Request for Information

SAN DIEGO UNIFIED SCHOOL DISTRICT Facilities Planning & Construction / Physical Plant Operations
4860 Ruffner St San Diego, CA 92111-1522

Project:	Ocean Discovery	**Document:**	**No. 0206**
Title:	Solar Scope Clarification	**Sub Ref. No.:**	
From:	Soltek Pacific	**Date:**	10/26/2016
To:	Rob Wellington Quigley	**Required Date:**	11/02/2016
Plan Ref:		**Response Date:**	

Question:

Assuming the solar/PV system is remaining the same size as the basis of design per drawing sheet E3.7 , PARs interpretation of the drawings and scope of work at bid time for the solar portion of work is as follows:

- Procurement and installation of conduit and wire from MSB to PV system disconnect, (4) 4/0 +(1) #4G in (1) 3 ” Conduit
- Procurement and installation of PV system disconnect, installed at the location shown on drawing E4.1
- Procurement and installation of conduit and wire from PV disconnect to Panel PV, (4) 4/0 +(1) #4G in (1) 3 ” Conduit
- Procurement and installation of panel “ PV ” as shown on Sheet E5.7 and E4.1
- Procurement and installation of conduit as described per Note 6 on E3.7, (1) 1 ¼ ” conduit for string wiring, (1) 1 ¼ ” conduit for spare capacity, and (1) ¾ ” conduit for communications to MET station. Exact roof penetration location to be determined by architect and conduit shall be stubbed into the electrical room (C-006). Conduit stubbed through the roof will be capped off and made water tight for future use by others (solar installer)

PAR ’ s interpretation of the scope of work that is not covered is as follows:

- Procurement and installation of Solar trees
- Procurement and installation of any solar equipment (Addendum #4 A20)
- Procurement and installation of Conduit / Wire from Panel PV to inverter(s).
- Procurement and installation of the grounding of inverter(s) Note 9, 10 and 11 on Sheet E5.7
- Procurement and installation of the DAS, note 5 on Sheet E5.7
- Procurement and installation of the raceway and wiring from the inverter to the DAS, note 8 on Sheet E5.7
- Procurement and installation of the MET, note 7 on Sheet E5.7
- Procurement of installation of string wiring from the inverter to the fuse box, Note 1 on Sheet E5.7
- Procurement and installation of the fuse box, note 2 on Sheet E5.7
- Procurement and installation of the conduit and wiring from the fuse box to the module strings, note 1 on sheet E5.7
- Procurement and installation of the roof arrays (24) Sunpower SPR-X21-335-BLK Modules.
- Procurement and installation for any conduit and wiring for power or communications to the solar trees. Addendum #4 labeled the solar trees as future (Addendum #4 A2) and no Envision drawings were ever provided (referencing Sheet E5.7) calling out for conduit size or wire size. Any reference to specific manufacturer was also disregarded (Addendum #4 A31) making it impossible for PAR to bid.
- Procurement and installation of light fixtures, conduit for fixtures and wiring of fixtures. No drawings of the solar trees were ever provided prior to bid making it impossible for PAR to tell if the proposed fixtures could be attached and/or the method of attachment to the solar trees themselves. Also comes with that is the physical layout of the trees themselves, conduit pathways could not be determined accurately and there was no mention as to the heights of the trees. Sheet E3.7 mentions it is to be a tracker style type, how does it articulate? Is there a pathway for conduit already available through the center of the tree? If not what is the manufacturers preferred method attachment for conduit straps, boxes and fixtures to the tree, after all it is a structural support. All of these questions as well as the note saying they were future led PAR to believe that this was part of the future scope of work.

Cost Impact: Possible
Schedule Impact: No

Proposed Solution:

Answer:

RWQ 11.14.2016
SEE ATTACHED RESPONSE

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No wire, conduit only - provide credit for wire

Question:

Assuming the solar/PV system is remaining the same size as the basis of design per drawing sheet E3.7 , PARs interpretation of the drawings and scope of work at bid time for the solar portion of work is as follows:

• Procurement and installation of conduit and ~~wire~~ from MSB to PV system disconnect, ~~(4) 4/0 + (1) #4G~~ in (1) 3 ” Conduit

ok • Procurement and installation of PV system disconnect, installed at the location shown on drawing E4.1

• Procurement and installation of conduit and ~~wire~~ from PV disconnect to Panel PV, ~~(4) 4/0 + (1) #4G~~ in (1) 3 ” Conduit

ok • Procurement and installation of panel “ PV ” as shown on Sheet E5.7 and E4.1

ok • Procurement and installation of conduit as described per Note 6 on E3.7, (1) 1 ¼ ” conduit for string wiring, (1) 1 ¼ ” conduit for spare capacity, and (1) ¾ ” conduit for communications to MET station. Exact roof penetration location to be determined by architect and conduit shall be stubbed into the electrical room (C-006). Conduit stubbed through the roof will be capped off and made water tight for future use by others (solar installer)

PAR ’ s interpretation of the scope of work that is not covered is as follows:

ok • Procurement and installation of Solar trees

Wire OK - We need conduit

ok • Procurement and installation of any solar equipment (Addendum #4 A20)

• Procurement and installation of Conduit / Wire from Panel PV to inverter(s).

Need ground rod and conduit up to roof

• Procurement and installation of the grounding of inverter(s) Note 9, 10 and 11 on Sheet E5.7

ok • Procurement and installation of the DAS, note 5 on Sheet E5.7

ok • Procurement and installation of the raceway and wiring from the inverter to the DAS, note 8 on Sheet E5.7

ok • Procurement and installation of the MET, note 7 on Sheet E5.7

ok • Procurement of installation of string wiring from the inverter to the fuse box, Note 1 on Sheet E5.7

ok • Procurement and installation of the fuse box, note 2 on Sheet E5.7

ok • Procurement and installation of the conduit and wiring from the fuse box to the module strings, note 1 on sheet E5.7

ok • Procurement and installation of the roof arrays (24) Sunpower SPR-X21-335-BLK Modules.

• Procurement and installation for any conduit and wiring for power or communications to the solar trees. Addendum #4 labeled the solar trees as future (Addendum #4 A2) and no Envision drawings were ever provided (referencing Sheet E5.7) calling out for conduit size or wire size. Any reference to specific manufacturer was also disregarded (Addendum #4 A31) making it impossible for PAR to bid.

Need conduit to be installed

• Procurement and installation of light fixtures, conduit for fixtures and wiring of fixtures. No drawings of the solar trees were ever provided prior to bid making it impossible for PAR to tell if the proposed fixtures could be attached and/or the method of attachment to the solar trees themselves. Also comes with that is the physical layout of the trees themselves, conduit pathways could not be determined accurately and there was no mention as to the heights of the trees. Sheet E3.7 mentions it is to be a tracker style type, how does it articulate? Is there a pathway for conduit already available through the center of the tree? If not what is the manufacturers preferred method attachment for conduit straps, boxes and fixtures to the tree, after all it is a structural support. All of these questions as well as the note saying they were future led PAR to believe that this was part of the future scope of work.

Need the lights and conduit

Cost Impact: Possible
Schedule Impact: No

Proposed Solution:

Answer:

PROJECT AREA INFORMATION

AREA DATA:

ZIP CODE...	92105
REC LOW....	5°C
AVG HI.......	26°C

ORIENTATION:

BASIS OF DESIGN

PV MODULES:
SUNPOWER, SPR-X21-345-BLK (345 WATT)
(24) MODULES
(6) MODULES PER STRING
(3) STRINGS

INVERTERS:
(1) ABB STRING INVERTER 10kW, 208V, 3PH
PVI-10.0-I-OUTD-S2-US-208

MOUNTING:
MODULES SHALL BE MOUNTED FLAT TO 25° SLOPED ROOF SURFACE TILT WITH APPROVED STRUCTURAL ATTACHMENTS. REFER TO DETAIL 2/A509 FOR MOUNTING.

SYSTEM SIZING:
DC RATING (kW STC) = 8.28 kW

GENERAL NOTE:
THIS CONTRACTOR IS RESPONSIBLE TO PROVIDE ESTIMATED kWH PRODUCTION VALUES OF THE SUBMITTED SYSTEM TO THE ARCHITECT FOR REVIEW DURING THE SUBMITTAL PROCESS. CALCULATIONS SHALL INCLUDE REDUCTION VALUES FOR ANY SHADING FROM ADJACENT OBSTRUCTIONS. ALL ADJACENT SHADE OBSTRUCTIONS MAY NOT BE SHOWN ON THESE PLANS. THIS CONTRACTOR IS RESPONSIBLE TO EVALUATE THE PLANS AND SITE FOR SHADE OBSTRUCTIONS PRIOR TO SUBMITTING CALCULATIONS.

NUMBERED SHEET NOTES

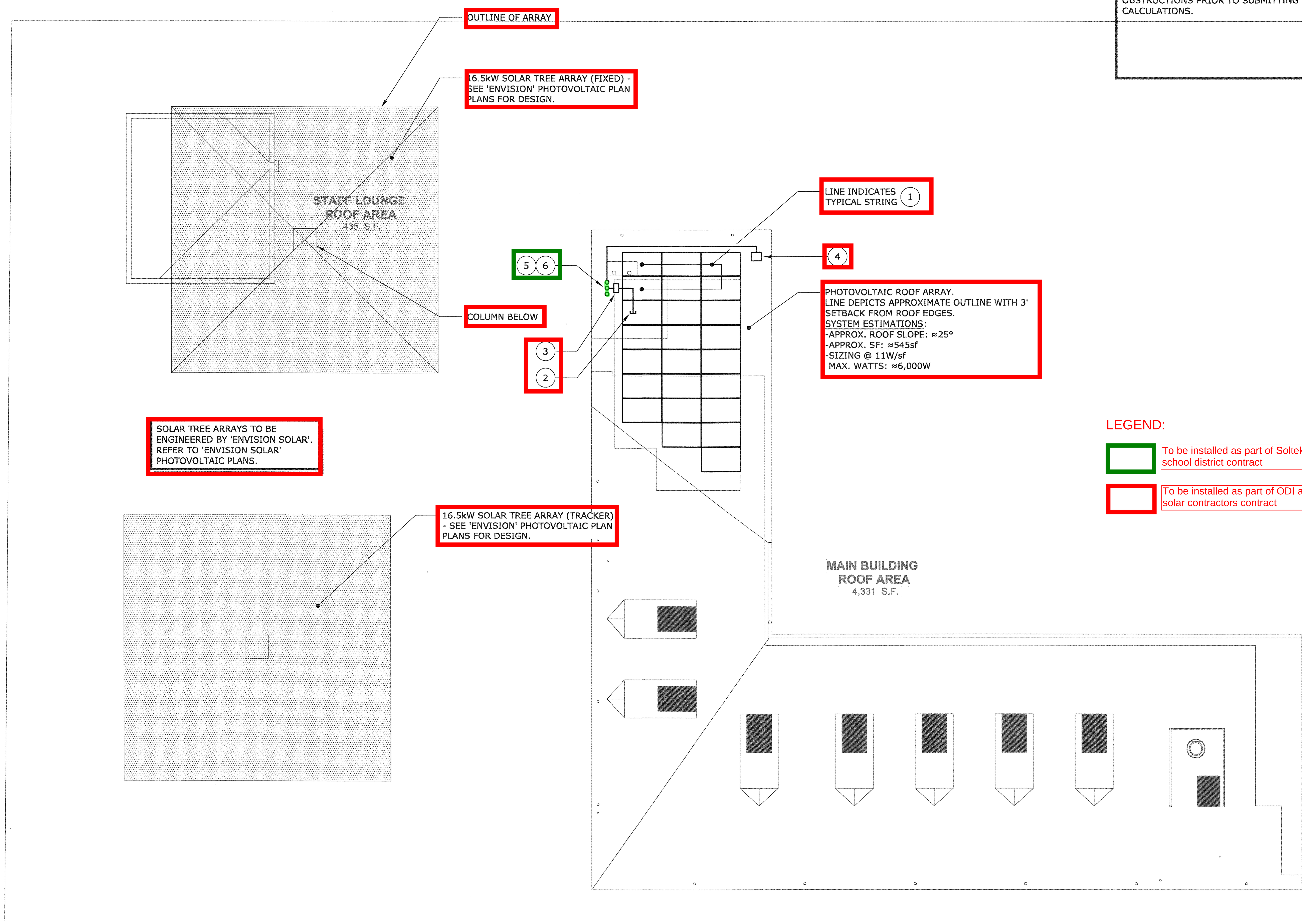
1. ALL STRING WIRING SHALL BE NEATLY ARRANGED AND SECURED BENEATH MODULES ALONG ENTIRETY OF ARRAY. LOCATE AND SECURE STRING WIRING SUCH THAT IT MINIMIZES EXPOSED VIEW.
2. PROVIDE CONDUIT STUB BELOW MODULES FOR STRING WIRING TRANSITION. STUB SHALL BE ORIENTED IN A DOWNWARD SLOPE TO MITIGATE WATER ENTRY.
3. PV STRING WIRING FUSE BOX - SEE E5.7.
4. MET STATION - SEE E5.7. LOCATE SUCH THAT MET STATION IS FREE OF SHADE, YEAR ROUND.
5. PROVIDE WEATHERPROOF ROOF PENETRATION TO INTERIOR SPACES BELOW. PROVIDE DC CONDUIT HOMERUN TO INVERTER LOCATION VIA ADJACENT DC DISCONNECTS. SEE E5.7.
6. PROVIDE AND INSTALL THE FOLLOWING CONDUITS FOR ROOF PV ARRAY:
   (1) 1-1/4" C. FOR STRING WIRING
   (1) 1-1/4" C. FOR SPARE CAPACITY
   (1) 3/4" C. FOR COMMUNICATIONS TO MET STATION
   COORDINATE EXACT ROOF LOCATIONS WITH ARCHITECT PRIOR TO ROUGH-IN. HOMERUNS SHALL BE STUBBED INTO ELECTRICAL ROOM, ADJACENT PV INVERTER LOCATION.

PHOTOVOLTAIC SYSTEM NOTES

1. ALL EXTERIOR EQUIPMENT / BOXES / COMBINERS SHALL BE NEMA 3R RATED FOR OUTDOOR USE.
2. ALL EXTERIOR BARE METAL RACEWAYS SHALL BE RIGID GALVANIZED STEEL (R.G.S.), U.O.N.
3. ALL CONDUCTORS TO BE SIZED PER NEC T310.15(B)(2)(c) AND T310.16 CORRECTION FACTORS FOR AMBIENT TEMPERATURE. CONDUCTORS SHALL ALSO BE DERATED PER NEC TABLE 310.15(B)(2)(A) FOR MORE THAN (3) CURRENT CARRYING CONDUCTORS IN A COMMON RACEWAY.
4. ALL UNDERGROUND RACEWAYS TO BE SCHEDULE 40 PVC, UNLESS OTHERWISE NOTED.
5. ALL IN-GROUND PULL BOXES TO BE FLUSH STYLE WITH CONCRETE LIDS. PROVIDE TRAFFIC RATED LIDS IN TRAFFIC AREAS.
6. COORDINATE ALL UTILITY SYSTEM RELATED ITEMS WITH UTILITY CO. INCLUDING APPLICATION FOR UTILITY INTERCONNECT AGREEMENT AND INSTALLATION OF BI-DIRECTIONAL METER.
7. ALL SYSTEM COMPONENTS AND EQUIPMENT / ALL COMPLY WITH NEC ARTICLE 690 AND OTHER APPLICABLE CODES, REGULATIONS AND LOCAL ORDINANCES.
8. ALL INVERTERS TO BE CERTIFIED WITH THE CALIFORNIA ENERGY COMMISSION AND UL1741 LISTED, UTILITY INTERACTIVE, SIZE AND RATINGS AS NOTED ON PLANS.
9. ALL DC DISCONNECTS TO BE 2P OR 3P (AS NOTED), 600VDC NEMA 3R RATED AND DC RATED (LABELED) FOR MIN. 156% OF Isc (WHERE USED).
10. ALL AC FEEDERS SIZED TO NEC TABLE 316, 75 DEGREE COLUMN WHEN USED WITH 75 DEGREE TERMINATIONS AND EQUIPMENT. USE 90 DEGREE COLUMN WHEN USED WITH PV EQUIPMENT RATED WITH 90 DEGREE TERMINATIONS. CONDUCTOR SIZES TO BE BASED ON FULL EQUIPMENT NAMEPLATE LOADS.
11. ALL CONDUIT FILL (AC AND DC) TO BE 40% MAXIMUM.
12. ALL DC CIRCUITS TO BE 2-WIRE + GROUND, (90 DEGREE COLUMN), RATED FOR MIN. 156% OF Isc.
13. ALL AC AND DC WIRING IN CONDUIT TO BE RHW-2, THWN-2, OR XHHW-2 (90 DEGREE) WET RATED FOR USE WITH 90 DEGREE LISTED TERMINALS ON PV EQUIPMENT.
14. ALL EXPOSED DC WIRING TO BE USE-2 OR SE (90 DEGREE) WET RATED AND SUNLIGHT RESISTANT. DC WIRING FOR UNGROUNDED PV SYSTEMS SHALL BE LISTED 'PV' WIRE PER 690.35(D)(3).
15. ALL PV MODULES TO BE UL 1703 LISTED.
16. ALL CONDUITS AT ROOF SHALL BE MOUNTED ON COOPER B-LINE DURA-BLOK SLEEPERS OR EQUAL, WITH MINIMUM 3-1/2" DISTANCE BETWEEN BOTTOM OF CONDUIT AND TOP OF ROOF SURFACE.

GROUNDING NOTES

1. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN EACH CONDUIT (BOTH AC AND DC), SIZED PER NEC 250 AND 690.
2. ALL GROUNDING SHALL BE PER NEC 250 AND 690-45. BOND ALL METAL SURFACES / FRAMES / EQUIPMENT WITH MIN. #8 GROUND STRAP AS REQUIRED.



LEGEND:

- (green box) To be installed as part of Soltek's and school district contract
- (red box) To be installed as part of ODI and solar contractors contract

ROOF LEVEL PLAN - PHOTOVOLTAIC (1/E3.7)
SCALE: 1/8" = 1'-0"

NORTH

REVIEWED BY: DISTRICT ARCHITECT / ASSISTANT DISTRICT ARCHITECT / SITE ADMINISTRATOR / OTHER / OTHER / OTHER — DATE

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
OFFICE OF REGULATION SERVICES
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DATE JUL 15 2015

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PREPARED FOR THE
BOARD OF EDUCATION
SAN DIEGO UNIFIED SCHOOL DISTRICT
SAN DIEGO, CALIFORNIA

PREPARED BY THE
FACILITIES PLANNING AND CONSTRUCTION PROJECT MANAGEMENT DEPARTMENT

ROOF LEVEL PLAN - PHOTOVOLTAIC
OCEAN DISCOVERY INSTITUTE
LIVING LAB
4255 THORN STREET
SAN DIEGO, CALIFORNIA
CONSTRUCTION DOCUMENTS

PROJECT NO.	
R.S.	A.P.
FILE NAME	
DATE 06/11/2015	DRAWN LN / CHECKED PJC
REVISIONS	SHEET NO. E3.7
	OF - SHEETS

OCEAN DISCOVERY INSTITUTE LIVING LAB–213123

GENERAL NOTES

A. IN ELECTRICAL ROOMS, WHERE ELECTRICAL EQUIPMENT IS LOCATED AT WALLS WITH BRACE FRAMING, PROVIDE AND INSTALL STEEL CHANNEL SUPPORTS FOR MOUNTING OF ELECTRICAL EQUIPMENT AWAY FROM WALL TO AVOID CONFLICT WITH BRACE FRAMING. STEEL CHANNEL SUPPORTS SHALL BE UNISTRUT OR EQUAL, AND SHALL INCLUDE ALL CHANNELS, BASES, FITTINGS, ETC., AS REQUIRED FOR A COMPLETE INSTALLATION.

B. IN ELECTRICAL ROOMS, CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ELECTRICAL EQUIPMENT WITHIN THE SPACE PROVIDED. CONTRACTOR SHALL PROVIDE ¼" SCALE PLANS OF ELECTRICAL ROOM LAYOUTS, AND ELEVATIONS OF STEEL CHANNEL SUPPORTS OF ELECTRICAL EQUIPMENT FOR REVIEW AND APPROVAL PRIOR TO ANY INSTALLATION OR ROUGH-IN.

C. PROVIDE WORK SPACE AROUND SWITCHBOARDS AND PANEL BOARDS AS REQUIRED BY NEC. ACCESS TO THE PANELS OF A MINIMUM CLEAR UNOBSTRUCTED WIDTH OF 30 INCHES SHALL BE PROVIDED FROM FACE OF PANEL TO AN AISLE AND 36 INCHES CLEAR UNOBSTRUCTED FRONT CLEARANCE. THIS SHALL APPLY IN ALL ELECTRICAL AND TELECOM ROOMS.

D. DEDICATED NEUTRALS REQUIRED FOR ALL BRANCH CIRCUITS.

E. DEVICES ON FIRE RATED WALLS TO BE 24" APART MINIMUM.

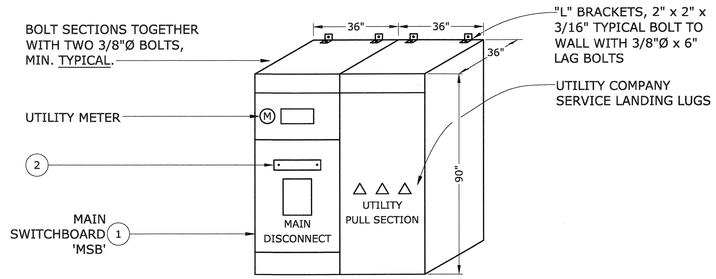
NUMBERED SHEET NOTES

1. PV SYSTEM DISCONNECT SHALL BE INSTALLED WITHIN 10 FEET OF UTILITY ELECTRICAL METER.
2. TELEPHONE/DATA TERMINAL BOARD, 3/4 INCH MARINE GRADE PLYWOOD (FIRE TREATED), INSTALLED THE FULL HEIGHT OF THE WALLS AND PAINTED. SEE SPECIFICATIONS.
3. GROUND BUS CABINET, PROVIDE AND INSTALL A #4/0 INSULATED GROUND WIRE IN 1 INCH CONDUIT TO MAIN SWITCHBOARD MSB GROUND BUS. VERIFY LOCATION PRIOR TO ROUGH-IN. SEE 1/E7.4.
4. PROVIDE AND INSTALL ELECTRICAL CONNECTIONS TO TELE/DATA RACKS. CONNECT COMPLETE.
5. PROVIDE 36" MINIMUM FRONT CLEARANCE FOR ALL ELECTRICAL EQUIPMENT. SEE GENERAL NOTE C.
6. PROVIDE & INSTALL DATA OUTLET & CONDUIT WITH CAT 5 CABLE TO M&V METERS (NIEC) IN ELECTRIC RM #C006.

LEGEND:

To be installed as part of Soltek's and school district contract

To be installed as part of ODI and solar contractors contract

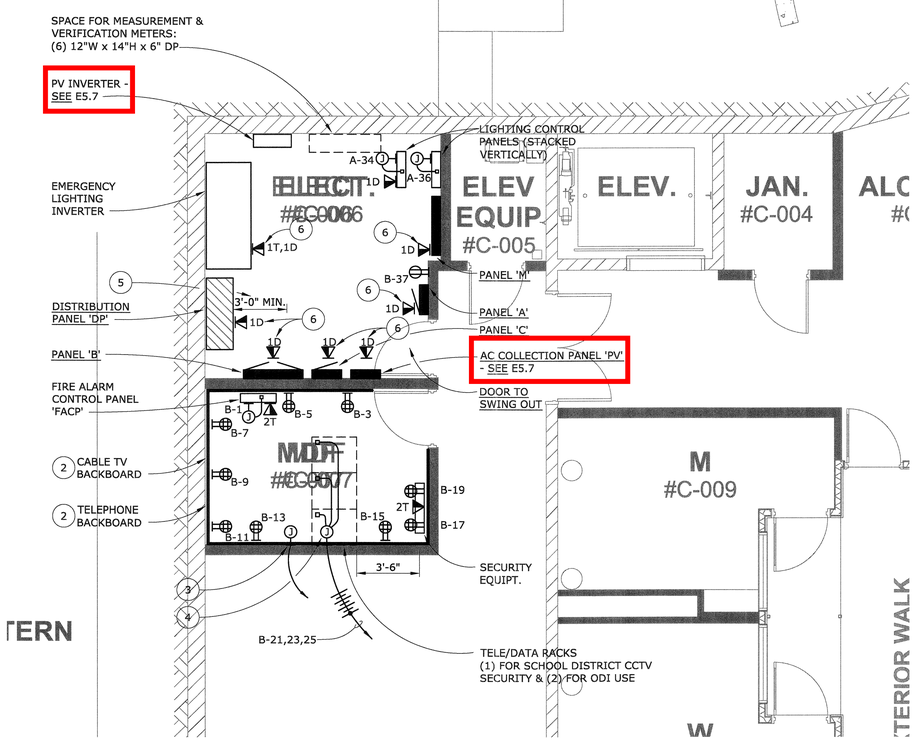


NUMBERED DETAIL NOTES

1. SUBMIT SHOP DRAWINGS TO UTILITY COMPANY FOR REVIEW. SEE 1/E5.1 FOR REQUIREMENTS.
2. PROVIDE AND INSTALL NAMEPLATE WITH NOMENCLATURE WHICH READS "BUILDING ELECTRICAL MAIN DISCONNECT".

MAIN SWITCHBOARD 'MSB' ELEVATION — 3 / E4.1

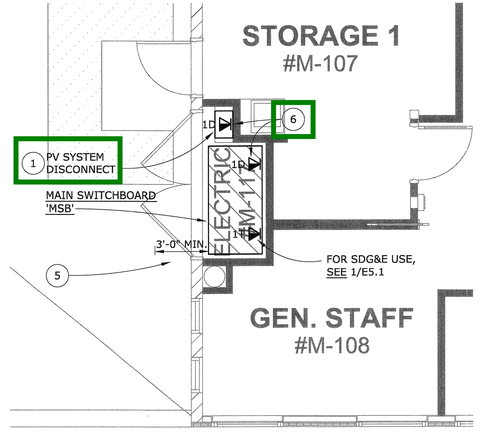
SCALE: NONE
FILE: L:\DETAILS\POWER\MSB\PMSB003 (MOD.)



PARTIAL PLAN - CANYON LEVEL ELECTRICAL ROOM — 2 / E4.1

SCALE: 1/4" = 1'-0"

NORTH



PARTIAL PLAN - MIDLEVEL MAIN ELECTRICAL CLOSET — 1 / E4.1

SCALE: 1/4" = 1'-0"

NORTH

REVIEWED BY

	DISTRICT ARCHITECT	ASSISTANT DISTRICT ARCHITECT	SITE ADMINISTRATOR	OTHER	OTHER	OTHER
DATE						

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
OFFICE OF REGULATION SERVICES
04 114084
AC — FSS — SS —
DATE JUL 15 2015
DSA

REGISTERED PROFESSIONAL ENGINEER — PAUL J. VANDER — No. 14738 — Exp. 6/15 — ELECTRICAL — STATE OF CALIFORNIA
CONSULTANT

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R.S. -	A.P. -
FILE NAME	-
DATE 06/11/2015	DRAWN L.N. CHECKED P.J.C.
REVISIONS	SHEET NO. E4.1 OF . SHEETS

P:\2013\OCEAN DISCOVERY INSTITUTE LIVING LAB-213123\CAD_A\E4_OCEAN LL.dwg, 6/11/2015 6:28:30 PM, tvessels

COPPER FEEDER SCHEDULE

FEEDER	CONDUIT	CONDUCTORS
8004	(2) 4"	2 SETS: (4)500 MCM & (1)#1/0 G.
4004	(1) 4"	(4)500 MCM & (1)#1/0 G.
4003	(1) 4"	(3)500 MCM & (1)#1/0 G.
2503	(1) 2"	(3)250 MCM & (1)#4 G.
2254	(1) 3"	(4)#4/0 & (1)#4 G.
2004	(1) 2"	(4)#3/0 & (1)#4 G.
1503	(1) 2"	(3)#1/0 & (1)#6 G.
1254	(1) 2"	(4)#1 & (1)#6 G.
1253	(1) 1 1/4"	(3)#1 & (1)#6 G.
100IG	(1) 1/2"	(4)#2 & (2)#6 G.
1004	(1) 2"	(4)#2 & (1)#6 G.
1003	(1) 1 1/4"	(3)#2 & (1)#6 G.
803	(1) 1"	(3)#4 & (1)#6 G.
603	(1) 1"	(3)#6 & (1)#10 G.
503	(1) 1"	(3)#8 & (1)#10 G.
404	(1) 3/4"	(4)#8 & (1)#10 G.

FEEDER TAG KEY

400 4 N
- 400 — FEEDER AMPACITY
- 4 — WIRE QUANTITY
- N — INDICATES DOUBLE NEUTRAL

NOTE: NOT ALL FEEDERS ON THIS SCHEDULE ARE NECESSARILY USED ON THIS PROJECT.

LOAD CALCULATION

LOAD		KVA
MAIN SWITCHBOARD MSB		
NEW DISTRIBUTION PANEL DP		
PANEL A	10.39	
PANEL B (SECTION 1)	32.22	
PANEL B (SECTION 2)	16.96	
PANEL C	30.48	
PANEL M (SECTION 1)	24.44	
PANEL M (SECTION 2)	25.94	
PANEL K	8.12	
PANEL AV	3.08	
ELEVATOR - 30HP	33.20	
DISTRIBUTION BOARD DP SUB-TOTAL	184.83	184.83
TOTAL KVA		184.83
TOTAL LOAD AMPS @ 120/208V:		511.98
TOTAL AMPS X 1.25%:		639.97

NEW MAIN ELECTRICAL SERVICE:
800 AMPS @ 120/208V, 3PH, 4W

NUMBERED SHEET NOTES

13. PROVIDE AND INSTALL 3/4" CONDUIT WITH CAT6 CABLE TO MDF ROOM FOR TIE-INTO SCHOOL DISTRICT SYSTEM VIA TELEPHONE LINE.
14. PRIOR TO ROUGH-IN AND PURCHASE OF CIRCUIT BREAKERS, CONDUIT AND FEEDERS: FOR NEW EQUIPMENT, VERIFY ELECTRICAL LOAD REQUIREMENTS WITH APPROVED EQUIPMENT SHOP DRAWINGS.
15. SHUNT TRIP CIRCUIT BREAKER FOR ELEVATOR. VERIFY SIZE WITH ELEVATOR VENDOR PRIOR TO ROUGH-IN AND PURCHASE OF CIRCUIT BREAKERS, CONDUIT AND FEEDERS. PROVIDE AND INSTALL FIRE ALARM CONTROL MODULE FOR ELEVATOR SHUNT TRIP. PROVIDE AND INSTALL ¾"C., (3) #12 CONTROL WIRING TO FIRE ALARM CONTROL MODULE AT ELEVATOR MACHINE ROOM FOR SPRINKLER SYSTEM INTERFACE. PROVIDE BREAKER WITH AUXILIARY DRY CONTACTS FOR POSITION STATUS TO BATTERY LOWERING DEVICE. PROVIDE AND INSTALL CONTROL WIRING TO ELEVATOR CONTROLLER. SEE 1/E7.3.
16. PROVIDE AND INSTALL CONTROL WIRING TO ELEVATOR CONTROLLER IN ELEVATOR MACHINE ROOM. SEE 1/E7.3.
17. CIRCUIT BREAKER FURNISHED WITH AUXILIARY DRY CONTACTS FOR ELEVATOR POSITION STATUS TO ELEVATOR BATTERY LOWERING DEVICE. SEE 1/E7.3.
18. PROVIDE WITH ISOLATED GROUND. SEE AV-002P & AV-101P.

GENERAL NOTES

A. PER CEC 110.06 PROVIDE AND INSTALL ELECTRIC ARC FLASH WARNING SIGNS ON ALL SWITCHBOARDS, PANELBOARDS, CONTROL PANELS, METER SOCKET ENCLOSURES, AND MOTOR CONTROLS.

B. BOND ALL COLD WATER PIPING SYSTEMS, GAS PIPING SYSTEMS, AND SPRINKLER PIPING SYSTEMS TO THE BUILDING GROUNDING ELECTRODE WITH (1)#4CU. IN 3/4" CONDUIT. BOND WHEREVER THERE IS A BREAK IN THE CONTINUITY OF THESE SYSTEMS THROUGHOUT THE PROJECT.

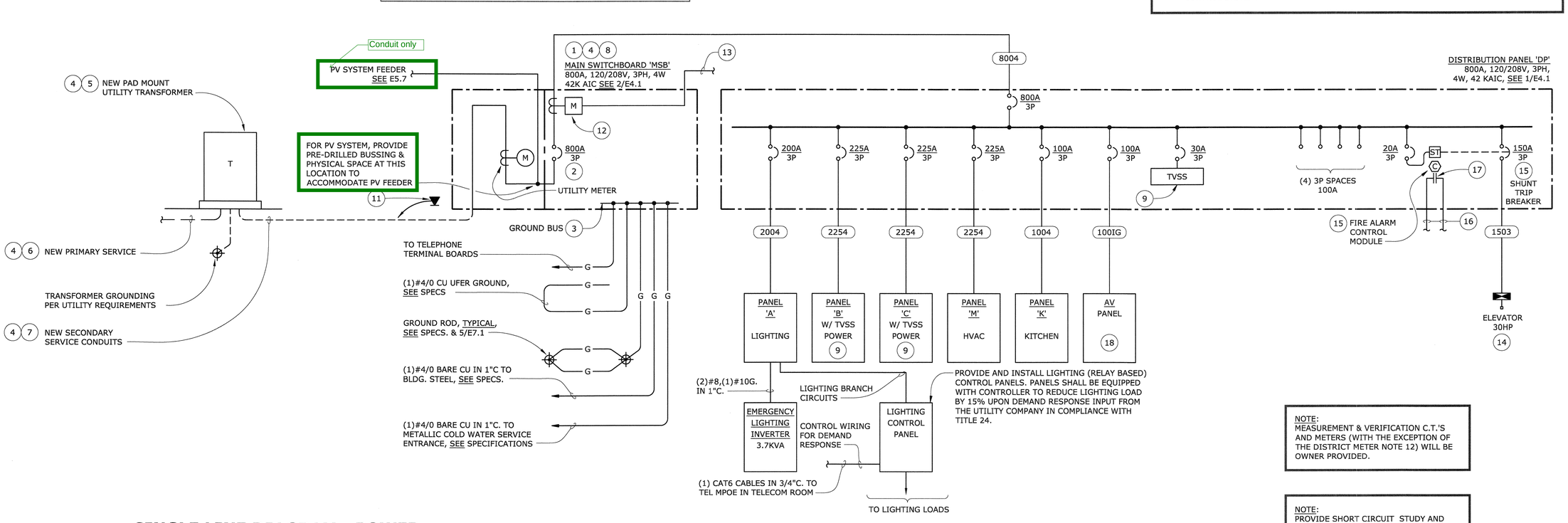
C. UNDERGROUND SERVICE CONDUITS SHALL BE SEALED PER CEC 230.8.

D. SEE SPECIFICATIONS SECTION 260500 FOR CBC SEISMIC CERTIFICATION AND INSTALLATION REQUIREMENTS FOR ALL EQUIPMENT DESIGNATED AS "CRITICAL EQUIPMENT" ON THIS PROJECT.

E. PROVIDE DEDICATED NEUTRALS FOR ALL BRANCH CIRCUITS.

NUMBERED SHEET NOTES

1. THE CONTRACTOR SHALL RETAIN THE SERVICES OF AN INDEPENDENT TESTING COMPANY (E.T.I., EMERSON, OR EQUAL) TO PERFORM AND PREPARE FINAL ELECTRICAL SYSTEM TESTING AND REPORTS, INCLUDING MEGGER AND COORDINATION STUDY. SET ALL ADJUSTABLE BREAKERS TRIP SETTING AND GFP PER STUDY RECOMMENDATIONS. COORDINATION STUDY SHALL BE SUBMITTED PER APPROVAL PER SPECIFICATION 262400.
2. LABEL AS 'BUILDING MAIN DISCONNECT'.
3. IN ADDITION TO GROUNDING INDICATED, BOND ALL COLD WATER PIPING SYSTEM, GAS PIPING SYSTEMS, AND SPRINKLER PIPING SYSTEMS TO THE BUILDING GROUNDING ELECTRODE SYSTEM WITH CODE SIZED BONDING CONDUCTOR IN (1) ¾ INCH CONDUIT. BOND WHEREVER THERE IS A BREAK IN THE CONTINUITY OF THESE SYSTEMS THROUGHOUT THE PROJECT.
4. THE CONTRACTOR SHALL VERIFY AND COORDINATE WITH SDG&E ALL REQUIREMENTS FOR A PERMANENT SERVICE PRIOR TO ORDERING ANY EQUIPMENT OR BEGINNING ANY SERVICE CONSTRUCTION. NO ALLOWANCES WILL BE GIVEN FOR FAILURE TO DO SO.
5. NEW PAD MOUNT SDG&E TRANSFORMER. PROVIDE AND INSTALL TRANSFORMER PAD AND GROUNDING PER SDG&E REQUIREMENTS. PROVIDE AND INSTALL ANY REQUIRED BOLLARDS. VERIFY TRANSFORMER AND BOLLARD LOCATIONS WITH SDG&E PRIOR TO INSTALLATION. SEE SITE PLAN 1/E1.1.
6. PROVIDE AND INSTALL NEW PRIMARY SERVICE CONDUITS PER SDG&E REQUIREMENTS. PROVIDE AND INSTALL SDG&E CONDUITS 36" MINIMUM BELOW GRADE. SERVICE CONDUIT(S) STUBBED OUT AT STREET, OR EXTENDED TO NEAREST EXISTING UTILITY PULLBOX OR UTILITY POLE. COORDINATE LOCATION AND CONNECTION REQUIREMENTS WITH UTILITY COMPANY. VERIFY SERVICE ENTRY POINT, CONDUIT AND PULLBOX REQUIREMENTS AND LOCATIONS PRIOR TO ANY EXCAVATION.
7. PROVIDE AND INSTALL NEW SECONDARY SERVICE CONDUITS TO NEW MAIN SWITCHBOARD, PER SDG&E REQUIREMENTS. SEE SITE PLAN 1/E1.1.
8. THE CONTRACTOR SHALL SUBMIT THE MAIN SWITCHBOARD SHOP DRAWINGS TO SDG&E FOR FINAL APPROVAL AND AIC (ASYMMETRIC INTERRUPTING CURRENT) VERIFICATION PRIOR TO RELEASE FOR MANUFACTURING. THE CONTRACTOR SHALL VERIFY AND COORDINATE WITH SDG&E ALL REQUIREMENTS FOR A PERMANENT SERVICE PRIOR TO ORDERING ANY EQUIPMENT OR BEGINNING ANY SERVICE CONSTRUCTION. NO EXTRA CHARGES SHALL BE APPROVED FOR FAILURE TO DO SO. THE SWITCHBOARD SHALL MEET ALL REQUIREMENTS FOR SDG&E FOR A COMPLETE AND PERMANENT INSTALLATION.
9. PROVIDE WITH TVSS.
10. PROVIDE AND INSTALL PV SYSTEM DISCONNECT. PV SYSTEM FUSED DISCONNECT SHALL BE INSTALLED WITHIN 10 FEET OF SDG&E ELECTRIC METER. SEE PARTIAL PLAN 1/E4.1.
11. PROVIDE AND INSTALL TELEPHONE OUTLET AND 1" CONDUIT HOMERUN FOR SDG&E REMOTE METER. COORDINATE EXACT LOCATION WITH SDG&E PRIOR TO ROUGH-IN.
12. PROVIDE AND INSTALL ELECTRICAL METER PER SCHOOL DISTRICT STANDARDS. THE METER SHALL HAVE 4-20mA OR PULSE OUTPUT FOR INPUT TO THE DISTRICT'S ENERGY MANAGEMENT CONTROL SYSTEM.



SINGLE LINE DIAGRAM - POWER

SCALE: NONE

1 / E5.1

NOTE:
MEASUREMENT & VERIFICATION C.T.'S AND METERS (WITH THE EXCEPTION OF THE DISTRICT METER NOTE 12) WILL BE OWNER PROVIDED.

NOTE:
PROVIDE SHORT CIRCUIT STUDY AND ARC FLASH STUDY PER SPECIFICATION 26 24 00, 2.3.

REVIEWED BY

	DISTRICT ARCHITECT	ASSISTANT DISTRICT ARCHITECT	SITE ADMINISTRATOR	OTHER	OTHER	OTHER
DATE						

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
OFFICE OF REGULATION SERVICES
04 114084
AC — FLS — SS — GL
DATE JUL 15 2015
DSA

REGISTERED PROFESSIONAL ENGINEER — No. 14738 — ELECTRICAL — STATE OF CALIFORNIA — MICHAEL ANDER
CONSULTANT

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SAN DIEGO, CALIFORNIA

PREPARED BY THE
FACILITIES PLANNING AND CONSTRUCTION PROJECT MANAGEMENT DEPARTMENT

SINGLE LINE DIAGRAM - POWER

OCEAN DISCOVERY INSTITUTE

LIVING LAB

4255 THORN STREET
SAN DIEGO, CALIFORNIA

CONSTRUCTION DOCUMENTS

PROJECT NO.
R.S. - A.P. -
FILE NAME -
DATE 06/11/2015
DRAWN LN/TV
CHECKED PJC
REVISIONS - - - -
SHEET NO. E5.1
OF - SHEETS

OCEAN DISCOVERY INSTITUTE LIVING LAB-213123

REQUIRED PLACARDS

1. ALL NAMEPLATE PLACARDS SHALL BE MACHINE GENERATED PHENOLIC TYPE WITH RED BACKGROUND AND WHITE LETTERING; U.O.N., AFFIXED TO EQUIPMENT IN A PERMANENT MANNER TO WITHSTAND THE INSTALLED ENVIRONMENT. MINIMUM LETTERING SIZE TO BE 1/4" UNLESS OTHERWISE NOTED OR REQUIRED FOR LEGIBILITY.

2. INSTALL A PERMANENT PHENOLIC PLAQUE AT THE SERVICE ENTRANCE EQUIPMENT DENOTING ALL ELECTRICAL POWER SOURCES TO READ:

   - WARNING -
   TWO POWER SOURCES!
   PHOTOVOLTAIC DISCONNECT LOCATED
   ADJACENT TO THIS SERVICE.

   SIGNAGE SHALL BE RED BACKGROUND WITH WHITE ENGRAVED LETTERS. MINIMUM SIGN SIZE SHALL BE 3" X 4".

3. A PERMANENT PHENOLIC PLAQUE SHALL BE PLACED AT THE POINT OF INTERCONNECTION TO READ AS FOLLOWS, PER CEC 690.54:

   PHOTOVOLTAIC SYSTEM AC DISCONNECT
   OPERATING CURRENT ____ AMPS
   OPERATING AC VOLTAGE OF ____ VOLTS
   SYSTEM SIZE = ___kW

4. LOAD CENTERS USED AS PHOTOVOLTAIC AC COMBINING PANELS SHALL BE LABELED TO READ:

   PHOTOVOLTAIC CIRCUITS ONLY
   NO ADDITIONAL CIRCUITS ALLOWED

5. PROVIDE A PLACARD ON ALL DISCONNECTS WITH THE FOLLOWING WORDING IN 1/4" HIGH LETTERING PER CEC 690.17:

   - WARNING -
   ELECTRIC SHOCK HAZARD,
   DO NOT TOUCH TERMINALS.
   TERMINALS ON BOTH THE LINE AND
   LOAD SIDES MAY BE ENERGIZED
   IN THE OPEN POSITION

   See single line below to be provided at MSB

6. PROVIDE A PLACARD ON ALL DC DISCONNECTS WITH THE FOLLOWING WORDING IN 1/4" LETTERING PER CEC 690.53:

   PHOTOVOLTAIC SYSTEM DC DISCONNECT
   RATED MAX POWER POINT CURRENT: ___ADC
   RATED MAX POWER POINT VOLTAGE: ___VDC
   MAXIMUM SYSTEM VOLTAGE: ___VDC
   SHORT CIRCUIT CURRENT: _.__ADC

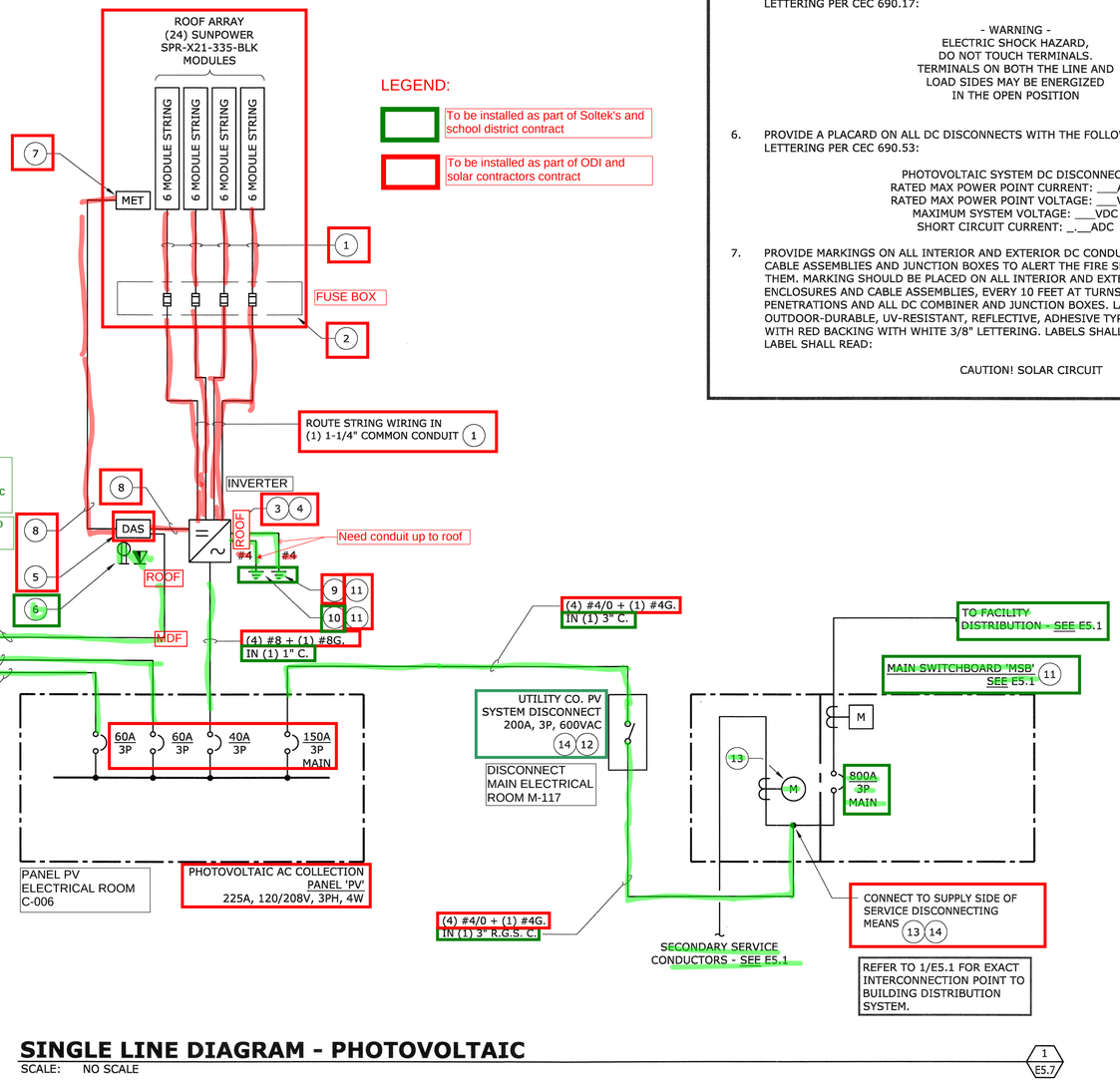
   See single line below to be provided at PV Disconnect only

7. PROVIDE MARKINGS ON ALL INTERIOR AND EXTERIOR DC CONDUIT RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES AND JUNCTION BOXES TO ALERT THE FIRE SERVICE TO AVOID CUTTING THEM. MARKING SHOULD BE PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES, EVERY 10 FEET AT TURNS AND ABOVE AND/OR BELOW PENETRATIONS AND ALL DC COMBINER AND JUNCTION BOXES. LABELS SHALL BE OUTDOOR-DURABLE, UV-RESISTANT, REFLECTIVE, ADHESIVE TYPE, HellermannTyton OR EQUAL WITH RED BACKING WITH WHITE 3/8" LETTERING. LABELS SHALL MEET UL969 SPECIFICATIONS. LABEL SHALL READ:

   CAUTION! SOLAR CIRCUIT

NUMBERED SHEET NOTES

1. PROVIDE HOMERUN FOR EACH STRING (POSITIVE AND NEGATIVE) TO INVERTER. STRING CONDUCTOR WIRING SHALL BE (2) #10 & (1) #8G. U.O.N. SEE PHOTOVOLTAIC SYSTEM NOTES ON SHEET E3.7 FOR WIRING REQUIREMENTS.
2. FUSE BOX - 600V DC, NEMA 3R, UL 1741. PROVIDE WITH 12A FUSES IN DIN RAIL MOUNTED FUSE HOLDERS. FUSE BOX SHALL BE LOCATED ON THE ROOF ADJACENT THE PV ARRAY FOR FIRE DEPARTMENT USE TO DISCONNECT POWER FROM CONDUCTORS WITHIN THE BUILDING.
3. INVERTERS TO BE CERTIFIED WITH THE CALIFORNIA ENERGY COMMISSION AND UL1741 LISTED. INVERTER ASSEMBLY TO INCLUDE INTEGRAL AC AND DC DISCONNECTS (NOT SHOWN).
4. INVERTER SHALL BE PROVIDED WITH AN INTEGRAL DC AND AC INTERFACE WHICH INCLUDES DC FUSES, DC DISCONNECT AND AC DISCONNECT.
5. PROVIDE A COMPLETE PHOTOVOLTAIC DATA ACQUISITION SYSTEM ('DAS') TO ALLOW OWNER TO REMOTELY VIEW REAL-TIME VISUAL METERS OF SYSTEM PERFORMANCE, HISTORICAL GRAPHS, LOCAL WEATHER DATA AND CUSTOM PROJECT DETAILS TO CLIENT SATISFACTION. THIS INCLUDES ALL HEAD END EQUIPMENT, SOFTWARE AND LICENSING FEES. THIS SHALL ALSO INCLUDE INSTALLATION OF ANY METROLOGICAL EQUIPMENT REQUIRED AT THE ROOF FOR WEATHER MONITORING. UTILIZE DECK MONITORING SOFTWARE OR EQUAL.
6. PROVIDE AND INSTALL FULLY TERMINATED CAT. 6 NETWORK JACK/CABLE AT DAS EQUIPMENT & 120V DUPLEX RECEPTACLE. DAS EQUIPMENT LOCATION BY SOLAR INTEGRATOR. CONFIRM EXACT LOCATION PRIOR TO ROUGH-IN.
7. PROVIDE COMPACT METEOROLOGICAL WEATHER STATION (MET) AT ROOF, COLUMBIA WEATHER SYSTEMS OR EQUAL. MET STATION SHALL BE FULLY COMPATIBLE WITH DAS EQUIPMENT, CONFIRM COMPATIBILITY PRIOR TO ROUGH-IN.
8. PROVIDE 3/4" RACEWAY WITH RS-485 WIRING FOR MONITORING EQUIPMENT COMMUNICATIONS. CONFIRM EXACT WIRING TYPE AND QUANTITY WITH DAS AND MET SYSTEMS SUPPLIERS PRIOR TO ROUGH-IN.
9. PROVIDE GROUNDING CONNECTION FROM INVERTER ASSEMBLY TO MAIN SWITCHBOARD GROUND BUS PER NEC 690.47 AND MANUFACTURERS INSTRUCTIONS.
10. PROVIDE AND INSTALL GROUND ROD IN GROUND ROD BOX WITH GEC CONNECTED TO INVERTER GROUND BUS.
11. ALL PV SYSTEM INTERCONNECTIONS WITH THE DISTRIBUTION SYSTEM SHALL COMPLY WITH NEC ARTICLE 690. PROVIDE AND INSTALL ALL GROUNDING AS REQUIRED BY NEC ARTICLE 250, 690, 705 AND SYSTEM MANUFACTURER.
12. KNIFE TYPE DISCONNECT TO BE CLEARLY LABELED "SOLAR SYSTEM DISCONNECT" AND LOCATED WITHIN 10 FT. OF THE MAIN SERVICE METER PER UTILITY COMPANY REGULATIONS. EXACT DISCONNECT TYPE SHALL BE A PG&E APPROVED PHOTOVOLTAIC DISCONNECT. COORDINATE EXACT TYPE WITH PG&E PRIOR TO ROUGH-IN.
13. COORDINATE ALL UTILITY INTERCONNECTIONS WITH PG&E, INCLUDING ANY REQUIRED APPLICATION FOR UTILITY INTERCONNECT AGREEMENT AND BI-DIRECTIONAL METERING INSTALLATION.
14. PROVIDE PV SYSTEM PLACARDS AS REQUIRED BY LOCAL UTILITY COMPANY.



SINGLE LINE DIAGRAM - PHOTOVOLTAIC

SCALE: NO SCALE

1 E5.7

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REGISTERED PROFESSIONAL ENGINEER ALEXANDER No.14738 Exp. 6/17 ELECTRICAL STATE OF CALIFORNIA
CONSULTANT

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