

--- = EQUIP. GROUNDING CONDUCTOR ——— = CIRCUIT CONDUCTOR —|— = FUSE —|— = CIRCUIT BREAKER (N) = NEW EQUIP. (E) = EXISTING EQUIP. L1 = LINE 1 (BLACK) L2 = LINE 2 (RED) N = NEUTRAL (WHITE) G = GROUND (GREEN) ⊕ = POSITIVE (RED) ⊖ = NEGATIVE (BLACK)

Array Configuration			
System: 14.56 kW stc, 11.40 kW AC			
Total PV Module Qty: 52			
Inverter I.D. #	Inv #1	Inv #2	
Inverter AC Power (kW):	6.00	4.00	
PV Power (kWstc):	8.40	6.16	
Inverter DC:AC Ratio	1.40	1.54	
Module Total Qty:	30	22	
String Qty:	2	2	
String Length:	17 & 13	11	
Max Open Circuit Voltage:	480	480	
Rated Maximum Power-Point Voltage:	380	380	
Short Circuit Current:	30.0	30.0	
Rated Maximum Power-Point Current:	22.1	16.2	

PV Module Specifications			
Model Number:	LG LG280S1C-G4		
Weight (lbs):	37.5		
Dimensions (in):	64.6 x 39.4 x 1.6		
Power @ STC (W):	280		
Voc (VDC):	38.8		
Vmp (VDC):	31.9	Voc Temp Coeff (%/°C):	-0.30
Isc (A):	9.33	Max Voltage (VDC):	1,000
Imp (A):	8.78	Module Quantity:	52

Inverter #1 Specifications			
Model Number:	SolarEdge SE6000H-US		
Power Rating (kW AC):	6.00		
Nominal AC Voltage (V):	240	(2/N/PE)	
Max Output Current (A):	25.0		
CEC Weighted Efficiency:	99.0%		
Maximum DC Voltage (V):	480		
Operating DC Voltage (V):	380	Inv. Quantity:	1

Inverter #2 Specifications			
Model Number:	SolarEdge SE3800H-US		
Power Rating (kW AC):	4.00		
Nominal AC Voltage (V):	240	(2/N/PE)	
Max Output Current (A):	16.0		
CEC Weighted Efficiency:	99.0%		
Maximum DC Voltage (V):	480		
Operating DC Voltage (V):	380	Inv. Quantity:	1

AC-Coupled Battery Specifications			
Model Number:	TESLA AC POWERWALL 2		
AC Energy:	13.5	kWh AC	
Power Rating:	5	kW AC	
Depth of Discharge:	100%		
Round Trip Efficiency:	89.00%		
Nominal AC Voltage:	240	Volts AC	
Max Output Current:	20.8	Amps	
Quantity:	3		

Power Optimizer Specifications			
Model Number:	SolarEdge P320		
Max Input Power (W):	320		
Max Input Voc (VDC):	48		
Max Input Isc (A):	11.0		
Output Current (A):	15		
Output Voltage (VDC):	60		
Min String Length:	8	Modules	
Max String Length:	25	Modules	
Max String Power (W):	5250		
Optimizer Quantity:	52		

120% Rule Calculation per NEC 705.12(D)(2)(3)			
Main Busbar Rating:	400	Amps	
Main Service Breaker Rating:	200	Amps	
PV Backfeeding Current:	51.25	Amps	
BUSBAR x 120% - MAIN BREAKER = MAX PV BREAKER			
480	-	200	= 280

AC System Summary			
PV Contribution			
NOMINAL SYSTEM VOLTAGE:	240	Volts AC	
MAX CURRENT PER 690.8(A):	41.0	Amps	
MAX CURRENT PER 690.8(B):	51	Amps	
AES Contribution			
NOMINAL SYSTEM VOLTAGE:	240	Volts AC	
MAX CURRENT PER 690.8(A):	62.4	Amps	
MAX CURRENT PER 690.8(B):	78	Amps	
Total Contribution			
NOMINAL SYSTEM VOLTAGE:	240	Volts AC	
MAX CURRENT PER 690.8(A):	103.4	Amps	
MAX CURRENT PER 690.8(B):	129	Amps	

PV System Maximum Voltage Calculation per NEC 690.7(A)			
Local Record Low Temp:	14 °C	Data Source:	HONOLULU INTL ARPT

Voc Temp Coefficient	25°C - Record Low Temp.	Voc	+ 1 = Correction Factor	Voc	Max # of Strings	Temperature	Corrected Open Circuit Voltage
0.31%/°C	x 11°C	+ 1 =	1.034	1.034	x 38.8	x 1	= 40.1 Volts DC

WIRE AND CONDUIT SCHEDULE												
TAG	CONDUIT SIZE	CONDUIT TYPE	PHASE CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			NEUTRAL CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			GROUND CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT			EST. DIST.
DC1	N/A	N/A	2/STRING	AWG #10		N/A	N/A	N/A	1	AWG #6	BARE CU	5
DC2	3/4"	PVC/EMT	6	AWG #10	THWN-2	N/A	N/A	N/A	1	AWG #8	THWN-2	50
AC1	3/4"	PVC/ EMT	2	AWG #8	THWN-2	1	AWG #8	THWN-2	1	AWG #8	THWN-2	5
AC2	3/4"	SCH80 PVC	2	AWG #10	THWN-2	1	AWG #10	THWN-2	1	AWG #8	THWN-2	5
AC3	1-1/2"	SCH80 PVC	2	AWG #10	THWN-2	1	AWG #10	THWN-2	1	AWG #6	THWN-2	5
AC4	1-1/4"	SCH80 PVC	2	AWG #10	THWN-2	1	AWG #10	THWN-2	1	AWG #6	THWN-2	20
AC5	2-1/2"	SCH80 PVC	2	AWG #3/0	THWN-2	1	AWG #3/0	THWN-2	1	AWG #6	THWN-2	15

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS				REQUIRED CONDUCTOR AMPACITY				AMPCITY CHECK #1	CONDUCTOR TEMPERATURE DERATING				CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION				AMPCITY CHECK #2	VOLTAGE DROP												
DC1	PV STRING	JUNCTION BOX	COPPER	90°C	AWG #10	55 Amps	15.0	x	1	=	15.0 Amps	x	1.25	=	18.8 Amps	18.8 Amps < 55.0 Amps	ROOFTOP, FREE AIR	32	-	N/A	47	0.82	N/A	1.00	55	x	0.82	x	1.00	=	45.1 Amps	15.0 Amps < 45.1 Amps	5 ft	0.02%
DC2	JUNCTION BOX	INVERTER	COPPER	75°C	AWG #10	35 Amps	15.0	x	1	=	15.0 Amps	x	1.25	=	18.8 Amps	18.8 Amps < 35.0 Amps	EXT. BLDG. WALL (+15°C)	32	1	N/A	47	0.82	6	0.80	40	x	0.82	x	0.80	=	26.3 Amps	15.0 Amps < 26.3 Amps	50 ft	0.51%

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS				REQUIRED CONDUCTOR AMPACITY				AMPCITY CHECK #1	CONDUCTOR TEMPERATURE DERATING				CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION				AMPCITY CHECK #2	VOLTAGE DROP										
AC1	INVERTER #1	GEN PANEL	COPPER	75°C	AWG #8	50 Amps	25.0	x	1	=	25.0 Amps	x	1.25	=	31.3 Amps	31.3 Amps < 50 Amps	INDOORS (+0°C)	32	32	0.96	2	1.00	75	x	0.96	x	1.00	=	72 Amps	25.0 Amps < 72.0 Amps	5 ft	0.05%
AC2	BATTERY BANK	GEN PANEL	COPPER	75°C	AWG #10	35 Amps	20.8	x	1	=	20.8 Amps	x	1.25	=	26.0 Amps	26.0 Amps < 35 Amps	INDOORS (+0°C)	32	32	0.96	2	1.00	40	x	0.96	x	1.00	=	38.4 Amps	20.8 Amps < 38.4 Amps	5 ft	0.11%
AC3	GEN PANEL	AC DISCONNECT	COPPER	75°C	AWG #1/0	150 Amps	(20.8 * 3) + 25+16	=	103.4 Amps	x	1.25	=	129.3 Amps	129.3 Amps < 150 Amps	INDOORS (+0°C)	32	32	0.96	2	1.00	170	x	0.96	x	1.00	=	163.2 Amps	103.4 Amps < 163.2 Amps	5 ft	0.05%		
AC4	AC DISCONNECT	BREAKOUT PANEL	COPPER	75°C	AWG #1/0	150 Amps	103.4	x	1	=	103.4 Amps	x	1.25	=	129.3 Amps	129.3 Amps < 150 Amps	EXT. BLDG. WALL (+15°C)	32	47	0.82	2	1.00	170	x	0.82	x	1.00	=	139.4 Amps	103.4 Amps < 139.4 Amps	20 ft	0.21%

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS				CONDUCTOR TEMPERATURE DERATING				CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION				AMPCITY CHECK	VOLTAGE DROP						
AC5	BREAKOUT PANEL	MAIN PANEL	COPPER	75°C	AWG #3/0	200 Amps	EXT. BLDG. WALL (+15°C)	32	47	0.82	2	1.00	225	x	0.82	x	1.00	=	184.5 Amps	200 Amps	175 Amps < 184.5 Amps	15 ft	0.19%

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS				CONDUCTOR TEMPERATURE DERATING				CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION				AMPCITY CHECK	VOLTAGE DROP						
AC5	BREAKOUT PANEL	MAIN PANEL	COPPER	75°C	AWG #3/0	200 Amps	EXT. BLDG. WALL (+15°C)	32	47	0.82	2	1.00	225	x	0.82	x	1.00	=	184.5 Amps	200 Amps	175 Amps < 184.5 Amps	15 ft	0.19%

Project: KAILUA, HI 96734

Project Details: 14.56 kWstc, 11.40 kW AC

REVISIONS		
DESCRIPTION	DATE	REV
ORIGINAL	07/26/2018	A

Sheet Title: **ELECTRICAL CALCULATIONS**

Sheet Number: **E1.1**

Sheet Size: **ANSI B - 17" x 11"**

DESIGN & DRAFTING BY: *Aarti Punase*
AARTI PUNASE

SepiSolar
POWER BY DESIGN

Reviewed & Approved by: **AD**

INITIAL: _____

