

HISTORIC AND DESIGN REVIEW COMMISSION

April 15, 2015

Agenda Item No: 26

HDRC CASE NO: 2015-147
ADDRESS: 721 HAYS ST
LEGAL DESCRIPTION: NCB 531 BLK 13 LOT A7
ZONING: R5 H
CITY COUNCIL DIST.: 2
DISTRICT: Dignowity Hill Historic District
APPLICANT: Lisa Pastrano
OWNER: John Wilkins
TYPE OF WORK: Install solar panels

REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install solar panels on the side and rear portions of the roof.

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.

FINDINGS:

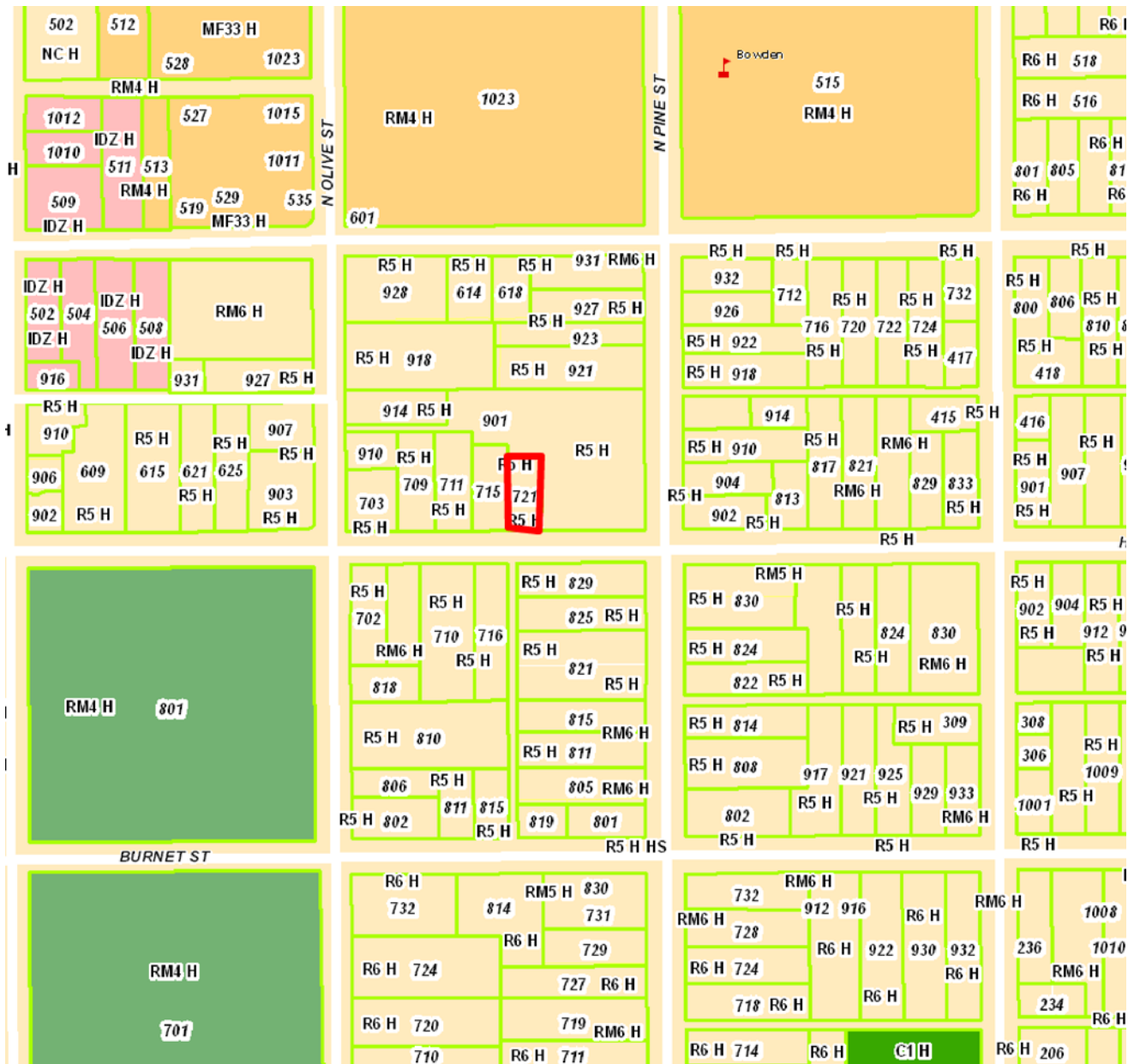
- a. According to the Guidelines for Additions, solar collectors should be located on the side or rear roof pitch to minimize visibility from the public right of way. As proposed, the panels on the north east corner of the house will be highly visible from the street which is not consistent with the guidelines.

RECOMMENDATION:

Staff does not recommend approval as submitted based on finding a. Staff recommends that the location of the panels is revised to minimize view from the street.

CASE MANAGER:

Adriana Ziga





721 Hays

Powered by ArcGIS Server

Printed: Apr 08, 2015

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Proposed location



ROOF LOAD CALCULATIONS:

DESIGNED LOAD:

ROOFING (SHINGLE)	2.5LBS PSF
1/2" SHEATHING	1.5LBS PSF
FRAMING	3.0LBS PSF
CEILING	2.5LBS PSF
MECH/PLBG/ELECTR.	1.5LBS PSF

ADDITIONAL LOAD:

DEAD LOAD	15LBS PSF
LIVE LOAD	15LBS PSF

LOAD DISTRIBUTION:

ALL LAGS GRK FASTENERS RSS 3/8 X 3 1/8" = 259 LBS
WITHDRAW RATING; 466 LBS PULL-THROUGH RATING

2 LAGS PER STANDOFF POINT LOAD

ALL TRUSSES ARE EXISTING @ 24" O.C.

NOTES:

1. THE SOLAR PANELS, ROOF MOUNTED, SYSTEM MUST BE ATTACHED TO THE EXISTING ROOF FRAMING STRUCTURE. DRAINAGE AND MOISTURE AT THE NEW PENETRATIONS MUST BE PROPERLY SEALED NOT TO ALLOW MOISTURE PENETRATION INTO THE EXISTING ROOF STRUCTURE.

2. INSTALLATION OF SOLAR EQUIPMENT SHALL INSURE CORRECT AND APPROPRIATE SAFE INSTALLATION BASED ON THE SYSTEMS DESIGN PARAMETERS, INSURING THAT STRUCTURAL SUPPORT MEMBERS CAN SUPPORT THE SOLAR PANEL ARRAYS; LAG SCREWS HAVE ADEQUATE PULLOUT STRENGTH AS INSTALLED; AND THE PROPER DESIGN LOADS FOR ROOF MOUNTING SYSTEMS ARE CORRECTLY CALCULATED.

3. INVERTERS ARE INSTALLED PER MANUFACTURER INSTALLATION INSTRUCTIONS, HOWEVER, AS A PRECAUTION, CARE SHOULD BE TAKEN WITH THE INSTALLATION OF THE INVERTERS SUBJECT TO DIRECT ELEMENTS SUCH AS: DIRECT SUNLIGHT, DIRECT WATER SPRAY OR NEAR DOWNSPOUTS.

UNIRAC SOLARMOUNT
MID CLAMPS & END CLAMPS
SEE ENLARGED ABOVE

UNIRAC SOLARMOUNT
L-FOOT HARDWARE
w/ 3/8" HEX HARDWARE

HYUNDAI #HIS-M255RG
255W MODULES

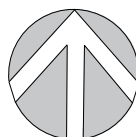
UNIRAC SOLARMOUNT
BEAM RAILING TYPICAL

(EXISTING) 2x6 TRUSSES
@ 24" O.C.

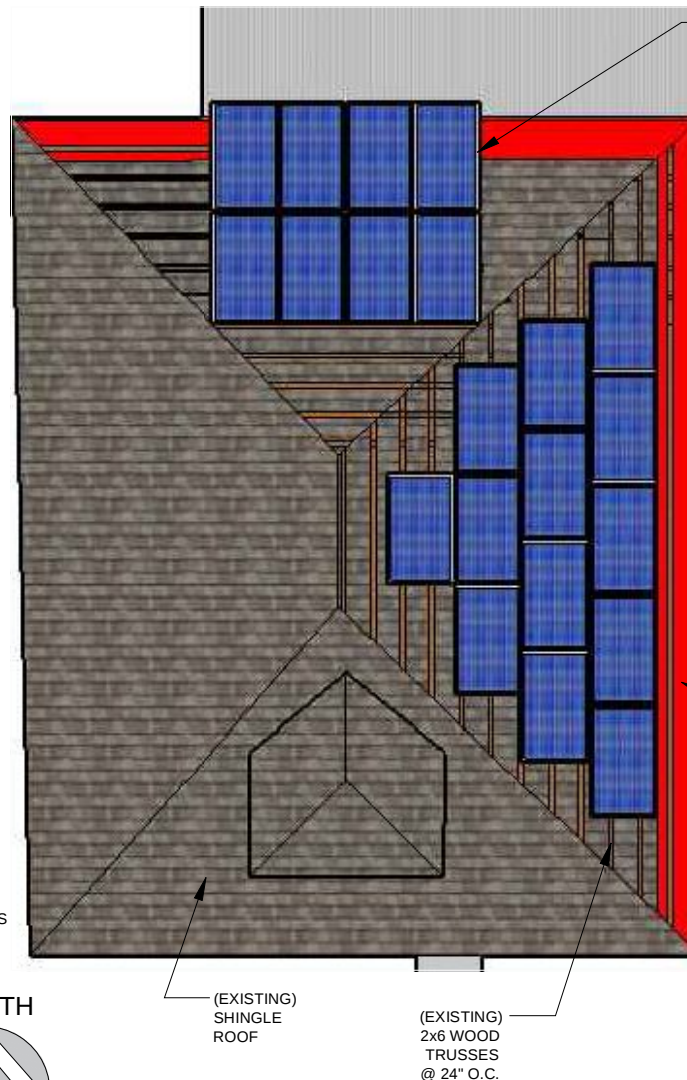
UNIRAC 2-PIECE
STANDOFF w/ 3/8"x 3-1/8"
GRK LAG FASTENER
(2 LAGS PER POINT LOAD)

1 RACKING & STANDOFF CONNECTION
SCALE: 1/2" = 1'-0" (FLUSH MOUNT ARRAY)

NORTH

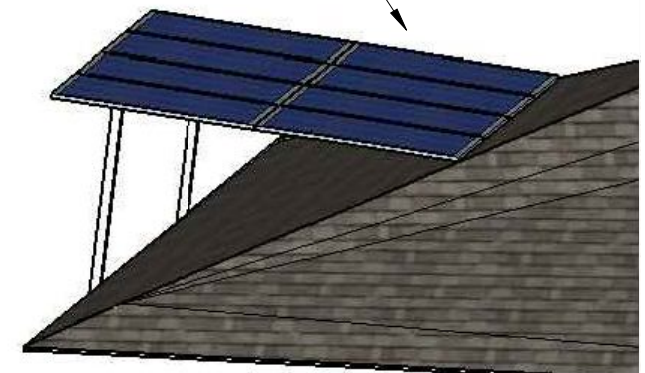


SOLAR ARRAY LAYOUT



PANEL GROUP B

(8) HYUNDAI SOLAR
#HIS-M255RG, 255W MODULES
HIGH PROFILE PREVIEW
NORTHSIDE ONLY
ALL OTHERS TO BE FLUSH MOUNTED
TO ROOF



3'-0" IFC
CLEARANCE

24" RADIUS
MIN. REQUIRED
NON OVERLAPPING

UNIRAC SOLAR
MOUNT RAILING
TYPICAL

UNIRAC 2-PIECE
ALUMINUM STANDOFF
w/ (2) 3/8"x 3-1/8" GRK
FASTENERS EA., TYP.

ROOF FLASHING
AND SEALANT AT
ALL ROOF
PENETRATIONS
TYPICAL

SOLAR ELECTRIC TEXAS



TECL#18011
4831 CHEDDER DRIVE
SAN ANTONIO, TX 78229
(210) 269-9842

PROJECT NAME AND ADDRESS

**5.355kW PHOTOVOLTAIC SYSTEM
WILKINS RESIDENCE
721 HAYS STREET
SAN ANTONIO, TEXAS
BEXAR COUNTY 78202**

ROOF PLAN
& SECTION DETAILS

DATE:
MAR.25TH 2015

DRAWN BY:
SW

SHEET:

E4

SYSTEM CALCULATIONS:

SYSTEM INVERTER : (1)SOLAR EDGE - SE5000A INVERTER(6750W)

INVERTER LOAD :
(21) MODULES ON (1) 6750W INVERTER
255W MODULES X 21= 5,355WATTS < 6,750WATTS = OK

SINGLE STRING(MAX) CONFIGURATIONS :
Vmp(VDV) 31.0V X 11 = 341.0V
Imp(AMP) 8.20A X 1 = 8.20A
Voc(VDC) w/ Optimizer = 1.0V
CONT. 1.0V X 11 = 11.0V
Isc(AMP) w/ Optimizer = 11.0A
Min. Wire ampacity Isc* 1.25 = 13.75A

COMBINER TO INVERTER :
Vmp(VDV) 31.0V X 11 = 341.0V
Imp(AMP) 8.20A X 2 = 8.20A
Voc(VDC) w/ Optimizer 1.0 x 11 = 11.0V
Isc(AMP) w/ Optimizer = 8.8A
Min. Wire ampacity Isc* 1.25 = 11.0A

SYSTEM TOTALS :
Vmp(VDV) 31.0V X 11 = 341.0V
Imp(AMP) 8.20A X 2 = 16.40A
Voc(VDC) w/ Optimizer 1.0 x 11 = 11.0V
Isc(AMP) w/ Optimizer = 17.6A

(SOLAR EDGE SE3800A-US) INVERTER CHARACTERISTICS:
DC: AC:
MAX INPUT POWER- 6750W MAX OUT POWER- 5450VA
MAX VDC IN - 500V NOM OUT CURRENT- 21.0A @240V
NOM. INPUT VOLT 350@240V NOM VOLT/RANGE- 211V--264V@ 240V
MAX IN CURRENT- 15.5A

(HYUNDAI SOLAR MODEL #HIS-M255RG) MODULE CHARACTERISTICS:
DC: AC:
MAX POWER RATING- 255W SHORT CIR. CURR.- 8.80A
MAX POWER VOLTAGE- 31.0V MAX. SYSTEM VOLT.- 1000V
OPEN CIRCUIT VOLTAGE- 38.20V MAX. FUSE- 15A
MAX POWER CURRENT- 8.20A

(SOLAR EDGE MODEL #P300) POWER OPTIMIZER CHARACTERISTICS:
DC: AC:
RATED INPUT POWER- 300W MAX OUTPUT CURR.- 15.0A
MAX INPUT VOLTAGE- 48.00V MAX. OUTPUT VOLT.- 60.0V
MPPT OPERATING RANGE- 8 - 48V MAX. SYSTEM VOLTAGE- 1000V
MAX CONT. INPUT CURRENT- 10.0A (Isc) MIN. STRING LENGTH- 8
MAX. STRING LENGTH- 20

PANEL GROUPING A
14 MODULES = 671LBS
WIND PRESSURE = 4903 LBS
SQUARE FOOT DISTRIBUTION = 2.72 LBS
OF POINT LOAD CONNECTIONS = 18
WEIGHT PER POINT LOAD = 40 LBS
NON OVERLAPPING RADIUS REQ = 22"

PANEL GROUPING B
6 MODULES = 288 LBS
WIND PRESSURE = 2104 LBS
SQUARE FOOT DISTRIBUTION = 2.12 LBS
OF POINT LOAD CONNECTIONS = 8
WEIGHT PER POINT LOAD = 40 LBS
NON OVERLAPPING RADIUS REQ = 22"

PHOTOVOLTAIC EQUIPMENT:

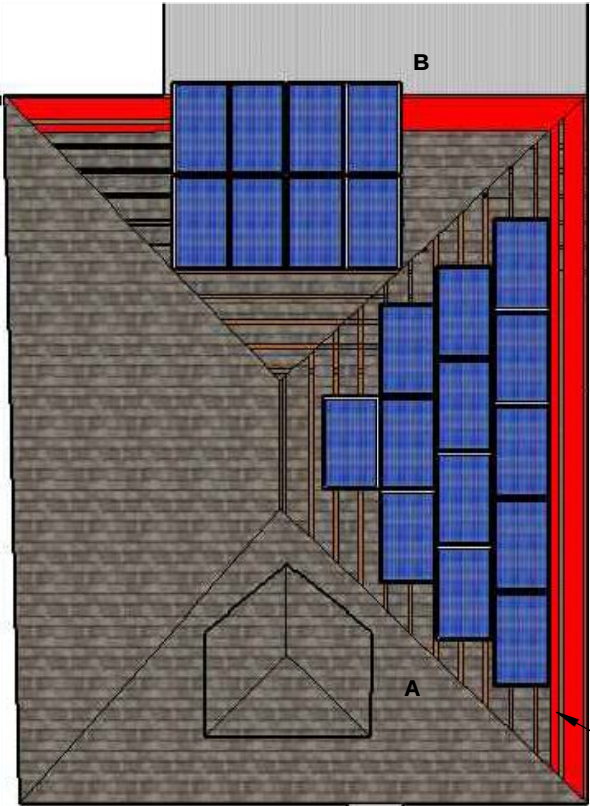
SYSTEM INVERTER :
NOMINAL VOLTAGE RANGE 211-264@240V
DC INPUT MAX AMP 13.0A
SOLAR EDGE
MODEL: SE3800A-US

SYSTEM MODULES : (55)
MAXIMUM POWER RATING 255W
MAXIMUM POWER VOLTAGE 31.0V
MAX POWER CURRENT 8.20A
HYUNDAI SOLAR MODULE
MODEL: HIS-M255RG

SYSTEM OPTIMIZERS : (55)
MAXIMUM INPUT POWER 300W
MAXIMUM INPUT VOLTAGE 48.00V
MAX INPUT CURRENT 10.0A
SOLAR EDGE OPTIMIZER
MODEL: P300

NOTES:

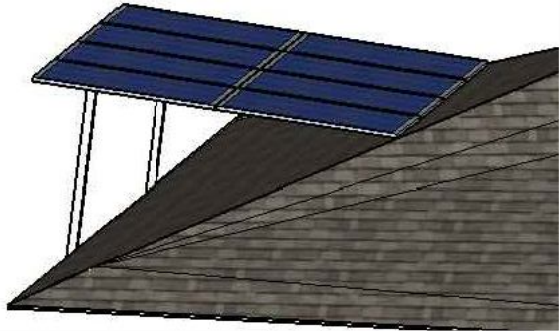
- ALL SOLAR PV MODULES INSTALLED w/ LEG KITS ON ROOF PITCHED 17 DEGREES PARALLEL TO ROOF FACING DUE SOUTH 160 AND SOUTHEAST AT 230 DEGREE AZIMUTH.(SECTIONS A&B). SECTION C TO BE TILLED 23 DEGREES @180 DEGREES AZIMUTH ON GROUND.
- SUPPORT ENTIRE PV ARRAY W/ UNIRAC QUICK MOUNT RACKING, TO BE SECURED INTO EXISTING ROOF TRUSSES (48" MAX) W/ GRK RSS 3/8" X 3-1/8" STAINLESS STEEL LAG BOLTS (MIN. 2" INTO RAFTER).
- SUPPORT ALL PHOTOVOLTAIC MODULES W/ UNIRAC QUICK RAILS, MOUNTED ON SERRATED L-FEET W/ 7" FLASHING COVERED STANDOFFS.
- THE SOLAR MODULES, ROOF MOUNTED, SYSTEM MUST BE ATTACHED TO THE EXIST ROOF FRAMING STRUCTURE. DRAINAGE & MOISTURE AT NEW ROOF PENETRATIONS MUST BE PROPERLY SEALED NOT TO ALLOW MOISTURE PENETRATION INTO THE EXIST ROOF CONSTRUCTION.
- INSTALLATION OF SOLAR EQUIPMENT SHALL INSURE CORRECT & APPROPRIATE SAFE INSTALLATION BASED ON SYSTEMS DESIGN PARAMETERS, INSURING THAT STRUCTURAL SUPPORT MEMBERS CAN SUPPORT THE SOLAR PANEL ARRAYS; LAG SCREWS HAVE ADEQUATE PULLOUT STRENGTH AS INSTALLED; AND THE PROPER DESIGN LOADS FOR ROOF MOUNTING SYSTEMS ARE CORRECTLY CALCULATED.
- EACH MODULE HAS A SOLAR EDGE OPTIMIZER THAT LIMITS THE MODULE OPEN CIRCUIT VOLTAGE TO 1V AND THE STRING SHORT CIRCUIT CURRENT TO 10A. INVERTER UTILIZES THE OPIMIZERS TO MAINTAIN OPTIMUM Vmp/Imp.



ROOF PANEL LAYOUT PLAN

24" RADIUS
MIN. REQUIRED
NON OVERLAPPING
POINT LOADS(STANDOFFS)

GROUP B PREVIEW



(PROPOSED)
ROOF MOUNTED
PHOTOVOLTAIC ARRAY
(21) HYUNDAI SOLAR RG-SERIES
MODEL: #HIS-M255RG
MULTI CRYSTALLINE 255W MODULES

(EXISTING)
WOOD
TRUSSES
@ 24" O.C.

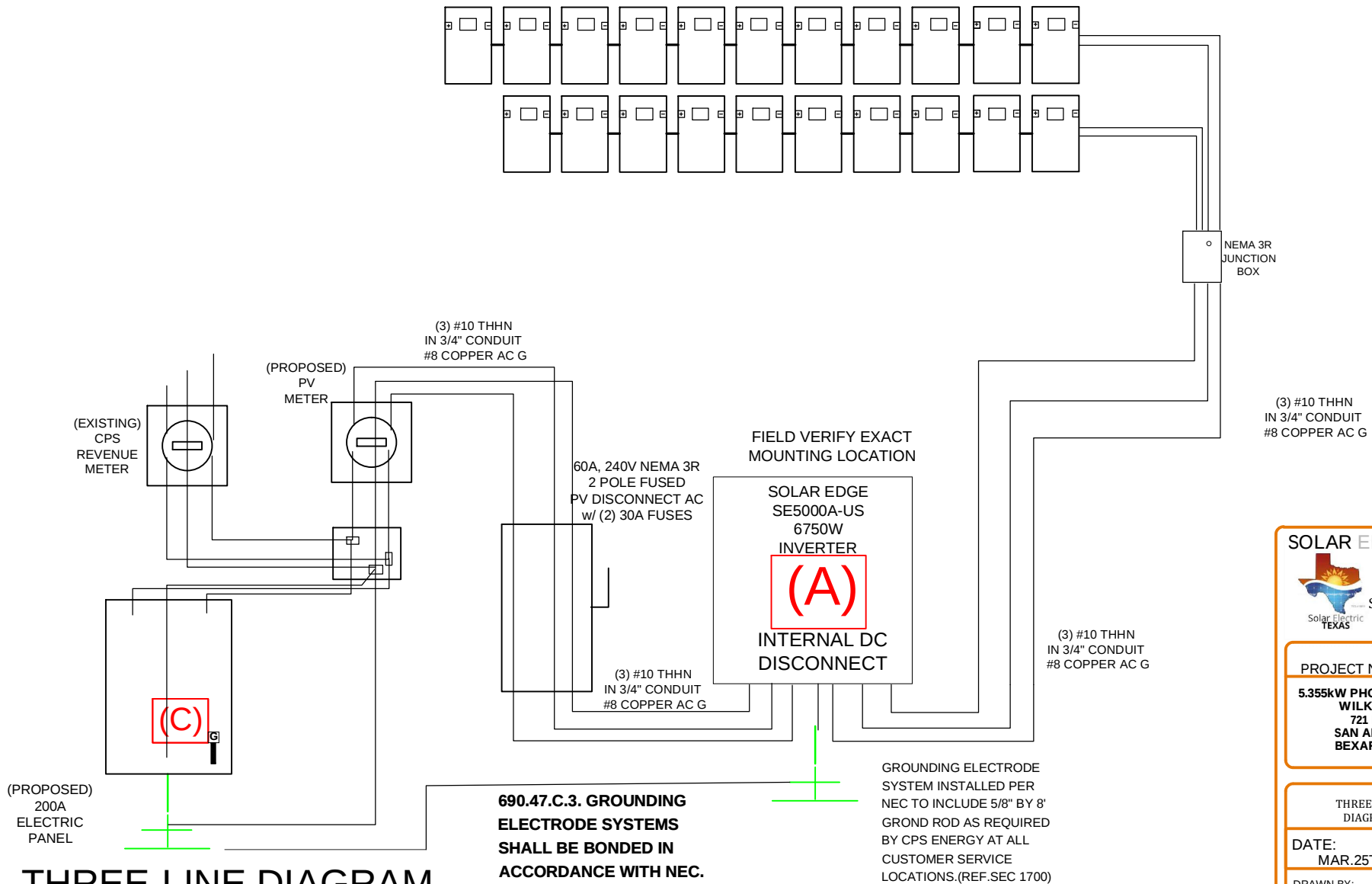


SOLAR ELECTRIC TEXAS
TECL#18011
4831 CHEDDER DRIVE
SAN ANTONIO, TX 78229
(210) 269-9842

PROJECT NAME AND ADDRESS
5.355kW PHOTOVOLTAIC SYSTEM
WILKINS RESIDENCE
721 HAYS STREET
SAN ANTONIO, TEXAS
BEXAR COUNTY 78202

NOTES & SYSTEM
CALCULATIONS
DATE: MAR.25TH 2015
DRAWN BY: SW
SHEET:
E3

PROPOSED 5.355kW (21 MODULES) HYUNDAI SOLAR RG-SERIES, #HiS-M255RG, 255W MODULES



THREE-LINE DIAGRAM

SCALE: (NO SCALE)

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THREE-LINE
DIAGRAM

DATE:
MAR.25TH 2015

DRAWN BY: SW

SHEET:

E2

ONE-LINE DIAGRAM

NOTES: SCALE: (NO SCALE)

- ALL EQUIPMENT IS TO BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF THE 2011 NEC ARTICLE 690 AND THE 2012 IFC 605.11.
- DISCONNECT SWITCH COMPLIES WITH NEC 690-17 AND HAS A SIGN READING: **"WARNING- ELECTRICAL SHOCK HAZARD- DO NOT TOUCH- TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION"** HAS BEEN APPLIED.
- CIRCUIT BREAKERS IN THE CUSTOMER'S DISTRIBUTION PANEL SHALL BE LABELED **" PHOTOVOLTAIC POWER SOURCE"** PER NEC 705-10 AND **"BREAKERS ARE BACKFED"** PER NEC 690-64(b)5.
- THE SOLAR OUTPUT METER, **TO BE SUPPLIED AND INSTALLED BY CONTRACTOR**, SHALL BE INSTALLED BETWEEN THE INVERTER AND SYSTEM DISCONNECT SWITCH AND SHALL BE LABELED: **"PHOTOVOLTAIC SYSTEM KWH METER."**
- THE PV ARRAY SAFETY DC DISCONNECT WILL BE MARKED WITH PV SOURCE RATINGS PER NEC 690.53.
 - OPERATING CURRENT
 - OPERATING VOLTAGE
 - MAXIMUM SYSTEM VOLTAGE
 - SHORT-CIRCUIT CURRENT
 - LABELED "PV ARRAY DC SAFETY DISCONNECT".
- EXISTING AC LOAD CENTER MUST MEET REQUIREMENTS OF 2011 NEC CODE 705.12. SUM OF MAIN BREAKER PLUS SOLAR BREAKER(S) MUST BE LESS THAN OR EQUAL TO BUS RATING. IF BACKFED BREAKERS ARE MOUNTED AT OPPOSITE END OF BUS FROM MAIN BREAKER OR FEEDER, THE SUM OF SOLAR BREAKERS AND MAIN BREAKER MAY BE EQUAL TO OR LESS THAN 120% OF BUS RATING.
- ALL CONDUIT TO BE EMT OR EQUAL AND NOT LESS THAN 1/2" TRADE SIZE.
- ROOF STANCHIONS, FLASHING AND RAILING TO BE PROVIDED BY PV INSTALLER.
- THE WIRING SIZES LISTED ARE PER 2011 NEC. INSTALLER IS RESPONSIBLE FOR DETERMINING HOW THE WIRES WILL BE RUN, LENGTH OF CONDUIT, AND FINAL ELECTRICAL COMPLETION OF PROJECT W/ ALL STRAPS, ETC.
- EACH MODULE SHALL BE GROUNDED USING THE MANUFACTURER'S SUPPLIED HARDWARE.
- ALL GROUNDED POINT LOCATIONS ARE AS SPECIFIED BY MANUFACTURER'S INSTALLATION INSTRUCTIONS, INCLUDING CLEAR & LEGIBLE IDENTIFICATION OF REQUIRED GROUNDING POINTS ON EACH MODULE.

(IFC 605.11.1 and 605.11.1.4)

- Marking is required on all interior and exterior dc conduit, raceways, enclosures, cable assemblies, and junction boxes to alert the fire service to avoid cutting them. Marking should be placed on all interior and exterior dc conduit, raceways, enclosures, and cable assemblies, every 10 feet, at turns and above and/or below penetrations and all dc combiner and junction boxes.

LABELS:

(Aa) 690.53 & 690.17 (PLACE ON DC DISCONNECT) **WARNING: ELECTRICAL SHOCK HAZARD DO NOT TOUCH TERMINALS. BOTH LINE & LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION. DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT.**

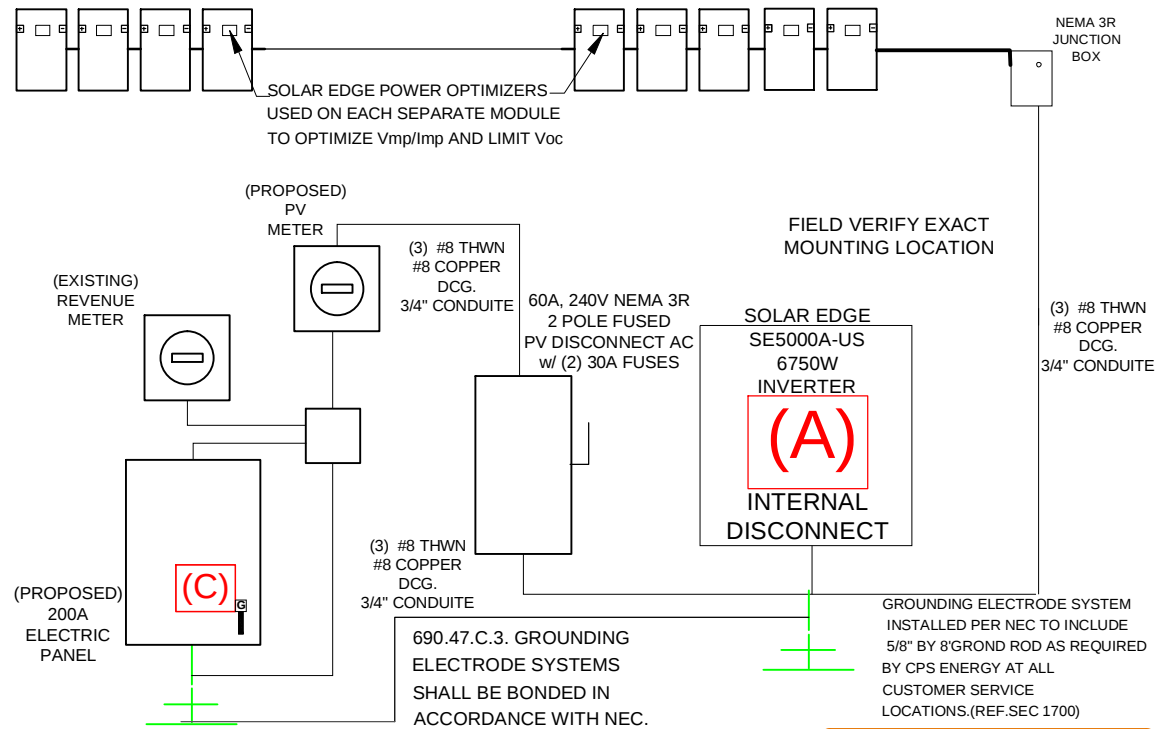
(Ab) 690.5 C (PLACE ON INVERTER) **WARNING: ELECTRICAL SHOCK HAZARD IF A GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED**

(B) 605.11.1.3 (PLACE AT MAIN SERVICE DISCONNECT) **WARNING: PHOTOVOLTAIC POWER SOURCE**

- MARKING CONTENT: CAUTION: SOLAR ELECTRIC SYSTEM
- RED BACKGROUND,
- WHITE LETTERING,
- MINIMUM 3/8" LETTER HEIGHT,
- ALL CAPITAL LETTERS,
- ARIAL OR SIMILAR FONT, NON-BOLD,
- REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (durable adhesive materials meet this requirement.)

(C) 690.54 (PLACE AT MAIN SERVICE) INTERACTIVE SYSTEM POINT OF INTERCONNECTION TO BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS AS A POWER SOURCE

PROPOSED 5.355kW (21 MODULES) HYUNDAI SOLAR RG-SERIES, #HIS-M255RG, 255W MODULES



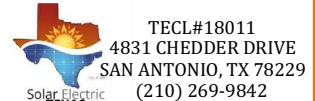
PV SYSTEM DC DISCONNECT

OPERATING CURRENT:	24.60 A
OPERATING VOLTAGE:	434.00 V
MAXIMUM SYSTEM VOLTAGE:	500 V
SHORT CIRCUIT CURRENT:	15.0 A

PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT:	42.0 A
MAXIMUM AC OPERATING VOLTAGE:	240 V

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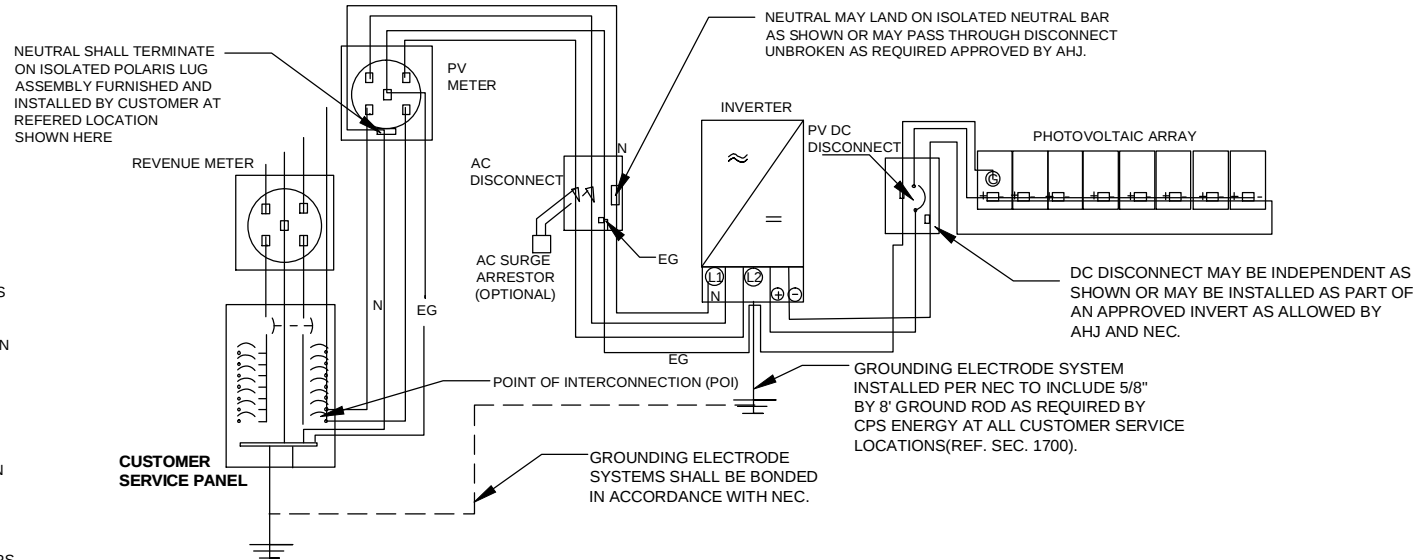
5.355kW PHOTOVOLTAIC SYSTEM
WILKINS RESIDENCE
721 HAYS STREET
SAN ANTONIO, TEXAS
BEXAR COUNTY 78202

ONE-LINE DIAGRAM	SHEET: E1
DATE: MAR. 25TH 2015	
DRAWN BY: SW	

LOAD-SIDE POINT OF INTERCONNECTION

SCALE: NTS

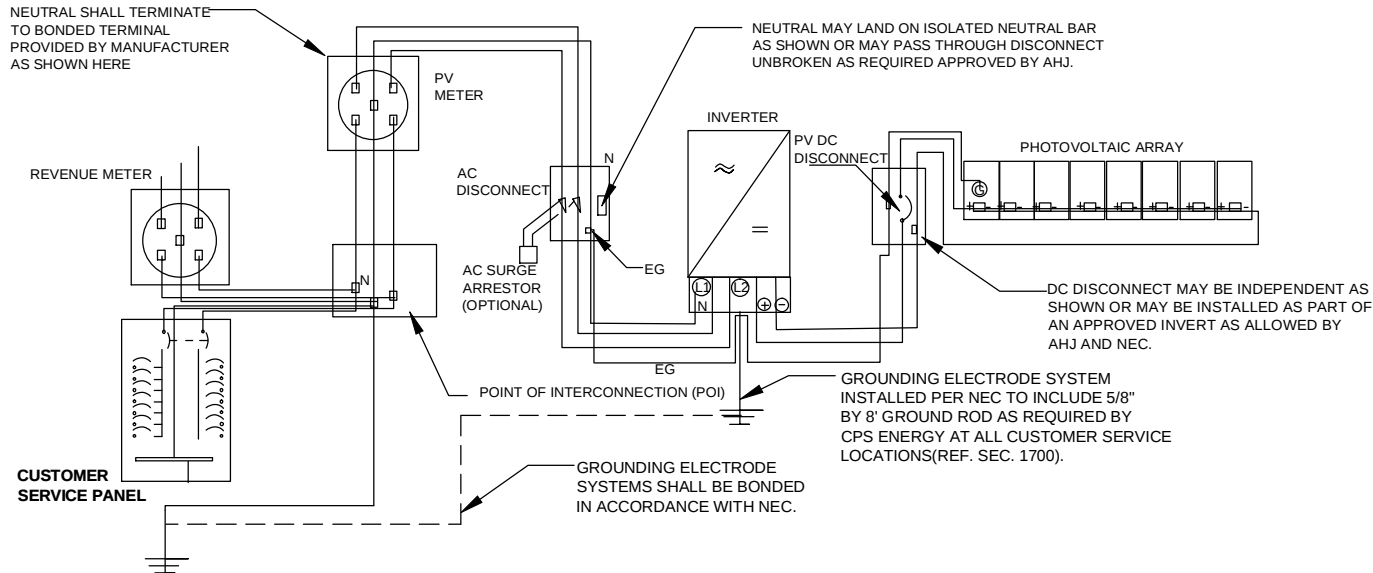
TYPICAL PHOTOVOLTAIC (PV) SYSTEM
120/240-VOLT
SINGLE-PHASE
THREE-WIRE DIAGRAM



LINE-SIDE POINT OF INTERCONNECTION

SCALE: NTS

TYPICAL PHOTOVOLTAIC (PV) SYSTEM
120/240-VOLT
SINGLE-PHASE
THREE-WIRE DIAGRAM



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WILKINS RESIDENCE
721 HAYS STREET
SAN ANTONIO, TEXAS
BEXAR COUNTY 78202**

ELECTRICAL
RISER DIAGRAM

DATE: MAR. 25TH 2015

DRAWN BY:

SHEET:

EE