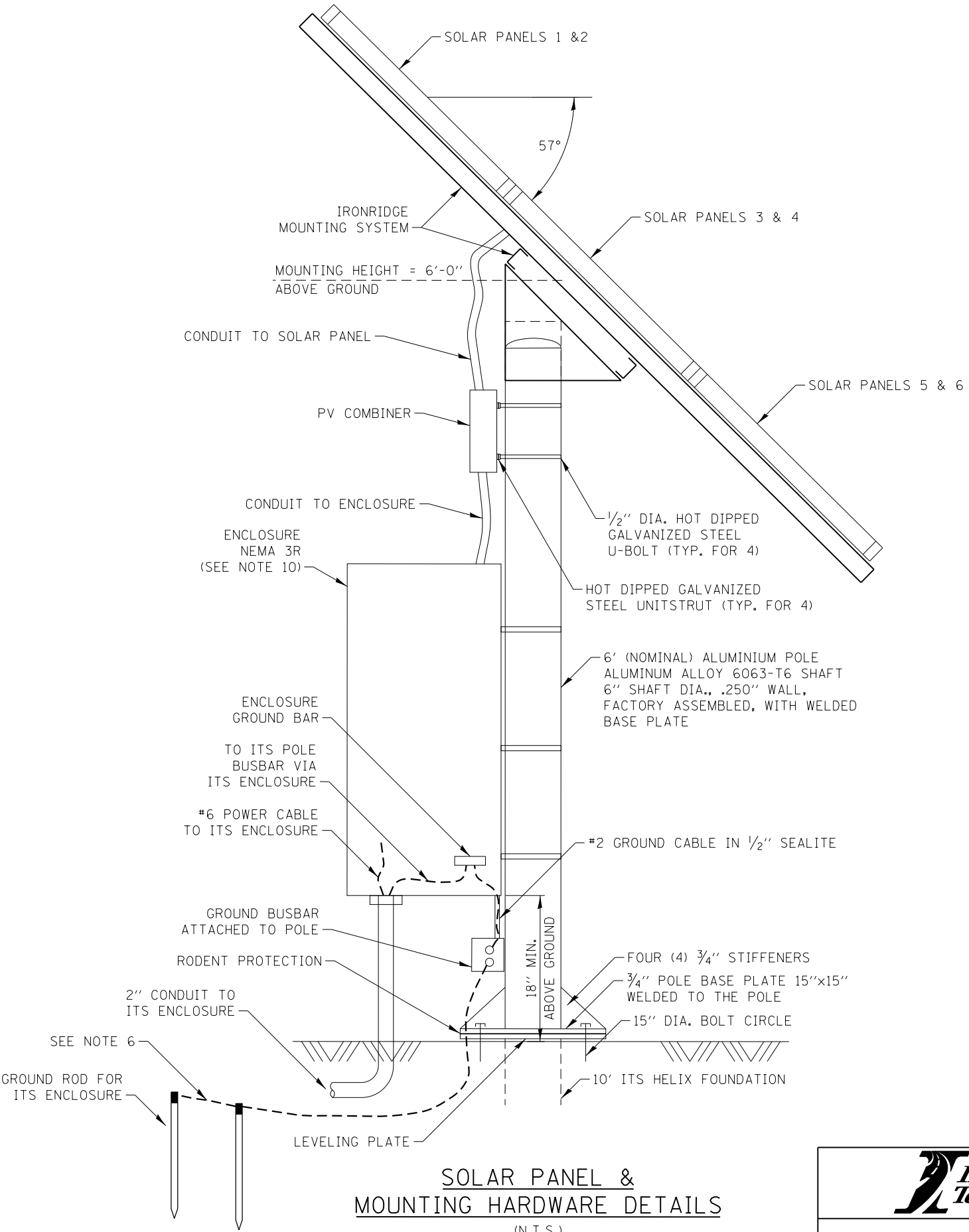


NOTES:

1. SOLAR POWER GENERATOR TO INCLUDE PANEL, BRACKETS, CABINET, CHARGER REGULATOR, BATTERIES, AND CABLES. STRUCTURE TO BE DESIGNED TO MEET STRUCTURAL DESIGN CRITERIA IN SPECIFICATION.
2. THE BATTERIES SHALL BE WIRED TO PROVIDE 24V DC POWER TO AN INVERTER FOR 120V AC DELIVERY TO ITS ENCLOSURE.
3. CONTRACTOR SHALL LOCATE THE GROUND MOUNTED SOLAR PANEL SYSTEM LESS THAN 20' FROM THE POLE-MOUNTED ITS SYSTEM AND ENSURE THAT THE SOLAR PANELS HAVE UNOBSTRUCTED SUN EXPOSURE.
4. GROUND MOUNTED SOLAR PANEL POLES INSTALLED WITHIN THE CLEAR ZONE SHALL BE SHIELDED BY BARRIER, LOCATED A MINIMUM OF 5' BEHIND THE PLANE OF ANY GUARDRAIL POSTS. SEE ILLINOIS TOLLWAY GUARDRAIL STANDARD (SECTION C OF STANDARDS) FOR MORE INFORMATION. ALL OTHER POLES SHALL BE LOCATED OUTSIDE THE CLEAR ZONE OR AS DIRECTED BY THE ENGINEER. FINAL LOCATION TO BE APPROVED BY THE ENGINEER.
5. ALL EQUIPMENT MUST BE CONNECTED TO A COMMON GROUND THROUGH THE ADJACENT ITS POLE BUSBAR. CONNECT A #2 AWG GROUND CABLE FROM THE EXTERNAL SOLAR POLE MOUNTED GROUND BUSBAR TO THE GROUND BAR IN THE SOLAR ENCLOSURE. ANY GROUND CONNECTED TO THE EXTERNAL GROUND BUSBAR SHALL BE EXOTHERMIC WELDED TO THE BUSBAR. SEALTITE CONDUIT SHOULD BE GROMMETTED ON END GOING TO BUSBAR TO PREVENT RODENTS AND INSECTS FROM ENTERING. A #2 AWG GROUND CABLE SHALL BE ATTACHED TO THE GROUND BUSBAR ATTACHED TO THE ADJACENT ITS POLE AND ROUTED THROUGH THE CONDUIT CONNECTING THE TWO ENCLOSURES AND ATTACHED TO THE GROUND BUSBAR ATTACHED TO THE SOLAR POLE. THE GROUND BUSBAR SHALL CONNECT TO A GROUND ROD (IN AN INSPECTION WELL) FOR THE SOLAR GENERATOR.
6. THE SOLAR POWER GENERATOR GROUND ROD SHALL BE CONNECTED TO THE GROUND ROD FOR THE ITS ENCLOSURE VIA A #2 AWG BARE GROUND CABLE EXOTHERMIC WELDED TO BOTH GROUND RODS.
7. CONTRACTOR TO PROVIDE ALL POWER AND GROUND WIRING REQUIRED FOR SYSTEM OPERATION WITHIN AND OUTSIDE THE ENCLOSURE.
8. BACKFILL HELIX FOUNDATION TO THE TOP OF THE POLE BASE ON ALL SIDES.
9. ALL CABLING (INCLUDING CABLING INSIDE THE ENCLOSURE) SHALL BE OUTDOOR RATED. THE GROUND WIRE (WHITE) IN THE POWER CABLE SHALL BE TAPED GREEN.
10. ENCLOSURE SHALL BE VENTED AND CONTAIN BATTERIES AND SOLAR CONTROLLER.
11. SOLAR PANELS SHALL FACE 186 DEGREES FROM MAGNETIC NORTH AND SHALL BE TILTED 57 DEGREES FROM THE HORIZON.

NOTE TO DESIGNER

THIS BASE SHEET SHOWS TYPICAL NEW CONSTRUCTION BUT IT IS NOT A STANDARD DRAWING. IT REQUIRES COMPLETION BY THE DESIGNER PRIOR TO INSERTION INTO A CONTRACT. MICROSTATION FILES AND THE "CADD STANDARDS MANUAL" ARE AVAILABLE ON THE ILLINOIS TOLLWAY WEBSITE. THE DESIGNER SHALL ACCEPT THE RESPONSIBILITY OF THE DESIGN OF THIS SHEET UPON ITS COMPLETION AND INSERTION INTO A CONTRACT. ALL "NOTE TO DESIGNER" BOXES SHALL BE REMOVED PRIOR TO INSERTION OF THE DRAWING INTO THE PLAN SET.



SOLAR POWER  
GENERATOR DETAILS

DATE  
3-31-2017

NEMA 3R ELECTRICAL BOX  
(SHALL CONTAIN SOLAR CONTROLLER, INVERTER, BATTERIES AND ELECTRONICS)

POLE MOUNTED ENCLOSURE  
30"W X 36"H X 16"D  
MIN. SIZE

24V BATTERY SYSTEM  
(4) AGM BATTERIES (6V, 400 AH)  
ARRANGED IN SERIES

SOLAR PV BATTERY SYSTEM  
1800 WATT ARRAY  
(6) 300W, (NOMINAL) SOLAR PANELS  
(3) SOURCE CIRCUITS (IN PARALLEL)  
(2) SOLAR MODULES (IN SERIES)

TEMPERATURE  
SENSOR CABLE

BATTERY TO BATTERY CONDUCTORS  
2/0 AWG THWN-2 CU  
(SHALL BE EQUAL LENGTH TO  
EQUALIZE BATTERY SYSTEM)

PVC COMBINER  
NEMA 3R

(3) SOURCE CIRCUITS  
(6) #10 AWG CU USE-2/PV WIRE  
(1) #6 AWG CU GROUND

(1) SOURCE CIRCUIT  
(2) #6 AWG THWN-2 CU  
(1) #10 AWG THWN-2 CU GND  
3/4" EMT CONDUIT

NOTE TO DESIGNER

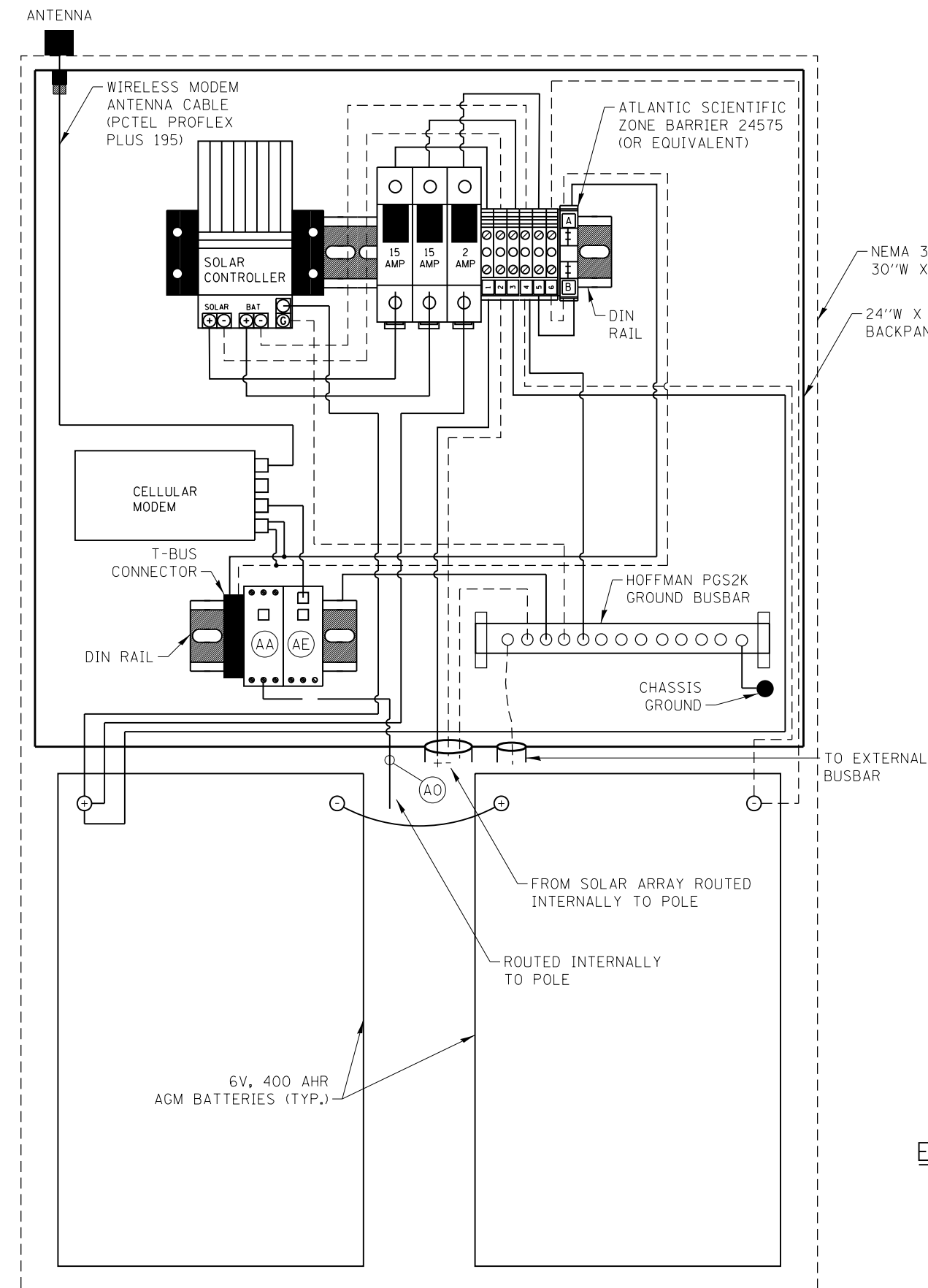
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M-ITS-1401

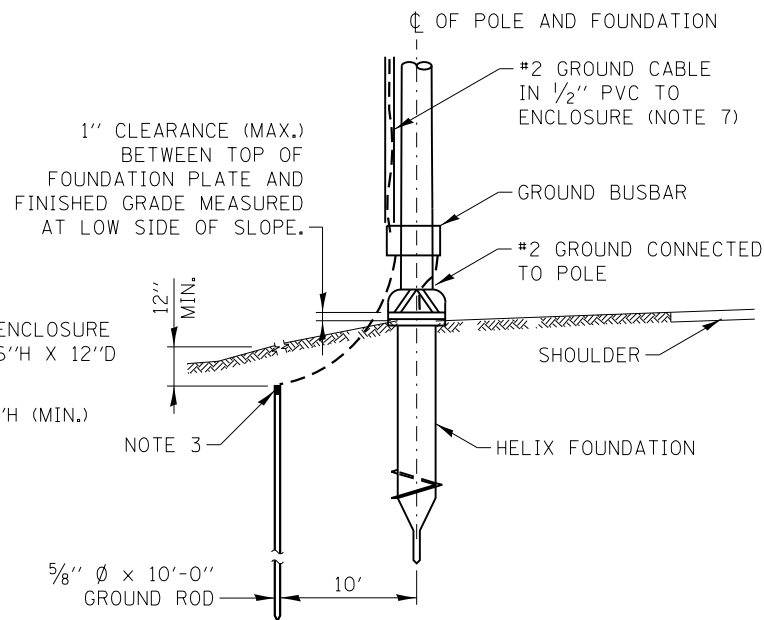


SOLAR POWER  
GENERATOR CABINET  
1-LINE ELECTRICAL DIAGRAM

DATE  
1-31-2015



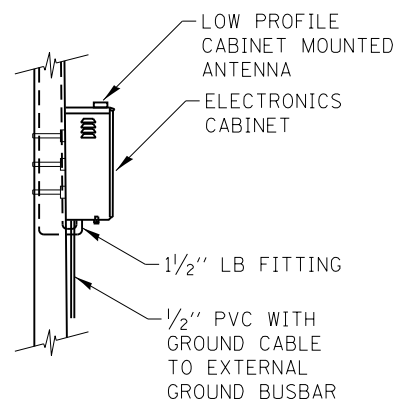
**TYPICAL ELECTRONICS CABINET LAYOUT**  
(NOT TO SCALE)



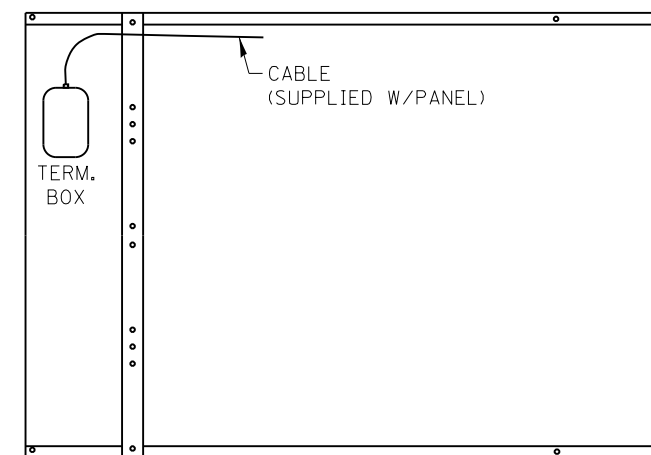
**TYPICAL INSTALLATION**  
(NOT TO SCALE)

### NOTE TO DESIGNER

THIS BASE SHEET SHOWS TYPICAL NEW CONSTRUCTION BUT IT IS NOT A STANDARD DRAWING. IT REQUIRES COMPLETION BY THE DESIGNER PRIOR TO INSERTION INTO A CONTRACT. MICROSTATION FILES AND THE "CADD STANDARDS MANUAL" ARE AVAILABLE ON THE ILLINOIS TOLLWAY WEBSITE. THE DESIGNER SHALL ACCEPT THE RESPONSIBILITY OF THE DESIGN OF THIS SHEET UPON ITS COMPLETION AND INSERTION INTO A CONTRACT. ALL "NOTE TO DESIGNER" BOXES SHALL BE REMOVED BY THE DESIGNER PRIOR TO INSERTION OF THE SHEET INTO THE PLAN SET.



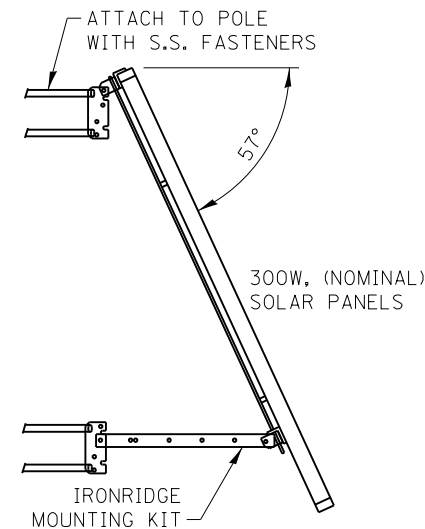
**ELECTRONICS CABINET MOUNTING DETAIL**



**BACK VIEW**

SOLAR PANEL (TYPICAL)

**SOLAR PANEL & MOUNTING HARDWARE DETAILS (TYPICAL)**



**SIDE VIEW**

SOLAR PANEL VERTICAL MOUNT (TYPICAL)

### NOTES:

- SOLAR PANELS SHALL BE OPENED 186 DEGREES FROM MAGNETIC NORTH AND SHALL BE TILTED 57 DEGREES (+/-0 DEGREES) FROM THE HORIZON.
- MOUNT CABINET ON SIDE OF POLE DOWNSTREAM OF TRAFFIC WHERE PRACTICAL.
- ALL GROUNDS SHALL BE CONNECTED TO THE GROUND BUSBAR. THIS INCLUDES THE BACKPLATE, ANY EQUIPMENT AND SURGE PROTECTION DEVICES. A #2 STRANDED WIRE GROUND CABLE SHALL BE UTILIZED TO CONNECT THE CABINET GROUND BUSBAR TO THE EXTERNAL POLE MOUNTED GROUND BUSBAR. ATTACHMENT TO THE POLE SHALL UTILIZE A 1/4" STAINLESS STEEL HEX HEAD NUT AND BOLT INCLUDING A RING CONNECTOR. THE GROUND WIRE SHALL BE ROUTED EXTERNAL TO POLE. THE EXTERNAL GROUND BUSBAR SHALL BE CONNECTED TO GROUND ROD UTILIZING A #2 BARE TINNED GROUND CABLE. EXOTHERMIC WELDS SHALL BE USED ON THE EXTERNAL GROUND BUSBAR ALONG WITH THE CONNECTION AT THE GROUND ROD. PVC SHALL BE SECURED TO THE POLE.
- POLE MUST BE LOCATED OUTSIDE THE CLEAR ZONE OR IN AREAS SHIELDED BY BARRIER.
- THE POLE BASE AND FOUNDATION SHALL BE SEALED USING 3/4" POLE BASE PLATE (SIZED TO MATCH HELIX FOUNDATION PLATE) TO PREVENT RODENT ENTRY INTO THE INTERIOR OF THE POLE.
- THE HELIX FOUNDATION SHALL BE INSTALLED WITH ITS AXIS PLUMB AND BACKFILLED TO COVER EXPOSED OPENINGS IN THE FOUNDATION.
- PVC CONDUIT TO BE SECURED TO POLE. USE METAL BUSHING TO CONNECT TO ENCLOSURE.
- ALL RACEWAYS AND ENTRY POINTS SHALL BE SEALED WITH ELECTRICAL PUTTY AFTER INSTALLATION.
- MODEM SHALL BE MOUNTED TO BACK PANEL.
- ALL CABLES SHALL ENTER THE ENCLOSURE FROM THE BOTTOM.

| ITEM | DESCRIPTION  |
|------|--|
| AA   | SENSOR SURGE SUPPRESSION, WAVETRONIX - CLICK-200 OR ISS ZONE BARRIER ZB24510           |
| AE   | RS-232 / RS-485 TO ETHERNET CONVERTOR WAVETRONIX - CLICK-3010R ISS-MOXA P5150A, OK-35A |
| A0   | MVDS CABLE, WAVETRONIX - WX-SS-706-60 OR ISS G4-CBL-60                                 |

M-ITS-1402



POLE MOUNTED SOLAR MVDS ASSEMBLY

DATE  
3-31-2017