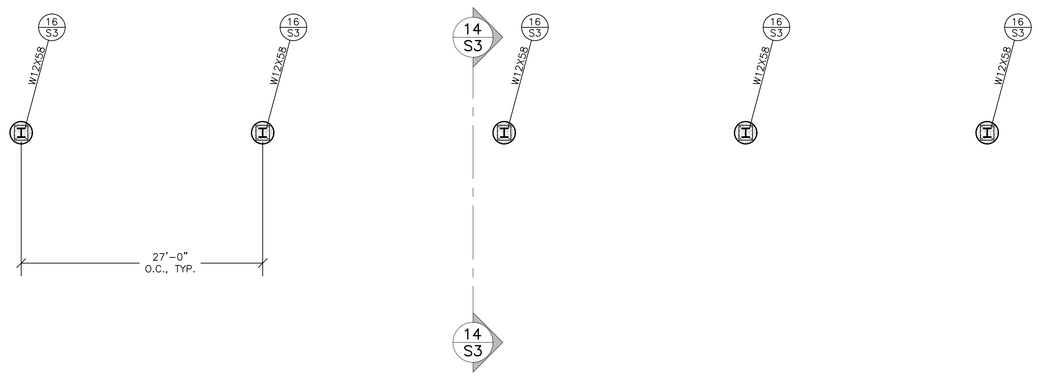
Sheet Number

S2.2

Sheet __ Of __



SOLAR CANOPY TYPE C FRAMING PLAN — **SCALE: 1/8" = 1'-0"**



SOLAR CANOPY TYPE C FOUNDATION PLAN — **SCALE: 1/8" = 1'-0"**

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

SOLAR CANOPY TYPE C FRAMING AND FOUNDATION PLAN

FOR CONSTRUCTION

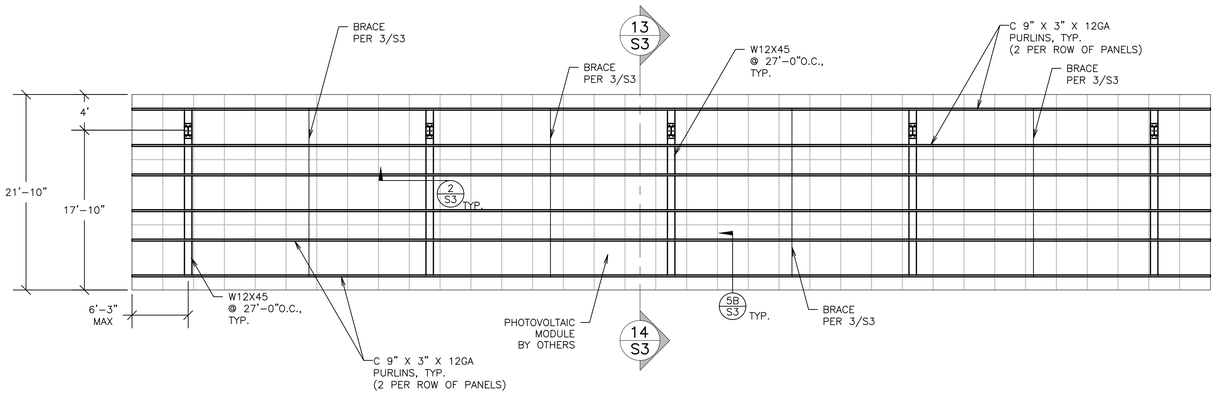
Revision	Description	Date

☐ Project Number:	23-6717
☐ Project Engineer:	JDL
☐ Checked By:	JRV
☐ Drawn By:	JDL
☐ Scale:	1/4"=1'-0"
☐ Date:	12.5.2022

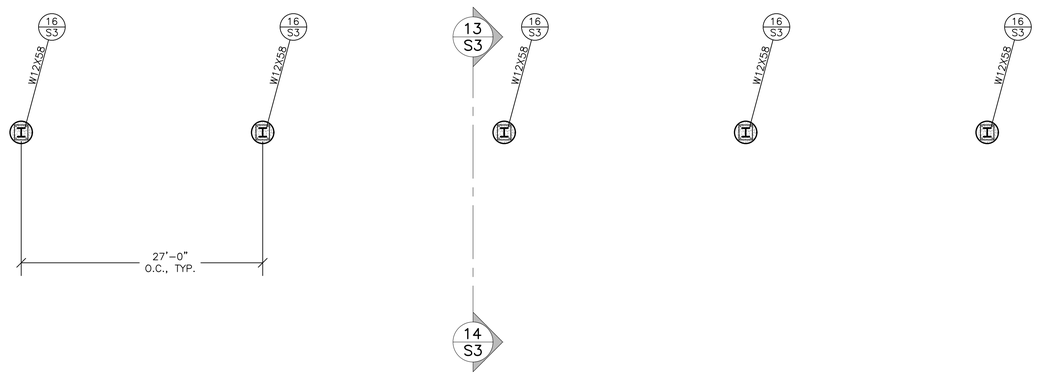
Sheet Number

S2.3

Sheet __ Of __



SOLAR CANOPY TYPE D FRAMING PLAN — **SCALE: 1/8" = 1'-0"**



SOLAR CANOPY TYPE D FOUNDATION PLAN — **SCALE: 1/8" = 1'-0"**

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

SOLAR CANOPY TYPE D FRAMING AND FOUNDATION PLAN

FOR CONSTRUCTION

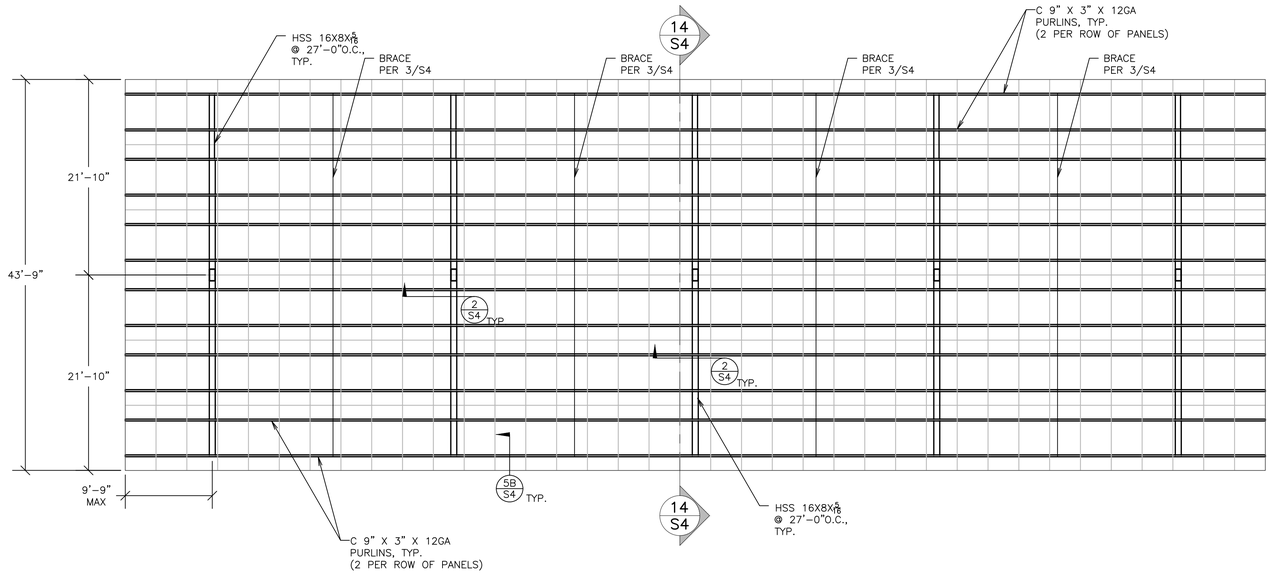
Revision	Description	Date

- Project Number: 23-6717
- Project Engineer: JDL
- Checked By: JRV
- Drawn By: JDL
- Scale: 1/4"=1'-0"
- Date: 12.5.2022

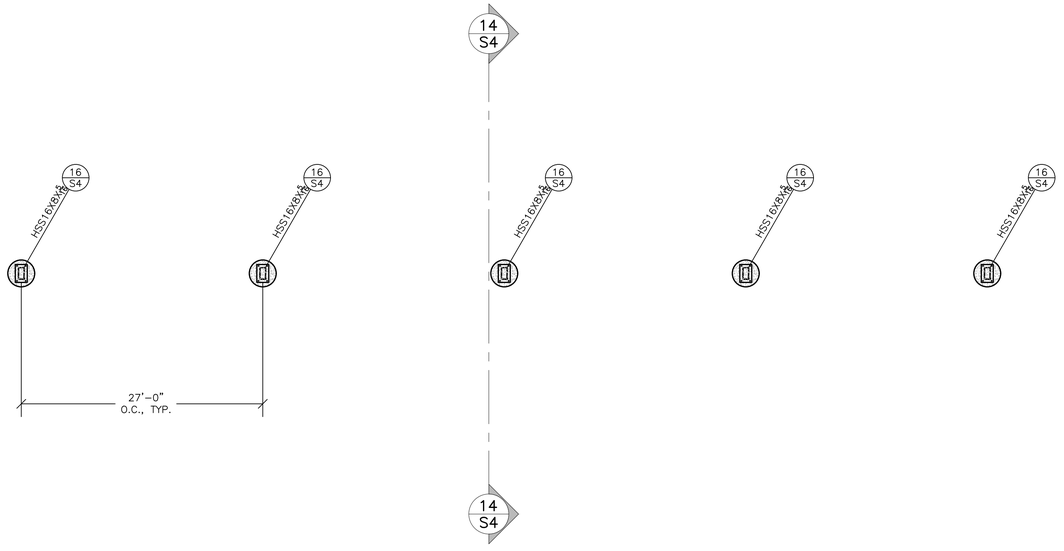
Sheet Number

S2.4

Sheet __ Of __



SOLAR CANOPY TYPE E FRAMING PLAN — **SCALE: 1/8" = 1'-0"**



SOLAR CANOPY TYPE E FOUNDATION PLAN — **SCALE: 1/8" = 1'-0"**

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

SOLAR CANOPY TYPE E FRAMING AND FOUNDATION PLAN

FOR CONSTRUCTION

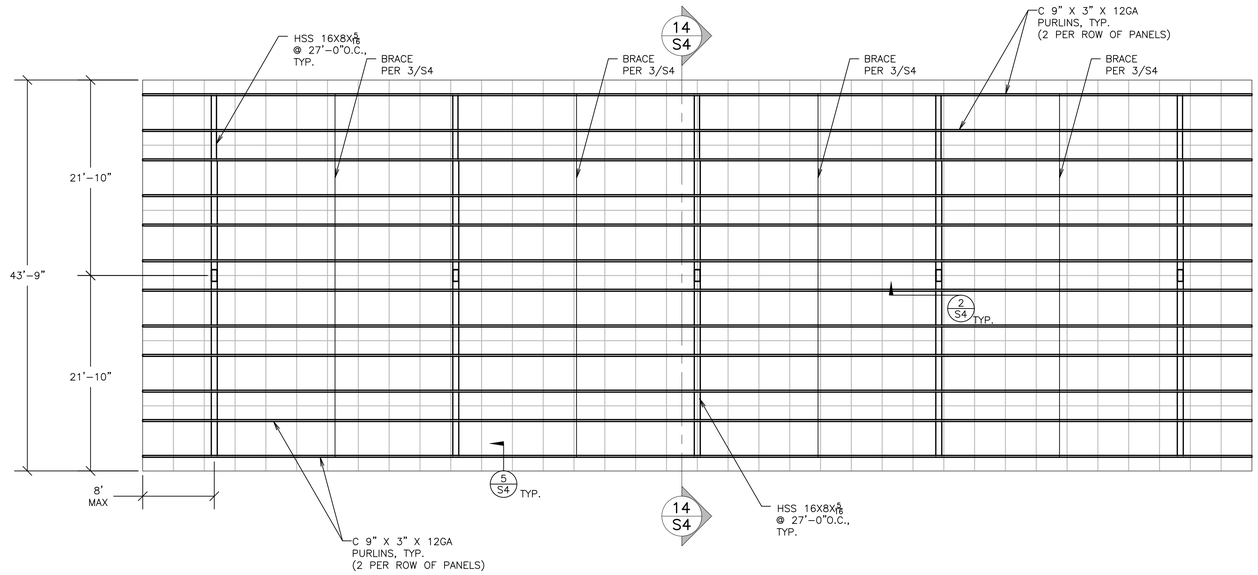
Revision	Description	Date

- Project Number: 23-6717
- Project Engineer: JDL
- Checked By: JRV
- Drawn By: JDL
- Scale: 1/4"=1'-0"
- Date: 12.5.2022

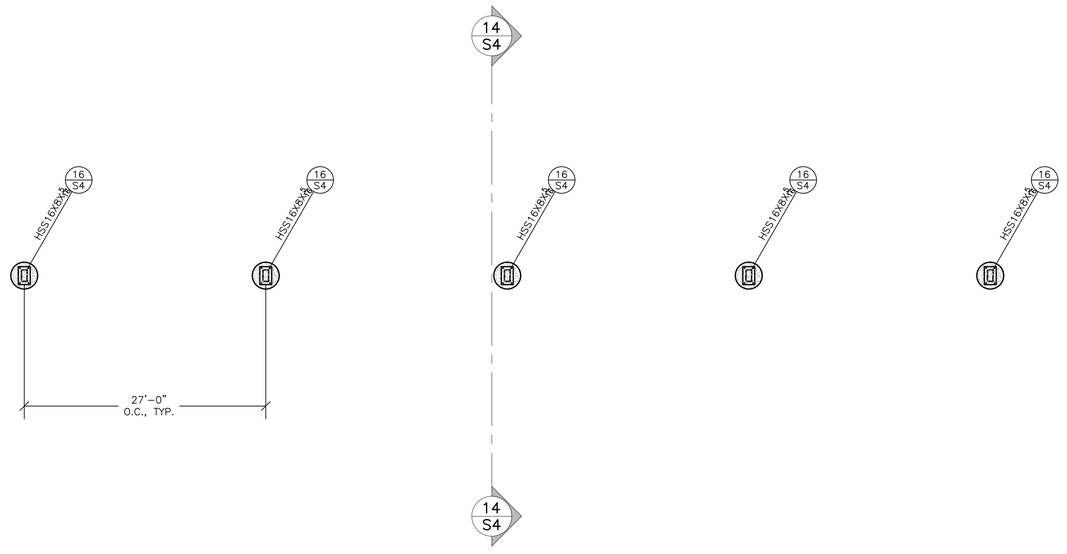
Sheet Number

S2.5

Sheet __ Of __



SOLAR CANOPY TYPE E FRAMING PLAN — **SCALE: 1/8" = 1'-0"**



SOLAR CANOPY TYPE E FOUNDATION PLAN — **SCALE: 1/8" = 1'-0"**

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

SOLAR CANOPY TYPE F FRAMING AND FOUNDATION PLAN

FOR CONSTRUCTION

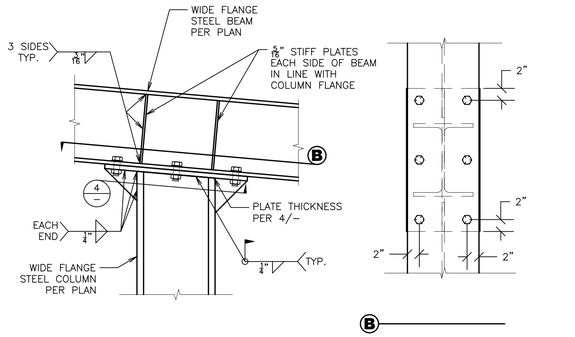
Revision	Description	Date

- Project Number: 23-6717
- Project Engineer: JDL
- Checked By: JRV
- Drawn By: JDL
- Scale: 1/4"=1'-0"
- Date: 12.5.2022

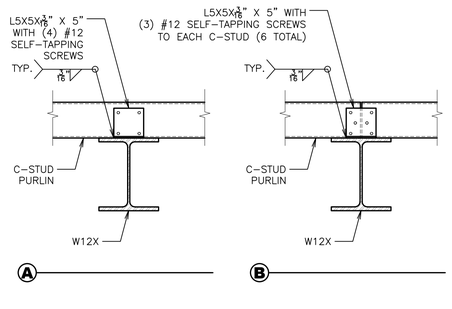
Sheet Number

S2.6

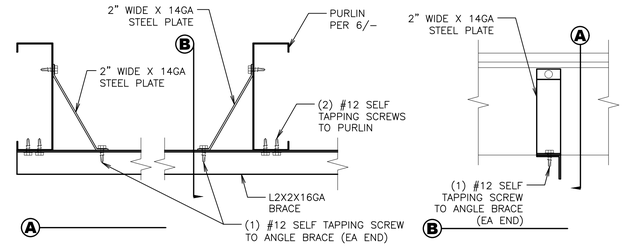
Sheet __ Of __



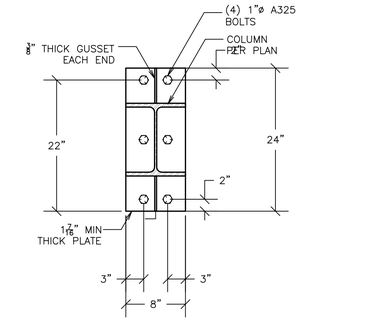
DETAIL OF UPPER CONNECTION | 1



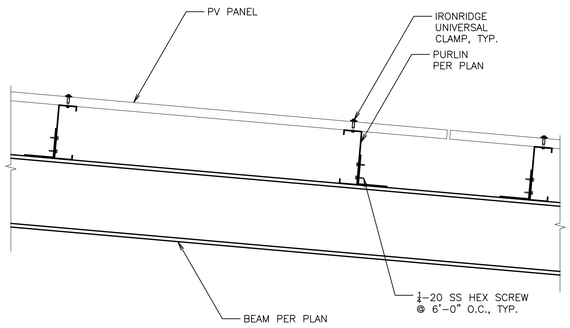
PURLIN TO WIDE FLANGE STEEL ATTACHMENT | 2



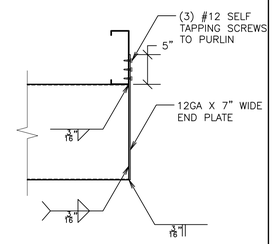
ANGLE BRACE DETAIL | 3



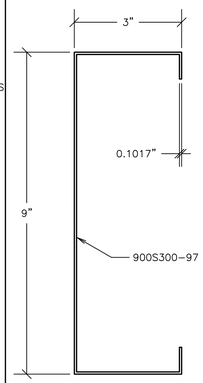
TOP PLATE CONNECTION DETAIL | 4



A INTERIOR PURLIN

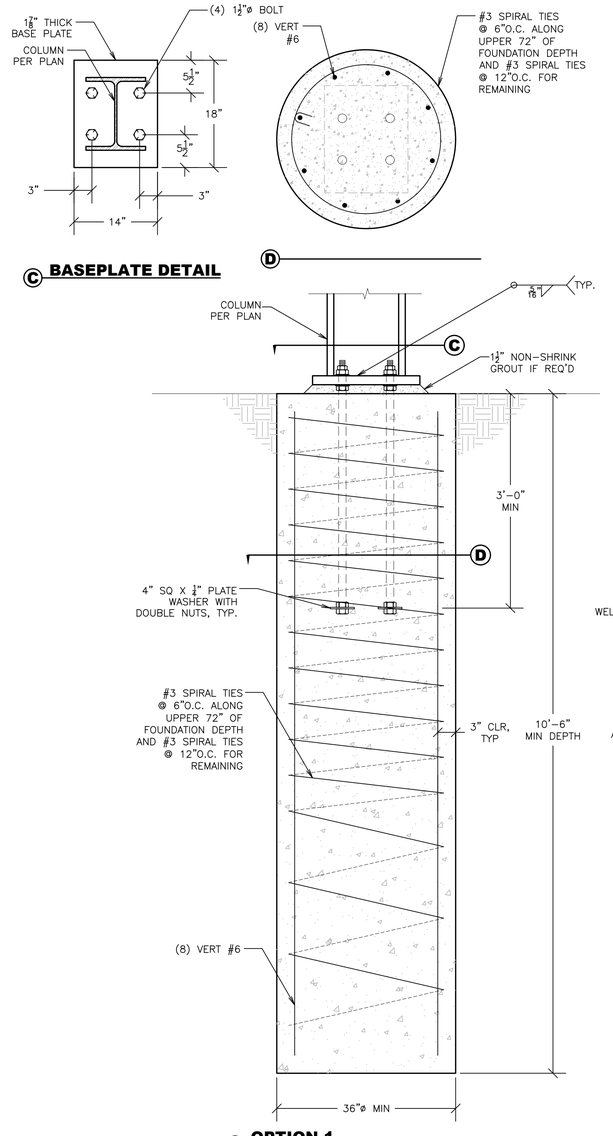


B EXTERIOR PURLIN

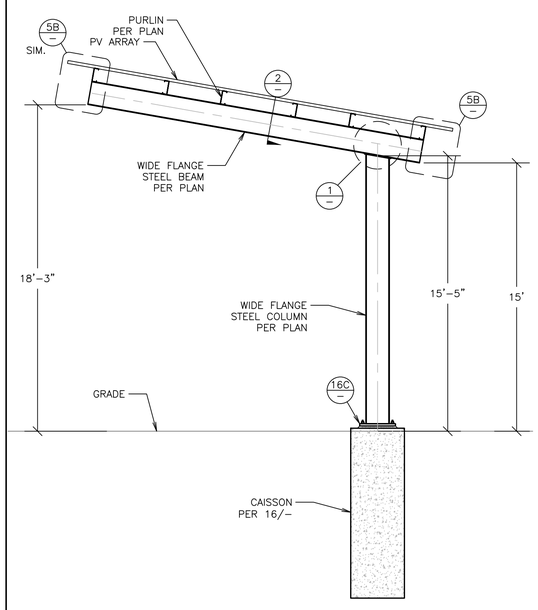


PV PANEL ATTACHMENT DETAIL | 5

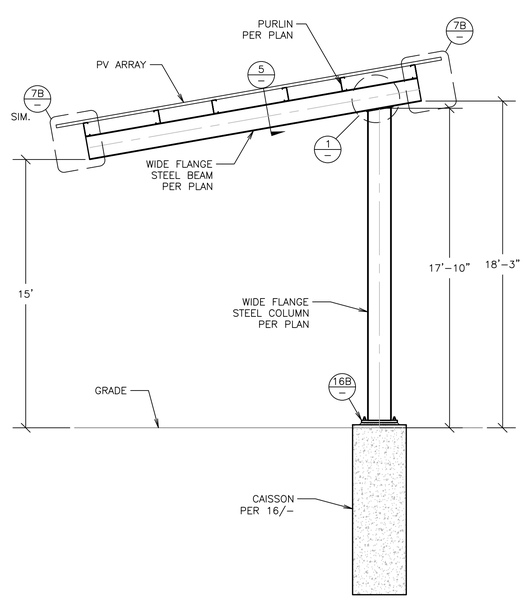
PURLIN DIMS | 6



TYPICAL FOOTING DETAIL | 16



CARPORT ELEVATION | 14



CARPORT ELEVATION | 14

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

FRAMING AND FOUNDATION DETAILS

FOR CONSTRUCTION

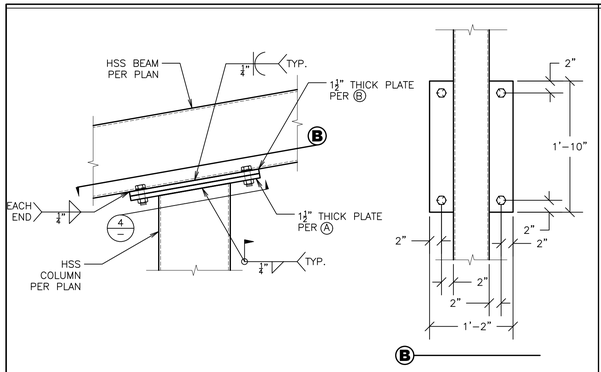
Revision	Description	Date

Project Number:	23-6717
Project Engineer:	JDL
Checked By:	JRV
Drawn By:	JDL
Scale:	1/4"=1'-0"
Date:	12.5.2022

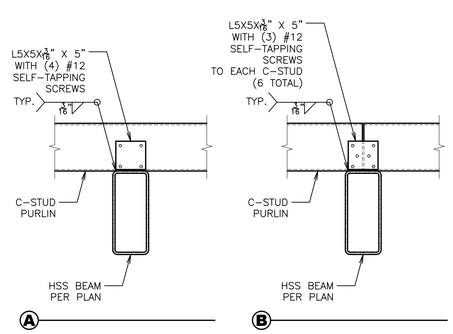
Sheet Number

S3

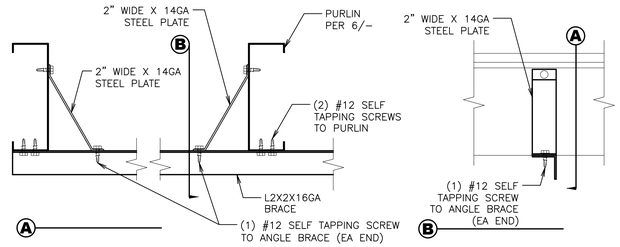
Sheet __ Of __



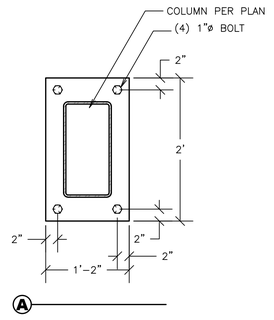
DETAIL OF UPPER CONNECTION | 1



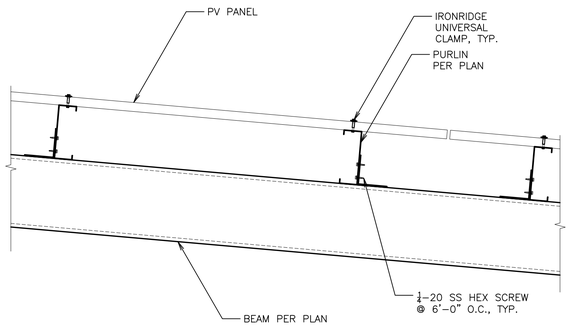
PURLIN TO WIDE FLANGE STEEL ATTACHMENT | 2



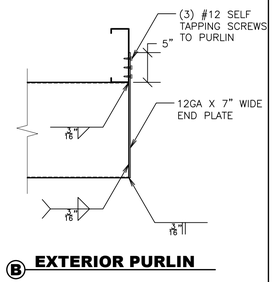
ANGLE BRACE DETAIL | 3



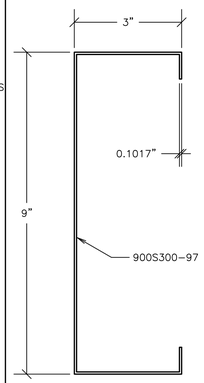
TOP PLATE CONNECTION DETAIL | 4



A INTERIOR PURLIN

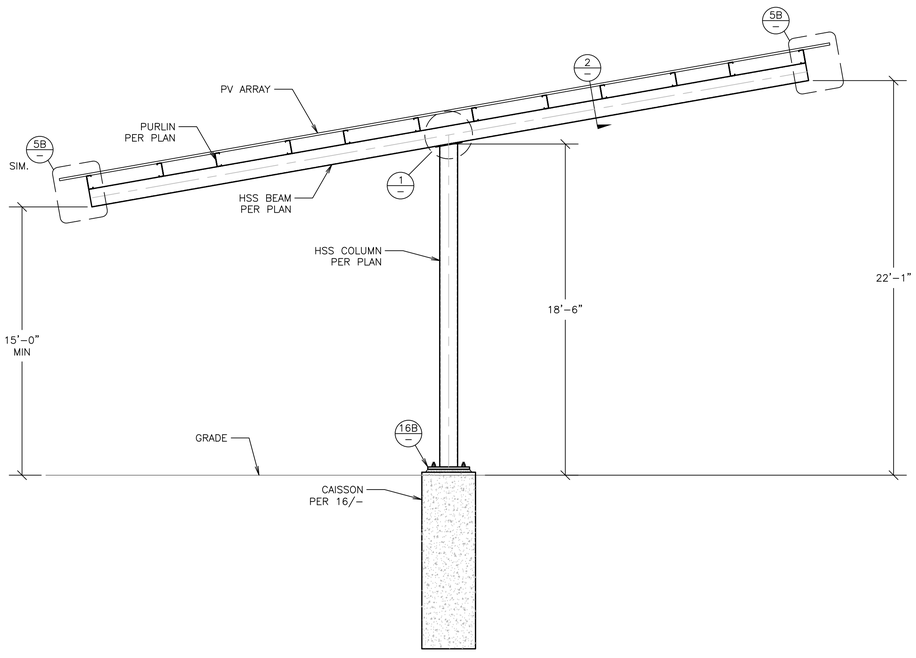


B EXTERIOR PURLIN

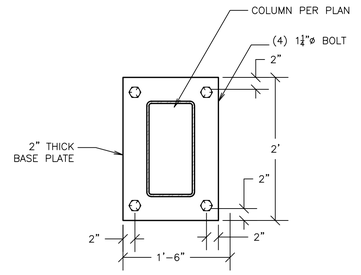


PV PANEL ATTACHMENT DETAIL | 5

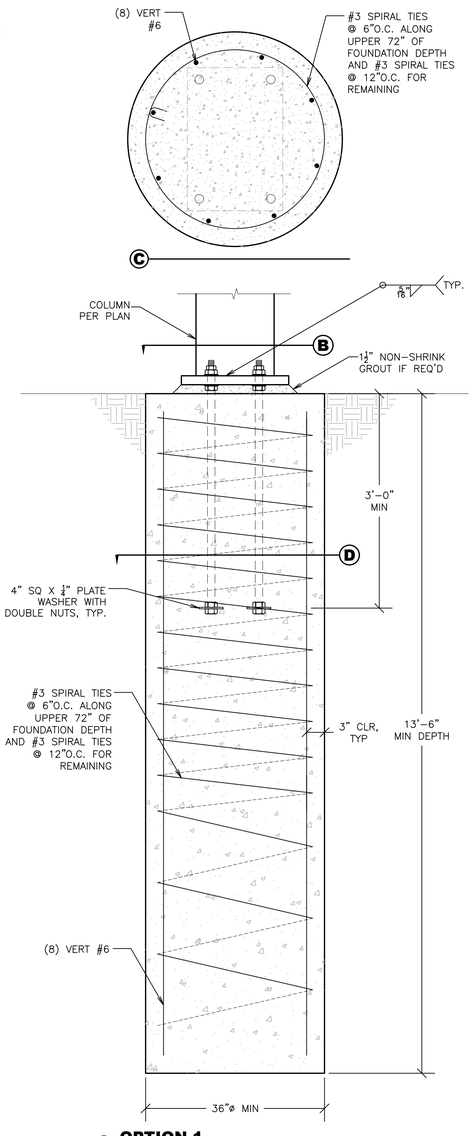
PURLIN DIMS | 6



CARPORT ELEVATION | 14



B BASEPLATE DETAIL



A OPTION 1

TYPICAL FOOTING DETAIL | 16

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/23
STRUCTURAL
STATE OF CALIFORNIA

Dec 14, 2023

Project Name / Address

New Solar Canopy For:
Applied Aerospace
[redacted]

Sheet Title

FRAMING
AND FOUNDATION
DETAILS

FOR CONSTRUCTION

Revision	Description	Date

☐ Project Number:	23-6717
☐ Project Engineer:	JDL
☐ Checked By:	JRV
☐ Drawn By:	JDL
☐ Scale:	1/4"=1'-0"
☐ Date:	12.5.2022

Sheet Number

S4

Sheet __ Of __

GENERAL NOTES:

1. GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS SHOWN ON THE PLANS, PRIOR TO COMMENCING WORK.
2. COORDINATE STRUCTURAL DETAILS & DIMENSIONS WITH RELATED REQUIREMENTS ON OTHER DRAWINGS.
3. THE ARCHITECT WILL INTERPRET THE INTENT OF THE DOCUMENTS IN CASE OF A POSSIBLE CONFLICT OR DISCREPANCY BETWEEN STRUCTURAL AND OTHER DISCIPLINES.
4. DETAILS NOTED AS "TYPICAL" OR "TYP" SHALL APPLY IN ALL CASES WHETHER OR NOT SPECIFICALLY REFERENCED.
5. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE 2022 EDITION OF THE CALIFORNIA BUILDING CODE (CBC).
6. FOUNDATION DESIGN IS BASED UPON GEOTECHNICAL REPORT BY SUNGRID SOLUTIONS DATED AUGUST 25, 2023:
   A. ALLOWABLE SOIL BEARING PRESSURE: 1500 PSF
7. MATERIAL REQUIREMENTS:
   - A. CONCRETE: F'C = 2500 PSI AT 28 DAYS; NO SPECIAL INSPECTION REQUIRED
   - B. REINFORCING STEEL: ASTM A615, #4 & SMALLER – GRADE 40, #5 & LARGER – GRADE 60
   - C. MECH ANCHORS: REFER TO 4/S1, TYPICAL.
8. STRUCTURAL DESIGN LOADS:
   - A. EQUIPMENT LOADS: TRANSFORMER = 5,000 LBS; MAIN SWITCHBOARD = 5,000 LBS; DISTRIBUTION PANEL = 5,000 LBS; PV COMBINER PANEL = 5,000 LBS; DISCONNECT = 1,028 LBS
   - B. SEISMIC DESIGN: OCCUPANCY CATEGORY = II; SEISMIC IMPORTANCE FACTOR = 1.0; S_S = 0.731; S_1 = 0.284; S_{DS} = 0.58; S_{D1} = 0.31; SEISMIC DESIGN CATEGORY = D; F_P = 0.18W; a_P = 2.5 I_P = 1.0; R_P = 6.0; ANALYSIS PROCEDURE = "EQUIVALENT LATERAL FORCE PROCEDURE"

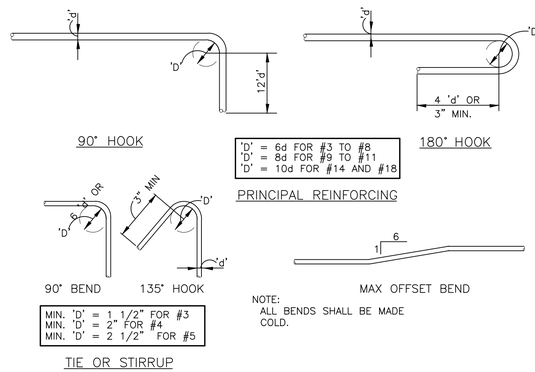
FOUNDATION NOTES:

1. ALL CONCRETE SHALL HAVE 2500 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS. NO SPECIAL INSPECTION REQUIRED.
2. PORTLAND CEMENT SHALL CONFORM TO ASTM C150, TYPE I OR II.
3. AGGREGATE FOR HARDROCK CONCRETE SHALL CONFORM TO ASTM C33 AND BE NON-REACTIVE.
4. CONCRETE COVERAGE OVER REINFORCEMENT, UNLESS NOTED OTHERWISE, SHALL BE AS FOLLOWING.
   - CONCRETE POURED DIRECTLY AGAINST EARTH..... 3"
   - ALL OTHER LOCATIONS..... 1½"
5. ALL PRE-INSTALLED ANCHORS SHALL BE FIRMLY HELD IN PLACE BY A TEMPLATE PRIOR TO PLACING CONCRETE. EXACT LOCATION MUST BE COORDINATED BETWEEN CONCRETE AND EQUIPMENT INSTALLER.
6. SOIL ENGINEER SHALL INSPECT FOUNDATION EXCAVATIONS PRIOR TO PLACEMENT OF CONCRETE FOR THE FOUNDATION.
7. ALL REINFORCING STEEL SHALL COMPLY WITH MATERIAL REQUIREMENTS NOTED ABOVE. PLACING OF REINFORCING STEEL SHALL COMPLY WITH CHAPTER 19 OF THE CALIFORNIA BUILDING CODE.
8. NON-SHRINK GROUT, WHERE REQUIRED, SHALL BE NON-METALIC BURKE GROUT, OR EQUAL.

SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS AND SUBSEQUENT REPORTS SHALL BE REINFORCED IN CONFORMANCE WITH SECTION 1704 OF THE 2022 CBC AT THE OWNERS EXPENSE.
2. ALL SPECIAL INSPECTIONS SHALL BE MADE BY AN INDEPENDENT INSPECTION AGENCY SUBJECT TO APPROVAL BY THE BUILDING DEPARTMENT, AND SHALL BE PAID BY THE OWNER.
3. THE FOLLOWING WORK SHALL BE PERFORMED UNDER CONTINUOUS DEPUTY INSPECTION IN THE PRESENCE OF THE OWNER'S SPECIAL INSPECTOR.
   - A. PLACEMENT OF CONCRETE WITH f'c = 3,000 PSI & GREATER
   - B. INSTALLATION OF EPOXY GROUTED DOWELS
4. SPECIAL INSPECTION & PROFESSIONAL OBSERVATION REPORTS SHALL BE SUBMITTED TO THE OWNER, ENGINEER, AND DEPARTMENT OF BUILDING & SAFETY NO LATER THAN SEVEN (7) WORKING DAYS FROM THE DATE OF INSPECTION/OBSERVATION.

GENERAL NOTES



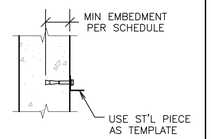
TYPICAL REINFORCING BENDS AND HOOKS | **3**

DRILLED EXPANSION TYPE ANCHOR BOLTS SHALL BE USED ONLY WHERE DETAILED OR FOR ATTACHMENT OF MECH. ELEC. OR MISC. ACCESSORIES OR EQUIPMENT TO THE STRUCTURE.

ACCEPTABLE WEDGE ANCHORS:
1. HILI-KWIK-BOLT-TZ (ICC ESR-1917, LARR 25701) IN NORMAL WT CONC.
2. ITW RAMSET/REDHEAD TRUBOLT+ (ICC ESR-2427, LARR 2748) IN NORMAL WT CONC.
3. SIMPSON STRONG-BOLT 2 (ICC ESR-3037, LARR 25891) IN NORMAL WT CONC.
4. SIMPSON WEDGE-ALL (ICC ESR 1396, LARR 24682) IN MASONRY ONLY.
5. DEWALT POWER-STUD+SD2 (ESR 2502, LARR 25831) IN NORMAL WT CONC.
6. DEWALT POWER-STUD+SD1 (ESR 2818, LARR 25864) IN CMU

ACCEPTABLE SCREW ANCHORS:
1. SIMPSON TITEN HD SCREW ANCHOR (ICC ESR-2713, LARR 25741) IN NORMAL WT CONC.
2. SIMPSON TITEN HD SCREW ANCHOR (ICC ESR-1056, LARR 25560) IN CMU
3. DEWALT SCREW-BOLT+ (ICC ESR-3889) IN CONCRETE
4. DEWALT SCREW-BOLT+ (ICC ESR-4042) IN CMU

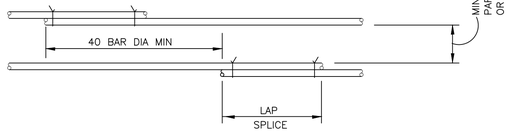
DRILLED BOLT SCHEDULE					
BOLT DIAMETER		3/8"	1/2"	5/8"	3/4"
MIN. EMBEDMENT		3"	4"	4"	5"
TEST	DIRCET-PULL TENSION (FT.LBS)	HARD ROCK	1100	2000	2300	3700
TEST	TORQUE WRENCH (FT.LBS)	HARD ROCK	25	50	80	50



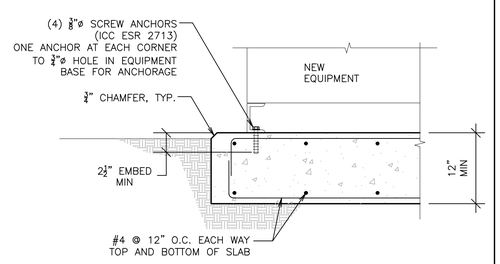
SPECIAL INSPECTION REQUIRED FOR INSTALLATION OF MECHANICAL ANCHORS ONLY WHERE UTILIZED TO RESIST SEISMIC FORCES, TYPICAL.

TYPICAL MECHANICAL ANCHOR DETAIL | **4**

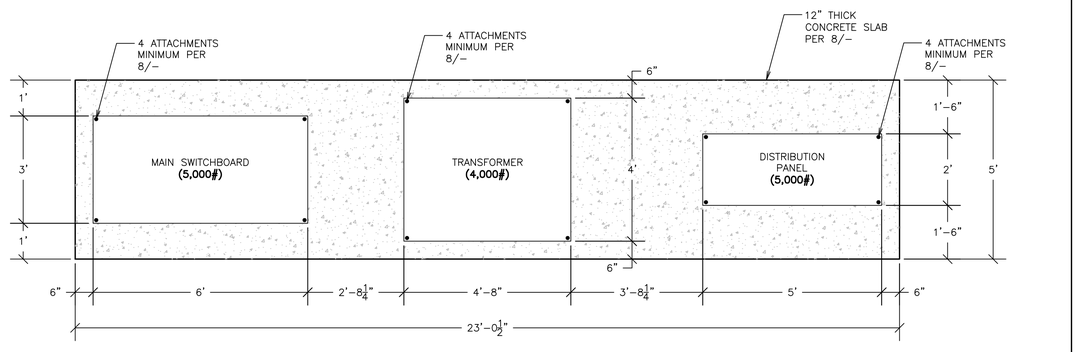
HORIZONTALLY PLACED REINFORCING	CONC. F'C PSI	BAR SIZE 3	4	5	6	7	8	9	10	11
		LAP SPLICE IN INCHES								
	2000	21	23	36	50	69	91	115	145	178
	3000	21	29	36	46	63	82	104	132	163
	4000	21	29	36	43	54	71	90	115	141
	5000	21	29	36	43	50	64	81	103	126
	MASONRY	21	23	36	50	69	91	115	145	178



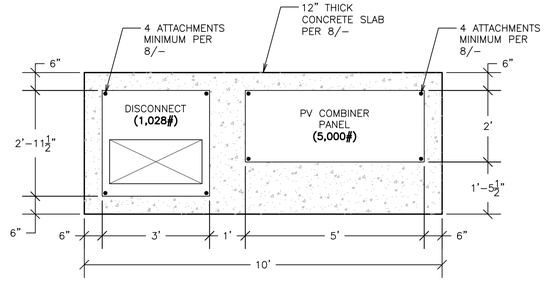
TYPICAL REINFORCING SPLICE DETAIL | **7**



DISCONNECT EQUIPMENT ANCHORAGE | **8**



PAD 1 LAYOUT | **SCALE: 1/2" = 1'-0"**



PAD 2 LAYOUT | **SCALE: 1/2" = 1'-0"**

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103
THOUSAND OAKS, CA 91360
805.496.2100
VinciSE.com

Stamp

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/25
STRUCTURAL
STATE OF CALIFORNIA

Jan 09, 2024

Project Name / Address

New Equipment For:
Applied Aerospace
[redacted]

Sheet Title

EQUIPMENT LAYOUT AND ANCHORAGE DETAIL

FOR CONSTRUCTION

Revision	Description	Date

- Project Number: 23-3457
- Project Engineer: JRV
- Checked By: JRV
- Drawn By: JDL
- Scale: 1/4"=1'-0"
- Date: 01.08.2024

Sheet Number

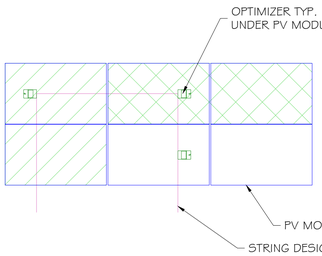
S1

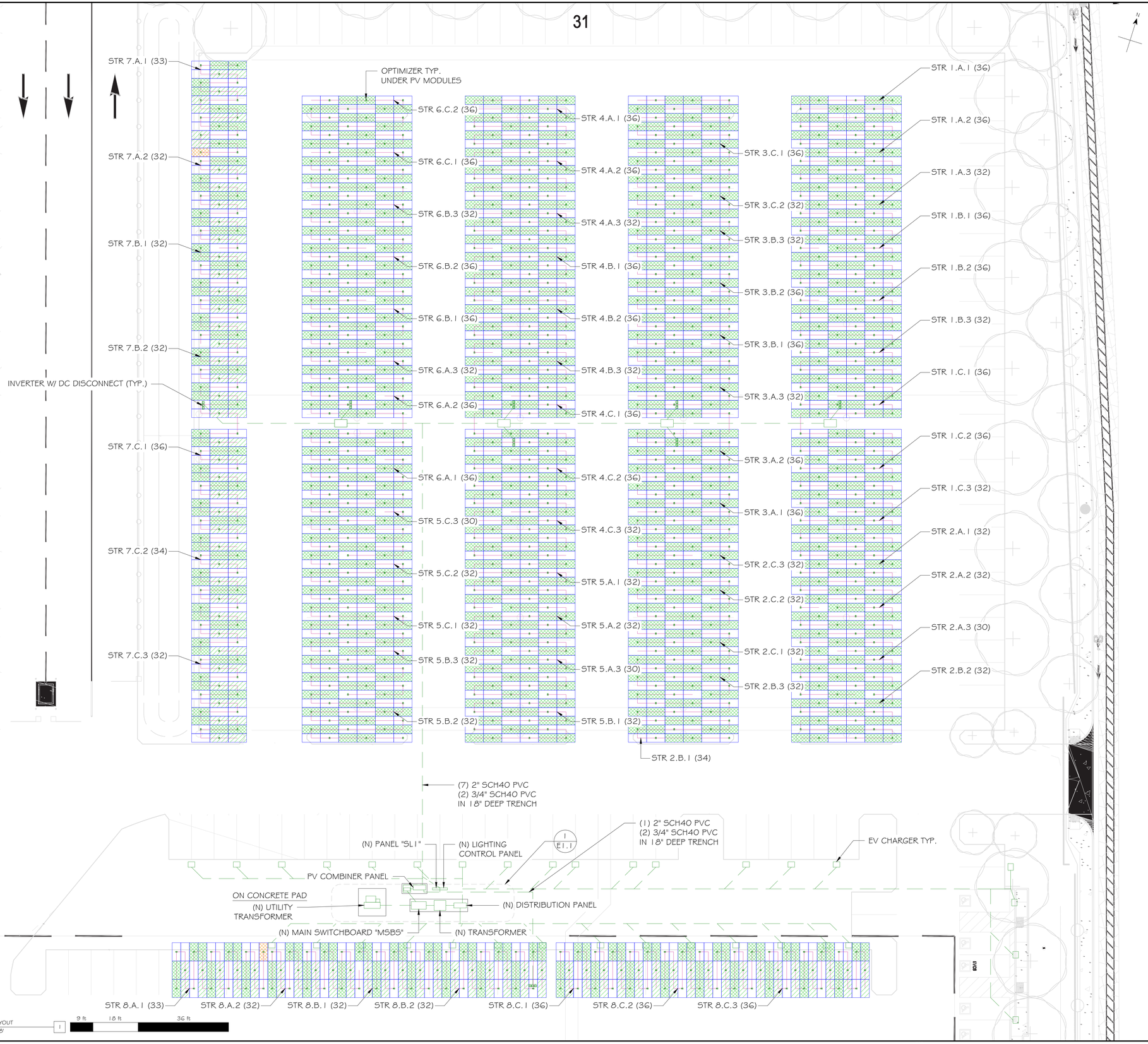
Sheet __ Of __

SYMBOL LEGEND		
SYMBOL	NAME	DESCRIPTION
	PV MODULE	HANWHA Q CELLS Q.PEAK DUO XL-G10.3-BFG-485

STRING LEGEND:
1.A.2 (36)
- 1 — INVERTER ID #
- A — MPPT/UNIT
- 2 — STRING ID #
- (36) — STRING LENGTH

NOTES:
MODULE PAIRS ARE IDENTIFIED BY THE HATCHED AREA ENCLOSING THEM. EACH OPTIMIZER CONNECTS TO (2) MODULES. THE STRING IS IDENTIFIED BY THE LINE CONNECTING THE HATCHED AREAS.





Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS		
DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

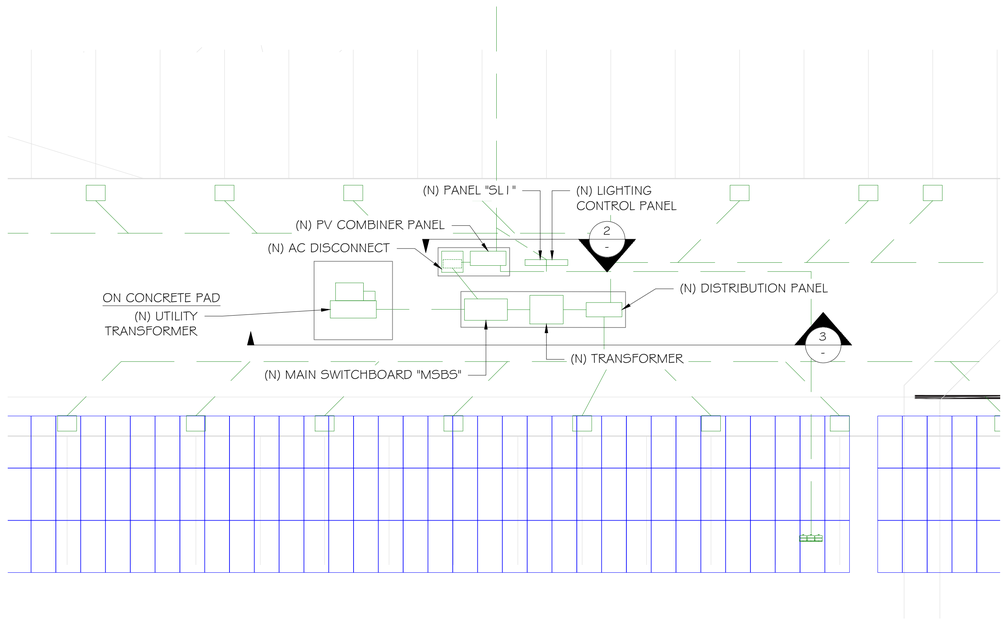
Sheet Title:
ELECTRICAL LAYOUT

Sheet Number:
E1.0

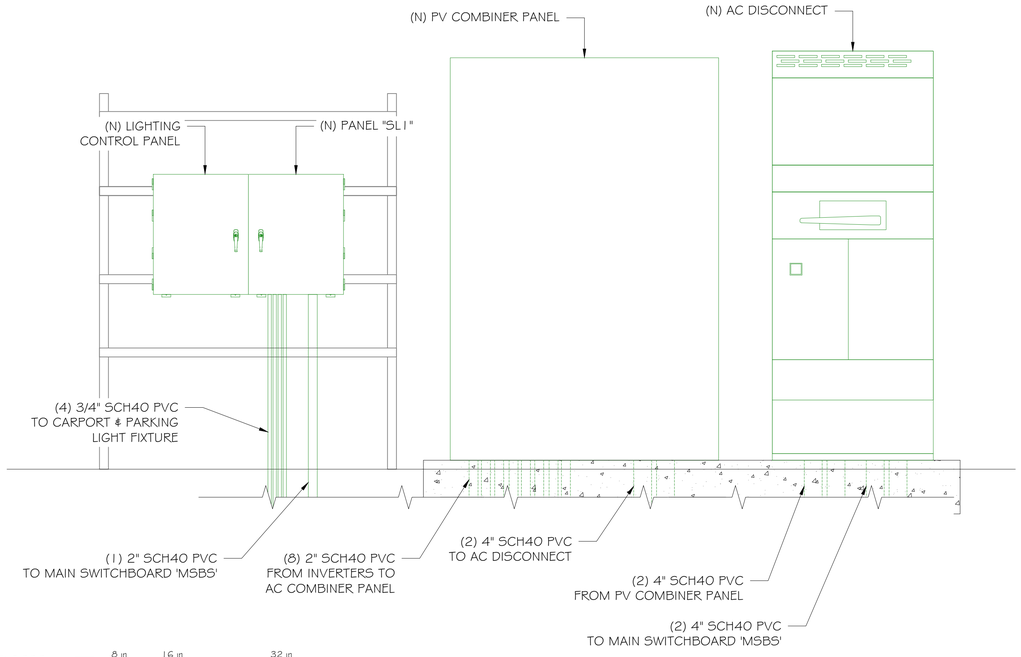
Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

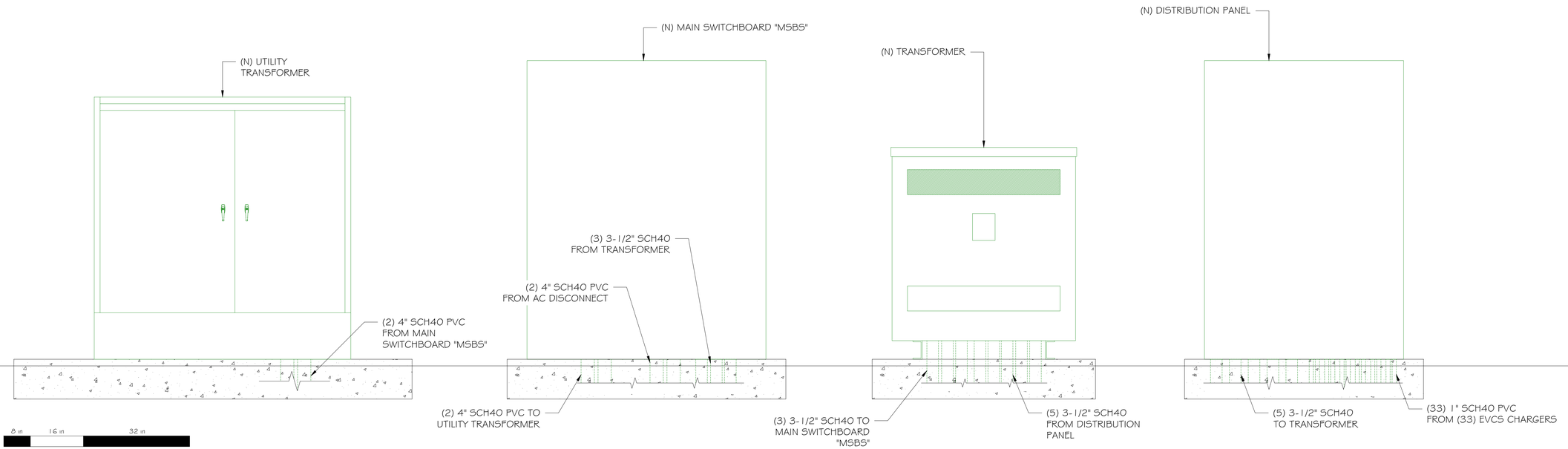
Reviewed & Approved by:
RD



ELECTRICAL EQUIPMENT LAYOUT 1
SCALE: 1" = 10'
5 ft 10 ft 20 ft



ELECTRICAL EQUIPMENT ELEV. 2
SCALE: 1" = 16"
8 in 16 in 32 in



ELECTRICAL EQUIPMENT ELEV. 3
SCALE: 1" = 16"
8 in 16 in 32 in

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

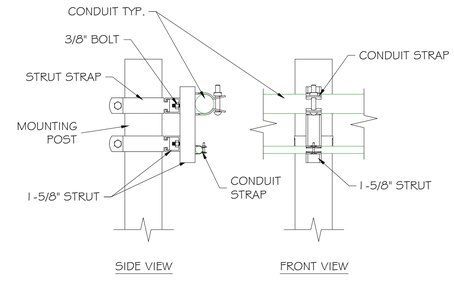
Sheet Title:
ELECTRICAL ELEVATIONS

Sheet Number:
E1.1

Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

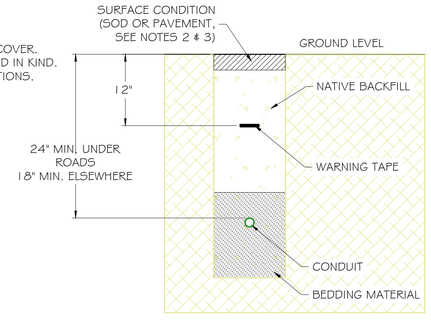
Reviewed & Approved by:
RD



CONDUIT POLE MOUNT
SCALE: NTS
3A

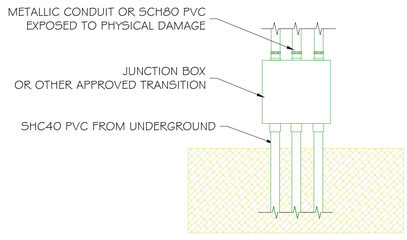
NOTES:
1.) BACKFILL WITH NATIVE MATERIAL IN COMPLIANCE WITH NEC 300.5(F). NATIVE MATERIAL SHALL BE APPROVED BY THE OWNERS REP. PRIOR TO USE. IF NOT ACCEPTABLE, USE FINE GRANULAR MATERIAL FOR BEDDING AND SIDE/TOP COVER.
2.) ASPHALT TO BE SAWCUT PRIOR TO TRENCHING. PAVEMENT SHALL BE REPLACED IN KIND.
3.) UNPAVED SURFACES SHALL BE RESTORED IN KIND TO MATCH EXISTING CONDITIONS.
4.) DETECTABLE WARNING TAPE SHALL BE INSTALLED 12" BELOW GRADE.
5.) REFER TO ELECTRICAL DRAWINGS FOR SIZE AND TYPE OF CONDUIT.
6.) NOTIFY UTILITY COMPANY PRIOR TO DIGGING PER "DIG SAFE" REQUIREMENTS.

811 Know what's below. Call before you dig.

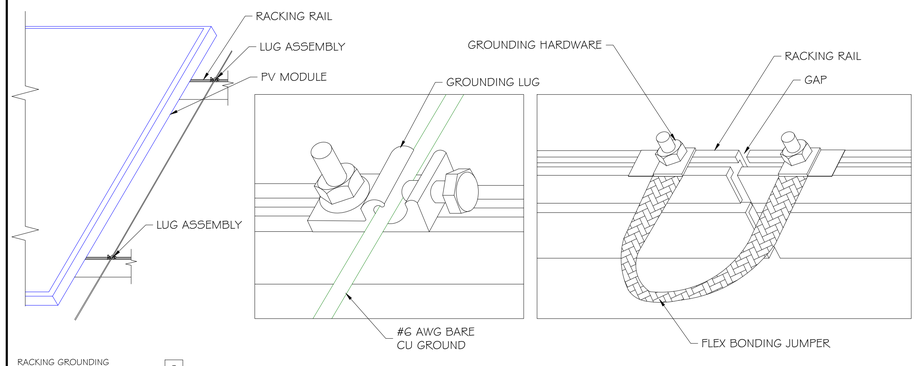


TRENCH CROSS-SECTION
SCALE: NTS
5

NOTES:
1.) CONDUIT SHALL BE INSTALLED WHERE 1000V CONDUCTORS ARE RAN IN AN ACCESSIBLE LOCATION.
2.) WHERE EXPOSED TO PHYSICAL DAMAGE, SCH40 PVC SHALL TRANSITION TO AN APPROVED METALLIC CONDUIT OR SCH80 PVC WITHIN A REASONABLE DISTANCE FROM WHERE THE CONDUIT EXITS THE EARTH.
3.) SCH80 PVC IS PERMITTED WHERE EXPOSED TO PHYSICAL DAMAGE.



PULLBOX TRANSITION
SCALE: NTS
7A



RACKING GROUNDING
SCALE: NTS
9

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/1 1/2024	A

Sheet Title:
CONSTRUCTION DETAILS

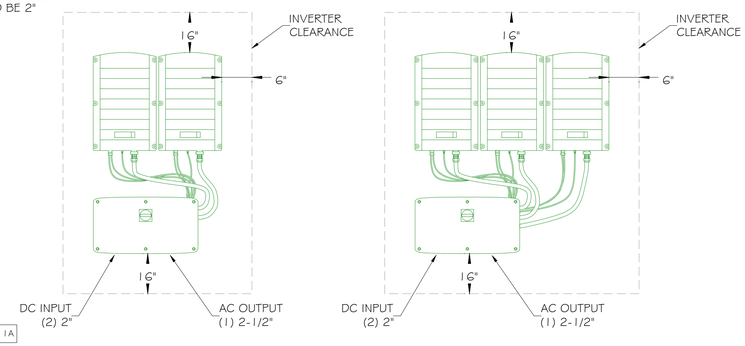
Sheet Number:
E1.2

Sheet Size:
ARCH D - 36" x 24"

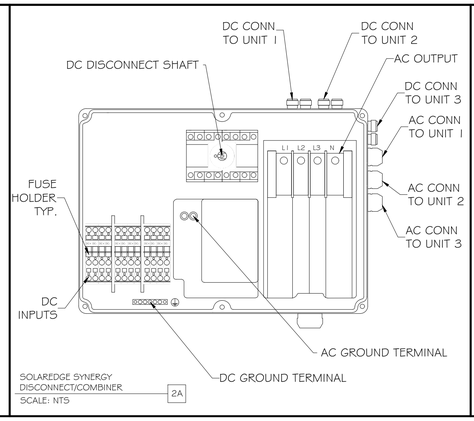
Design & Drafting by:

Reviewed & Approved by:
RD

NOTE:
WHEN INSTALLED OUTSIDE,
MINIMUM SIDE CLEARANCE BETWEEN
INVERTERS IS ALLOWED TO BE 2"

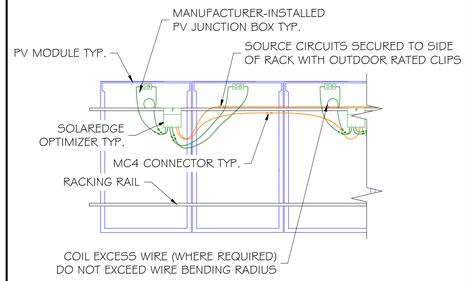


SOLAREDGE INVERTER
SCALE: NTS
1A

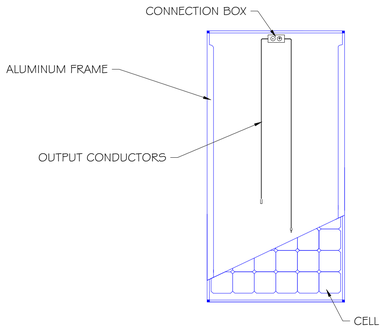


SOLAREDGE SYNERGY DISCONNECT/COMBINER
SCALE: NTS
2A

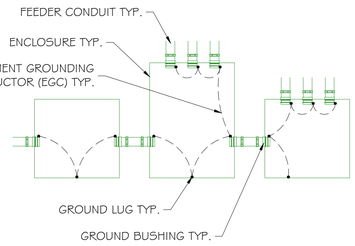
NOTE:
FOR PARALLEL CONNECTIONS OF MODULES TO
OPTIMIZERS, SEE DETAIL 6 BELOW



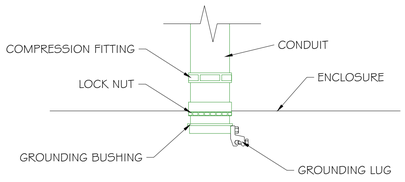
SOLAREDGE DUAL OPTIMIZER
SCALE: NTS
3C



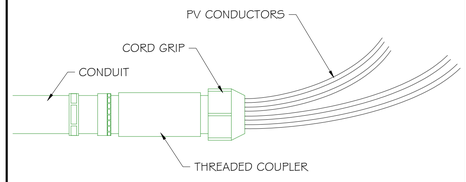
MODULE DETAIL
SCALE: NTS
4



EQUIPMENT GROUNDING
SCALE: NTS
8



CONDUIT GROUNDING
SCALE: NTS
9



CONDUIT CORD CONNECTOR
SCALE: NTS
10

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

Sheet Title:
CONSTRUCTION DETAILS

Sheet Number:
E1.3

Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:
RD

480V | ---- = EQUIP. GROUNDING CONDUCTOR | ——— = CIRCUIT CONDUCTOR | = FUSE | = CIRCUIT BREAKER | (N) = NEW EQUIP. | (E) = EXISTING EQUIP. | L1 = LINE 1 (BROWN) | L2 = LINE 2 (ORANGE) | L3 = LINE 3 (YELLOW) | N = NEUTRAL (WHITE) | G = GROUND (GREEN) | = POSITIVE (RED) | = NEGATIVE (BLACK)

Array Configuration
System: 1076.7 kWstc, 960 kW AC
Total PV Module Qty: 2220

Inverter I.D. #		Inv #1A/B/C			Inv #2A/B/C			Inv #3A/B/C			Inv #4A/B/C			Inv #5A/B/C			Inv #6A/B/C			Inv #7A/B/C			Inv #8A/B/C		
Inverter AC Power (kW):		120.0			120.0			120.0			120.0			120.0			120.0			120.0			120.0		
PV Power (kWstc):		50.44	50.44	50.44	45.59	47.53	46.56	50.44	50.44	32.98	50.44	50.44	50.44	45.59	46.56	45.59	50.44	50.44	34.92	31.525	31.04	49.47	31.525	31.04	52.38
Inverter DC:AC Ratio		1.261	1.261	1.261	1.1398	1.1883	1.164	1.261	1.261	0.8245	1.261	1.261	1.261	1.1398	1.164	1.1398	1.261	1.261	0.873	0.7881	0.776	1.2368	0.7881	0.776	1.3095
Module Total Qty:		104	104	104	94	98	96	104	104	68	104	104	104	94	96	94	104	104	72	65	64	102	65	64	108
INPUT 1	String Qty:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	String Length:	36	36	36	32	34	32	36	36	36	36	36	36	32	32	32	36	36	36	33	32	36	33	32	36
	Max Open Circuit Voltage:	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	Operating Voltage:	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850
	Max Short Circuit Current:	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
	Operating Current:	20.5	20.5	20.5	18.3	19.4	18.3	20.5	20.5	20.5	20.5	20.5	20.5	18.3	18.3	18.3	20.5	20.5	20.5	18.8	18.3	20.5	18.8	18.3	20.5
INPUT 2	String Qty:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	String Length:	36	36	36	32	32	32	36	36	32	36	36	36	32	32	32	36	36	36	32	32	34	32	32	36
	Max Open Circuit Voltage:	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	Operating Voltage:	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850
	Max Short Circuit Current:	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
	Operating Current:	20.5	20.5	20.5	18.3	18.3	18.3	20.5	20.5	18.3	20.5	20.5	20.5	18.3	18.3	18.3	20.5	20.5	20.5	18.3	18.3	19.4	18.3	18.3	20.5
INPUT 3	String Qty:	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1				1			1
	String Length:	32	32	32	30	32	32	32	32		32	32	32	30	32	30	32	32				32			36
	Max Open Circuit Voltage:	1000	1000	1000	1000	1000	1000	1000	1000	0	1000	1000	1000	1000	1000	1000	1000	1000	0	0	0	1000	0	0	1000
	Operating Voltage:	850	850	850	850	850	850	850	850	0	850	850	850	850	850	850	850	850	0	0	0	850	0	0	850
	Max Short Circuit Current:	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	0.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	0.0	0.0	0.0	18.0	0.0	0.0	18.0
	Operating Current:	18.3	18.3	18.3	17.1	18.3	18.3	18.3	18.3	0.0	18.3	18.3	18.3	17.1	18.3	17.1	18.3	18.3	0.0	0.0	0.0	18.3	0.0	0.0	20.5

PV Module Specifications

Model Number:	Q.PEAK DUO XL-G10.3/BFG 485		
Manufacturer:	Hanwha Q CELLS		
Dimensions (in):	87.2 x 41.1 x 1.4		
Weight (lbs):	64.2	Power @ STC (W):	485
Voc (VDC):	53.6	Power @ PTC (W):	454.3
Vmp (VDC):	45.6	Voc Temp Coeff (%/°C):	-0.27
Isc (A):	11.16	Max Voltage (VDC):	1,500
Imp (A):	10.63	Module Quantity:	2,220

Power Optimizer Specifications

Model Number:	SolarEdge P1100	
Max Input Power (W):	1100	
Max Input Voc (VDC):	125	
Max Input Isc (A):	14.1	
Output Current (A):	18	
Output Voltage (VDC):	80	
Min String Length:	27	Modules
Max String Length:	60	Modules
Max String Power (W):	20300	
Optimizer Quantity:	1110	

Inverter #1 - #8 Specifications

Model Number:	SolarEdge SE120KUS[SI1-5B]		
Nominal Power (kW AC):	120.00		
Nominal AC Voltage (V):	480	(3/N/PE)	
Max Output Current (A):	144.3		
CEC Weighted Efficiency:	98.5%		
Maximum DC Voltage (V):	1000	# of Inputs:	12
Operating DC Voltage (V):	850	Inv. Quantity:	8

PV System Maximum Voltage Calculation per NEC 690.7(A)

Local ASHRAE Min Temp: -3 °C — Data Source: STOCKTON METROPOLITIAN ARPT

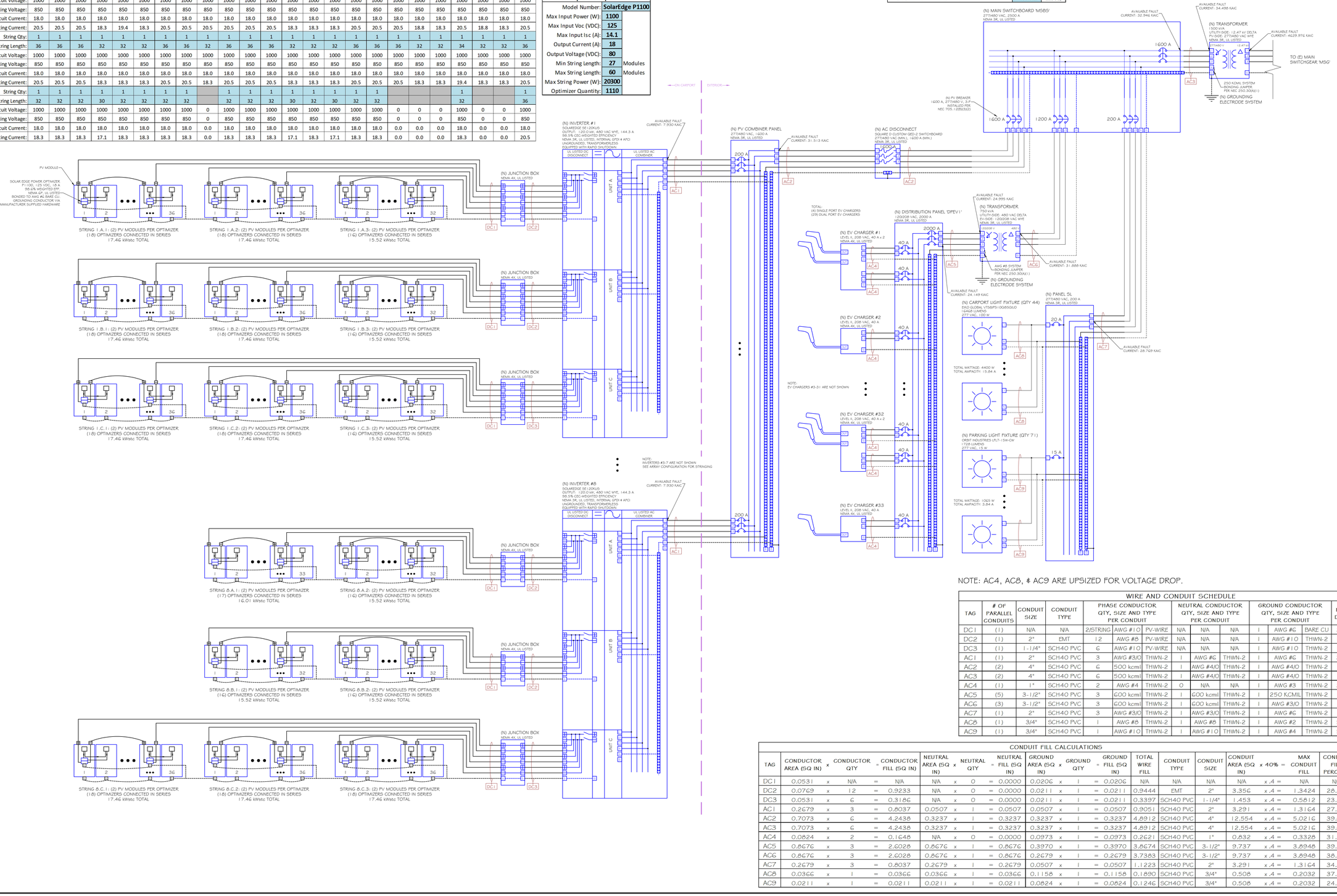
Voc Temp Coefficient	x	25°C - ASHRAE Min Temp.	+ 1 =	Voc Correction Factor	Voc Correction Factor	x	Voc	x	Max # of Modules in Series	=	Temperature Corrected Open Circuit Voltage
0.2681%/°C	x	28°C	+ 1 =	1.075	1.075	x	53.6	x	2	=	115.3 Volts DC

AC System Summary

NOMINAL SYSTEM VOLTAGE:	480	Volts AC
MAX CURRENT PER 690.8(A):	1154	Amps
MAX CURRENT PER 690.8(B):	1443	Amps

CEC Rating Calculation

Module PTC Rating (W)	x	No. of Modules	x	Average Inverter CEC Efficiency	=	CEC System Size	
454.3 W	x	2220	x	98.5%	=	993.42	kW AC



NOTE: AC4, AC8, & AC9 ARE UPSIZED FOR VOLTAGE DROP.

WIRE AND CONDUIT SCHEDULE

TAG	# OF PARALLEL CONDUITS	CONDUIT SIZE	CONDUIT TYPE	PHASE CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			NEUTRAL CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			GROUND CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			EST. DIST.
DC1	(1)	N/A	N/A	2/STRING	AWG #10	PV-WIRE	N/A	N/A	N/A	1	AWG #6	BARE CU	235
DC2	(1)	2"	EMT	12	AWG #8	PV-WIRE	N/A	N/A	N/A	1	AWG #10	THWN-2	135
DC3	(1)	1-1/4"	SCH40 PVC	6	AWG #10	PV-WIRE	N/A	N/A	N/A	1	AWG #10	THWN-2	105
AC1	(1)	2"	SCH40 PVC	3	AWG #3/0	THWN-2	1	AWG #6	THWN-2	1	AWG #6	THWN-2	385
AC2	(2)	4"	SCH40 PVC	6	500 kcmil	THWN-2	1	AWG #4/0	THWN-2	1	AWG #4/0	THWN-2	50
AC3	(2)	4"	SCH40 PVC	6	500 kcmil	THWN-2	1	AWG #4/0	THWN-2	1	AWG #4/0	THWN-2	50
AC4	(1)	1"	SCH40 PVC	2	AWG #4	THWN-2	0	N/A	N/A	1	AWG #8	THWN-2	290
AC5	(5)	3-1/2"	SCH40 PVC	3	600 kcmil	THWN-2	1	600 kcmil	THWN-2	1	250 KCMIL	THWN-2	25
AC6	(3)	3-1/2"	SCH40 PVC	3	600 kcmil	THWN-2	1	600 kcmil	THWN-2	1	AWG #3/0	THWN-2	25
AC7	(1)	2"	SCH40 PVC	3	AWG #3/0	THWN-2	1	AWG #3/0	THWN-2	1	AWG #6	THWN-2	25
AC8	(1)	3/4"	SCH40 PVC	1	AWG #8	THWN-2	1	AWG #8	THWN-2	1	AWG #2	THWN-2	525
AC9	(1)	3/4"	SCH40 PVC	1	AWG #10	THWN-2	1	AWG #10	THWN-2	1	AWG #4	THWN-2	570

CONDUIT FILL CALCULATIONS

TAG	CONDUCTOR AREA (SQ IN)	x	CONDUCTOR QTY	=	CONDUCTOR FILL (SQ IN)	NEUTRAL AREA (SQ IN)	x	NEUTRAL QTY	=	NEUTRAL FILL (SQ IN)	GROUND AREA (SQ IN)	x	GROUND QTY	=	GROUND FILL (SQ IN)	TOTAL WIRE FILL	CONDUIT TYPE	CONDUIT SIZE	CONDUIT AREA (SQ IN)	x 40% =	MAX CONDUIT FILL	CONDUIT FILL PERCENT
DC1	0.0531	x	N/A	=	N/A	N/A	x	0	=	0.0000	0.0206	x	1	=	0.0206	N/A	N/A	N/A	N/A	x .4 =	N/A	N/A
DC2	0.0769	x	12	=	0.9233	N/A	x	0	=	0.0000	0.0211	x	1	=	0.0211	0.9444	EMT	2"	3.356	x .4 =	1.3424	28.1%
DC3	0.0531	x	6	=	0.3186	N/A	x	0	=	0.0000	0.0211	x	1	=	0.0211	0.3397	SCH40 PVC	1-1/4"	1.453	x .4 =	0.5812	23.4%
AC1	0.2679	x	3	=	0.8037	0.0507	x	1	=	0.0507	0.0507	x	1	=	0.0507	0.9051	SCH40 PVC	2"	3.291	x .4 =	1.3164	27.5%
AC2	0.7073	x	6	=	4.2438	0.3237	x	1	=	0.3237	0.3237	x	1	=	0.3237	4.8912	SCH40 PVC	4"	12.554	x .4 =	5.0216	39.0%
AC3	0.7073	x	6	=	4.2438	0.3237	x	1	=	0.3237	0.3237	x	1	=	0.3237	4.8912	SCH40 PVC	4"	12.554	x .4 =	5.0216	39.0%
AC4	0.0824	x	2	=	0.1648	N/A	x	0	=	0.0000	0.0973	x	1	=	0.0973	0.2621	SCH40 PVC	1"	0.832	x .4 =	0.3328	31.5%
AC5	0.8676	x	3	=	2.6028	0.8676	x	1	=	0.8676	0.3970	x	1	=	0.3970	3.8674	SCH40 PVC	3-1/2"	9.737	x .4 =	3.8948	39.7%
AC6	0.8676	x	3	=	2.6028	0.8676	x	1	=	0.8676	0.2679	x	1	=	0.2679	3.7383	SCH40 PVC	3-1/2"	9.737	x .4 =	3.8948	38.4%
AC7	0.2679	x	3	=	0.8037	0.2679	x	1	=	0.2679	0.0507	x	1	=	0.0507	1.1223	SCH40 PVC	2"	3.291	x .4 =	1.3164	34.1%
AC8	0.0366	x	1	=	0.0366	0.0366	x	1	=	0.0366	0.1158	x	1	=	0.1158	0.1890	SCH40 PVC	3/4"	0.508	x .4 =	0.2032	37.2%
AC9	0.0211	x	1	=	0.0211	0.0211	x	1	=	0.0211	0.0824	x	1	=	0.0824	0.1246	SCH40 PVC	3/4"	0.508	x .4 =	0.2032	24.5%

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

Sheet Title:
ELECTRICAL DIAGRAM

Sheet Number:
E2.0

Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:
RD

Array Configuration

System: 1076.7 kWstc, 960 kW AC

Total PV Module Qty: 2220

	Inverter I.D. #	Inv #1A/B/C			Inv #2A/B/C			Inv #3A/B/C			Inv #4A/B/C			Inv #5A/B/C			Inv #6A/B/C			Inv #7A/B/C			Inv #8A/B/C		
	Inverter AC Power (kW):	120.0			120.0			120.0			120.0			120.0			120.0			120.0			120.0		
	PV Power (kWstc):	50.44	50.44	50.44	45.59	47.53	46.56	50.44	50.44	32.98	50.44	50.44	50.44	45.59	46.56	45.59	50.44	50.44	34.92	31.525	31.04	49.47	31.525	31.04	52.38
	Inverter DC:AC Ratio	1.261	1.261	1.261	1.1398	1.1883	1.164	1.261	1.261	0.8245	1.261	1.261	1.261	1.1398	1.164	1.1398	1.261	1.261	0.873	0.7881	0.776	1.2368	0.7881	0.776	1.3095
	Module Total Qty:	104	104	104	94	98	96	104	104	68	104	104	104	94	96	94	104	104	72	65	64	102	65	64	108
INPUT 1	String Qty:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	String Length:	36	36	36	32	34	32	36	36	36	36	36	36	32	32	32	36	36	36	33	32	36	33	32	36
	Max Open Circuit Voltage:	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	Operating Voltage:	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850
	Max Short Circuit Current:	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
	Operating Current:	20.5	20.5	20.5	18.3	19.4	18.3	20.5	20.5	20.5	20.5	20.5	20.5	18.3	18.3	18.3	20.5	20.5	20.5	18.8	18.3	20.5	18.8	18.3	20.5
INPUT 2	String Qty:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	String Length:	36	36	36	32	32	32	36	36	32	36	36	36	32	32	32	36	36	36	32	32	34	32	32	36
	Max Open Circuit Voltage:	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	Operating Voltage:	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850	850
	Max Short Circuit Current:	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
	Operating Current:	20.5	20.5	20.5	18.3	18.3	18.3	20.5	20.5	18.3	20.5	20.5	20.5	18.3	18.3	18.3	20.5	20.5	20.5	18.3	18.3	19.4	18.3	18.3	20.5
INPUT 3	String Qty:	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1				1			1
	String Length:	32	32	32	30	32	32	32	32		32	32	32	30	32	30	32	32				32			36
	Max Open Circuit Voltage:	1000	1000	1000	1000	1000	1000	1000	1000	0	1000	1000	1000	1000	1000	1000	1000	1000	0	0	0	1000	0	0	1000
	Operating Voltage:	850	850	850	850	850	850	850	850	0	850	850	850	850	850	850	850	850	0	0	0	850	0	0	850
	Max Short Circuit Current:	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	0.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	0.0	0.0	0.0	18.0	0.0	0.0	18.0
	Operating Current:	18.3	18.3	18.3	17.1	18.3	18.3	18.3	18.3	0.0	18.3	18.3	18.3	17.1	18.3	17.1	18.3	18.3	0.0	0.0	0.0	18.3	0.0	0.0	20.5

PV Module Specifications

Model Number:	Q.PEAK DUO XL-G10.3/BFG 485
Manufacturer:	Hanwha Q CELLS
Dimensions (in):	87.2 x 41.1 x 1.4
Weight (lbs):	64.2
Voc (VDC):	53.6
Vmp (VDC):	45.6
Isc (A):	11.16
Imp (A):	10.63
Power @ STC (W):	485
Power @ PTC (W):	454.3
Voc Temp Coeff (%/°C):	-0.27
Max Voltage (VDC):	1,500
Module Quantity:	2,220

Power Optimizer Specifications

Model Number:	SolarEdge P1100	
Max Input Power (W):	1100	
Max Input Voc (VDC):	125	
Max Input Isc (A):	14.1	
Output Current (A):	18	
Output Voltage (VDC):	80	
Min String Length:	27	Modules
Max String Length:	60	Modules
Max String Power (W):	20300	
Optimizer Quantity:	1110	

Inverter #1 - #8 Specifications

Model Number:	SolarEdge SE120KUS[SI1-SB]		
Nominal Power (kW AC):	120.00		
Nominal AC Voltage (V):	480	(3/N/PE)	
Max Output Current (A):	144.3		
CEC Weighted Efficiency:	98.5%		
Maximum DC Voltage (V):	1000	# of Inputs:	12
Operating DC Voltage (V):	850	Inv. Quantity:	8

PV System Maximum Voltage Calculation per NEC 690.7(A)

Local ASHRAE Min Temp: **-3 °C** — Data Source: **STOCKTON METROPOLITIAN ARPT**

Voc Temp Coefficient		25°C - ASHRAE Min Temp.		+ 1	=	Voc Correction Factor
0.2681%/°C	x	28°C		+ 1	=	1.075

Voc Correction Factor		Voc		Max # of Modules in Series	=	Temperature Corrected Open Circuit Voltage	
1.075	x	53.6	x	2	=	115.3	Volts DC

AC System Summary

NOMINAL SYSTEM VOLTAGE:	480	Volts AC
MAX CURRENT PER 690.8(A):	1154	Amps
MAX CURRENT PER 690.8(B):	1443	Amps

CEC Rating Calculation

Module PTC Rating (W)		No. of Modules		Average Inverter CEC Efficiency	=	CEC System Size	
454.3 W	x	2220	x	98.5%	=	993.42	kW AC

NOTE: AC4, AC8, & AC9 ARE UPSIZED FOR VOLTAGE DROP.

WIRE AND CONDUIT SCHEDULE

TAG	# OF PARALLEL CONDUITS	CONDUIT SIZE	CONDUIT TYPE	PHASE CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			NEUTRAL CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			GROUND CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			EST. DIST.
DC1	(1)	N/A	N/A	2STRING	AWG #10	PV-WIRE	N/A	N/A	N/A	1	AWG #6	BARE CU	235
DC2	(1)	2"	EMT	12	AWG #8	PV-WIRE	N/A	N/A	N/A	1	AWG #10	THWN-2	135
DC3	(1)	1-1/4"	SCH40 PVC	6	AWG #10	PV-WIRE	N/A	N/A	N/A	1	AWG #10	THWN-2	105
AC1	(1)	2"	SCH40 PVC	3	AWG #3/0	THWN-2	1	AWG #6	THWN-2	1	AWG #6	THWN-2	385
AC2	(2)	4"	SCH40 PVC	6	500 kcmil	THWN-2	1	AWG #4/0	THWN-2	1	AWG #4/0	THWN-2	50
AC3	(2)	4"	SCH40 PVC	6	500 kcmil	THWN-2	1	AWG #4/0	THWN-2	1	AWG #4/0	THWN-2	50
AC4	(1)	1"	SCH40 PVC	2	AWG #4	THWN-2	0	N/A	N/A	1	AWG #3	THWN-2	290
AC5	(5)	3-1/2"	SCH40 PVC	3	600 kcmil	THWN-2	1	600 kcmil	THWN-2	1	250 KCMIL	THWN-2	25
AC6	(3)	3-1/2"	SCH40 PVC	3	600 kcmil	THWN-2	1	600 kcmil	THWN-2	1	AWG #3/0	THWN-2	25
AC7	(1)	2"	SCH40 PVC	3	AWG #3/0	THWN-2	1	AWG #3/0	THWN-2	1	AWG #6	THWN-2	25
AC8	(1)	3/4"	SCH40 PVC	1	AWG #8	THWN-2	1	AWG #8	THWN-2	1	AWG #2	THWN-2	525
AC9	(1)	3/4"	SCH40 PVC	1	AWG #10	THWN-2	1	AWG #10	THWN-2	1	AWG #4	THWN-2	570

CONDUIT FILL CALCULATIONS

TAG	CONDUCTOR AREA (SQ IN)	x	CONDUCTOR QTY	=	CONDUCTOR FILL (SQ IN)	NEUTRAL AREA (SQ IN)	x	NEUTRAL QTY	=	NEUTRAL FILL (SQ IN)	GROUND AREA (SQ IN)	x	GROUND QTY	=	GROUND FILL (SQ IN)	TOTAL WIRE FILL	CONDUIT TYPE	CONDUIT SIZE	CONDUIT AREA (SQ IN)	x 40% =	MAX CONDUIT FILL	CONDUIT FILL PERCENT
DC1	0.0531	x	N/A	=	N/A	N/A	x	0	=	0.0000	0.0206	x	1	=	0.0206	N/A	N/A	N/A	N/A	x .4 =	N/A	N/A
DC2	0.0769	x	12	=	0.9233	N/A	x	0	=	0.0000	0.0211	x	1	=	0.0211	0.9444	EMT	2"	3.356	x .4 =	1.3424	28.1%
DC3	0.0531	x	6	=	0.3186	N/A	x	0	=	0.0000	0.0211	x	1	=	0.0211	0.3397	SCH40 PVC	1-1/4"	1.453	x .4 =	0.5812	23.4%
AC1	0.2679	x	3	=	0.8037	0.0507	x	1	=	0.0507	0.0507	x	1	=	0.0507	0.9051	SCH40 PVC	2"	3.291	x .4 =	1.3164	27.5%
AC2	0.7073	x	6	=	4.2438	0.3237	x	1	=	0.3237	0.3237	x	1	=	0.3237	4.8912	SCH40 PVC	4"	12.554	x .4 =	5.0216	39.0%
AC3	0.7073	x	6	=	4.2438	0.3237	x	1	=	0.3237	0.3237	x	1	=	0.3237	4.8912	SCH40 PVC	4"	12.554	x .4 =	5.0216	39.0%
AC4	0.0824	x	2	=	0.1648	N/A	x	0	=	0.0000	0.0973	x	1	=	0.0973	0.2621	SCH40 PVC	1"	0.832	x .4 =	0.3328	31.5%
AC5	0.8676	x	3	=	2.6028	0.8676	x	1	=	0.8676	0.3970	x	1	=	0.3970	3.8674	SCH40 PVC	3-1/2"	9.737	x .4 =	3.8948	39.7%
AC6	0.8676	x	3	=	2.6028	0.8676	x	1	=	0.8676	0.2679	x	1	=	0.2679	3.7383	SCH40 PVC	3-1/2"	9.737	x .4 =	3.8948	38.4%
AC7	0.2679	x	3	=	0.8037	0.2679	x	1	=	0.2679	0.0507	x	1	=	0.0507	1.1223	SCH40 PVC	2"	3.291	x .4 =	1.3164	34.1%
AC8	0.0366	x	1	=	0.0366	0.0366	x	1	=	0.0366	0.1158	x	1	=	0.1158	0.1890	SCH40 PVC	3/4"	0.508	x .4 =	0.2032	37.2%
AC9	0.0211	x	1	=	0.0211	0.0211	x	1	=	0.0211	0.0824	x	1	=	0.0824	0.1246	SCH40 PVC	3/4"	0.508	x .4 =	0.2032	24.5%

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS: MATERIAL	CONN. TEMP. RATING	TRADE SIZE	AMPACITY PER 310.16 & 310.17	REQUIRED CONDUCTOR AMPACITY: OPTIMIZER OUTPUT CURRENT	x	# OF PARALLEL STRINGS	=	MAX CURRENT PER 690.8(A)(1)	x	CONT. OPERATION 690.8(B)(1)	=	MAX CURRENT PER 690.8(B)(1)	AMPACITY CHECK #1: MAX CURRENT PER 690.8(B)(1)	<	CONDUCTOR AMPACITY
DC1	PV STRING	JUNCTION BOX	COPPER	90°C	AWG #10	55 Amps	18.0	x	1	=	18.0 Amps	x	1.25	=	22.5 Amps	22.5 Amps	<	55.0 Amps
DC2	JUNCTION BOX	INVERTER	COPPER	75°C	AWG #8	50 Amps	18.0	x	1	=	18.0 Amps	x	1.25	=	22.5 Amps	22.5 Amps	<	50.0 Amps
DC3	JUNCTION BOX	INVERTER	COPPER	75°C	AWG #10	35 Amps	18.0	x	1	=	18.0 Amps	x	1.25	=	22.5 Amps	22.5 Amps	<	35.0 Amps

CONDUCTOR TEMPERATURE DERATING: CIRCUIT ENVIRONMENT	LOCAL 2% AVG. HIGH TEMP (°C)	HEIGHT ABOVE ROOF (in)	TEMP. ADDER PER 310.15(B)(3)(c)	EXPECTED OPERATING TEMP (°C)	AMPACITY CORRECTION 310.15(B)(1)
ROOFTOP, FREE AIR	36	-	N/A	36	0.91
OUTDOORS, SHADED (+10°C)	36	-	N/A	46	0.82
UNDERGROUND (+0°C)	36	-	N/A	36	0.91

CONDUIT FILL DERATING: # OF UNGROUNDED CONDUCTORS	AMPACITY CORRECTION 310.15(C)(1)
N/A	1.00
12	0.50
6	0.80

CORRECTED AMPACITY CALCULATION: 90°C CONDUCTOR AMPACITY	x	TEMP DERATE	x	CONDUIT FILL DERATE	=	DERATED CONDUCTOR AMPACITY
55	x	0.91	x	1.00	=	50.1 Amps
55	x	0.82	x	0.50	=	22.6 Amps
40	x	0.91	x	0.80	=	29.2 Amps

AMPACITY CHECK #2: MAX CURRENT PER 690.8(B)(2)	<	DERATED CONDUCTOR AMPACITY
18.0 Amps	<	50.1 Amps
18.0 Amps	<	22.6 Amps
18.0 Amps	<	29.2 Amps

VOLTAGE DROP: EST. ONE-WAY DISTANCE	VOLTAGE DROP
235 ft	1.25%
135 ft	0.46%
105 ft	0.53%

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS: MATERIAL	TERMINAL TEMP. RATING	TRADE SIZE	NUMBER OF PARALLEL CONDUCTORS	AMPACITY PER 310.16 & 310.17	REQUIRED CONDUCTOR AMPACITY: INVERTER OUTPUT CURRENT	x	# OF INVERTERS	=	MAX CURRENT PER 690.8(A)(3)	x	CONT. OPERATION 690.8(B)(1)	=	MAX CURRENT PER 690.8(B)(1)	AMPACITY CHECK #1: MAX CURRENT PER 690.8(B)(1)	<	CONDUCTOR AMPACITY
AC1	INVERTER #1 - #8	PV COMBINER PANEL	COPPER	75°C	AWG #3/0	1	200 Amps	144.3	x	1	=	144.3 Amps	x	1.25	=	180.4 Amps	180.4 Amps	<	200 Amps
AC2	PV COMBINER PANEL	PV BREAKER	COPPER	75°C	500 kcmil	4	1520 Amps	144.3	x	8	=	1154.4 Amps	x	1.25	=	1443.0 Amps	1443.0 Amps	<	1520 Amps
AC3	MAIN SWITCHBOARD 'MSBS'	TRANSFORMER	COPPER	75°C	500 kcmil	4	1520 Amps	144.3	x	8	=	1154.4 Amps	x	1.25	=	1443.0 Amps	1443.0 Amps	<	1520 Amps

CONDUCTOR TEMPERATURE DERATING: CIRCUIT ENVIRONMENT	LOCAL 2% AVG. HIGH TEMP (°C)	EXPECTED OPERATING TEMP (°C)	AMPACITY CORRECTION 310.15(B)(1)
UNDERGROUND (+0°C)	36	36	0.91
UNDERGROUND (+0°C)	36	36	0.91
UNDERGROUND (+0°C)	36	36	0.91

CONDUIT FILL DERATING: # OF UNGROUNDED CONDUCTORS	AMPACITY CORRECTION 310.15(C)(1)
3	1.00
6	0.80
6	0.80

CORRECTED AMPACITY CALCULATION: 90°C CONDUCTOR AMPACITY	x	TEMP DERATE	x	CONDUIT FILL DERATE	=	DERATED CONDUCTOR AMPACITY
225	x	0.91	x	1.00	=	204.8 Amps
1720	x	0.91	x	0.80	=	1252 Amps
1720	x	0.91	x	0.80	=	1252 Amps

AMPACITY CHECK #2: MAX CURRENT PER 690.8(B)(2)	<	DERATED CONDUCTOR AMPACITY
144.3 Amps	<	204.8 Amps
1154.4 Amps	<	1252.2 Amps
1154.4 Amps	<	1252.2 Amps

VOLTAGE DROP: EST. ONE-WAY DISTANCE	VOLTAGE DROP
385 ft	1.54%
50 ft	0.13%
50 ft	0.13%

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS: MATERIAL	TERMINAL TEMP. RATING	TRADE SIZE	NUMBER OF PARALLEL CONDUCTORS	AMPACITY PER 310.16 & 310.17
AC4	EVCS	DISTRIBUTION PANEL 'DPEV1'	COPPER	75°C	AWG #4	1	85 Amps
AC5	DISTRIBUTION PANEL 'DPEV1'	TRANSFORMER	COPPER	75°C	600 kcmil	5	2100 Amps
AC6	TRANSFORMER	MAIN SWITCHBOARD 'MSBS'	COPPER	75°C	600 kcmil	3	1260 Amps
AC7	MAIN SWITCHBOARD 'MSBS'	PANEL SL	COPPER	75°C	AWG #3/0	1	200 Amps
AC8	PANEL SL	CARPORT LIGHT FIXTURE	COPPER	75°C	AWG #8	1	50 Amps
AC9	PANEL SL	PARKING LIGHT FIXTURE	COPPER	75°C	AWG #10	1	35 Amps

CONDUCTOR TEMPERATURE DERATING: CIRCUIT ENVIRONMENT	LOCAL 2% AVG. HIGH TEMP (°C)	EXPECTED OPERATING TEMP (°C)	AMPACITY CORRECTION 310.15(B)(1)
UNDERGROUND (+0°C)	36	36	0.91
UNDERGROUND (+0°C)	36	36	0.91
UNDERGROUND (+0°C)	36	36	0.91
UNDERGROUND (+0°C)	36	36	0.91
UNDERGROUND (+0°C)	36	36	0.91
UNDERGROUND (+0°C)	36	36	0.91

CONDUIT FILL DERATING: # OF UNGROUNDED CONDUCTORS	AMPACITY CORRECTION 310.15(C)(1)
2	1.00
3	1.00
3	1.00
3	1.00
2	1.00
2	1.00

CORRECTED AMPACITY CALCULATION: 90°C CONDUCTOR AMPACITY	x	TEMP DERATE	x	CONDUIT FILL DERATE	=	DERATED CONDUCTOR AMPACITY
95	x	0.91	x	1.00	=	86.5 Amps
2375	x	0.91	x	1.00	=	2161 Amps
1425	x	0.91	x	1.00	=	1297 Amps
225	x	0.91	x	1.00	=	204.8 Amps
55	x	0.91	x	1.00	=	50.1 Amps
40	x	0.91	x	1.00	=	36.4 Amps

AMPACITY CHECK: SPECIFIED OCPD RATING	NEXT STD. OCPD SIZE DOWN, 240.4	<	DERATED CONDUCTOR AMPACITY
40 Amps	35 Amps	<	86.5 Amps
2000 Amps	1600 Amps	<	2161.3 Amps
1200 Amps	1000 Amps	<	1296.8 Amps
200 Amps	175 Amps	<	204.8 Amps
20 Amps	15 Amps	<	50.1 Amps
15 Amps	15 Amps	<	36.4 Amps

VOLTAGE DROP: EST. ONE-WAY DISTANCE	VOLTAGE DROP
290 ft	2.99%
25 ft	0.08%
25 ft	0.08%
25 ft	0.14%
525 ft	3.42%
570 ft	4.43%

Contractor:

Project:

APPLIED AEROSPACE
[redacted]

Project Details:

1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

Sheet Title:

ELECTRICAL CALCULATIONS

Sheet Number:

E2.1

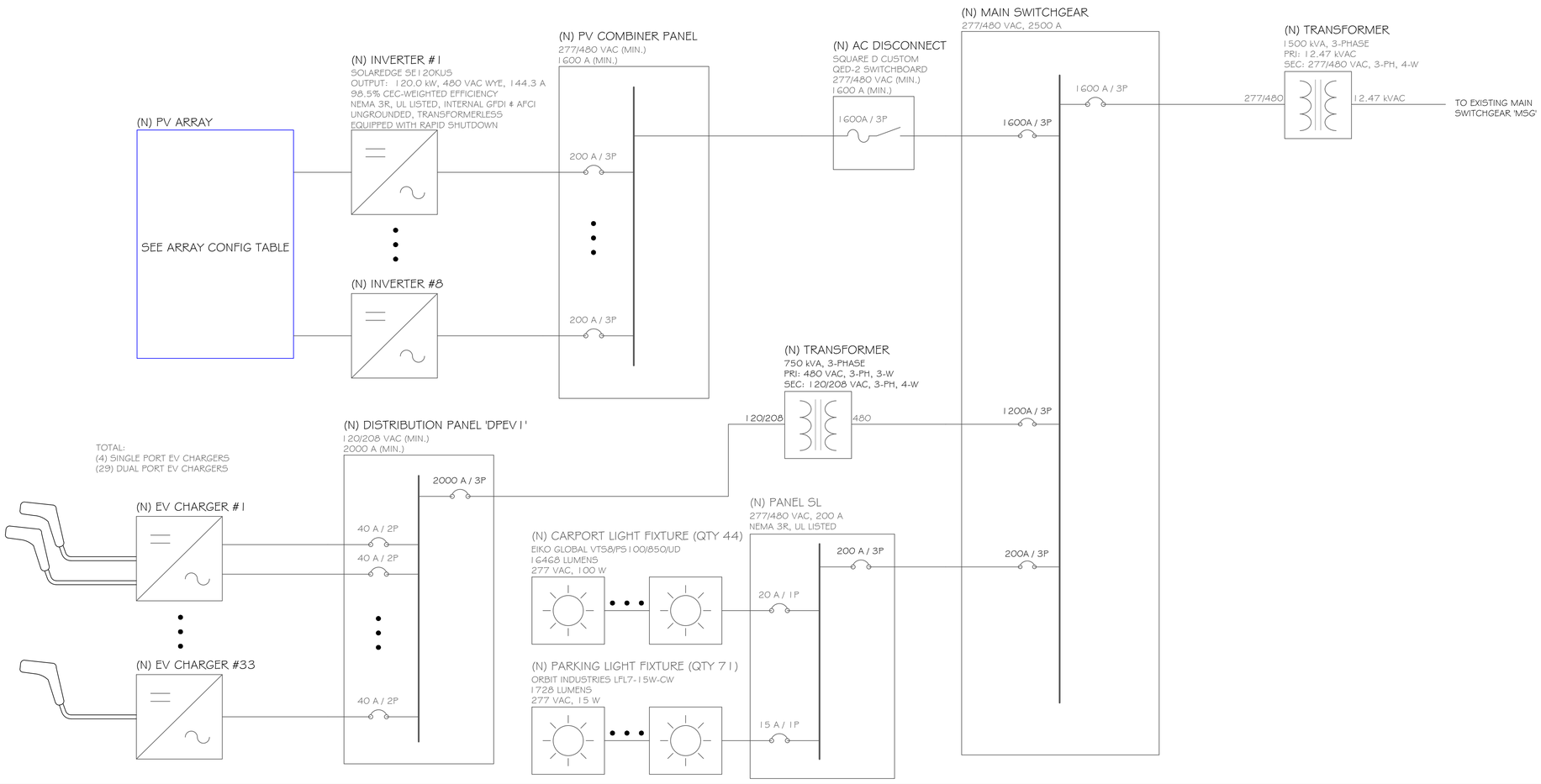
Sheet Size:

ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:

RD



SOLAR AC DISCONNECT

REQD BY: NEC 690.13(B) — 1
APPLY TO:
AC DISCONNECT SWITCHES

SOLAR DC DISCONNECT

REQD BY: NEC 690.13(B) — 2
APPLY TO:
DC DISCONNECT SWITCHES

⚠ WARNING
ELECTRIC SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

REQD BY: NEC 690.13(B) — 3
APPLY TO:
DISCONNECTS, FUSES, CIRCUIT BREAKERS

WARNING: PHOTOVOLTAIC POWER SOURCE

REQD BY: CEC 690.31, CRC R331.2 — 4
APPLY TO:
JUNCTION BOXES, RACEWAYS, CABLE TRAYS, CONDUIT BODIES WITH AVAILABLE OPENINGS, EVERY 10', WITHIN 1' OF TURNS/PENETRATIONS

⚠ WARNING
DUAL POWER SUPPLY
SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

REQD BY: NEC 705.12(C) — 5
APPLY TO:
ANYALL ELECTRICAL PANELS CONNECTED TO MULTIPLE POWER SOURCES

PHOTOVOLTAIC SYSTEM DISCONNECT
AC CURRENT: 1443 A
VOLTAGE: 480 VAC

REQD BY: NEC 690.54 — 6
APPLY TO:
POINT OF INTERCONNECTION

⚠ WARNING
THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR.

REQD BY: NEC 705.12(B)(3)(3) — 7
APPLY TO:
AC COMBINER PANEL

⚠ CAUTION ⚠
DO NOT INSTALL ADDITIONAL LOADS IN THIS PANEL

REQD BY: NEC 705.12(B)(3)(3) — 8
APPLY TO:
AC COMBINER PANEL

⚠ WARNING
ARC FLASH HAZARD
APPROPRIATE PPE REQUIRED. FAILURE TO COMPLY CAN RESULT IN INJURY OR DEATH. REFER TO NFPA 70E.

REQD BY: NEC 110.16, NFPA 70E — 9
APPLY TO:
AC COMBINER PANEL

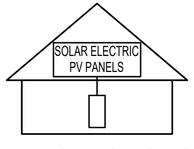
⚠ WARNING
POWER SOURCE OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

REQD BY: NEC 705.12(B)(3)(2) — 10
APPLY TO:
PV BACKFED CIRCUIT BREAKER(S)

GRID TIED PHOTOVOLTAIC POWER SOURCE
MAX SYSTEM VOLTAGE: 1000 V
MAX SYSTEM CURRENT: 54 A
MAX RATED OUTPUT CURRENT OF THE DC/DC CONVERTER: 18 A
MAX INVERTER OUTPUT: 120 kW, 144.3 A, 480 VAC

REQD BY: NEC 690.53 — 11
APPLY TO:
INVERTER #1-#8

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN



TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

REQD BY: NEC 690.12 & 690.56(C) — 12
APPLY TO:
RAPID SHUTDOWN INITIATION SWITCH

SIGNAGE REQUIREMENTS

1.) RED BACKGROUND W/ WHITE LETTERING, OR:
2.) WHITE BACKGROUND W/ BLACK LETTERING
3.) MIN. 3/8" LETTER HEIGHT
4.) ALL CAPITAL LETTERS
5.) ARIAL OR SIMILAR FONT
6.) WEATHER RESISTANT MATERIAL, PER UL 969

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

Sheet Title:
BLOCK DIAGRAM & SAFETY PLACARDS

Sheet Number:
E3.0

Sheet Size:
ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:
RD

powered by Q.ANTUM DUO Z

Q.PEAK DUO XL-G10.3 / BFG
470-485

BIFACIAL DOUBLE GLASS MODULE WITH EXCELLENT RELIABILITY AND ADDITIONAL YIELD

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2020

Q CELLS Yield Security

BIFACIAL ENERGY YIELD GAIN OF UP TO 20%
Bifacial Q.ANTUM solar cells with zero gap cell layout make efficient use of light shining on the module rear-side for radically improved LCOE.

LOW ELECTRICITY GENERATION COSTS
Q.ANTUM DUO Z combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology for higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 21.2%.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behavior.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID and Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

FRAME FOR VERSATILE MOUNTING OPTIONS
High-tech aluminum alloy frame protects from damage, enables use of a wide range of mounting structures and is certified regarding IEC for high snow (5400 Pa) and wind loads (2400 Pa).

A RELIABLE INVESTMENT
Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty[2].

[1] APT test conditions according to IEC / TS 62804-1:2015 method B (−1500 V, 168 h) including post treatment according to IEC 61215-1-1 Ed. 2.0 (CD)
[2] See data sheet on rear for further information.

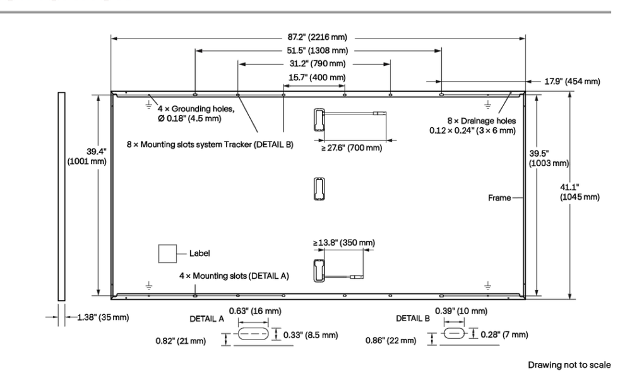
THE IDEAL SOLUTION FOR:
Ground-mounted solar power plants

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	87.2 in × 41.1 in × 1.38 in (including frame) (2216 mm × 1045 mm × 35 mm)
Weight	64.2 lbs (29.1 kg)
Front Cover	0.08 in (2.0 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	0.08 in (2.0 mm) semi-tempered glass
Frame	Anodized aluminum
Cell	6 × 26 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥27.6 in (700 mm), (−) ≥13.8 in (350 mm)
Connector	Stäubli MC4-Evo2, Hanwha Q CELLS HQC4, IP68



ELECTRICAL CHARACTERISTICS

POWER CLASS			470		475		480		485	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] AND BSTC[1] (POWER TOLERANCE +5 W / −0 W)										
				BSTC*		BSTC*		BSTC*		BSTC*
Minimum: Power at MPP[1]	P_{MPP}	[W]	470	514.1	475	519.6	480	525.0	485	530.5
Short Circuit Current[1]	I_{SC}	[A]	11.04	12.08	11.08	12.12	11.12	12.17	11.16	12.21
Open Circuit Voltage[1]	V_{OC}	[V]	52.91	53.10	53.15	53.34	53.39	53.58	53.63	53.82
Current at MPP	I_{MPP}	[A]	10.51	11.50	10.55	11.54	10.59	11.58	10.63	11.63
Voltage at MPP	V_{MPP}	[V]	44.73	44.72	45.03	45.02	45.33	45.32	45.63	45.62
Efficiency[1]	η	[%]	≥20.3	≥22.2	≥20.5	≥22.4	≥20.7	≥22.7	≥20.9	≥22.9

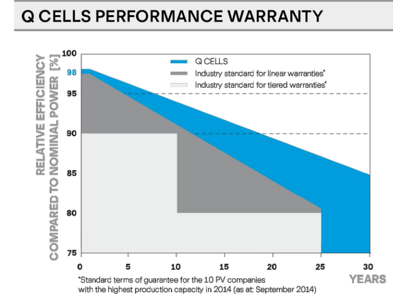
Bifaciality of P_{MPP} and I_{SC} 70% ±5% • Bifaciality given for rear side irradiation on top of STC (front side) • According to IEC 60904-1-2

[1]Measurement tolerances P_{MPP} ±3%; I_{SC}, V_{OC} ±5% at STC: 1000 W/m²; *at BSTC: 1000 W/m² + φ × 135 W/m², φ = 70% ±5%, 25 ± 2 °C, AM 1.5 according to IEC 60904-3

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]			470	475	480	485
Minimum: Power at MPP	P_{MPP}	[W]	353.8	357.6	361.4	365.1
Short Circuit Current	I_{SC}	[A]	8.89	8.92	8.96	8.99
Open Circuit Voltage	V_{OC}	[V]	50.04	50.27	50.49	50.72
Current at MPP	I_{MPP}	[A]	8.27	8.30	8.34	8.37
Voltage at MPP	V_{MPP}	[V]	42.77	43.06	43.35	43.63

[2]800 W/m², NMOT, spectrum AM 1.5

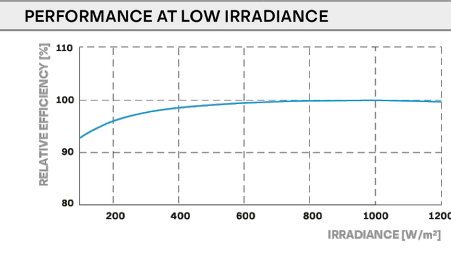
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.45% degradation per year. At least 93.95% of nominal power up to 10 years. At least 84.95% of nominal power up to 30 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[% / K]	+0.04	Temperature Coefficient of V_{OC}	β	[% / K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[% / K]	−0.34	Nominal Module Operating Temperature	NMOT	[°F]	108 ± 5.4 (42 ± 3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1500	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 29[4]
Max. Design Load, Push / Pull[3]	[lbs/ft²]	75 (3600 Pa) / 33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	−40 °F up to +185 °F (−40 °C up to +85 °C)
Max. Test Load, Push / Pull[3]	[lbs/ft²]	113 (5400 Pa) / 50 (2400 Pa)		

[3] See Installation Manual
[4] New Type is similar to Type 3 but with metallic frame

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells); Certification in process.

C Certified US UL 61730 · CE · TÜV Rheinland CERTIFIED www.tuv.com ID 1111220277

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

Power Optimizer
For North America
P1101

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
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

solaredge.com

solaredge

Power Optimizer
For North America
P1101

Power Optimizer Model (Typical Module Compatibility)		P1101 (for up to 2 x high power or bi-facial modules)	Units
INPUT			
Rated Input DC Power(1)		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 (Isc)		14.1	Adc
Maximum Short Circuit Current per Input (Isc)		-	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		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		Compliant with NEC 2014, 2017, 2020	
EMC		FCC Part 15 Class A, IEC61000-6-2, IEC61000-6-3	
Safety		IEC62109-1 (class II safety), UL1741, UL3741	
Material		UL94 V-0, UV resistant	
RoHS		Yes	
INSTALLATION SPECIFICATIONS			
Compatible SolarEdge Inverters		All commercial three phase inverters	
Maximum Allowed System Voltage		1000	Vdc
Dimensions (W x L x H)		129 x 162 x 59 / 5.1 x 6.4 x 2.32	mm / in
Weight		1064 / 2.34	gr / lb
Input Connector		MC4(2)	
Input Wire Length Options	1	1.6 / 5.2	m / ft
	2		
	3		
Output Wire Type / Connector		Double insulated; MC4	
Output Wire Length		2.4 / 7.8	m / ft
Operating Temperature Range(3)		-40 to +85 / -40 to +185	˚C / ˚F
Protection Rating		IP68 / NEMA6P	
Relative Humidity		0 – 100	%

(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 the Power Optimizer Input Connector Compatibility Technical Note.
(3) For ambient temperatures above +70˚C / +158˚F power de-rating is applied. Refer to Power Optimizers De-Rating Application Note for more details.

PV System Design Using a SolarEdge Inverter(4)(5)		208V Grid SE10K	208V Grid SE17.3K*	277/480V Grid SE30K	277/480V Grid SE40K*	
Compatible Power Optimizers		P1101				
Minimum String Length	Power Optimizers	8	10	14	14	
	PV Modules	15	19	27	27	
Maximum String Length	Power Optimizers	30	30	30	30	
	PV Modules	60	60	60	60	
Maximum Continuous Power per String		7200	8820	15300	15300	W
Maximum Allowed Connected Power per String(6)		1 string - 8400	1 string – 10020	1 string – 17550	2 strings or less – 17550	W
		2 strings or more – 9800	2 strings or more – 12020	2 strings or more – 20300	3 strings or more – 20300	
Parallel Strings of Different Lengths or Orientations		Yes				
Maximum Difference in Number of Power Optimizers Allowed Between the Shortest and Longest String Connected to the Same Inverter Unit		5 Power Optimizers				

* The same rules apply for Synergy units of equivalent power ratings, that are part of the modular Synergy Technology inverter.
(4) 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.
(5) Design with three phase 208V inverters is limited. Use the SolarEdge Designer for verification.
(6) To connect more STC power per string, design your project using SolarEdge Designer.

RoHS · Intertek

Three Phase Inverter with Synergy Technology
For the 277/480V Grid for North America
SE80KUS / SE100KUS / 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

solaredge

Three Phase Inverter with Synergy Technology
For the 277/480V Grid for North America
SE66.6KUS / SE80KUS / SE100KUS / SE120KUS

Applicable to inverter with Part Numbers	SExxK-USx8Ixxxx SE80KUS	SE100KUS	SE120KUS	
OUTPUT				
Rated AC Active Output Power	80000	100000	120000	W
Maximum AC Apparent Output Power	80000	100000	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(1)	59.5 - 60 - 60.5			Hz
Maximum Continuous Output Current (per Phase, PF=1)	96.5	120	145	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(2)			
CEC Weighted Efficiency	98.5			%
Nighttime Power Consumption	< 8	< 12		W
ADDITIONAL FEATURES				
Supported Communication Interfaces(3)	2 x RS485, 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, 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/downloads#, to download the relevant product datasheet

Three Phase Inverter with Synergy Technology
For the 277/480V Grid for North America
SE66.6KUS / SE80KUS / SE100KUS / SE120KUS

Applicable to inverter with Part Numbers	SExxK-USx8Ixxxx SE80KUS	SE100KUS	SE120KUS	
INSTALLATION SPECIFICATIONS				
Number of Synergy Units per Inverter	2	3		
AC Max Conduit Size	2 ½"			in
Max AWG Line / PE	4/0 / 1/0			
DC Max Conduit Size	1 x 3" ; 2 x 2"			in
DC Input Inverter / Synergy Unit	8 / 4 pairs; 6-12 AWG	12 / 4 pairs; 6-12 AWG		
Dimensions (H x W x D)	Synergy Unit: 22 x 12.9 x 10.75 / 558 x 328 x 273 Synergy Manager: 14.17 x 22.4 x 11.6 / 360 x 560 x 295			in / mm
Weight	Synergy Unit: 70.4 / 32 Synergy Manager: 39.6 / 18			lb / kg
Operating Temperature Range	-40 to +140 / -40 to +60(4)			F / ˚C
Cooling	Fan (user replaceable)			
Noise	< 67			dBA
Protection Rating	NEMA 3R			
Mounting	Brackets provided			

(4) For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note.pdf

CE RoHS

Contractor:

Project:
APPLIED AEROSPACE
[redacted]

Project Details:
1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/11/2024	A

Sheet Title: EQUIPMENT DATASHEETS

Sheet Number: D1.0

Sheet Size: ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by: RD

CT4000 Level 2 Commercial Charging Station

Specifications and Ordering Information

CT4021

Ordering Information

The order codes below represent specific product configurations. Other product options are available. Please contact ChargePoint Sales for information and order codes.

Specify model number followed by the applicable code(s).
The order code sequence is: **Model-Options**. **Software**, **Services** and **Misc** are ordered as separate line items.

Hardware

Description		Order Code
Model	1830 mm (6 ft) Single Port Bollard Mount	CT4011-GW1
	1830 mm (6 ft) Dual Port Bollard Mount	CT4021-GW1
	1830 mm (6 ft) Single Port Wall Mount	CT4013-GW1
	1830 mm (6 ft) Dual Port Wall Mount	CT4023-GW1
	2440 mm (8 ft) Dual Port Bollard Mount	CT4025-GW1
	2440 mm (8 ft) Dual Port Wall Mount	CT4027-GW1
Included	Integral Modem – North America	-GW1
Misc	Power Management Kit Bollard Concrete Mounting Kit	CT4000-PMGMT
	Bollard Concrete Mounting Kit	CT4001-CCM

*Note: ALL CT4000 stations include Integral Modem -GW1.

Software & Services

Description	Order Code
ChargePoint Commercial Service Plan	CPCLD-COMMERCIAL-*n**
ChargePoint Enterprise Plan	CPCLD-ENTERPRISE-*n**
ChargePoint Assure	CT4000-ASSURE*n**
Station Activation and Configuration	CPSUPPORT-ACTIVE
ChargePoint Station Installation and Validation	CT4000-INSTALLVALID

Note: All CT4000 stations require a network service plan per port.

*Substitute *n* for desired years (1, 2, 3, 4 or 5 years)

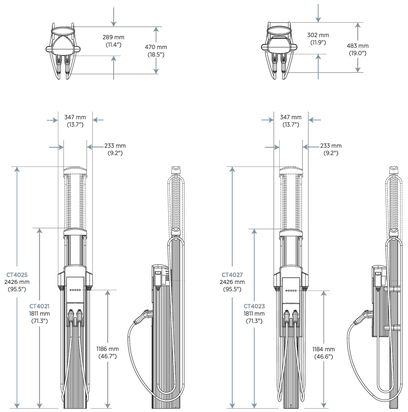
Order Code Examples

If ordering this…	…the order code is
1830 mm (6 ft) Dual Port Bollard Networked Station with Concrete Mounting Kit	CT4021-GW1 CT4001-CCM
ChargePoint Commercial Service Plan, 3 Year Subscription	CPCLD-COMMERCIAL-3
ChargePoint Station Installation and Validation	CT4000-INSTALLVALID
3 Years of Assure Coverage	CT4000-ASSURE3
1830 mm (6 ft) Single Port Wall Mount Networked Station	CT4013-GW1
ChargePoint Commercial Service Plan, 5 Year Subscription	CPCLD-COMMERCIAL-5
5 Years of Assure Coverage	CT4000-ASSURE5
Station Activation and Configuration	CPSUPPORT-ACTIVE

Architectural Drawings (Dimensions)

CT4021 1830 mm (6')
CT4025 2440 mm (8')
Bollard

CT4023 1830 mm (6')
CT4027 2440 mm (8')
Wall Mount



General Specifications

Electrical Input

Electrical Input	Single Port (AC Voltage 208 / 240V AC)			Dual Port (AC Voltage 208 / 240V AC)		
	Input Current	Input Power Connection	Required Service Panel Power	Input Current	Input Power Connection	Required Service Panel Power
Standard	30A	One 40A branch circuit	40A dual pole (non-GFCI type)	30A x 2	Two independent 40A branch circuits	40A dual pole (non-GFCI type) x 2
Standard Power Share	n/a	n/a	n/a	32A	One 40A branch circuit	40A dual pole (non-GFCI type)
Power Select 24A	24A	One 30A branch circuit	30A dual pole (non-GFCI type)	24A x 2	Two independent 30A branch circuits	30A dual pole (non-GFCI type) x 2
Power Select 24A Power Share	n/a	n/a	n/a	24A	One 30A branch circuit	30A dual pole (non-GFCI type)
Power Select 16A	16A	One 20A branch circuit	20A dual pole (non-GFCI type)	16A x 2	Two independent 20A branch circuits	20A dual pole (non-GFCI type)
Power Select 16A Power Share	n/a	n/a	n/a	16A	One 20A branch circuit	20A dual pole (non-GFCI type)
Service Panel GFCI	Do not provide external GFCI as it may conflict with internal GFCI (CCID)					
Wiring – Standard	3-wire (L1, L2, Earth)			5-wire (L1, L1, L2, L2, Earth)		
Wiring – Power Share	n/a			3-wire (L1, L2, Earth)		
Station Power	8 W typical (standby), 15 W maximum (operation)					

Electrical Output

Electrical Output	Single Port (AC Voltage 208 / 240V AC)	Dual Port (AC Voltage 208 / 240V AC)
Standard	7.2 kW (240V AC @ 30A)	7.2 kW (240V AC @ 30A) x 2
Standard Power Share	n/a	7.2 kW (240V AC @ 30A) x 1 or 3.8 kW (240V AC @ 16A) x 2

Power Select 24A	5.8 kW (240V AC @ 24A)	5.8 kW (240V AC @ 24A) x 2
Power Select 24A Power Share	n/a	5.8 kW (240V AC @ 24A) x 1 Or 2.9 kW (240V AC @ 12A) x 2
Power Select 16A	3.8 kW (240V AC @ 16A)	3.8 kW (240V AC @ 16A) x 2
Power Select 16A Power Share	n/a	3.8 kW (240V AC @ 16A) x 1 Or 1.9 kW (240V AC @ 8A) x 2

Functional Interfaces

	Single Port (AC Voltage 208 / 240V AC)	Dual Port (AC Voltage 208 / 240V AC)
Connector Types	SAE J1772™	SAE J1772™ x 2
Cable Length — 1.8 m (6 ft) Cable Management	5.5 m (18 ft)	5.5 m (18 ft) x 2
Cable Length — 2.4 m (8 ft) Cable Management	n/a	7 m (23 ft)
Overhead Cable Management System	Yes	
LCD Display	145 mm (5.7 in) full color, 640 x 480, 30 fps full motion video, active matrix, UV protected	
Card Reader	ISO 15693, ISO 14443, NFC	
Locking Holster	Yes	Yes x 2

Safety and Connectivity Features

Ground Fault Detection	20 mA CCID with auto retry
Open Safety Ground Detection	Continuously monitors presence of safety (green wire) ground connection
Plug-Out Detection	Power terminated per SAE J1772™ specifications
Power Measurement Accuracy	+/- 2% from 2% to full scale (30A)
Power Report/Store Interval	15 minute, aligned to hour. Vehicle to grid connected and responsive to TOU signals
Local Area Network	2.4 GHz WiFi (802.11 b/g/n)
Wide Area Network	LTE Category 4

Safety and Operational Ratings

Station Enclosure Rating	Type 3R per UL 50E
Safety and Compliance	UL and cUL listed; complies with UL 2594, UL 2231-1, UL 2231-2, and NEC Article 625
Station Surge Protection	6 kV @ 3,000A. In geographic areas subject to frequent thunder storms, supplemental surge protection at the service panel is recommended.
EMC Compliance	FCC Part 15 Class A
Operating Temperature	-40°C to 50°C (-40°F to 122°F)
Non-Operating Temperature	-40°C to 60°C (-40°F to 140°F)
Terminal Block Temperature Rating	105°C (221°F)
Operating Humidity	Up to 85% @ 50°C (122°F) non-condensing
Non-Operating Humidity	Up to 95% @ 50°C (122°F) non-condensing
Network	All stations include integral LTE modem and will be automatically configured to operate as gateway or non-gateway as needed

ChargePoint, Inc. reserves the right to alter product offerings and specifications at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document

ChargePoint, Inc.
240 East Hacienda Avenue
Campbell, CA 95008-6617 USA

+1.408.841.4500 or
+1.877.370.3802 US and Canada toll-free

chargepoint.com

Contact Us

Visit chargepoint.com

Call +1.408.705.1992

Email sales@chargepoint.com

Listed by Underwriters Laboratories Inc.

Contractor:

Project:

APPLIED AEROSPACE
[redacted]

Project Details:

1076.70 kWstc, 960.00 kW AC
AHJ: [redacted]
APN: [redacted]

Engineering Approval:

REVISIONS

DESCRIPTION	DATE	REV
PERMIT SET	1/1 1/2024	A

Sheet Title:

EQUIPMENT DATASHEETS

Sheet Number:

D1.1

Sheet Size:

ARCH D - 36" x 24"

Design & Drafting by:

Reviewed & Approved by:

RD