

**LOAD TABLE FOR KAMURU IKULU PHC**

POWER SOURCE: GRID																	
	CLINIC BLOCK- 63A DISTRIBUTION BOARD												SECURITY HOUSE BLOCK- NO DISTRIBUTION BOARD			TOTAL (W)	
CIRCUIT IDENTITY																	
MCB RATING																	
DIVERSITY FACTOR																	
LIGHTING CIRCUIT																	
COOLING SYSTEM ( CEILING FAN)																	
13AMP SOCKET FOR EQUIPMENT POWERING																	-
15AMP SOCKET FOR EQUIPMENT POWERING																	-
PEAK LOAD (W)																	-
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE				
CABLE SIZES IN mm																	

POWER SOURCE: PV SYSTEM	SYSTEM ID: <b>KAMURU IKULU SYS 1, SYS 2 &amp; SYS 3</b> CAPACITY: <b>3x23,080 KWP</b>																	
	CLINIC BLOCK- 100A CONSUMER UNIT												SECURITY HOUSE BLOCK- 32A CONSUMER UNIT			TOTAL (W)		
CIRCUIT IDENTITY	AL0	AL1	AL2	AL3	AL4	AL5	AL8	AP1	AP2	AP3	AP4			AL6	AL7	AP5		
MCB RATING	10A	10A	10A	10A	10A	10A	10A	20A	20A	20A	20A			10A	10A	20A		
DIVERSITY FACTOR	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.6			0.9	0.9	0.6		
LIGHTING CIRCUIT	432	486	324				306							90				
COOLING SYSTEM ( CEILING FAN)				675	675	450									75			
13AMP SOCKET FOR EQUIPMENT POWERING								1000	100	2930								
PEAK LOAD (W)																		
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT						13A SOCKET OUTLET			SPARE	SPARE	LIGHTING & CEILING FAN CIRCUIT	13A SOCKET OUTLET	SPARE	SPARE			
CABLE SIZES IN mm	3x1.5mm						3x2.5mm					3x1.5mm	3x2.5mm					
RED PHASE										2930								2930
YELLOW PHASE	432	486	324	675			306		100									2323
BLUE PHASE					675	450		1000						90	75			2290
TOTAL (W)																		7543

DRAWING NO:	KCS/EM/RD/LT/PHC24	REVISION NO:	2	Rev. DATE:
DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR KAMURU IKULU PHC

Analysis of power distribution  
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

**BILL OF MATERIALS FOR KAMURU IKULU PHC ELECTRICAL RETROFIT**

CLINIC BLOCK				SECURITY HOUSE				KAMURU IKULU TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	24	1	Ceiling fan	No.	1	25
2	18 Watts CFL	No.	87	2	18 Watts CFL	No.	5	92
3	Roof mounted luminaire	No.	73	3	Roof mounted luminaire	No.	1	74
4	Wall mounted luminaire	No.	14	4	Wall mounted luminaire	No.	4	18
5	1 Gang light switch	No.	23	5	1 Gang light switch	No.		23
6	2 Gang light switch	No.	5	6	2 Gang light switch	No.	1	6
7	3 Gang light switch	No.	2	7	3 Gang light switch	No.		2
8	13 Amp socket single	No.	13	8	13 Amp socket single	No.	1	14
9	13 Amp socket double	No.	6	9	13 Amp socket double	No.		6
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	136	11	Junction box	No.	7	143
12	Single patress box (flush)	No.	43	12	Single patress box (flush)	No.	2	45
13	Double patress box (flush)	No.	6	13	Double patress box (flush)	No.	0	6
14	Single patress box (surface)	No.		14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	20	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	2	22
17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs Packs (100 per pack)	packs	1	17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs	packs	1	2
18	100A distribution board	No.	2	18	100A distribution board	No.		2
19	60A distribution board	No.		19	60A distribution board	No.		0
20	30A distribution board	No.		20	30A distribution board	No.		0
21	100A consumer unit	No.		21	100A consumer unit	No.		0
22	60A consumer unit	No.		22	60A consumer unit	No.		0
23	30A consumer unit	No.		23	30A consumer unit	No.	1	1
24	100A Residual current circuit breaker	No.	2	24	100A Residual current circuit breaker	No.		2
25	60A Residual current circuit breaker	No.		25	60A Residual current circuit breaker	No.		0
26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.	1	1
27	100A change over	No.	2	27	100A change over	No.		2
28	60A change over	No.		28	60A change over	No.		0
29	30A change over	No.		29	30A change over	No.		0
	<b>1.5mm cable (Twin &amp; Earth)</b>				<b>1.5mm cable (Twin &amp; Earth)</b>			
30	AL0&AL1 (Lighting circuit)	Mts	430	30	AL6 (Lighting circuit)	Mts	50	
31	AL2(Lighting circuit)	Mts	330	31	AL7 (Ceiling fan circuit)	Mts	30	
32	AL3 (Ceiling fan circuit)	Mts	150	32		Mts		
33	AL4 (Ceiling fan circuit)	Mts	150	33		Mts		
34	AL5 (Ceiling fan circuit)	Mts	100	34		Mts		
35	<b>Total 1.5mm cable</b>	Mts	<b>1160</b>	35	<b>Total 1.5mm cable</b>	Mts	<b>80</b>	<b>1240</b>
36	<b>2.5mm cable (Twin &amp; Earth)</b>			36	<b>2.5mm cable (Twin &amp; Earth)</b>			
37	AP1 (Socket circuit)	Mts	80	37	AP6 (Socket circuit)	Mts	90	
38	AP2 (Socket circuit)	Mts	70	38		Mts		
39	AP3 (Socket circuit)	Mts	80	39		Mts		
40	AP4 (Socket circuit)	Mts	80	40		Mts		
41	<b>Total 2.5mm cable</b>	Mts	<b>310</b>	41	<b>Total 2.5mm cable</b>	Mts	<b>90</b>	<b>400</b>
42	4x16mm PVC/SWA/PVC armoured cable	Mts	100	42	4x16mm PVC/SWA/PVC armoured cable	Mts		100
43	4x10mm PVC/SWA/PVC armoured cable	Mts		43	4x10mm PVC/SWA/PVC armoured cable	Mts		0
44	4x6mm PVC/SWA/PVC armoured cable	Mts		44	4x6mm PVC/SWA/PVC armoured cable	Mts	60	60
45	4x4mm PVC/SWA/PVC armoured cable	Mts		45	4x4mm PVC/SWA/PVC armoured cable	Mts		0
46	Cable terminating lugs	No.	16	46	Cable terminating lugs	No.	16	32
47	Recline cable (25mm)	Mts	60	47	Recline cable (25mm)	Mts		60
48	Earth wire for building (16mm)	Mts	70	48	Earth wire for building (16mm)	Mts	50	120
49	Underground marking tape	Mts	100	49	Underground marking tape	Mts	60	160

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Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR KAMURU IKULU PHC

Material quantities required for the  
electrical installation

SCALE: NTS  
PAGE: 4 OF 4

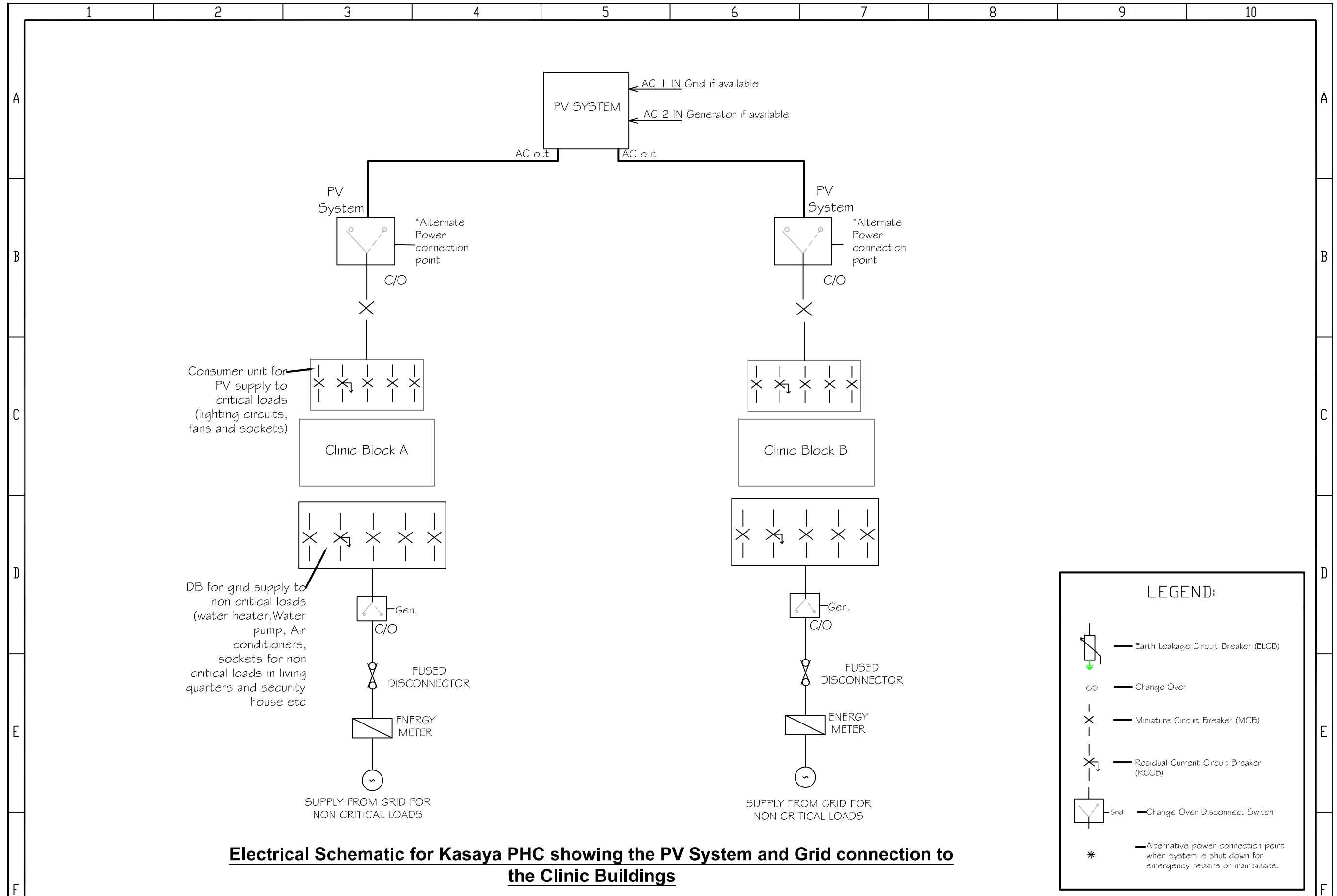
KADUNA CLINICS PROJECT  
KCS/EM/RD/DRW/PHC25

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Electrical System Design for Kasaya PHC

- Electrical Schematic for PV and Grid connection to PHC
  - Electrical wiring diagram for PHC Buildings.
  - Load Table for PHC Buildings
  - Bill of Materials for electrical retrofit
- 

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**Electrical Schematic for Kasaya PHC showing the PV System and Grid connection to the Clinic Buildings**

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DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
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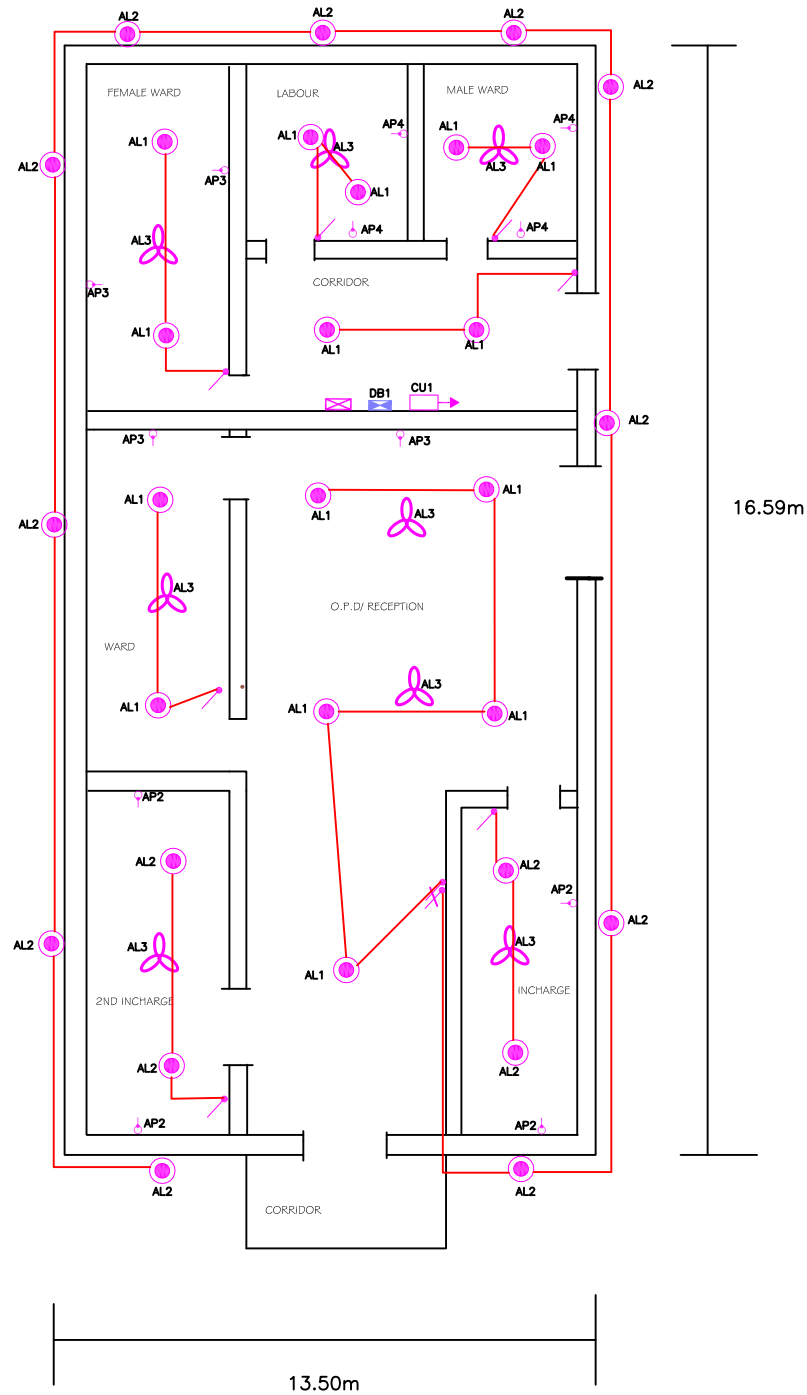


Kaduna Clinic Solar  
RETROFIT SCHEMATIC DRAWING  
FOR KASAYA PHC

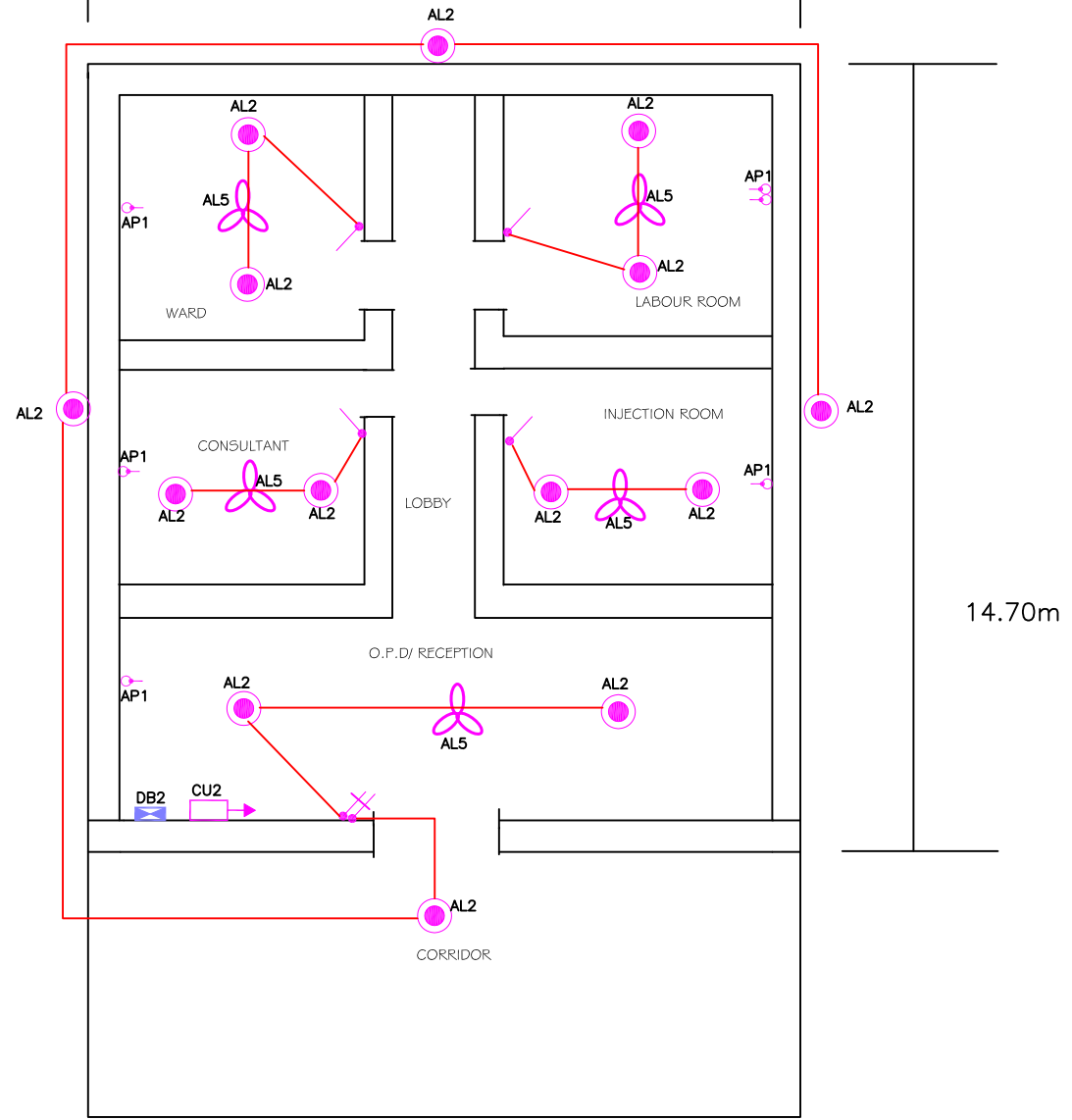
Electrical Schematic design showing  
the PV System and Grid connection  
to the Clinic Buildings

SCALE:	NTS
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# Clinic Block B



13.07m



# Clinic Block A

## Kasaya PHC Building Electrical Wiring.

**LEGEND:**

- FAN
- EXTERNAL LIGHT
- 1 GANG LIGHT SWITCH
- 3 GANG LIGHT SWITCH
- 2 GANG LIGHT SWITCH
- SINGLE 13A SOCKET
- 15A SOCKET
- CHANGE OVER SWITCH
- EARTH LEAKAGE CIRCUIT BREAKER
- TP & N DISTRIBUTION BOARD
- CFL
- WATER HEATER
- BORE HOLE CONTROL SWITCH
- CONSUMER UNIT
- COOKER UNIT

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Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR KASAYA PHC

Electrical wiring design showing  
the wiring and fitting connection  
in the Clinic Buildings

SCALE:	NTS
PAGE:	2 OF 4

### LOAD TABLE FOR DAMBA KASAYA PHC

POWER SOURCE: GRID														
	CLINIC BLOCK A- 63A DISTRIBUTION BOARD								CLINIC BLOCK B- 100A DISTRIBUTION BOARD					TOTAL (W)
CIRCUIT IDENTITY														
MCB RATING														
DIVERSITY FACTOR														
LIGHTING CIRCUIT														
COOLING SYSTEM ( CEILING FAN)														
13AMP SOCKET FOR EQUIPMENT POWERING														-
15AMP SOCKET FOR EQUIPMENT POWERING														-
PEAK LOAD (W)														-
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	
CABLE SIZES IN mm														

POWER SOURCE: PV SYSTEM	SYSTEM ID: <b>DAMBA KASAYA SYS 1</b>													
	CAPACITY: <b>21,060 KWP</b>													
	CLINIC BLOCK A- 63A CONSUMER UNIT								CLINIC BLOCK B- 100A CONSUMER UNIT					TOTAL (W)
CIRCUIT IDENTITY	AL1	AL3	AL4	AP2	AP3	AP4			AL2	AL5	AP1			
MCB RATING	10A	10A	10A	20A	20A	20A			10A	10A	20A			
DIVERSITY FACTOR	0.9	0.9	0.9	0.6	0.6	0.6			0.9	0.9	0.6			
LIGHTING CIRCUIT	252	288							252					<b>792</b>
COOLING SYSTEM ( CEILING FAN)			600							375				<b>975</b>
13AMP SOCKET FOR EQUIPMENT POWERING														<b>603</b>
PEAK LOAD (W)														<b>2,370</b>
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT			13A SOCKET OUTLET			SPARE	SPARE	LIGHTING & CEILING FAN CIRCUIT	13A SOCKET OUTLET	SPARE	SPARE		
CABLE SIZES IN mm	3x1.5mm			3x2.5mm					3x1.5mm	3x2.5mm				

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Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR KASAYA PHC

Analysis of power distribution  
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

**BILL OF MATERIALS FOR DAMBA KASAYA PHC ELECTRICAL RETROFIT**

CLINIC BLOCK A				CLINIC BLOCK B				DAMBA KASAYA TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	8	1	Ceiling fan	No.	5	13
2	18 Watts CFL	No.	30	2	18 Watts CFL	No.	14	44
3	Roof mounted luminaire	No.	19	3	Roof mounted luminaire	No.	11	30
4	Wall mounted luminaire	No.	11	4	Wall mounted luminaire	No.	3	14
5	1 Gang light switch	No.	7	5	1 Gang light switch	No.	4	11
6	2 Gang light switch	No.	1	6	2 Gang light switch	No.	1	2
7	3 Gang light switch	No.		7	3 Gang light switch	No.		0
8	13 Amp socket single	No.	12	8	13 Amp socket single	No.	4	16
9	13 Amp socket double	No.		9	13 Amp socket double	No.	1	1
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	50	11	Junction box	No.	24	74
12	Single patress box (flush)	No.	20	12	Single patress box (flush)	No.	9	29
13	Double patress box (flush)	No.	0	13	Double patress box (flush)	No.	1	1
14	Single patress box (surface)	No.		14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	8	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	Bundles	4	12
17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs Packs (100 per pack)	packs	1	17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs	Packs	1	2
18	100A distribution board	No.	1	18	100A distribution board	No.	1	2
19	60A distribution board	No.		19	60A distribution board	No.		0
20	30A distribution board	No.		20	30A distribution board	No.		0
21	100A consumer unit	No.	1	21	100A consumer unit	No.	1	2
22	60A consumer unit	No.		22	60A consumer unit	No.		0
23	30A consumer unit	No.		23	30A consumer unit	No.		0
24	100A Residual current circuit breaker	No.	2	24	100A Residual current circuit breaker	No.	2	4
25	60A Residual current circuit breaker	No.		25	60A Residual current circuit breaker	No.		0
26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.		0
27	100A change over	No.	2	27	100A change over	No.	2	4
28	60A change over	No.		28	60A change over	No.		0
29	30A change over	No.		29	30A change over	No.		0
<b>1.5mm cable (Twin &amp; Earth)</b>				<b>1.5mm cable (Twin &amp; Earth)</b>				
30	AL1 (Lighting circuit)	Mts	130	30	AL2 (Lighting circuit)	Mts	130	
31	AL2 (Lighting circuit)	Mts	100	31	AL5 (Ceiling fan circuit)	Mts	90	
32	AL3 (Ceiling fan circuit)	Mts	130	32				
34	<b>Total 1.5mm cable</b>	Mts	<b>360</b>	34	<b>Total 1.5mm cable</b>	Mts	<b>220</b>	<b>580</b>
<b>2.5mm cable (Twin &amp; Earth)</b>				<b>2.5mm cable (Twin &amp; Earth)</b>				
35	AP2 (Socket circuit)	Mts	70	35	AP1 (Socket circuit)	Mts	80	
36	AP3 (Socket circuit)	Mts	70	36				
37	AP4 (Socket circuit)	Mts	70	37				
38	<b>Total 2.5mm cable</b>	Mts	<b>210</b>	38	<b>Total 2.5mm cable</b>	Mts	<b>80</b>	<b>290</b>
39	4x16mm PVC/SWA/PVC armoured cable	Mts	100	39	4x16mm PVC/SWA/PVC armoured cable	Mts	60	160
40	4x10mm PVC/SWA/PVC armoured cable	Mts		40	4x10mm PVC/SWA/PVC armoured cable	Mts		0
41	4x6mm PVC/SWA/PVC armoured cable	Mts		41	4x6mm PVC/SWA/PVC armoured cable	Mts		0
42	4x4mm PVC/SWA/PVC armoured cable	Mts		42	4x4mm PVC/SWA/PVC armoured cable	Mts		0
43	Cable terminating lugs	No.	16	43	Cable terminating lugs	No.	16	32
44	Recline cable (25mm)	Mts	50	44	Recline cable (25mm)	Mts	50	100
45	Earth wire for building (16mm)	Mts	50	45	Earth wire for building (16mm)	Mts	50	100
46	Underground marking tape	Mts	100	46	Underground marking tape	Mts	60	160

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DRAWN BY:	DANIEL MOMOH			
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Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR KASAYA PHC

Material quantities required for the electrical installation

SCALE: NTS  
PAGE: 4 OF 4

KADUNA CLINICS PROJECT  
KCS/EM/RD/DRW/PHC26

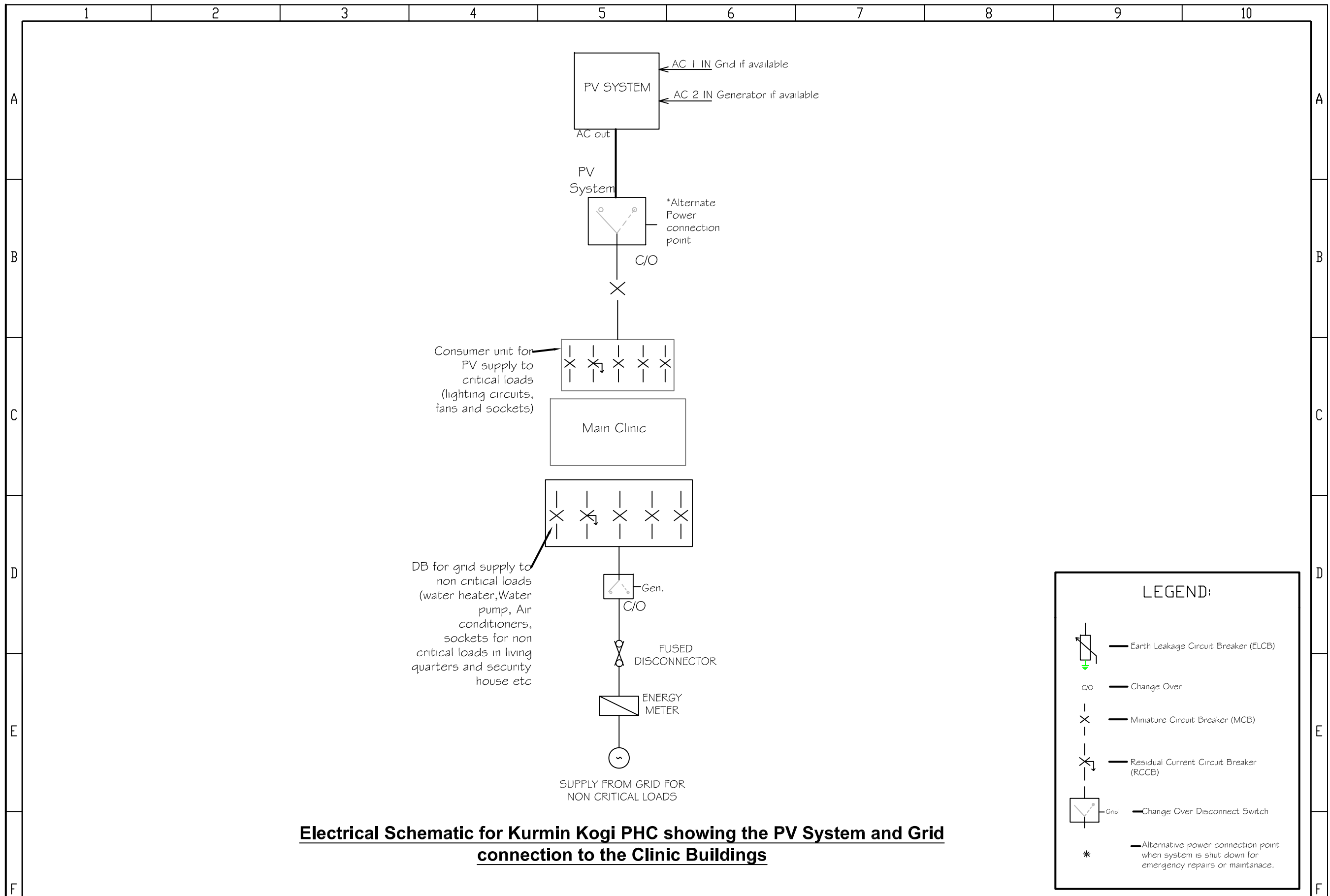
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Electrical System Design for Kurmin Kogi PHC

- Electrical Schematic for PV and Grid connection to PHC
  - Electrical wiring diagram for PHC Buildings.
  - Load Table for PHC Buildings
  - Bill of Materials for electrical retrofit
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October 2015



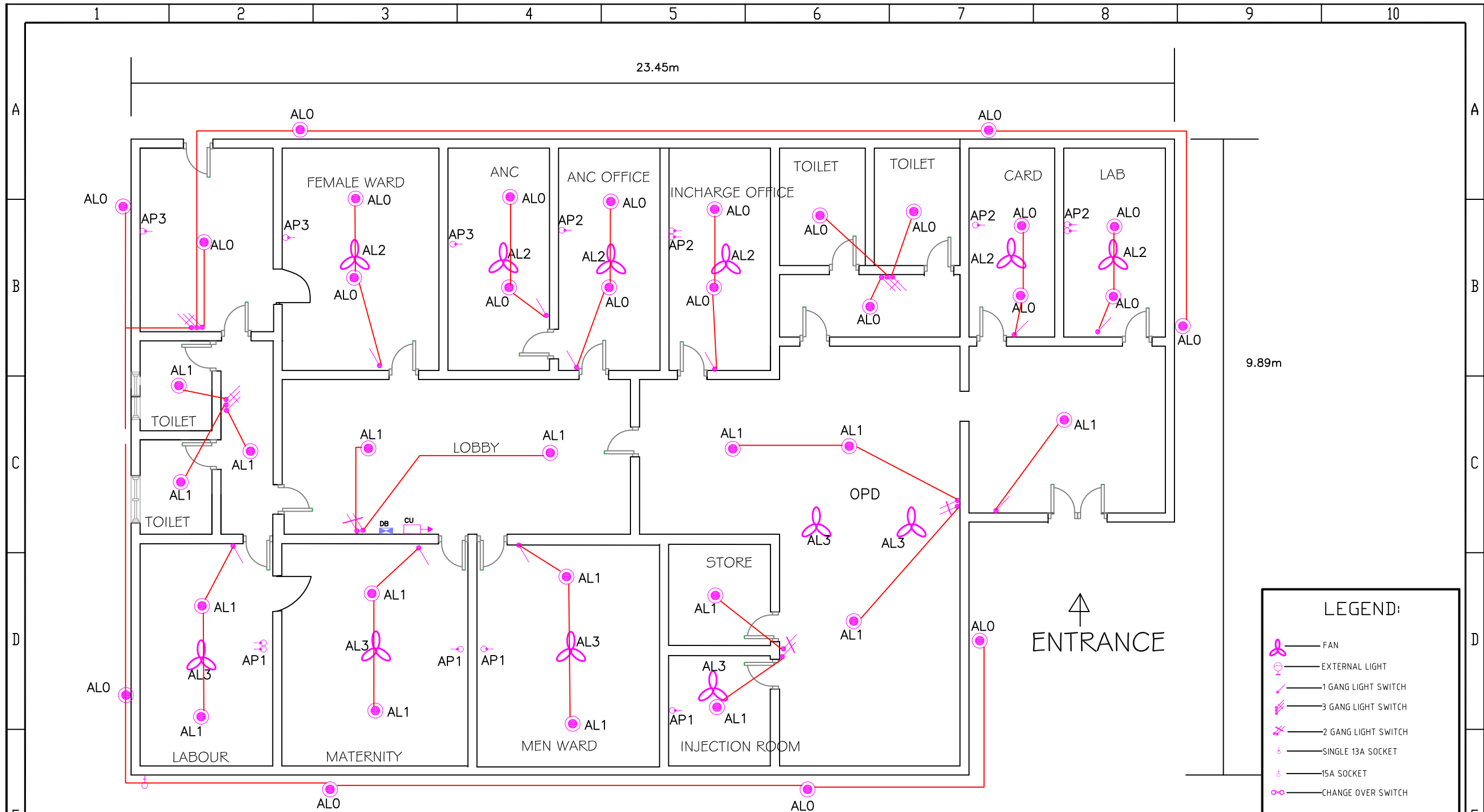


**Electrical Schematic for Kurmin Kogi PHC showing the PV System and Grid connection to the Clinic Buildings**

**LEGEND:**

- Earth Leakage Circuit Breaker (ELCB)
- Change Over
- Miniature Circuit Breaker (MCB)
- Residual Current Circuit Breaker (RCCB)
- Change Over Disconnect Switch
- Alternative power connection point when system is shut down for emergency repairs or maintenance.

DRAWING NO:	KSC/EM/RD/DRW/PHC26/0001	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar RETROFIT SCHEMATIC DRAWING FOR KURMIN KOGI	Electrical Schematic design showing the PV System and Grid connection to the Clinic Buildings	SCALE:	NTS
DESIGN BY:	MARTIN UNIAKHE				PAGE:				1 OF 4	
DRAWN BY:	DANIEL MOMOH									
DATE:	OCTOBER									



**LEGEND:**

- FAN
- EXTERNAL LIGHT
- 1 GANG LIGHT SWITCH
- 3 GANG LIGHT SWITCH
- 2 GANG LIGHT SWITCH
- SINGLE 13A SOCKET
- 15A SOCKET
- CHANGE OVER SWITCH
- EARTH LEAKAGE CIRCUIT BREAKER
- TP & N DISTRIBUTION BOARD
- CFL
- WATER HEATER
- BORE HOLE CONTROL SWITCH
- CONSUMER UNIT
- COOKER UNIT

## Kurmin Kogi PHC Building Electrical Wiring.

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Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR KURMIN KOGI

Electrical wiring design showing  
the wiring and fitting connection  
in the Clinic Buildings

SCALE:	NTS
PAGE:	2 OF 4

### LOAD TABLE FOR KURMIN KOGI PHC

POWER SOURCE: GRID										
MAIN CLINIC- 100A DISTRIBUTION BOARD										TOTAL (W)
CIRCUIT IDENTITY										
MCB RATING										
DIVERSITY FACTOR										
LIGHTING CIRCUIT										
COOLING SYSTEM ( CEILING FAN)										
13AMP SOCKET FOR EQUIPMENT POWERING										-
15AMP SOCKET FOR EQUIPMENT POWERING										-
PEAK LOAD (W)										-
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	
CABLE SIZES IN mm										

POWER SOURCE: PV SYSTEM										
SYSTEM ID:		KURMIN KOGI SYS 1								
CAPACITY:		21,060 KWP								
MAIN CLINIC- 100A CONSUMER UNIT										TOTAL (W)
CIRCUIT IDENTITY	AL0	AL1	AL2	AL3	AP1	AP2	AP3			
MCB RATING	10A	10A	10A	10A	20A	20A	20A			
DIVERSITY FACTOR	0.9	0.9	0.9	0.9	0.6	0.6	0.6			
LIGHTING CIRCUIT	432	306								738
COOLING SYSTEM ( CEILING FAN)			450	450						900
13AMP SOCKET FOR EQUIPMENT POWERING										-
PEAK LOAD (W)										1,638
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT				13A SOCKET OUTLET			SPARE	SPARE	
CABLE SIZES IN mm	3x1.5mm				3x2.5mm					

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Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR KURMIN KOGI

Analysis of power distribution  
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

**BILL OF MATERIALS FOR KURMIN KOGI PHC ELECTRICAL  
RETROFIT**

CLINIC BLOCK				KURMIN KOGI TOTAL
S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	12	12
2	18 Watts CFL	No.	40	40
3	Roof mounted luminaire	No.	33	33
4	Wall mounted luminaire	No.	8	8
5	1 Gang light switch	No.	10	10
6	2 Gang light switch	No.	3	3
7	3 Gang light switch	No.	3	3
8	13 Amp socket single	No.	8	8
9	13 Amp socket double	No.	3	3
10	15 Amp socket	No.	1	1
11	Junction box	No.	68	68
12	Single patress box (flush)	No.	24	24
13	Double patress box (flush)	No.	3	3
14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	11	11
17	PVC accessories, male bush, saddle clamp, angle bend, screws and pegs Packs (100 per pack)	packs	1	1
18	100A distribution board	No.	1	1
19	60A distribution board	No.		0
20	30A distribution board	No.		0
21	100A consumer unit	No.	1	1
22	60A consumer unit	No.		0
23	30A consumer unit	No.		0
24	100A Residual current circuit breaker	No.	2	2
25	60A Residual current circuit breaker	No.		0
26	30A Residual current circuit breaker	No.		0
27	100A change over	No.	2	2
28	60A change over	No.		0
29	30A change over	No.		0
	<b>1.5mm cable (Twin &amp; Earth)</b>			<b>0</b>
30	AL0&AL1 (Lighting circuit)	Mts	430	
31	AL2 (Ceiling fan circuit)	Mts	100	
32	AL3 (Ceiling fan circuit)	Mts	100	
33	<b>Total 1.5mm cable</b>	Mts	<b>630</b>	<b>630</b>
	<b>2.5mm cable (Twin &amp; Earth)</b>			<b>0</b>
34	AP1 (Socket circuit)	Mts	70	
35	AP2 (Socket circuit)	Mts	70	
36	AP3 (Socket circuit)	Mts	60	
37	<b>Total 2.5mm cable</b>	Mts	<b>200</b>	<b>200</b>
38	4x16mm PVC/SWA/PVC armoured cable	Mts	100	100
39	4x10mm PVC/SWA/PVC armoured cable	Mts		0
40	4x6mm PVC/SWA/PVC armoured cable	Mts		0
41	4x4mm PVC/SWA/PVC armoured cable	Mts		0
42	Cable terminating lugs	No.	16	16
43	Recline cable (25mm)	Mts	60	60
44	Earth wire for building (16mm)	Mts	70	70
45	Underground marking tape	Mts	100	100

DRAWING NO:	KCS/EM/RD/BOM/PHC26	REVISION NO:	2	Rev. DATE:
DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR KURMIN KOGI

Material quantities required for the  
electrical installation

SCALE:	NTS
PAGE:	4 OF 4

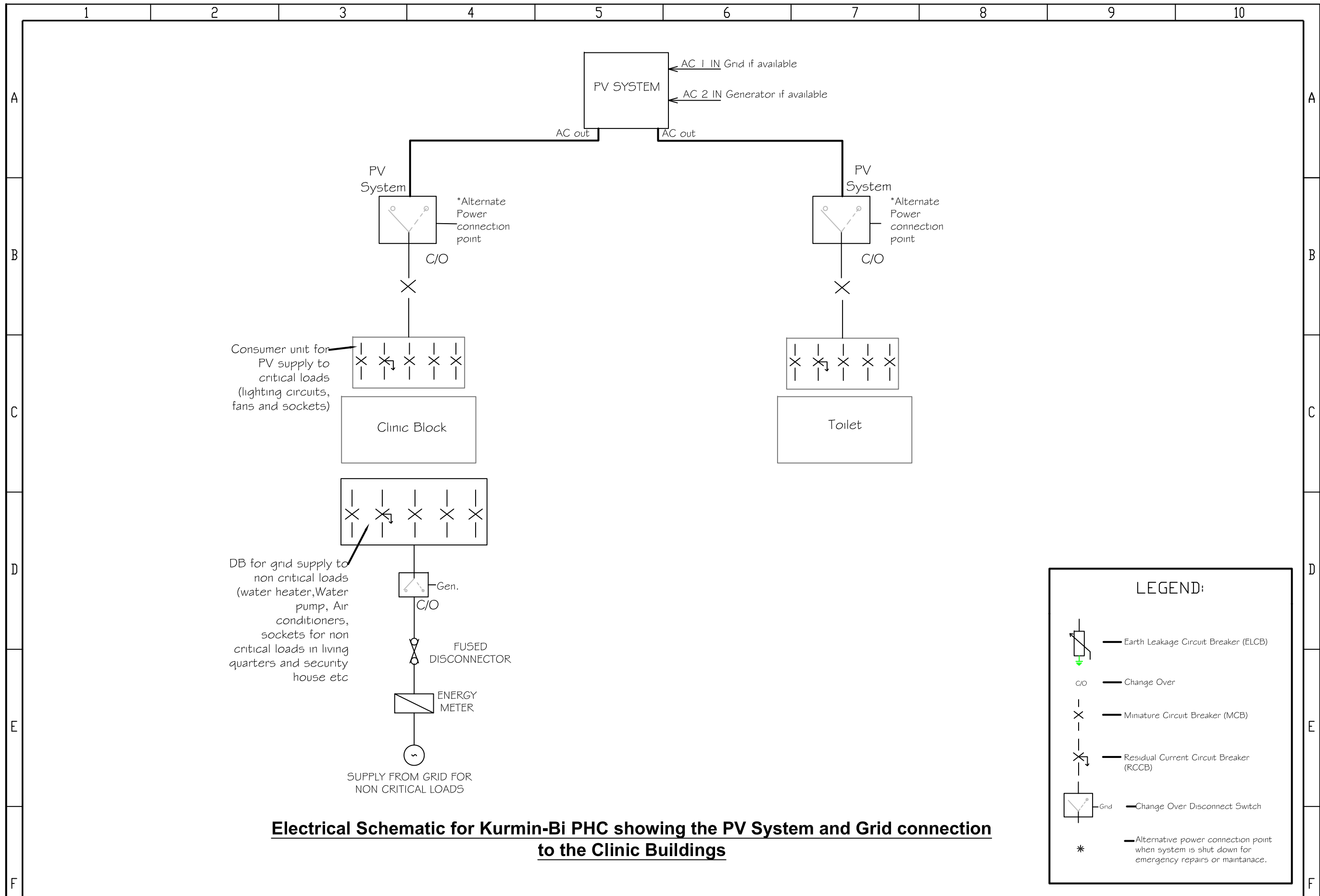
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Electrical System Design for Kurmin-Bi PHC

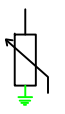


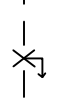


- Electrical Schematic for PV and Grid connection to PHC
  - Electrical wiring diagram for PHC Buildings.
  - Load Table for PHC Buildings
  - Bill of Materials for electrical retrofit
- 

October 2015



**Electrical Schematic for Kurmin-Bi PHC showing the PV System and Grid connection to the Clinic Buildings**

**LEGEND:**

-  Earth Leakage Circuit Breaker (ELCB)
-  Change Over
-  Miniature Circuit Breaker (MCB)
-  Residual Current Circuit Breaker (RCCB)
-  Change Over Disconnect Switch
-  \* Alternative power connection point when system is shut down for emergency repairs or maintenance.

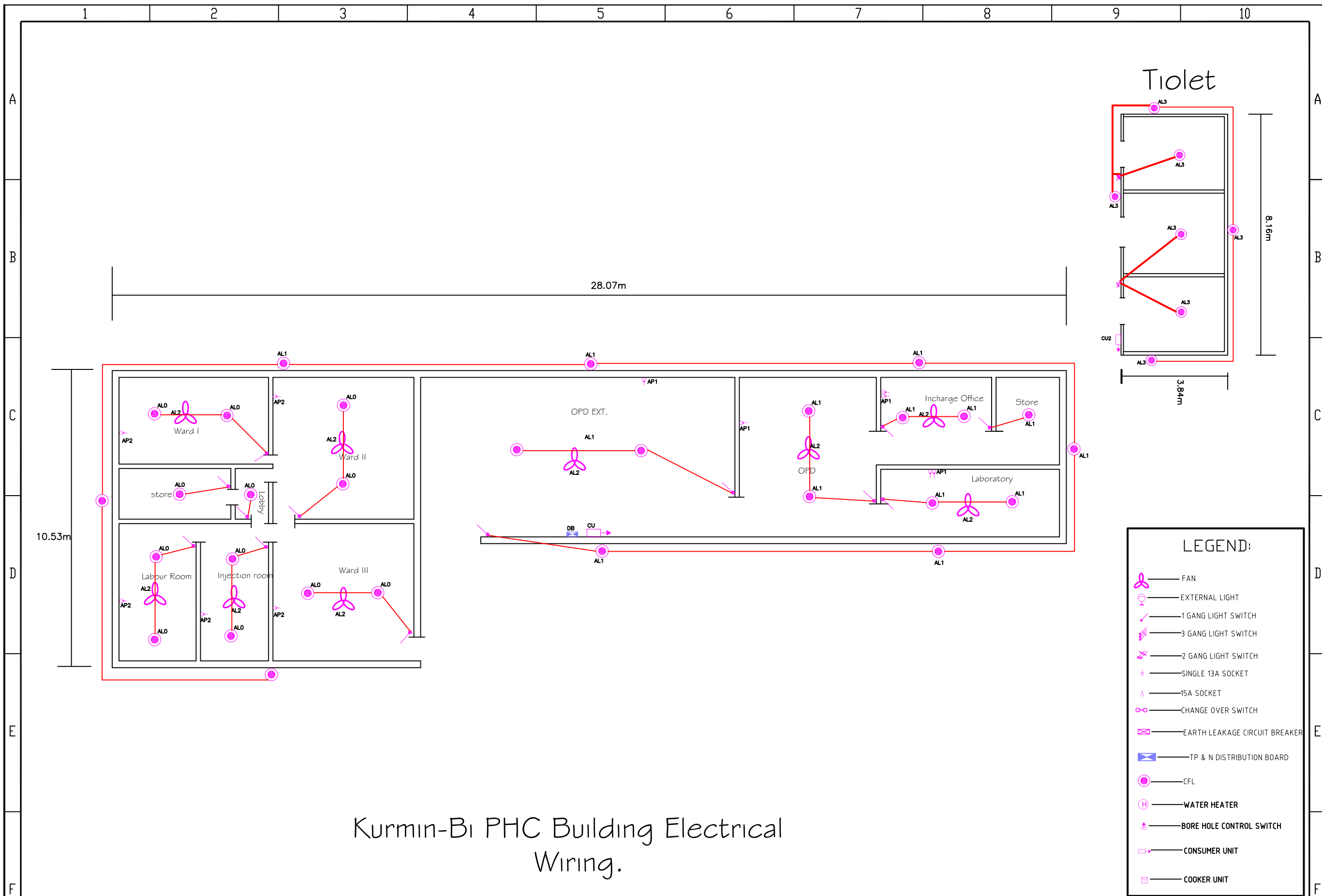
DRAWING NO.:	KSC/EM/RD/DRW/PHC27/0001	REVISION NO.:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
RETROFIT SCHEMATIC DRAWING  
FOR KURMIN-BI PHC

Electrical Schematic design showing the PV System and Grid connection to the Clinic Buildings

SCALE:	NTS
PAGE:	1 OF 4



## Kurmin-Bi PHC Building Electrical Wiring.

LEGEND:	
	FAN
	EXTERNAL LIGHT
	1 GANG LIGHT SWITCH
	3 GANG LIGHT SWITCH
	2 GANG LIGHT SWITCH
	SINGLE 13A SOCKET
	15A SOCKET
	CHANGE OVER SWITCH
	EARTH LEAKAGE CIRCUIT BREAKER
	TP & N DISTRIBUTION BOARD
	CFL
	WATER HEATER
	BORE HOLE CONTROL SWITCH
	CONSUMER UNIT
	COOKER UNIT

DRAWING NO:	KCS/EM/RD/DRW/PHC27/0002	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNIAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR KURMIN-BI PHC


Electrical wiring design showing the wiring and fitting connection in the Clinic Buildings

SCALE:	NTS
PAGE:	2 OF 4

### LOAD TABLE FOR KURMIN BI PHC

POWER SOURCE: GRID										
	MAIN CLINIC- 100A DISTRIBUTION BOARD						TOILET- NO DISTRIBUTION BOARD			TOTAL (W)
CIRCUIT IDENTITY										
MCB RATING										
DIVERSITY FACTOR										
LIGHTING CIRCUIT										
COOLING SYSTEM ( CEILING FAN)										
13AMP SOCKET FOR EQUIPMENT POWERING										-
15AMP SOCKET FOR EQUIPMENT POWERING										-
PEAK LOAD (W)										-
FINAL SUB-CIRCUIT		SPARE	SPARE	SPARE	SPARE	SPARE				
CABLE SIZES IN mm										

POWER SOURCE: PV SYSTEM										
		SYSTEM ID: <b>KURMIN BI SYS 1</b>								
		CAPACITY: <b>21,060 KWP</b>								
	MAIN CLINIC- 100A CONSUMER UNIT						TOILET- 32A CONSUMER UNIT			TOTAL (W)
CIRCUIT IDENTITY	AL0	AL1	AL2	AP1	AP2		AL3			
MCB RATING	10A	10A	10A	20A	20A		10A			
DIVERSITY FACTOR	0.9	0.9	0.9	0.6	0.6		0.9			
LIGHTING CIRCUIT	216	306					126			<b>648</b>
COOLING SYSTEM ( CEILING FAN)			675							<b>675</b>
13AMP SOCKET FOR EQUIPMENT POWERING										<b>210</b>
PEAK LOAD (W)										<b>1,533</b>
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT			13A SOCKET OUTLET		SPARE	LIGHTING & CEILING FAN CIRCUIT			
CABLE SIZES IN mm	3x1.5mm			3x2.5mm						

DRAWING NO:	KCS/EM/RD/LT/PHC27	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar LOAD DISTRIBUTION TABLE FOR KURMIN-BI PHC	Analysis of power distribution within the Clinic buildings	SCALE:	NTS
DESIGN BY:	MARTIN UNUAKHE								PAGE:	3 OF 4
DRAWN BY:	DANIEL MOMOH									
DATE:	OCTOBER									



**BILL OF MATERIALS FOR KURMIN BI PHC ELECTRICAL RETROFIT**

CLINIC BLOCK								KURMIN BI TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	9	1	Ceiling fan	No.	0	9
2	18 Watts CFL	No.	29	2	18 Watts CFL	No.	7	36
3	Roof mounted luminaire	No.	21	3	Roof mounted luminaire	No.	3	24
4	Wall mounted luminaire	No.	8	4	Wall mounted luminaire	No.	3	11
5	1 Gang light switch	No.	13	5	1 Gang light switch	No.		13
6	2 Gang light switch	No.		6	2 Gang light switch	No.	2	2
7	3 Gang light switch	No.		7	3 Gang light switch	No.		0
8	13 Amp socket single	No.	7	8	13 Amp socket single	No.		7
9	13 Amp socket double	No.	2	9	13 Amp socket double	No.		2
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	51	11	Junction box	No.	8	59
12	Single patress box (flush)	No.	20	12	Single patress box (flush)	No.	2	22
13	Double patress box (flush)	No.	2	13	Double patress box (flush)	No.	0	2
14	Single patress box (surface)	No.		14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	7	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	2	9
17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs Packs (100 per pack)	packs	1	17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs Packs (100 per pack)	packs	1	2
18	100A distribution board	No.	1	18	100A distribution board	No.		1
19	60A distribution board	No.		19	60A distribution board	No.		0
20	30A distribution board	No.		20	30A distribution board	No.		0
21	100A consumer unit	No.	1	21	100A consumer unit	No.		1
22	60A consumer unit	No.		22	60A consumer unit	No.		0
23	30A consumer unit	No.		23	30A consumer unit	No.	1	1
24	100A Residual current circuit breaker	No.	2	24	100A Residual current circuit breaker	No.		2
25	60A Residual current circuit breaker	No.		25	60A Residual current circuit breaker	No.		0
26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.	1	1
27	100A change over	No.	2	27	100A change over	No.		2
28	60A change over	No.		28	60A change over	No.		0
29	30A change over	No.		29	30A change over	No.		0
<b>1.5mm cable (Twin &amp; Earth)</b>				<b>1.5mm cable (Twin &amp; Earth)</b>				
30	ALO&AL1 (Lighting circuit)	Mts	250	30	AL3 (Lighting circuit)	Mts	170	
31	AL2 (Ceiling fan circuit)	Mts	120	31		Mts		
32	<b>Total 1.5mm cable</b>	Mts	<b>370</b>	32	<b>Total 1.5mm cable</b>	Mts	<b>170</b>	<b>540</b>
<b>2.5mm cable (Twin &amp; Earth)</b>				<b>2.5mm cable (Twin &amp; Earth)</b>				
33	AP1 (Socket circuit)	Mts	110	33		Mts		
	AP2 (Socket circuit)	Mts	50					
34	<b>Total 2.5mm cable</b>	Mts	<b>160</b>	34	<b>Total 2.5mm cable</b>	Mts	<b>0</b>	<b>160</b>
35	4x16mm PVC/SWA/PVC armoured cable	Mts	100	35	4x16mm PVC/SWA/PVC armoured cable	Mts		100
36	4x10mm PVC/SWA/PVC armoured cable	Mts		36	4x10mm PVC/SWA/PVC armoured cable	Mts		0
37	4x6mm PVC/SWA/PVC armoured cable	Mts		37	4x6mm PVC/SWA/PVC armoured cable	Mts	60	60
38	4x4mm PVC/SWA/PVC armoured cable	Mts		38	4x4mm PVC/SWA/PVC armoured cable	Mts		0
39	Cable terminating lugs	No.	16	39	Cable terminating lugs	No.	16	32
40	Recline cable (25mm)	Mts	60	40	Recline cable (25mm)	Mts	60	120
41	Earth wire for building (16mm)	Mts	60	41	Earth wire for building (16mm)	Mts	60	120
42	Underground marking tape	Mts	100	42	Underground marking tape	Mts	60	160

DRAWING NO:	KCS/EM/RD/BOM/PHC27	REVISION NO:	2	Rev. DATE:
DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR KURMIN-BI PHC

Material quantities required for the  
electrical installation

SCALE: NTS  
PAGE: 4 OF 4

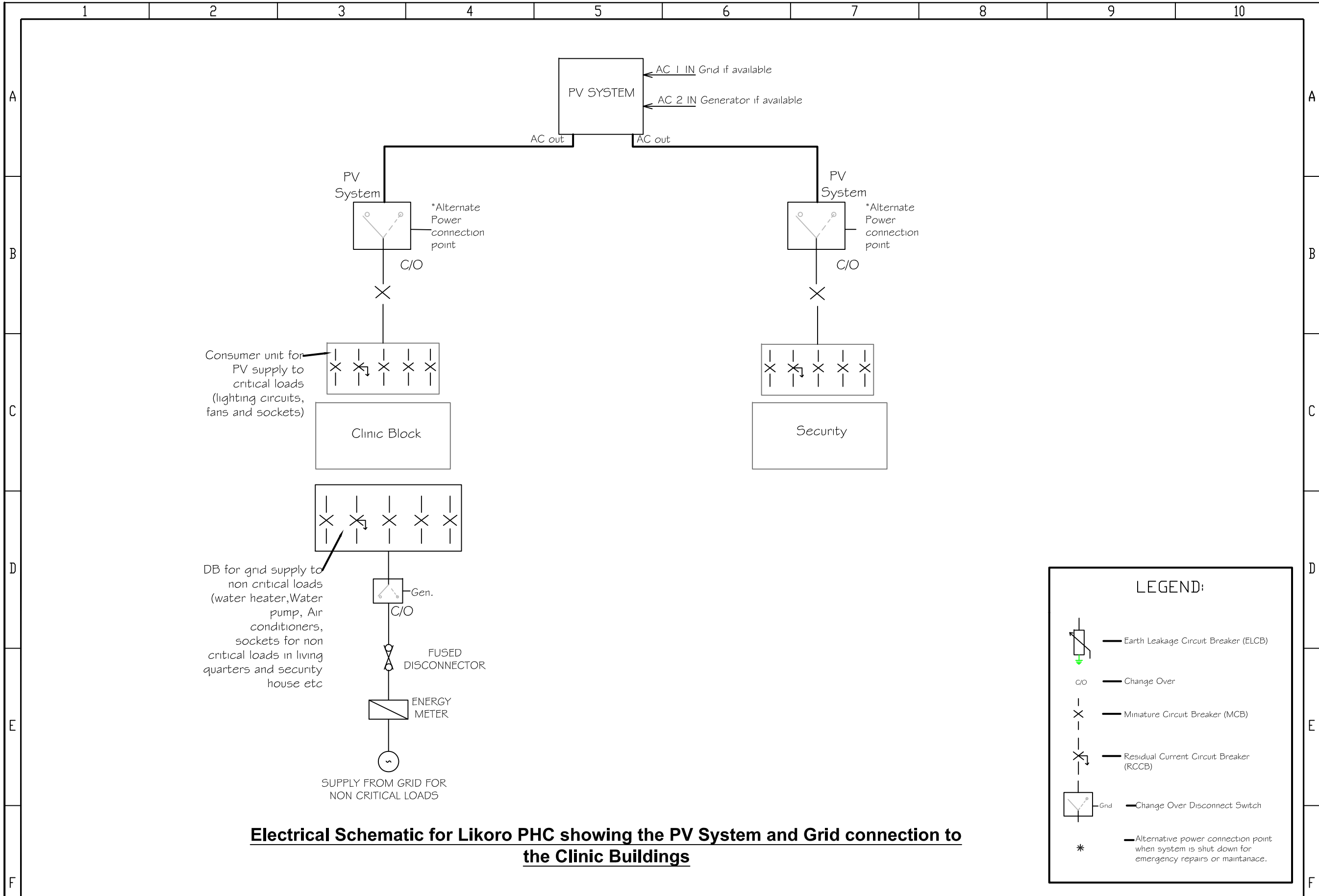
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Electrical System Design for Likoro PHC







- Electrical Schematic for PV and Grid connection to PHC
  - Electrical wiring diagram for PHC Buildings.
  - Load Table for PHC Buildings
  - Bill of Materials for electrical retrofit
- 

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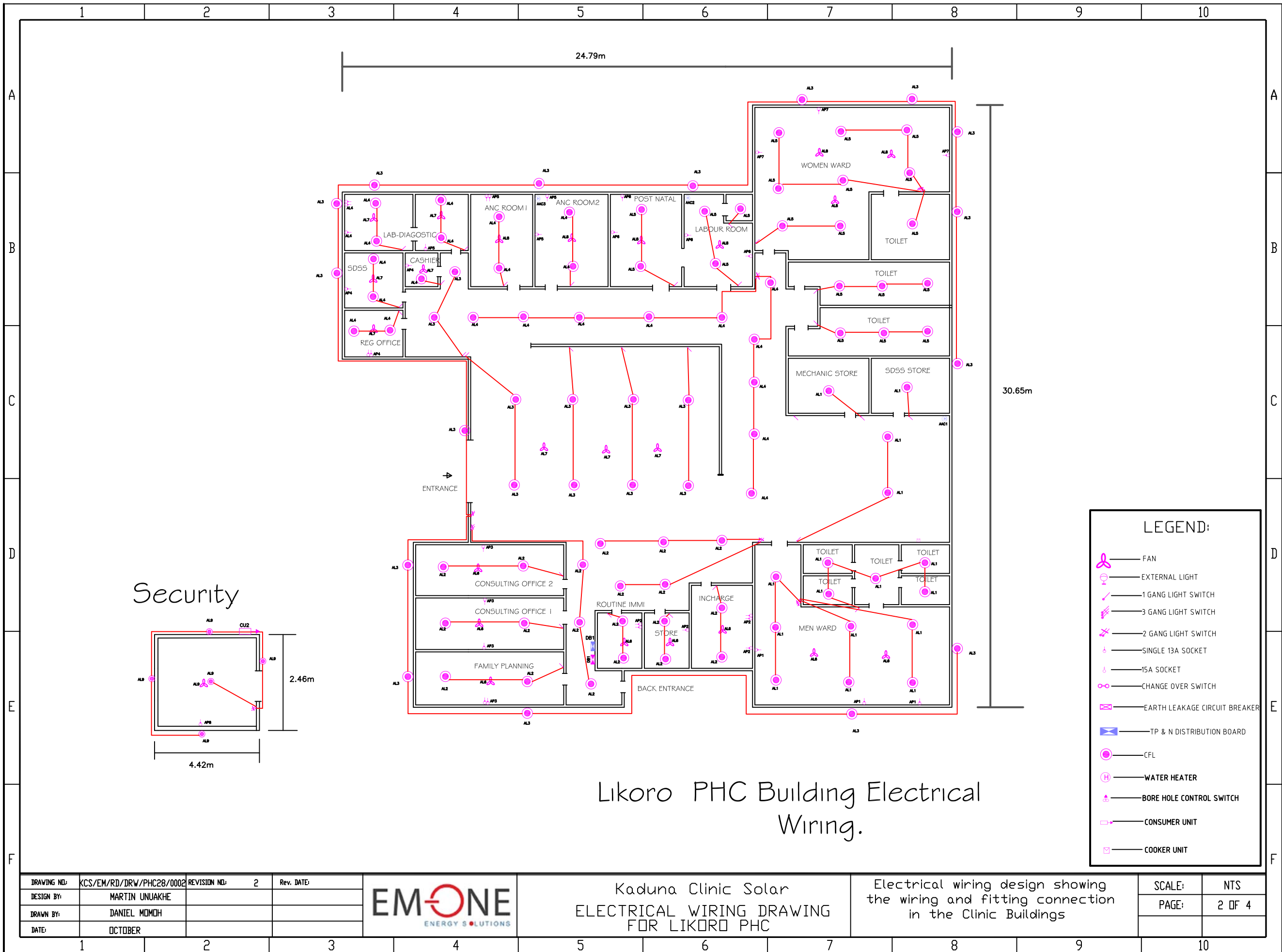


**Electrical Schematic for Likoro PHC showing the PV System and Grid connection to the Clinic Buildings**

**LEGEND:**

-  Earth Leakage Circuit Breaker (ELCB)
-  Change Over
-  Miniature Circuit Breaker (MCB)
-  Residual Current Circuit Breaker (RCCB)
-  Change Over Disconnect Switch
-  \* Alternative power connection point when system is shut down for emergency repairs or maintenance.

DRAWING NO:	KSC/EM/RD/DRW/PHC28/0001	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar RETROFIT SCHEMATIC DRAWING FOR LIKORO PHC	Electrical Schematic design showing the PV System and Grid connection to the Clinic Buildings	SCALE:	NTS
DESIGN BY:	MARTIN UNJAKHE								PAGE:	1 OF 4
DRAWN BY:	DANIEL MOMOH									
DATE:	OCTOBER									



## Likoro PHC Building Electrical Wiring.

DRAWING NO:	KCS/EM/RD/DRW/PHC28/0002	REVISION NO:	2	Rev. DATE:
DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR LIKORO PHC

Electrical wiring design showing  
the wiring and fitting connection  
in the Clinic Buildings

SCALE:	NTS
PAGE:	2 OF 4

### LOAD TABLE FOR LIKORO PHC

POWER SOURCE: GRID	MAIN CLINIC- 100A DISTRIBUTION BOARD														SECURITY- NO DISTRIBUTION BOARD				TOTAL (W)	
CIRCUIT IDENTITY	AAC1	AAC2	AAC3																	
MCE RATING	20A	20A	20A																	
DIVERSITY FACTOR	0.6	0.6	0.6																	
LIGHTING CIRCUIT																				
COOLING SYSTEM ( CEILING FAN)																				
13AMP SOCKET FOR EQUIPMENT POWERING																				-
15AMP SOCKET FOR EQUIPMENT POWERING	1,500	1,500	1,500																	4,500
PEAK LOAD (W)																				4,500
FINAL SUB-CIRCUIT	13A SOCKET OUTLET			SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE					
CABLE SIZES IN mm	3x2.5mm																			

POWER SOURCE: PV SYSTEM	SYSTEM ID: LIKORO SYS 1 & SYS 2 CAPACITY: 2x28,080 KWP														MAIN CLINIC- 100A CONSUMER UNIT				SECURITY- 32A CONSUMER UNIT				TOTAL (W)
CIRCUIT IDENTITY	AL1	AL2	AL3	AL4	AL5	AL6	AL7	AL8	AP1	AP2	AP3	AP4	AP5	AP6	AP7	AL9	AP8						
MCE RATING	10A	10A	10A	10A	10A	10A	10A	10A	20A	20A	20A	20A	20A	20A	20A	10A	20A						
DIVERSITY FACTOR	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.9	0.6						
LIGHTING CIRCUIT	414	360	468	414	360											90				2,106			
COOLING SYSTEM ( CEILING FAN)						600	600	525								75				1,800			
13AMP SOCKET FOR EQUIPMENT POWERING									200	200	200	300	300	300	300		60			1,860			
PEAK LOAD (W)																				5,766			
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT						13A SOCKET OUTLET						SPARE	SPARE	LIGHTING & CEILING FAN	13A SOCKET OUTLET							
CABLE SIZES IN mm	3x1.5mm						3x2.5mm								3x1.5mm	3x2.5mm							
RED PHASE							600	525			200	300	300							1925			
YELLOW PHASE			468		360	600								300	300					2028			
BLUE PHASE	414	360		414					200	200						165	60			1813			
TOTAL (W)																				5766			

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DESIGN BY:	MARTIN UNUAKHE				
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DATE:	OCTOBER				



Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR LIKORO PHC

Analysis of power distribution  
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

**BILL OF MATERIALS FOR LIKORO PHC ELECTRICAL RETROFIT**

CLINIC BLOCK				SECURITY HOUSE				LIKORO TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	23	1	Ceiling fan	No.	1	24
2	18 Watts CFL	No.	96	2	18 Watts CFL	No.	5	101
3	Roof mounted luminaire	No.	80	3	Roof mounted luminaire	No.	1	81
4	Wall mounted luminaire	No.	16	4	Wall mounted luminaire	No.	4	20
5	1 Gang light switch	No.	28	5	1 Gang light switch	No.		28
6	2 Gang light switch	No.	4	6	2 Gang light switch	No.	1	5
7	3 Gang light switch	No.	2	7	3 Gang light switch	No.		2
8	13 Amp socket single	No.	21	8	13 Amp socket single	No.	1	22
9	13 Amp socket double	No.	6	9	13 Amp socket double	No.		6
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	157	11	Junction box	No.	7	164
12	Single patress box (flush)	No.	55	12	Single patress box (flush)	No.	2	57
13	Double patress box (flush)	No.	6	13	Double patress box (flush)	No.	0	6
14	Single patress box (surface)	No.		14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	23	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	1	24
17	PVC accessories, male bush, saddle clamp, angle bend, screws and pegs Packs (100 per pack)	packs	1	17	PVC accessories, male bush, saddle clamp, angle bend, screws and pegs	packs	1	2
18	100A distribution board	No.	2	18	100A distribution board	No.		2
19	60A distribution board	No.		19	60A distribution board	No.		0
20	30A distribution board	No.		20	30A distribution board	No.		0
21	100A consumer unit	No.		21	100A consumer unit	No.		0
22	60A consumer unit	No.		22	60A consumer unit	No.		0
23	30A consumer unit	No.		23	30A consumer unit	No.	1	1
24	100A Residual current circuit breaker	No.	2	24	100A Residual current circuit breaker	No.		2
25	60A Residual current circuit breaker	No.		25	60A Residual current circuit breaker	No.		0
26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.	1	1
27	100A change over	No.	2	27	100A change over	No.		2
28	60A change over	No.		28	60A change over	No.		0
29	30A change over	No.		29	30A change over	No.		0
	<b>1.5mm cable (Twin &amp; Earth)</b>				<b>1.5mm cable (Twin &amp; Earth)</b>			<b>0</b>
30	AL1 (Lighting circuit)	Mts	150	30	AL9 (Lighting circuit)	Mts	50	
31	AL2 (Lighting circuit)	Mts	190	31		Mts		
32	AL3 (Lighting circuit)	Mts	180	32		Mts		
33	AL4 (Lighting circuit)	Mts	160	33		Mts		
34	AL5 (Lighting circuit)	Mts	180	34		Mts		
35	AL6 (Ceiling fan circuit)	Mts	130	35		Mts		
36	AL7 (Ceiling fan circuit)	Mts	130	36		Mts		
37	AL8 (Ceiling fan circuit)	Mts	120	37		Mts		
38	<b>Total 1.5mm cable</b>	Mts	<b>1240</b>	38	<b>Total 1.5mm cable</b>	Mts	<b>50</b>	<b>1290</b>
	<b>2.5mm cable (Twin &amp; Earth)</b>				<b>2.5mm cable (Twin &amp; Earth)</b>			
39	AP1 (Socket circuit)	Mts	60	39	AP8 (Socket circuit)	Mts	30	
40	AP2 (Socket circuit)	Mts	70	40		Mts		
41	AP3 (Socket circuit)	Mts	70	41		Mts		
42	AP4 (Socket circuit)	Mts	80	42		Mts		
43	AP5 (Socket circuit)	Mts	70	43		Mts		
44	AP6 (Socket circuit)	Mts	70	44		Mts		
45	AP7 (Socket circuit)	Mts	60	45		Mts		
46	<b>Total 2.5mm cable</b>	Mts	<b>480</b>	46	<b>Total 2.5mm cable</b>	Mts	<b>30</b>	<b>510</b>
47	4x16mm PVC/SWA/PVC armoured cable	Mts	100	47	4x16mm PVC/SWA/PVC armoured cable	Mts		100
48	4x10mm PVC/SWA/PVC armoured cable	Mts		48	4x10mm PVC/SWA/PVC armoured cable	Mts		0
49	4x6mm PVC/SWA/PVC armoured cable	Mts		49	4x6mm PVC/SWA/PVC armoured cable	Mts	60	60
50	4x4mm PVC/SWA/PVC armoured cable	Mts		50	4x4mm PVC/SWA/PVC armoured cable	Mts		0
51	Cable terminating lugs	No.	16	51	Cable terminating lugs	No.	16	32
52	Recline cable (25mm)	Mts	60	52	Recline cable (25mm)	Mts		60
53	Earth wire for building (16mm)	Mts	70	53	Earth wire for building (16mm)	Mts	60	130
54	Underground marking tape	Mts	100	54	Underground marking tape	Mts	60	160

DRAWING NO:	KCS/EM/RD/BOM/PHC28	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR LIKORO PHC

Material quantities required for the electrical installation

SCALE: NTS  
PAGE: 4 OF 4

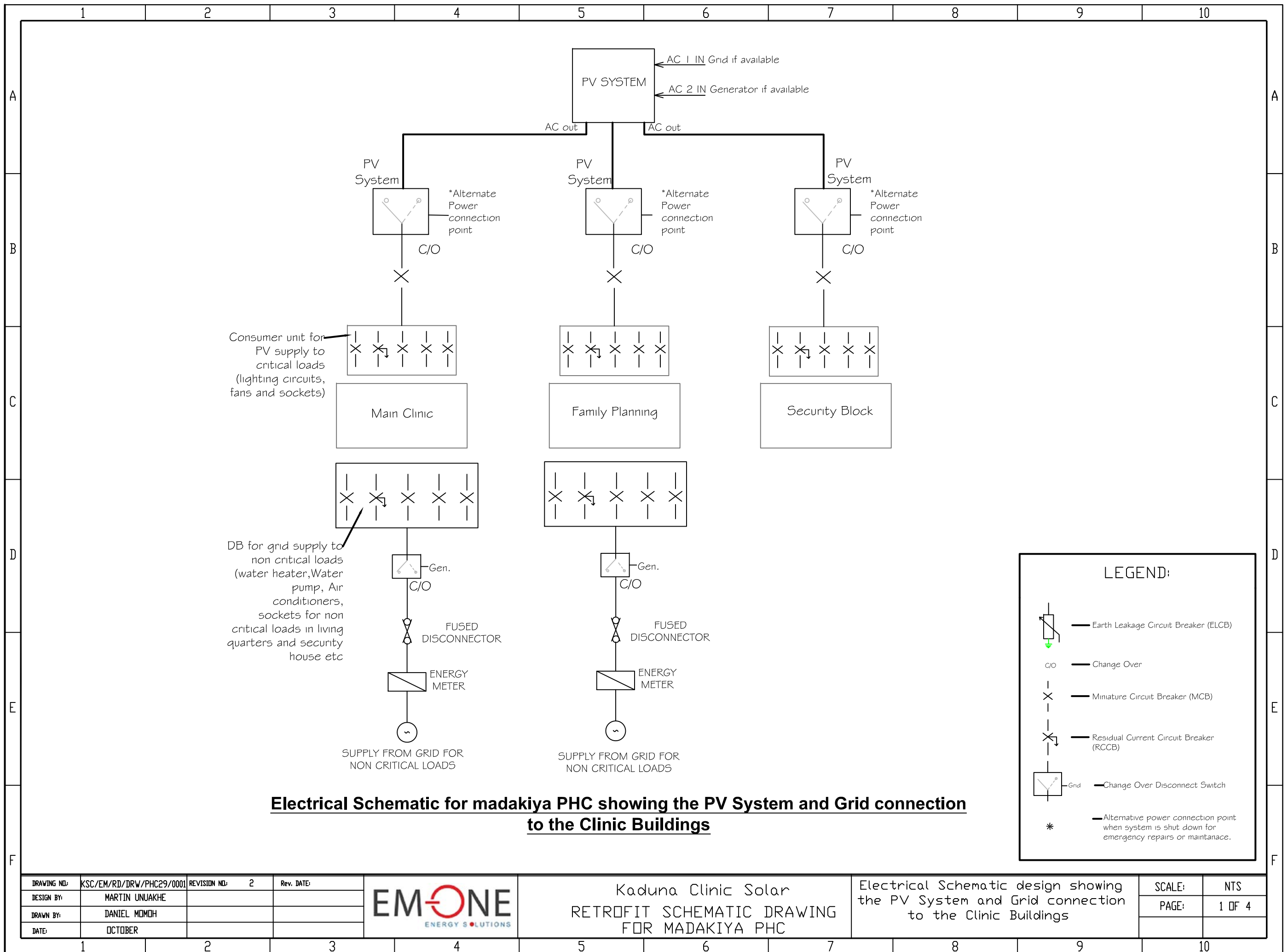
KADUNA CLINICS PROJECT  
KCS/EM/RD/DRW/PHC29

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Electrical System Design for Madakiya PHC

- Electrical Schematic for PV and Grid connection to PHC
  - Electrical wiring diagram for PHC Buildings.
  - Load Table for PHC Buildings
  - Bill of Materials for electrical retrofit
- 

October 2015



**Electrical Schematic for madakiya PHC showing the PV System and Grid connection to the Clinic Buildings**

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DESIGN BY:	MARTIN UNJAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



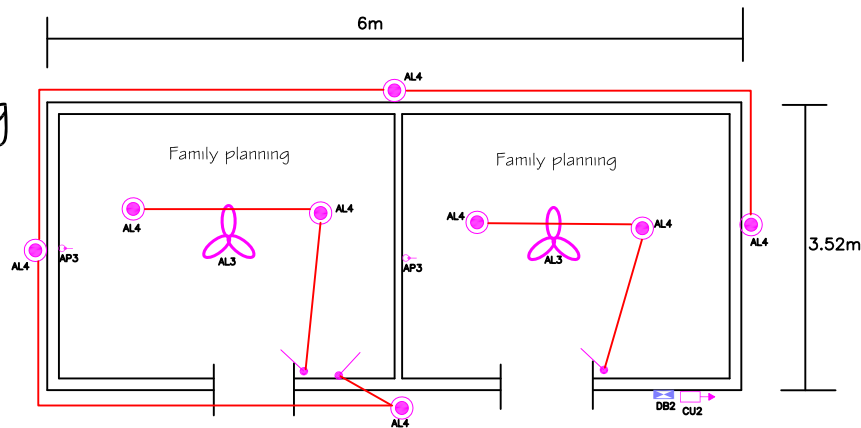
Kaduna Clinic Solar  
RETROFIT SCHEMATIC DRAWING  
FOR MADAKIYA PHC

Electrical Schematic design showing  
the PV System and Grid connection  
to the Clinic Buildings

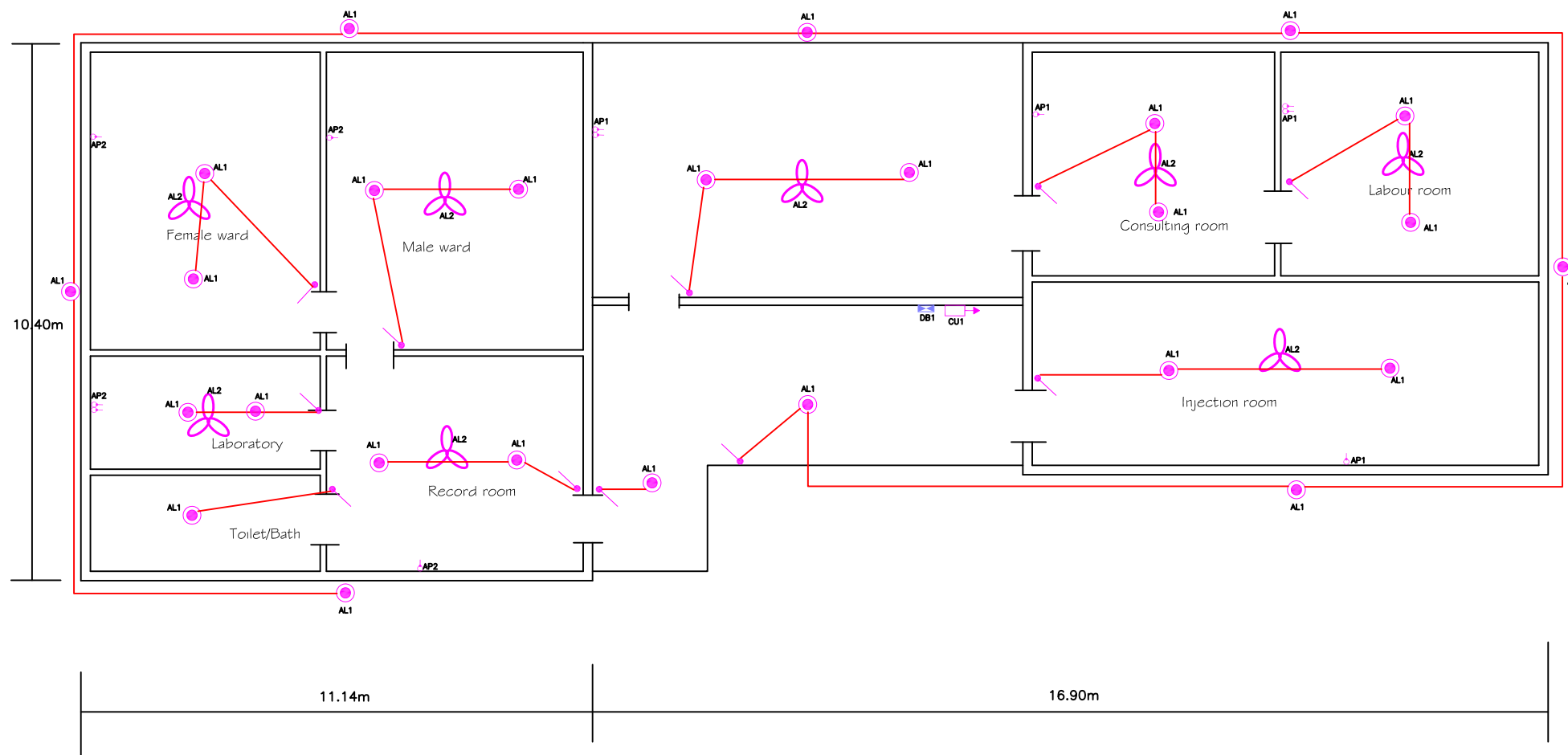
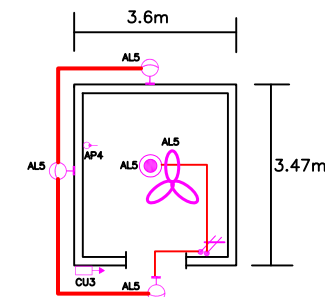
SCALE:	NTS
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Family Planning



Security



**LEGEND:**

- FAN
- EXTERNAL LIGHT
- 1 GANG LIGHT SWITCH
- 3 GANG LIGHT SWITCH
- 2 GANG LIGHT SWITCH
- SINGLE 13A SOCKET
- 15A SOCKET
- CHANGE OVER SWITCH
- EARTH LEAKAGE CIRCUIT BREAKER
- TP & N DISTRIBUTION BOARD
- CFL
- WATER HEATER
- BORE HOLE CONTROL SWITCH
- CONSUMER UNIT
- COOKER UNIT

## Madakiya PHC Building Electrical Wiring.

DRAWING NO:	KCS/EM/RD/DRW/PHC29/0002	REVISION NO:	2	Rev. DATE:
DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR MADAKIYA PHC

Electrical wiring design showing  
the wiring and fitting connection  
in the Clinic Buildings

SCALE:	NTS
PAGE:	2 OF 4

### LOAD TABLE FOR MADAKIYA PHC

POWER SOURCE: GRID															
	CLINIC BLOCK- 100A DISTRIBUTION BOARD						FAMILY PLANNING UNIT- 60A DISTRIBUTION BOARD					SECURITY- NO DISTRIBUTION BOARD			TOTAL (W)
CIRCUIT IDENTITY															
MCB RATING															
DIVERSITY FACTOR															
LIGHTING CIRCUIT															
COOLING SYSTEM ( CEILING FAN)															
13AMP SOCKET FOR EQUIPMENT POWERING															-
15AMP SOCKET FOR EQUIPMENT POWERING															-
PEAK LOAD (W)															-
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE				
CABLE SIZES IN mm															

POWER SOURCE: PV SYSTEM	SYSTEM ID: <b>MADAKIYA SYS 1</b>															
	CAPACITY: <b>13,260 KWP</b>															
	CLINIC BLOCK- 100A CONSUMER UNIT						FAMILY PLANNING UNIT- 60A CONSUMER UNIT					SECURITY- 32A CONSUMER UNIT			TOTAL (W)	
CIRCUIT IDENTITY	AL1	AL2	AP1	AP2			AL3	AL4	AP3			AL5	AP4			
MCB RATING	10A	10A	20A	20A			10A	10A	20A			10A	20A			
DIVERSITY FACTOR	0.9	0.9	0.6	0.6			0.9	0.9	0.6			0.9	0.6			
LIGHTING CIRCUIT	468							144				72				<b>684</b>
COOLING SYSTEM ( CEILING FAN)		600					150									<b>750</b>
13AMP SOCKET FOR EQUIPMENT POWERING																
PEAK LOAD (W)																<b>1,434</b>
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT		13A SOCKET OUTLET		SPARE	SPARE	LIGHTING & CEILING FAN CIRCUIT		13A SOCKET OUTLET		SPARE	SPARE				
CABLE SIZES IN mm	3x1.5mm		3x2.5mm				3x1.5mm		3x2.5mm				3x1.5mm			

DRAWING NO:	KCS/EM/RD/LT/PHC29	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNJAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR MADAKIYA PHC

Analysis of power distribution  
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

1      2      3      4      5      6      7      8      9      10

A  
B  
C  
D  
E  
F

A  
B  
C  
D  
E  
F

1      2      3      4      5      6      7      8      9      10

**BILL OF MATERIALS FOR MADAKIYA PHC ELECTRICAL RETROFIT**

CLINIC BLOCK				FAMILY PLANNING ROOM				SECURITY HOUSE				MADAKIYA TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	8	1	Ceiling fan	No.	2	1	Ceiling fan	No.	1	11
2	18 Watts CFL	No.	26	2	18 Watts CFL	No.	8	2	18 Watts CFL	No.	4	38
3	Roof mounted luminaire	No.	19	3	Roof mounted luminaire	No.	4	3	Roof mounted luminaire	No.	1	24
4	Wall mounted luminaire	No.	7	4	Wall mounted luminaire	No.	4	4	Wall mounted luminaire	No.	3	14
5	1 Gang light switch	No.	11	5	1 Gang light switch	No.	3	5	1 Gang light switch	No.		14
6	2 Gang light switch	No.		6	2 Gang light switch	No.		6	2 Gang light switch	No.	1	1
7	3 Gang light switch	No.		7	3 Gang light switch	No.		7	3 Gang light switch	No.		0
8	13 Amp socket single	No.	4	8	13 Amp socket single	No.	2	8	13 Amp socket single	No.	1	7
9	13 Amp socket double	No.	3	9	13 Amp socket double	No.		9	13 Amp socket double	No.		3
10	15 Amp socket	No.		10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	44	11	Junction box	No.	13	11	Junction box	No.	6	63
12	Single patress box (flush)	No.	15	12	Single patress box (flush)	No.	5	12	Single patress box (flush)	No.	2	22
13	Double patress box (flush)	No.	3	13	Double patress box (flush)	No.	0	13	Double patress box (flush)	No.	0	3
14	Single patress box (surface)	No.		14	Single patress box (surface)	No.		14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		15	Double patress box (surface)	No.		15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	7	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	2	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	1	9
17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs Packs (100 per pack)	packs	1	17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs	packs	1	17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs	packs	1	3
18	100A distribution board	No.	1	18	100A distribution board	No.		18	100A distribution board	No.		1
19	60A distribution board	No.		19	60A distribution board	No.	1	19	60A distribution board	No.		1
20	30A distribution board	No.		20	30A distribution board	No.		20	30A distribution board	No.		0
21	100A consumer unit	No.	1	21	100A consumer unit	No.		21	100A consumer unit	No.		1
22	60A consumer unit	No.		22	60A consumer unit	No.	1	22	60A consumer unit	No.		1
23	30A consumer unit	No.		23	30A consumer unit	No.		23	30A consumer unit	No.	1	1
24	100A Residual current circuit breaker	No.	2	24	100A Residual current circuit breaker	No.		24	100A Residual current circuit breaker	No.		2
25	60A Residual current circuit breaker	No.		25	60A Residual current circuit breaker	No.	2	25	60A Residual current circuit breaker	No.		2
26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.	1	1
27	100A change over	No.	2	27	100A change over	No.		27	100A change over	No.		2
28	60A change over	No.		28	60A change over	No.	2	28	60A change over	No.		2
29	30A change over	No.		29	30A change over	No.		29	30A change over	No.		0
<b>1.5mm cable (Twin &amp; Earth)</b>				<b>1.5mm cable (Twin &amp; Earth)</b>				<b>1.5mm cable (Twin &amp; Earth)</b>				
30	AL1 (Lighting circuit)	Mts	220	30	AL3 (Ceiling fan circuit)	Mts	40	30	AL5 (Lighting circuit)	Mts	50	
31	AL2 (Ceiling fan circuit)	Mts	130	31	AL4 (Lighting circuit)	Mts	70	31		Mts		
32	<b>Total 1.5mm cable</b>	Mts	<b>350</b>	32	<b>Total 1.5mm cable</b>	Mts	<b>110</b>	32	<b>Total 1.5mm cable</b>	Mts	<b>50</b>	<b>510</b>
<b>2.5mm cable (Twin &amp; Earth)</b>				<b>2.5mm cable (Twin &amp; Earth)</b>				<b>2.5mm cable (Twin &amp; Earth)</b>				
33	AP1 (Socket circuit)	Mts	70	33	AP3 (Socket circuit)	Mts	40	33	AP4 (Socket circuit)	Mts	20	
34	AP2 (Socket circuit)	Mts	70	34		Mts		34		Mts		
35	<b>Total 2.5mm cable</b>	Mts	<b>140</b>	35	<b>Total 2.5mm cable</b>	Mts	<b>40</b>	35	<b>Total 2.5mm cable</b>	Mts	<b>20</b>	<b>200</b>
36	4x16mm PVC/SWA/PVC armoured cable	Mts	100	36	4x16mm PVC/SWA/PVC armoured cable	Mts	60	36	4x16mm PVC/SWA/PVC armoured cable	Mts		160
37	4x10mm PVC/SWA/PVC armoured cable	Mts		37	4x10mm PVC/SWA/PVC armoured cable	Mts		37	4x10mm PVC/SWA/PVC armoured cable	Mts		0
38	4x6mm PVC/SWA/PVC armoured cable	Mts		38	4x6mm PVC/SWA/PVC armoured cable	Mts		38	4x6mm PVC/SWA/PVC armoured cable	Mts	50	50
39	4x4mm PVC/SWA/PVC armoured cable	Mts		39	4x4mm PVC/SWA/PVC armoured cable	Mts		39	4x4mm PVC/SWA/PVC armoured cable	Mts		0
40	Cable terminating lugs	No.	16	40	Cable terminating lugs	No.	16	40	Cable terminating lugs	No.	8	40
41	Recline cable (25mm)	Mts	60	41	Recline cable (25mm)	Mts	60	41	Recline cable (25mm)	Mts		120
42	Earth wire for building (16mm)	Mts	60	42	Earth wire for building (16mm)	Mts	60	42	Earth wire for building (16mm)	Mts	60	180
43	Underground marking tape	Mts	100	43	Underground marking tape	Mts	60	43	Underground marking tape	Mts	60	220

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DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR MADAKIYA PHC

Material quantities required for the  
electrical installation

SCALE: NTS  
PAGE: 4 OF 4

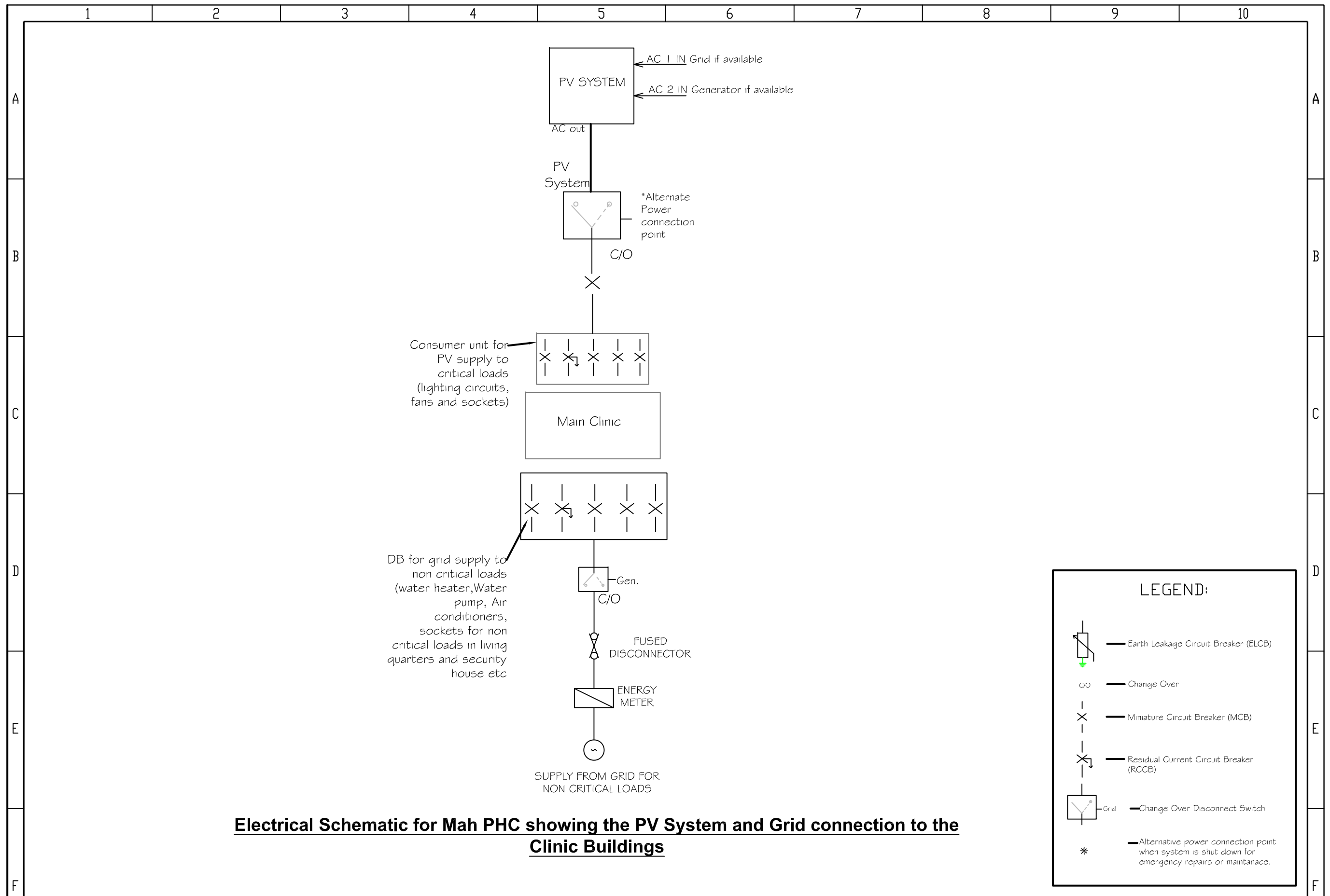
KADUNA CLINICS PROJECT  
KCS/EM/RD/DRW/PHC30

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Electrical System Design for Mah PHC

- Electrical Schematic for PV and Grid connection to PHC
  - Electrical wiring diagram for PHC Buildings.
  - Load Table for PHC Buildings
  - Bill of Materials for electrical retrofit
- 

October 2015



**Electrical Schematic for Mah PHC showing the PV System and Grid connection to the Clinic Buildings**

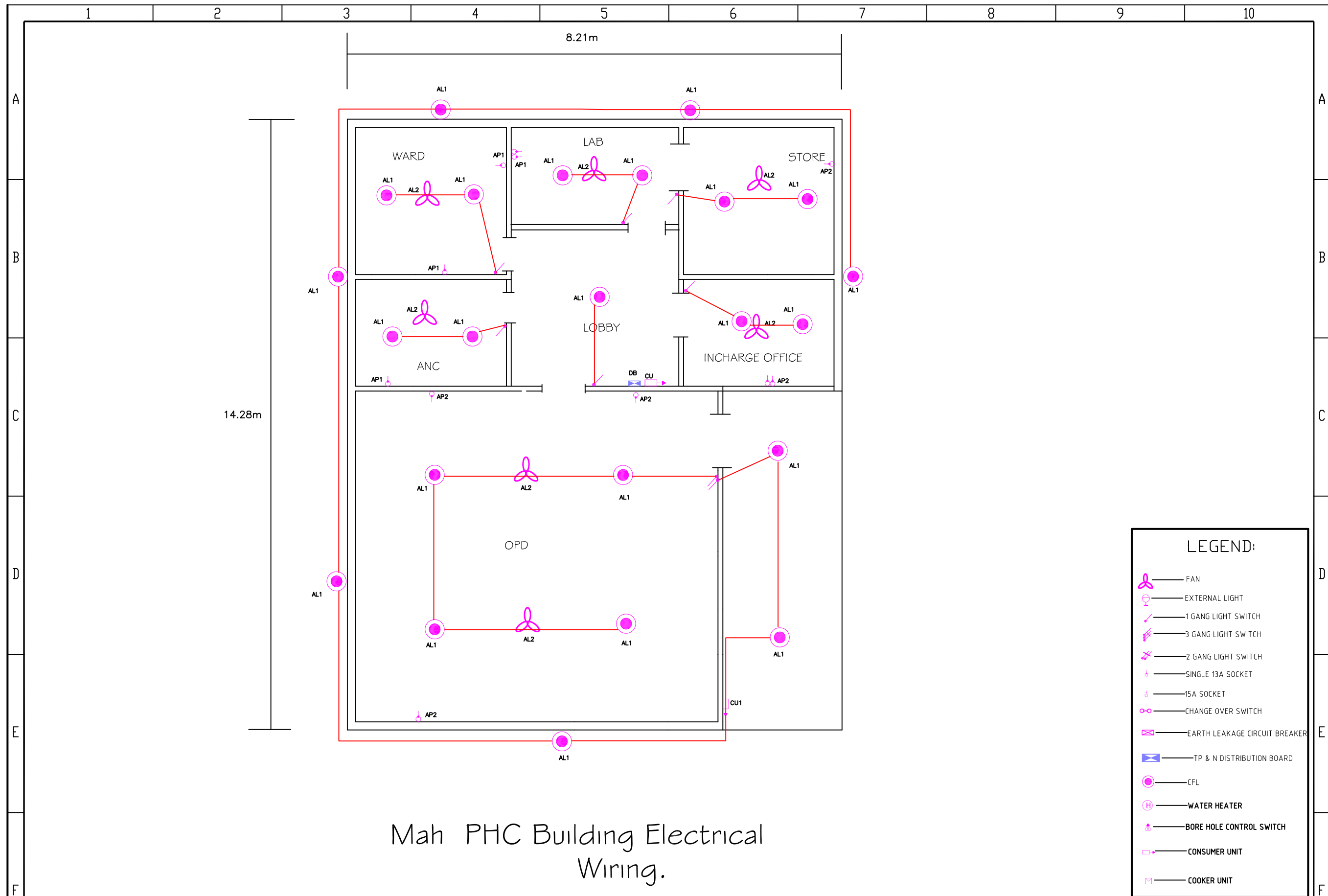
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DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
RETROFIT SCHEMATIC DRAWING  
FOR MAH PHC

Electrical Schematic design showing  
the PV System and Grid connection  
to the Clinic Buildings

SCALE:	NTS
PAGE:	1 OF 4



## Mah PHC Building Electrical Wiring.

DRAWING NO:	KCS/EM/RD/DRW/PHC30/0002	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR MAH PHC

Electrical wiring design showing  
the wiring and fitting connection  
in the Clinic Buildings

SCALE:	NTS
PAGE:	2 OF 4

### LOAD TABLE FOR MAH PHC

POWER SOURCE: GRID							
	MAIN CLINIC- 100A DISTRIBUTION BOARD						TOTAL (W)
CIRCUIT IDENTITY							
MCB RATING							
DIVERSITY FACTOR							
LIGHTING CIRCUIT							
COOLING SYSTEM ( CEILING FAN)							
13AMP SOCKET FOR EQUIPMENT POWERING							-
15AMP SOCKET FOR EQUIPMENT POWERING							-
PEAK LOAD (W)							-
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	
CABLE SIZES IN mm							

POWER SOURCE: PV SYSTEM	SYSTEM ID: MAH SYS 1						
	CAPACITY: 13,260						
	MAIN CLINIC- 100A CONSUMER UNIT						TOTAL (W)
CIRCUIT IDENTITY	AL1	AL2	AP1	AP2			
MCB RATING	10A	10A	20A	20A			
DIVERSITY FACTOR	0.9	0.9	0.6	0.6			
LIGHTING CIRCUIT	414						414
COOLING SYSTEM ( CEILING FAN)		525					525
13AMP SOCKET FOR EQUIPMENT POWERING							
PEAK LOAD (W)							939
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT		13A SOCKET OUTLET		SPARE	SPARE	
CABLE SIZES IN mm	3x1.5mm		3x2.5mm				

DRAWING NO:	KCS/EM/RD/LT/PHC30	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNJAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR MAH PHC

Analysis of power distribution  
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

**BILL OF MATERIALS FOR MAH PHC ELECTRICAL RETROFIT**

CLINIC BLOCK				MAHTOTAL
S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	7	7
2	18 Watts CFL	No.	23	23
3	Roof mounted luminaire	No.	17	17
4	Wall mounted luminaire	No.	6	6
5	1 Gang light switch	No.	6	6
6	2 Gang light switch	No.	1	1
7	3 Gang light switch	No.		0
8	13 Amp socket single	No.	7	7
9	13 Amp socket double	No.	2	2
10	15 Amp socket	No.		0
11	Junction box	No.	39	39
12	Single patress box (flush)	No.	14	14
13	Double patress box (flush)	No.	2	2
14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	6	6
17	PVC accessories, male bush, saddle clamp, angle bend, screws and pegs Packs (100 per pack)	packs	1	1
18	100A distribution board	No.	1	1
19	60A distribution board	No.		0
20	30A distribution board	No.		0
21	100A consumer unit	No.	1	1
22	60A consumer unit	No.		0
23	30A consumer unit	No.		0
24	100A Residual current circuit breaker	No.	2	2
25	60A Residual current circuit breaker	No.		0
26	30A Residual current circuit breaker	No.		0
27	100A change over	No.	2	2
28	60A change over	No.		0
29	30A change over	No.		0
	<b>1.5mm cable (Twin &amp; Earth)</b>			
30	AL1 (Lighting circuit)	Mts	180	
31	AL2 (Ceiling fan circuit)	Mts	120	
32	<b>Total 1.5mm cable</b>	Mts	<b>300</b>	<b>300</b>
	<b>2.5mm cable (Twin &amp; Earth)</b>			
33	AP1 (Socket circuit)	Mts	80	
34	AP2 (Socket circuit)	Mts	90	
35	<b>Total 2.5mm cable</b>	Mts	<b>170</b>	<b>170</b>
36	4x16mm PVC/SWA/PVC armoured cable	Mts	60	60
37	4x10mm PVC/SWA/PVC armoured cable	Mts		0
38	4x6mm PVC/SWA/PVC armoured cable	Mts		0
39	4x4mm PVC/SWA/PVC armoured cable	Mts		0
40	Cable terminating lugs	No.	16	16
41	Recline cable (25mm)	Mts	50	50
42	Earth wire for building (16mm)	Mts	50	50
43	Underground marking tape	Mts	60	60

DRAWING NO:	KCS/EM/RD/BOM/PHC30	REVISION NO:	2	Rev. DATE:
DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR MAH PHC

Material quantities required for the electrical installation

SCALE:	NTS
PAGE:	4 OF 4



KADUNA CLINICS PROJECT  
KCS/EM/RD/DRW/PHC3 I

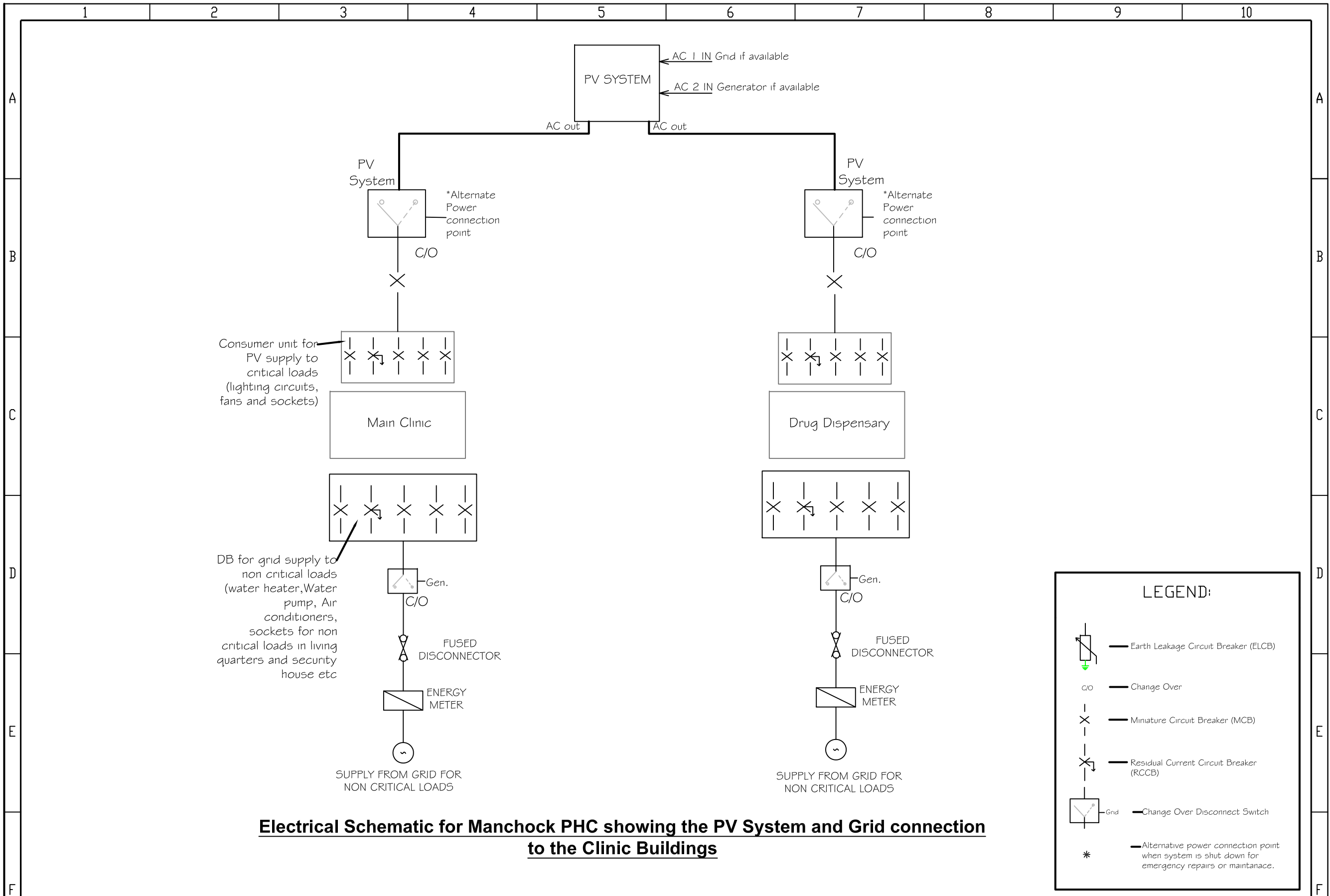
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Electrical System Design for Manchock PHC

- Electrical Schematic for PV and Grid connection to PHC
- Electrical wiring diagram for PHC Buildings.
- Load Table for PHC Buildings
- Bill of Materials for electrical retrofit

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October 2015



**Electrical Schematic for Manchock PHC showing the PV System and Grid connection to the Clinic Buildings**

DRAWING NO:	KSC/EM/RD/DRW/PHC31/0001	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				

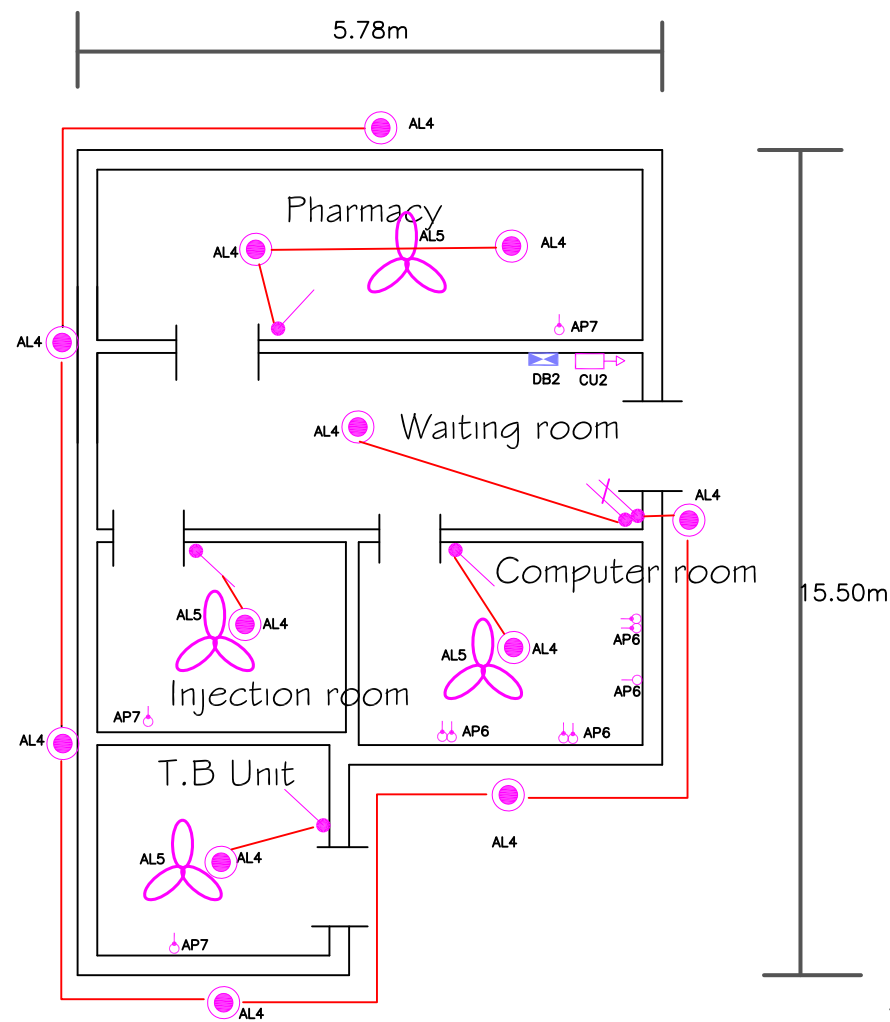


Kaduna Clinic Solar  
RETROFIT SCHEMATIC DRAWING  
FOR MANCHOCK PHC

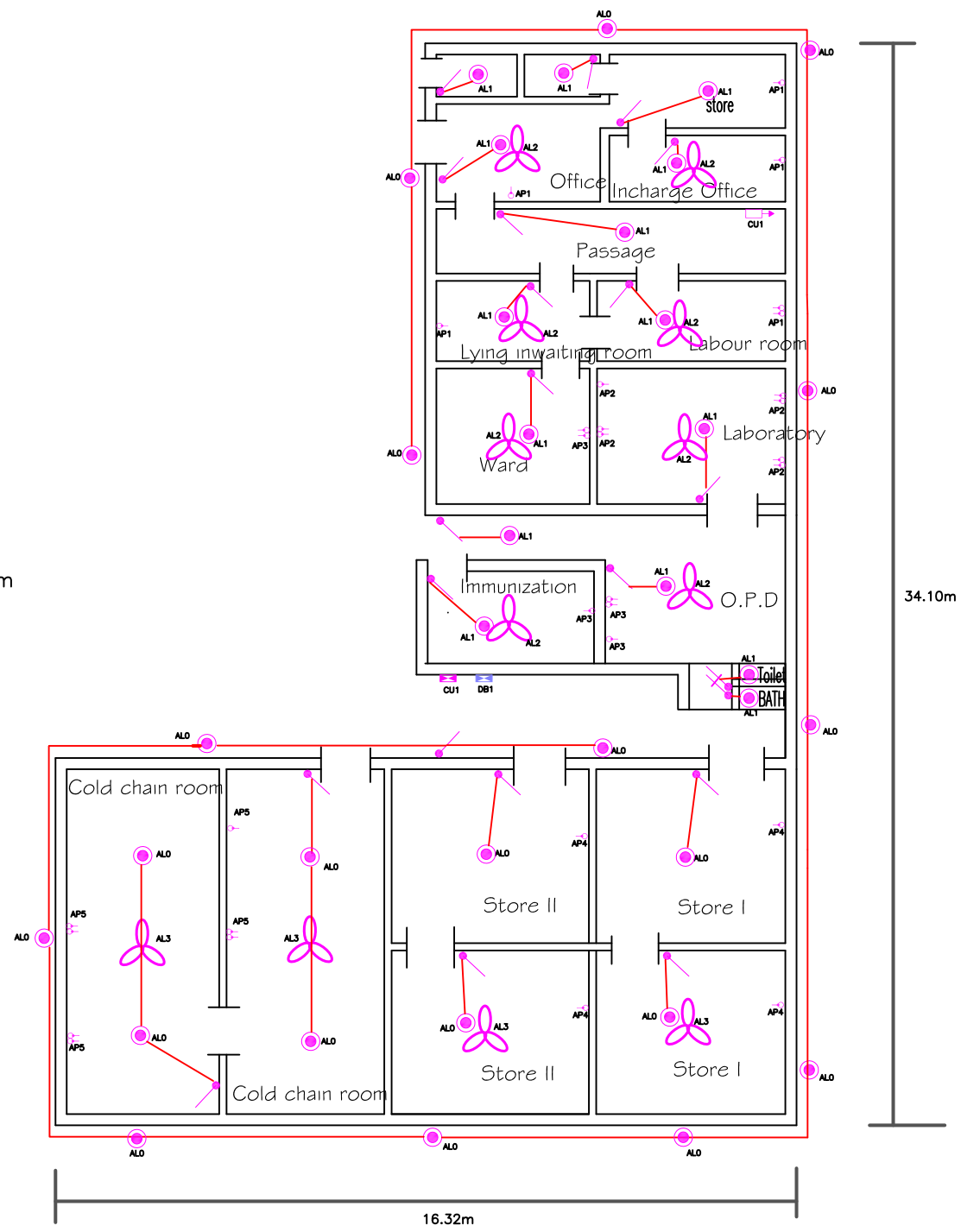
Electrical Schematic design showing the PV System and Grid connection to the Clinic Buildings

SCALE:	NTS
PAGE:	1 OF 4

# Drug Dispensary



# Main Clinic



## Manchock PHC Building Electrical Wiring.

LEGEND:	
	FAN
	EXTERNAL LIGHT
	1 GANG LIGHT SWITCH
	3 GANG LIGHT SWITCH
	2 GANG LIGHT SWITCH
	SINGLE 13A SOCKET
	15A SOCKET
	CHANGE OVER SWITCH
	EARTH LEAKAGE CIRCUIT BREAKER
	TP & N DISTRIBUTION BOARD
	CFL
	WATER HEATER
	BORE HOLE CONTROL SWITCH
	CONSUMER UNIT
	COOKER UNIT

DRAWING NO:	KCS/EM/RD/DRW/PHC31/0002	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR MANCHOCK PHC

Electrical wiring design showing  
the wiring and fitting connection  
in the Clinic Buildings

SCALE:	NTS
PAGE:	2 OF 4

**LOAD TABLE FOR MANCHOCK PHC**

POWER SOURCE: GRID	CLINIC BLOCK- 100A DISTRIBUTION BOARD										DRUG DISPENSARY- 63A DISTRIBUTION BOARD				TOTAL (W)
CIRCUIT IDENTITY															
MCB RATING															
DIVERSITY FACTOR															
LIGHTING CIRCUIT															
COOLING SYSTEM ( CEILING FAN)															
13AMP SOCKET FOR EQUIPMENT POWERING															-
15AMP SOCKET FOR EQUIPMENT POWERING															-
PEAK LOAD (W)															-
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	
CABLE SIZES IN mm															

POWER SOURCE: PV SYSTEM	SYSTEM ID: MANCHOK SYS 1 & SYS 2														TOTAL (W)	
	CAPACITY: 2x 28,080 KWP															
	CLINIC BLOCK- 100A CONSUMER UNIT										DRUG DISPENSARY- 63A CONSUMER UNIT				TOTAL (W)	
CIRCUIT IDENTITY	AL0	AL1	AL2	AL3	AP1	AP2	AP3	AP4	AP5		AL4	AL5	AP6	AP7		
MCB RATING	10A	10A	10A	10A	20A	20A	20A	20A	20A		10A	10A	20A	20A		
DIVERSITY FACTOR	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.6	0.6		0.9	0.9	0.6	0.6		
LIGHTING CIRCUIT	378	270									468				1,116	
COOLING SYSTEM ( CEILING FAN)			600	300								300			1,200	
13AMP SOCKET FOR EQUIPMENT POWERING					400	400	400	400	400				400	300	2,700	
PEAK LOAD (W)															5,016	
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT				13A SOCKET OUTLET					SPARE	SPARE	LIGHTING & CEILING FAN CIRCUIT	13A SOCKET OUTLET	SPARE	SPARE	
CABLE SIZES IN mm	3x1.5mm				3x2.5mm							3x1.5mm	3x2.5mm			
RED PHASE								400	400				400	300	1500	
YELLOW PHASE	378	270	600	300								300			1848	
BLUE PHASE					400	400	400				468				1668	
TOTAL (W)															5016	

DRAWING NO:	KCS/EM/RD/LT/PHC31	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR MANCHOCK PHC

Analysis of power distribution  
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

**BILL OF MATERIALS FOR MANCHOK PHC ELECTRICAL RETROFIT**

CLINIC BLOCK				DRUG DISPENSARY				MANCHOK TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	12	1	Ceiling fan	No.	4	16
2	18 Watts CFL	No.	36	2	18 Watts CFL	No.	12	48
3	Roof mounted luminaire	No.	23	3	Roof mounted luminaire	No.	6	29
4	Wall mounted luminaire	No.	13	4	Wall mounted luminaire	No.	6	19
5	1 Gang light switch	No.	20	5	1 Gang light switch	No.	4	24
6	2 Gang light switch	No.	1	6	2 Gang light switch	No.	1	2
7	3 Gang light switch	No.		7	3 Gang light switch	No.		0
8	13 Amp socket single	No.	12	8	13 Amp socket single	No.	3	15
9	13 Amp socket double	No.	9	9	13 Amp socket double	No.	2	11
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	78	11	Junction box	No.	22	100
12	Single patress box (flush)	No.	33	12	Single patress box (flush)	No.	8	41
13	Double patress box (flush)	No.	9	13	Double patress box (flush)	No.	2	11
14	Single patress box (surface)	No.		14	Single patress box (surface)	No.		0
15	Double patress box (surface)	No.		15	Double patress box (surface)	No.		0
16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	13	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	4	17
17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs Packs (100 per pack)	packs	1	17	PVC accessories, male bush, saddle clamp, angle bend,screws and pegs	packs	1	2
18	100A distribution board	No.	2	18	100A distribution board	No.		2
19	60A distribution board	No.		19	60A distribution board	No.	2	2
20	30A distribution board	No.		20	30A distribution board	No.		0
21	100A consumer unit	No.		21	100A consumer unit	No.		0
22	60A consumer unit	No.		22	60A consumer unit	No.		0
23	30A consumer unit	No.		23	30A consumer unit	No.		0
24	100A Residual current circuit breaker	No.	2	24	100A Residual current circuit breaker	No.		2
25	60A Residual current circuit breaker	No.		25	60A Residual current circuit breaker	No.	2	2
26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.		0
27	100A change over	No.	2	27	100A change over	No.		2
28	60A change over	No.		28	60A change over	No.	2	2
29	30A change over	No.		29	30A change over	No.		0
<b>1.5mm cable (Twin &amp; Earth)</b>				<b>1.5mm cable (Twin &amp; Earth)</b>				
30	AL0 (Lighting circuit)	Mts	160	30	AL4 (Lighting circuit)	Mts	120	
31	AL1 (Lighting circuit)	Mts	240	31	AL5 (Ceiling fan circuit)	Mts	70	
32	AL2 (Ceiling fan circuit)	Mts	130	32		Mts		
33	AL3 (Ceiling fan circuit)	Mts	70	33		Mts		
34	<b>Total 1.5mm cable</b>	Mts	<b>600</b>	34	<b>Total 1.5mm cable</b>	Mts	<b>190</b>	<b>790</b>
<b>2.5mm cable (Twin &amp; Earth)</b>				<b>2.5mm cable (Twin &amp; Earth)</b>				
35	AP1 (Socket circuit)	Mts	90	35	AP6 (Socket circuit)	Mts	40	
36	AP2 (Socket circuit)	Mts	70	36	AP7 (Socket circuit)	Mts	60	
37	AP3 (Socket circuit)	Mts	70	37		Mts		
38	AP4 (Socket circuit)	Mts	70	38		Mts		
39	AP5 (Socket circuit)	Mts	70	39		Mts		
40	AP5 (Socket circuit)	Mts	70	40		Mts		
41	<b>Total 2.5mm cable</b>	Mts	<b>370</b>	41	<b>Total 2.5mm cable</b>	Mts	<b>100</b>	<b>470</b>
42	4x16mm PVC/SWA/PVC armoured cable	Mts	100	42	4x16mm PVC/SWA/PVC armoured cable	Mts	100	200
43	4x10mm PVC/SWA/PVC armoured cable	Mts		43	4x10mm PVC/SWA/PVC armoured cable	Mts		0
44	4x6mm PVC/SWA/PVC armoured cable	Mts		44	4x6mm PVC/SWA/PVC armoured cable	Mts		0
45	4x4mm PVC/SWA/PVC armoured cable	Mts		45	4x4mm PVC/SWA/PVC armoured cable	Mts		0
46	Cable terminating lugs	No.	16	46	Cable terminating lugs	No.	16	32
47	Recline cable (25mm)	Mts	50	47	Recline cable (25mm)	Mts	80	140
48	Earth wire for building (16mm)	Mts	70	48	Earth wire for building (16mm)	Mts	60	130
49	Underground marking tape	Mts	100	49	Underground marking tape	Mts	100	200

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DESIGN BY:	MARTIN UNJAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar  
BILL OF MATERIAL  
FOR MANCHOCK PHC

Material quantities required for the  
electrical installation

SCALE:	NTS
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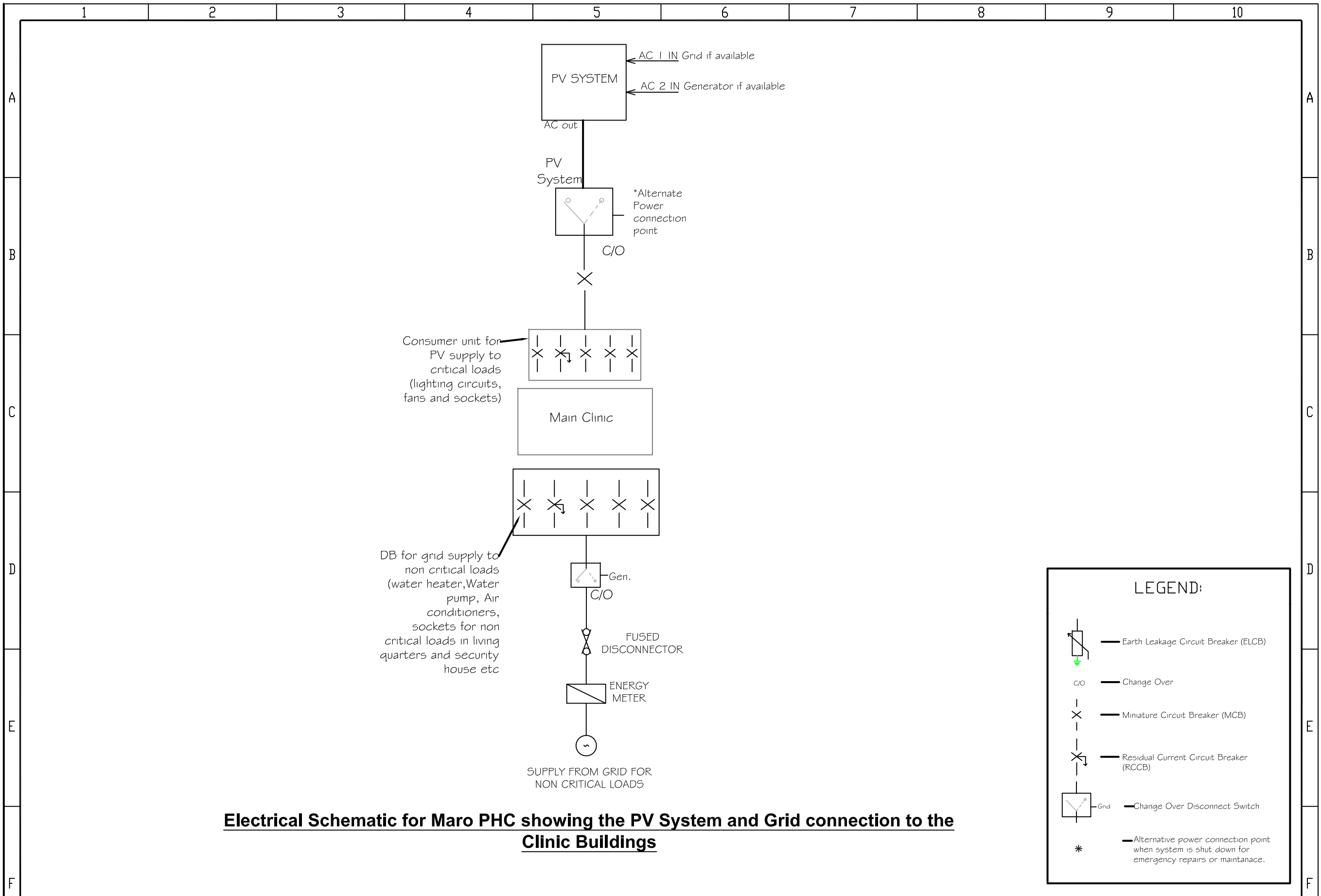
KADUNA CLINICS PROJECT  
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Electrical System Design for Maro PHC

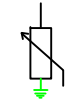





- Electrical Schematic for PV and Grid connection to PHC
  - Electrical wiring diagram for PHC Buildings.
  - Load Table for PHC Buildings
  - Bill of Materials for electrical retrofit
- 

October 2015

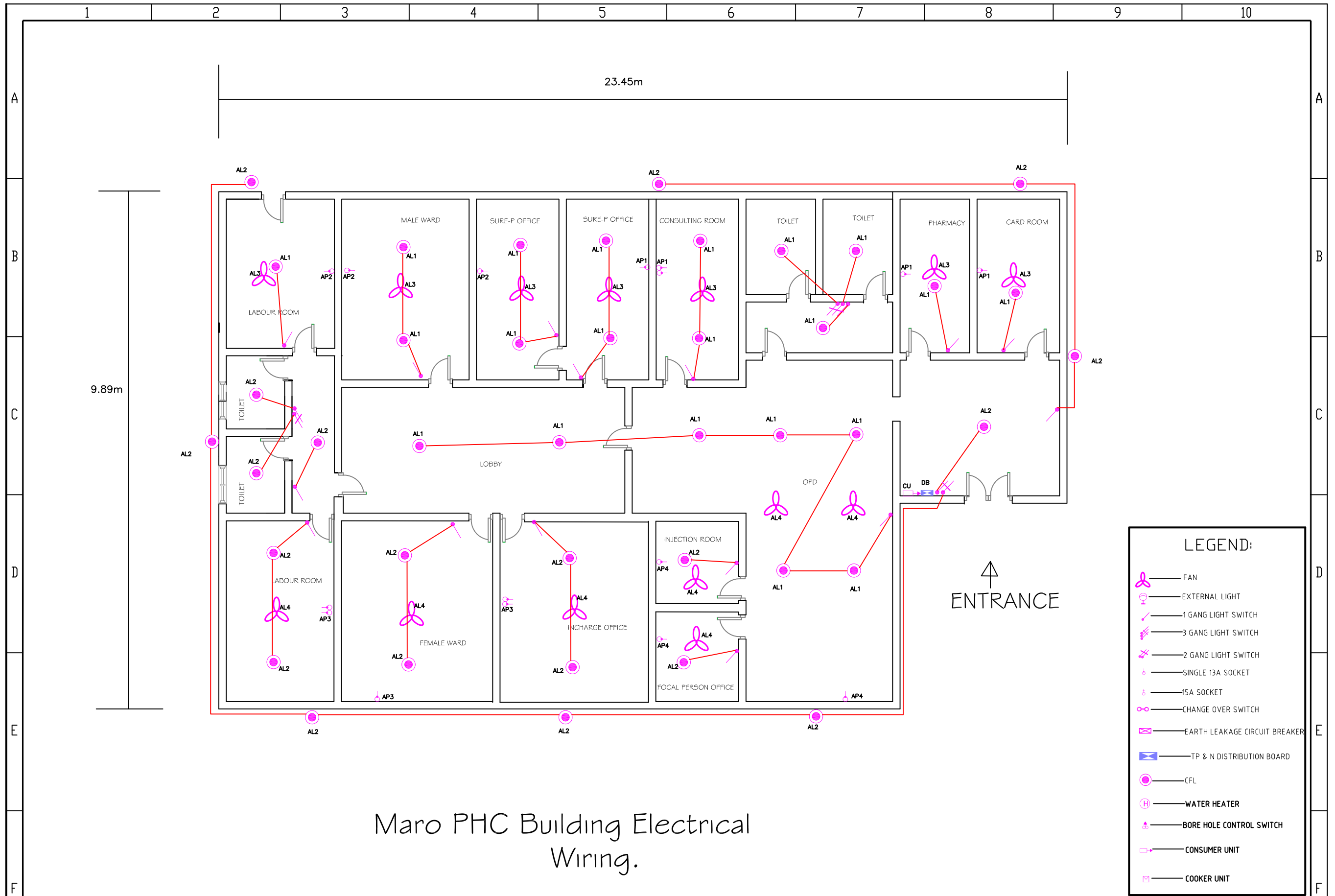


**Electrical Schematic for Maro PHC showing the PV System and Grid connection to the Clinic Buildings**

**LEGEND:**

-  Earth Leakage Circuit Breaker (ELCB)
-  Change Over
-  Miniature Circuit Breaker (MCB)
-  Residual Current Circuit Breaker (RCCB)
-  Change Over Disconnect Switch
-  Alternative power connection point when system is shut down for emergency repairs or maintenance.

DRAWING NO:	KSC/EM/RD/DRW/PHC32/0001	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar RETROFIT SCHEMATIC DRAWING FOR MARO PHC	Electrical Schematic design showing the PV System and Grid connection to the Clinic Buildings	SCALE:	NTS
DESIGN BY:	MARTIN UNUAKHE								PAGE:	1 OF 4
DRAWN BY:	DANIEL MOMOH									
DATE:	OCTOBER									



## Maro PHC Building Electrical Wiring.

LEGEND:	
	FAN
	EXTERNAL LIGHT
	1 GANG LIGHT SWITCH
	3 GANG LIGHT SWITCH
	2 GANG LIGHT SWITCH
	SINGLE 13A SOCKET
	15A SOCKET
	CHANGE OVER SWITCH
	EARTH LEAKAGE CIRCUIT BREAKER
	TP & N DISTRIBUTION BOARD
	CFL
	WATER HEATER
	BORE HOLE CONTROL SWITCH
	CONSUMER UNIT
	COOKER UNIT

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DESIGN BY:	MARTIN UNJAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
ELECTRICAL WIRING DRAWING  
FOR MARO PHC

Electrical wiring design showing the wiring and fitting connection in the Clinic Buildings

SCALE:	NTS
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**LOAD TABLE FOR MARO PHC**

POWER SOURCE: GRID										
	<b>MAIN CLINIC- 100A DISTRIBUTION BOARD</b>									<b>TOTAL (W)</b>
CIRCUIT IDENTITY										
MCB RATING										
DIVERSITY FACTOR										
LIGHTING CIRCUIT										
COOLING SYSTEM ( CEILING FAN)										
13AMP SOCKET FOR EQUIPMENT POWERING										-
15AMP SOCKET FOR EQUIPMENT POWERING										-
PEAK LOAD (W)										-
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	
CABLE SIZES IN mm										

POWER SOURCE: PV SYSTEM	SYSTEM ID: <b>MARO SYS 1</b>									
	CAPACITY: <b>23,400KWP</b>									
	<b>MAIN CLINIC- 100A CONSUMER UNIT</b>									<b>TOTAL (W)</b>
CIRCUIT IDENTITY	AL1	AL2	AL3	AL4	AP1	AP2	AP3			
MCB RATING	10A	10A	10A	10A	20A	20A	20A			
DIVERSITY FACTOR	0.9	0.9	0.9	0.9	0.6	0.6	0.6			
LIGHTING CIRCUIT	378	360								<b>738</b>
COOLING SYSTEM ( CEILING FAN)			525	525						<b>1,050</b>
13AMP SOCKET FOR EQUIPMENT POWERING										
PEAK LOAD (W)										<b>1,788</b>
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT				13A SOCKET OUTLET			SPARE	SPARE	
CABLE SIZES IN mm	3x1.5mm				3x2.5mm					

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DESIGN BY:	MARTIN UNJAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar  
LOAD DISTRIBUTION TABLE  
FOR MARO PHC

Analysis of power distribution  
within the Clinic buildings

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