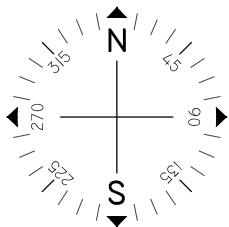
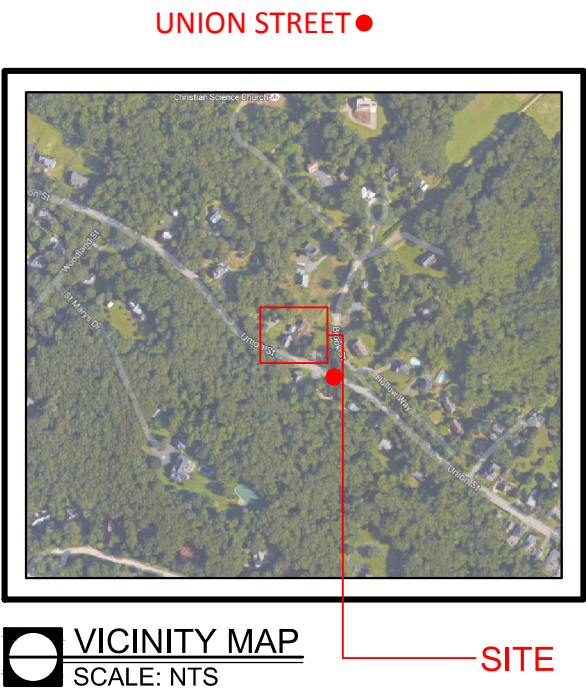


INSTALLATION OF NEW ROOF MOUNTED 9.36kW PV SYSTEM 164 UNION STREET NATICK, MA 01760



Issued / Revisions

| P1 | ISSUED TO TOWNSHIP FOR PERMIT | 3/3/2016 |
|-----|-------------------------------|----------|
| NO. | DESCRIPTION | DATE |

Project Title:

NAVISKY, MICHAEL
TRINITY ACCT #: 2016-92022

Project Address:

164 UNION STREET
NATICK, MA 01760

Drawing Title:

PROPOSED 9.36kW
SOLAR SYSTEM

Drawing Information

| | |
|---------------|----------|
| DRAWING DATE: | 3/3/2016 |
| DRAWN BY: | JC |
| REVISED BY: | |

System Information:

| | |
|---------------------|--------------------|
| TOTAL SYSTEM SIZE: | 9.36kW |
| TOTAL MODULE COUNT: | 36 |
| MODULES USED: | CANADIAN SOLAR 260 |
| MODULE SPEC #: | CS6P-260P |
| UTILITY COMPANY: | EVERSOURCE |
| UTILITY ACCT #: | 1104 727 1066 |
| UTILITY METER #: | 1663313 |
| DEAL TYPE: | |

| Rev. No. | Sheet |
|----------|--------|
| P1 | PV - 1 |



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GENERAL NOTES

1. THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL EQUIPMENT AND FOLLOWING ALL DIRECTIONS AND INSTRUCTIONS CONTAINED IN THE DRAWING PACKAGE AND INFORMATION RECEIVED FROM TRINITY.
2. THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL EQUIPMENT AND FOLLOWING ALL DIRECTIONS AND INSTRUCTION CONTAINED IN THE COMPLETE MANUAL.
3. THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR READING AND UNDERSTANDING ALL DRAWINGS, COMPONENT AND INVERTER MANUALS PRIOR TO INSTALLATION. THE INSTALLATION CONTRACTOR IS ALSO REQUIRED TO HAVE ALL COMPONENT SWITCHES IN THE OFF POSITION AND FUSES REMOVED PRIOR TO THE INSTALLATION OF ALL FUSES BEARING SYSTEM COMPONENTS.
4. ONCE THE PHOTOVOLTAIC MODULES ARE MOUNTED, THE INSTALLATION CONTRACTOR SHOULD HAVE A MINIMUM OF ONE ELECTRICIAN WHO HAS ATTENDED A SOLAR PHOTOVOLTAIC INSTALLATION COURSE ON SITE.
5. FOR SAFETY, IT IS RECOMMENDED BY THE MANUFACTURE THAT THE INSTALLATION CREW ALWAYS HAVE A MINIMUM OF TWO PERSONS WORKING TOGETHER AND THAT EACH OF THE INSTALLATION CREW MEMBERS BE TRAINED IN FIRST AID AND CPR.
6. THIS SOLAR PHOTOVOLTAIC SYSTEM IS TO BE INSTALLED FOLLOWING THE CONVENTIONS OF THE NATIONAL ELECTRIC CODE. ANY LOCAL CODE WHICH MAY SUPERSEDE THE NEC SHALL GOVERN.
7. ALL SYSTEM COMPONENTS TO BE INSTALLED WITH THIS SYSTEM ARE TO BE "UL" LISTED. ALL EQUIPMENT WILL BE NEMA 3R OUTDOOR RATED UNLESS INDOORS.

GENERAL NOTES

IF ISSUED DRAWING IS MARKED WITH A REVISION CHARACTER OTHER THAN "A", PLEASE BE ADVISED THAT FINAL EQUIPMENT AND/OR SYSTEM CHARACTERISTICS ARE SUBJECT TO CHANGE DUE TO AVAILABILITY OF EQUIPMENT.

GENERAL NOTES CONTINUED

8. THE DC VOLTAGE FROM THE PANELS IS ALWAYS PRESENT AT THE DC DISCONNECT ENCLOSURE AND THE DC TERMINALS OF THE INVERTER DURING DAYLIGHT HOURS. ALL PERSONS WORKING ON OR INVOLVED WITH THE PHOTOVOLTAIC SYSTEM ARE WARNED THAT THE SOLAR MODULES ARE ENERGIZED WHENEVER THEY ARE EXPOSED TO LIGHT.
9. ALL PORTIONS OF THIS SOLAR PHOTOVOLTAIC SYSTEM SHALL BE MARKED CLEARLY IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ARTICLE 690.
10. PRIOR TO THE INSTALLATION OF THIS PHOTOVOLTAIC SYSTEM, THE INSTALLATION CONTRACTOR SHALL ATTEND A PRE-INSTALLTION MEETING FOR THE REVIEW OF THE INSTALLATION PROCEDURES, SCHEDULES, SAFETY AND COORDINATION.
11. PRIOR TO THE SYSTEM START UP THE INSTALLATION CONTRACTOR SHALL ASSIST IN PERFORMING ALL INITIAL HARDWARE CHECKS AND DC WIRING CONDUCTIVITY CHECKS.
12. FOR THE PROPER MAINTENANCE AND ISOLATION OF THE INVERTS REFER TO THE ISOLATION PROCEDURES IN THE OPERATION MANUAL.
13. THE LOCATION OF PROPOSED ELECTRIC AND TELEPHONE UTILITIES ARE SUBJECT TO FINAL APPROVAL OF THE APPROPRIATE UTILITY COMPANIES AND OWNERS.
14. ALL MATERIALS, WORKMANSHIP AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREIN SHALL BE IN ACCORDANCE WITH:
 - A) CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS AND REQUIREMENTS

GENERAL NOTES CONTINUED

14. B) CURRENT PREVAILING UTILITY COMPANY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS
15. THIS SET OF PLANS HAVE BEEN PREPARED FOR THE PURPOSE OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DRAWINGS UNTIL REVISED TO INDICATE "ISSUED FOR CONSTRUCTION".
16. ALL INFORMATION SHOWN MUST BE CERTIFIED PRIOR TO USE FOR CONSTRUCTION ACTIVITIES.

ABBREVIATIONS

| | |
|------|--------------------------------------|
| AMP | AMPERE |
| AC | ALTERNATING CURRENT |
| AL | ALUMINUM |
| AF | AMP. FRAME |
| AFF | ABOVE FINISHED FLOOR |
| AFG | ABOVE FINISHED GRADE |
| AWG | AMERICAN WIRE GAUGE |
| C | CONDUIT (GENERIC TERM OF SPECIFIED) |
| CB | COMBINER BOX |
| CKT | CIRCUIT |
| CT | CURRENT TRANSFORMER |
| CU | COPPER |
| DC | DIRECT CURRENT |
| DISC | DISCONNECT SWITCH |
| DWG | DRAWING |
| EC | ELECTRICAL SYSTEM INSTALLER |
| EMT | ELECTRICAL METALLIC TUBING |
| FS | FUSIBLE SWITCH |
| FU | FUSE |
| GND | GROUND |
| GFI | GROUND FAULT INTERRUPTER |
| HZ | FREQUENCY (CYCLES PER SECOND) |

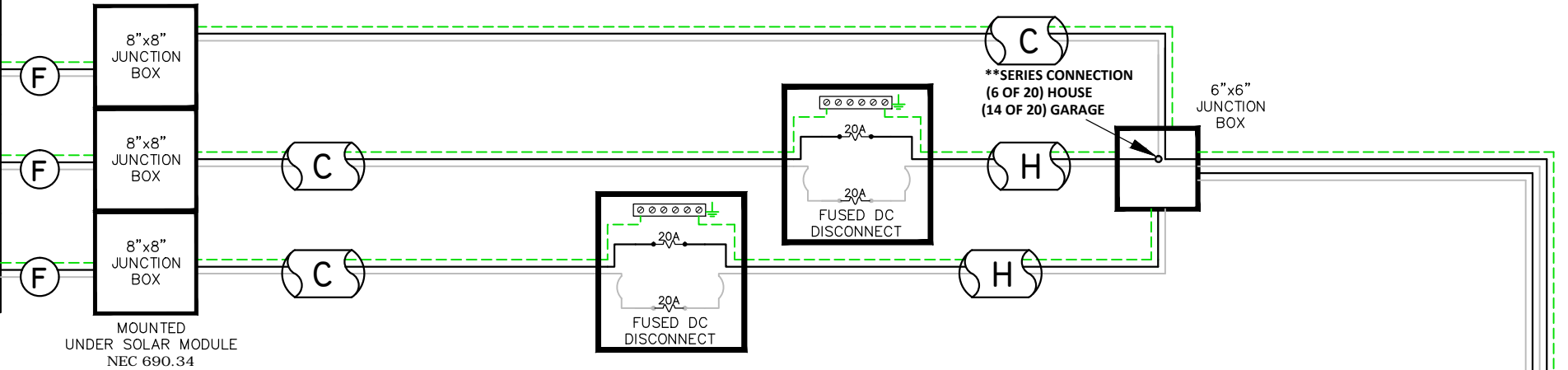
ABBREVIATIONS CONTINUED

| | |
|--------|--|
| JB | JUNCTION BOX |
| KCMIL | THOUSAND CIRCULAR MILS |
| KVA | KILO-VOLT AMPERE |
| KW | KILO-WATT |
| KWH | KILO-WATT HOUR |
| L | LINE |
| MCB | MAIN CIRCUIT BREAKER |
| MDP | MAIN DISTRIBUTION PANEL |
| MLO | MAIN LUG ONLY |
| MTD | MOUNTED |
| MTG | MOUNTING |
| N | NEUTRAL |
| NEC | NATIONAL ELECTRICAL CODE |
| NIC | NOT IN CONTRACT |
| NO # | NUMBER |
| NTS | NOT TO SCALE |
| OCP | OVER CURRENT PROTECTION |
| P | POLE |
| PB | PULL BOX |
| PH Ø | PHASE |
| PVC | POLY-VINYL CHLORIDE CONDUIT |
| PWR | POWER |
| QTY | QUANTITY |
| RGS | RIGID GALVANIZED STEEL |
| SN | SOLID NEUTRAL |
| JSWBD | SWITCHBOARD |
| TYP | TYPICAL |
| U.O.I. | UNLESS OTHERWISE INDICATED |
| WP | WEATHERPROOF |
| XFMR | TRANSFORMER |
| +72 | MOUNT 72 INCHES TO BOTTOM OF ABOVE FINISHED FLOOR OR GRADE |

SHEET INDEX

- PV-1 COVER SHEET W/ SITE INFO & NOTES
PV-2 ROOF PLAN W/ MODULE LOCATIONS
PV-3 ELECTRICAL 3 LINE DIAGRAM

| |
|--|
| SOLAR MODULES MOUNTED TO ROOF ON 3 ARRAYS 36 - 260W MODULES W/ 1 SOLAR EDGE P300 PER MODULE 18.75 ADC MAX PER STRING |
| (TOTAL) 1 STRING OF 20 MODULES IN SERIES - 350 Vmax 1 STRING OF 16 MODULES IN SERIES - 350 Vmax *2 STRINGS TO BE TERMINATED IN PARALLEL INSIDE INVERTER 1 |
| (HOUSE) 1 STRING (6 OF 20) MODULES IN SERIES - 350 Vmax *STRING (6 OF 20) TO BE TERMINATED IN SERIES WITH (14 OF 20) FROM GARAGE |
| (GARAGE) 1 STRING (14 OF 20) MODULES IN SERIES - 350 Vmax *STRING (14 OF 20) TO BE TERMINATED IN SERIES WITH (6 OF 20) FROM HOUSE |
| (COTTAGE) 1 STRING OF 16 MODULES IN SERIES - 350 Vmax *1 STRING TO BE TERMINATED IN PARALLEL INSIDE INVERTER 1 |



ARRAY CIRCUIT WIRING NOTES

1.) LICENSED ELECTRICIAN ASSUMES ALL RESPONSIBILITY FOR DETERMINING ONSITE CONDITIONS AND EXECUTING INSTALLATION IN ACCORDANCE WITH NEC 2014

2.) LOWEST EXPECTED AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP = -16°C

3.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMP = 33°C

4.) 2005 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN A ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES)

5.) PHOTOVOLTAIC POWER SYSTEMS SHALL BE PERMITTED TO OPERATE WITH UNGROUNDED PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUIT AS PER NEC 690.35

6.) ALL EQUIPMENT INSTALLED OUTDOORS SHALL HAVE A NEMA 3R RATING.

7.) ALL SOLAR SYSTEM LOAD CENTERS TO CONTAIN ONLY GENERATION CIRCUITS AND NO UNUSED POSITIONS OR LOADS

CALCULATIONS FOR CURRENT CARRYING CONDUCTORS
REQUIRED CONDUCTOR AMPACITY PER STRING
[NEC 690.8(B)(1)]: (15.00*1.25)1 = 18.75A

AWG #10, DERATED AMPACITY
AMBIENT TEMP: 55°C, TEMP DERATING FACTOR: .76
RACEWAY DERATING = 4 CCC: 0.80
(40*.76)0.80 = 24.32A

24.32A ≥ 18.75A, THEREFORE WIRE SIZE IS VALID

TOTAL AC REQUIRED CONDUCTOR AMPACITY
32.00A*1.25 = 40.00A

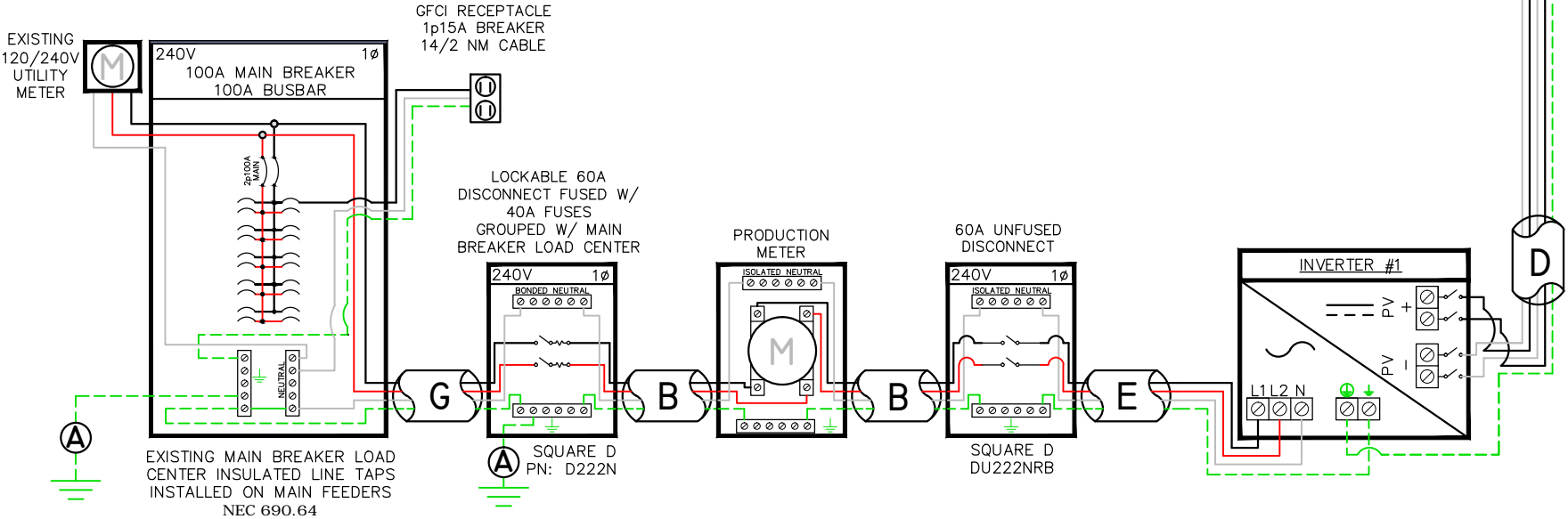
AWG #8, DERATED AMPACITY
AMBIENT TEMP: 30°C, TEMP DERATING: 1.0
RACEWAY DERATING ≤ 3 CCC: N/A
55A*1.0 = 55A

55A ≥ 40.00A, THEREFORE AC WIRE SIZE IS VALID

CALCULATION FOR PV OVERCURRENT PROTECTION
TOTAL INVERTER CURRENT: 32.00A
32.00A*1.25 = 40.00A
--> 40A OVERCURRENT PROTECTION IS VALID

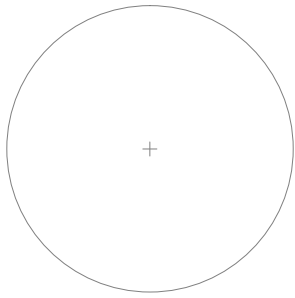
| PV MODULE SPECIFICATIONS | |
|--------------------------------|------|
| CANADIAN SOLAR 260 (CS6P-260P) | |
| Imp | 8.56 |
| Vmp | 30.4 |
| Voc | 37.5 |
| Isc | 9.12 |

| INVERTER #1 - SE7600A-US | | | |
|--------------------------|------|------|------|
| DC | | AC | |
| Imp | 23.5 | Pout | 7600 |
| Vmp | 350 | Iout | 32 |
| Voc | 500 | Imax | 40 |
| Isc | 30 | Vnom | 240 |



| | | | |
|---|--|---|---|
| A | #6 THWN-2 GEC TO EXISTING GROUND ROD | G | 3/4" FMC W/ 3-#6 THWN-2, 1-#8 THWN-2 GROUND |
| B | 3/4" EMT W/ 2-#8 THWN-2, 1-#10 THWN-2, 1-#10 THWN-2 GROUND | H | 1" PVC W/ 2-#10 THWN-2, 1-#10 THWN-2 GROUND (SEE LAYOUT FOR APPROX. TRENCH LENGTHS) |
| C | 3/4" EMT W/ 2-#10 THWN-2, 1-#10 THWN-2 GROUND | | |
| D | 3/4" EMT W/ 4-#10 THWN-2, 1-#10 THWN-2 GROUND | | |
| E | 3/4" EMT W/ 2-#8 THWN-2, 1-#10 THWN-2, 1-#10 THWN-2 GROUND | | |
| F | #12 PV WIRE W/ #6 BARE COPPER BOND TO ARRAY | | |

Engineer / License Holder:



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| DEAL TYPE: | |

Rev. No.

P1

Sheet

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