

Sunrun

BLD2023-02424 ***REVISION***

11/6/23

CHANGES:

1. Derate to 175A not 150A (**update permit card**)
2. Equipment relocated interior-inverter/backup panel
3. Lovato RSD switch added
4. 225A bus rated main (200A was an error)
5. 90A Gateway feeder breaker
6. 90A backfeed
7. Wire/conduit
8. Placard update
9. Removed (N) 60A AC disco/MID meter

Thank you,
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SHEET INDEX	
PAGE #	DESCRIPTION
PV-1.0	COVER SHEET
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PV-5.0	SIGNAGE

ABBREVIATIONS	
A	AMPERE
AC	ALTERNATING CURRENT
AFC	ARC FAULT CIRCUIT INTERRUPTER
AZIM	AZIMUTH
COMP	COMPOSITION
DC	DIRECT CURRENT
(E)	EXISTING
ESS	ENERGY STORAGE SYSTEM
EXT	EXTERIOR
INT	INTERIOR
MSP	MAIN SERVICE PANEL
(N)	NEW
NTS	NOT TO SCALE
OC	ON CENTER
PRE-FAB	PRE-FABRICATED
PSF	POUNDS PER SQUARE FOOT
PV	PHOTOVOLTAIC
RSD	RAPID SHUTDOWN DEVICE
TL	TRANSFORMERLESS
TYP	TYPICAL
V	VOLTS
W	WATTS
LAN	LANDSCAPE
POR	PORTRAIT

ABBREVIATIONS	
1	COMMUNICATION WIRES
	CHIMNEY
	ATTIC VENT
	FLUSH ATTIC VENT
	PVC PIPE VENT
	METAL PIPE VENT
	T-VENT
	SATELLITE DISH
	FIRE SETBACKS
	HARDSCAPE
— PL —	PROPERTY LINE
	INTERIOR EQUIPMENT SHOWN AS DASHED
	SOLAR MODULES
	RAIL
	STANDOFFS & FOOTINGS

LEGEND

	SERVICE ENTRANCE
	MAIN PANEL
	SUB-PANEL
	PV LOAD CENTER
	SUNRUN METER
	DEDICATED PV METER
	INVERTER(S)
	AC DISCONNECT(S)
	DC DISCONNECT(S)
	IQ COMBINER BOX
	POWERWALL ENERGY STORAGE SYSTEM (ESS)
	BACKUP GATEWAY
	GENERATION PANEL

SCOPE OF WORK

SYSTEM SIZE: 5850W DC, 7600W AC
 MODULES: (15) CANADIAN SOLAR: CS3N-390MS
 INVERTERS: (1) SOLAREEDGE TECHNOLOGIES: SE7600H-USSN
 RACKING: ULTRA RAIL SPEEDSEAL FOOT, SEE DRAWING SNR-DC-00438
 ENERGY STORAGE SYSTEM: (1) TESLA: POWERWALL, 13.5KWh, 5KW INVERTER OUTPUT, LITHIUM-ION BATTERY (WEIGHT: 251.3LB EACH)
 MAIN BREAKER DERATE: REPLACE EXISTING 200A MAIN BREAKER WITH NEW 175 AMP MAIN BREAKER.
 BACKUP GATEWAY: (1) 200A TESLA POWERWALL CONTROL PANEL
 EXISTING SOLAR SYSTEM INSTALLED.

VICINITY MAP



GENERAL NOTES

ALL WORK SHALL COMPLY WITH 2022 CRC/CBC/CEBC, MUNICIPAL CODE, AND ALL MANUFACTURERS' LISTINGS AND INSTALLATION INSTRUCTIONS.
 PHOTOVOLTAIC SYSTEM WILL COMPLY WITH 2022 CEC.
 ELECTRICAL SYSTEM GROUNDING WILL COMPLY WITH 2022 CEC.
 PHOTOVOLTAIC SYSTEM IS FUNCTIONALLY GROUNDED. NO CONDUCTORS ARE SOLIDLY GROUNDED IN THE INVERTER. SYSTEM COMPLIES WITH 690.41(A).
 MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
 INVERTER CONFORMS TO AND IS LISTED UNDER UL 1741.
 RACKING CONFORMS TO AND IS LISTED UNDER UL 2703.
 SNAPRACK RACKING SYSTEMS, IN COMBINATION WITH TYPE I, OR TYPE II MODULES, ARE CLASS A FIRE RATED.
 RAPID SHUTDOWN SYSTEM IN COMPLIANCE WITH CEC 2022 690.12(B)(1) WHERE CONDUCTORS OUTSIDE OF THE ARRAY ARE LIMITED TO LESS THAN 30V IN 30 SECONDS AND CEC 2022 690.12(B)(2)(2) WHERE CONDUCTORS INSIDE THE ARRAY BOUNDARY IS LIMITED TO LESS THAN 80V IN 30 SECONDS
 CONSTRUCTION FOREMAN TO PLACE CONDUIT RUN PER 690.31(D).
 ARRAY DC CONDUCTORS ARE SIZED FOR DERATED CURRENT.
 11.38 AMPS MODULE SHORT CIRCUIT CURRENT.
 17.78 AMPS DERATED SHORT CIRCUIT CURRENT [690.8 (A)(1) & 690.8 (B)].
 ENERGY STORAGE SYSTEM CONFORMS TO AND IS LISTED UNDER UL 9540.
 ENERGY STORAGE SYSTEM LIVE PARTS ARE NOT ACCESSIBLE DURING ROUTINE MAINTENANCE. SYSTEM VOLTAGE IN ACCORDANCE WITH NEC 706.20 AND EXCEPTION 1 NEC 706.20 (B).
 ADDITIONAL DISCONNECTING MEANS SHALL BE INSTALLED WHERE THE CIRCUITS FROM THESE TERMINALS PASS THROUGH A WALL OR PARTITION PER 706.15(D).
 LISTED, COMBINATION TYPE AFCI SHALL BE INSTALLED WHERE BACKED UP CIRCUIT WIRING IS EXTENDED MORE THAN 6FT AND DOES NOT INCLUDE ANY ADDITIONAL OUTLETS OR DEVICES PER NEC 210.12(D).
 THE CAPACITY OF THE STANDALONE SYSTEM SUPPLY SHALL BE EQUAL TO OR GREATER THAN THE LOAD POSED BY THE SINGLE LARGEST UTILIZATION EQUIPMENT CONNECTED TO THE SYSTEM PER NEC ARTICLE 710.15(A)
 ALL PASS-THROUGH CONDUCTORS MUST COMPLY WITH NEC 312.8

BUILDING TYPE OF CONSTRUCTION: VB CBC TABLE 601
 OCCUPANCY GROUP: R3 & U CBC 302.1
 THE GENERAL CONTRACTOR IS TO VERIFY THE DWELLING UNIT'S SMOKE AND CARBON MONOXIDE ALARMS PER CRC SECTIONS R314 AND R315, PRIOR TO THE FINAL INSPECTION

REV	NAME	DATE	COMMENTS
B	J CASTILLO	8/1/2023	NOTES
C	J CASTILLO	9/1/23	SLD METER
D	MOUSTAFA IDRIS	10/11/23	EQUIPMENT LOCATION AND SLD

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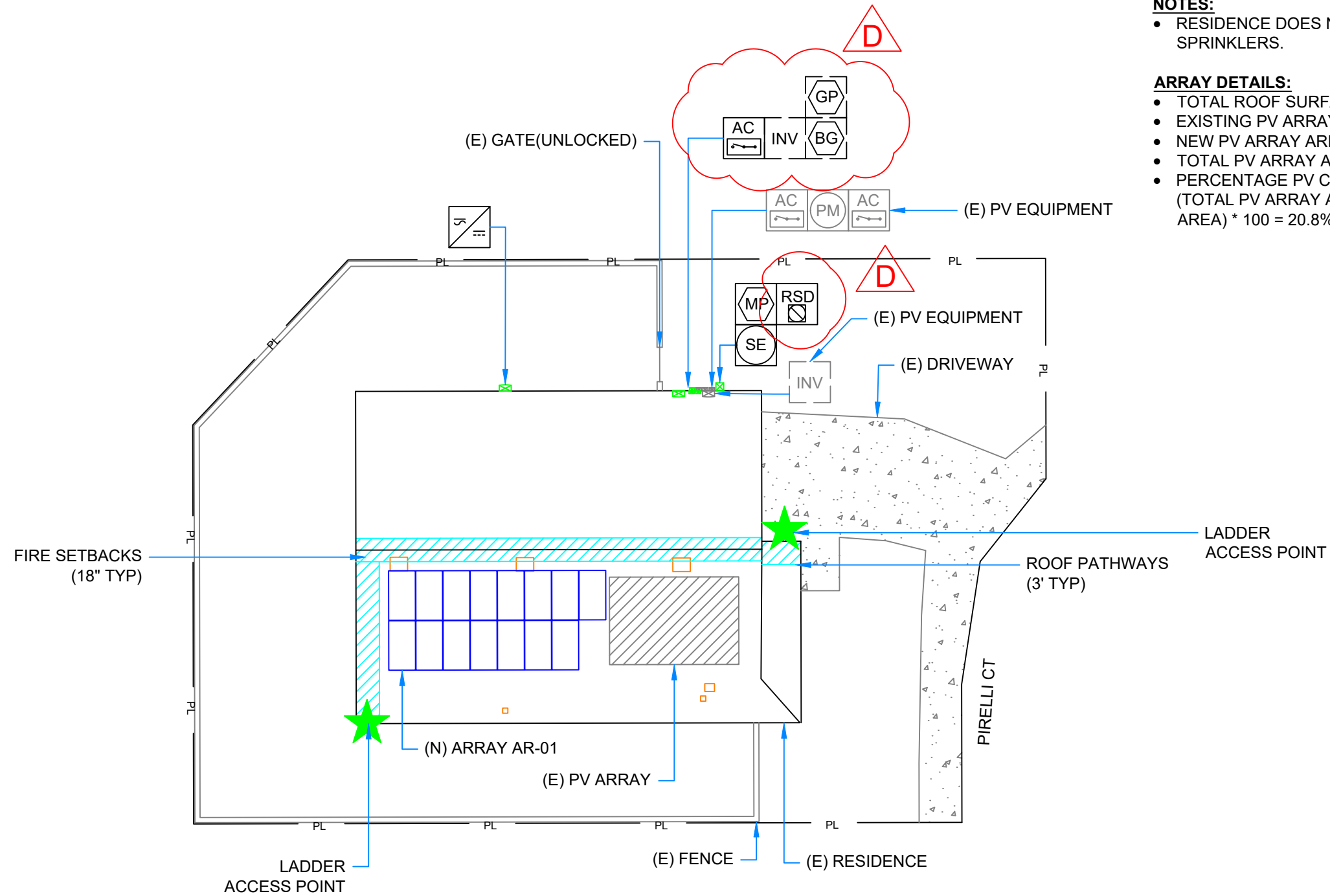
PROJECT NUMBER:
 117R-241WLS

DESIGNER: (415) 580-6920 ex3
 WILLIAM UBREY

SHEET
COVER SHEET

REV: D1 11/7/2023

PAGE
PV-1.0



NOTES:

- RESIDENCE DOES NOT CONTAIN ACTIVE FIRE SPRINKLERS.

ARRAY DETAILS:

- TOTAL ROOF SURFACE AREA: 2453 SQFT.
- EXISTING PV ARRAY AREA: 181 SQ FT.
- NEW PV ARRAY AREA: 328.3 SQ FT.
- TOTAL PV ARRAY AREA: 512.3 SQ FT.
- PERCENTAGE PV COVERAGE: (TOTAL PV ARRAY AREA/TOTAL ROOF SURFACE AREA) * 100 = 20.8%

NOTES:

THE POINT OF ACCESS AREA WILL NOT BE OVER ANY DOORS, WINDOWS, OR OTHER OBSTRUCTIONS

NOTE - PLACARD WILL BE INSTALLED FOR THE FOLLOWING:
 PV EQUIPMENT SEPARATED BY FENCE/GATE
 MAIN SERVICE PANEL SEPARATED BY FENCE/GATE

	ARRAY PITCH	TRUE AZIM	PV AREA (SQFT)
AR-01	23°	180°	328.3

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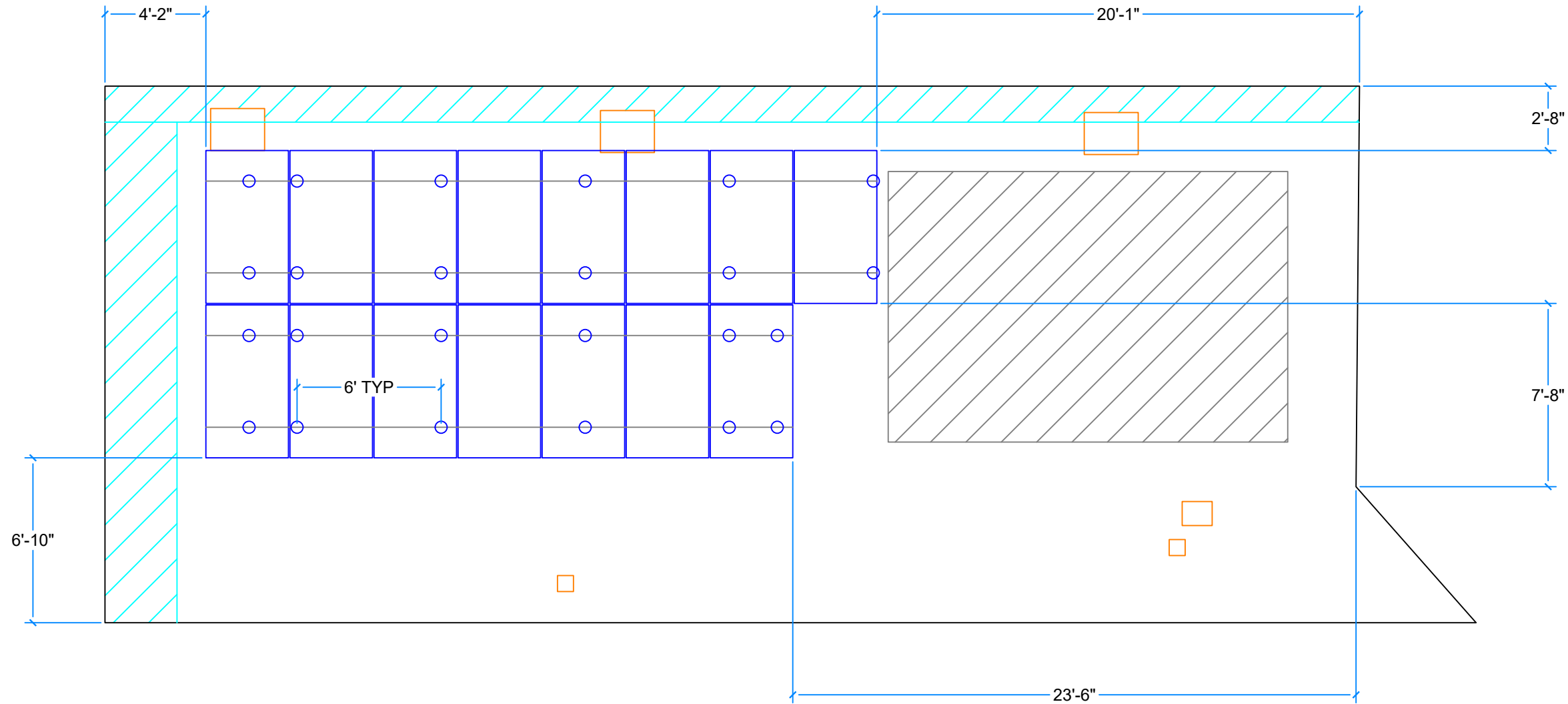
SHEET
SITE PLAN

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PV-2.0

ROOF INFO			FRAMING INFO			ATTACHMENT INFORMATION					
Name	Type	Height	Type	Max Span	OC Spacing	Detail	Max Landscape OC Spacing	Max Landscape Overhang	Max Portrait OC Spacing	Max Portrait Overhang	Configuration
AR-01	COMP SHINGLE - UR	1-Story	2X4 PRE-FABRICATED TRUSSES	5' - 9"	24"	ULTRA RAIL SPEEDSEAL FOOT, SEE DRAWING SNR-DC-00438	6' - 0"	2' - 4"	6' - 0"	2' - 2"	STACKED

D1 - AR-01 - SCALE: 0.015625
AZIM: 180°
PITCH: 23°



INSTALLERS SHALL NOTIFY ENGINEER OF ANY POTENTIAL STRUCTURAL ISSUES OBSERVED PRIOR TO PROCEEDING W/ INSTALLATION.
 * IF ARRAY (EXCLUDING SKIRT) IS WITHIN 12" BOUNDARY REGION OF ANY ROOF PLANE EDGES (EXCEPT VALLEYS), THEN ATTACHMENTS NEED TO BE ADDED AND OVERHANG REDUCED WITHIN THE 12" BOUNDARY REGION ONLY AS FOLLOWS:
 ** ALLOWABLE ATTACHMENT SPACING INDICATED ON PLANS TO BE REDUCED BY 50%.
 ** ALLOWABLE OVERHANG INDICATED ON PLANS TO BE 1/5TH OF ALLOWABLE ATTACHMENT SPACING INDICATED ON PLANS.

DESIGN CRITERIA
MAX DISTRIBUTED LOAD: 3 PSF
SNOW LOAD: 0 PSF
WIND SPEED: 93 MPH 3-SEC GUST.
S.S. LAG SCREW 5/16": 2.5" MIN. EMBEDMENT

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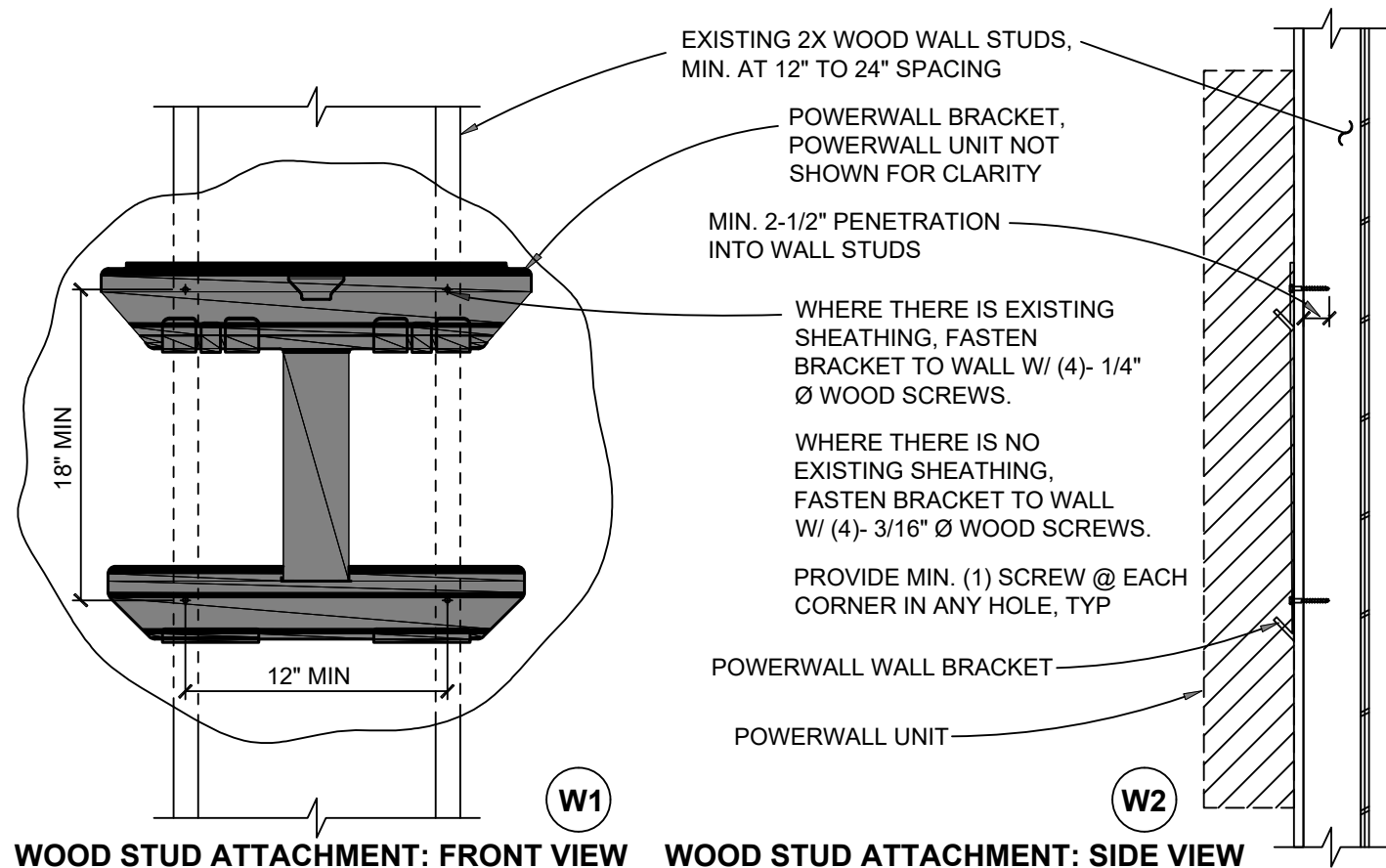
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SHEET
LAYOUT

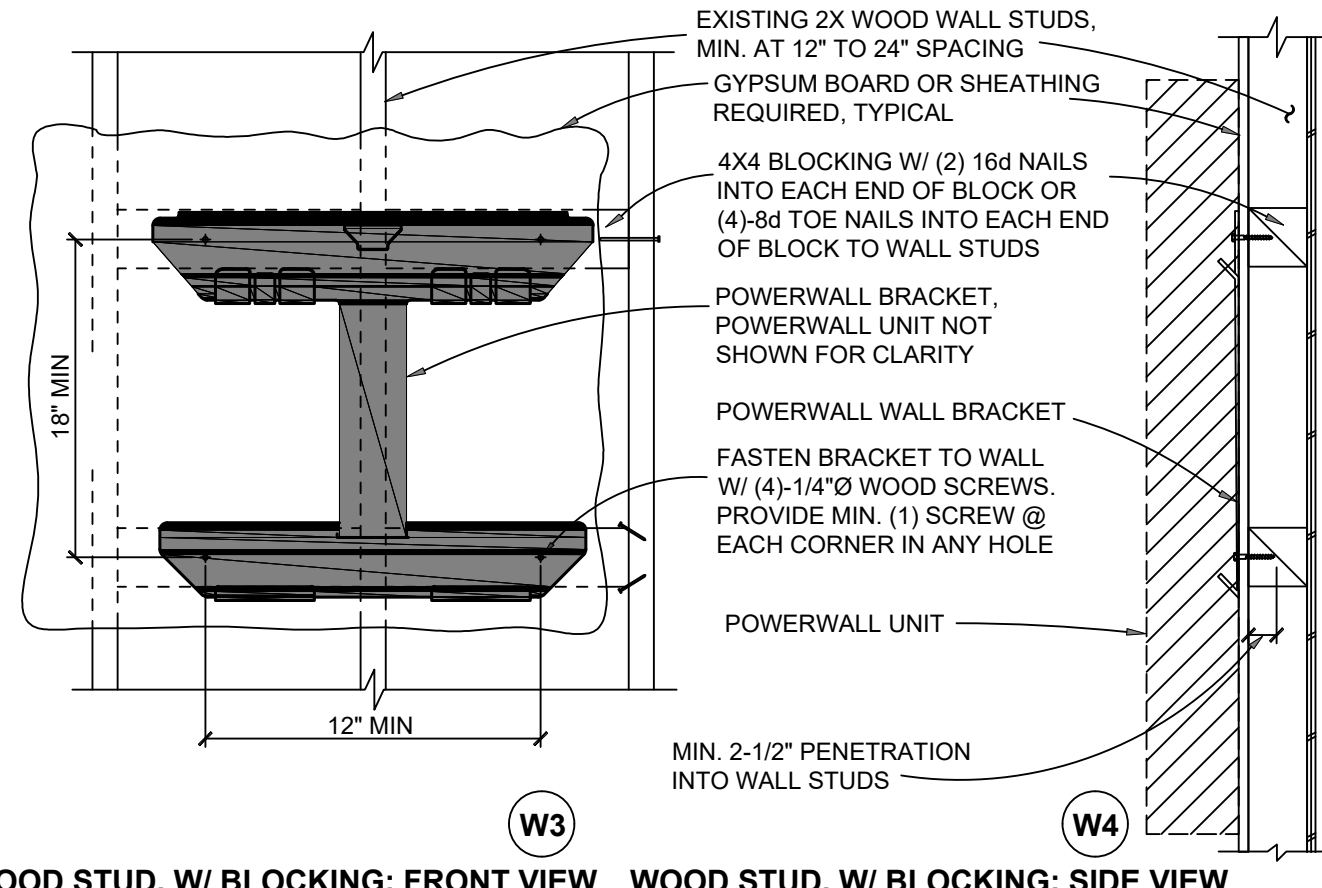
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PV-3.0



WOOD STUD ATTACHMENT: FRONT VIEW

WOOD STUD ATTACHMENT: SIDE VIEW



WOOD STUD, W/ BLOCKING: FRONT VIEW

WOOD STUD, W/ BLOCKING: SIDE VIEW

NOTE: SEE GENERAL NOTES ON SHEET 2

SCALE: 1"=1'-0"

BRACKET ATTACHMENT TO WOOD STUD TESLA POWERWALL

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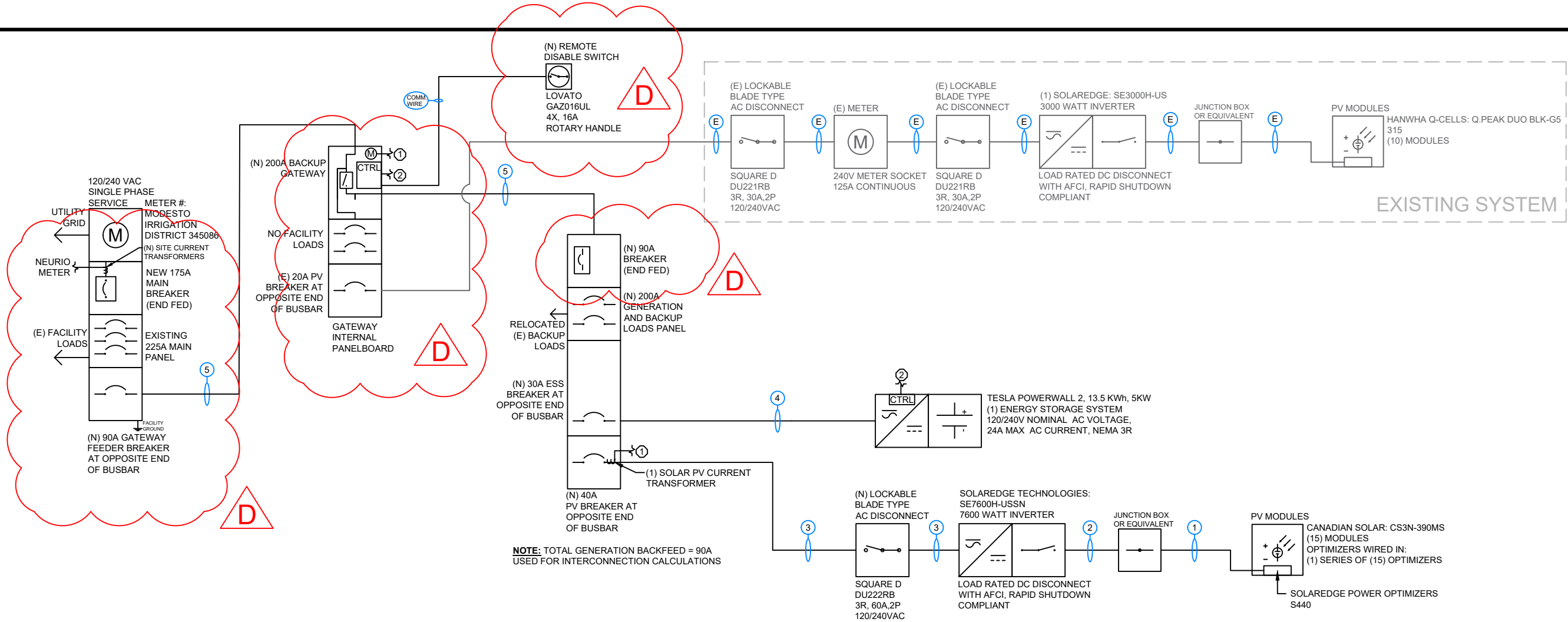
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SHEET **MOUNTING
DETAIL**

REV: D1 11/7/2023

PAGE **PV-3.1**



NOTE: TOTAL GENERATION BACKFEED = 90A
USED FOR INTERCONNECTION CALCULATIONS

CONDUIT SCHEDULE				
#	CONDUIT	CONDUCTOR	NEUTRAL	GROUND
1	NONE	(2) 10 AWG PV WIRE	NONE	(1) 6 AWG BARE COPPER
2	3/4" EMT OR EQUIV.	(2) 10 AWG THHN/THWN-2	NONE	(1) 10 AWG THHN/THWN-2
3	3/4" EMT OR EQUIV.	(2) 8 AWG THHN/THWN-2	(1) 10 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2
4	3/4" EMT OR EQUIV.	(2) 10 AWG THHN/THWN-2	(1) 10 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2
5	1" EMT OR EQUIV.	(2) 3 AWG THHN/THWN-2	(1) 3 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2
E	EXISTING			

MODULE CHARACTERISTICS

CANADIAN SOLAR: CS3N-390MS: 390 W
 OPEN CIRCUIT VOLTAGE: 44.1 V
 MAX POWER VOLTAGE: 36.8 V
 SHORT CIRCUIT CURRENT: 11.38 A

S440 OPTIMIZER CHARACTERISTICS:

MIN INPUT VOLTAGE: 8 VDC
 MAX INPUT VOLTAGE: 60 VDC
 MAX INPUT ISC: 14.5 ADC
 MAX OUTPUT CURRENT: 15 ADC

SYSTEM CHARACTERISTICS - INVERTER 1

SYSTEM SIZE: 5850 W
 SYSTEM OPEN CIRCUIT VOLTAGE: 15 V
 SYSTEM OPERATING VOLTAGE: 400 V
 MAX ALLOWABLE DC VOLTAGE: 480 V
 SYSTEM OPERATING CURRENT: 14.63 A
 SYSTEM SHORT CIRCUIT CURRENT: 15 A

NOTE:

THE AIC RATING FOR THE MAIN BREAKER AND SOLAR BREAKER SHALL HAVE AN EQUAL OR GREATER AIC RATINGS THAN THE EXISTING BREAKERS. CEC 690.13(E). OR BY OTHER MEANS OF SHOWING THE PV SYSTEM IS RATED FOR THE AVAILABLE FAULT CURRENT. CEC 110.9, 110.10

NOTE:

NEW ELECTRICAL SHALL BE LOCATED AT LEAST THREE (3) FEET FROM GAS METER OR GAS SHUT-OFF VALVES. CPC1208.7.1; CEC 110.26

NOTE:

GROUNDING ELECTRODE CONDUCTOR SHALL BE SIZED PER CEC 250.66

NOTE:

THE GEC SHALL BE SIZED #6AWG PER 250.120 (c)

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SHEET

ELECTRICAL

REV: D1

11/7/2023

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

LABEL LOCATION:
INVERTER(S), AC/DC DISCONNECT(S), AC COMBINER PANEL (IF APPLICABLE).
PER CODE(S): NEC 2020: 690.13(B), CEC 2022: 690.13(B)

! WARNING
THREE POWER SUPPLY
SOURCES: UTILITY GRID, BATTERY AND PV SOLAR ELECTRIC SYSTEM

LABEL LOCATION:
UTILITY SERVICE METER AND MAIN SERVICE PANEL.
PER CODE(S): NEC 2020: 705.12(C), CEC 2022: 705.12(C)

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

LABEL LOCATION:
ADJACENT TO PV BREAKER AND ESS OCPD (IF APPLICABLE).
PER CODE(S): NEC 2020: 705.12(B)(3)(2), CEC 2022: 705.12(B)(3)(2)

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

LABEL LOCATION:
PV LOAD CENTER (IF APPLICABLE) AND ANY PANEL THAT UTILIZES "THE SUM OF BREAKERS RULE".
PER CODE(S): NEC 2020: 705.12 (B)(3)(3), CEC 2022: 705.12 (B)(3)(3)

PV SYSTEM DISCONNECT
MAXIMUM AC OPERATING CURRENT: 32 AMPS
NOMINAL OPERATING AC VOLTAGE: 240 VAC

LABEL LOCATION:
AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION.
PER CODE(S): NEC 2020: 690.54, CEC 2022: 690.54

INVERTER 1
PHOTOVOLTAIC DC DISCONNECT
MAXIMUM SYSTEM VOLTAGE: 480 VDC

LABEL LOCATION:
INVERTER(S), DC DISCONNECT(S).
PER CODE(S): NEC 2020: 690.53, CEC 2022: 690.53

ENERGY STORAGE SYSTEM DISCONNECT

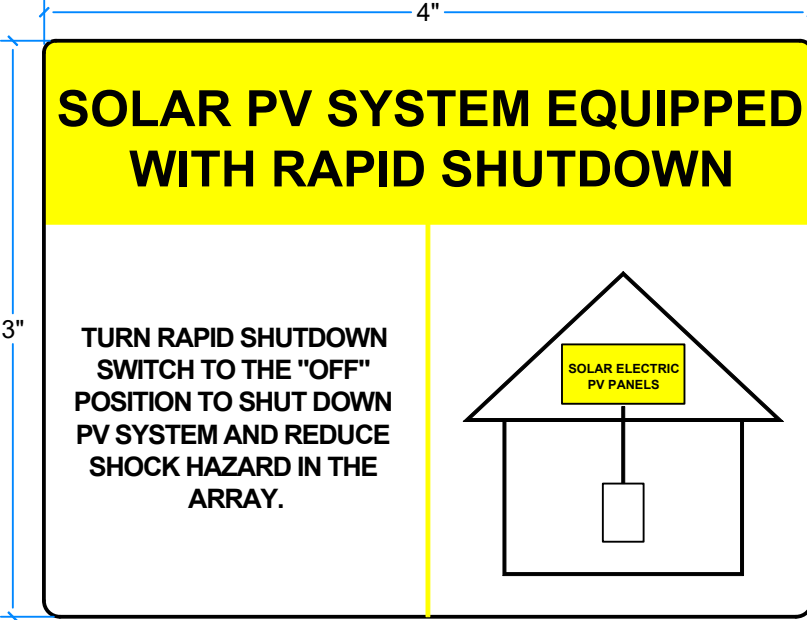
LABEL LOCATION:
ENERGY STORAGE SYSTEM DISCONNECT
PER CODE(S): NEC 2020: 706.15(C), CEC 2022: 706.15(C)

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION:
INTERIOR AND EXTERIOR DC CONDUIT EVERY 10 FT, AT EACH TURN, ABOVE AND BELOW PENETRATIONS, ON EVERY JB/PULL BOX CONTAINING DC CIRCUITS.
PER CODE(S): NEC 2020: 690.31(D)(2), CEC 2022: 690.31(D)(2)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL LOCATION:
INSTALLED WITHIN 3' OF RAPID SHUT DOWN SWITCH PER CODE(S): NEC 2020: 690.56(C)(2), CEC 2022: 690.56(C)(2), IFC 2018: 1204.5.3



LABEL LOCATION:
ON OR NO MORE THAT 1 M (3 FT) FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED.
PER CODE(S): NEC 2020: 690.56(C), CEC 2022: 690.56(C)

**MAIN BREAKER DE-RATED FOR SOLAR BACKFEED
MAX 175A MAIN BREAKER ALLOWED**

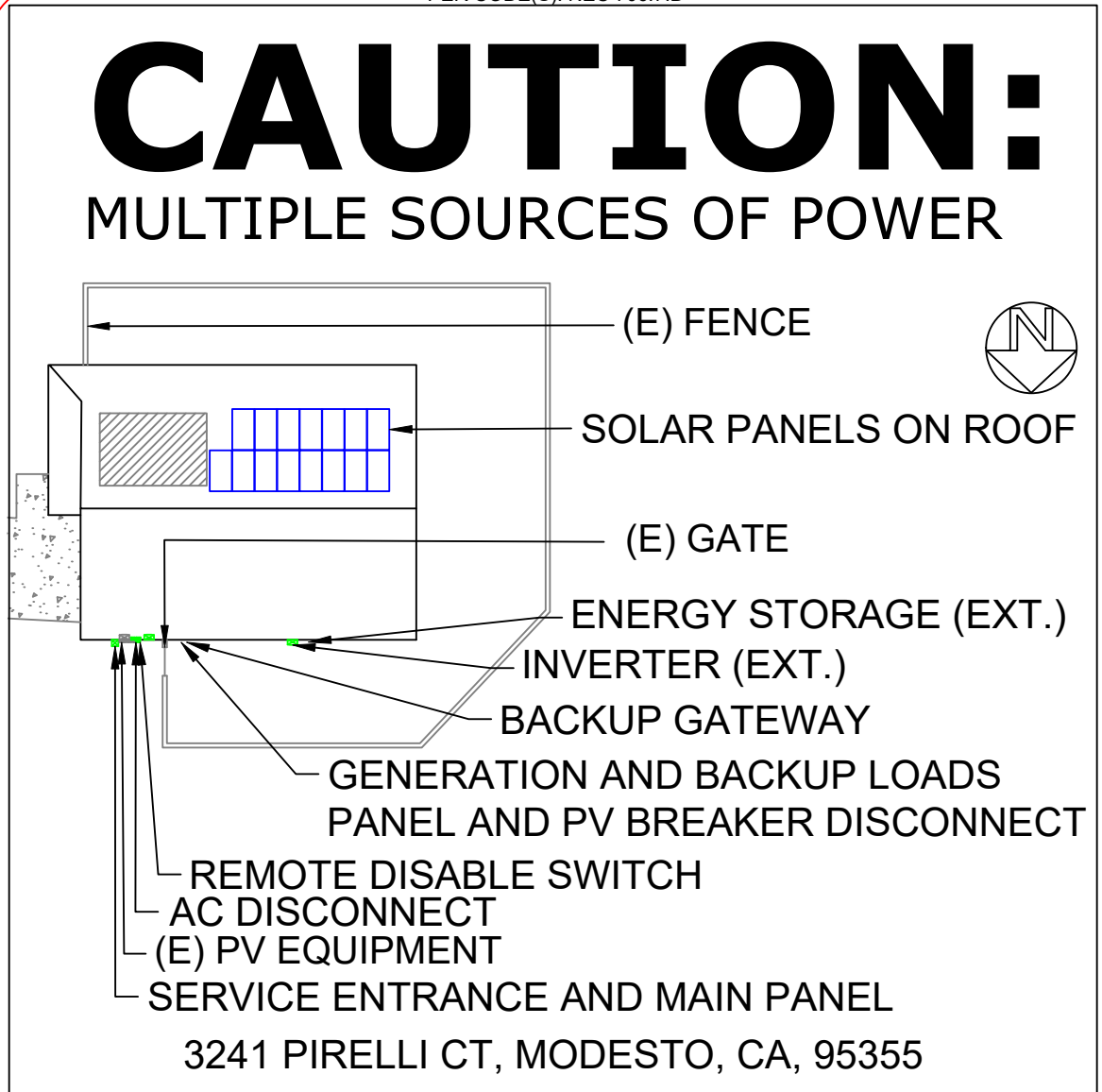
LABEL LOCATION:
MAIN SERVICE PANEL ADJACENT TO MAIN SERVICE BREAKER.
PER CODE(S): CEC 2022: 705.12(B)(3)(2), NEC 2020: 705.12(B)(3)(2), NEC 2017: 705.12(B)(2)(3)(b), NEC 2014: 705.12(D)(2)(3)(c), NEC 2011: 705.12(D)(4), CEC 2019: 705.12(B)(2)(3)(b)

NOTE - PLACARD WILL BE INSTALLED FOR THE FOLLOWING:
PV EQUIPMENT SEPARATED BY FENCE/GATE
MAIN SERVICE PANEL SEPARATED BY FENCE/GATE

- NOTES AND SPECIFICATIONS:
- SIGNS AND LABELS SHALL MEET THE REQUIREMENTS OF THE 2022 CEC ARTICLE 110.21(B), UNLESS SPECIFIC INSTRUCTIONS ARE REQUIRED BY SECTION 690, OR IF REQUESTED BY THE LOCAL AHJ.
 - SIGNS AND LABELS SHALL ADEQUATELY WARN OF HAZARDS USING EFFECTIVE WORDS, COLORS AND SYMBOLS.
 - LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR WIRING METHOD AND SHALL NOT BE HAND WRITTEN.
 - LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
 - SIGNS AND LABELS SHALL COMPLY WITH ANSI Z535.4-2011, PRODUCT SAFETY SIGNS AND LABELS, UNLESS OTHERWISE SPECIFIED.
 - DO NOT COVER EXISTING MANUFACTURER LABELS.

PW2
BATTERY DISCONNECT
NOMINAL ESS VOLTAGE: 120/240 VAC
MAX AVAIL. SHORT-CIRCUIT FROM ESS: 32 A
ARC FAULT CLEARING TIME FROM ESS: 67 MS
DATE OF CALCULATION: 11/7/23

LABEL LOCATION:
MAIN PANEL
PER CODE(S): NEC 706.7.D



PER CODE(S): NEC 2020 : 705.10, 710.10, CEC 2022: 705.10, 710.10

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SHEET SIGNAGE
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