

HISTORIC AND DESIGN REVIEW COMMISSION

December 02, 2020

HDRC CASE NO: 2020-519
ADDRESS: 405 CLUB DR
LEGAL DESCRIPTION: NCB 7014 BLK LOT W 45 FT OF 2 & E 10 FT OF 3 AT 405 CLUB DR
ZONING: RM-4, H
CITY COUNCIL DIST.: 7
DISTRICT: Monticello Park Historic District
APPLICANT: Stacey Zimmermann/Marc Jones Construction LLC dba Sunpro Solar
OWNER: Carrie Willcockson/WILLCOCKSON CARRIE BETH
TYPE OF WORK: Solar panel installation
APPLICATION RECEIVED: November 18, 2020
60-DAY REVIEW: Not Applicable Due to City Council Emergency Orders
CASE MANAGER: Rachel Rettaliata

REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install 18 solar modules on the existing roof.

APPLICABLE CITATIONS:

Historic Design Guidelines, Chapter 3, Guidelines for Additions

6. Designing for Energy Efficiency

A. BUILDING DESIGN

- i. *Energy efficiency*—Design additions and new construction to maximize energy efficiency.
- ii. *Materials*—Utilize green building materials, such as recycled, locally-sourced, and low maintenance materials whenever possible.
- iii. *Building elements*—Incorporate building features that allow for natural environmental control – such as operable windows for cross ventilation.
- iv. *Roof slopes*—Orient roof slopes to maximize solar access for the installation of future solar collectors where compatible with typical roof slopes and orientations found in the surrounding historic district.

B. SITE DESIGN

- i. *Building orientation*—Orient new buildings and additions with consideration for solar and wind exposure in all seasons to the extent possible within the context of the surrounding district.
- ii. *Solar access*—Avoid or minimize the impact of new construction on solar access for adjoining properties.

C. SOLAR COLLECTORS

- i. *Location*—Locate solar collectors on side or rear roof pitch of the primary historic structure to the maximum extent feasible to minimize visibility from the public right-of-way while maximizing solar access. Alternatively, locate solar collectors on a garage or outbuilding or consider a ground-mount system where solar access to the primary structure is limited.
- ii. *Mounting (sloped roof surfaces)*—Mount solar collectors flush with the surface of a sloped roof. Select collectors that are similar in color to the roof surface to reduce visibility.
- iii. *Mounting (flat roof surfaces)*—Mount solar collectors flush with the surface of a flat roof to the maximum extent feasible. Where solar access limitations preclude a flush mount, locate panels towards the rear of the roof where visibility from the public right-of-way will be minimized.

FINDINGS:

- a. The primary structure at 405 Crofton is a 2-story, multi-family residential structure constructed circa 1950. The structure features a cross gable composition shingle roof, brick cladding, a second-story front porch with prominent wood balusters, and one-over-wood windows. The house has a large set back from Club and the front landscaping features a tall tree in front of the front-facing gable. The property is contributing to the Monticello Park Historic District.
- b. LOCATION – The applicant is requesting approval to install 18 solar panels on the south-facing roofline of the primary structure. The 15 panels on the main side gable portion of the roof will be partially visible from

the public right-of-way. The remaining 3 panels will be located on the roof of the second-story front porch and will not be visible from the public right-of-way. According to the Historic Design Guidelines for Additions 6.C.i., solar collectors should be located on a side or rear roof pitch to the maximum extent possible to minimize the visibility from the public right-of-way. While the south-facing panels on the side gable roof will be partially visible from Club, staff finds the proposed location appropriate given their flush-mounted pitch and site-specific restrictions regarding efficient placement for maximum sun exposure.

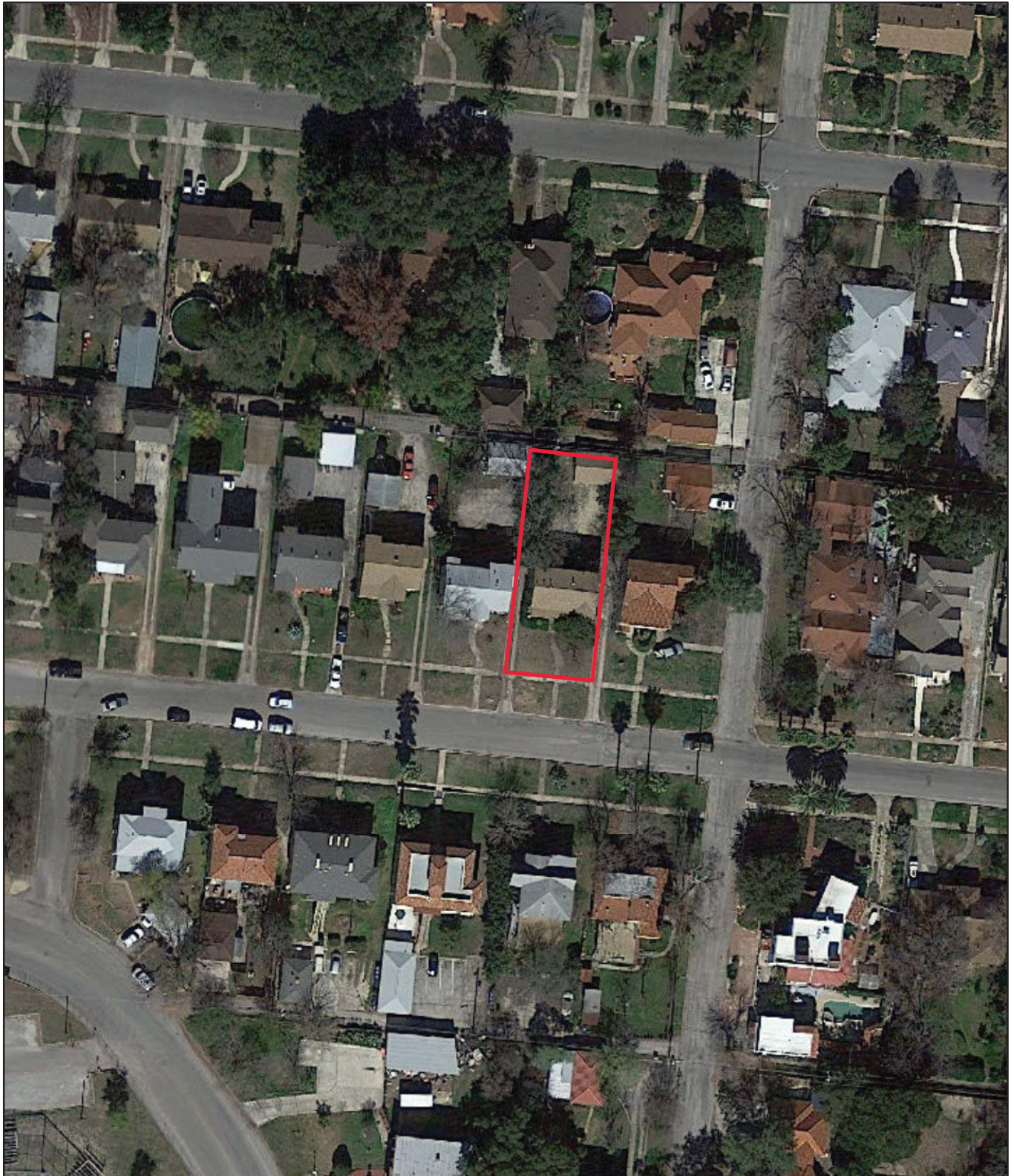
- c. PITCH – The panels will be installed flush with the roof pitch. Staff finds the proposal consistent with the Guidelines.
- d. REVERSABILITY – The panels are fully removable from the existing roof, returning the roof to its pre-solar panel condition. Staff finds this consistent with the Guidelines.

RECOMMENDATION:

Staff recommends approval based on findings a through d with the following stipulation:

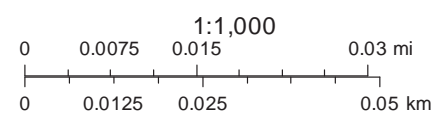
- i. That the solar panels maintain at least 18” of separation from the roof eaves.

City of San Antonio One Stop

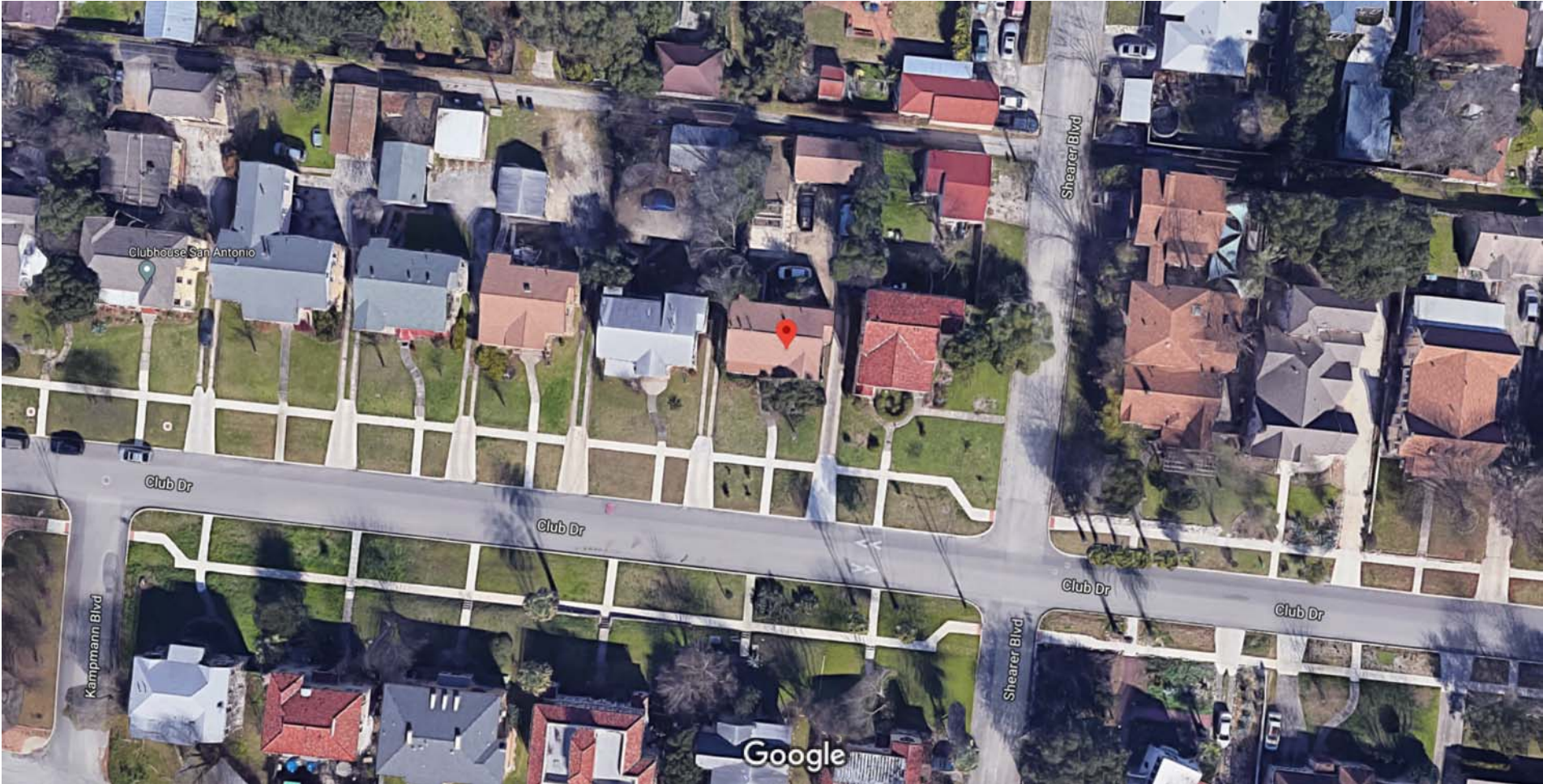


November 18, 2020

— User drawn lines

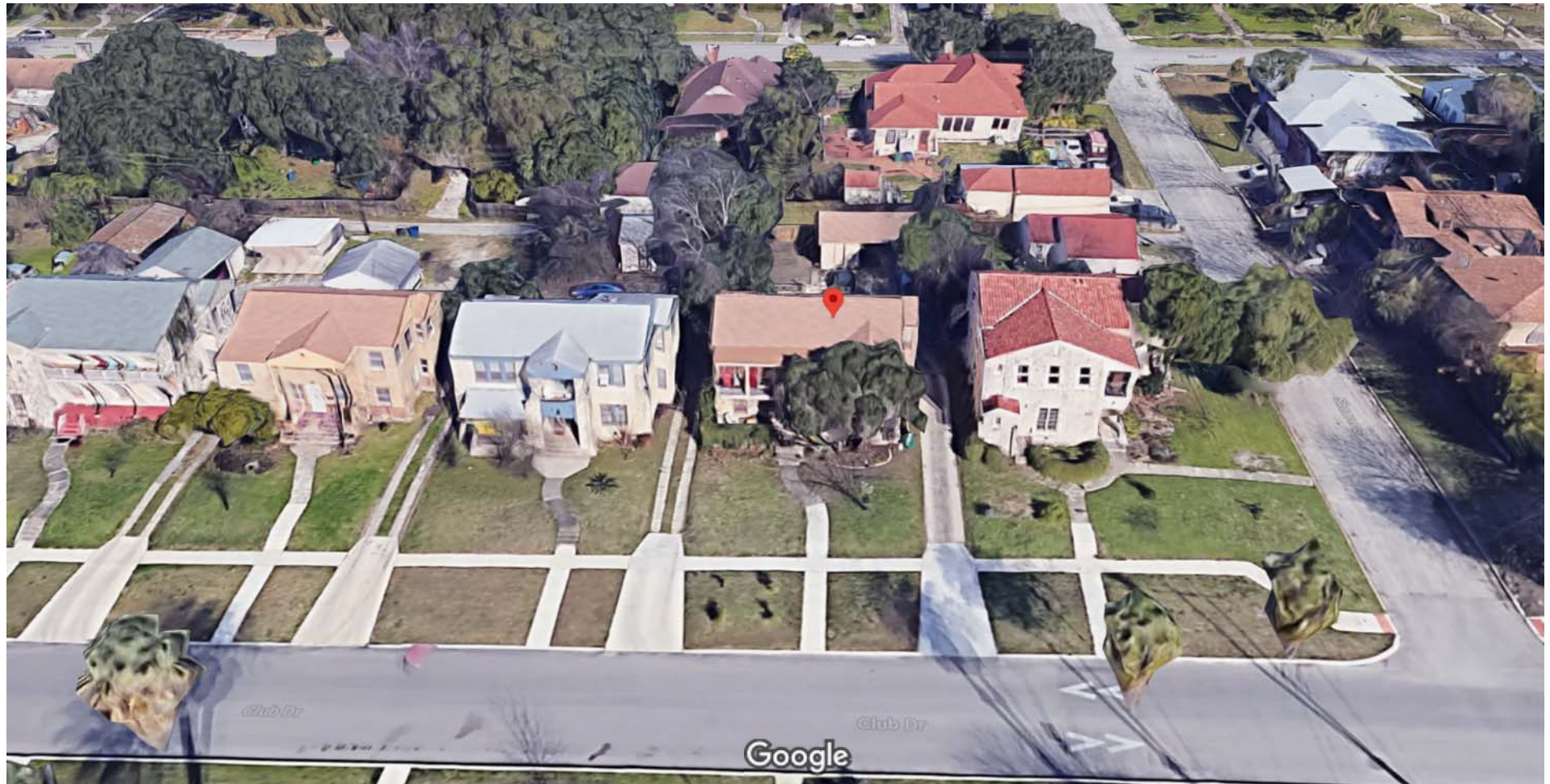


Google Maps 405 Club Dr



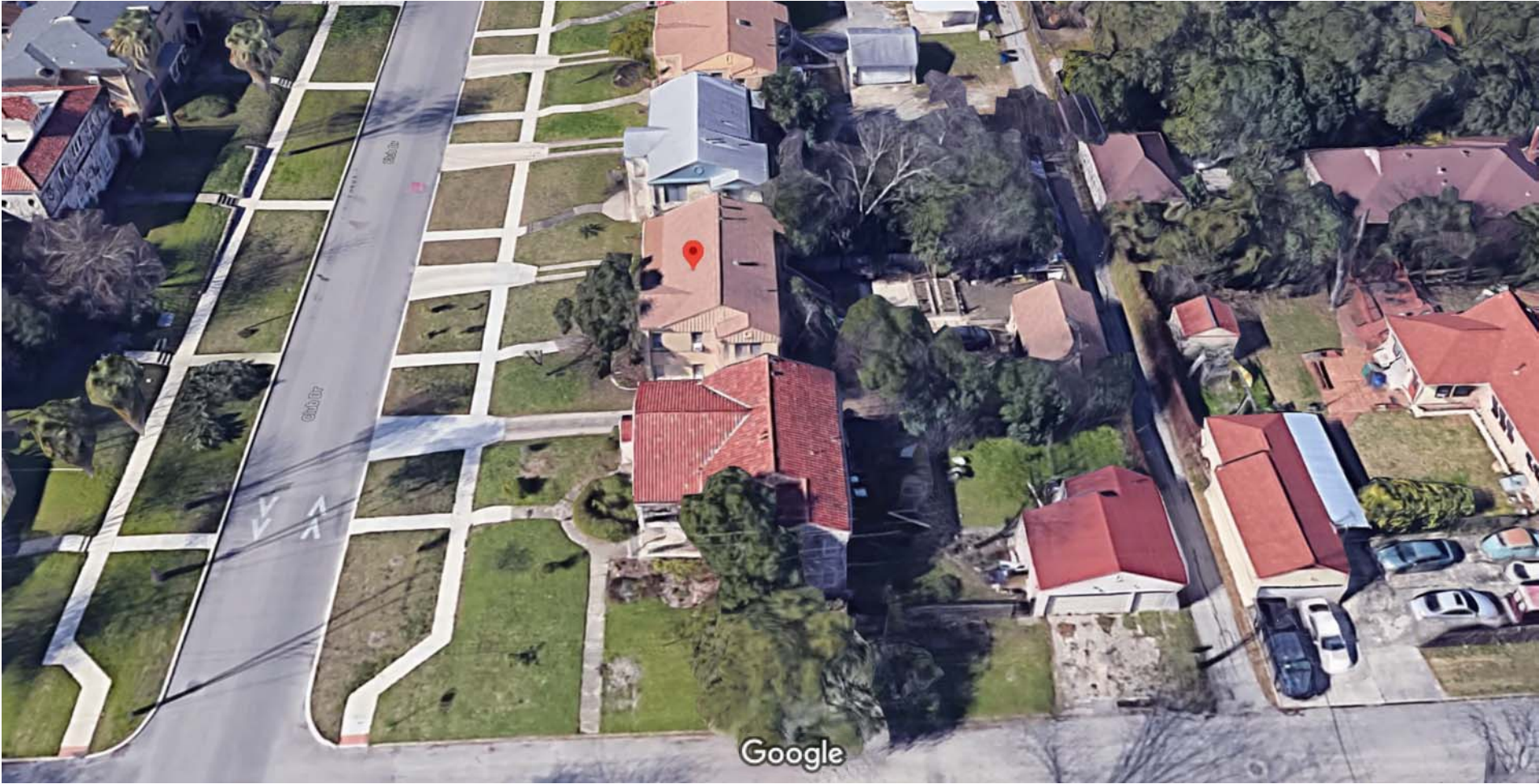
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NEW PHOTOVOLTAIC SYSTEM 6.21 KW DC
405 CLUB DRIVE, SAN ANTONIO, TX 78201, USA

GENERAL NOTES

1.1.1 PROJECT NOTES:
1.1.2 THISPHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
1.1.3 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION
1.1.4 GROUND FAULT DETECTION AND INTERRUPTION (GFDI) DEVICE IS INTEGRATED WITH THE MICROINVERTER IN ACCORDANCE WITH NEC 690.41(B)
1.1.5 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4: PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY
1.1.6 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
1.1.7 ALL INVERTERS, PHOTOVOLTAIC MODULES,PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATIONPER 690.4 (D). SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].
1.1.8 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

1.2.1 SCOPE OF WORK:
1.2.2 PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT

1.3.1 WORK INCLUDES:
1.3.2 PV RACKING SYSTEM INSTALLATION - UNIRAC SOLAR
1.3.3 PV MODULE AND INVERTER INSTALLATION - LG ELECTRONICS LG345N1C-V5 / ENPHASE INVERTER
1.3.4 PV EQUIPMENT ROOF MOUNT
1.3.5 PV SYSTEM WIRING TO A ROOF-MOUNTED JUNCTION BOX
1.3.6 PV LOAD CENTERS (IF INCLUDED)
1.3.7 PV METERING/MONITORING (IF INCLUDED)
1.3.8 PV DISCONNECTS
1.3.9 PV GROUNDING ELECTRODE & BONDING TO (E) GEC
1.3.10 PV FINAL COMMISSIONING
1.3.11 (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV 1.3.13
SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE

PROJECT INFORMATION

OWNER
NAME: CARRIE WILLCOCKSON

PROJECT MANAGER
NAME: MATTHEW WEBB
PHONE: 5052180838

CONTRACTOR NAME
MARC JONES CONSTRUCTION,
LLC DBA SUNPRO SOLAR
PHONE: 5052180838

SCOPE OF WORK

SYSTEM SIZE: STC:18 X 345W= 6.21 kW DC
PTC: 18 x 321W = 5.78 kW DC
(18) LG ELECTRONICS LG345N1C-V5
(18) ENPHASE IQ7 PLUS -72-2-US

ATTACHMENT TYPE: ROOF MOUNT
MSP UPGRADE: YES

AUTHORITIES HAVING JURISDICTION

BUILDING: CITY OF SAN ANTONIO
ZONING: CITY OF SAN ANTONIO
UTILITY: CPS

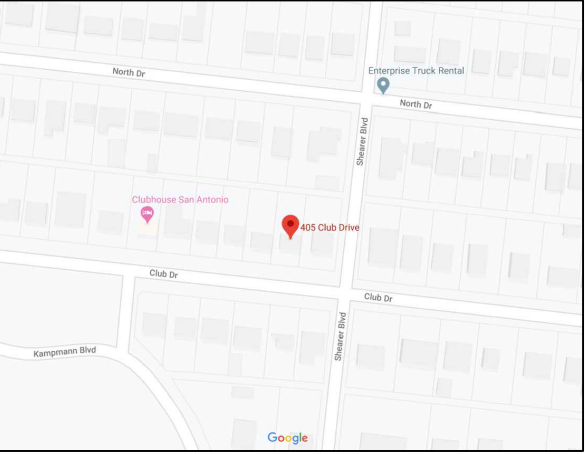
DESIGN SPECIFICATION

OCCUPANCY: II
CONSTRUCTION: SINGLE-FAMILY
ZONING: RESIDENTIAL
GROUND SNOW LOAD: 5 psf
WIND EXPOSURE: B
WIND SPEED: 115 mph

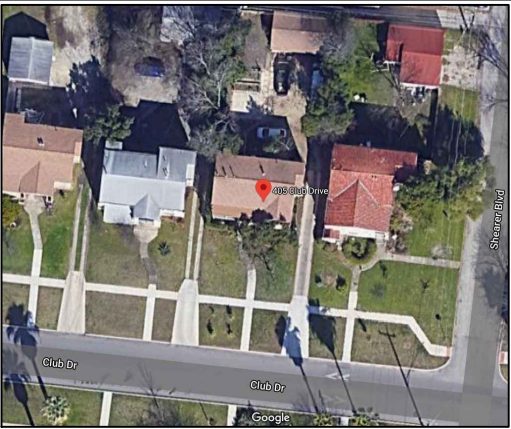
APPLICABLE CODES & STANDARDS

BUILDING: IBC 2015 IRC 2015
ELECTRICAL: NEC 2017
FIRE: IFC 2015

VICINITY MAP



SATELLITE VIEW



SHEET INDEX

T-001	COVER PAGE
G-001	NOTES
A-101	SITE PLAN
A-102	ELECTRICAL PLAN
A-103	ATTACHMENT PLAN
A-104	STRUCTURAL PLAN
A-105	HOUSE ELEVATION
E-601	LINE DIAGRAM
E-602	ELECTRICAL CALCULATIONS
E-603	PLACARD
R-001	RESOURCE DOCUMENT
R-002	RESOURCE DOCUMENT
R-003	RESOURCE DOCUMENT
R-004	RESOURCE DOCUMENT
R-005	RESOURCE DOCUMENT
R-006	RESOURCE DOCUMENT
R-007	RESOURCE DOCUMENT
R-008	RESOURCE DOCUMENT
R-009	RESOURCE DOCUMENT
R-010	RESOURCE DOCUMENT
R-011	RESOURCE DOCUMENT



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MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS
CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

Signature with Seal

REVISIONS	DATE			
	DESCRIPTION	CHANGE MODULES TO LG345		
REV	1.0			

SHEET TITLE	
COVER PAGE	
DRAWN DATE	05/06/2020
DRAWN BY	WAS
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T-001	

2.1.1 SITE NOTES:

2.1.2 A LADDER WILL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2.1.3 THE PV MODULESARECONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
2.1.4 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
2.1.5 PROPERACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PERSECTION NEC 110.26.
2.1.6 ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.

2.2.1 EQUIPMENT LOCATIONS:

2.2.2 ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.
2.2.3 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).
2.2.4 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.
2.2.5 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
2.2.6 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
2.2.7 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

2.3.1 STRUCTURAL NOTES:

2.3.2 RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUSTALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAI MANUFACTURER'S INSTRUCTIONS.
2.3.3 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.
2.3.4 ROOFTOP PENETRATIONS FOR PV RACEWAY WILLBE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.
2.3.5 ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.
2.3.6 WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.

2.4.1 WIRING & CONDUIT NOTES:

2.4.2 ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS AREBASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
2.4.3 CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
2.4.4 VOLTAGE DROP LIMITED TO 1.5%.
2.4.5 DC WIRING LIMITED TO MODULE FOOTPRINT. MICROINVERTER WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY W/ SUITABLE WIRING CLIPS.
2.4.6 AC CONDUCTORS COLORED OR MARKED AS FOLLOWS: PHASE A OR L1- BLACK PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE PHASE C OR L3- BLUE, YELLOW, ORANGE**, OR OTHER CONVENTION NEUTRAL- WHITE OR GREY IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].

2.5.1 GROUNDING NOTES:

2.5.2 GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVISES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.
2.5.3 PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.
2.5.4 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).
2.5.5 EQUIPMENT GROUNDING CONDUCTORS SHALLBE SIZED ACCORDING TO NEC 690.45 AND MICROINVERTER MANUFACTORERS' INSTRUCTIONS.
2.5.6 EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURERDOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.
2.5.7 THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OFA MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.
2.5.8 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]
2.5.9 THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.
2.5.10 GROUND-FAULT DETECTION SHALL COMPLY WITH NEC 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS

2.6.1 DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:

2.6.2 DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHENTHE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARECONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).
2.6.3 DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
2.6.4 PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D).
2.6.5 ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.
2.6.6 MICROINVERTER BRANCHES CONNECTED TO A SINGLE BREAKER OR GROUPED FUSES IN ACCORDANCE WITH NEC 110.3(B).
2.6.7 IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.

2.7.1 INTERCONNECTION NOTES:

2.7.2 LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 705.12 (B)]
2.7.3 THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(D)(2)(3)].
2.7.4 THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(B)(2)(3)].
2.7.5 AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (B)(2)(3)(C).
2.7.6 FEEDER TAP INTERCONNECTION (LOADSIDE) ACCORDING TO NEC 705.12 (B)(2)(1)
2.7.7 SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42 2.7.8BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (B)(5)].



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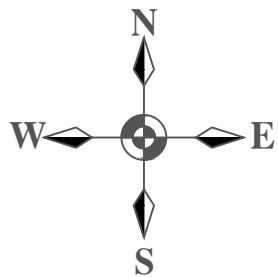
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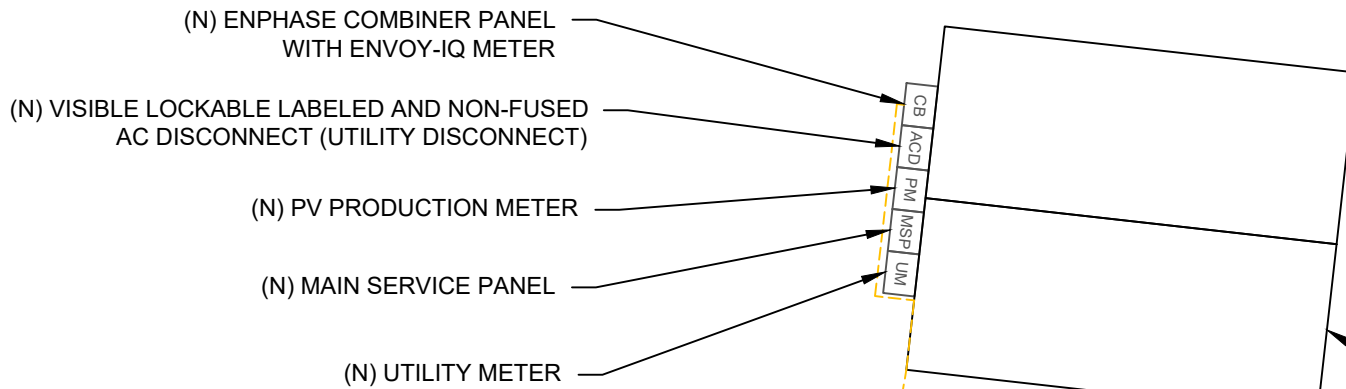
REVISIONS		
REV	DESCRIPTION	DATE
1.0	CHANGE MODULES TO LG345	06/11/20

SHEET TITLE	
NOTES	
DRAWN DATE	05/06/2020
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SHEET NUMBER	
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SHEET TITLE SITE PLAN			
DRAWN DATE		05/06/2020	
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- ① - MODULE STRING
- ② - MODULE STRING



NON HABITABLE GROUP U STRUCTURE

(N) 18" DEEP TRENCH CONDUIT APPROX 60'

(N) CONDUIT RUN

ROOF 2

ROOF 1

ROOF SECTION(S)

ROOF 1	TILT - 23° AZIMUTH - 186° MODULE - 15
ROOF 2	TILT - 10° AZIMUTH - 186° MODULE - 3



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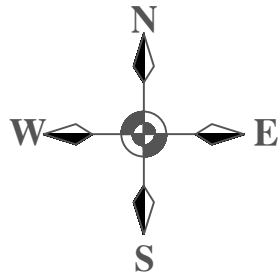
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ELECTRICAL PLAN

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A-102

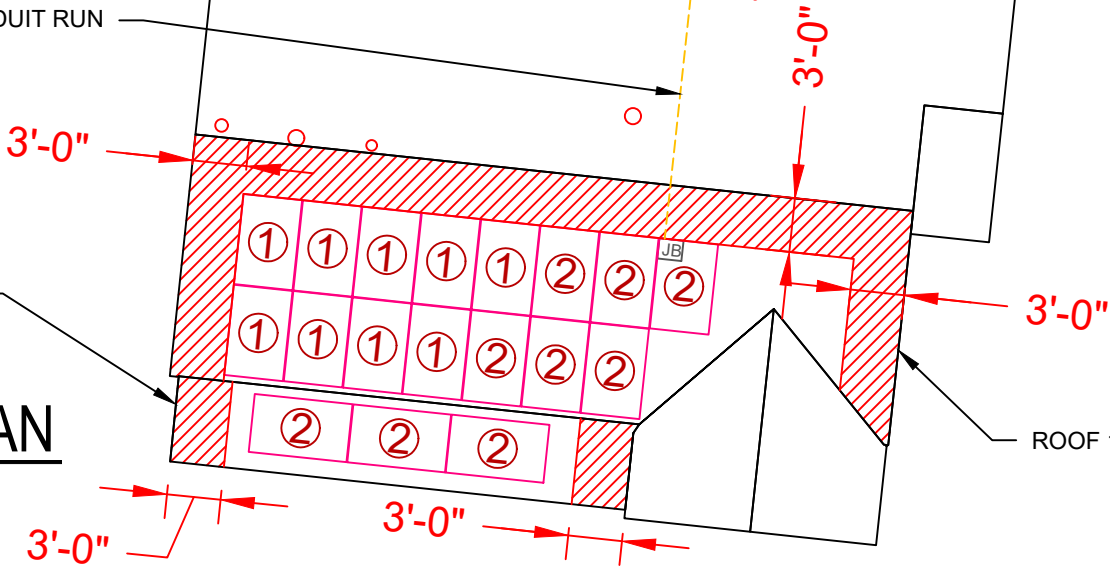
LEGEND

- FIRE SETBACK
- PROPERTY LINE
- JUNCTION BOX
- SKYLIGHT (ROOF OBSTRUCTION)
- CHIMNEY (ROOF OBSTRUCTION)
- VENT, ATTIC FAN (ROOF OBSTRUCTION)

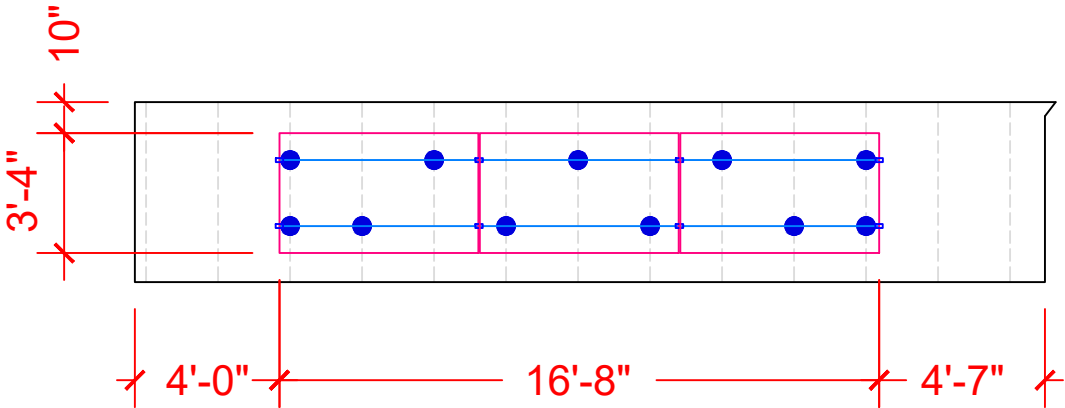
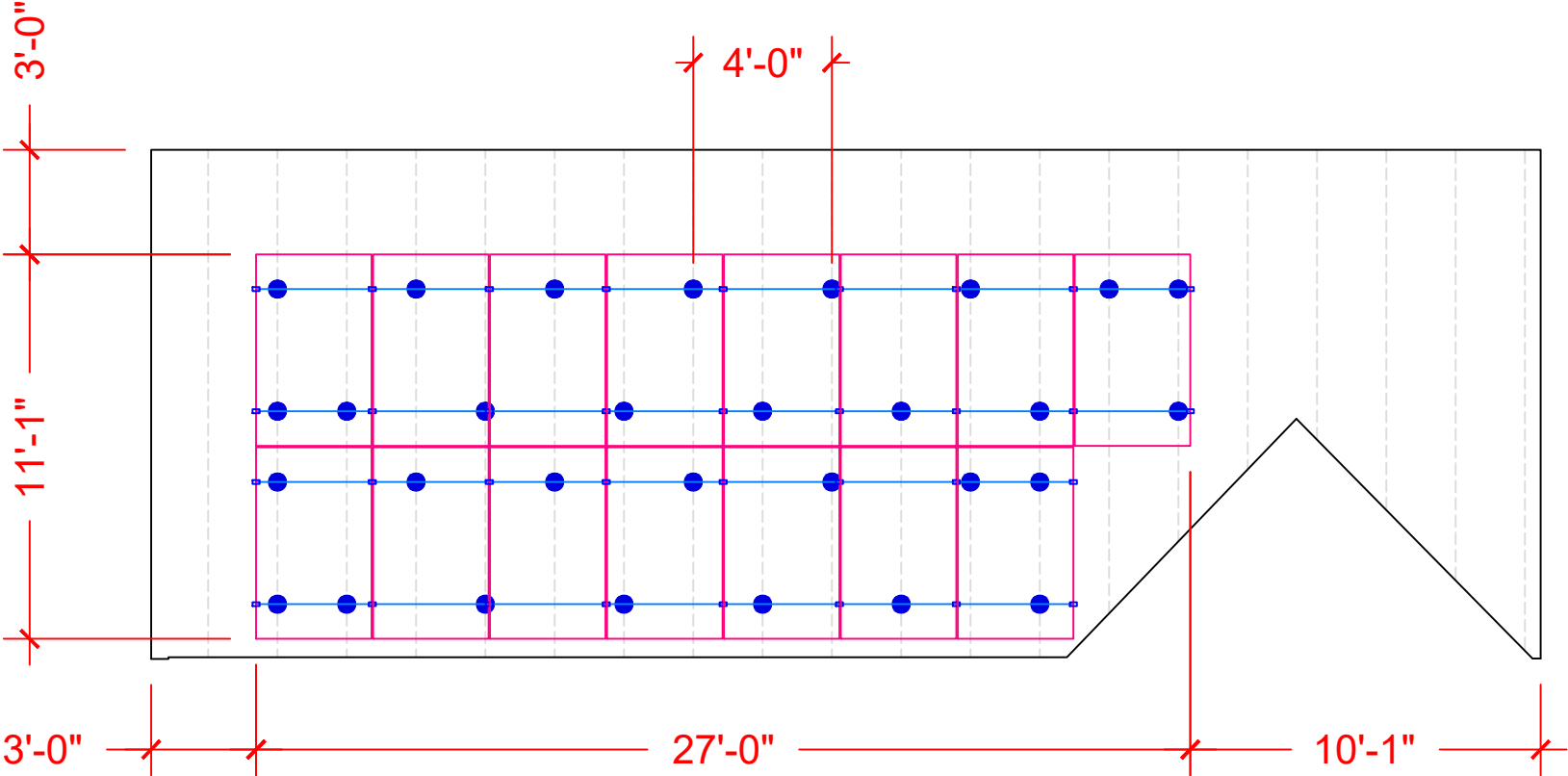


1 | ELECTRICAL PLAN

SCALE:3/32" = 1'-0"



ARRAY 1
TILT- 23 DEG
AZIMUTH - 186 DEG



ARRAY 2
TILT- 10 DEG
AZIMUTH - 186 DEG

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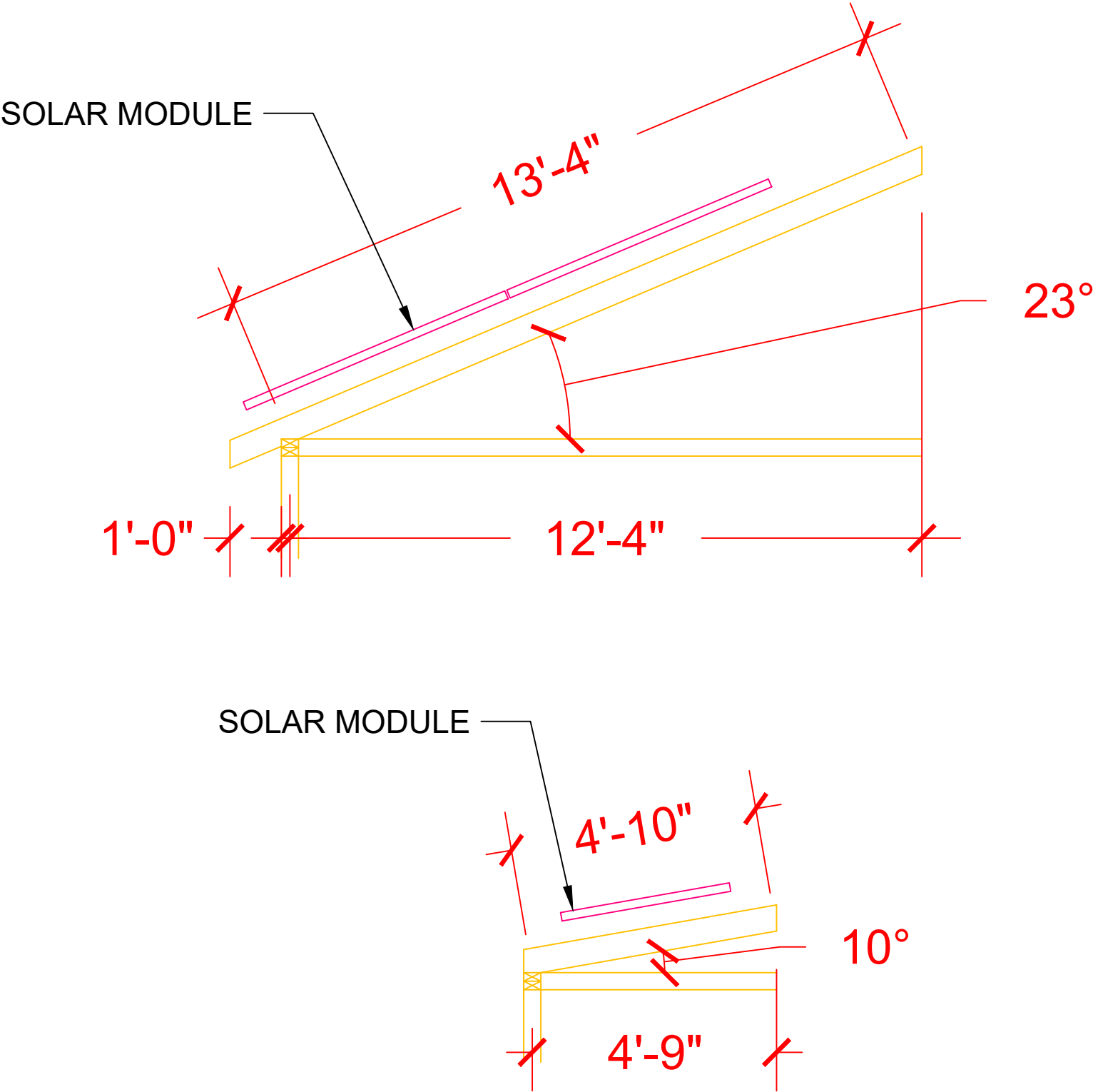
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SHEET TITLE
ATTACHMENT PLAN

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A-103



ROOF SECTION(S)	
ROOF 1	ROOF MATERIAL - COMPOSITE SHINGLE RAFTER SIZE - 2"X6" O.C. SPACING - 24"
ROOF 2	ROOF MATERIAL - COMPOSITE SHINGLE RAFTER SIZE - 2"X6" O.C. SPACING - 24"

ROOF 1

ROOF 2



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SHEET TITLE
STRUCTURAL
PLAN

DRAWN DATE05/06/2020

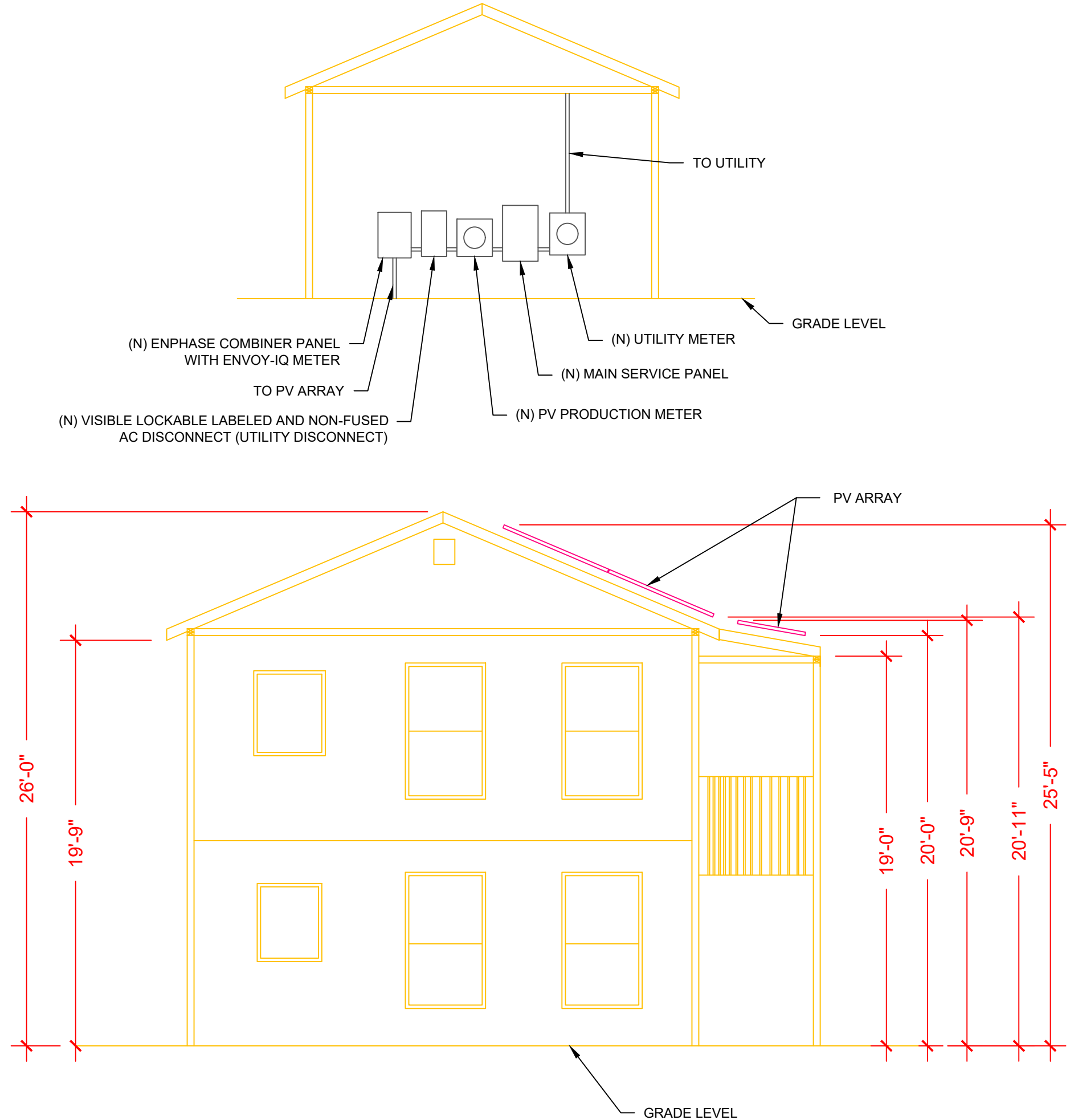
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1 | HOUSE ELEVATION

SCALE:3/16" = 1'-0"





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SHEET TITLE
HOUSE ELEVATION

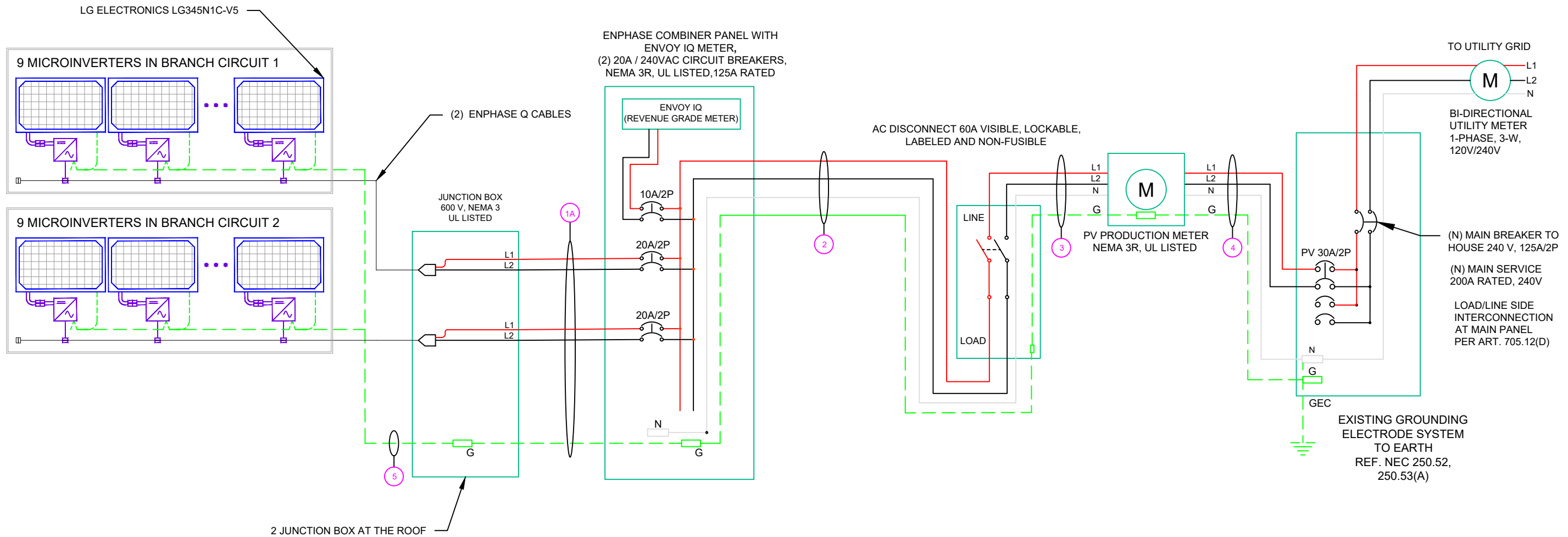
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SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	LG ELECTRONICS LG345N1C-V5
VMP	34.9V
IMP	9.89A
VOC	41.2V
ISC	10.57A
TEMP. COEFF. VOC	-0.26%/°C
MODULE DIMENSION	66.4"L x 40"W x 1.6"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ 7+ MICROINVERTER
MIN/MAX DC VOLT RATING	22V MIN/ 60V MAX
MAX INPUT POWER	235W-440W
NOMINAL AC VOLTAGE RATING	240V/ 211-264V
MAX AC CURRENT	1.21A
MAX MODULES PER STRING	13 (SINGLE PHASE)
MAX OUTPUT POWER	290 VA

WIRE /CONDUIT SCHEDULE	
TAG	DESCRIPTION
1A	#12 THWN-2 & (1)#6 THWN-2 GROUND / 1" PVC CONDUIT IN TRENCHING APPROX 60'.
2	#6 THWN-2 & (1)#6 THWN-2 GROUND /1" EMT CONDUIT
3	#6 THWN-2 & (1)#6 THWN-2 GROUND /1" EMT CONDUIT
4	#6 THWN-2 & (1)#6 THWN-2 GROUND /1" EMT CONDUIT
5	(1)#6 BARE GROUND



22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN ANTONIO, TX 78201, USA

Signature with Seal

REVISIONS	DESCRIPTION	DATE
REV	1.0	06/11/20
CHANGE MODULES TO LG345		

SHEET TITLE

LINE DIAGRAM

DRAWN DATE	05/06/2020
DRAWN BY	WAS
REVIEWED BY	-

SHEET NUMBER

E-601

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-6°
AMBIENT TEMP (HIGH TEMP 2%)	37°
CONDUIT HEIGHT	0.5"
CONDUCTOR TEMPERATURE RATE	90°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.27% /°C

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN CONDUIT
.80	4-6
.70	7-9
.50	10-20

CALCULATIONS:

1. CURRENT CARRYING CONDUCTOR

(A) BEFORE IQ COMBINER PANEL

AMBIENT TEMPERATURE - 37°C ...NEC 310.15(B)(3)(c)
TEMPERATURE DERATE FACTOR - 0.91 ...NEC 310.15(B)(2)(a)
GROUPING FACTOR - 0.8...NEC 310.15(B)(3)(a)

CONDUCTOR AMPACITY

= (INV O/P CURRENT) x 1.25 / A.T.F / G.F ...NEC 690.8(B)
= [(9 x 1.21) x 1.25] / [0.91 x 0.8]
= 18.70A
SELECTED CONDUCTOR - #12 THWN-2 ...NEC 310.15(B)(16)

4. VOLTAGE DROP CALCULATION

VOLTAGE DROP= (0.2 x LENGTH OF CONDUCTOR x
CURRENT x RESISTANCE IN CONDUCTOR) / 240
= (0.2 x 60 x 21.78 x 2 (FOR #12 AWG WIRE)) / 240
= 2.18%

VOLTAGE DROP IS WITHIN PERMISSIBLE LIMIT OF
3%.HENCE OK

(B) AFTER IQ COMBINER PANEL
TEMPERATURE DERATE FACTOR - 0.91
GROUPING FACTOR - 1

CONDUCTOR AMPACITY

= (TOTAL INV O/P CURRENT) x 1.25 / 0.91 x 1 ...NEC 690.8(B)
= [(18 x 1.21) x 1.25] / [0.91 x 1]
= 29.92 A
SELECTED CONDUCTOR - #6 THWN-2 ...NEC 310.15(B)(16)

2. PV OVER CURRENT PROTECTION ...NEC 690.9(B)

= TOTAL INVERTER O/P CURRENT x 1.25
= (18 x 1.21) x 1.25 = 27.23 A
SELECTED OCPD = 30 A ...NEC 240.6

3. 120% RULE FOR BACKFEED BREAKER
...NEC 705.12(D)(2)(3)

MCB + PV BREAKER <= (1.2 x BUS BAR
RATING RATING RATING)
(125 + 30) <= 1.2 x 200A
155.00 <= 240.00 HENCE OK



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REVISIONS		
REV	DESCRIPTION	DATE
1.0	CHANGE MODULES TO LG345	06/11/20

SHEET TITLE	
ELECTRICAL CALCULATIONS	
DRAWN DATE	05/06/2020
DRAWN BY	WAS
REVIEWED BY	-

SHEET NUMBER	
E-602	

WARNING:
PHOTOVOLTAIC
POWER SOURCE

LABEL 1
ON ALL CONDUITS SPACED AT MAX 10FT

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

LABEL 5
AT EACH AC DISCONNECT

! CAUTION !
SOLAR POINT OF
INTERCONNECTION

LABEL 9
AT UTILITY METER

! CAUTION !
SOLAR ELECTRIC
SYSTEM CONNECTED
AND ENERGIZED

LABEL 2
AT INVERTER

PHOTOVOLTAIC
AC DISCONNECT

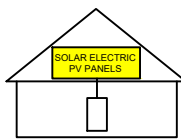
LABEL 6
AT EACH AC DISCONNECT

! WARNING !
THE SERVICE METER IS ALSO SERVED
BY A PHOTOVOLTAIC SYSTEM

LABEL 10
AT UTILITY METER

**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



SOLAR ELECTRIC
PV PANELS

LABEL 3
AT INVERTER

! WARNING !
DUAL POWER SOURCES
SECOND SOURCE IS PV SYSTEM

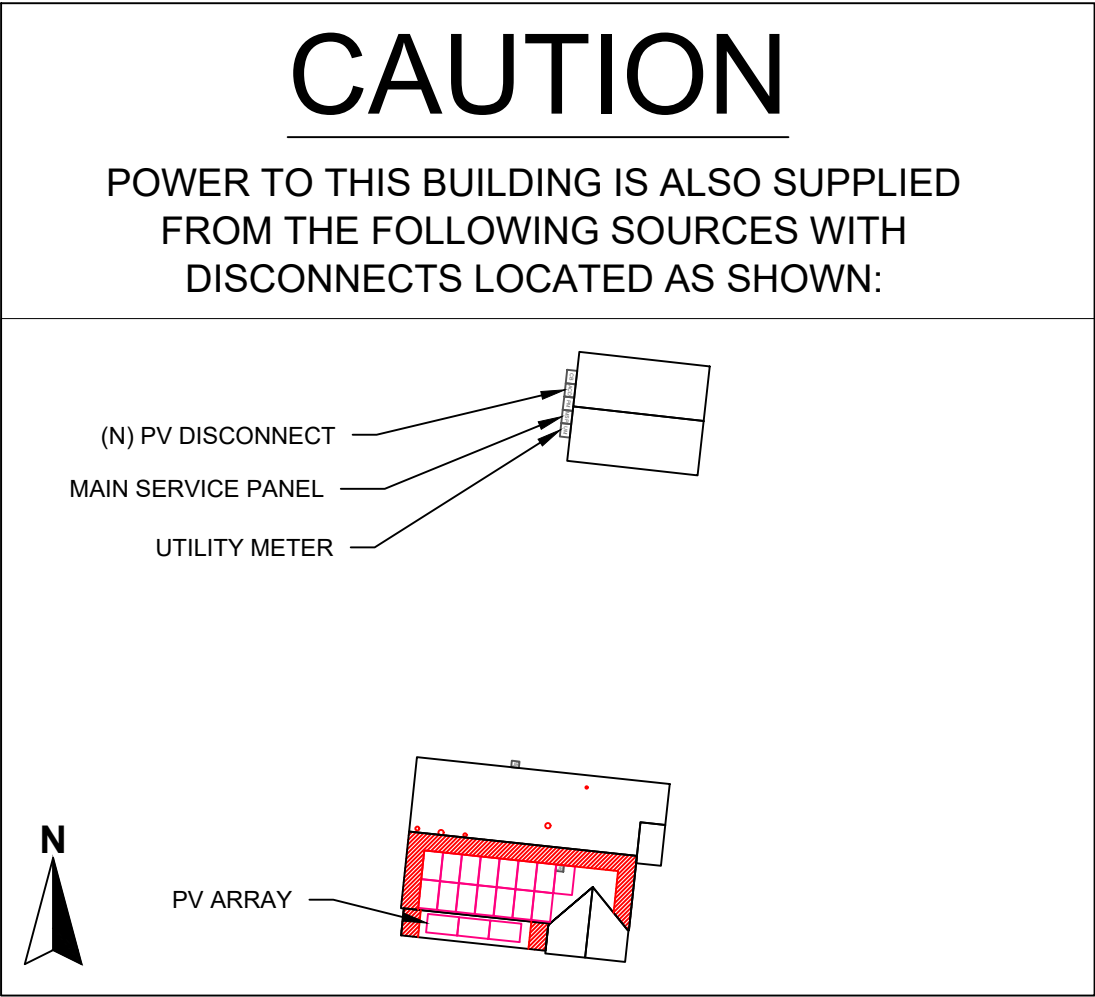
LABEL 7
AT MEP


PHOTOVOLTAIC
DC DISCONNECT

LABEL 4
AT DC DISCONNECT

! WARNING !
SOLAR SYSTEM CONNECTED
AND ENERGIZED

LABEL 8
AT MEP





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REVISIONS		DATE		
REV	DESCRIPTION			
1.0	CHANGE MODULES TO LG345	06/11/20		

SHEET TITLE
PLACARDS

DRAWN DATE	05/06/2020
DRAWN BY	WAS
REVIEWED BY	-

SHEET NUMBER
E-603

Enphase
IQ 7 and IQ 7+
Microinverters

The high-powered smart grid-ready Enphase IQ 7 Micro™ and Enphase IQ 7+ Micro™ dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.



To learn more about Enphase offerings, visit enphase.com



Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)		IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings¹	235 W - 350 W +		235 W - 440 W +		
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules		
Maximum input DC voltage	48 V		60 V		
Peak power tracking voltage	27 V - 37 V		27 V - 45 V		
Operating range	16 V - 48 V		16 V - 60 V		
Min/Max start voltage	22 V / 48 V		22 V / 60 V		
Max DC short circuit current (module Isc)	15 A		15 A		
Overtoltage class DC port	II		II		
DC port backfeed current	0 A		0 A		
PV array configuration	1 x 1 ungrounded array; No additional AC side protection required; AC side protection requires max 20A per branch circuit		DC side protection required; AC side protection requires max 20A per branch circuit		
OUTPUT DATA (AC)		IQ 7 Microinverter		IQ 7+ Microinverter	
Peak output power	250 VA		295 VA		
Maximum continuous output power	240 VA		290 VA		
Nominal (L-L) voltage/range²	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V	
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)	
Nominal frequency	60 Hz		60 Hz		
Extended frequency range	47 - 68 Hz		47 - 68 Hz		
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms		
Maximum units per 20 A (L-L) branch circuit³	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)	
Overtoltage class AC port	III		III		
AC port backfeed current	0 A		0 A		
Power factor setting	1.0		1.0		
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging		
EFFICIENCY	@240 V	@208 V	@240 V	@208 V	
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %	
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %	
MECHANICAL DATA					
Ambient temperature range	-40°C to +65°C				
Relative humidity range	4% to 100% (condensing)				
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)				
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)				
Weight	1.08 kg (2.38 lbs)				
Cooling	Natural convection - No fans				
Approved for wet locations	Yes				
Pollution degree	PD3				
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure				
Environmental category / UV exposure rating	NEMA Type 6 / outdoor				
FEATURES					
Communication	Power Line Communication (PLC)				
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.				
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.				
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.				

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit enphase.com

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2019-3-26



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REVISIONS		DATE			
REV	DESCRIPTION				
1.0	CHANGE MODULES TO LG345	06/11/20			

SHEET TITLE
RESOURCE
DOCUMENT

DRAWN DATE	05/06/2020
DRAWN BY	WAS
REVIEWED BY	-

SHEET NUMBER
R-002

Enphase IQ Combiner 3 (X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3™** with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.



Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 3

MODEL NUMBER

IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
------------------------------	--

ACCESSORIES and REPLACEMENT PARTS (not included, order separately)

Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), quantity 2
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3

ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy

MECHANICAL DATA

Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)

COMPLIANCE

Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit enphase.com

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2018-09-13



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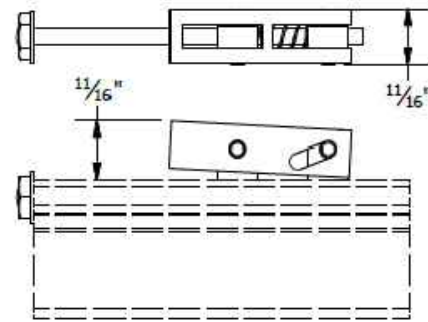
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SHEET TITLE
RESOURCE
DOCUMENT

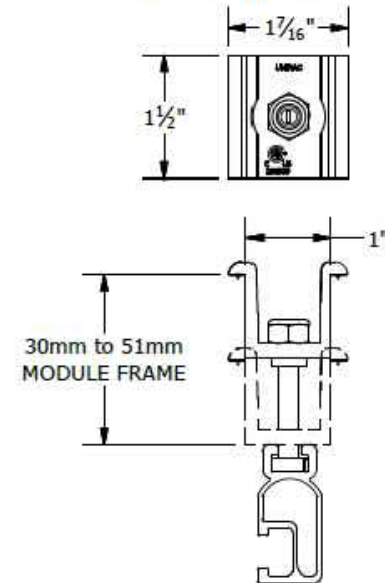
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R-003

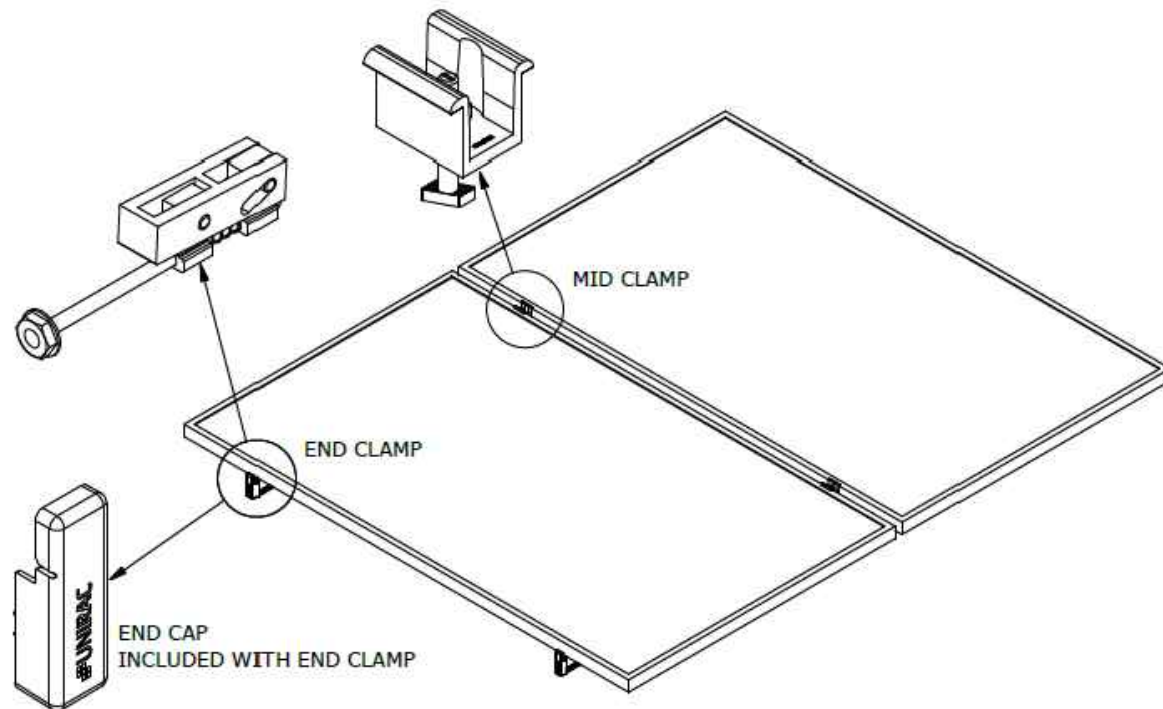
PRO SERIES END CLAMP



PRO SERIES MID CLAMP



PART # TABLE	
P/N	DESCRIPTION
302035M	ENDCLAMP PRO
302030M	MIDCLAMP PRO - MILL
302030D	MIDCLAMP PRO - DRK



UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

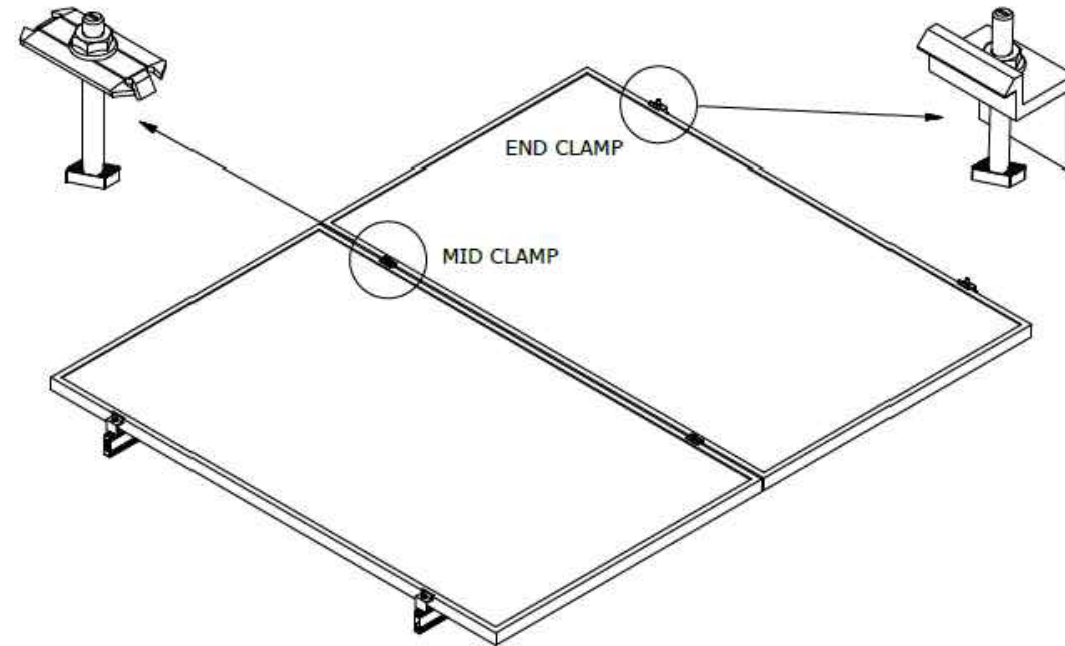
PRODUCT LINE: SOLARMOUNT
DRAWING TYPE: PART & ASSEMBLY
DESCRIPTION: PRO SERIES BONDING CLAMPS
REVISION DATE: 10/26/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL
PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

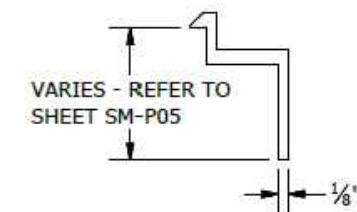
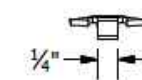
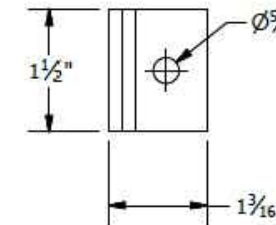
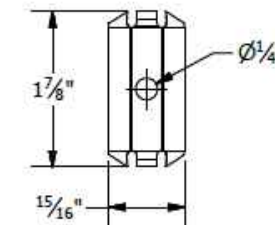
SM-A01
SHEET

END CLAMP

MID CLAMP



PART # TABLE	
P/N	DESCRIPTION
302027C	SM BND MIDCLAMP BC SS
302027D	SM BND MIDCLAMP BC DRK SS
302028C	SM BND MIDCLAMP EF SS
302028D	SM BND MIDCLAMP EF DRK SS
302029C	SM BND MIDCLAMP DK SS
302029D	SM BND MIDCLAMP DK DRK SS
	FOR BONDING END CLAMP REFER TO SHEET SM-P05



BONDING SM MID CLAMP BONDING SM END CLAMP

UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE: SOLARMOUNT
DRAWING TYPE: PART & ASSEMBLY
DESCRIPTION: BONDING TOP CLAMPS
REVISION DATE: 10/26/2017

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SM-A01A
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SUNPR

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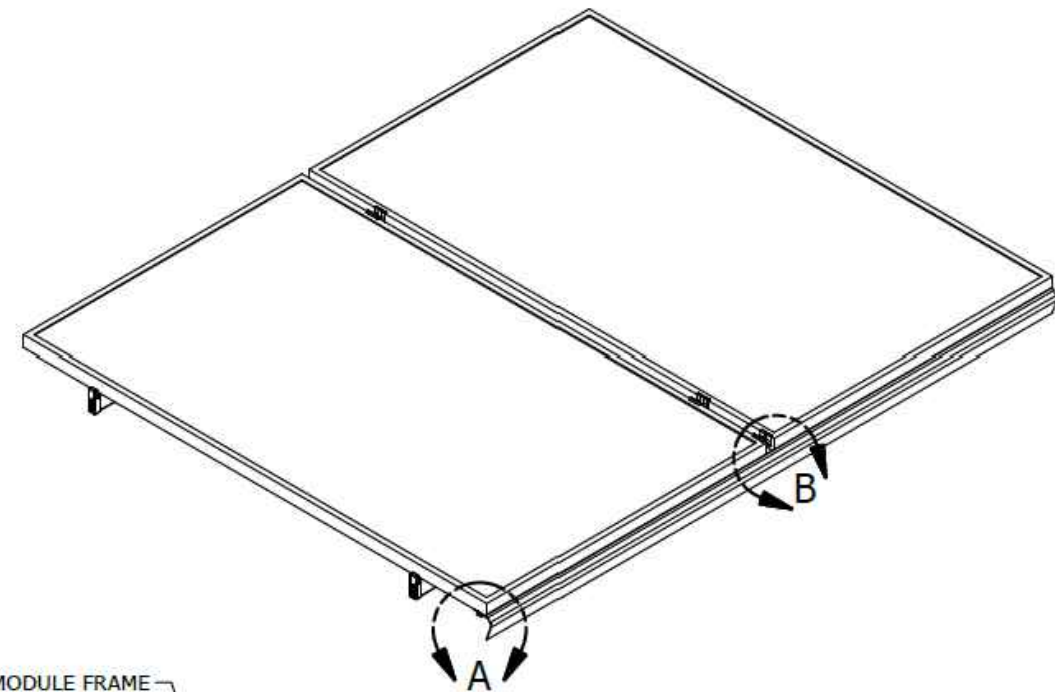
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REV	DESCRIPTION			
1.0	CHANGE MODULES TO LG345	06/11/20		

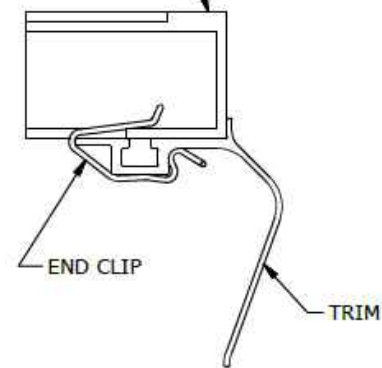
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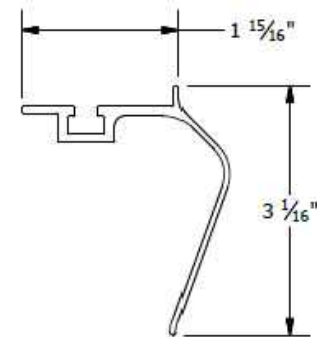
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R-004



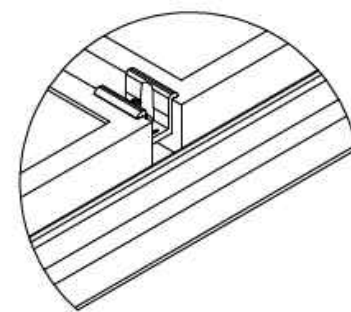
MODULE FRAME



DETAIL A
TRIM END CLIP



TRIM



DETAIL B
MID CLAMP TRIM CONNECTION

PART # TABLE		
P/N	DESCRIPTION	LENGTH
206072D-B	SM TRIM DRK	168"
008025S	SM TRIM END CLIP	-



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ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	SM TRIM END CLIP
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

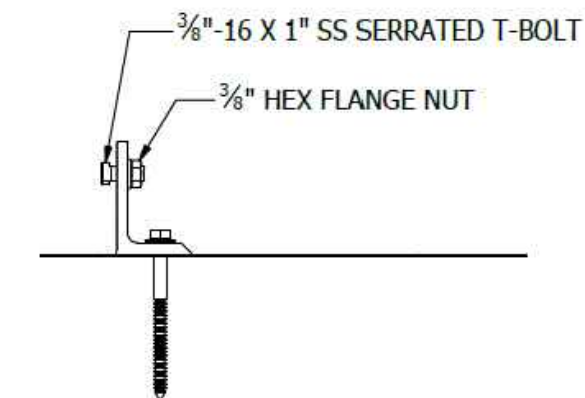
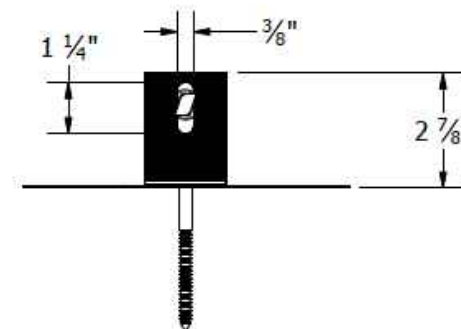
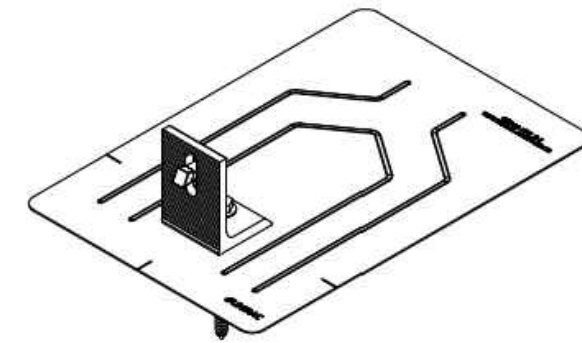
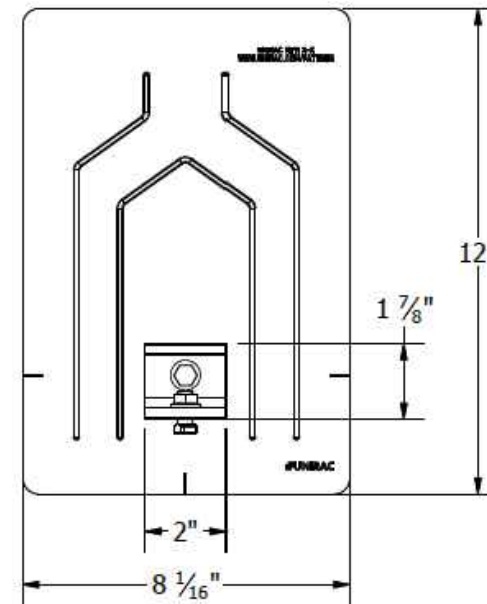
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SM-A02

SHEET

NOTES:

1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. PACKAGING: KITS OF 10



PART # TABLE	
P/N	DESCRIPTION
004055M	FLASHKIT PRO MILL
004055D	FLASHKIT PRO DRK



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	KIT DETAIL
DESCRIPTION:	FLASHKIT PRO
REVISION DATE:	9/24/2018

DRAWING NOT TO SCALE
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SM-A03

SHEET



22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

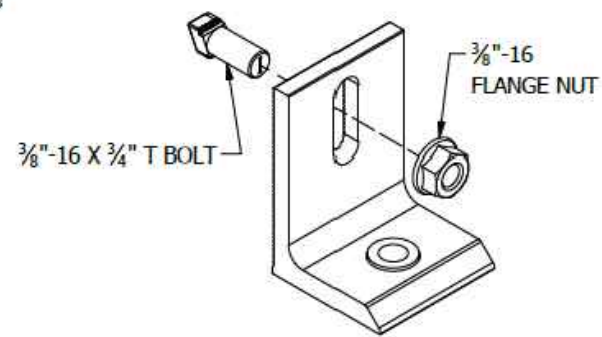
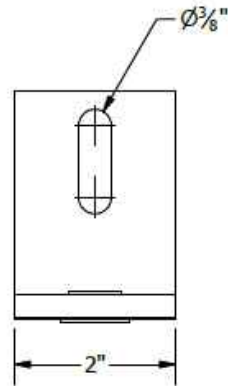
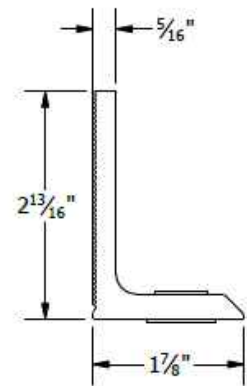
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REVISIONS		DATE
REV	DESCRIPTION	
1.0	CHANGE MODULES TO LG345	06/11/20

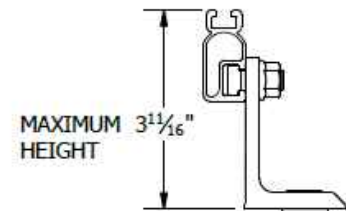
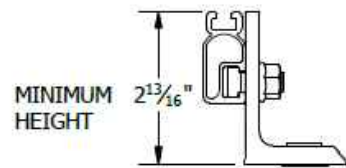
SHEET TITLE
RESOURCE
DOCUMENT

DRAWN DATE	05/06/2020
DRAWN BY	WAS
REVIEWED BY	-

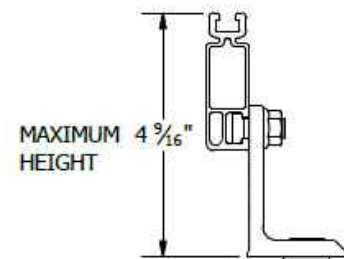
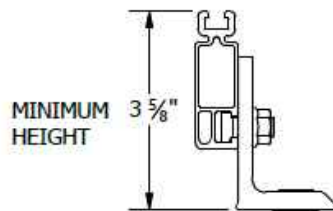
SHEET NUMBER
R-005



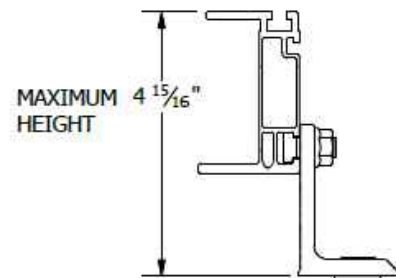
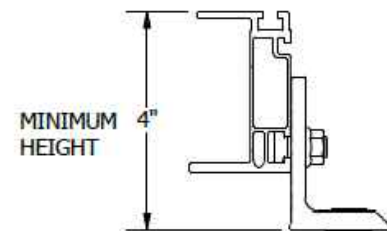
L-FOOT



SOLARMOUNT LIGHT
ON L-FOOT



SOLARMOUNT STANDARD
ON L-FOOT



SOLARMOUNT HD
ON L-FOOT



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
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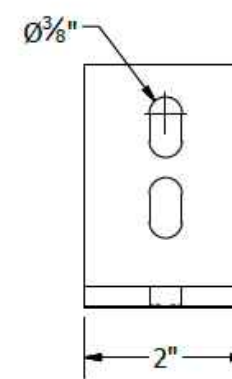
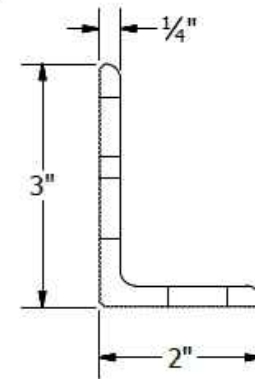
PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	L-FOOT
REVISION DATE:	11/19/2018

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

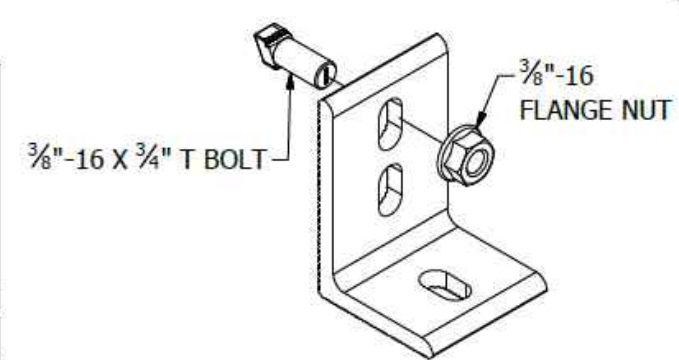
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A11

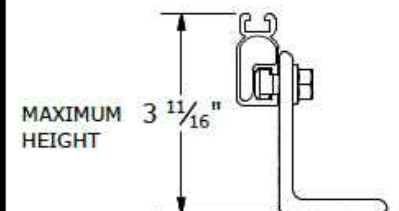
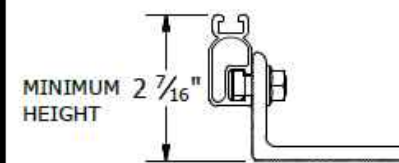
SHEET



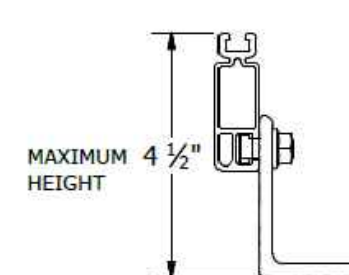
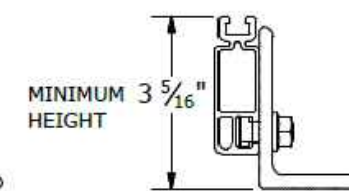
L-FOOT



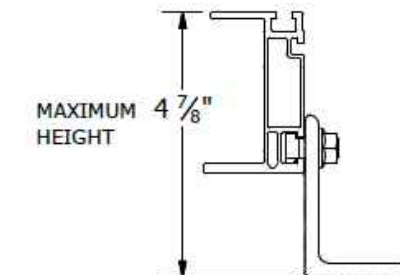
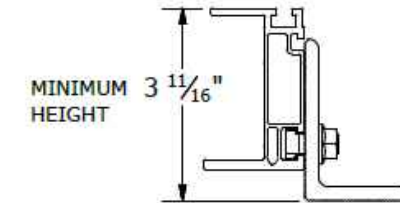
PART # TABLE	
P/N	DESCRIPTION
304001C	L-FOOT SERR W/T-BOLT CLR
304001D	L-FOOT SERR W/T-BOLT DRK



SOLARMOUNT LIGHT
ON L-FOOT



SOLARMOUNT STANDARD
ON L-FOOT



SOLARMOUNT HD
ON L-FOOT

NOTES:

1. L-FOOT CAN BE INSTALLED IN TWO ORIENTATIONS, PLEASE REFER TO INSTRUCTIONS IN THE QUICK START GUIDE.



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	L-FOOT
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A04

SHEET

SUNPR

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

Signature with Seal

REV	DESCRIPTION	DATE	1.0	CHANGE MODULES TO LG345	06/11/20

SHEET TITLE
RESOURCE
DOCUMENT

DRAWN DATE	05/06/2020
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REVIEWED BY	-

SHEET NUMBER
R-006

PROJECT NAME & ADDRESS

CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

Signature with Seal

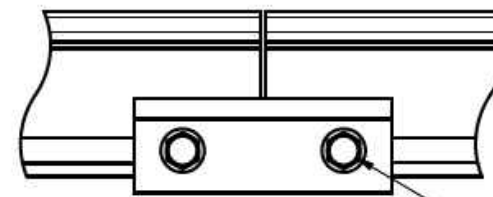
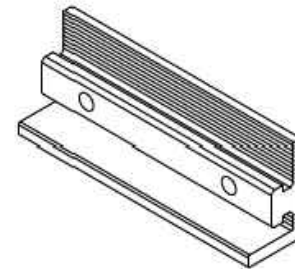
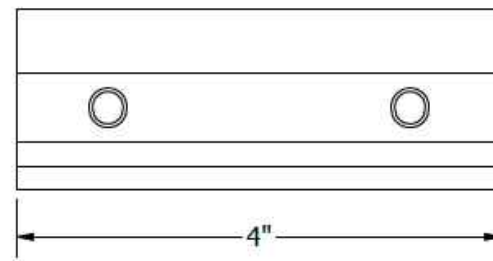
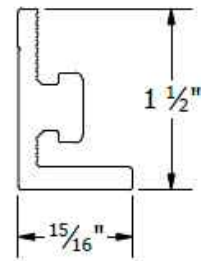
REV	DESCRIPTION	DATE	1.0	06/11/20		
	CHANGE MODULES TO LG345					

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE	05/06/2020
DRAWN BY	WAS
REVIEWED BY	-

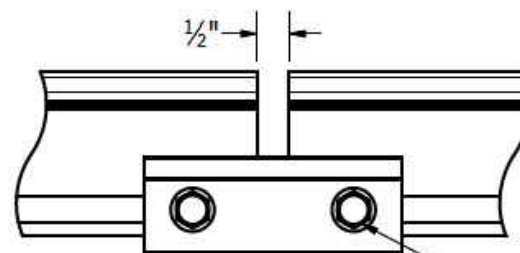
SHEET NUMBER
R-007

BONDING SPLICE BAR



TYPICAL SPLICE BAR DETAIL

5/16"-18 TYPE F THREAD
CUTTING SCREWS INCLUDED



TYPICAL EXPANSION JOINT DETAIL

NOTE THAT ONLY 2 SCREWS ARE
USED AT AN EXPANSION JOINT.
THE SPLICE BAR DOES NOT BOND
ACROSS AN EXPANSION JOINT.
SEE INSTALLATION GUIDE FOR
INSTRUCTION.

PART # TABLE

P/N	DESCRIPTION
303019M	BND SPLICE BAR PRO SERIES MILL
303019D	BND SPLICE BAR PRO SERIES DRK



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING SPLICE BAR PRO SERIES
REVISION DATE:	8/23/2018

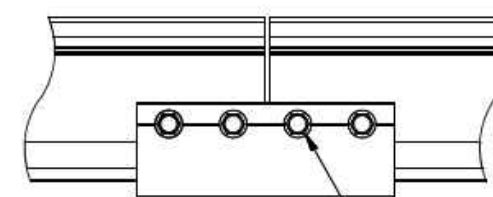
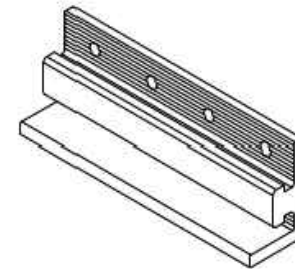
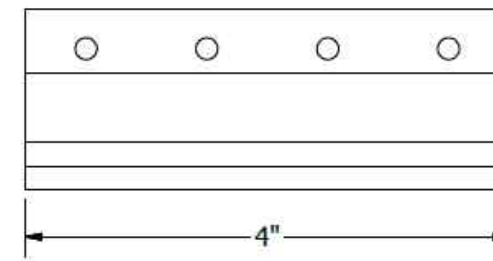
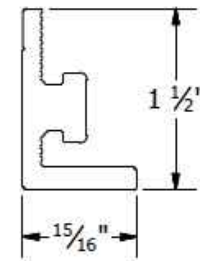
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
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SM-A05

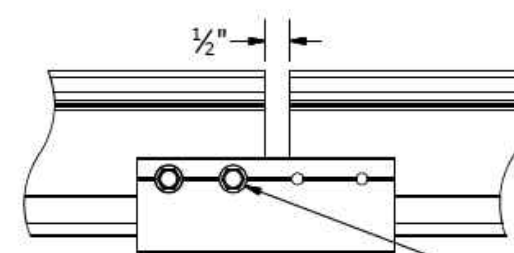
SHEET

BONDING SPLICE BAR



TYPICAL SPLICE BAR DETAIL

#12 X 3/4" SELF DRILLING SS SCREWS INCLUDED



TYPICAL EXPANSION JOINT DETAIL

NOTE THAT ONLY 2 SCREWS ARE
USED AT AN EXPANSION JOINT.
THE SPLICE BAR DOES NOT BOND
ACROSS AN EXPANSION JOINT.
SEE INSTALLATION GUIDE FOR
INSTRUCTION.

PART # TABLE

P/N	DESCRIPTION
303018C	BND SPLICE BAR SERRATED CLR
303018D	BND SPLICE BAR SERRATED DRK



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING SPLICE BAR
REVISION DATE:	9/27/2017

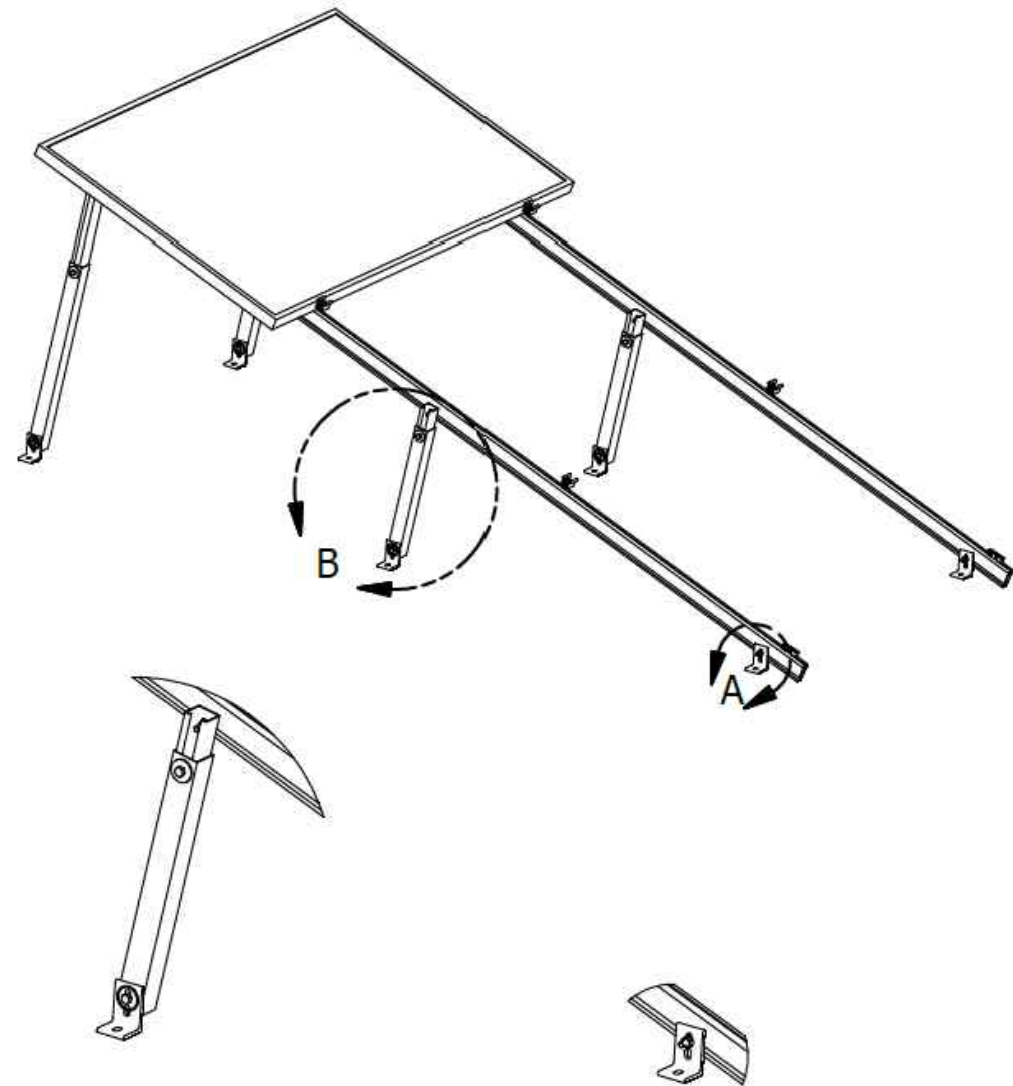
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
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LEGAL NOTICE

SM-A05

SHEET

NOTES:
1. SEE SM TILH INSTALLATION GUIDE FOR ASSEMBLY INSTRUCTIONS.



DETAIL B
REAR TILT LEG

DETAIL A
L FOOT

UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE: SOLARMOUNT TILT
DRAWING TYPE: ASSEMBLY
DESCRIPTION: HIGH PROFILE TILT
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
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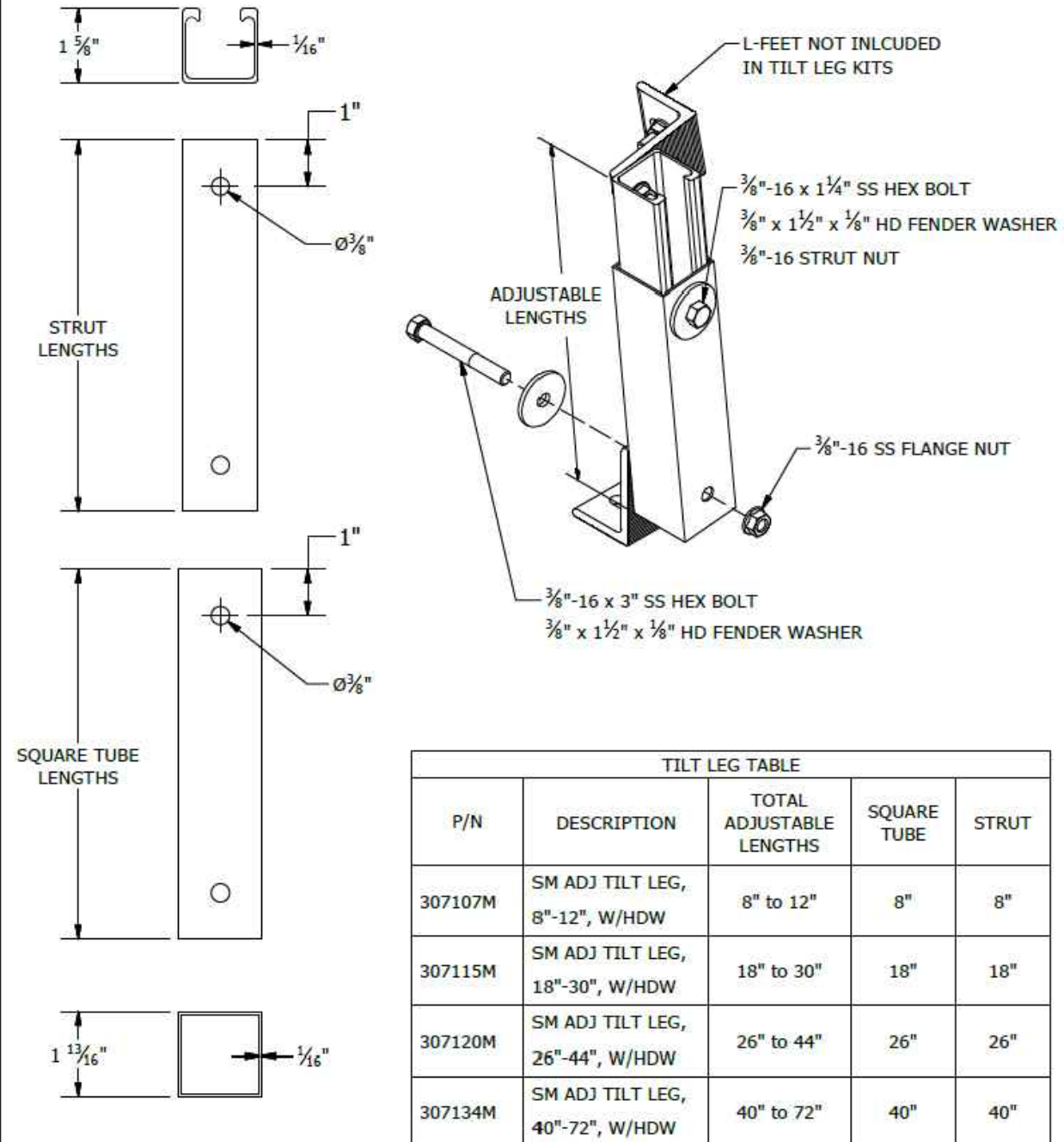
SM-A08
SHEET

UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE: SOLARMOUNT TILT
DRAWING TYPE: ASSEMBLY
DESCRIPTION: ADJUSTABLE TILT
LEG
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A09
SHEET



SUNPRO

22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

Signature with Seal

REV	DESCRIPTION	DATE	1.0	CHANGE MODULES TO LG345		
		06/11/20				

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE: 05/06/2020
DRAWN BY: WAS
REVIEWED BY: -

SHEET NUMBER
R-008

PROJECT NAME & ADDRESS

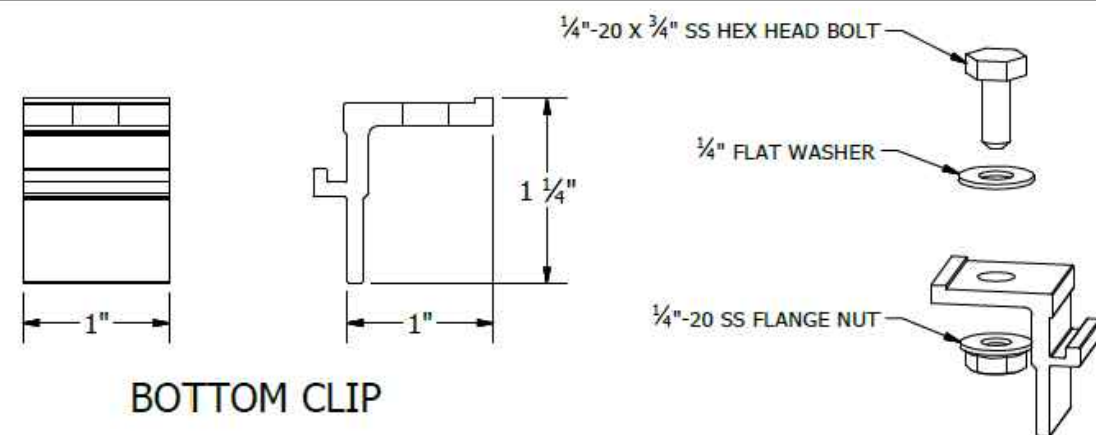
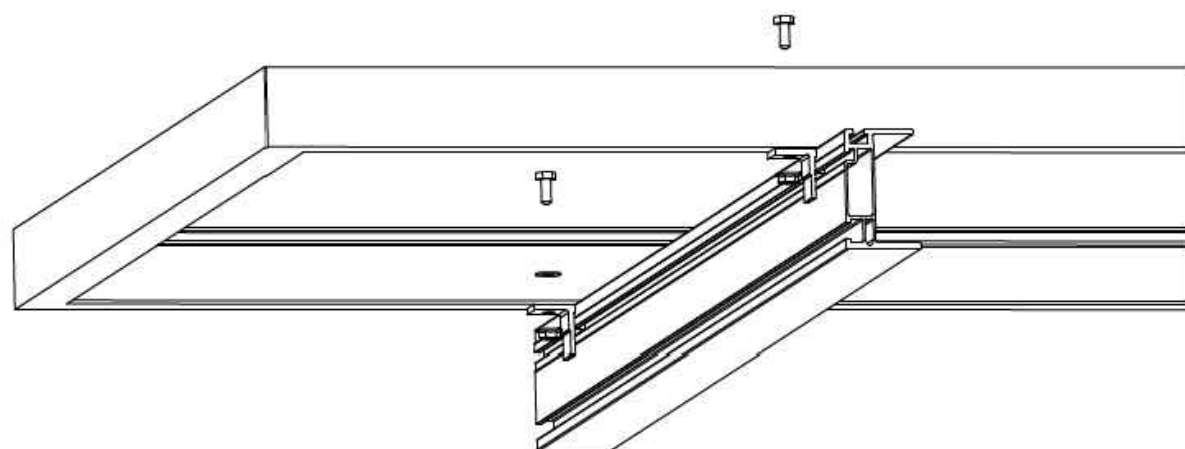
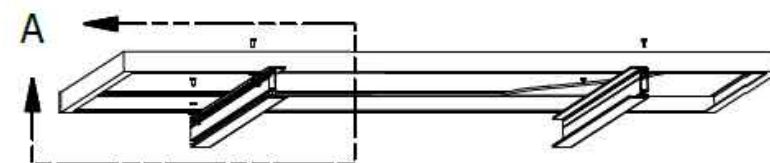
CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

Signature with Seal

REV	DESCRIPTION	DATE	1.0	CHANGE MODULES TO LG345		
		06/11/20				

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE	05/06/2020
DRAWN BY	WAS
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SHEET NUMBER
R-009

BOTTOM CLIP

DETAIL A


PART # TABLE	
P/N	DESCRIPTION
302000C	SMHD BOTTOM CLIPS W/HDW CLR


1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
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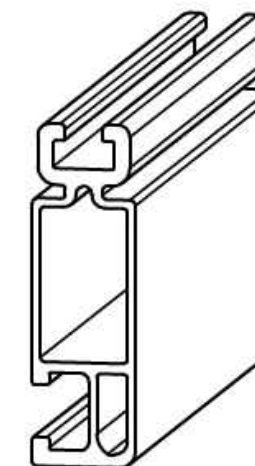
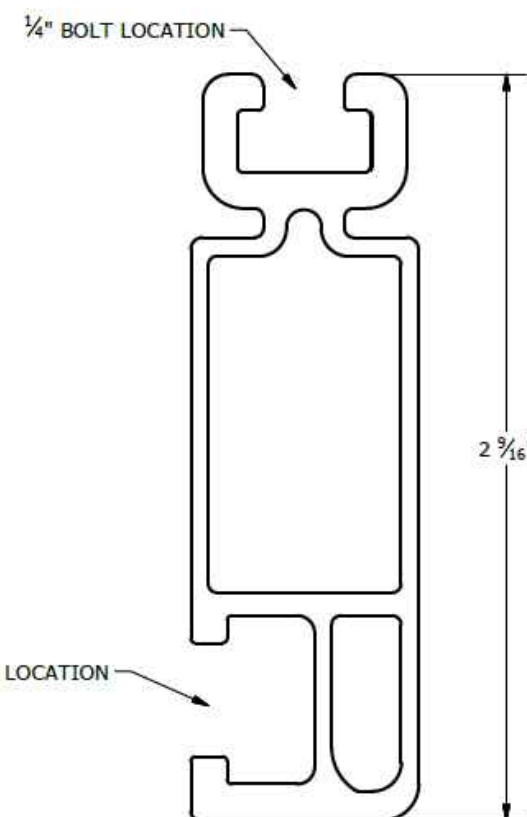
PRODUCT LINE:	SOLARMOUNT HD
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BOTTOM CLIP
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
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LEGAL NOTICE

SM-A10

SHEET



PART # TABLE		
P/N	DESCRIPTION	LENGTH
320132M	SM RAIL 132" MILL	132"
310132C	SM RAIL 132" CLR	132"
320168M	SM RAIL 168" MILL	168"
310168C	SM RAIL 168" CLR	168"
320168D	SM RAIL 168" DRK	168"
320208M	SM RAIL 208" MILL	208"
310208C	SM RAIL 208" CLR	208"
320240M	SM RAIL 240" MILL	240"
310240C	SM RAIL 240" CLR	240"
310240D	SM RAIL 240" DRK	240"


1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
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PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	STANDARD RAIL
REVISION DATE:	9/11/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
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LEGAL NOTICE

SM-P01

SHEET

PROJECT NAME & ADDRESS

CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

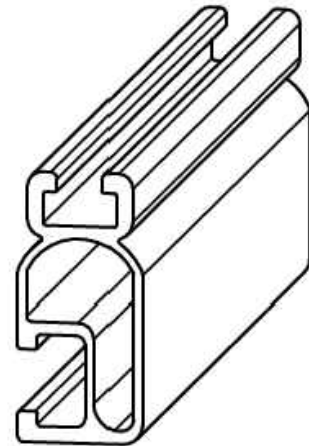
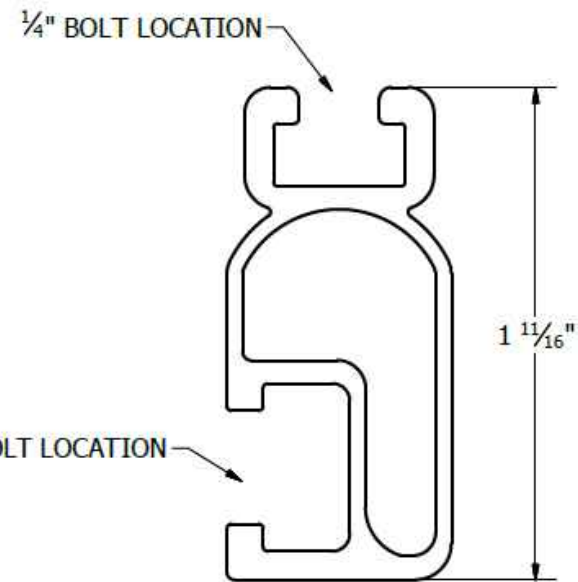
Signature with Seal

REV	DESCRIPTION	DATE	1.0	CHANGE MODULES TO LG345		
		06/11/20				

SHEET TITLE
**RESOURCE
DOCUMENT**

DRAWN DATE	05/06/2020
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SHEET NUMBER
R-010



PART # TABLE		
P/N	DESCRIPTION	LENGTH
315168M	SM LIGHT RAIL 168" MILL	168"
315168D	SM LIGHT RAIL 168" DRK	168"
315240M	SM LIGHT RAIL 240" MILL	240"
315240D	SM LIGHT RAIL 240" DRK	240"

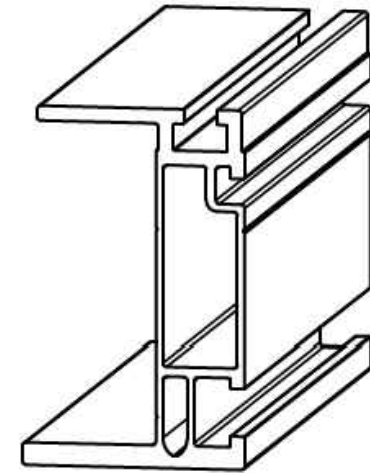
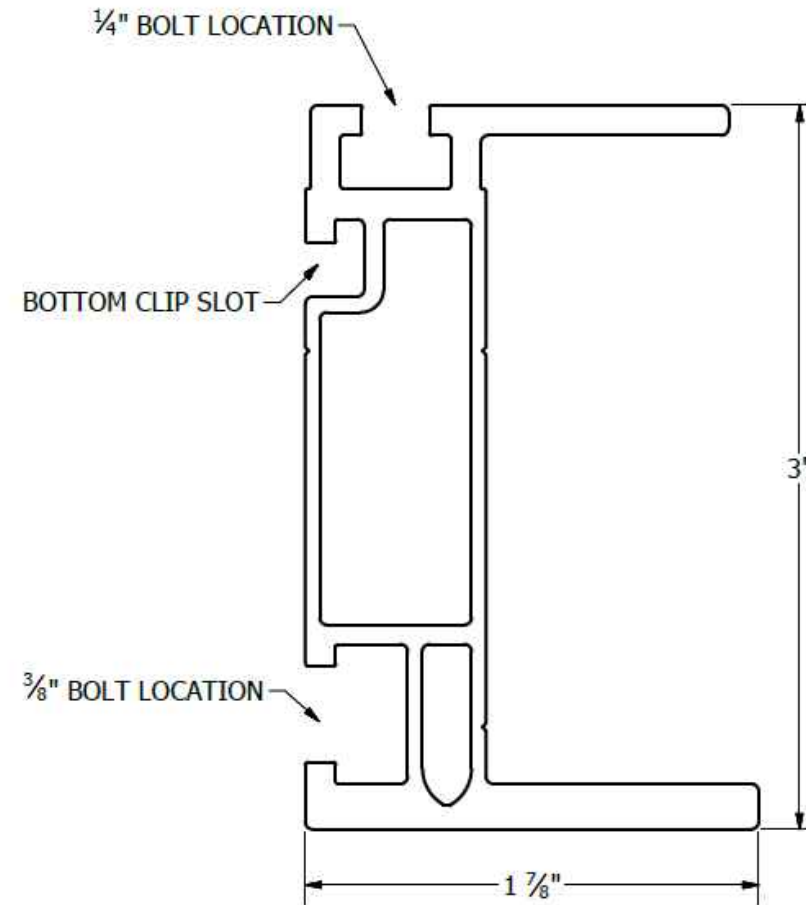

1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE: SOLARMOUNT
DRAWING TYPE: PART DETAIL
DESCRIPTION: LIGHT RAIL
REVISION DATE: 9/11/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-P02

SHEET



PART # TABLE		
P/N	DESCRIPTION	LENGTH
410144M	SMHD, RAIL 144" MILL	144"
410168M	SMHD, RAIL 168" MILL	168"
410204M	SMHD, RAIL 204" MILL	204"
410240M	SMHD, RAIL 240" MILL	240"


1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

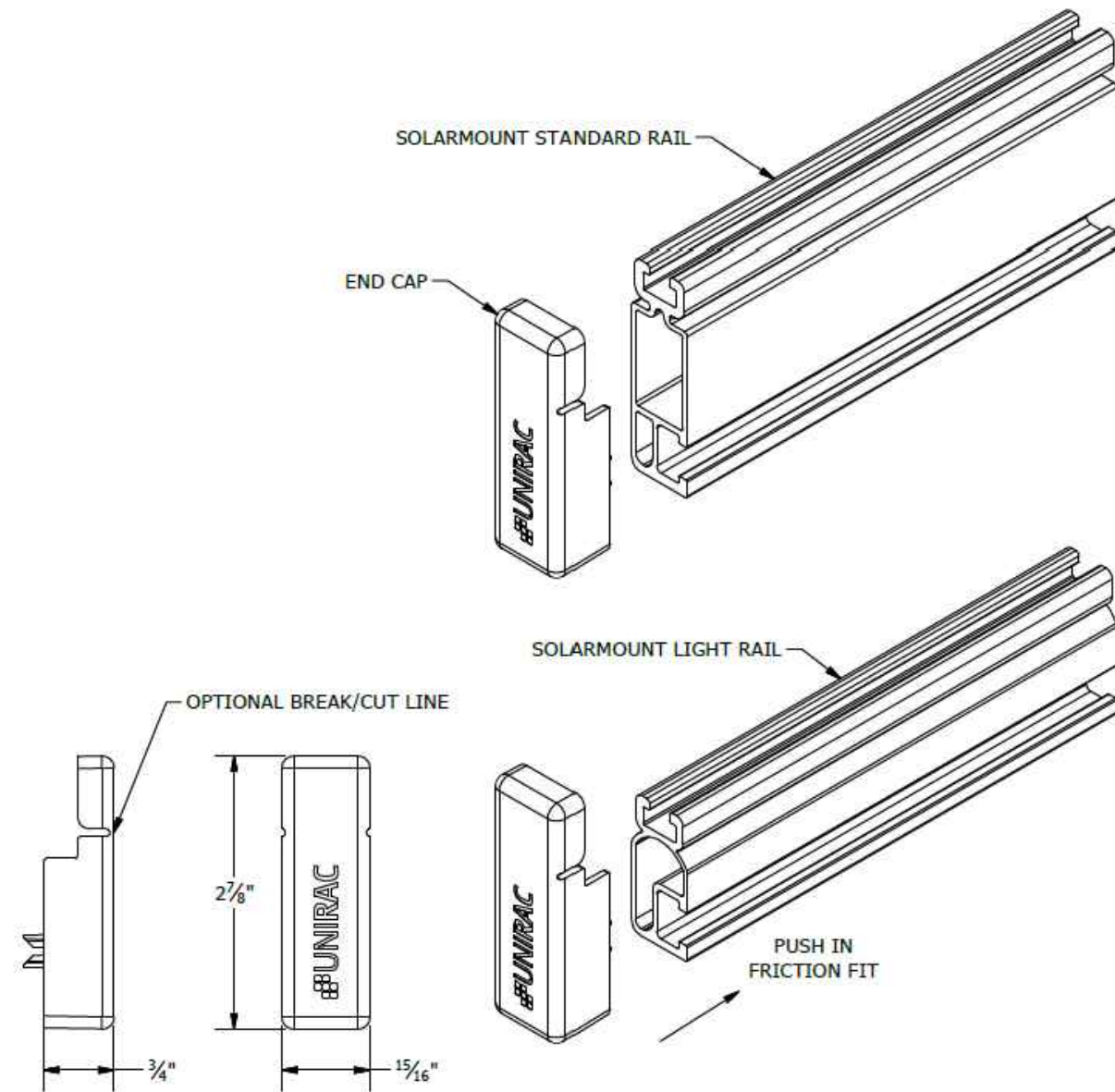
PRODUCT LINE: SOLARMOUNT
DRAWING TYPE: PART DETAIL
DESCRIPTION: HD RAIL
REVISION DATE: 9/11/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL
PRODUCT PROTECTED BY
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SM-P03

SHEET

- NOTES:
1. END CAP INCLUDED WITH EVERY END CLAMP.
 2. END CAP FITS SOLARMOUNT LIGHT AND STANDARD RAIL PROFILES.



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
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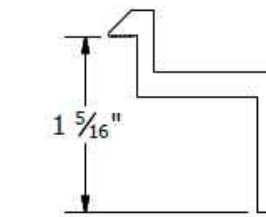
PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	END CAPS
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

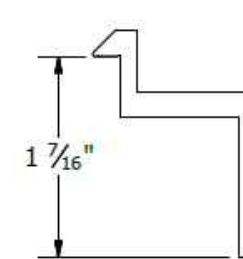
PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-P04

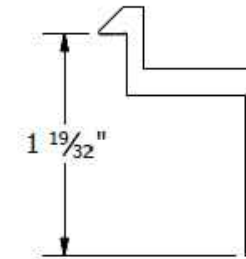
SHEET



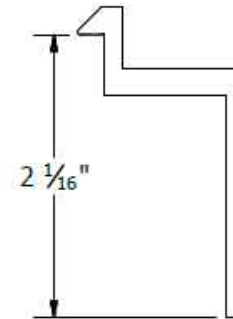
B CLAMP
30mm to 32mm Module Thickness
(1.18" to 1.26")



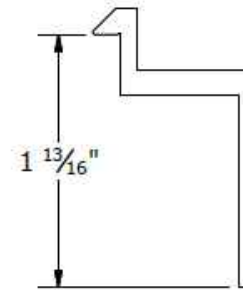
C CLAMP
33mm to 36mm Module Thickness
(1.30" to 1.42")



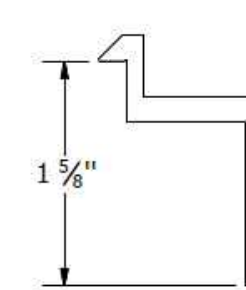
D CLAMP
38mm to 40mm Module Thickness
(1.50" to 1.57")



E CLAMP
50mm to 51mm Module Thickness
(1.97" to 2.00")

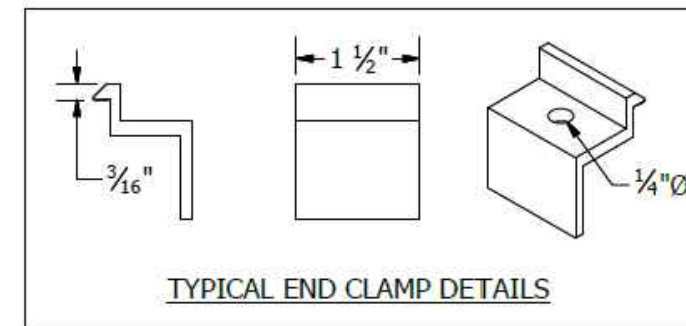


F CLAMP
45mm to 47mm Module Thickness
(1.77" to 1.85")



K CLAMP
39mm to 41mm Module Thickness
(1.54" to 1.61")

PART # TABLE	
P/N	DESCRIPTION
302021C	SM ENDCLAMP B CLR AL
302021D	SM ENDCLAMP B DRK AL
302022C	SM ENDCLAMP C CLR AL
302022D	SM ENDCLAMP C DRK AL
302023C	SM ENDCLAMP D CLR AL
302023D	SM ENDCLAMP D DRK AL
303024C	SM ENDCLAMP E CLR AL
302024D	SM ENDCLAMP E DRK AL
302025C	SM ENDCLAMP F CLR AL
302025D	SM ENDCLAMP F DRK AL
302026C	SM ENDCLAMP K CLR AL
302026D	SM ENDCLAMP K DRK AL



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	END CLAMPS - TOP MOUNTING
REVISION DATE:	9/27/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
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LEGAL NOTICE

SM-P05

SHEET



22171 MCH RD
MANDEVILLE, LA 70471
PHONE: 9152011490

PROJECT NAME & ADDRESS

CARRIE WILLCOCKSON
405 CLUB DRIVE, SAN
ANTONIO, TX 78201,
USA

Signature with Seal

REVISIONS		DATE		
REV	DESCRIPTION			
1.0	CHANGE MODULES TO LG345	06/11/20		

SHEET TITLE
RESOURCE
DOCUMENT

DRAWN DATE	05/06/2020
DRAWN BY	WAS
REVIEWED BY	-

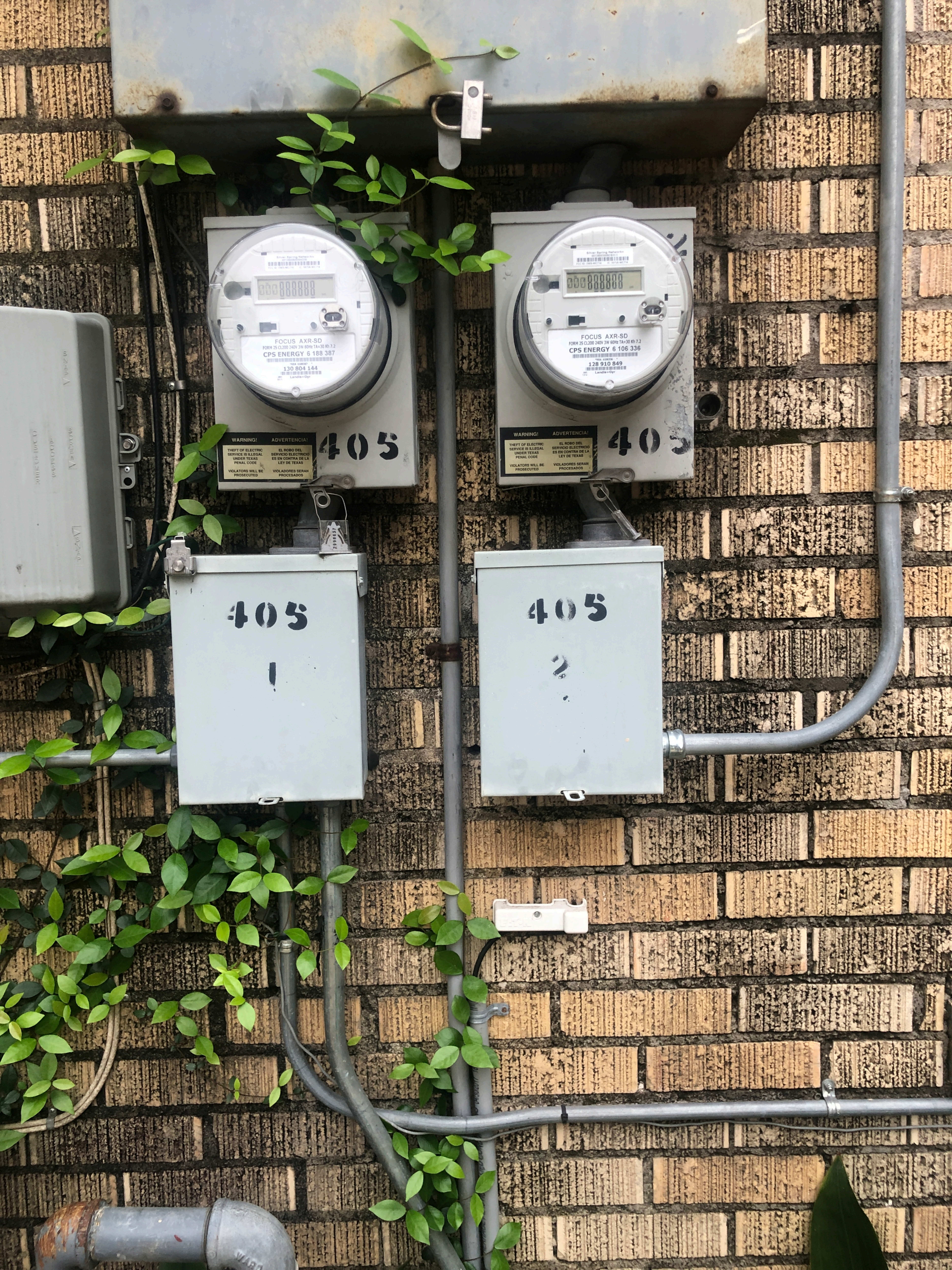
SHEET NUMBER
R-011











FOCUS AXR-SD
FORM 25 CL200 240V 3W 60Hz TA=30 Kh 7.2
CPS ENERGY 6 188 387
130 804 144
Landis+Gyr

WARNING! ADVERTENCIA!
THEFT OF ELECTRIC SERVICE IS ILLEGAL UNDER TEXAS PENAL CODE VIOLATORS WILL BE PROSECUTED
EL ROBO DEL SERVICIO ELECTRICO ES EN CONTRA DE LA LEY DE TEXAS VIOLADORES SERAN PROCESADOS

405

FOCUS AXR-SD
FORM 25 CL200 240V 3W 60Hz TA=30 Kh 7.2
CPS ENERGY 6 106 336
128 910 849
Landis+Gyr

WARNING! ADVERTENCIA!
THEFT OF ELECTRIC SERVICE IS ILLEGAL UNDER TEXAS PENAL CODE VIOLATORS WILL BE PROSECUTED
EL ROBO DEL SERVICIO ELECTRICO ES EN CONTRA DE LA LEY DE TEXAS VIOLADORES SERAN PROCESADOS

403

405
1

403
2



Outside Light
Garage
Dishwasher

main
ART 2.1

NEW
BED
OUT

SMOKE
ALARM

NEW
LIVING ROOM
OUT

LIVING
ROOM LITS

DINING LITS

BATH & BED
LITS

~~NOT A C~~
~~OPERATE!~~

~~SPACE AC~~

NEW
DINING
OUT

~~STOVE~~
KIT OFT

DIN
MICRO

BEDROOM
PLUGS

~~WASH~~

DRAIN
GFCI

C
DISPOSAL
NEW

NEW
STONE

Carrie Willcockson

6.21KWDC 5.22KWAC

(1) Branch circuit of 9 modules

(1) Branch circuit of 9 modules

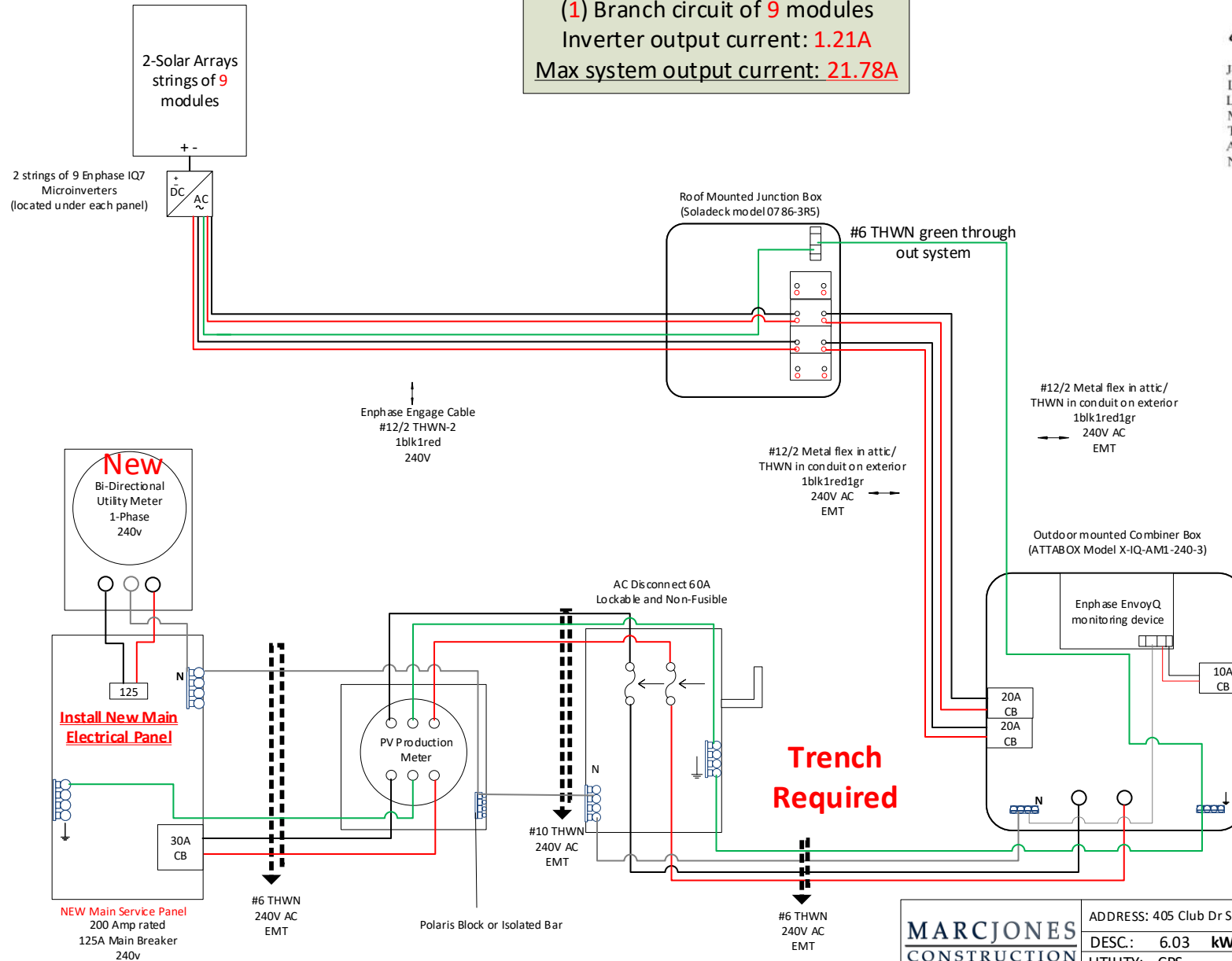
Inverter output current: 1.21A

Max system output current: 21.78A

PV Module: (18) LG345N1C-V5
Inverter: Enphase (18) IQ7PLUS-72-2-US(240v)
(290va)



Joseph Chevalier, Sr.
Licensed Electrician
LA#49417
MS#21374
TX#373057
AR#M9565
NABCEP PV-050718-019483



MARCJONES
CONSTRUCTION
residential · commercial · solar

SUNPRO
SOLAR HOME SPECIALISTS

ADDRESS: 405 Club Dr San Antonio, Tx 78201

DESC.: 6.03 kW solar panel system

UTILITY: CPS

JURISDICTION: COSA

DATE: 04.13.20

REV: 2

SHEET: 1 OF 1

Layout
Designer:

One-Line
Designer: J.Caballero



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