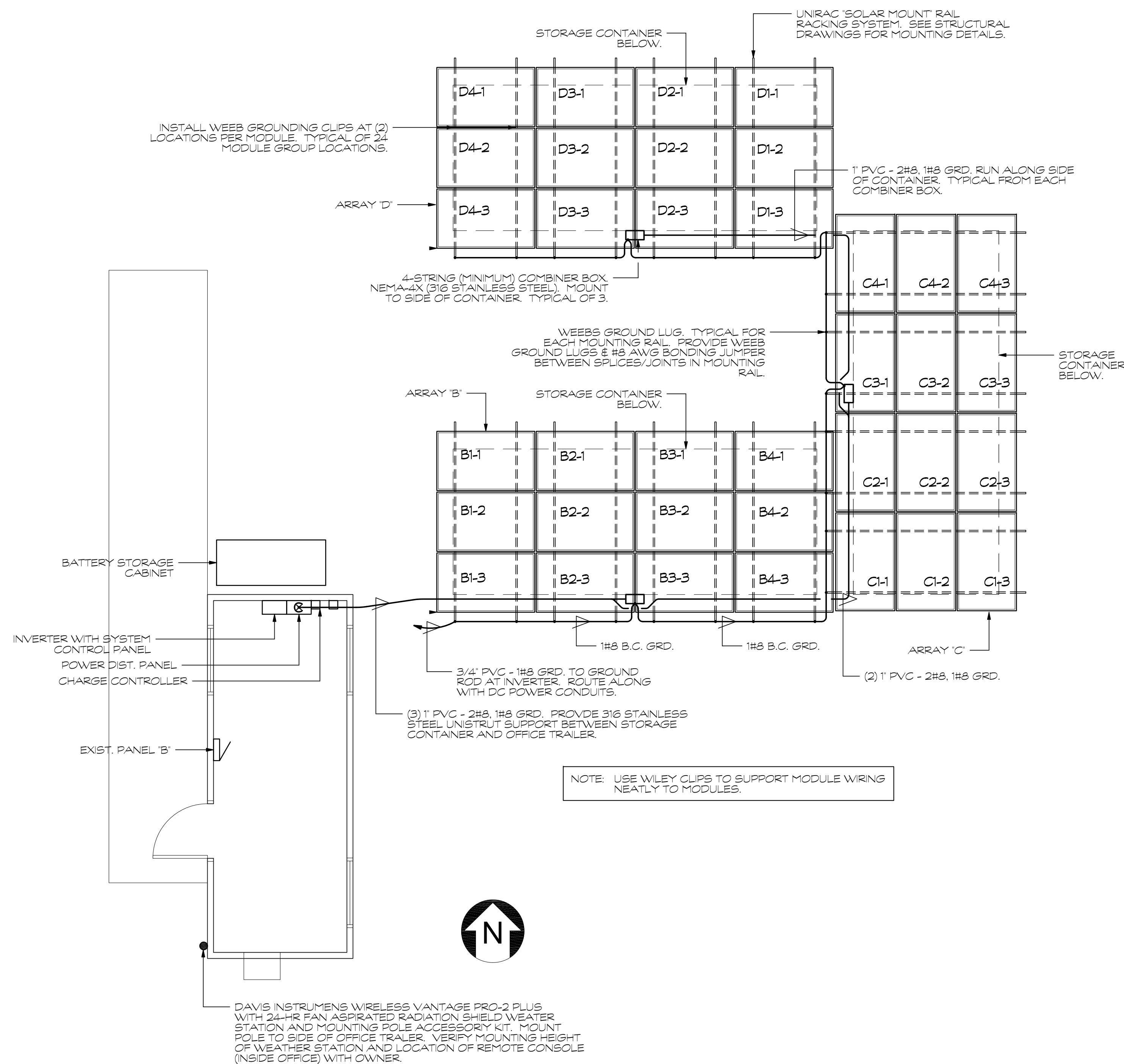


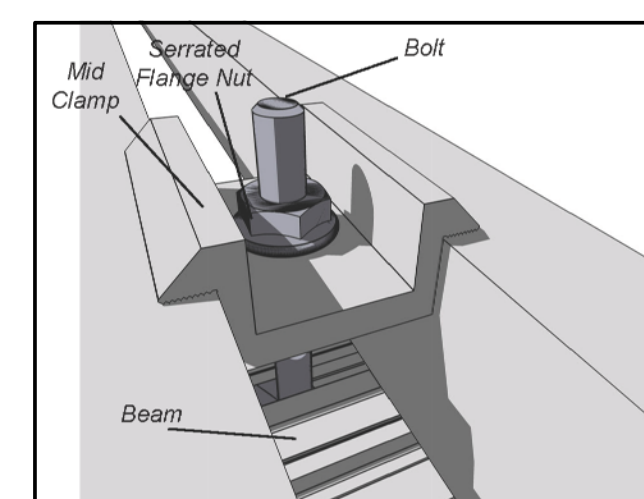
PARTIAL HANA LANDFILL ELECTRICAL SITE PLAN

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

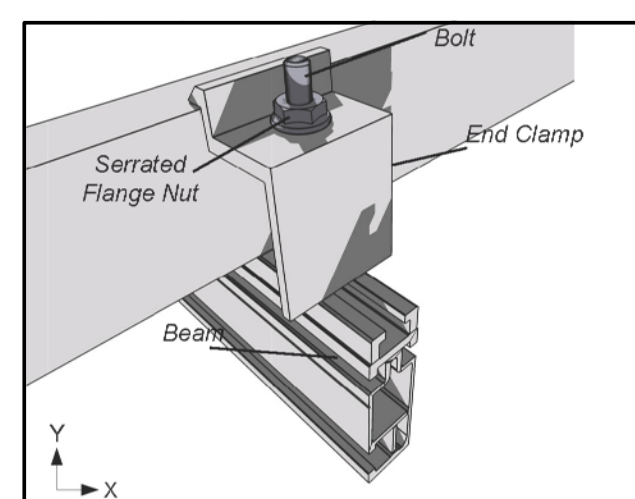


PARTIAL LANAI LANDFILL ELECTRICAL SITE PLAN

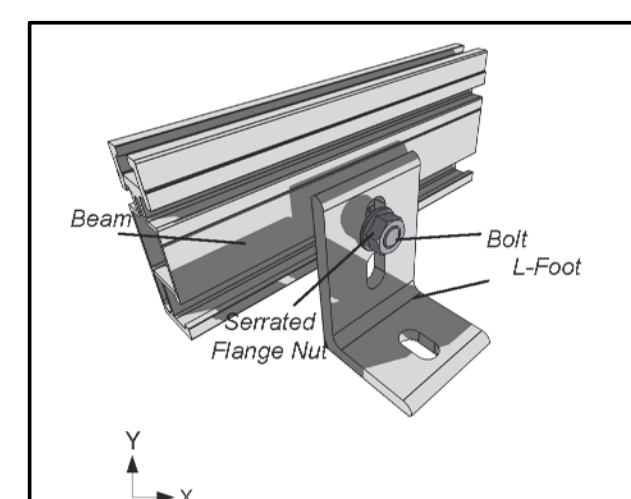
SCALE: 1/4" = 1'-0"



MID CLAMP



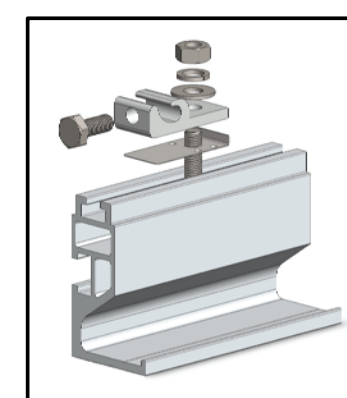
END CLAMP



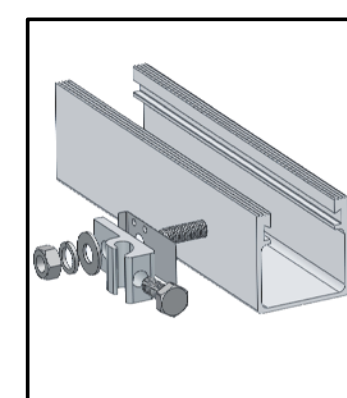
"L" FOOT BRACKET

UNIRAC "SOLAR MOUNT" DETAILS

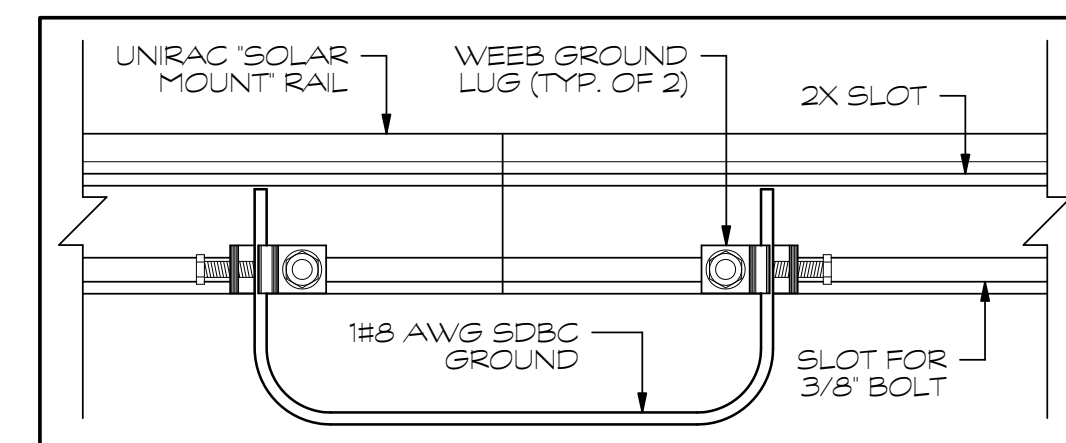
NOT TO SCALE



GROUND LUG



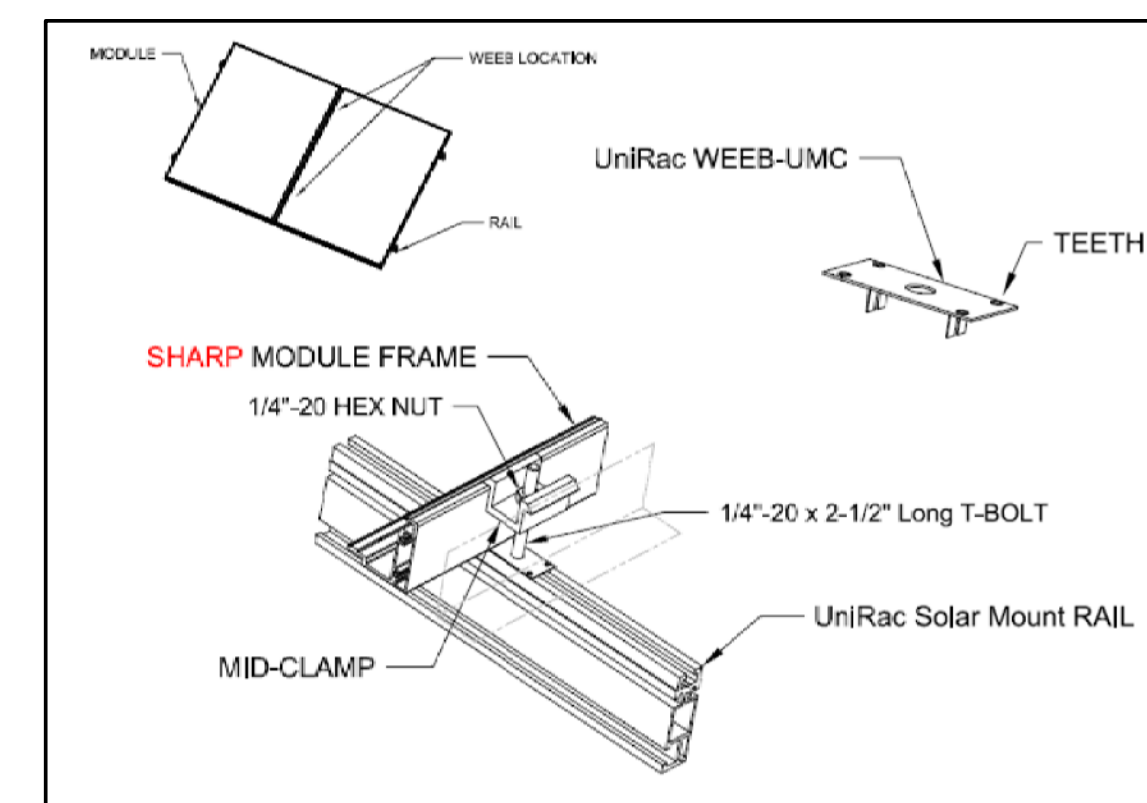
GROUND LUG



RAIL SPLICE BONDING

NOTES:

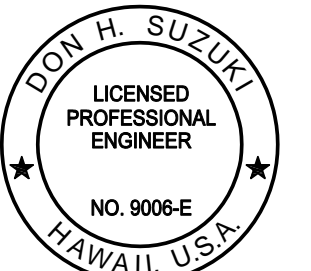
- A WEEB is installed on every MID-CLAMP assembly.
- Lift MODULE slightly over the WEEB during positioning.
- Ensure WEEB is not pushed out of position.
- Check that all components are level and teeth of WEEB are not visible.
- The WEEB is intended for single use only; they are not to be reused.
- All hardware must be 300 Series stainless steel.



MODULE GROUND

WEEB DETAILS

NOT TO SCALE



EXPIRES: 4/30/12

This work was prepared by me or under my supervision and construction of this project will be under my observation.

JOB NO. 10-199 DATE: 12-08-10

DRAWN BY: K.N. DESIGNED BY: D.S./L.M.

ELECTRICAL PLANS FOR:
**PHOTOVOLTAIC SYSTEMS
AT HANA LANDFILL AND
LANAI LANDFILL**

TMK: (2) 1-3-006, 012
TMK: (2) 4-9-002, 001 (FOR)

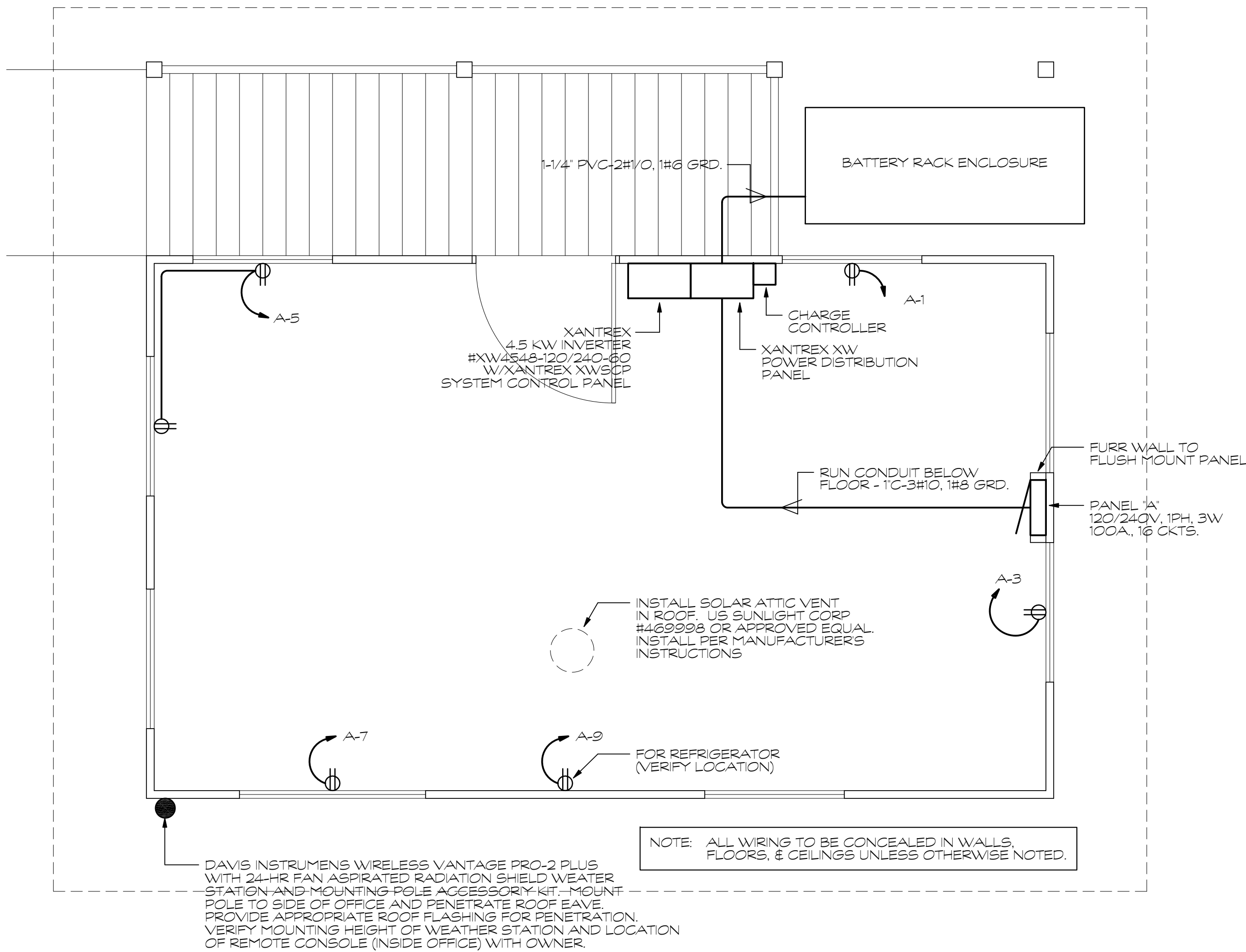
HANA, MAUI, HAWAII
LANAI CITY, LANAI, HAWAII

REVISIONS:

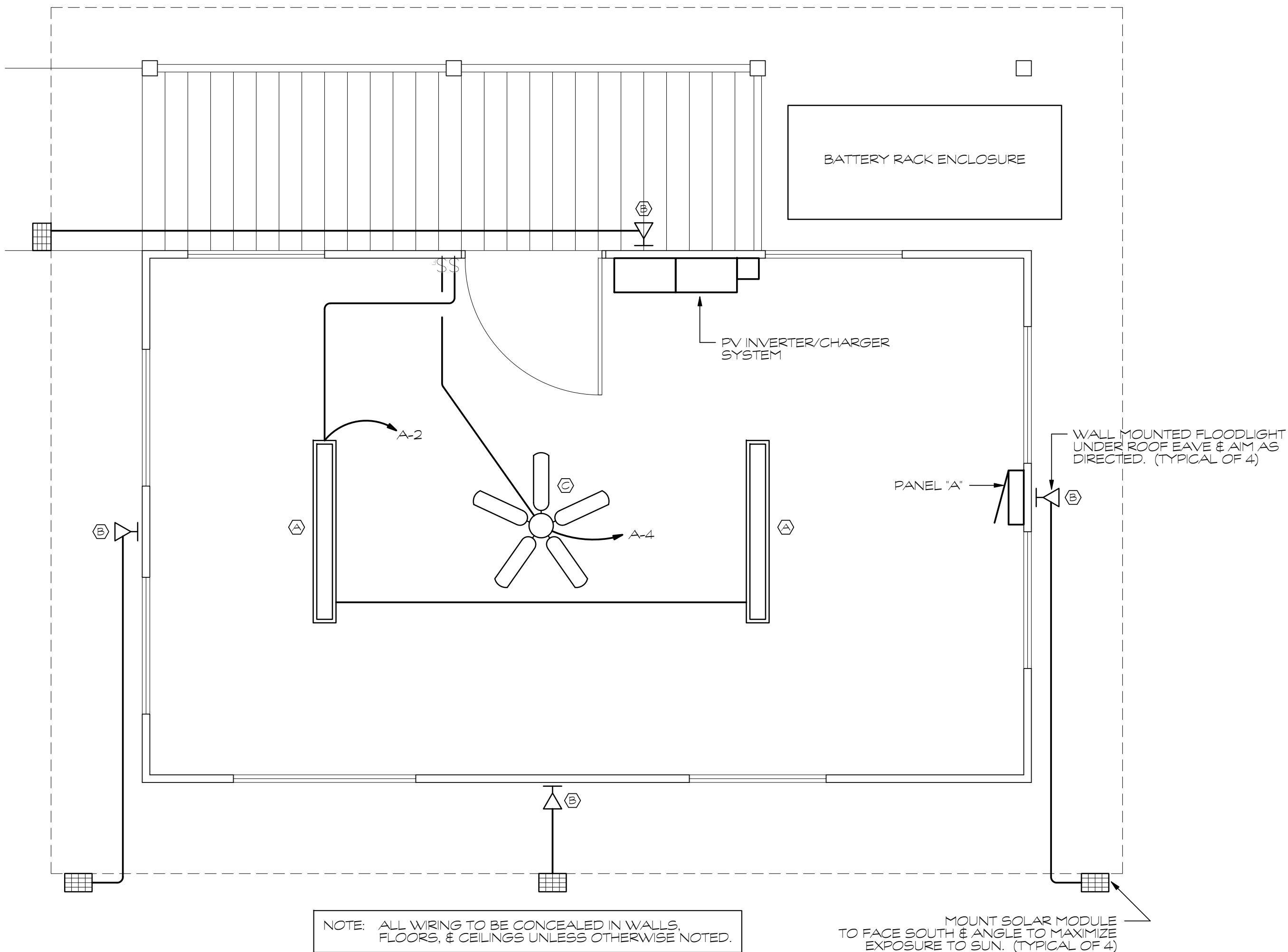
SHEET NO.

E1

DRAWING DATE: 8/1/2011



HANA OFFICE ELECTRICAL POWER PLAN
SCALE: 1/2" = 1'-0"



HANA OFFICE ELECTRICAL LIGHTING PLAN
SCALE: 1/2" = 1'-0"

COMPUTER NOTE

AS A REQUIREMENT OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE (2) TWO LAPTOP COMPUTERS (ONE FOR EACH SITE). BELOW ARE THE SPECIFICATION FOR THE LAPTOP COMPUTERS:

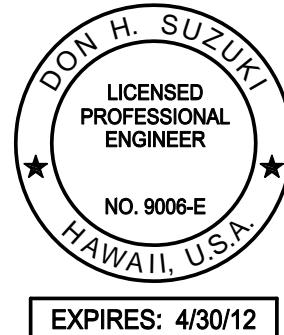
Dell Latitude E6420
Processor: Intel Core i5-2520M (2.50GHz, 3M cache) with Turbo Boost Technology 2.0
Operating System: Genuine Windows 7 Professional, SP1, No media (64-bit) English
Hardware Support Services: 5 year ProSupport with 5 year NBD Limited Onsite Service after Remote Diagnosis
System Recovery: Resource DVD (drivers), Recovery Media for Cyberlink Power DVD & Roxio Starter, DVD PlayBurn, Recovery Media for Genuine Windows 7 Professional, SP1, 64-bit, Multiple Language, Manager for Windows 7, SP1, Multiple Language
Memory: 4.0 GB, DDR3-1333MHz SDRAM, 2 DIMMS
Primary Storage: 250 GB 5400rpm Hard Drive
Primary Battery: 3 Year Warranty 9-cell (87WH) Primary Lithium Ion Battery
Primary Optical: 8X DVD+RW w/Roxio and Cyberlink Power DVD, no media.
Wireless LAN (802.11): Intel Centrino Advanced-N 6205 802.11a/b/g/n Half Mini Card
Camera/Microphone: Light Sensitive Webcam and Noise Cancelling Digital Array Mic
LCD: 14" HD (1366x768) Anti-Glare LED-backlit
Internal Keyboard: Internal English Dual Pointing Keyboard
Graphics: Intel HD Graphics 3000
Energy Star/EPEAT Gold: Energy Star 5.0 Enabled/EPEAT Gold
Mobile Broadband: Dell Wireless DW5630 Multi-mode HSPA-EVDO Mini Card (Gobi 3000) - Verizon
AC Adapter: 90W A/C Adapter (3-pin)
Carrying Case: Nylon Backpack - Fits laptops with Screen Sizes Up to 17"
Complete Care: 5 year Accidental Damage Service
Extended Battery Service: 2 Years Extended Battery Service for Years 2 and 3 of System Life

PANEL SCHEDULE: PANEL "A"											
Voltage: 120/240V			Phase: 1		Wire: 3		Bus Amps: 100A		No. Ckts: 16		
Mounting: FLUSH			NEMA Config: 1		Breaker Type:		Plug In - 10,000 AIC Minimum				
Ckt	Description	Ph A	Ph B	Brkr	Wire	Ckt	Description	Ph A	Ph B	Brkr	Wire
1	R-OFFICE	0.2		1P20	12	2	L-LIGHTS	0.2		1P20	12
3		0.2				4	CEILING FAN		0.1	1P20	12
5		0.4				6					
7			0.2			8					
9	R-REFER	0.7				10					
11	SPARE					12					
13						14					
15						16					

SYMBOLS LIST	
	BRANCH CIRCUITS CONCEALED IN CEILING OR WALLS, 2 CONDUCTORS WITH CODE SIZE GROUND UNLESS NOTED OTHERWISE. NUMBER NEXT TO LINE INDICATES SIZE OF CONDUCTORS WHEN OTHER THAN #12.
	DUPLEX RECEPTACLE, 120V, 20A. +15" UNLESS NOTED.
	SINGLE POLE SWITCH, 120V, 20A. +48" UNLESS NOTED.
	FAN SWITCH, 120V, 20A. +48" UNLESS NOTED.
	PANELBOARD.
	8' FLUORESCENT LUMINAIRE. SEE LUMINAIRE SCHEDULE.
	FLOODLIGHT. SEE LUMINAIRE SCHEDULE.
	DENOTES GROUND FAULT CURRENT INTERRUPTER.
	DENOTES WEATHER-PROOF.

LUMINAIRE SCHEDULE		
	DAYBRITE HWN232-UNV-1/2-EB/OIS OR APPROVED EQUAL	4' 2-LAMP, SURFACE MOUNTED FLUORESCENT WRAP-AROUND LUMINAIRE WITH (2) F32T8 LAMPS (3500K), ACRYLIC LENS, AND ELECTRONIC BALLAST.
	XEPA TECHNOLOGIES XP645D OR APPROVED EQUAL	SOLAR POWERED L.E.D. WALL MOUNTED FLOOD LIGHT WITH INTEGRAL PHOTOCELL, MOTION DETECTOR, AND BATTERY. PHOTOVOLTAIC MODULE REMOTE MOUNTED.
	REGENCY MX2-AW OR APPROVED EQUAL	52" DIAMETER CEILING FAN W/HUGGER MOUNTING.

- GENERAL NOTES**
- ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE COUNTY OF MAUI, THE CURRENT EDITIONS OF THE NATIONAL ELECTRICAL CODE, AND LIFE SAFETY CODE, AND THE AMERICAN ELECTRICIANS HANDBOOK (BY CROFT), AND APPLICABLE INSTRUCTIONS OF MANUFACTURERS OF EQUIPMENT AND MATERIAL SUPPLIED FOR THIS PROJECT.
 - ALL MATERIALS TO BE NEW AND BE LISTED BY UNDERWRITERS LABORATORIES AS CONFORMING TO ITS STANDARDS WHERE SUCH STANDARDS EXIST.
 - INSTALLATION TO BE COMPLETE IN EVERY DETAIL AND READY FOR USE. ANY ITEM SUPPLIED BY THE CONTRACTOR DEVELOPING DEFECTS WITHIN ONE (1) YEAR OF FINAL ACCEPTANCE BY OWNER, EXCEPT LAMPS, TO BE REPLACED BY MATERIALS, APPARATUS OR PARTS INCLUDING INSTALLATION LABOR TO MAKE THE DEFECTIVE PORTION CONFORM TO THE TRUE INTENT AND MEANING OF THE DRAWINGS AND SPECIFICATIONS, AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR TO ALSO WARRANTY THEIR WORKMANSHIP FOR THE SAME ONE (1) YEAR PERIOD TO BE FREE OF DEFECTS.
 - THE CIRCUIT ROUTING AND LAYOUT ARE TYPICAL ONLY AND MAY BE VARIED IN A LOGICAL ORDER. PREPARE A RECORD DRAWING REFLECTING ANY DEVIATIONS TO TURN OVER TO THE ENGINEER AT THE COMPLETION OF THE WORK. ANY DEVICE MAY BE RELOCATED WITHIN 10 FEET BEFORE INSTALLATION AT THE DIRECTION OF THE ARCHITECT/ENGINEER WITHOUT ADDITIONAL COST TO THE OWNER.
 - ALL WORK TO BE PERFORMED IN A NEATLY EXECUTED AND WORKMANLIKE MANNER.
 - ANY DEVIATIONS FROM THE PLANS AND SPECIFICATIONS TO BE REFERRED TO THE ENGINEER PRIOR TO IMPLEMENTATION FOR APPROVAL.
 - CONDUCTORS SHALL BE TYPE THHN/THWN COPPER UNLESS NOTED ON PLANS. MINIMUM POWER CONDUCTOR SIZE TO BE #12 AWG. CONDUCTORS FOR PV ARRAY SHALL BE TYPE USE-2, PV OR APPROVED EQUAL.
 - VERIFY EQUIPMENT LOCATION, MOUNTING HEIGHT, AND ELECTRICAL REQUIREMENT/CONNECTION WITH OWNER OR EQUIPMENT SUPPLIER PRIOR TO INSTALLATION. CONTRACTOR TO MAKE ADJUSTMENTS TO MEET REQUIREMENT OF ACTUAL EQUIPMENT INSTALLED. ALL CHANGES TO COMPLY WITH ALL APPLICABLE COUNTY CODES, NATIONAL ELECTRICAL CODE, AND LIFE SAFETY CODES. NOTE CHANGES ON "AS-BUILT" DRAWING SET.
 - ALL WIRING SHALL BE CONCEALED IN WALLS, CEILINGS, FLOORS, AND FURRED SPACES UNLESS OTHERWISE NOTED. ALL WIRING TO BE INSTALLED IN CONDUIT OR TYPE "NMC" WHERE ALLOWED BY CODE. USE EMT WITH COMPRESSION CONNECTORS FOR ALL EXPOSED INDOOR LOCATIONS. USE SCHEDULE 40 PVC WITH EXPANSION FITTINGS FOR ALL EXTERIOR EXPOSED CONDUIT RUNS.
 - VERIFY AND CHECK ALL DIMENSIONS AT JOB PRIOR TO PROCEEDING WITH WORK.
 - VERIFY EXISTING ELECTRICAL SYSTEM AND SITE WORKING CONDITIONS PRIOR TO SUBMITTING BID OR PROPOSAL.
 - TORQUE ELECTRICAL CONNECTIONS PER MANUFACTURERS RECOMMENDED SPECIFICATIONS.
 - BALANCE ELECTRICAL LOAD AT PANEL.
 - CONTRACTOR TO VERIFY THE SUITABLE REUSE OF EXISTING ELECTRICAL WIRING.
 - PROVIDE EQUIPMENT GROUNDING AS REQUIRED BY CODE.
 - WIRING DEVICES SHALL BE SPECIFICATION GRADE. GROUNDING TYPE, COLOR TO BE SPECIFIED BY ARCHITECT. RECEPTACLES TO HAVE NEMA CONFIGURATION TO MATCH CORD CAP ON EQUIPMENT SUPPLIED. SWITCHES TO BE ROCKER TYPE.
 - PROVIDE REQUIRED LABELING OF PV AND ELECTRICAL SYSTEM AS REQUIRED BY NEC.



EXPIRES: 4/30/12
This work was prepared by me or under my supervision and construction of this project will be under my observation.

JOB NO. DATE:
10-199 12-08-10
DRAWN BY: DESIGNED BY:
K.N. D.S./L.M.

**PHOTOVOLTAIC SYSTEMS
AT HANA LANDFILL AND
LANAI LANDFILL**

ELECTRICAL PLANS FOR

REVISIONS:

SHEET NO.

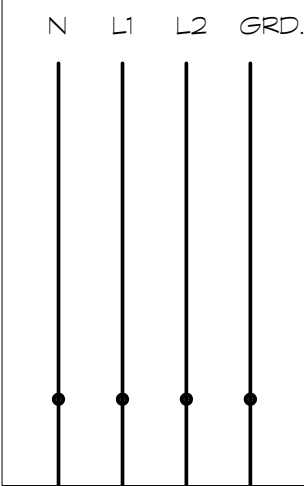
E2

DRAWING DATE: 8/7/2011

TMK: (2) 1-3-006; 012
TMK: (2) 4-9-002; 001 (FOR)
HANA, MAUI, HAWAII
LANAI CITY, LANAI, HAWAII

ELECTRICAL DATA				
MANUFACTURER	MODULE DATA	STRING DATA	INVERTER DATA	SYSTEM TOTAL
SHARP #NU-U24DF1			XANTREX	
CELL TYPE/RATING	MONOCRYSTALLINE		XW4548-120/240-60	1 INVERTERS
NO. MODULES AND CONNECTIONS		3 MODULES/STRING	8 STRINGS/INVERTER	24 MODULES
OPEN CIRCUIT VOLTAGE (VOC)	37.40 VDC	112.2 VDC	112.2 VDC	112.2 VDC
MAXIMUM POWER VOLTAGE (VPM)	30.10 VDC	90.3 VDC	90.3 VDC	90.3 VDC
SHORT CIRCUIT CURRENT (ISC)	8.65 ADC	8.65 ADC	69.2 ADC	69.2 ADC
MAXIMUM POWER CURRENT (IPM)	7.98 ADC	7.98 ADC	63.84 ADC	63.84 ADC
MAXIMUM POWER (PMAX)	240 W	720 W	5760 W	5760 W
CELL EFFICIENCY	16.1%			
MODULE EFFICIENCY	14.7%			
PTC RATING (W2)				
MAXIMUM SYSTEM VOLTAGE	600 VDC			
SERIES FUSE RATING	15A			
TYPE OF OUTPUT TERMINAL	MC4 CONNECTOR			

NEW PANEL 'A'
120/240V, 1PH, 3W,
100A, 12 CKTS.

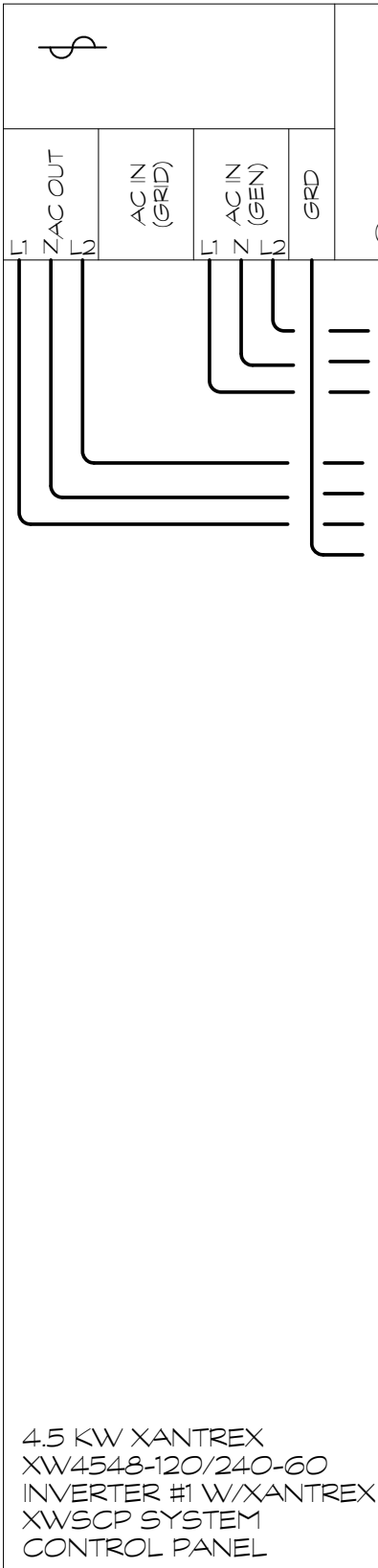


NEW T EMT-3#10, 1#8 GRD.

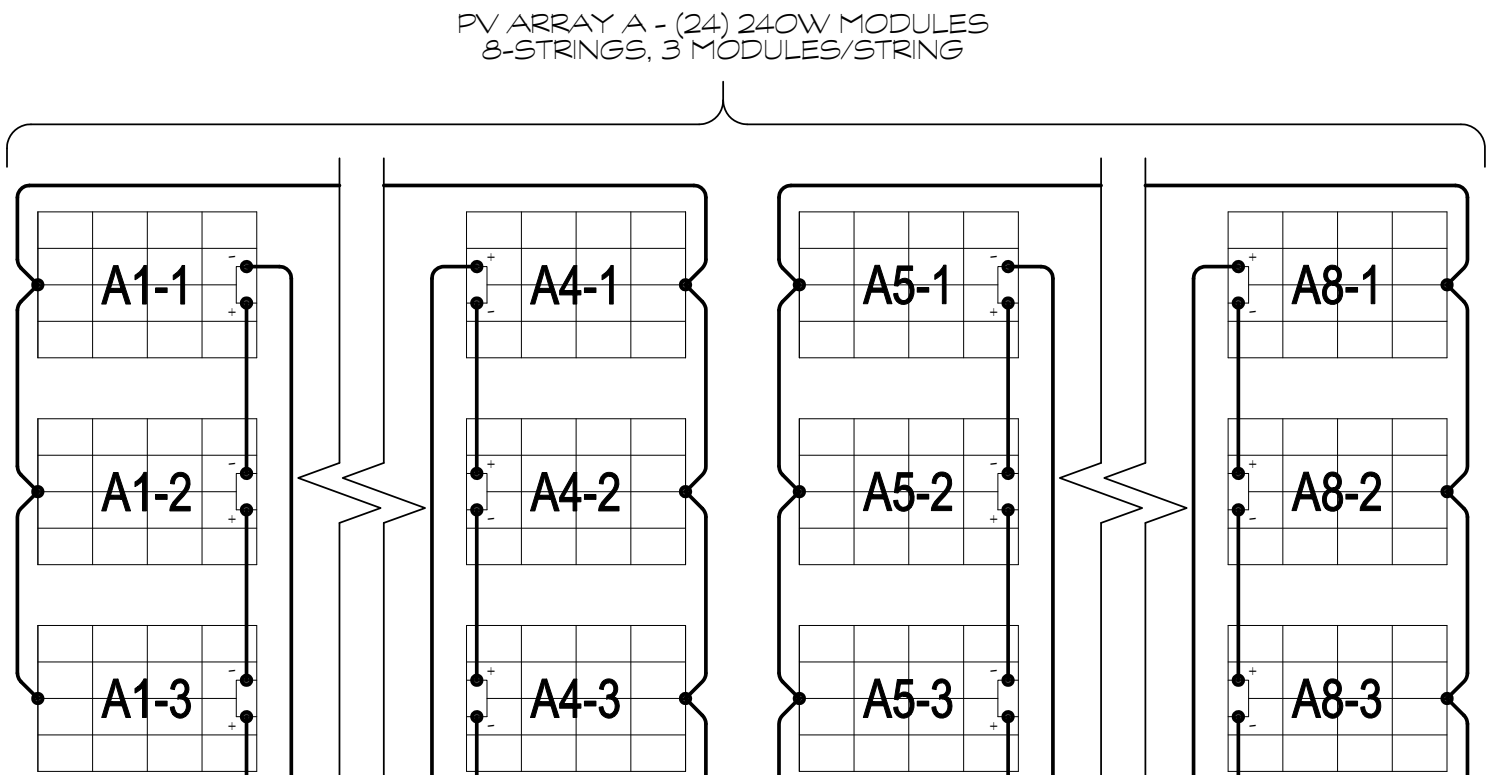
NEW T EMT-3#10 W/GRD, TYPE 'SO' CORD.

3#10 W/GRD, TYPE 'SO' CORD.

GENERATOR PLUG
NEMA L14-30P



NEW XANTREX
XW POWER DISTRIBUTION
PANEL #1



NEW #10 AWG TYPE USE-2,
SUNLIGHT RESISTANT WIRING
1 = 1sc X 1.56 = 13.49A

NEW COMBINER BOX
(4 CKT. MINIMUM)
NEMA-4X 3/16 S.S.

NEW COMBINER BOX
(4 CKT. MINIMUM)
NEMA-4X 3/16 S.S.

1C-2#8, 1#8 GRD.

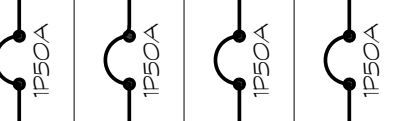
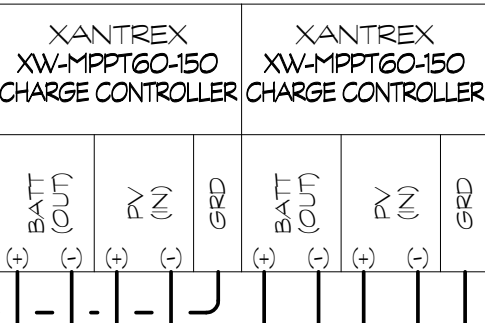
1C-2#8, 1#8 GRD.

1#8 B.C.

3/4" PVC-1#8 B.C.

3/4" PVC - 1#6 B.C. GRD.

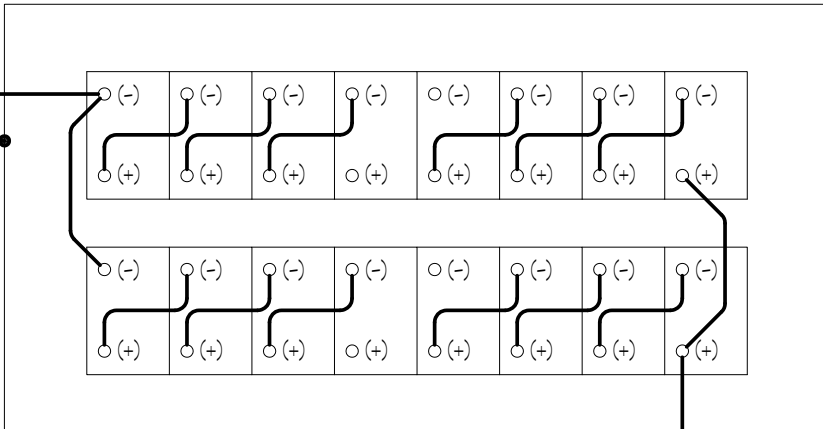
3/4" X 10'-0" GRD. ROD.



(-) DCV BUS

DC DISC. SW.

(16) TROJAN BATTERIES: 110S-RE DEEP CYCLE
LEAD ACID BATTERY (6V, 250AH EACH) OR APPROVED EQUAL.
INSTALL IN CUSTOM 172"X30"X48" (MINIMUM), NEMA-3R (3/16
S.S.) ENCLOSURE WITH BATTERY RACKS.



2#1/0, 1#6 GRD.

NOTES:

- ENCLOSURE TO BE RATED NEMA-3R (3/16 STAINLESS STEEL).
- ENCLOSURE TO BE SIZED TO FIT BATTERY RACK & HAVE SUFFICIENT SPACE FOR BATTERY MAINTENANCE AND/OR REMOVAL.
- PROVIDE 3 POINT LATCH OR EQUIVALENT POSITIVE LATCHING PANEL DOOR(S).
- ENCLOSURE SHALL HAVE LOCKING SYSTEM TO PREVENT UNAUTHORIZED ACCESS.
- ENCLOSURE SHALL HAVE SUFFICIENT VENTILATION TO DISSIPATE GASSES PRODUCED WHILE CHARGING BATTERIES.
- IN LIEU OF STAINLESS STEEL ENCLOSURE, CONTRACTOR MAY CONSTRUCT SIMILAR ENCLOSURE BASED ON WOOD CONSTRUCTION. DESIGN SHALL BE FURNISHED BY CONTRACTOR FOR APPROVAL. CONSTRUCTION OF ENCLOSURE MUST PROVIDE SIMILAR PROTECTION OF CONTENTS AS STAINLESS STEEL ENCLOSURE (STRENGTH, RESISTANCE TO VANDALISM/THEFT).

HANA LANDFILL THREE LINE DIAGRAM

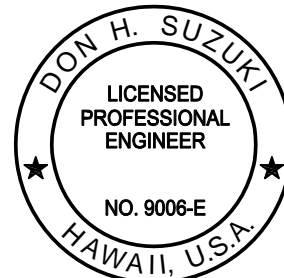
NOT TO SCALE

MORIKAWA & ASSOCIATES LLC

Electrical Engineering Services
431 Auli Drive
P.O. Box 880280
Pukalani, Hawaii 96788

Tel: (808) 572-1745
Fax: (808) 572-6323

Licensed in:
Alaska - Hawaii - Idaho -
Nevada - Oregon - Washington -
California - Michigan - Arizona - Guam



EXPIRES: 4/30/12

[Signature]
This work was prepared by me or under my
supervision and construction of this project
will be under my observation.

JOB NO. 10-199 DATE: 12-08-10

DRAWN BY: K.N. DESIGNED BY: D.S./L.M.

PHOTOVOLTAIC SYSTEMS AT HANA LANDFILL AND LANAI LANDFILL

ELECTRICAL PLANS FOR:

HANA, MAUI, HAWAII
LANAI CITY, LANAI, HAWAII

TMK: (2) 1-3-006, 012
TMK: (2) 4-9-002, 001 (FOR)

REVISIONS:

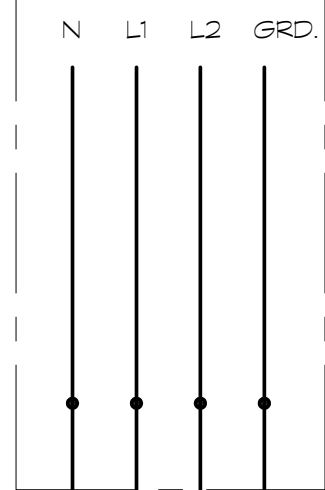
SHEET NO.

E3

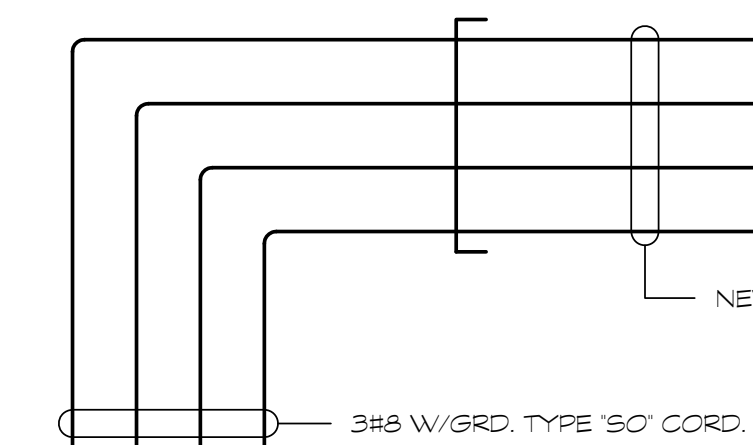
DRAWING DATE: 8/1/2011

ELECTRICAL DATA				
MODULE DATA		STRING DATA	INVERTER DATA	SYSTEM TOTAL
MANUFACTURER	SHARP #NU-U240F1			
CELL TYPE/RATING	MONOCRYSTALLINE			
NO. MODULES AND CONNECTIONS		3 MODULES/STRING	12 STRINGS/INVERTER	36 MODULES
OPEN CIRCUIT VOLTAGE (VOC)		37.40 VDC	112.2 VDC	112.2 VDC
MAXIMUM POWER VOLTAGE (VPM)		30.10 VDC	90.3 VDC	90.3 VDC
SHORT CIRCUIT CURRENT (ISC)		8.65 ADC	103.8 ADC	103.8 ADC
MAXIMUM POWER CURRENT (IPM)		7.98 ADC	95.76 ADC	95.76 ADC
MAXIMUM POWER (PMAX)		240 W	8640 W	8640 W
CELL EFFICIENCY		16.1%		
MODULE EFFICIENCY		14.7%		
PTC RATING (W2)				
MAXIMUM SYSTEM VOLTAGE		600 VDC		
SERIES FUSE RATING		15A		
TYPE OF OUTPUT TERMINAL		MC4 CONNECTOR		

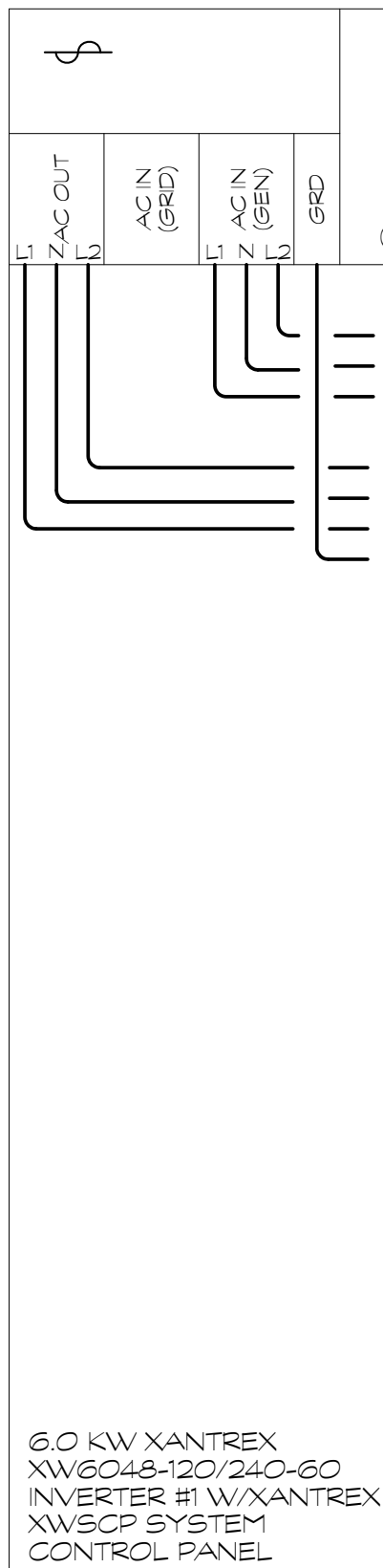
EXIST. PANEL 'B'
120/240V, 1PH, 3W,
100A, 8 CKTS.



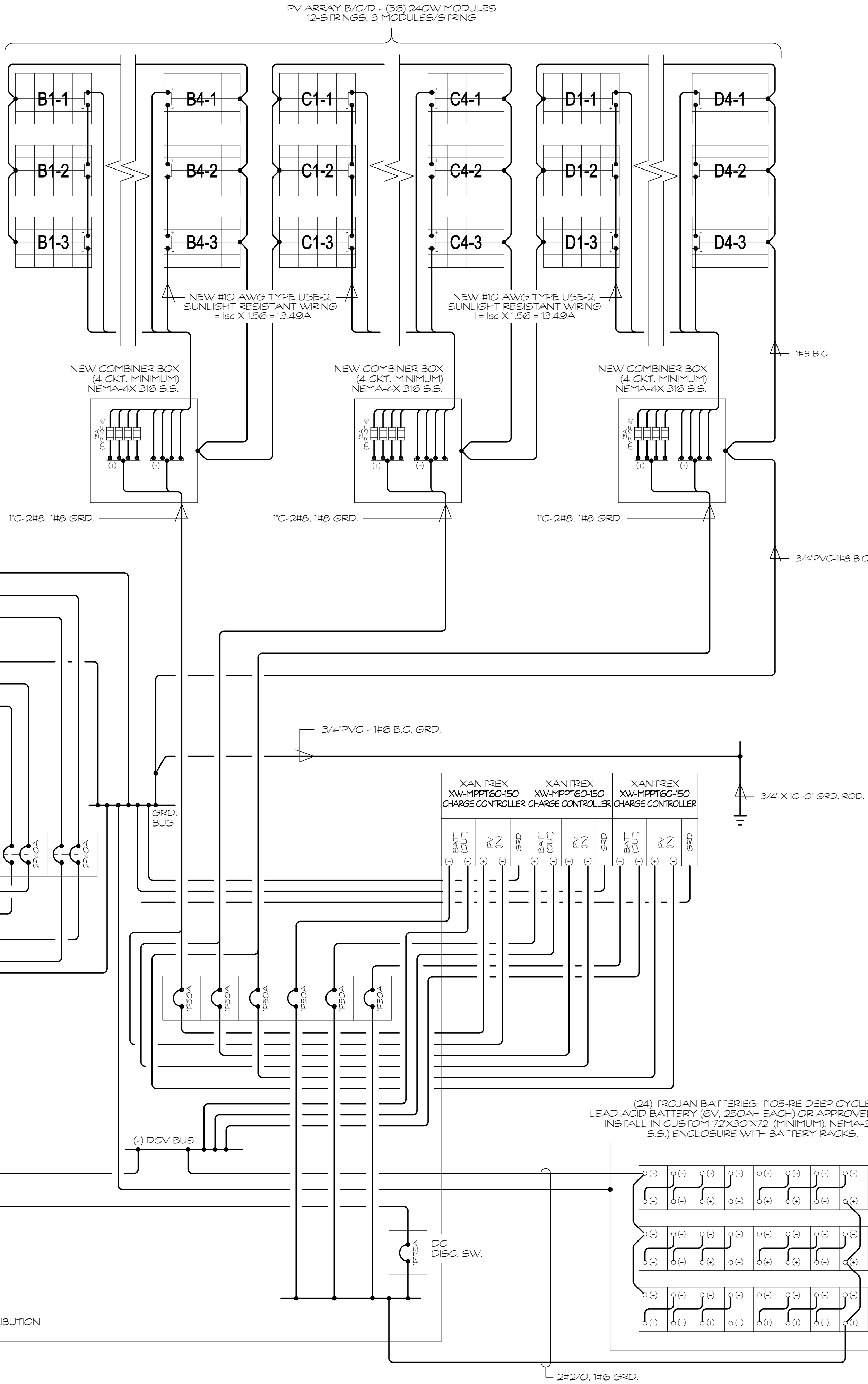
NEW T EMT-3#8, 1#8 GRD.



GENERATOR PLUG
NEMA L14-50P



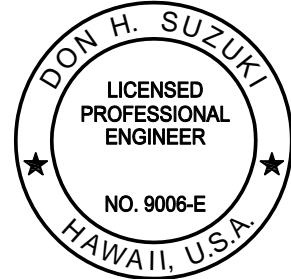
NEW XANTREX
XW POWER DISTRIBUTION
PANEL #1



(24) TROJAN BATTERIES: 1105-RE DEEP CYCLE
LEAD ACID BATTERY (6V, 250AH EACH) OR APPROVED EQUAL
INSTALL IN CUSTOM 72X36X72 (MINIMUM), NEMA-3R (3/16
S.S.) ENCLOSURE WITH BATTERY RACKS.

- NOTES:
- ENCLOSURE TO BE RATED NEMA-3R (3/16 STAINLESS STEEL).
 - ENCLOSURE TO BE SIZED TO FIT BATTERY RACK & HAVE SUFFICIENT SPACE FOR BATTERY MAINTENANCE AND/OR REMOVAL.
 - PROVIDE 3 POINT LATCH OR EQUIVALENT POSITIVE LATCHING PANEL DOOR(S).
 - ENCLOSURE SHALL HAVE LOCKING SYSTEM TO PREVENT UNAUTHORIZED ACCESS.
 - ENCLOSURE SHALL HAVE SUFFICIENT VENTILATION TO DISSIPATE GASSES PRODUCED WHILE CHARGING BATTERIES.
 - IN LIEU OF STAINLESS STEEL ENCLOSURE, CONTRACTOR MAY CONSTRUCT SIMILAR ENCLOSURE BASED ON WOOD CONSTRUCTION. DESIGN SHALL BE FURNISHED BY CONTRACTOR FOR APPROVAL. CONSTRUCTION OF ENCLOSURE MUST PROVIDE SIMILAR PROTECTION OF CONTENTS AS STAINLESS STEEL ENCLOSURE (STRENGTH, RESISTANCE TO VANDALISM/THEFT).

LANAI LANDFILL THREE LINE DIAGRAM
NOT TO SCALE



EXPIRES: 4/30/12

This work was prepared by me or under my supervision and construction of this project will be under my observation.

JOB NO. 10-199 DATE: 12-08-10
DRAWN BY: K.N. DESIGNED BY: D.S./L.M.

ELECTRICAL PLANS FOR:
PHOTOVOLTAIC SYSTEMS
AT HANA LANDFILL AND
LANAI LANDFILL

TMK: (2) 1-3-006; 012
TMK: (2) 4-9-002; 001 (POR)

HANA, MAUI, HAWAII
LANAI CITY, LANAI, HAWAII

REVISIONS:

SHEET NO.