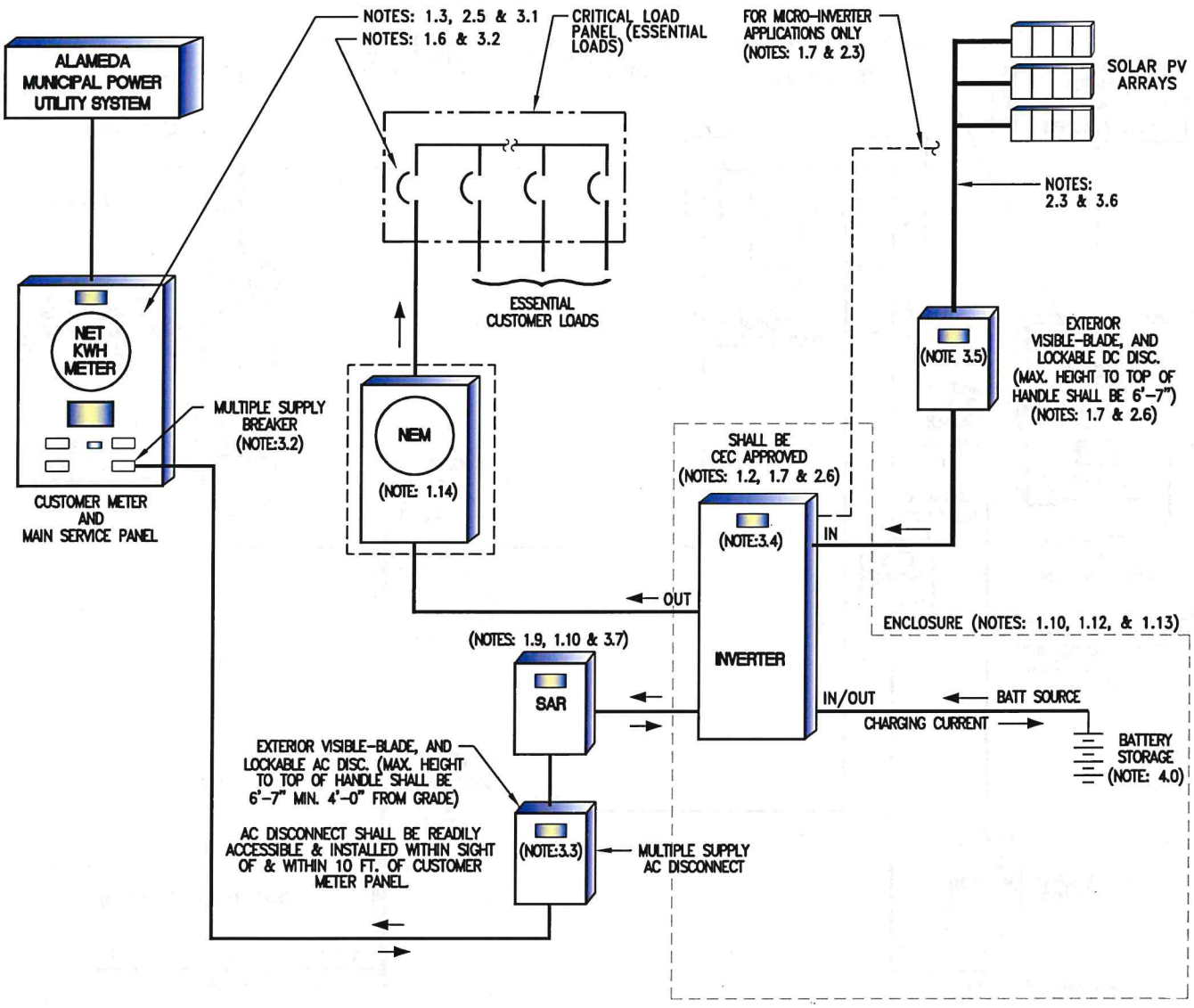

FIGURE 1
BLOCK DIAGRAM–SOLAR PV INSTALLATION
WITH BATTERY BACKUP SYSTEM

REV	DESCRIPTION	BY	DATE
0	NEW DRAWING	AA	04/03/18
1	ADDED NOTES 2.8, 4.1, 4.4 & 4.5	DH	06/14/18
2	REVISED STORAGE SYSTEMS INTERCONNECTION FOR SOLAR AGREEMENT	VT	07/16/18

ALAMEDA MUNICIPAL POWER
A Department of the City of Alameda
2000 GRAND STREET, P.O. BOX H
ALAMEDA, CALIFORNIA 94501

TITLE :
SINGLE METER
SOLAR PV & ENERGY STORAGE
SYSTEMS INSTALLATION ELIGIBLE
RENEWABLE GENERATION (UP TO 25KW)

DRAWN :	RB/ZVA	DATE: JULY 16, 2018	DWG. NO. : 1-L-617	REV. 2	
REVIEWED:					
APPROVED:	DMA		SCALE : NTS	SHT 1 OF 5	

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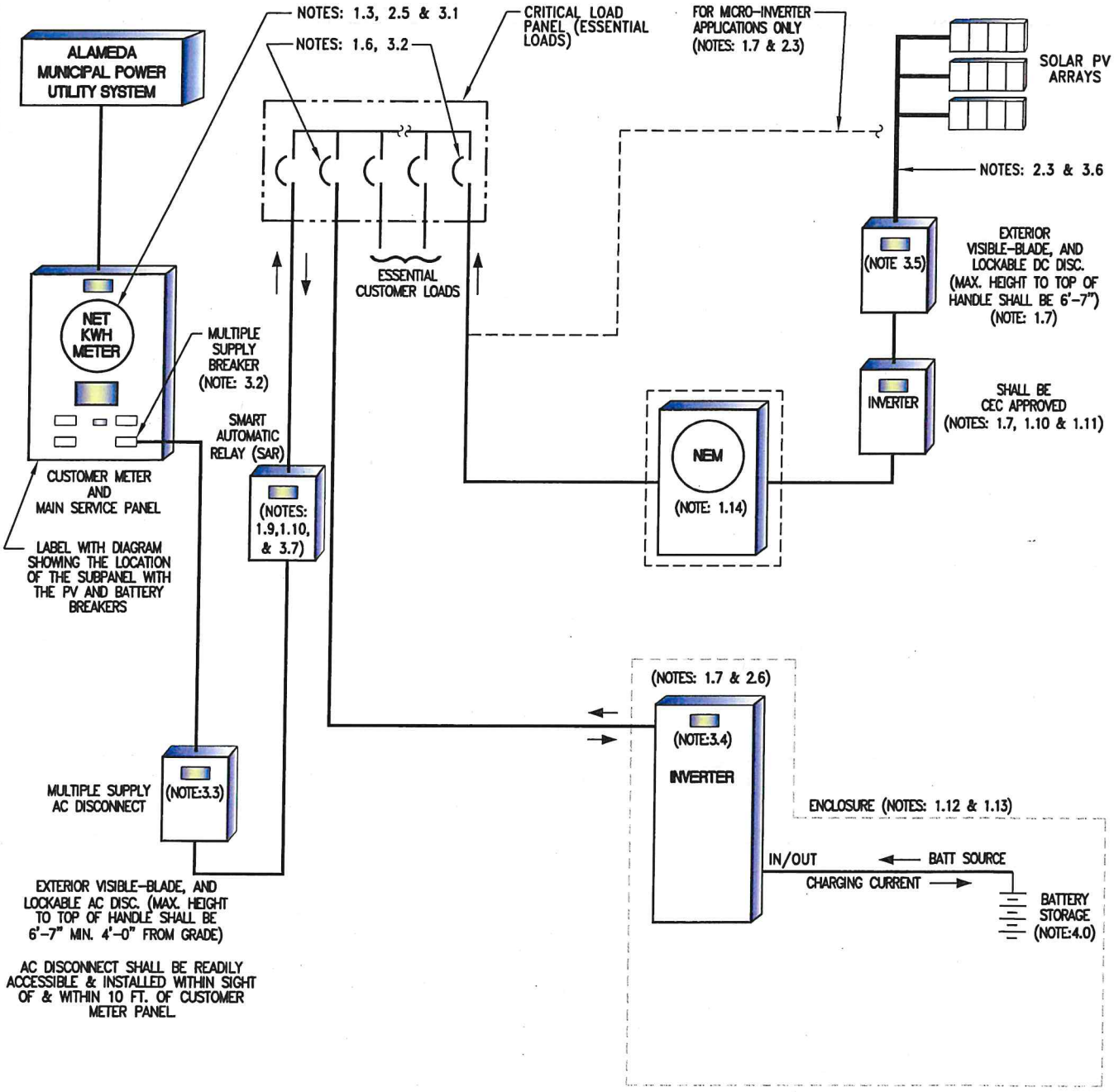

FIGURE 2
BLOCK DIAGRAM-SOLAR PV WITH BATTERY BACKUP SYSTEM (ALTERNATIVE INSTALLATION)

REV	DESCRIPTION	BY	DATE
0	NEW DRAWING	AA	04/03/18
1	ADDED NOTES 2.8, 4.1, 4.4 & 4.5	DH	06/14/18
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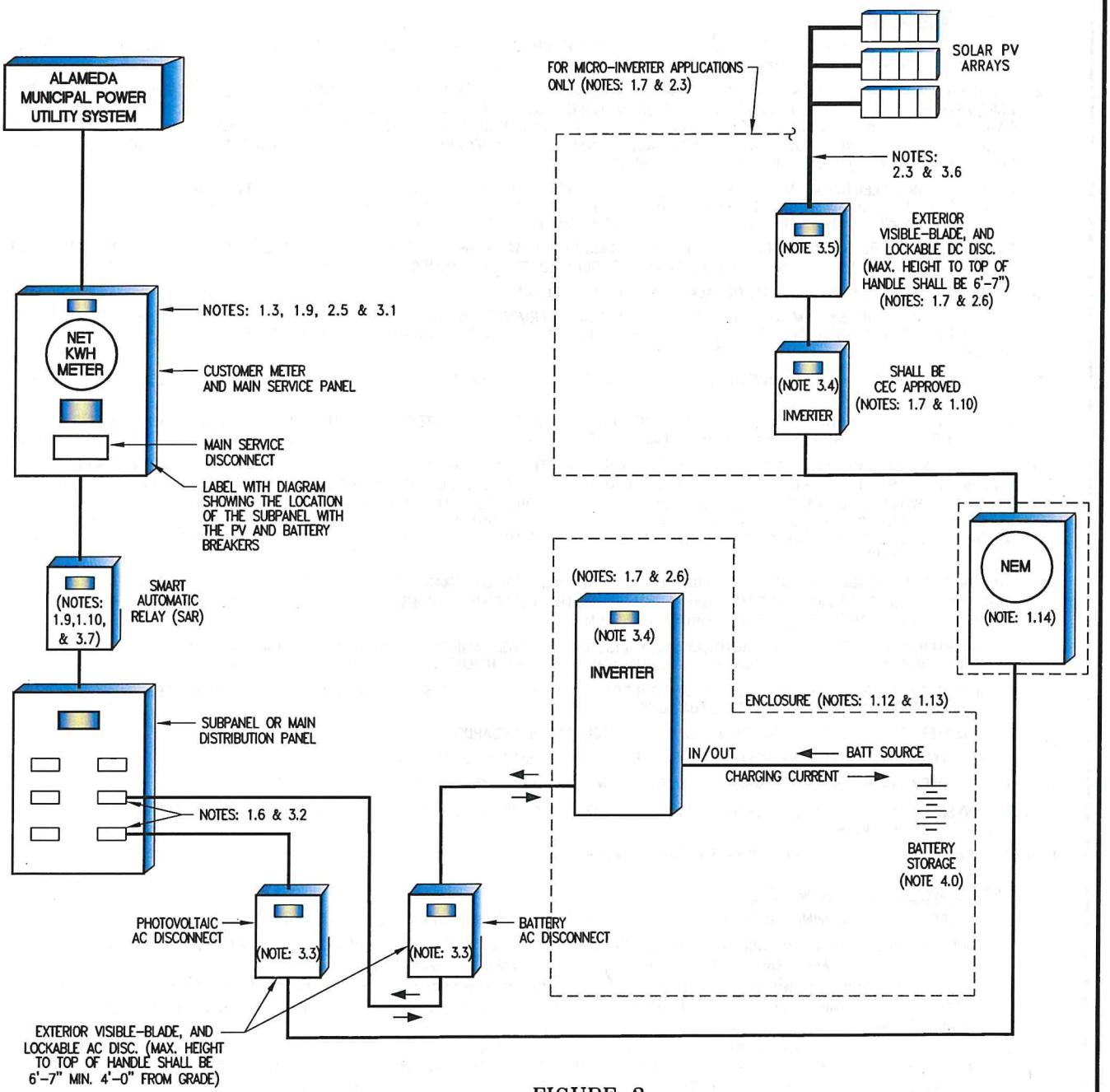

FIGURE 3
BLOCK DIAGRAM-SOLAR PV WITH BATTERY BACKUP SYSTEM (PARTIAL BACKUP)

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1.0. GENERAL NOTES:

1.1 ALL EQUIPMENT AND INSTALLATION SHALL MEET THE LATEST EDITION OF ALL APPLICABLE PROVISIONS OF THE FOLLOWING STANDARDS: UL STANDARD 1703, UL STANDARD 1973 AND UL STANDARD 1741 SA.

1.2 ALL EQUIPMENT AND INSTALLATION SHALL COMPLY WITH ALAMEDA MUNICIPAL POWER'S (AMP'S) INTERCONNECTION AND PURCHASE AGREEMENT FOR ELIGIBLE RENEWABLE GENERATION METERING, AMP'S RULES AND REGULATIONS, ALAMEDA ELECTRICAL CODE, CALIFORNIA ELECTRICAL CODE, NATIONAL ELECTRICAL CODE, CALIFORNIA STATE FIRE MARSHAL REGULATIONS, AND CALIFORNIA ENERGY COMMISSION'S (CEC) NEW SOLAR HOME PARTNERSHIP (NSHP) OR CALIFORNIA PUBLIC UTILITIES COMMISSION'S (CPUC) CALIFORNIA SOLAR INITIATIVE (CSI) LISTS OF ELIGIBLE EQUIPMENT.

1.3 IF THE EXISTING ELECTRICAL METER IS NOT CAPABLE OF MEASURING THE FLOW OF ELECTRICITY IN TWO DIRECTIONS, THE CUSTOMER SHALL BE RESPONSIBLE FOR ALL EXPENSES INVOLVED IN PURCHASING AND INSTALLING A NEW SERVICE METER PANEL TO ACCOMODATE A NET KWH METER THAT IS ABLE TO MEASURE ELECTRICITY FLOW IN TWO DIRECTIONS.

1.4 CUSTOMER SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE BATTERY BACK-UP AND THE SOLAR PHOTOVOLTAIC SYSTEM INSTALLATION INCLUDING ALL AMP'S COSTS THAT ARE RELATED TO THE PROJECT.

1.5 CUSTOMER SHALL OBTAIN ALL CITY OF ALAMEDA REQUIRED PERMITS.

1.6 SOLAR PHOTOVOLTAIC SYSTEM AND BATTERY SYSTEM SHALL TERMINATE ON THEIR OWN PROPERLY RATED AC BREAKER IN THE CRITICAL LOAD PANEL, IN THE MAIN SERVICE EQUIPMENT OR IN THE MAIN DISTRIBUTION PANEL EXCLUSIVELY FOR A WHOLE HOME BACKUP SYSTEM.

1.7 THE DC DISCONNECT AND THE INVERTER AT GRADE LEVEL WILL NOT BE REQUIRED IF MICRO-INVERTER TECHNOLOGY IS PROPOSED ON THE SOLAR PV MODULES.

1.8 AMP RESERVES THE RIGHT TO WITNESS THE FUNCTIONAL TESTS OF THE BATTERY BACK-UP AND THE SOLAR PHOTOVOLTAIC SYSTEM INSTALLATION. THE CUSTOMER SHALL NOTIFY AMP AT LEAST 5 DAYS PRIOR TO THE ESTABLISHED DATE OF INSPECTION OR TESTING.

1.9 AN EXTERNAL OR INTERNAL (INTEGRATED WITHIN THE INVERTER) AUTOMATIC TRANSFER SWITCH (ATS) OR MANUAL TRANSFER SWITCH SHALL BE INSTALLED BETWEEN THE CUSTOMER'S BACKUP SYSTEM AND ALAMEDA MUNICIPAL POWER REVENUE METER. TRANSFER SWITCH EQUIPMENT SHALL MEEL UL STANDARD 1008. ATS IS LOCKABLE IN THE "OFF" POSITION. IN LIEU OF AN ATS A SMART AUTOMATIC RELAY (SAR) AS SHOWN IN FIGURES 2 & 3 COMPLYING WITH UL 1741 OR UL 1008 MAY BE USED. THE AUTOMATIC RELAY MAYBE INSTALLED DOWN STREAM OF THE MAIN SERVICE METER AND DISCONNECT OR DOWNSTREAM OF THE MAIN SERVICE PANEL.

1.10 CUSTOMER SHALL SUBMIT DETAILED INFORMATION ON THE INVERTER OR SMART AUTOMATIC RELAY (SAR) TO VERIFY UL 1741 COMPLIANCE. THE CUSTOMER INVERTER/SAR SHALL HAVE THE FOLLOWING MINIMUM SPECIFICATIONS FOR PARALLEL OPERATION WHEN AUTHORIZED WITH AMP'S ELECTRIC DISTRIBUTION SYSTEM:

- INVERTER/SAR OUTPUT SHALL AUTOMATICALLY DISCONNECT FROM AMP'S UTILITY SOURCE UPON LOSS OF UTILITY VOLTAGE AND SHALL NOT BE RECONNECTED UNTIL THE UTILITY VOLTAGE HAS BEEN RESTORED.
- INVERTER/SAR SHALL AUTOMATICALLY DISCONNECT FROM AMP'S UTILITY SOURCE WITHIN THE TIMES INDICATED IN IEEE 1547 FOR VOLTAGE AND FREQUENCY FLUCTUATIONS.
- INVERTER OUTPUT DISTORTION SHALL MEET THE IEEE 519 STANDARDS.

1.11 THERE MAYBE A SEPARATE INVERTER EACH FOR THE BATTERY SYSTEM & THE PV SYSTEM.

1.12 THE INVERTER MAYBE IN THE COMBINED ENCLOSURE WITH THE BATTERY SYSTEM.

1.13 THE INVERTER IS A SMART CONVERTER CAPABLE OF TAKING AC OR DC INPUT & CONVERTING AC TO DC (RECTIFIER) & DC TO AC (INVERTER).

1.14 APPLICABLE ONLY ON EXISTING SOLAR PV SYSTEM WITH NEM.

2.0 INSTALLATION REQUIREMENTS:

2.1 THERE WILL BE A MINIMUM OF 36" WALKING SPACE AROUND THE PERIMETER OF SOLAR ARRAYS INSTALLED ON ROOFS.

2.2 GROUND MOUNTED SOLAR ARRAYS WILL BE ERECTED IN AREAS CLEAR OF COMBUSTIBLE VEGETATION. A MINIMUM VEGETATION CLEARANCE OR MOWED PERIMETER OF 10" SHALL BE MAINTAINED.

2.3 ALL SOLAR CONDUITS, INTERIOR OR EXTERIOR, SHALL BE PERMANENTLY LABELED WITH FADE RESISTANT MATERIAL AS SHOWN IN 3.6. THIS LABEL SHALL BE INSTALLED EVERY 20'. FOR VERTICAL CONDUIT, A MINIMUM OF ONE LABEL SHALL BE AFFIXED AT EYE LEVEL.

2.4 BATTERY STORAGE IN ENCLOSED ROOMS BUT NOT IN THE METER ROOM, IF THERE IS A METER ROOM. IF BATTERIES ARE CONTAINED WITHIN CABINET, THE CABINET CAN BE MOUNTED ON THE FLOOR. OTHERWISE BATTERIES SHOULD BE MOUNTED A MINIMUM OF 24" ABOVE FLOOR. A PERMANENT PLACARD IS TO BE POSTED.

2.5 PERMANENT PLACARD SHALL BE INSTALLED ON EXTERIOR OF MAIN ELECTRICAL PANEL OR SUBPANEL AS SHOWN IN 3.1.

2.6 ALL DISCONNECTS SHALL BE ACCESSIBLE TO AUTHORIZED REPRESENTATIVES OF THE CITY OF ALAMEDA. THE NET KWH METER, AC DISCONNECT, INVERTER DC DISCONNECT TRANSFER SWITCH AND AUTOMATIC RELAYS SHALL BE LOCATED TOGETHER WHEN POSSIBLE.

2.7 THE MAXIMUM LENGTH OR WIDTH OF THE SOLAR ARRAY SHALL NOT EXCEED 100 FEET.

2.8 NO INSTALLATION OF EQUIPMENT IS PERMITTED ABOVE THE GAS METER.

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LABELING REQUIREMENTS:

3.0 LABELS SHALL HAVE A RED BACKGROUND WITH REFLECTIVE WHITE LETTERING AND SHALL BE FADE-RESISTANT. LETTERS SHALL BE 1/4-INCH MINIMUM. ALL LABELS SHALL BE PERMANENTLY INSTALLED ON EQUIPMENT.

LABEL LOCATION AND LABELING:

3.1 ELECTRIC PANEL (NOTE 2.5)

CAUTION
MULTIPLE POWER SUPPLY

AND

CAUTION
SOLAR PV SYSTEM AND BATTERY BACK-UP INSTALLED. WHEN POWER DISCONNECTED, SOLAR PANELS AND BATTERY POWER WIRING MAY REMAIN ENERGIZED

3.2 ELECTRIC PANEL PV, BATTERY AND MULTIPLE SUPPLY BREAKERS. LETTERS MAY BE REDUCED TO 1/8-INCH MINIMUM IN HEIGHT AND INSTALLED IN THE MAIN ELECTRICAL PANEL, ADJACENT TO THE BREAKER.

PHOTOVOLTAIC BREAKER

BATTERY BREAKER

MULTIPLE SUPPLY BREAKER

3.3 AC DISCONNECT

PHOTOVOLTAIC AC DISCONNECT

BATTERY AC DISCONNECT

MULTIPLE SUPPLY AC DISCONNECT

3.4 INVERTER

PHOTOVOLTAIC INVERTER

BATTERY INVERTER

3.5 DC DISCONNECTS (NEAR INVERTER)

PHOTOVOLTAIC DC DISCONNECT

3.6 CONDUITS (NOTE 2.3)

CAUTION
SOLAR PV WIRING MAY REMAIN ENERGIZED AFTER DISCONNECTION DURING DAYLIGHT HOURS

3.7 TRANSFER SWITCH OR AUTOMATIC RELAY

TRANSFER SWITCH

SMART AUTOMATIC RELAY

4.0 REQUIREMENTS FOR BATTERY BACKUP SYSTEMS:

4.1 BE USED TO SERVE ESSENTIAL LOADS ON THE CUSTOMER'S PREMISES, ONLY. BOTH THE PV & THE BATTERY SYSTEM CAN SERVE THE ESSENTIAL LOADS.

4.2 ENGINEERING DRAWING MUST BE REVIEWED AND APPROVED BY AMP BEFORE CONSTRUCTION BEGINS. CUSTOMER SHALL PROVIDE COPIES OF THE ONE-LINE DIAGRAMS AND DOCUMENTATION DESCRIBING MODES OF OPERATION PRIOR TO START OF CONSTRUCTION. REVIEW BY AMP OF CUSTOMER'S SPECIFICATIONS SHALL NOT BE CONSTRUED AS CONFIRMING OR ENDORSING THE DESIGN, OR AS IMPLYING ANY WARRANTY OF SAFETY OR DURABILITY OF THE CUSTOMER FACILITY.

4.3 WHEN THE UTILITY GRID IS OFFLINE, THE BATTERY SYSTEM SHALL NOT BE ABLE TO EXPORT POWER BACK TO THE GRID. WHEN OPERATING IN PARALLEL TO THE GRID, THE BATTERY SYSTEM MAY ONLY BE INADVERTANTLY EXPORT POWER BACK TO THE GRID.

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