HISTORIC AND DESIGN REVIEW COMMISSION

November 04, 2015

Agenda Item No: 1

HDRC CASE NO:	**2015-433**
ADDRESS:	819 E MAGNOLIA AVE
LEGAL DESCRIPTION:	NCB 6939 BLK LOT 5 AT 819 MAGNOLIA AVE E
ZONING:	R4 H RIO-1
CITY COUNCIL DIST.:	1
DISTRICT:	River Road Historic District
APPLICANT:	Brandon Gibbs/1 Sun Solutions
OWNER:	Mitch Hill
TYPE OF WORK:	Installation of Solar Panels

REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install solar panel claw racking system, ballast blocks, modules, inverter, and electrical interconnection on the roof of the primary structure located at 819 E Magnolia Avenue.

APPLICABLE CITATIONS:

Historic Design Guidelines, Chapter 3, Guidelines for Additions

6. Designing for Energy Efficiency

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:

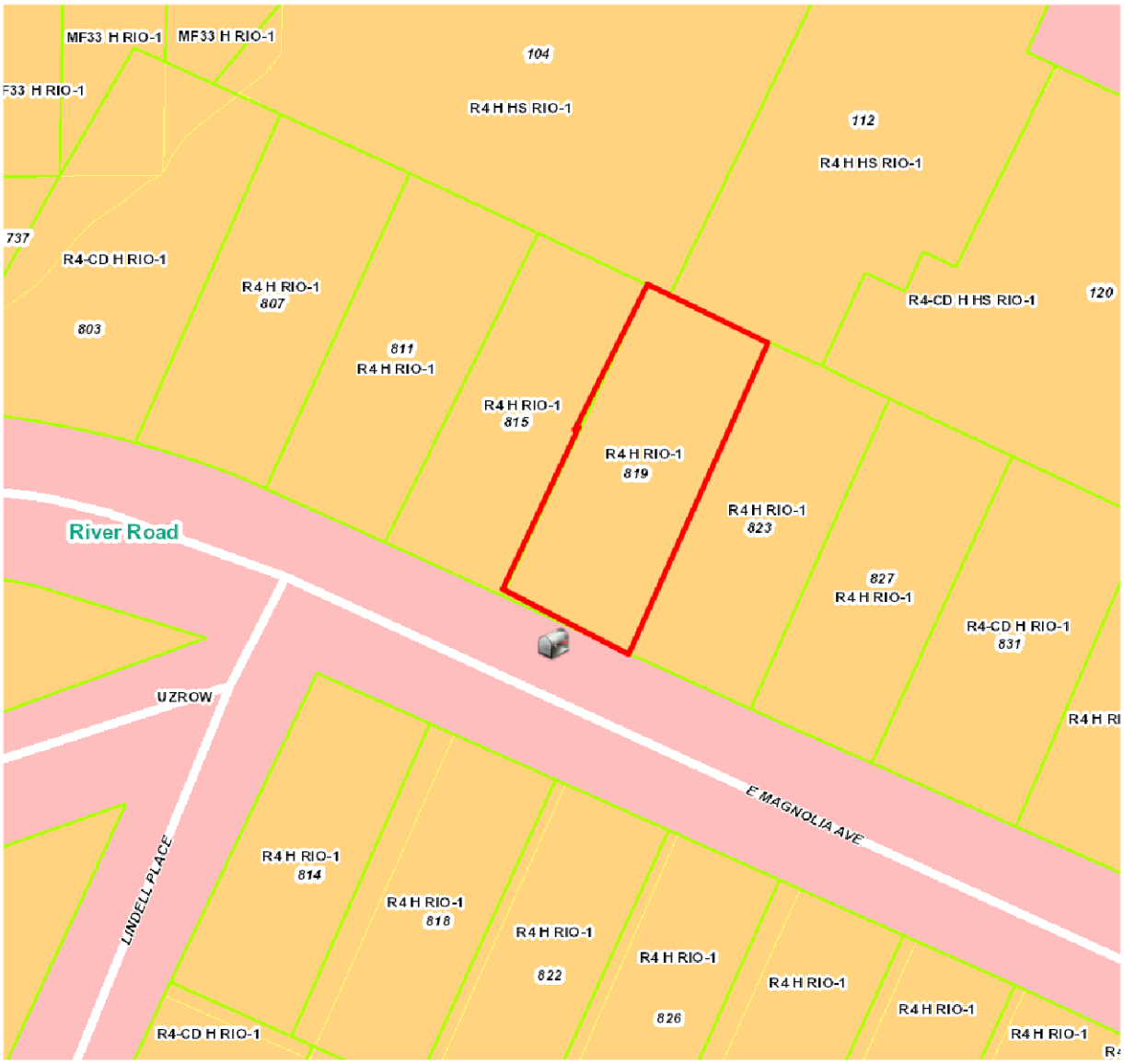
a. Staff visited the site on October 19th, 2015, and found that with the parapet wall and the existing growth, the proposed solar installation will not be seen from the public right of way.
b. The applicant has proposed to install a solar panel claw racking system, ballast blocks, modules, inverter, and electrical interconnection on the roof of the primary structure located at 819 E Magnolia Avenue. According to the Guidelines for Additions 6.C.i., solar collectors should be located on the side or rear roof pitch of the primary historic structure to minimize visibility from the public right of way. Staff finds the proposed location appropriate and consistent with the Guidelines.

RECOMMENDATION:

Staff recommends approval as submitted based on findings a and b.

CASE MANAGER:

Lauren Sage



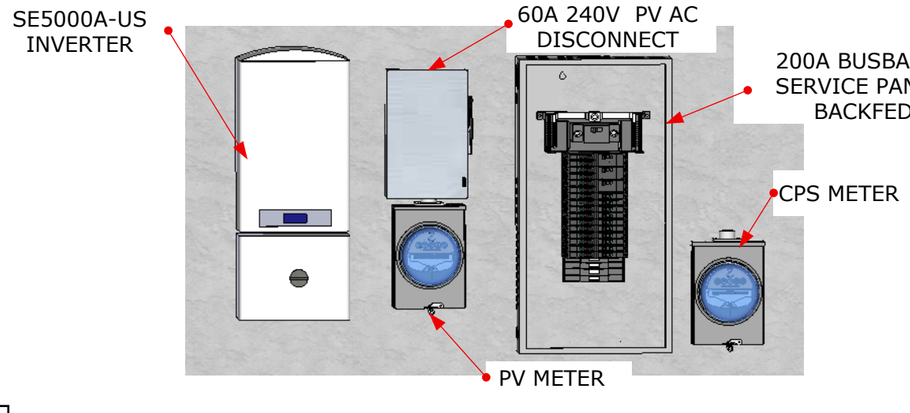
N

Flex Viewer

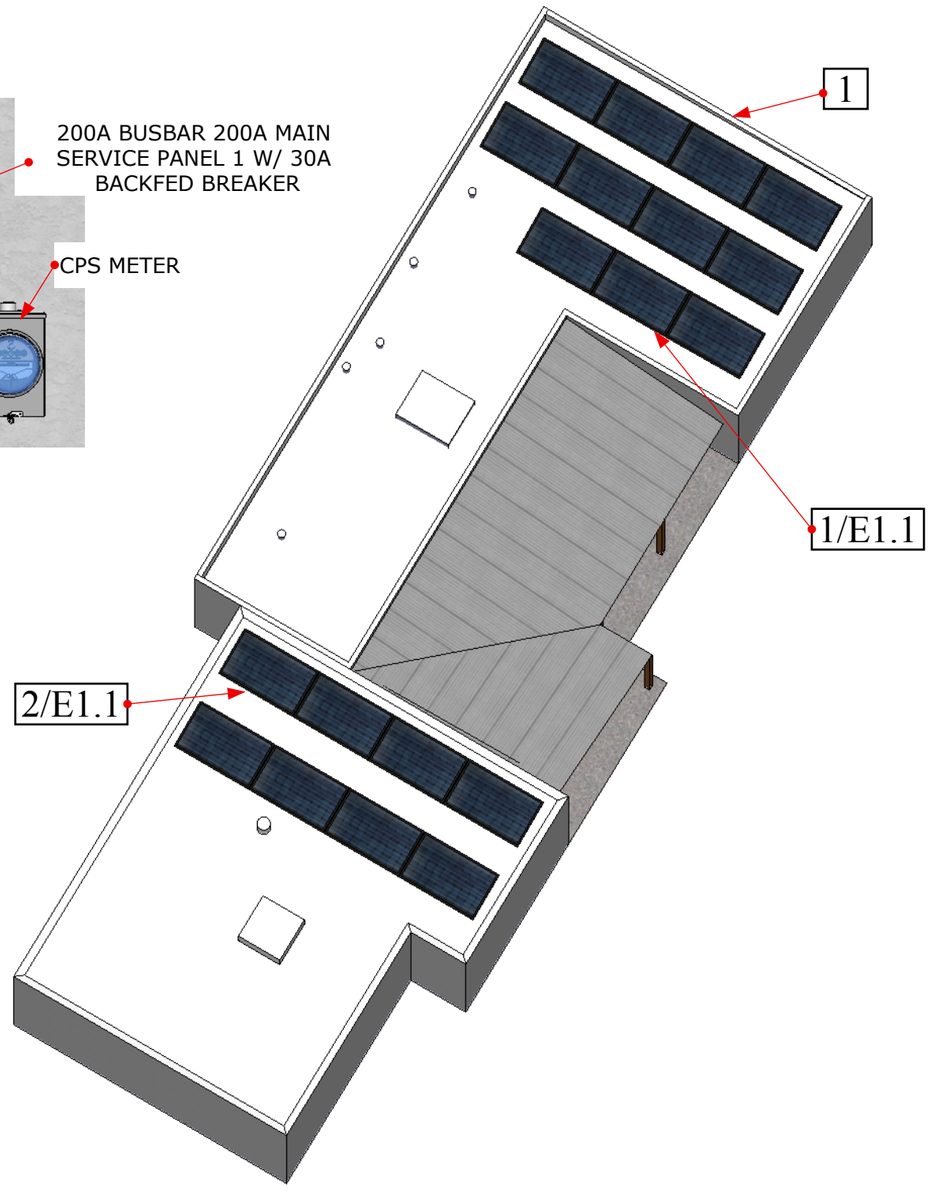
Powered by ArcGIS Server

Printed:Oct 20, 2015

5.70KW SOLAR ARRAY INSTALL AT HILL RESIDENCE
819 EAST MAGNOLIA AVENUE SAN ANTONIO TX 78212 210-410-0126



1 EQUIPMENT LOCATION OUTSIDE

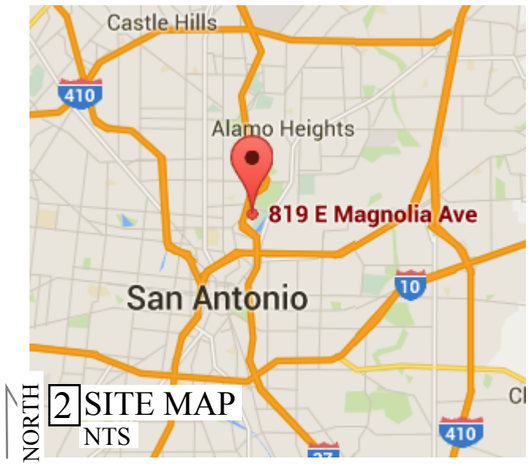


	NAME	QUANTITY
	LG300N1C-B3 MODULES 64.57" X 39.37" X 35MM	19
	SOLAR EDGE SE5000A-US INVERTER	1
	SOLAR EDGE P300 POWER OPTIMIZERS	19
	PANEL CLAW BALLASTED RACKING (SEE PANEL CLAW PLANS)	1
	NEMA 3R JUNCTION BOX	3
	ZIGBEE MONITORING	1

3 HARDWARE SCHEDULE

COORDINATE ALL WORK
WITH PROJECT MANAGER
STUART PRIOUR 512-767-5030

SALES: BROOKE MARSHALL



2 SITE MAP
NTS

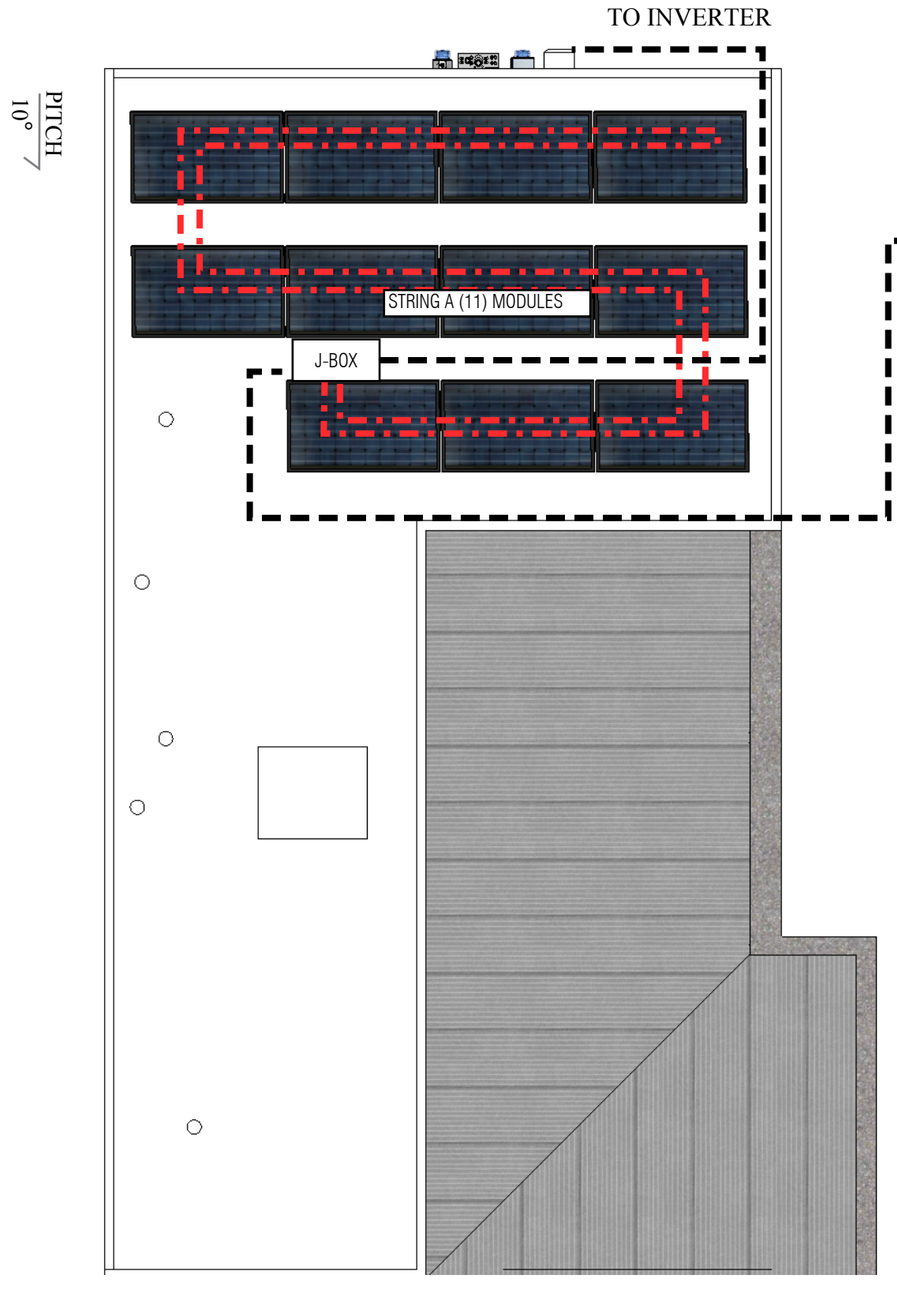
NATIVE
201 Cole Street - Austin, TX 78737 - 855-BLDNATIVE (253-6284)
www.buildnative.com - TECL 26718 - TACL B00041702E

PROJECT TITLE
HILL RESIDENCE
819 EAST MAGNOLIA AVENUE
SAN ANTONIO TX 78212

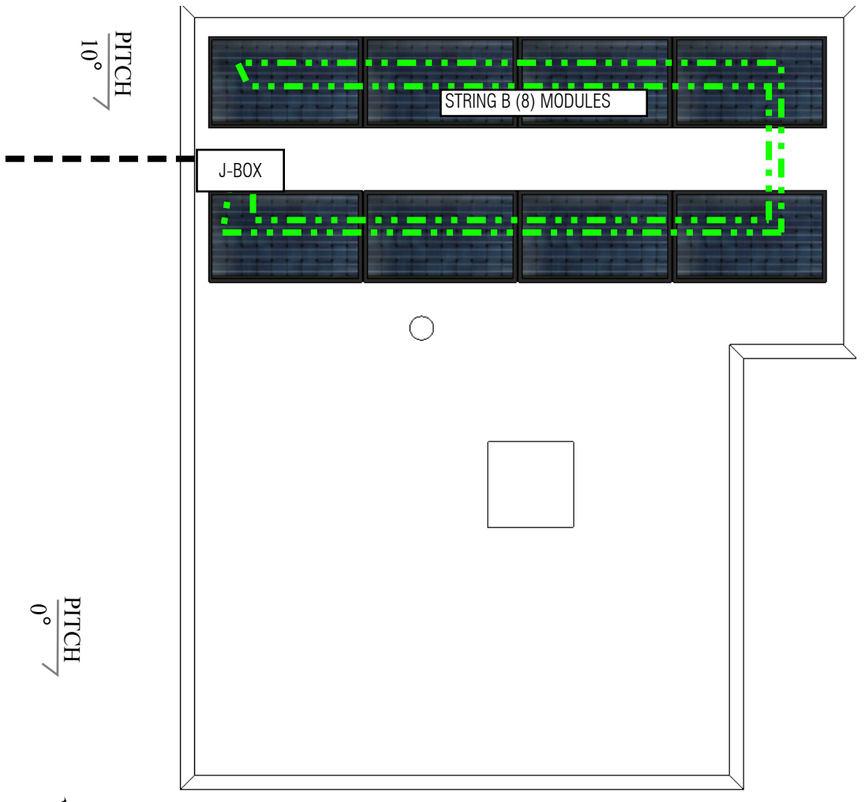
SHEET TITLE
ARRAY PLAN, SITE MAP, MODULE DIMENSIONS, EQUIPMENT LAYOUT, HARDWARE SCHEDULE

E1.0

Drawn by: ETJH | JULY 16, 2015



1 SOLAR ARRAY PLAN
SCALE: 3/16" = 1'



2 SOLAR ARRAY PLAN
SCALE: 3/16" = 1'

-SEE PANEL CLAW PLANS FOR BALLAST DETAIL

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ARRAY PLAN, SITE MAP, MODULE DIMENSIONS, EQUIPMENT LAYOUT, HARDWARE SCHEDULE

E1.1

Drawn by: ETJH | JULY 16, 2015

SOLAR EDGE NOTES

-MODULE TO OPTIMIZER CONNECTIONS ARE WIRED IN PARALLEL
-OPTIMIZERS ARE WIRED TOGETHER IN SERIES STRINGS
-DC OPTIMIZERS REGULATE ALL STRING VOLTAGES TO 350V
-AMPS CAN BE FOUND BY DIVIDING TOTAL DC STRING WATTAGE BY 350V.
-BEFORE A STRING IS CONNECTED TO THE INVERTER, EACH OPTIMIZER WILL GENERATE ONE VOLT. SIMPLE VOLTAGE TEST AT END OF STRING WILL DETERMINE HOW MANY OPTIMIZERS ARE CONNECTED.

LABEL JUNCTION BOXES/ DC DISCONNECTS PER NEC 690.35 (F):

1 –

WARNING
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

LABEL INVERTERS PER NEC 690.5 (C):

2 –

WARNING
ELECTRICAL SHOCK HAZARD
IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL ALL AC DISCONNECTING MEANS 1 & 2 PER NEC 690.54:

3 –

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT:	26.25A
MAXIMUM AC OPERATING VOLTAGE:	240VAC

LABEL INVERTER 1 &2 PER NEC 690.52:

4 –

RATED MAX POWER-POINT CURRENT	18.00A
RATED MAX POWER-POINT VOLTAGE	350V
MAXIMUM SYSTEM VOLTAGE	500V
SHORT CIRCUIT CURRENT	30.00A

LABEL AGGREGATE PANEL PER NEC 690.52:

5 –

NOMINAL OPERATING AC	NA
NOMINAL OPERATING AC	NA
MAXIMUM AC POWER	NA
MAXIMUM AC CURRENT	NA

LABEL ALL SERVICEABLE PANELS PER NEC 694.22 (A) (4):

6 –

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL PV POWER SOURCE BREAKER PER NEC705.12 (D) (4) AND NEC 690.64:

7 –

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PV SYSTEM

CAUTION
PV SYSTEM CIRCUIT BREAKER IS BACKFED

LABEL SOLAR CIRCUIT EVERY 10', AT TURNS AND ABOVE OR BELOW PENETRATIONS AND JUNCTION BOXES PER NEC 690.31 (E) (3):

8 –

PHOTOVOLTAIC POWER SOURCE

WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, LABEL PER NEC 690.17:

9 –

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

AT PV BREAKER, MAIN PV DISCONNECT AND ALL JUNCTION AND COMBINER BOXES, LABEL PER NEC 110.27 (C):

10 –

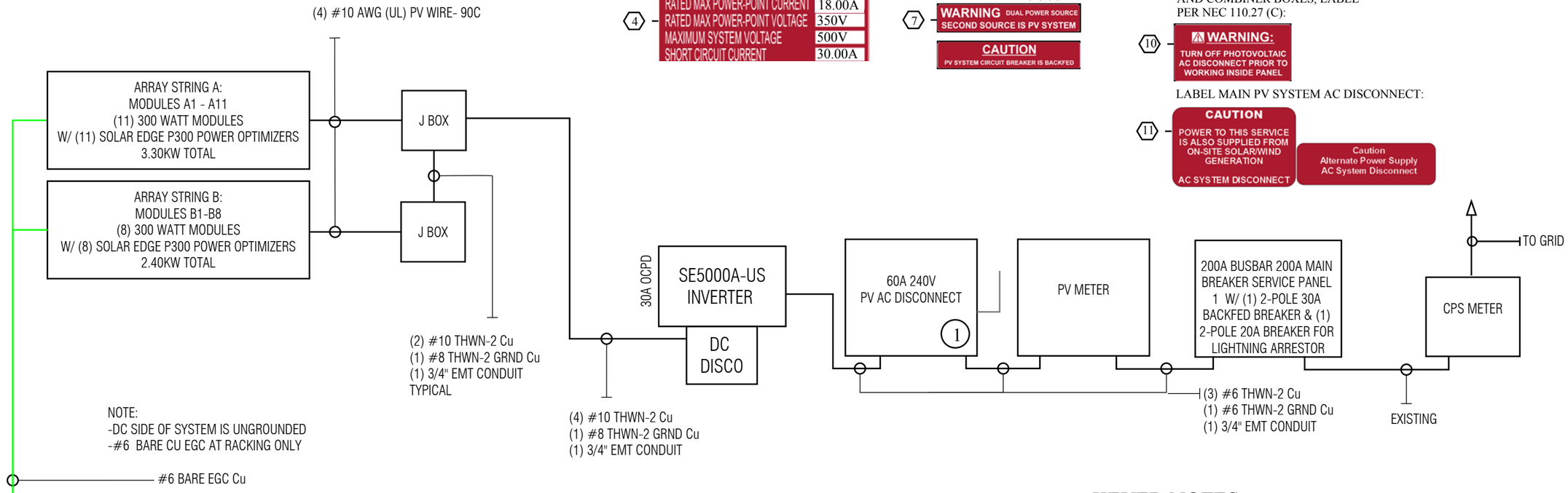
WARNING:
TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

LABEL MAIN PV SYSTEM AC DISCONNECT:

11 –

CAUTION
POWER TO THIS SERVICE IS ALSO SUPPLIED FROM ON-SITE SOLAR/WIND GENERATION
AC SYSTEM DISCONNECT

Caution
Alternate Power Supply
AC System Disconnect



NOTES:

1. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH NEC ARTICLE 690.
2. CONDUCTORS ARE TO BE COPPER UNLESS OTHERWISE NOTED AND COMPLY WITH NEC 110.14.
3. ALL PV SYSTEM COMPONENTS SHALL BE LISTED AND COMPLY WITH UL1703 AND UL1741.
4. WIRING MATERIALS NOT PROTECTED IN CONDUIT SHALL BE SUITABLE FOR SUN EXPOSURE AND WET LOCATIONS.
5. CIRCUIT BREAKER TO BE SUITABLE PER NEC 690.64 (BX5).
6. THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE CONTINUOUS PER NEC 690.48.
7. THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ACCORDANCE WITH NEC 690.43. 690.45 AND 250.122.
8. THE GROUNDING ELECTRODE CONDUCTOR SHALL BE CONTINUOUS PER NEC 250.64 (C) AND 690.47 (A).
9. THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 COPPER WIRE (NEC 250.64 B).
10. THE DC GROUNDING ELECTRODE CONDUCTOR SHALL BE SIZED ACCORDING TO NEC 250.166 AND 690.47 (B).
11. THE AC GROUNDING ELECTRODE CONDUCTOR SHALL BE INSTALLED IN ACCORDANCE WITH NEC 690.47 (A) AND 250.66.
12. LABEL SOLAR MODULES AND POWER INVERTERS WITH LISTING AGENCY NAME AND NUMBER PER NEC 110.3 (B).
13. BACKFED PV BREAKER SHALL BE INSTALLED AT THE OPPOSITE END OF THE BUS BAR FROM THE MAIN BREAKER
14. AC DISCONNECT SHALL BE EXTERNALLY OPERATED KNIFE BLADE TYPE WHICH IS LOCKABLE IN THE "ON" AND "OFF" VISIBLE DESIGNATIONS AND IS DIRECTLY ACCESIBLE TO THE UTILITY.

1-LINE DIAGRAM

KEYED NOTES

(1) – AC DISCONNECT MUST HAVE VISIBLE BREAK AND BE LOCKABLE IN THE OPEN POSITION AND COMPLY WITH NEC 230.79 (D)

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PROJECT TITLE
HILL RESIDENCE
819 EAST MAGNOLIA AVENUE
SAN ANTONIO TX 78212

SHEET TITLE
ONE LINE DIAGRAM

E1.2

Drawn by: ETJH | JULY 16, 2015

SITE DESIGN CRITERIA	
BUILDING CODE	ASCE 7-10
RISK CATEGORY	II
DESIGN LIFE	25 YEARS
MRI ADJUSTMENT FACTOR	0.93
WIND SPEED (MPH)	115
WIND EXPOSURE CATEGORY	C
Iw	1.00
GROUND SNOW (PSF)	5
Is	1.00
Ss	0.08
S1	0.03
Ie	1.00
Ip	1.00
SEISMIC DESIGN CATEGORY	A
SEISMIC SITE CLASS	D - ASSUMED

PROJECT SUMMARY	
MODULE TYPE	LG LG 275S1C-B3
MODULE DIMENSIONS (IN.)	39.37 X 64.57 X 1.38
NUMBER OF MODULES	19
MODULE WATTAGE (W STC)	275
SYSTEM SIZE (KW STC)	5.2
SYSTEM WEIGHT (LB)	2527
SYSTEM AREA (SQ FT.)	488
NUMBER OF ARRAYS	2
ARRAY TILT (DEG)	11.8

GENERAL NOTES:

1. ALL SITE, PROJECT, AND BUILDING DETAILS ARE PROVIDED BY CUSTOMER OR GENERATED VIA SATELLITE IMAGERY FROM INFORMATION PROVIDED BY CUSTOMER. PANELCLAW IS NOT RESPONSIBLE FOR SITE INACCURACIES THAT COULD LEAD TO CHANGES TO THESE DRAWING DETAILS AND ARRAY LAYOUT CONFIGURATIONS. ALL INFORMATION CONTAINED WITHIN THESE DOCUMENTS ARE TO BE FIELD VERIFIED BY CUSTOMER AND INSTALLER. ANY CHANGES OR MODIFICATIONS TO THESE DOCUMENTS, CONTAINED INFORMATION, OR FINAL ARRAY AND MOUNTING SYSTEM INSTALLATIONS MUST BE SUBMITTED TO PANELCLAW AND OTHER PROJECT AUTHORITIES FOR APPROVAL.
2. REFER TO AND FOLLOW THE APPROPRIATE PANELCLAW INSTALLATION MANUALS AND PROCEDURES DURING THE INSTALLATION PROCESS. NOT FOLLOWING SUCH PROCEDURES AND METHODS COULD RESULT IN DAMAGE TO THE COMPONENTS OR MAY VOID THE PRODUCT WARRANTY.
3. ARRAY SETBACKS: ALL ARRAYS ARE REQUIRED TO BE SETBACK 3-FEET FROM ALL ROOF EDGES UNLESS OTHERWISE SPECIFIED AND CALLED OUT ON THE ARRAY DIAGRAMS ON THIS PAGE OR ON ADDITIONAL ARRAY BALLAST PAGES.
4. REFER TO THE SPECIFIC ARRAY BALLAST SHEETS FOR BALLASTING REQUIREMENTS BASED ON THE PROVIDED SITE INFORMATION.
5. SYSTEM PSF INCLUDES ALL PANELCLAW RACKING COMPONENTS, MECHANICAL ATTACHMENTS(IF APPLICABLE), PV MODULE AND BALLAST BLOCKS. FOR MAXIMUM SYSTEM POINT LOAD SUMMARY (PLS), REFER TO CALCULATIONS.
6. PANELCLAW AND/OR PANELCLAW CONSULTING ENGINEERS ARE NOT RESPONSIBLE FOR DETERMINING THE ADEQUACY OF THE STRUCTURE TO SUPPORT LOADS IMPOSED BY THE ARRAY AND MOUNTING SYSTEM. SUPPORT STRUCTURE TO BE CHECKED BY OTHERS.
7. ALWAYS ALLOW 6" CLEARANCE BETWEEN ARRAYS AND ALL FIXED ROOF OBJECTS OR ROOF EDGES. REFER TO LOCAL FIRE CODES AND ELECTRICAL CODES FOR ADDITIONAL REQUIREMENTS WHICH MAY GOVERN DESIGN.

SHEET INDEX	
NO.	DESCRIPTION
PC-1	COVER SHEET
PC-2	ARRAY SITE MAP
PC-3	TYPICAL ARRAY DIMENSIONS
PC-4	BALLAST LEGEND
PC-5	BALLAST LAYOUTS - 1

AERIAL PHOTO / SITE DIAGRAM

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STAMP:

REV	DESCRIPTION	DATE	CHECK	PREP
1	REVISED BALLAST MAP LAYOUT	2015/08/26	RFC	PG
0	INITIAL BALLAST MAP LAYOUT	2015/07/14	RFC	PG

SCALE:
0" 1/2" 1" 2"
ORIGINAL SIZE 36"X24"
SHEET SIZE ARCH "D"

PREPARED FOR:
NATIVE

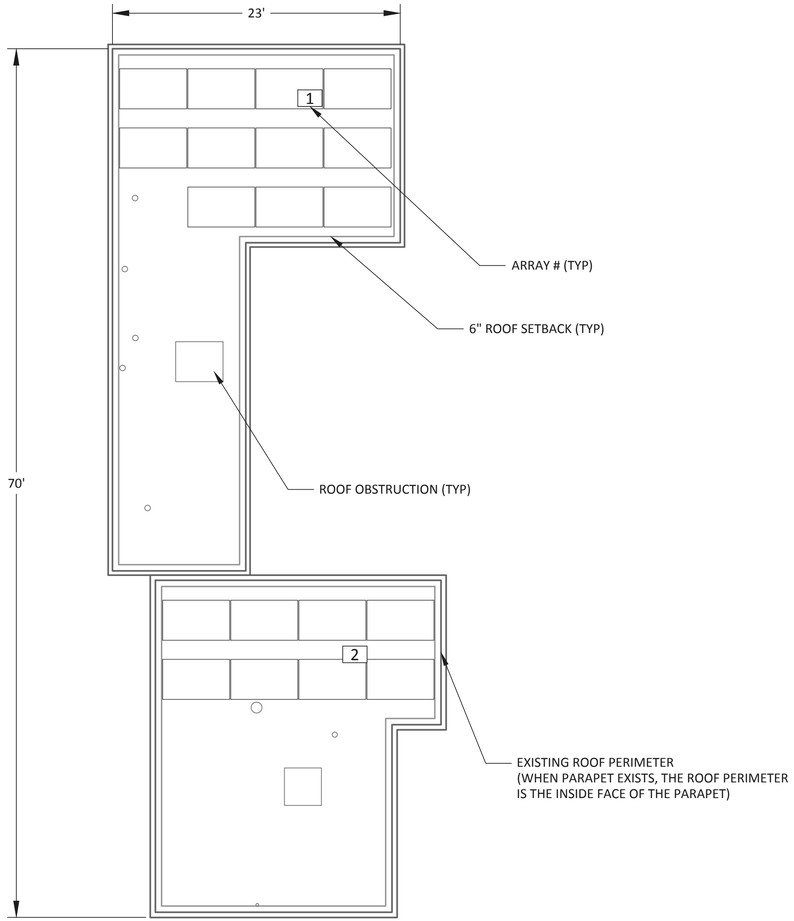
PROJECT:
MITCH HILL

LOCATION:
819 EAST MANGOLIA
SAN ANTONIO, TEXAS 78212

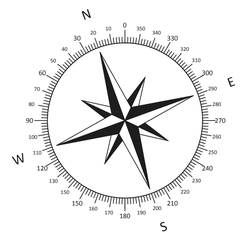
SHEET TITLE:
COVER SHEET

REVISION: 1

SHEET: PC-1



POLAR BEAR® III FR 10°		
PROJECT PART QUANTITIES		
ITEM	PART NUMBER	QTY
NORTH SUPPORT	500018401	16
ASSY, SPRT, STD, NORTH, 10 DEG, PB3		
SOUTH SUPPORT	5000185	16
ASSY, SPRT, SOUTH, PB3		
STANDARD SUPPORT	500018302	22
ASSY, SPRT, TIGHT ROW, 10 DEG, PB3		
LONG BALLAST TRAY - SHARED	200042001	19
BALLAST TRAY, LONG, G90ST, 68L1, PB3 10D		
LONG BALLAST TRAY - SINGLE	200042002	1
BALLAST TRAY, LONG, G90ST, 68L2, PB3 10D		
SHORT BALLAST TRAY	200042102	14
BALLAST TRAY, SHORT, G90ST, 34L2, PB3 10D		
CLAW	200045002	76
CLAW, G90 ST, 120D, 0420, PB3		
HARDWARE - CLAW	500015801	1
HEX, FLG, SERR, 1/4-20 X 1.75L & 0.5L, 304SS (100 / EACH BOLT TYPE, 200 NUTS)		
BOLT KIT - BALLAST TRAY	5000159	1
HEX, FLG, SERR, 1/4-20 X 0.5L, 304SS (100 BOLTS)		
NUT KIT - BALLAST TRAY	5000189	1
HEX, FLG, SERR, 1/4-20, 304SS (100 NUTS)		
CONCRETE MASONRY UNIT	200045304	46
BLOCK, CONCRETE, 32.6 LBS - 4"X 8"X 16" NOMINAL, PARTNER SUPPLIED		



ARRAY SITE MAP

SCALE: NTS

1
PC-2

NOTES:

1. ALL DIMENSIONS SHOWN ARE BASED UPON INFORMATION PROVIDED TO PANELCLAW. FIELD VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION OF THE SOLAR ARRAY. NOTIFY PANELCLAW OF ANY DISCREPANCIES.

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SCALE:
0" 1/2" 1" 2"
ORIGINAL SIZE 36"X24"
SHEET SIZE ARCH "D"

PREPARED FOR:
NATIVE

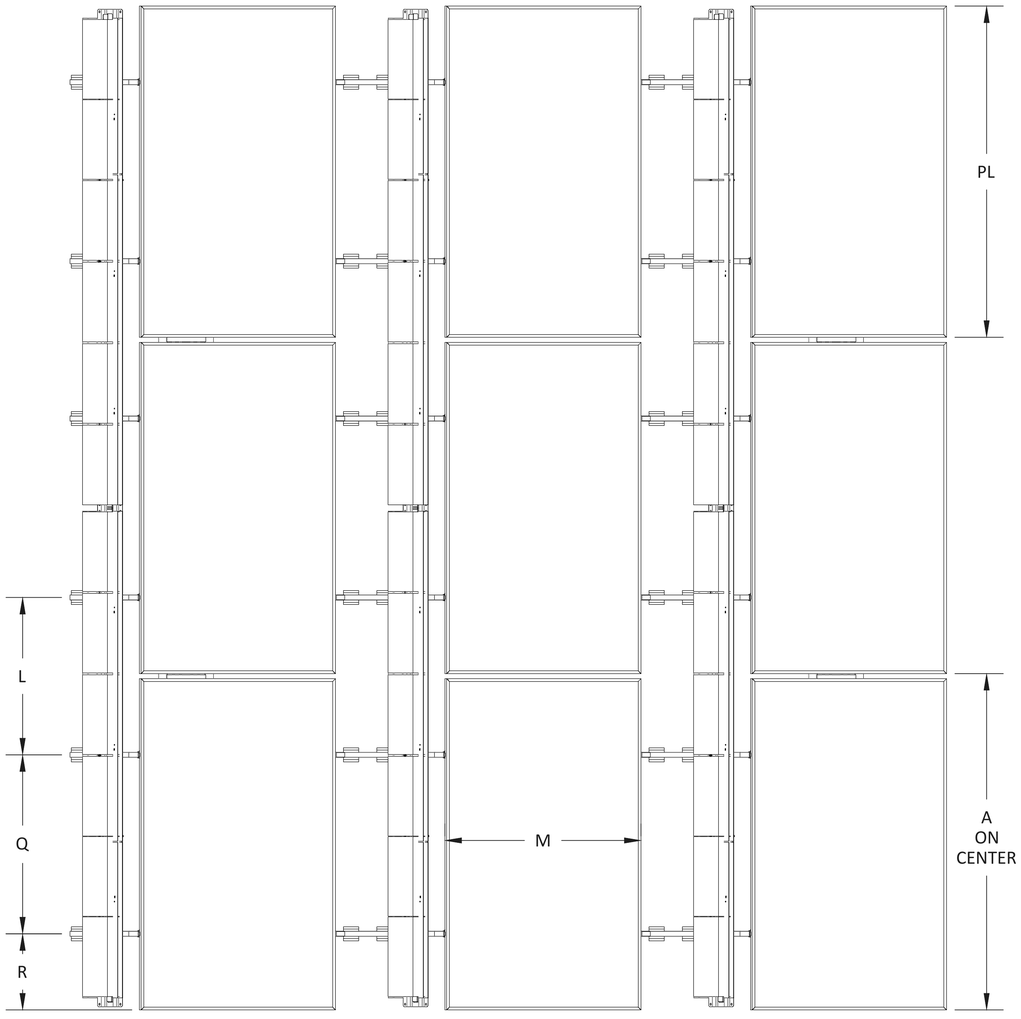
PROJECT:
MITCH HILL

LOCATION:
819 EAST MANGOLIA
SAN ANTONIO, TEXAS 78212

SHEET TITLE:
ARRAY SITE MAP

REVISION: 1

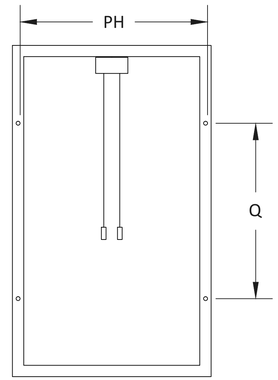
SHEET: PC-2



ARRAY TOP VIEW

SCALE: N.T.S.

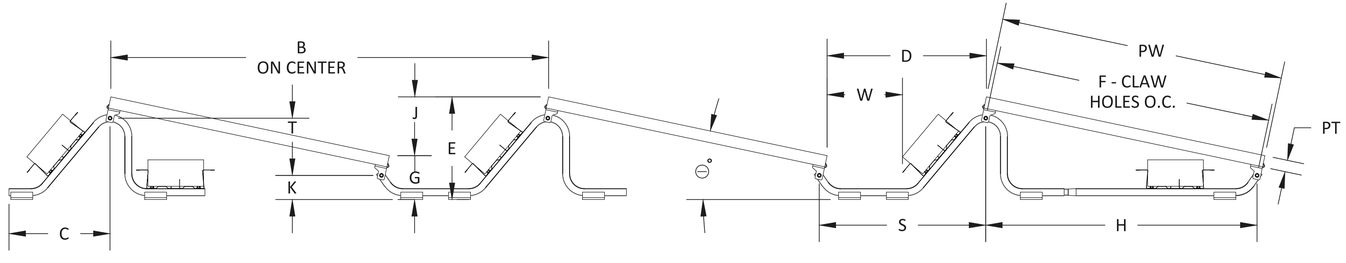
A PC-3



MODULE BACK VIEW

SCALE: N.T.S.

C PC-3



ARRAY CROSS SECTION

SCALE: N.T.S.

B PC-3

ARRAY DIMENSIONS		
	UNITS	
	mm	IN
PL	1640	64.57
PW	1000	39.37
PT	35	1.38
PH	960	37.80
A	1665	65.57
B	1446	56.92
C	352	13.85
D	467	18.37
E	352	13.87
F	976	38.43
G	148	5.84
H	956	37.62
J	204	8.03
K	84	3.30
L	765	30.13
M	979	38.54
Q	900	35.43
R	370	14.57
S	490	19.30
T	199	7.84
W	174	6.85
Θ (DEG)	11.8	11.8
D : J (#:1)	2.29	2.29

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ORIGINAL SIZE 36"X24"
SHEET SIZE ARCH "D"

PREPARED FOR:
NATIVE

PROJECT:
MITCH HILL

LOCATION:
819 EAST MANGOLIA
SAN ANTONIO, TEXAS 78212

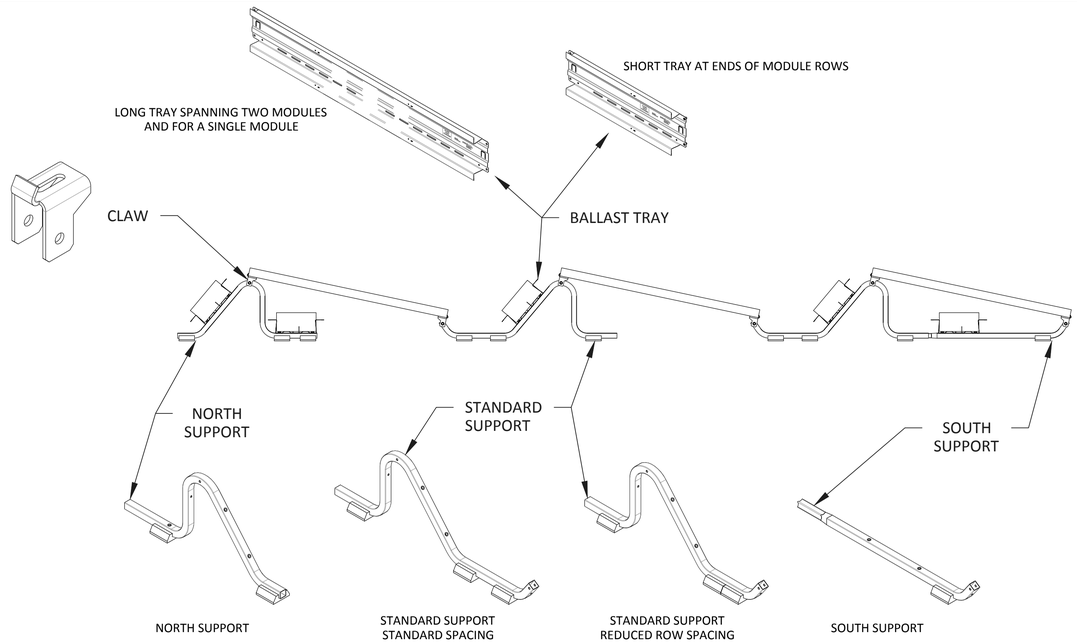
SHEET TITLE:
TYPICAL ARRAY DIMENSIONS

REVISION: 1

SHEET: PC-3

BALLAST INSTALLATION LEGEND

TYPICAL BALLAST QUANTITY PER MODULE	TYPICAL BALLAST INSTALLATION - TOP VIEW	SINGLE BALLAST INSTALLATION ON WEST ARRAY EDGE MODULE - TOP VIEW	SINGLE BALLAST INSTALLATION ON EAST ARRAY EDGE MODULE- TOP VIEW	CROSS SECTION VIEW
1	NORTH BALLAST TRAY (TYP)	NOTE THAT THE BALLAST IS ALWAYS ON THE OUTER MOST SUPPORT ON ARRAY EDGES	STANDARD SUPPORT (TYP)	INCLINED BALLAST TRAY - MAXIMUM BALLAST CAPACITY OF (4) 8"X16" FOR A 60 CELL MODULE AND (5) FOR A 72 CELL MODULE
1	UNDER MODULE BALLAST TRAY (TYP)		PRIMARY SOUTH FLAT BALLAST TRAY (TYP)	SECONDARY FLAT BALLAST TRAY - INSTALL ONE LONG TRAY SPANNING A SINGLE MODULE WHERE THE PRESCRIBED BALLAST IN THE FLAT TRAY IS MORE THAN THE PRIMARY TRAYS BALLAST CAPACITY (4 FOR A 60 CELL MODULE AND 5 FOR A 72 CELL MODULE).
2 OR MORE	REMAINDER		MODULE (TYP)	PRIMARY FLAT BALLAST TRAY - PRESCRIBED BALLAST IN THE FLAT TRAY(S) IS PLACED HERE UP TO THE MAXIMUM TRAY CAPACITY FIRST (4 FOR A 60 CELL MODULE AND 5 FOR A 72 CELL MODULE).
2 OR MORE	REMAINDER			
2 OR MORE	REMAINDER			
MORE THAN MAX (SEE CROSS SECTION VIEW FOR MAX)	REMAINDER			



COMPONENT IDENTIFICATIONS — A / PV-4

SCALE: N.T.S.

BALLAST AND MECHANICAL ATTACHMENT NOTES:

1. WHERE NO NUMBER IS SHOWN ON THE BALLAST LAYOUT THERE IS NO BALLAST ON THAT BALLAST TRAY.
2. WHERE "MA" IS SHOWN ON THE BALLAST LAYOUT A MECHANICAL ATTACHMENT MUST BE INSTALLED ON THAT BALLAST TRAY. THE MECHANICAL ATTACHMENT IS INSTALLED AT THE CENTER OF THE LONG BALLAST TRAY, TYPICALLY SPANNING TWO MODULES.

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PREPARED FOR: NATIVE

PROJECT: MITCH HILL

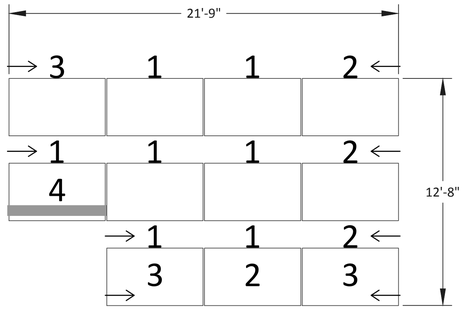
LOCATION: 819 EAST MANGOLIA SAN ANTONIO, TEXAS 78212

SHEET TITLE: BALLAST LEGEND

REVISION: 1

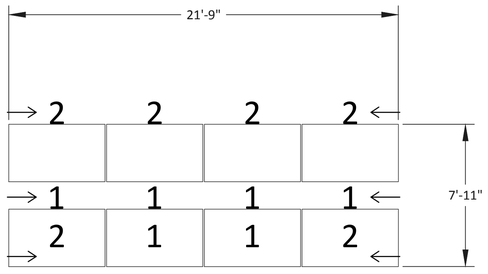
SHEET: PC-4

ARRAY 1		ARRAY 2	
ROOF INFORMATION		**ROOF INFORMATION**	
ROOF HEIGHT (FT)	14	ROOF HEIGHT (FT)	14
PARAPET HEIGHT (FT)	1.8	PARAPET HEIGHT (FT)	1.8
ROOF TILT (DEG)	3	ROOF TILT (DEG)	0
ROOF TYPE	TPO	ROOF TYPE	Asphalt
SPECIFICATIONS		**SPECIFICATIONS**	
NUMBER OF MODULES	11	NUMBER OF MODULES	8
MODULE POWER (W)	275	MODULE POWER (W)	275
ARRAY OUTPUT (Kw)	3.0	ARRAY OUTPUT (Kw)	2.2
ARRAY AZIMUTH	205	ARRAY AZIMUTH	205
PART QUANTITIES		**PART QUANTITIES**	
ITEM	QTY	ITEM	QTY
STANDARD SUPPORTS	14	STANDARD SUPPORTS	8
NORTH SUPPORTS	8	NORTH SUPPORTS	8
SOUTH SUPPORTS	8	SOUTH SUPPORTS	8
CLAWS	44	CLAWS	32
BALLAST TRAY SHARED	10	BALLAST TRAY SHARED	9
BALLAST TRAY SINGLE	1	BALLAST TRAY SINGLE	0
SHORT BALLAST TRAY	8	SHORT BALLAST TRAY	6
BALLAST BLOCKS	28	BALLAST BLOCKS	18
ATTACHMENTS	0	ATTACHMENTS	0
LOADING DETAILS		**LOADING DETAILS**	
SINGLE MODULE WT (LB)	37.0	SINGLE MODULE WT (LB)	37.0
SINGLE CMU WT (LB)	32.6	SINGLE CMU WT (LB)	32.6
TOTAL ARRAY WT (LB)	1501	TOTAL ARRAY WT (LB)	1025
ARRAY AREA (SQ. FT)	277	ARRAY AREA (SQ. FT)	143
ARRAY LOAD (PSF)	5.42	ARRAY LOAD (PSF)	7.16



BALLAST LAYOUT - ARRAY 1 (1 / PC-5)

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



BALLAST LAYOUT - ARRAY 2 (2 / PC-5)

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

BALLAST TRAY LEGEND		
→	FILL IN BETWEEN SHORT TRAY ARROWS	
SHORT TRAY AT END OF ROWS	LONG TRAY SPANNING TWO MODULES	LONG TRAY SPANNING SINGLE MODULE

NOT APPROVED FOR CONSTRUCTION

panelclaw®

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1570 OSGOOD ST. SUITE 2100
NORTH ANDOVER, MA 01845
TEL: 978.688.4900
FAX: 978.688.5100
www.panelclaw.com

STAMP:

REV	DESCRIPTION	DATE	CHECK	PREP
1	REVISED BALLAST MAP LAYOUT	2015/08/26	RFC	PG
0	INITIAL BALLAST MAP LAYOUT	2015/07/14	RFC	PG

SCALE:
0" 1/2" 1" 2"
ORIGINAL SIZE 36"X24"
SHEET SIZE ARCH "D"

PREPARED FOR:
NATIVE

PROJECT:
MITCH HILL

LOCATION:
819 EAST MANGOLIA
SAN ANTONIO, TEXAS 78212

SHEET TITLE:
BALLAST
LAYOUT - 1

REVISION: 1

SHEET: PC-5

LG
Life's Good

Innovation for a Better Life

MonoX®

LG275S1C-B3

60 cell

Mono X® series are LG Electronics' high-quality monocrystalline module brands. The quality is the result of our strong commitment in developing a module to improve benefits for customers. Features of Mono X® series include higher efficiency and durability than LG previous models, convenient installation, and aesthetic exterior.

Intertek

APPROVED PRODUCT
KM 564573 BS EN 61215
Photovoltaic Modules

Light and Robust

With a weight of just 16.8 kg (36.96 lb), LG modules are proven to demonstrate outstanding durability against external pressure up to 5400 Pa.

Convenient Installation

LG modules are carefully designed to benefit installers by allowing quick and easy installations throughout the carrying, grounding, and connecting stages of modules.

100% EL Test Completed

All LG modules pass Electroluminescence inspection. This EL inspection detects cracks and other imperfections unseen by the naked eye.

Positive Power Tolerance

LG provides rigorous quality testing to solar modules to assure customers of the stated power outputs of all modules, with a positive nominal tolerance starting at 0%.

Reliable Warranties

LG stands by its products with the strength of a global corporation and sterling warranty policies. LG offers a 10 year product limited warranty and a 25 year limited linear output warranty.

The Extra 2% Power

To minimize losses due to mismatch, LG produces 3 groups of solar modules which are sorted by its current class. This enables Mono X® to maximize the system's output by around 2% based over the theoretical calculation.

About LG Electronics

LG Electronics is a multinational corporation committed to expanding its capacity with solar energy business as its future growth engine. Our solar energy source research program was launched in 1985, backed by LG Group's rich experience in semi-conductors, LCD, chemistry and electronic materials industry. We successfully released the first MonoX® series to the market in 2010 which exported to 32 countries in 2 years. In 2013, MonoX® NeON won "Intersolar Award", which proved its leading innovation in the industry.

MonoX®

LG275S1C-B3

Mechanical Properties

Cells	6 x 10
Cell vendor	LG
Cell type	Monocrystalline
Cell dimensions	156.5 x 156.5 mm / 6 x 6 in
# of busbar	3
Dimensions (L x W x H)	1640 x 1000 x 35 mm 64.57 x 39.37 x 1.38 in
Static snow load	5400 Pa / 113 psf
Static wind load	2400 Pa / 50 psf
Weight	16.8 ± 0.5 kg / 36.96 ± 1.1 lb
Connector type	MC4 connector IP 67
Junction box	IP 67 with 3 bypass diodes
Length of cables	1000 mm / 39.37 in
Glass	High transmission tempered glass
Frame	Anodized aluminum

Certifications and Warranty

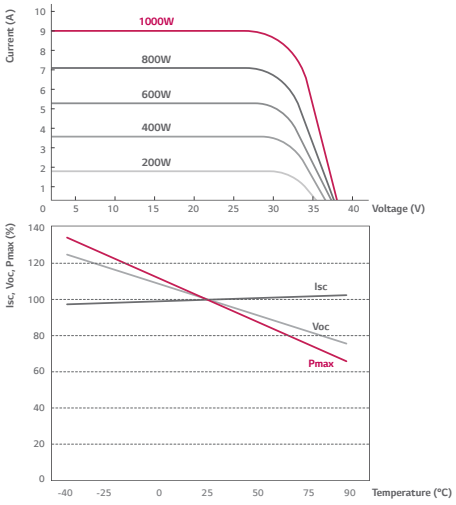
Certifications	IEC 61215, IEC 61730-1/-2, Salt Mist Corrosion Test (IEC61701), DLG-Fokus Test "Ammonia Resistance", UL 1703, ISO 9001
Module fire performance (UL1703)	Type 2
Product warranty	10 years
Output warranty of Pmax (measurement Tolerance ± 3%)	Limited Linear warranty*

* 1) 1st year: 97%, 2) After 2nd year: 0.7%p annual degradation, 3) 80.2% for 25 years

Temperature Coefficients

NOCT	45.0 ± 2 °C
Pmpp	-0.43 %/°C
Voc	-0.31 %/°C
Isc	0.04 %/°C

Characteristic Curves



Electrical Properties (STC *)

	LG275S1C-B3
Maximum power at STC (Pmpp)	275
MPP voltage (Vmpp)	31.7
MPP current (Impp)	8.68
Open circuit voltage (Voc)	38.7
Short circuit current (Isc)	9.26
Module efficiency (%)	16.8
Operating temperature (°C)	-40 ~ +90
Maximum system voltage (V)	1000 (IEC), 600 (UL)
Maximum series fuse rating (A)	15
Power tolerance (%)	0 ~ +3

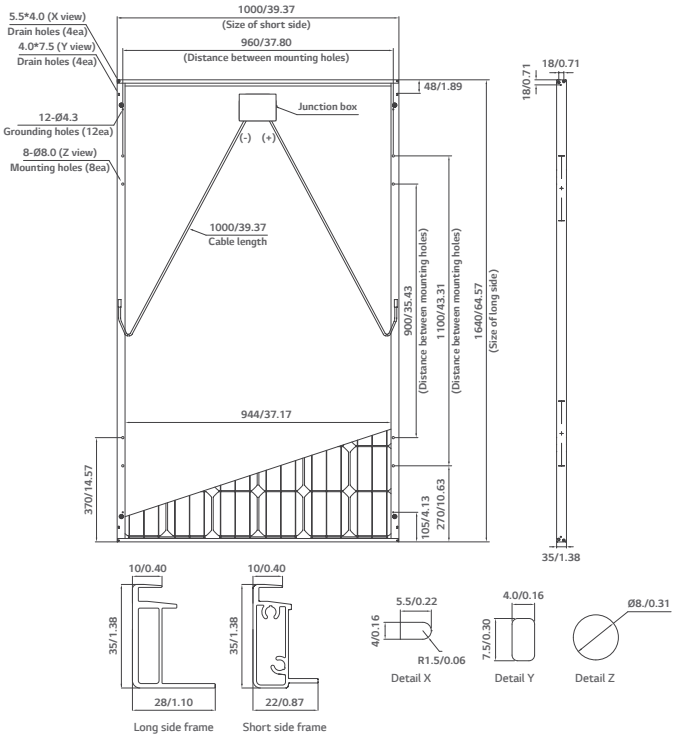
* STC (Standard Test Condition): Irradiance 1000 W/m², module temperature 25 °C, AM 1.5
* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.

Electrical Properties (NOCT*)

	LG275S1C-B3
Maximum power at NOCT (Pmpp)	202
MPP voltage (Vmpp)	29.1
MPP current (Impp)	6.92
Open circuit voltage (Voc)	35.9
Short circuit current (Isc)	7.46
Efficiency reduction (from 1000 W/m² to 200 W/m²)	< 4.5%

* NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1 m/s

Dimensions (mm/in)



* The distance between the center of the mounting/grounding holes.

LG Life's Good

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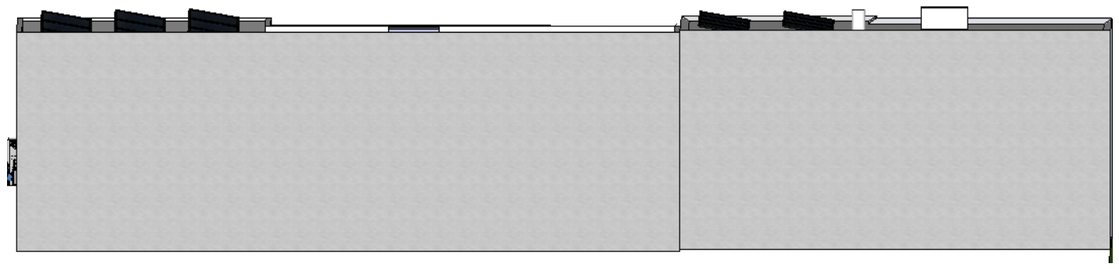
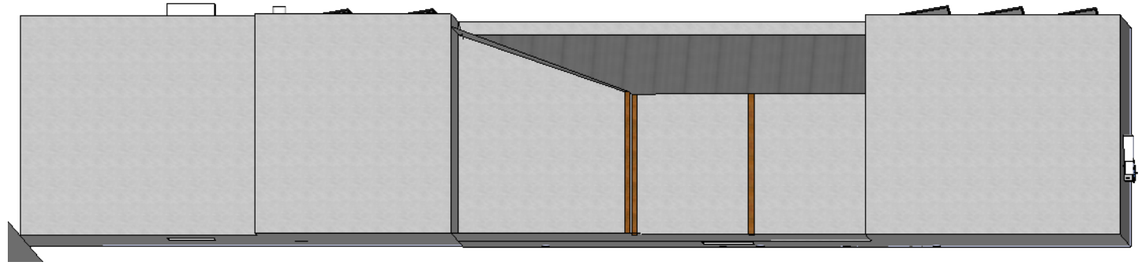
Contact: lg.solar@lge.com
www.lgsolarusa.com

Innovation for a Better Life

ELEVATIONS

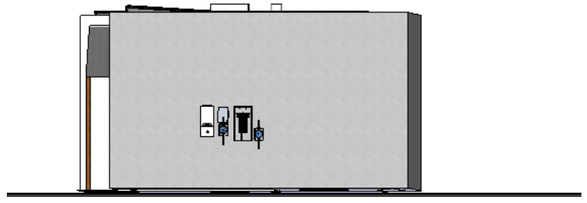


WEST



EAST

SOUTH



NORTH


FROM STREET
819


REAR


REAR


REAR


REAR


REAR