



## Submission # SUBDA0093522023

**Submission Date:**

08/30/2023

**No Objection Date:**

09/04/2023

**Submission Type:**

Design for No Objection

**Wireman**



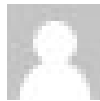
Jose Olivera

EL00621

+5016149876

oliverajose60.jao@gmail.com

**Owner/ Developer**



Richard Vaske

**Location**



3.5 North Wes of Ambergris Caye,  
San Pedro  
Belize, Belize



### Project Summary

SERVICE TYPE	AMPS	VOLTS	PHASE	CABLE SIZE/TYPE(L)	CABLE SIZE/TYPE(L1)	CABLE SIZE/TYPE(L2)	CABLE SIZE/TYPE(N)	CABLE SIZE/TYPE(G)	SQUARE FEET	KVA
Meter 1	100	240/120	Single	2 AWG	2 AWG		2 AWG	8 AWG	600	7.8

**Reviewer Signature:**

Ashton Ovado

**Approval Signature:**

Ernesto Gomez



**H. Submission Data Sheet for No Objection of Design**

<b>Designed by:</b> Jose Olivera	<b>Cat/Lic #:</b> EL00621	<b>Phone:</b> 614-9876
<b>Owner/developer:</b> Richard David Vaske	<b>Email:</b> -	<b>Phone:</b> -
<b>Service Type:</b> New: <input checked="" type="checkbox"/> Add to existing: <input type="checkbox"/> TCC: <input type="checkbox"/> Social TC: <input type="checkbox"/> Upgrade: <input type="checkbox"/>		
<b>Project Type:</b> Residential: <input checked="" type="checkbox"/> Commercial: <input type="checkbox"/> Industrial: <input type="checkbox"/> Other: <input type="checkbox"/>		
<b>Project location:</b> 3.5 North West of San Pedro Town, Ambergris		<b>District:</b> Belize
<b>Additional Notes:</b>		

**Project Summary:**

Service type	amps:	Volts:	Phase:	Cable size/type (L/N/G)			Square feet:	kVA:
Meter bank								
<b>OFF GRID PV SYSTEM</b>	<b>100</b>	<b>240/120</b>	<b>1</b>	<b>#2</b>	<b>#2</b>	<b>#8</b>	<b>600</b>	<b>7.8</b>
Meter 2								
Meter 3								
Meter 4								
Meter 5								
Meter 6								

*These designs and drawings are being submitted for project no objection only and any no objection hereof is not authorization for any physical work to be executed on the basis this design. I understand that I require further submission and approval to actually commence work.*

*Jose*

oliverajose60.jao@gmail.com

Signature of Licensed Wireman

e-mail address of Wireman

Below to be filled in by PUC

File No. \_\_\_\_\_



**PUBLIC UTILITIES  
COMMISSION  
BELIZE**

No objection \_\_\_\_\_

Returned for Corrections \_\_\_\_\_

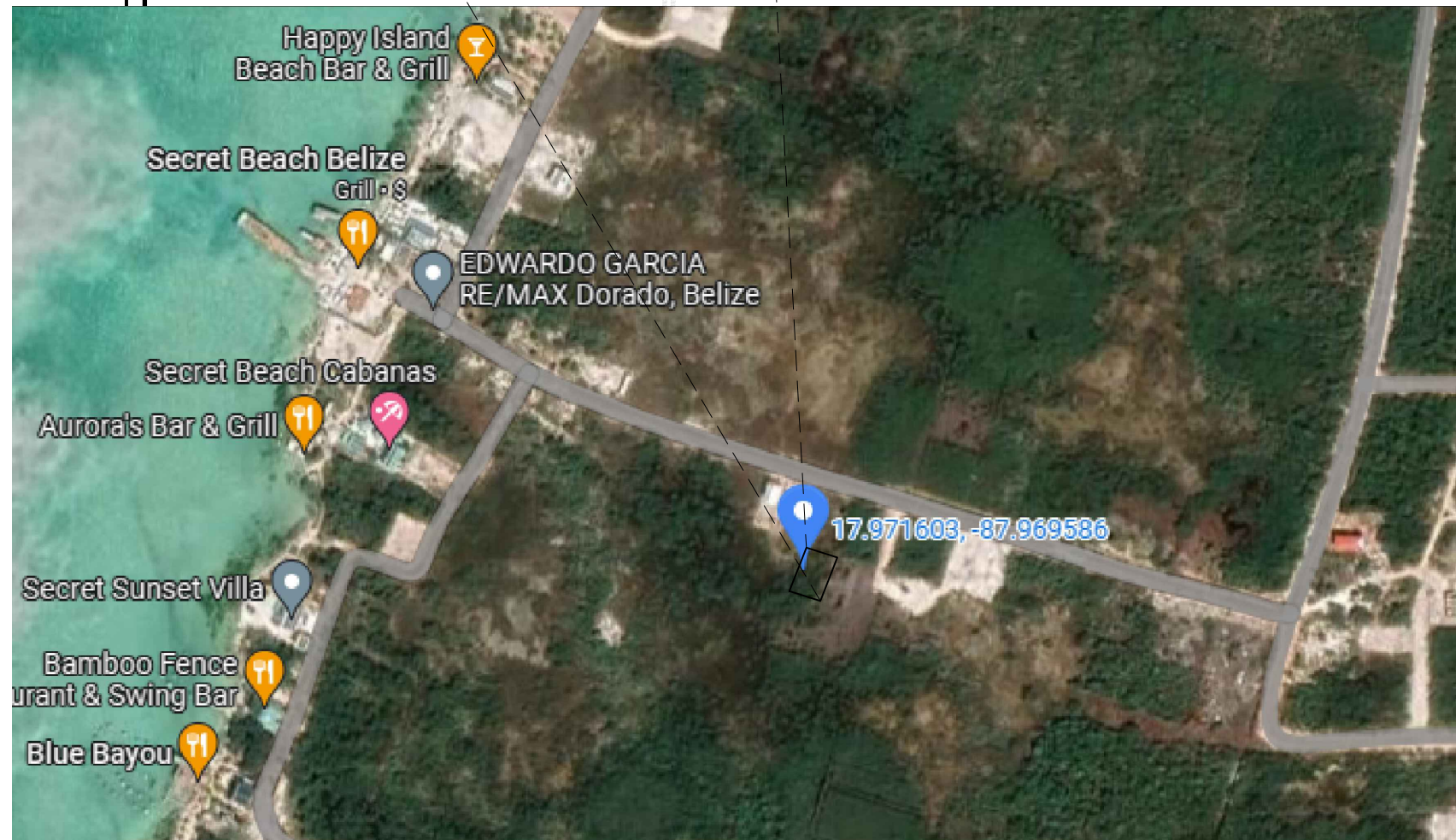


PROPOSED RESIDENCE  
 for MR. RICHARD DAVID VASKE  
 TO BE LOCATED AT  
 3.5 NORTH WEST - SECRET BEACH,  
 SAN PEDRO TOWN, AMBERGRIS CAYE  
 BELIZE DISTRICT, C.A  
 ELECTRICAL PLAN

REVIEWED BY:

SEPT. 04 2023

4 Sep 23



P.U.C. LICENSED WIREMEN, ONLY, SHALL ENGAGE IN THE INSTALLATION WORKS OF THIS ELECTRICAL PROJECT, IN ACCORDANCE WITH WIREMAN CATEGORY AND INSTALLATION LIMITS.

WIREMAN WILLING TO PERFORM THIS INSTALLATION SHALL BE RESPONSIBLE OF:

1. COORDINATING WITH CLIENT, FOR ANY CHANGES REQUIRED AND / OR REQUESTED.
2. SUBMITTING THE AS-BUILT DRAWINGS FOR FINAL NO OBJECTION.
3. SUBMITTING THE FILLED DECLARATION FORM AFTER COMPLETION OF INSTALLATION.
4. HANDING OVER OF THE FINAL AS-BUILT DRAWING TO THE CUSTOMER.



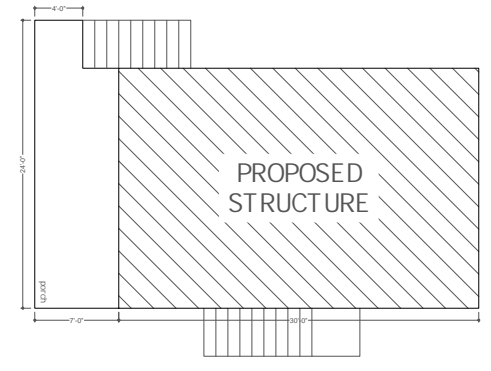
Project Name: Proposed Residence	
Client: Richard David Vaske	
Location: 3.5 North West San Pedro Town	
Project Type: Residential	
Drawn by: Jose Olivera	
Electrical Technician: JOSE OLIVERA +501-614-9876 EL00621	
Date: Aug. 16, 23	Page: CP
Scale: NTS	

ACCESS STREET

50'-0"

90'-0"

block 7  
Parcel # 8349,  
3.5 mile nw -  
secret beach



PROPOSED STRUCTURE



adj acent lot

adj acent lot

adj acent lot

ACCESS STREET

ACCESS STREET



**PUBLIC UTILITIES  
COMMISSION  
BELIZE**

Project Name:  
Proposed Residence

Client:  
Richard David Vaske

Location: 3.5 North West  
San Pedro Town

Project Type:  
Residential

Drawn by:  
Jose Olivera

Electrical Technician:  
JOSE OLIVERA  
+501-614-9876  
EL00521

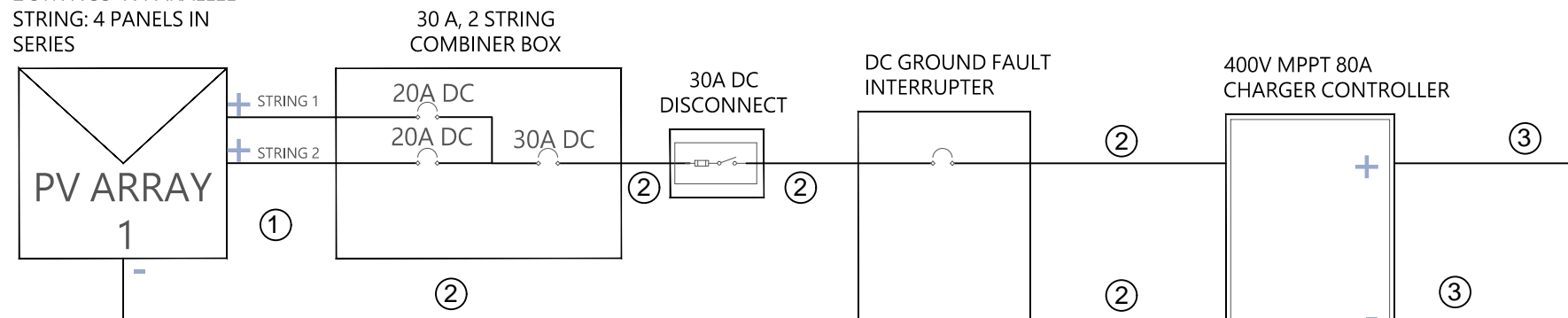
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Aug. 16, 23

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E.01

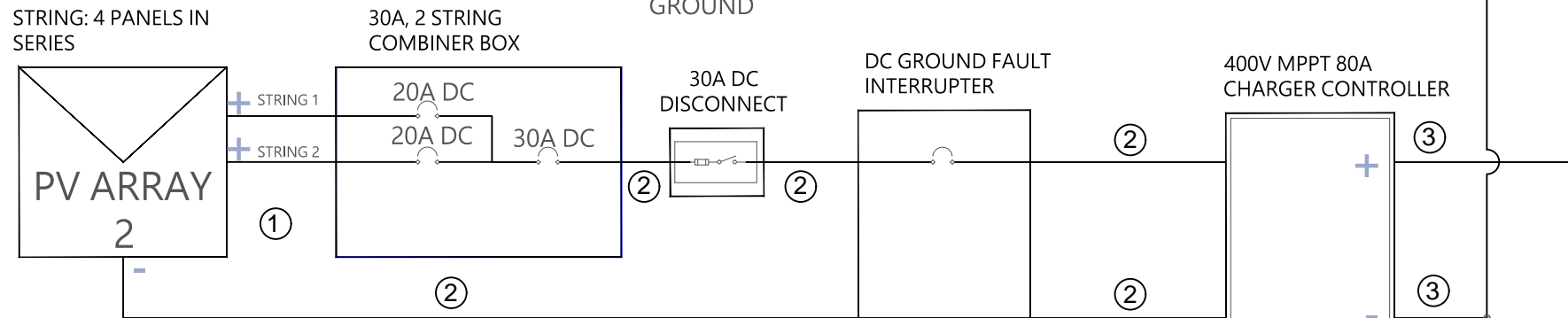
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1/16" = 1'

E.01 - VICINITY PLAN

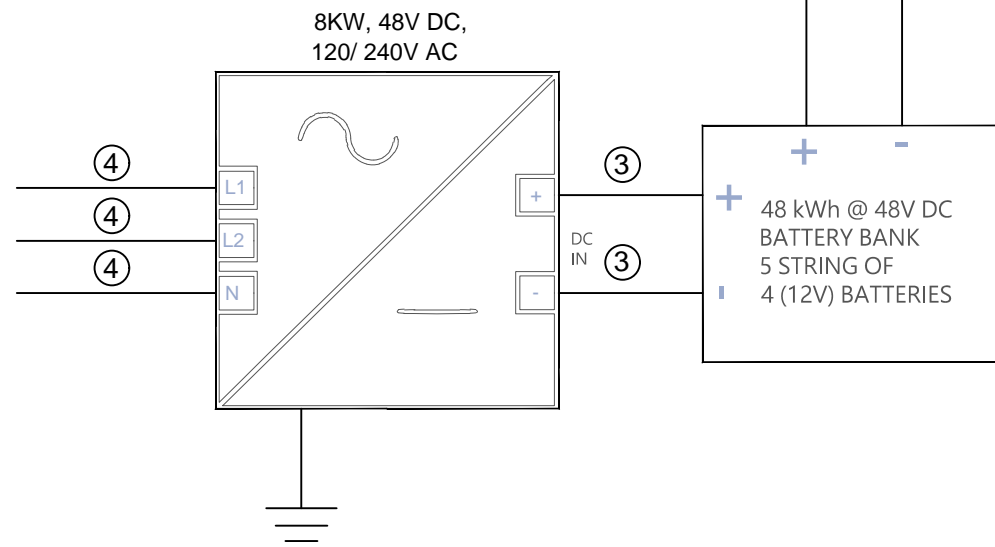
8 SOLAR PANELS  
2 STRINGS IN PARALLEL  
STRING: 4 PANELS IN SERIES



8 SOLAR PANELS  
2 STRINGS IN PARALLEL  
STRING: 4 PANELS IN SERIES



Power Consumption Calculation					
Lighting	Quantity	VA/Unit	Total VA	Hours/Day	kW-hr/Day
Bedroom Light	4	20	80	10	0.8
Bathroom Light	1	20	20	5	0.1
Living/Kitchen	2	20	40	12	0.48
Outside Light	3	20	60	13	0.78
<b>Appliance</b>					
TV/Small Appliance	1	500	500	6	3
Refrigerator	1	350	350	12	4.2
AC Unit	3	1066	3198	8	25.584
<b>Total (kW-hr/Day)</b>					<b>34.94</b>



Inverter Sizing	
Daily Power Consumption	34.94
Irridance (NASA Power Resource Database (kW-hr/Sqft/day))	5.735
Total Efficiency of System Including Cable,temp. Inverter	77%
Peak Power (kW)	7.91
<b>Inverter: 8 kVA Inverter</b>	

Battery Bank Sizing	
Daily Power Demand @120V (AH)	291
Daily Power Demand @12V (AH)	2912
Number of 200 AH Batteries	15
Discharge Percentage	80%
Total Calculated Number of 12V, 200AH Batteries	18
<b>5 string of 4(12V) Batteries (48V System) (20 Batteries)</b>	
Model Example : GLB12-200FT 200 AH Deep Cycle Battery	

Solar Panel Arrangement	
Peak Power (KW)	7.91
Number of 320 W Panel	15.7
<b>Total Panels: 16</b>	
<b>Arrangement</b>	
<b>4 Panel In Series</b>	
<b>4 String In Parallel</b>	

Solar Panel Discription	
Type:	Mono crystalline
WATT Rating	320 W
Short Circuit Current:	10.02 A
Open Circuit Voltage:	40.1 VDC
Ambient Temperature:	76 to 68 (F)
Series Open Circuit Voltage: $(4 \times 40.1 \text{ VDC}) \times 1.02 = 163.6 \text{ VDC}$ (NEC 690.7 (A)(1)/Table 690.7(A) )	
Parallel Short Circuit Amperage: $4 \times 10.02 \text{ A} * 1.25 = 50 \text{ A}$ (NEC 690.8(A) (1))	
Open Circuit Voltage (204.5 VDC) within accepted limit of 600 VDC for single and two-family dwellings (NEC 690.7)	
<b>BATTERY CHARGER</b>	
$(8\text{kw}/48 \text{ VDC}) = 166.66\text{A}$	
$166.66\text{A} \times 1.25 = 208.33 \text{ A}/2 = 104.16\text{A}$	
<b>Battery Charger to be 2 x ( MPPT, 300 VDC, 120A) in parallel</b>	

Wire Size Guide	
①	#12 AWG DC Rated
②	#2 AWG DC Rated
③	1/0 AWG DC Rated
④	#6 AWG AC Rated



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Proposed Residence

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Richard David Vaske  
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Project Type:  
Residential

Drawn by:  
Jose Olivera  
Electrical Technician:  
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EL00621

Date:  
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E.02

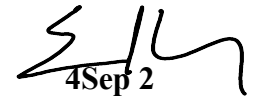
Residence for Richard David Vaske; Main Distribution Panel ( A )																
Location:	Kitchen	Circuits:	16			Main Conductors:	#2 Awg, Stranded Copper, THWN									
Voltage:	240/120	Main Breaker:	100A			L1, L2, N:	#8 Awg Stranded Copper									
Amperage:	125 A	Phases:	1Ø			Ground:	#8 Awg Stranded Copper									
Type:	Indoor	Wires:	3			Conduit:	2"									
Circuit #	Description	Circuit Breaker	KVA	Amps	L1, L2 N	G	Conduit Size	PH	Circuit #	Description	Circuit Breaker	KVA	Amps	L1, L2 N	G	Conduit Size
1	Refrigerator	20A	0.35	2.9	#12Awg	#12Awg	20mm	A	2	Lights Circuit 1	20A	0.29	2.4	#12Awg	#12Awg	20mm
3	Kitchen Outlets	20A	1.5	12.5	#12Awg	#12Awg	20mm	B	4	Space						
5	Bedrm 3 & Liv/Din Outlets	20A	0.72	6.0	#12Awg	#12Awg	20mm	A	6	Bedroom 1						
7	Bedroom 1&2 Outlets	20A	1.08	9.0	#12Awg	#12Awg	20mm	B	8	12kBTU AC	2 X20A	1.07	4.4	#10Awg	#10Awg	25mm
9	Bathroom Outlet	20A	0.18	1.5	#12Awg	#12Awg	20mm	A	10	Bedroom 2						
11	External Outlets	20A	0.36	3.0	#12Awg	#12Awg	20mm	B	12	12kBTU AC	2 X20A	1.07	4.4	#10Awg	#10Awg	25mm
13	Laundry Provision ONLY	20A	1.5	12.5	#12Awg	#12Awg	20mm	A	14	Bedroom 3						
15	Space							B	16	12kBTU AC	2 X20A	1.07	4.4	#10Awg	#10Awg	25mm
<b>TOTAL KVA</b>		<b>9.2</b>														
<b>AMPS/PHASE</b>		<b>38.2</b>														
<b>PHASE A ( AMPS )</b>		<b>38.7</b>														
<b>PHASE B ( AMPS )</b>		<b>37.8</b>														

Notes: 1. AC's breakers and wires to be re-sized, according to name plate rating of equipment purchased.  
2. Actual phase balancing to be done after installation.

REVIEWED BY:



SEPT. 04 2023



4Sep 2

STANDARD CALCULATION (NEC 2017, PART III, 220.40) PANEL A & SERVICE			
<b>1. Dwelling</b>			
<b>GENERAL LIGHTING (220.12)</b>			
AREA	VA/SFT		
First Floor	600 3	1800 VA	
<b>SMALL APPLIANCE (220.52)</b>			
QTY	VA		
Small Appliance Circuit Load (A)	2 1500	3000 VA	
Laundry Circuit Load (B)	1 1500	1500 VA	
		<b>SUB-TOTAL 6300 VA</b>	
<b>DEMAND FACTOR (220.42)</b>			
FIRST 3KVA @ 100%			3000 VA
REMAINDER <120kVA @ 35%			1155 VA
		<b>TOTAL VA 4155 VA</b>	
<b>Appliance Load (220.53)</b>			
QTY	VA		
Refrigerator	1 350	350 VA	
Extractor Fans	1 127	127 VA	
		<b>SUB-TOTAL 477 VA</b>	
<b>DEMAND FACTOR (220.53)</b>			
Four or more @ 75%			<b>TOTAL VA 477 VA</b>
<b>MOTOR &amp; OTHER LOADS (220.50)</b>			
430.24 (3)	QTY	VA	
Air Conditioning (12k BTU)	3	1066	3198 VA
		<b>7830 VA</b>	
		<b>Total KVA 7.83 KVA</b>	
		<b>Total Sافت 600</b>	
1 PH 240/120V		<b>33 A</b>	
<b>PANEL A TO BE 100A, 240/120V, 3 WIRE, 1PH</b>			



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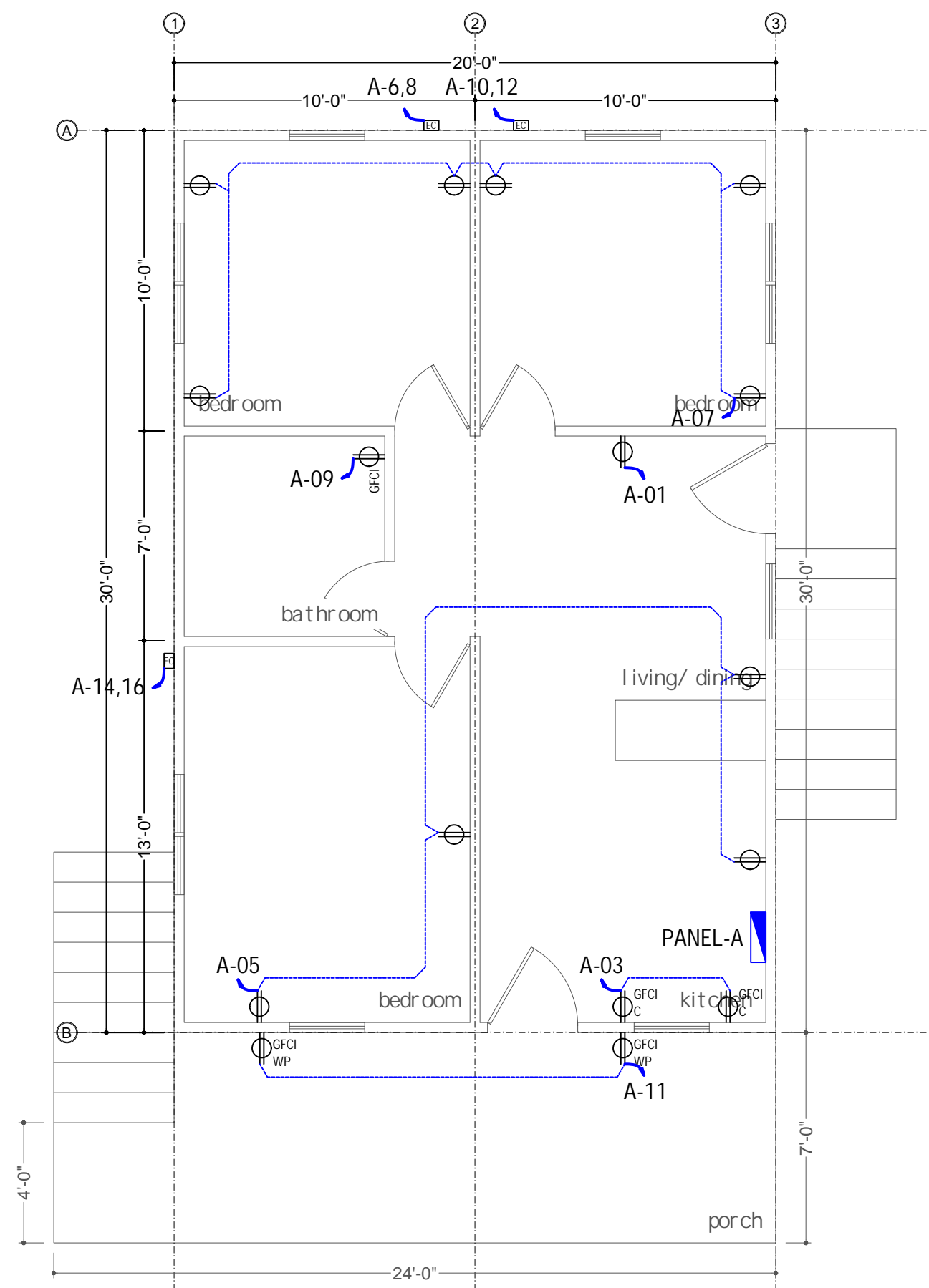
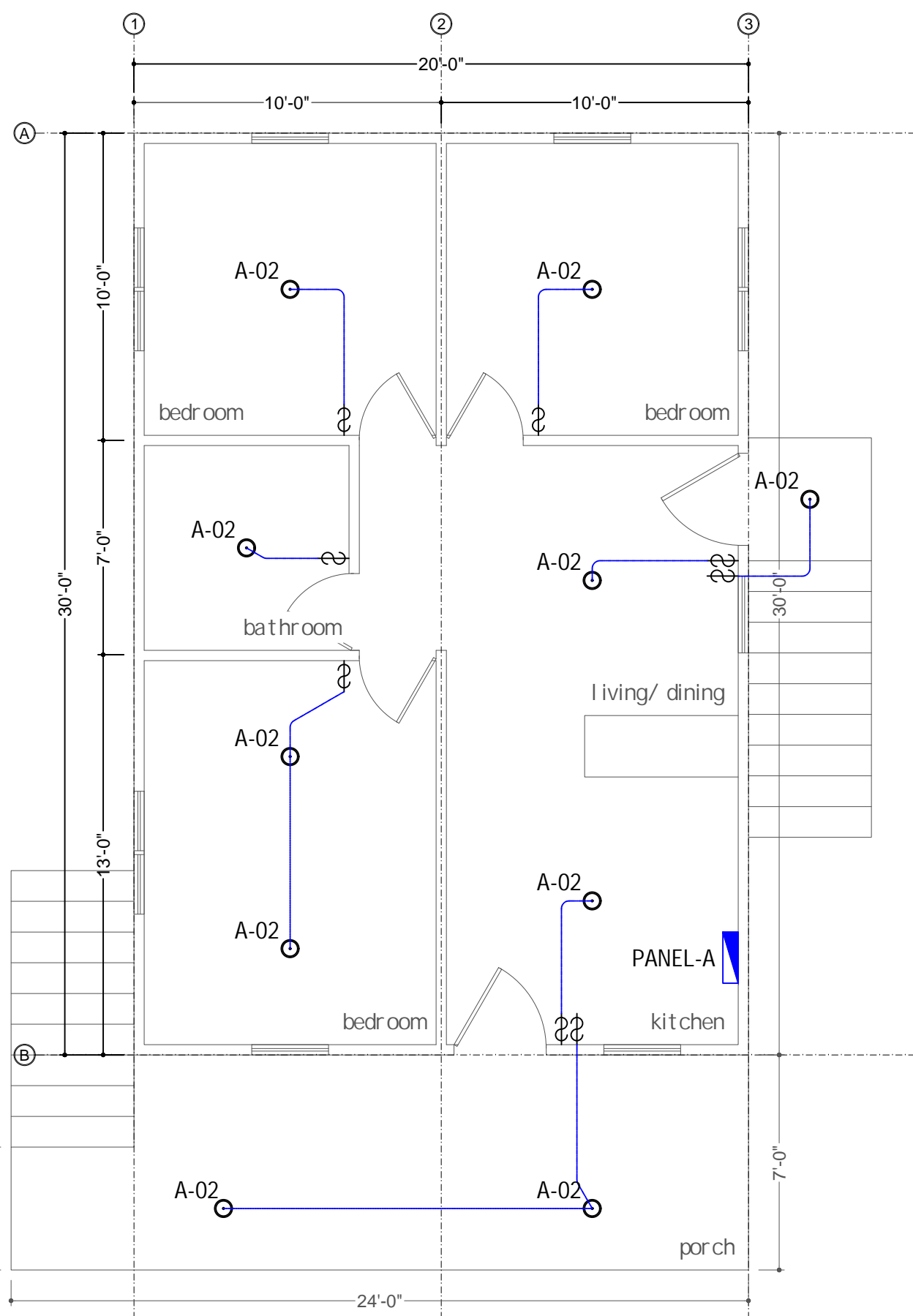
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Aug. 16, 23

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E.03

E.03 - LOAD SHEET AND CALCULATION



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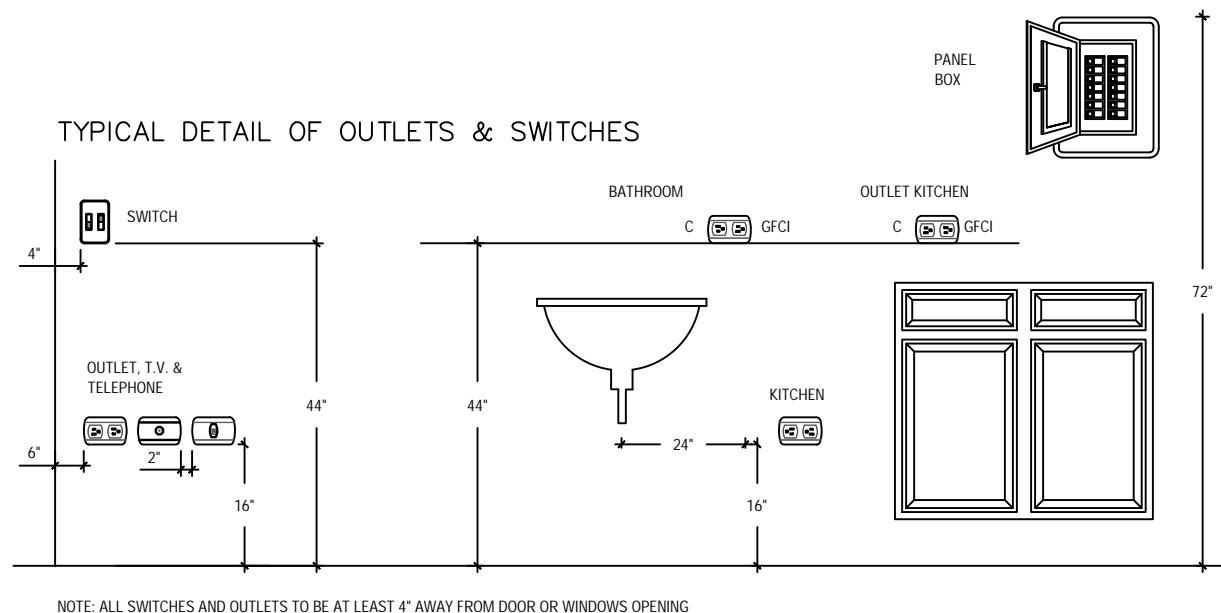
Date: Aug. 16, 23	Page: E.04
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E.04 - ELECTRICAL LIGHTS AND OUTLETS LAYOUT

GENERAL ELECTRICAL NOTES

- 1.) ALL WORKS SHALL BE DONE IN ACCORDANCE WITH LOCAL APPLICABLE CODE.
- 2.) THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL OFFSETS, BENDS AND BOXES REQUIRED TO MAKE A COMPLETE NEAT INSTALLATION IN ACCORDANCE WITH APPLICABLE CODE.
- 3.) APPROVAL SHALL BE OBTAINED FROM STRUCTURAL ENGINEER PRIOR TO CUTTING OR DRILLING ANY STRUCTURAL SUPPORT MEMBER.
- 4.) WIRE SIZES SHALL BE #12 THHN / THWN UNLESS OTHERWISE NOTED ON PLANS. CONDUCTOR #6 OR LARGER SHALL BE THWN.
- 5.) ALL CONDUCTORS TO BE COPPER UNLESS OTHERWISE NOTED
- 6.) ALL CONDUCTORS SHALL BE RUN IN CONDUIT. (NON-METALLIC TYPE) NMC CABLE IS PERMITTED AS AN OPTION. IF PVC SCHEDULE 40 IS USED FOR UNDERGROUND FEEDERS ONLY, AN EQUIPMENT GROUND CONDUCTOR MUST BE INSTALLED AND CONDUIT SIZE INCREASE AS REQUIRED. THE USE OF NMC IS PERMITTED FOR ALL OTHER WIRING.
- 7.) ALL NON POWER RELATED WIRING CAN BE RUN IN CEILING PLENUM WITHOUT CONDUIT
- 8.) FUSES SHALL BE DUAL ELEMENT, TIME DELAY TYPE UNLESS OTHERWISE NOTED.
- 9.) ALL LUMINARIES SHALL BE PROPERLY SUPPORTED IN ACCORDANCE WITH THE CEILING SYSTEM MANUFACTURER RECOMMENDATIONS AND LOCAL CODE REQUIREMENTS.
- 10.) THIS DRAWING IS A GUIDE FOR THE ELECTRICAL INSTALLATION OF ELECTRICAL SERVICE. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE A FUNCTIONING SYSTEM.
- 11.) ALL CABLES SHALL BE RUN WITHOUT SPLICES EXCEPT OTHERWISE INDICATED.
- 12.) ALL PULL AND JUNCTION BOXES SHALL BE ACCESSIBLE AT ALL TIMES
- 13.) EXACT POINT AND METHODS OF CONNECTION SHALL BE DETERMINED IN FIELD.
- 14.) ALL WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER.
- 15.) ALL RACEWAY ROUTED, INSULATED CONDUCTORS SYSTEMS SHALL BE COLOR CODED AS FOLLOWS:  
  
208/120V 1 PH SYSTEM  
  
PHASE 'A'    BLACK  
PHASE 'B'    RED  
NEUTRAL      WHITE  
GROUND      GREEN
- 16.) ALL ROUGH IN DIMENSIONS ARE TO CENTER LINE OF DEVICE UNLESS OTHERWISE NOTED.

ELECTRICAL	
SYMBOL	LEGEND
	LIGHT SWITCH SINGLE POLE 5'-0" ABOVE F.F.L.
	110V DOUBLE CONVENIENCE OUTLET 18" ABOVE F.F.L., 12" ABOVE KITCHEN CABINETS & SHELF, AND 5'-0" ABOVE F.F.L. IN BATH
	110V DOUBLE CONVENIENCE OUTLET 18" ABOVE F.F.L. GROUND FAULT INTERRUPTED 12" ABOVE KITCHEN CABINETS & SHELF, AND 5'-0" ABOVE F.F.L. IN BATH
	CABLE INTERNET JACK DROP
	PROPANE
	110 V CEILING LIGHT FIXTURE
	CEILING FAN W/ LIGHT. SWITCHES FOR FAN ARE DOUBLE SWITCH ONE FOR LIGHT AND FOR FAN.
	MAIN CIRCUIT BOX
	110 V RECESSED LIGHT FIXTURE
	ELECTRICAL LINE
	EXTRACTOR FAN
	CEILING MOUNTED EXTERNAL LIGHT
	FLOOD LIGHT
	VANITY LIGHT



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Date: Aug. 16, 23	Page: E.05
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