

BILL OF MATERIALS FOR MARO PHC ELECTRICAL RETROFIT

CLINIC BLOCK				MARO TOTAL
S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	14	14
2	18 Watts CFL	No.	41	41
3	Roof mounted luminaire	No.	33	33
4	Wall mounted luminaire	No.	8	8
5	1 Gang light switch	No.	15	15
6	2 Gang light switch	No.	2	2
7	3 Gang light switch	No.	1	1
8	13 Amp socket single	No.	10	10
9	13 Amp socket double	No.	3	3
10	15 Amp socket	No.		0
11	Junction box	No.	72	72
12	Single patress box (flush)	No.	28	28
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	12	12
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.	1	1
28	60A change over	No.		0
29	30A change over	No.		0
1.5mm cable (Twin & Earth)				
30	AL1 (Lighting circuit)	Mts	210	
31	AL2 (Lighting circuit)	Mts	210	
32	AL3 (Ceiling fan circuit)	Mts	120	
33	AL4 (Ceiling fan circuit)	Mts	120	
34	Total 1.5mm cable	Mts	660	660
2.5mm cable (Twin & Earth)				
35	AP1 (Socket circuit)	Mts	70	
36	AP2 (Socket circuit)	Mts	70	
37	AP3 (Socket circuit)	Mts	80	
38	Total 2.5mm cable	Mts	220	220
39	4x16mm PVC/SWA/PVC armoured cable	Mts	100	100
40	4x10mm PVC/SWA/PVC armoured cable	Mts		0
41	4x6mm PVC/SWA/PVC armoured cable	Mts		0
42	4x4mm PVC/SWA/PVC armoured cable	Mts		0
43	Cable terminating lugs	No.	16	16
44	Recline cable (25mm)	Mts	60	60
45	Earth wire for building (16mm)	Mts	70	70
46	Underground marking tape	Mts	100	100

DRAWING NO:	KCS/EM/RD/BOM/PHC32	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNJAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
BILL OF MATERIAL
FOR MARO PHC

Material quantities required for the electrical installation

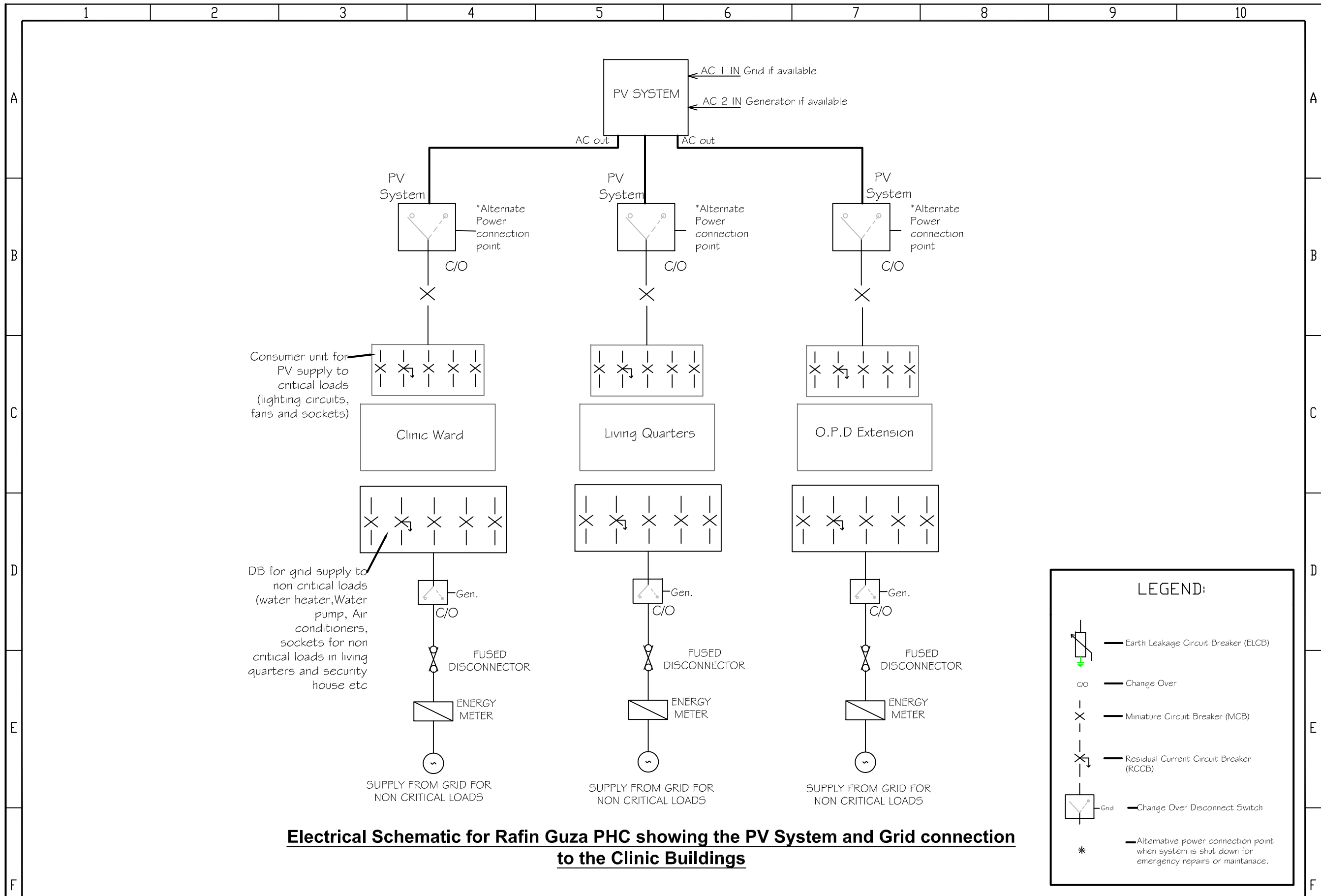
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PAGE: 4 OF 4

KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC33

Electrical System Design for Rafin Guza PHC

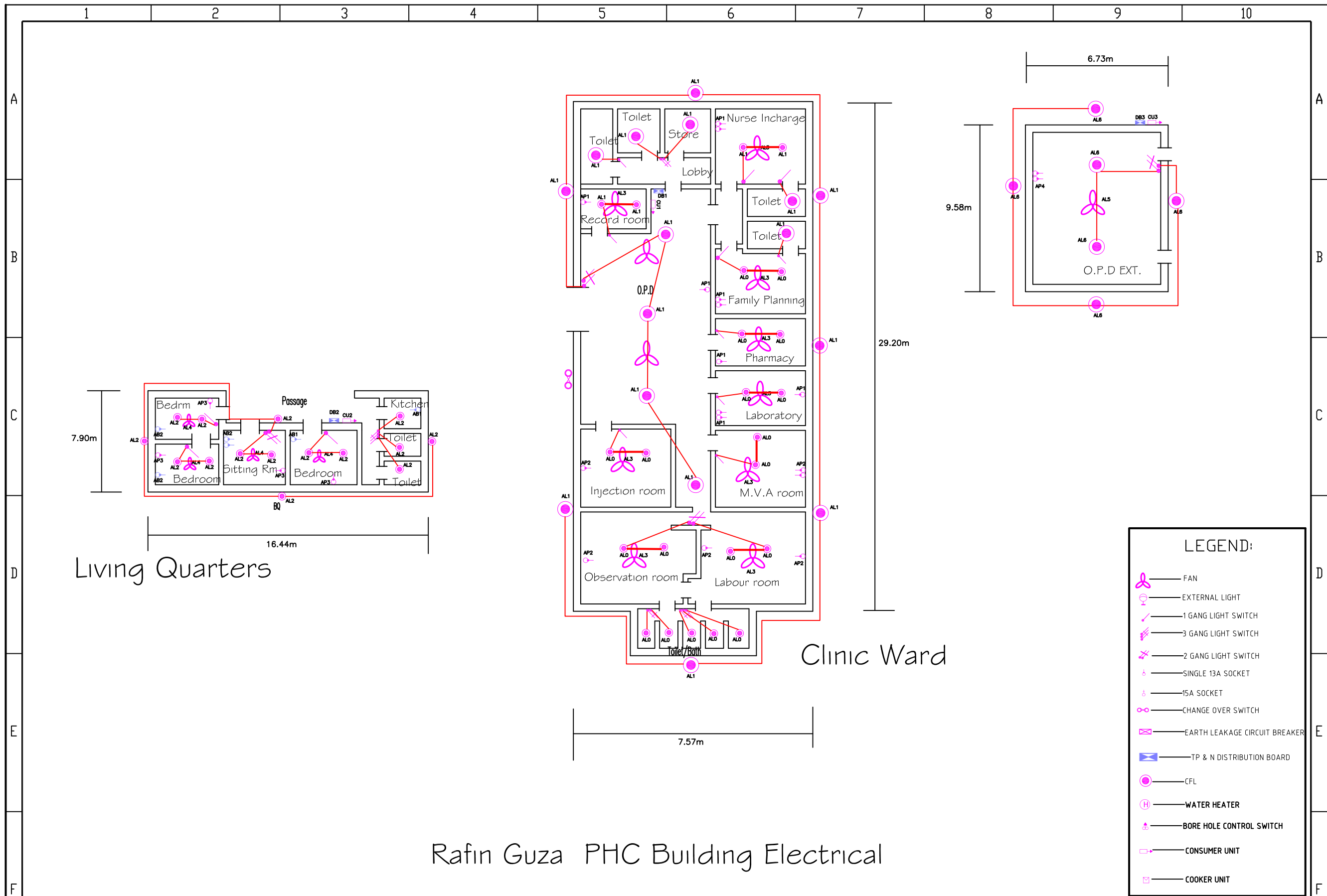
- Electrical Schematic for PV and Grid connection to PHC
 - Electrical wiring diagram for PHC Buildings.
 - Load Table for PHC Buildings
 - Bill of Materials for electrical retrofit
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October 2015



Electrical Schematic for Rafin Guza PHC showing the PV System and Grid connection to the Clinic Buildings

DRAWING NO:	KSC/EM/RD/DRW/PHC33/0001	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar RETROFIT SCHEMATIC DRAWING FOR RAFIN GUZA 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									



Rafin Guza PHC Building Electrical

DRAWING NO:	KCS/EM/RD/DRW/PHC33/0002	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
ELECTRICAL WIRING DRAWING
FOR RAFIN GUZA PHC


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

SCALE:	NTS
PAGE:	2 OF 4

LOAD TABLE FOR RAFIN GUZA PHC

POWER SOURCE: GRID														
MAIN CLINIC AND OPD EXTENSION- 100A DISTRIBUTION BOARD									STAFF QUARTERS- 63A DISTRIBUTION BOARD				TOTAL (W)	
CIRCUIT IDENTITY									AB1	AB2				
MCB RATING									20A	20A				
DIVERSITY FACTOR									0.6	0.6				
LIGHTING CIRCUIT														
COOLING SYSTEM (CEILING FAN)														
13AMP SOCKET FOR EQUIPMENT POWERING									1,000					1,000
15AMP SOCKET FOR EQUIPMENT POWERING														-
PEAK LOAD (W)														1,000
FINAL SUB-CIRCUIT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	13A SOCKET OUTLET	SPARE	SPARE	SPARE		
CABLE SIZES IN mm									3x2.5mm					

POWER SOURCE: PV SYSTEM														
SYSTEM ID:		RAFIN GUZA SYS 1												
CAPACITY:		28,080 KWP												
MAIN CLINIC AND OPD EXTENSION- 100A CONSUMER UNIT									STAFF QUARTERS- 63A CONSUMER UNIT				TOTAL (W)	
CIRCUIT IDENTITY	AL0	AL1	AL3	AL5	AL6	AP1	AP2	AP4	AL2	AL4	AP3			
MCB RATING	10A	10A	10A	10A	10A	20A	20A	20A	10A	10A	20A			
DIVERSITY FACTOR	0.9	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.9	0.9	0.6			
LIGHTING CIRCUIT	342	360			108				270					1,080
COOLING SYSTEM (CEILING FAN)			675	75						300				1,050
13AMP SOCKET FOR EQUIPMENT POWERING						1620					290			1,910
PEAK LOAD (W)														4,040
FINAL SUB-CIRCUIT	LIGHTING & CEILING FAN CIRCUIT					13A SOCKET OUTLET			LIGHTING & CEILING FAN CIRCUIT	13A SOCKET OUTLET	SPARE	SPARE		
CABLE SIZES IN mm	3x1.5mm					3x2.5mm			3x1.5mm	3x2.5mm				

DRAWING NO:	KCS/EM/RD/LT/PHC33	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar LOAD DISTRIBUTION TABLE FOR RAFIN GUZA 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 RAFIN GUZA PHC ELECTRICAL RETROFIT

CLINIC BLOCK & OPD EXTENSION				STAFF QUARTERS				RAFIN GUZA 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.	15	51
3	Roof mounted luminaire	No.	25	3	Roof mounted luminaire	No.	11	36
4	Wall mounted luminaire	No.	11	4	Wall mounted luminaire	No.	4	15
5	1 Gang light switch	No.	10	5	1 Gang light switch	No.	3	13
6	2 Gang light switch	No.	5	6	2 Gang light switch	No.	1	6
7	3 Gang light switch	No.	1	7	3 Gang light switch	No.	1	2
8	13 Amp socket single	No.	8	8	13 Amp socket single	No.	8	16
9	13 Amp socket double	No.	5	9	13 Amp socket double	No.	1	6
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	65	11	Junction box	No.	29	94
12	Single patress box (flush)	No.	24	12	Single patress box (flush)	No.	13	37
13	Double patress box (flush)	No.	5	13	Double patress box (flush)	No.	1	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	12	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	Bundles	6	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.	1	18	100A distribution board	No.		1
19	60A distribution board	No.		19	60A distribution board	No.	1	1
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.	1	1
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
	1.5mm cable (Twin & Earth)				1.5mm cable (Twin & Earth)			
30	AL0&AL1 (Lighting circuit)	Mts	360	30	AL2 (Lighting circuit)	Mts	160	
31	AL3 (Ceiling fan circuit)	Mts	180	31	AL4 (Ceiling fan circuit)	Mts	70	
32	AL5 (Ceiling fan circuit)	Mts	50	32		Mts		
33	AL6 (Lighting circuit)	Mts	70	33		Mts		
34	Total 1.5mm cable	Mts	660	34	Total 1.5mm cable	Mts	230	890
	2.5mm cable (Twin & Earth)				2.5mm cable (Twin & Earth)			
35	AP1 (Socket circuit)	Mts	100	35	AP3 (Socket circuit)	Mts	90	
36	AP2 (Socket circuit)	Mts	80	36	AB1 (Socket circuit)	Mts	40	
37	AP4 (Socket circuit)	Mts	30	37	AB2 (Socket circuit)	Mts	60	
38	Total 2.5mm cable	Mts	210	38	Total 2.5mm cable	Mts	190	400
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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DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
BILL OF MATERIAL
FOR RAFIN GUZA PHC

Material quantities required for the
electrical installation

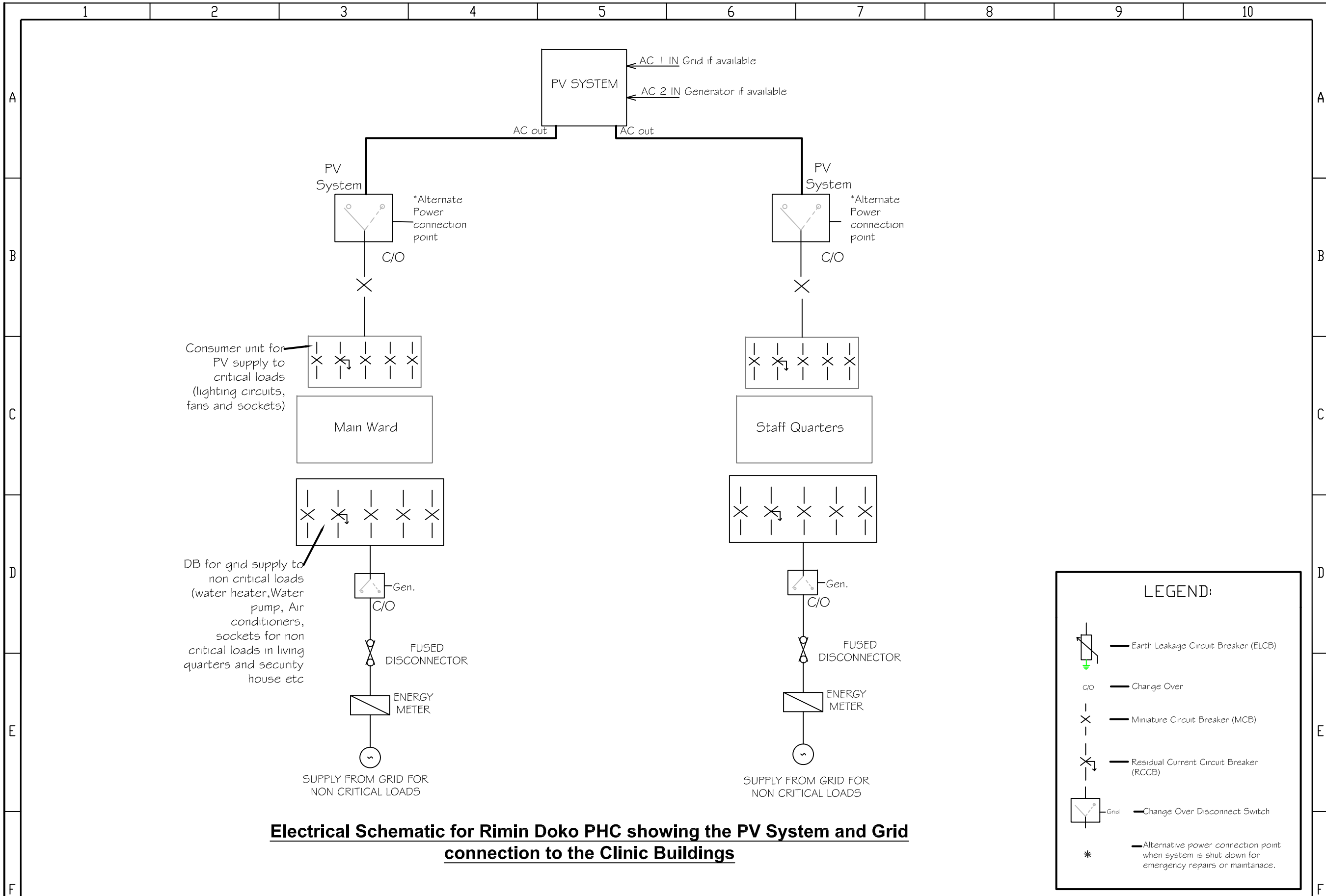
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PAGE:	4 OF 4

KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC34

Electrical System Design for Rimin Doko 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 Rimin Doko PHC showing the PV System and Grid connection to the Clinic Buildings

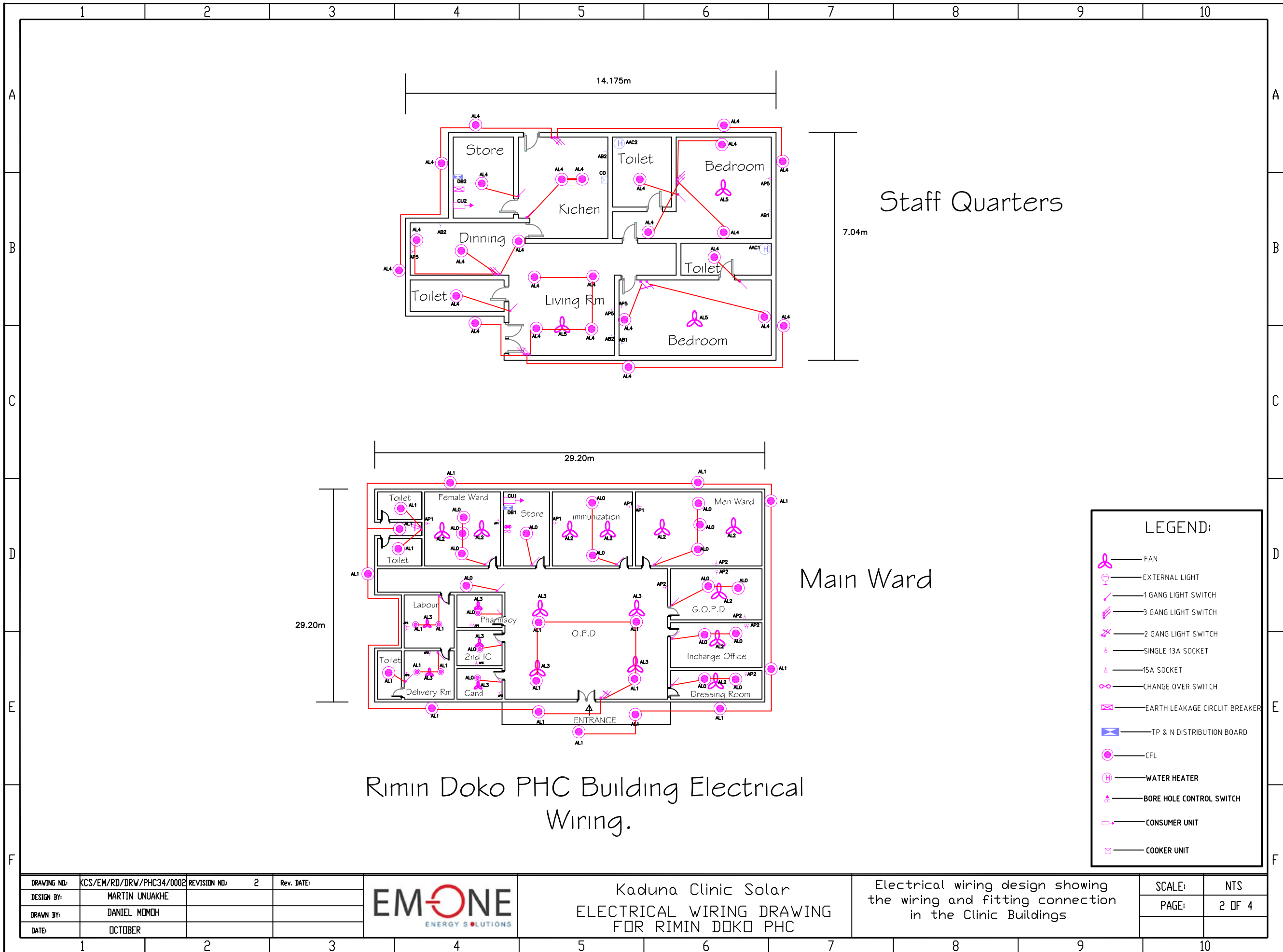
DRAWING NO:	KSC/EM/RD/DRW/PHC34/0001	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
RETROFIT SCHEMATIC DRAWING
FOR RIMIN DOKO PHC

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

SCALE:	NTS
PAGE:	1 OF 4



Staff Quarters

Main Ward

Rimin Doko 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				
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Kaduna Clinic Solar
ELECTRICAL WIRING DRAWING
FOR RIMIN DOKO PHC

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

SCALE:	NTS
PAGE:	2 OF 4

BILL OF MATERIALS FOR RIMIN DOKO PHC ELECTRICAL RETROFIT

CLINIC BLOCK				DOCTOR'S APARTMENT				RIMIN DOKO TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	18	1	Ceiling fan	No.	3	21
2	18 Watts CFL	No.	41	2	18 Watts CFL	No.	24	65
3	Roof mounted luminaire	No.	33	3	Roof mounted luminaire	No.	16	49
4	Wall mounted luminaire	No.	8	4	Wall mounted luminaire	No.	8	16
5	1 Gang light switch	No.	14	5	1 Gang light switch	No.	5	19
6	2 Gang light switch	No.	2	6	2 Gang light switch	No.	1	3
7	3 Gang light switch	No.		7	3 Gang light switch	No.	4	4
8	13 Amp socket single	No.	14	8	13 Amp socket single	No.	1	15
9	13 Amp socket double	No.	3	9	13 Amp socket double	No.	3	6
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	74	11	Junction box	No.	38	112
12	Single patress box (flush)	No.	30	12	Single patress box (flush)	No.	11	41
13	Double patress box (flush)	No.	3	13	Double patress box (flush)	No.	3	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	12	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	6	18
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
19	60A distribution board	No.		19	60A distribution board	No.	1	1
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.	1	1
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
	1.5mm cable (Twin & Earth)				1.5mm cable (Twin & Earth)			
30	AL0&AL1 (Lighting circuit)	Mts	350	30	AL4 (Lighting circuit)	Mts	310	
31	AL2 (Ceiling fan circuit)	Mts	150	31	AL5 (Ceiling fan circuit)	Mts	60	
32	AL3 (Ceiling fan circuit)	Mts	150	32		Mts		
33	Total 1.5mm cable	Mts	650	33	Total 1.5mm cable	Mts	370	1020
	2.5mm cable (Twin & Earth)				2.5mm cable (Twin & Earth)			
34	AP1 (Socket circuit)	Mts	80	34	AP5 (Socket circuit)	Mts	70	
35	AP2 (Socket circuit)	Mts	80	35	AB1 (Heater)	Mts		
36	AP3 (Socket circuit)	Mts	70	36		Mts		
37	AP4 (Socket circuit)	Mts	40	37		Mts		
38	Total 2.5mm cable	Mts	270	38	Total 2.5mm cable	Mts	70	340
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	60	44	Recline cable (25mm)	Mts	80	140
45	Earth wire for building (16mm)	Mts	70	45	Earth wire for building (16mm)	Mts	60	130
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 RIMIN DOKO PHC

Material quantities required for the electrical installation

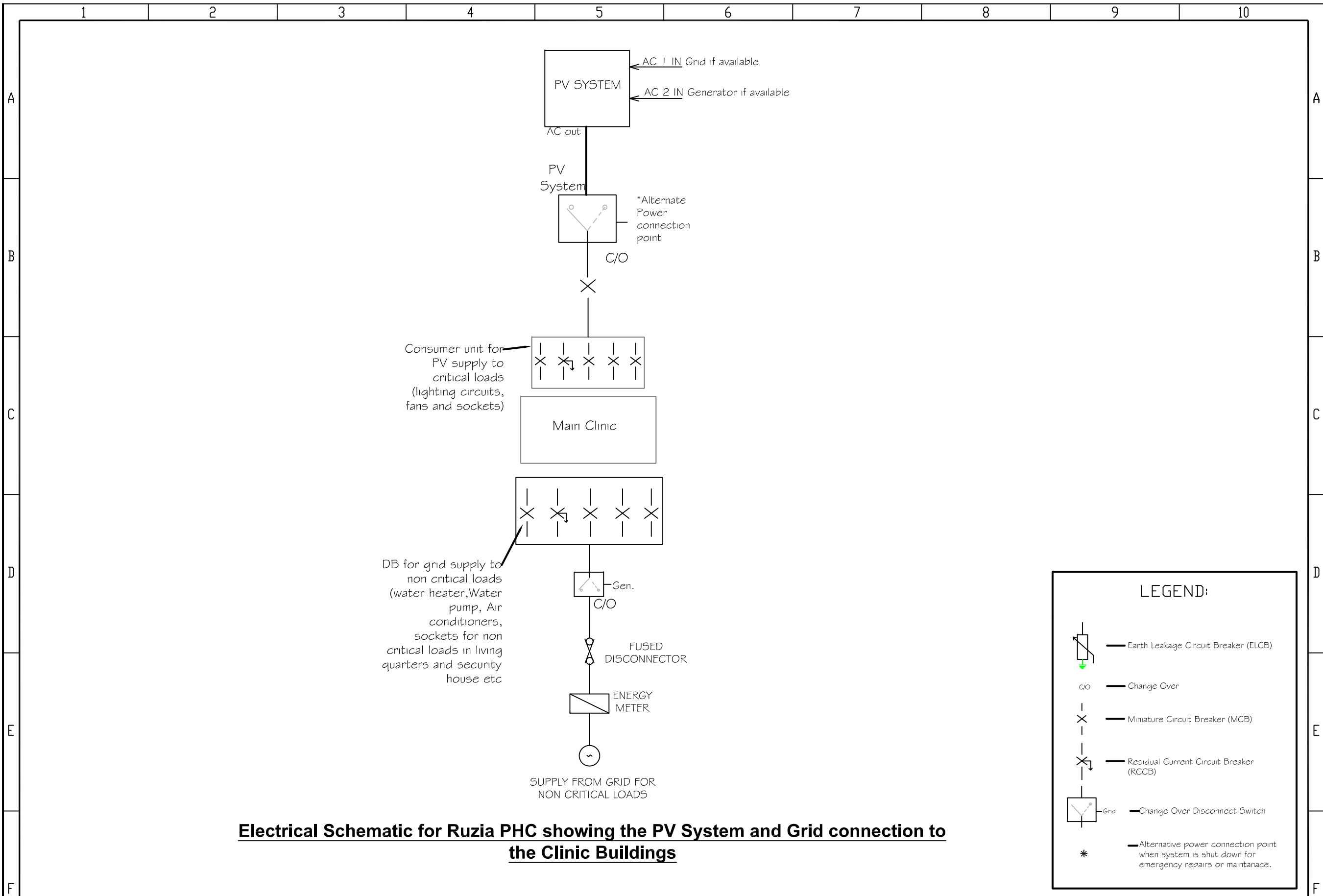
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PAGE:	4 OF 4

KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC35







Electrical System Design for Ruzia 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

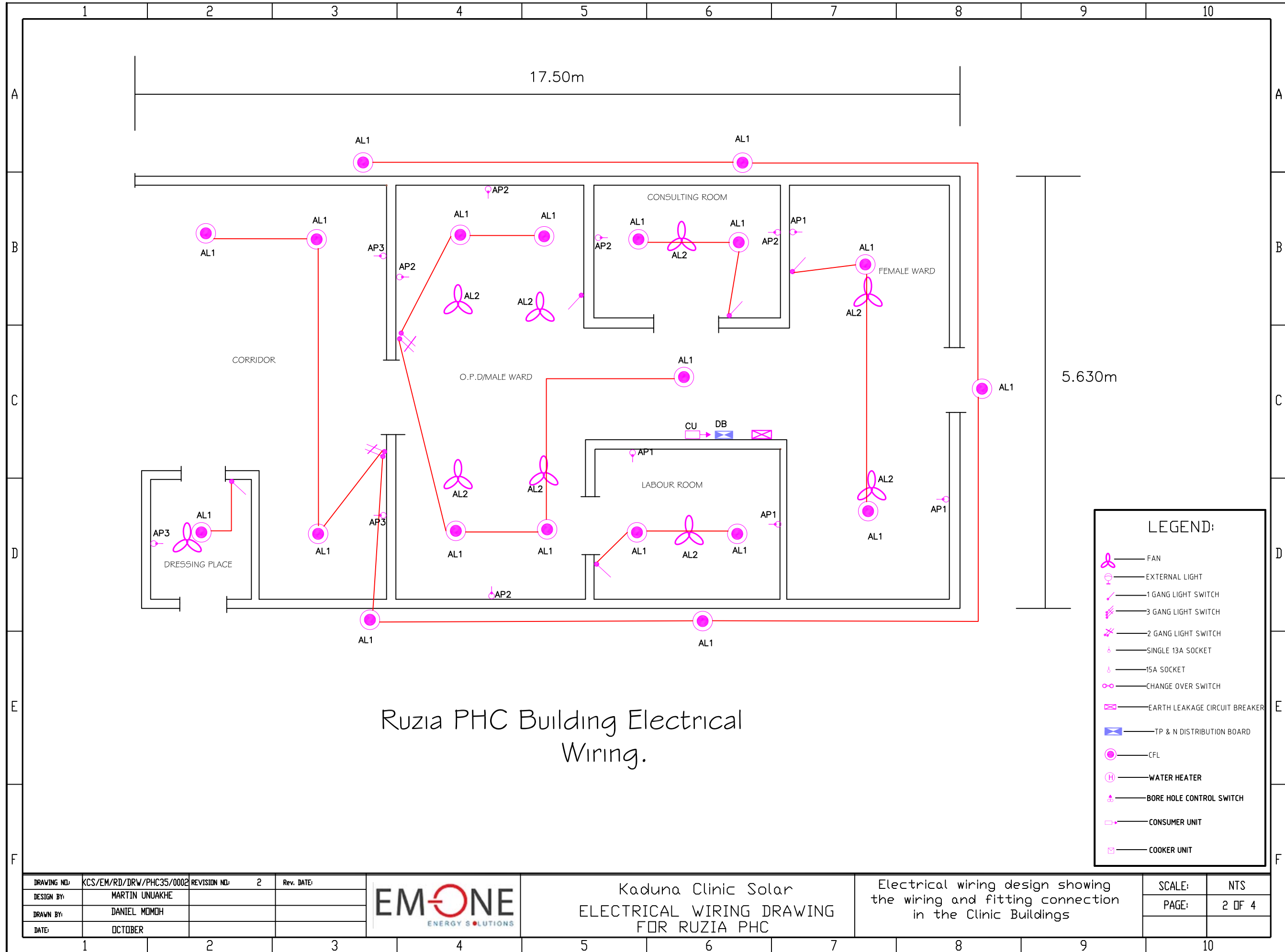


LEGEND:

-  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.

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

DRAWING NO:	KSC/EM/RD/DRW/PHC35/0001	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar RETROFIT SCHEMATIC DRAWING FOR RUZIA 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									
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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 UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar
ELECTRICAL WIRING DRAWING
FOR RUZIA PHC

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

SCALE:	NTS
PAGE:	2 OF 4

LOAD TABLE FOR RUZIYA 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	
CABLE SIZES IN mm								

POWER SOURCE: PV SYSTEM	SYSTEM ID: RUZIA SYS 1							
	CAPACITY: 21,060 KWP							
	MAIN CLINIC- 100A CONSUMER UNIT						TOTAL (W)	
CIRCUIT IDENTITY	AL1	AL2	AP1	AP2	AP3			
MCB RATING	10A	10A	20A	20A	20A			
DIVERSITY FACTOR	0.9	0.9	0.6	0.6	0.6			
LIGHTING CIRCUIT	360						360	
COOLING SYSTEM (CEILING FAN)		600					600	
13AMP SOCKET FOR EQUIPMENT POWERING			225	150			690	
PEAK LOAD (W)							1,650	
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 RUZIA PHC

Analysis of power distribution
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

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

CLINIC BLOCK				RUZIYA TOTAL
S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	9	9
2	18 Watts CFL	No.	20	20
3	Roof mounted luminaire	No.	15	15
4	Wall mounted luminaire	No.	5	5
5	1 Gang light switch	No.	5	5
6	2 Gang light switch	No.	2	2
7	3 Gang light switch	No.		0
8	13 Amp socket single	No.	12	12
9	13 Amp socket double	No.		0
10	15 Amp socket	No.		0
11	Junction box	No.	39	39
12	Single patress box (flush)	No.	19	19
13	Double patress box (flush)	No.	0	0
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	7	7
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
	1.5mm cable (Twin & Earth)			
30	AL1 (Lighting circuit)	Mts	180	
31	AL2 (Ceiling fan circuit)	Mts	150	
32	Total 1.5mm cable	Mts	330	330
	2.5mm cable (Twin & Earth)			
34	AP1 (Socket circuit)	Mts	70	
35	AP2 (Socket circuit)	Mts	80	
36	AP3 (Socket circuit)	Mts	60	
37	Total 2.5mm cable	Mts	210	210
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/PHC35	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
BILL OF MATERIAL
FOR RUZIA PHC

Material quantities required for the
electrical installation

SCALE: NTS

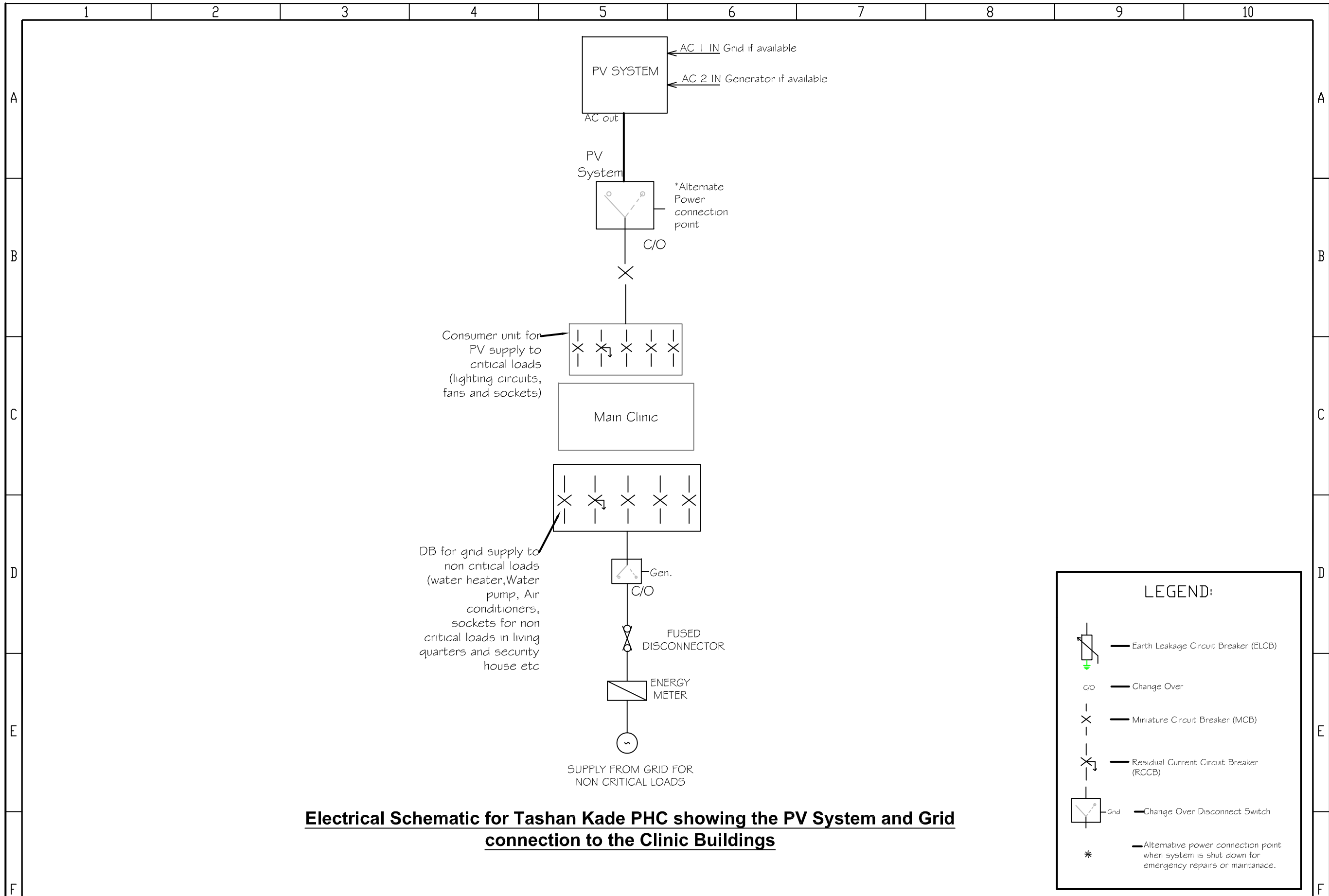
PAGE: 4 OF 4

KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC36

Electrical System Design for Tashan Kade 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 Tashan Kade PHC showing the PV System and Grid connection to the Clinic Buildings

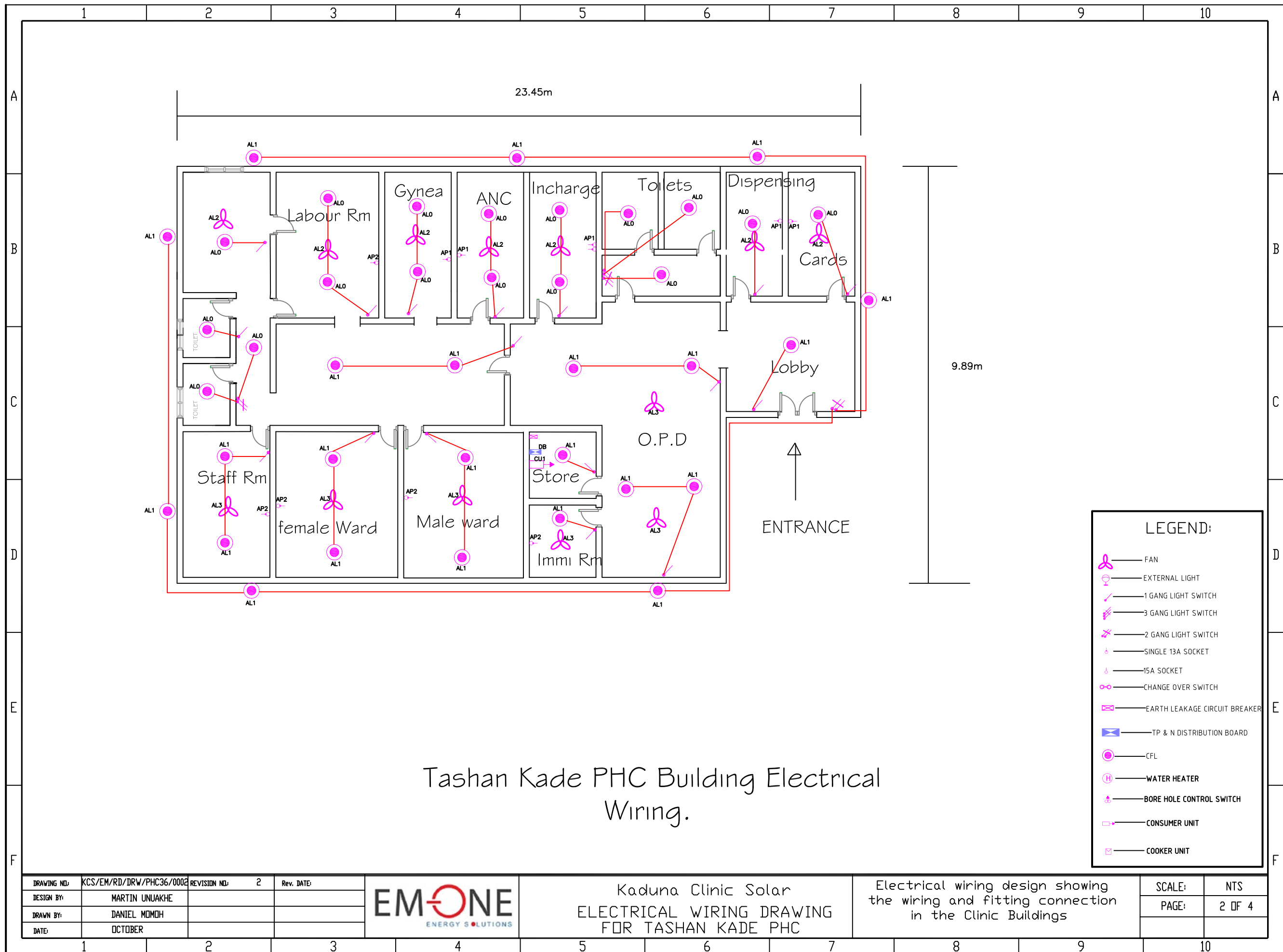
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DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar
RETROFIT SCHEMATIC DRAWING
FOR TASHAN KADE PHC

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

SCALE:	NTS
PAGE:	1 OF 4



Tashan Kade 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/PHC36/0002	REVISION NO:	2	Rev. DATE:	
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DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
ELECTRICAL WIRING DRAWING
FOR TASHAN KADE PHC

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

SCALE:	NTS
PAGE:	2 OF 4

LOAD TABLE FOR TASHAR KADE 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
CABLE SIZES IN mm								

POWER SOURCE: PV SYSTEM	SYSTEM ID: TASHAN KADE SYS 1							
	CAPACITY: 23,400 KWP							
	MAIN CLINIC- 100A CONSUMER UNIT							TOTAL (W)
CIRCUIT IDENTITY	AL0	AL1	AL2	AL3	AP1	AP2		
MCB RATING	10A	10A	10A	10A	20A	20A		
DIVERSITY FACTOR	0.9	0.9	0.9	0.9	0.6	0.6		
LIGHTING CIRCUIT	306	414						720
COOLING SYSTEM (CEILING FAN)			450	525				975
13AMP SOCKET FOR EQUIPMENT POWERING					70			70
PEAK LOAD (W)								1,765
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 TASHAN KADE PHC

Analysis of power distribution
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

BILL OF MATERIALS FOR TASHAN KADE PHC ELECTRICAL RETROFIT

CLINIC BLOCK				TASHAN KADE TOTAL
S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	13	13
2	18 Watts CFL	No.	40	40
3	Roof mounted luminaire	No.	32	32
4	Wall mounted luminaire	No.	8	8
5	1 Gang light switch	No.	17	17
6	2 Gang light switch	No.	2	2
7	3 Gang light switch	No.	1	1
8	13 Amp socket single	No.	9	9
9	13 Amp socket double	No.	1	1
10	15 Amp socket	No.		0
11	Junction box	No.	70	70
12	Single patress box (flush)	No.	29	29
13	Double patress box (flush)	No.	1	1
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
	1.5mm cable (Twin & Earth)			
30	AL0&AL1 (Lighting circuit)	Mts	400	
31	AL2 (Lighting circuit)	Mts	120	
32	AL3 (Ceiling fan circuit)	Mts	100	
33	Total 1.5mm cable	Mts	620	620
	2.5mm cable (Twin & Earth)			
34	AP1 (Socket circuit)	Mts	90	
35	AP2 (Socket circuit)	Mts	90	
36	Total 2.5mm cable	Mts	180	180
37	4x16mm PVC/SWA/PVC armoured cable	Mts	60	60
38	4x10mm PVC/SWA/PVC armoured cable	Mts		0
39	4x6mm PVC/SWA/PVC armoured cable	Mts		0
40	4x4mm PVC/SWA/PVC armoured cable	Mts		0
41	Cable terminatng lugs	No.	16	16
42	Recline cable (25mm)	Mts	50	50
43	Earth wire for building (16mm)	Mts	50	50
44	Underground marking tape	Mts	60	60

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DRAWN BY:	DANIEL MOMOH			
DATE:	OCTOBER			



Kaduna Clinic Solar
BILL OF MATERIAL
FOR TASHAN KADE PHC

Material quantities required for the electrical installation

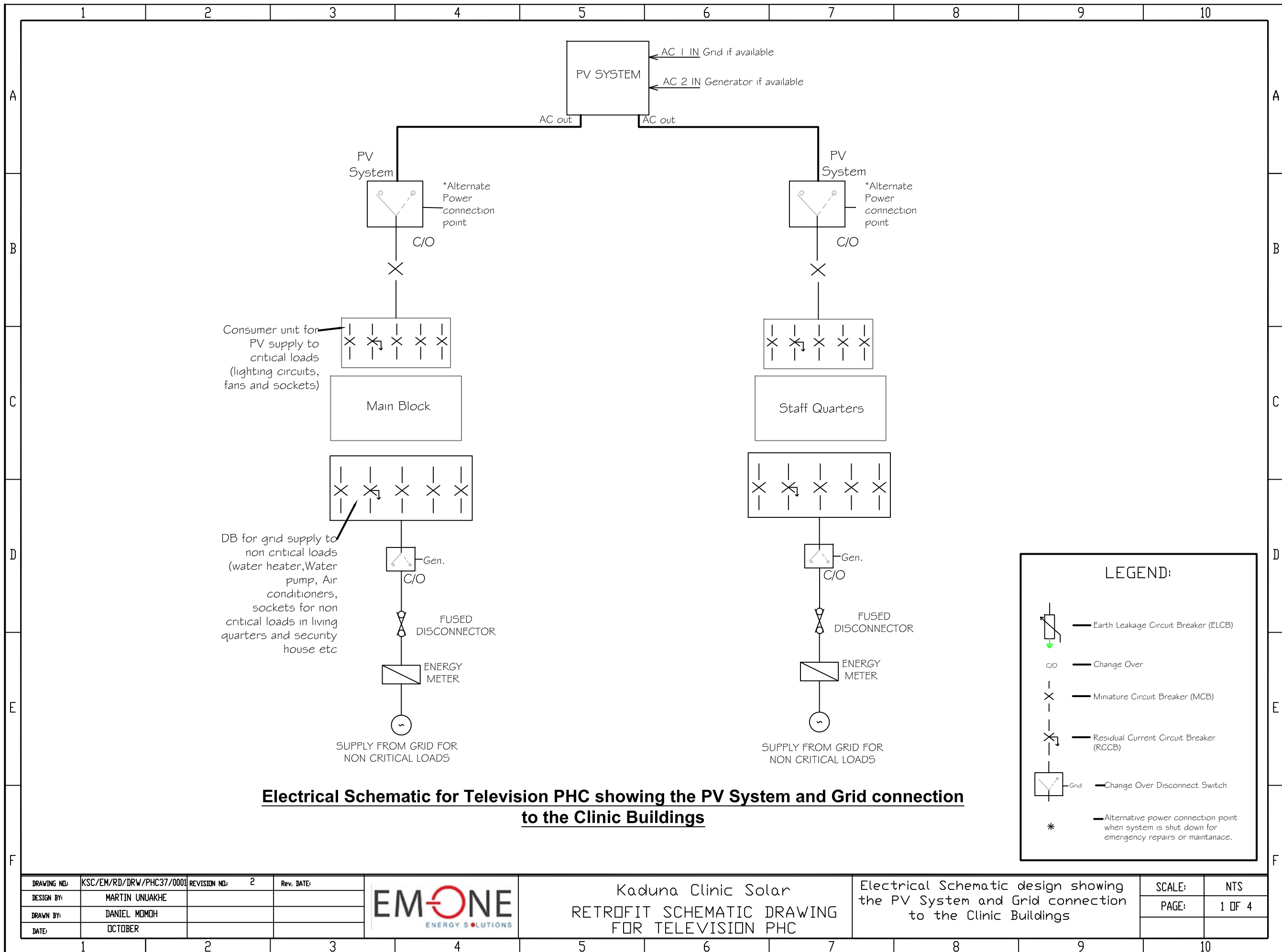
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PAGE: 4 OF 4

KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC37

Electrical System Design for Television 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 Television PHC showing the PV System and Grid connection to the Clinic Buildings

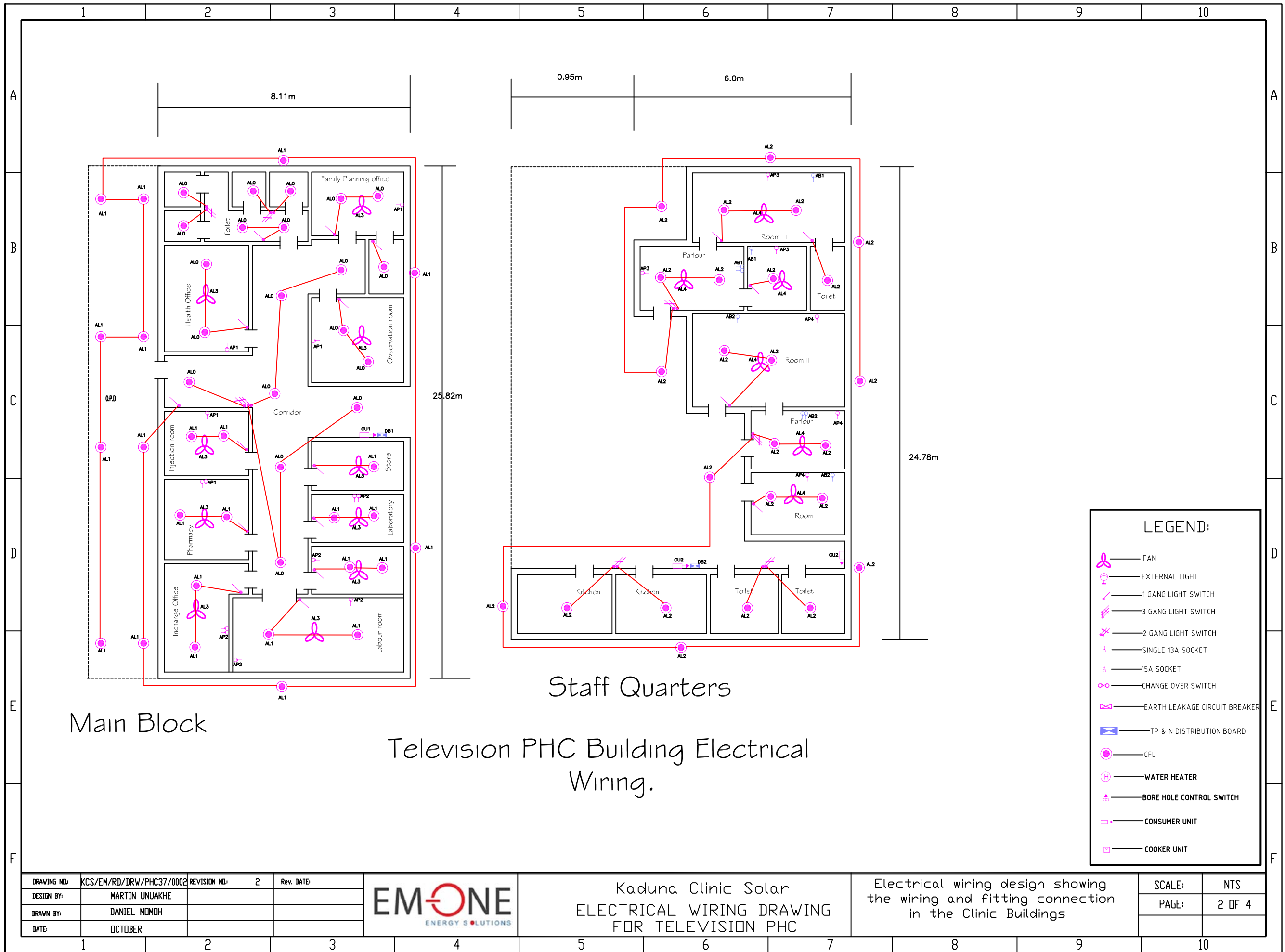
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DRAWN BY:	DANIEL MOMOH			
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Kaduna Clinic Solar
RETROFIT SCHEMATIC DRAWING
FOR TELEVISION PHC

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

SCALE:	NTS
PAGE:	1 OF 4



Main Block

Staff Quarters

Television 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 TELEVISION PHC

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

SCALE:	NTS
PAGE:	2 OF 4

BILL OF MATERIALS FOR TELEVISION PHC ELECTRICAL RETROFIT

CLINIC BLOCK				STAFF QUARTERS				TELEVISION TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	10	1	Ceiling fan	No.	6	16
2	18 Watts CFL	No.	45	2	18 Watts CFL	No.	25	70
3	Roof mounted luminaire	No.	41	3	Roof mounted luminaire	No.	19	60
4	Wall mounted luminaire	No.	4	4	Wall mounted luminaire	No.	6	10
5	1 Gang light switch	No.	13	5	1 Gang light switch	No.	5	18
6	2 Gang light switch	No.	2	6	2 Gang light switch	No.	4	6
7	3 Gang light switch	No.	1	7	3 Gang light switch	No.		1
8	13 Amp socket single	No.	7	8	13 Amp socket single	No.	10	17
9	13 Amp socket double	No.	3	9	13 Amp socket double	No.	2	5
10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	71	11	Junction box	No.	46	117
12	Single patress box (flush)	No.	23	12	Single patress box (flush)	No.	19	42
13	Double patress box (flush)	No.	3	13	Double patress box (flush)	No.	2	5
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	9	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	8	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.	1	18	100A distribution board	No.		1
19	60A distribution board	No.		19	60A distribution board	No.	1	1
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.	1	1
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
	1.5mm cable (Twin & Earth)				1.5mm cable (Twin & Earth)			
30	AL1 (Lighting circuit)	Mts	390	30	AL2 (Lighting circuit)	Mts	250	
31	AL3 (Ceiling fan circuit)	Mts	160	31	AL4 (Ceiling fan circuit)	Mts	100	
32	Total 1.5mm cable	Mts	550	32	Total 1.5mm cable	Mts	350	900
	2.5mm cable (Twin & Earth)				2.5mm cable (Twin & Earth)			
33	AP1 (Socket circuit)	Mts	80	33	AP3 (Socket circuit)	Mts	60	
34	AP2 (Socket circuit)	Mts	80	34	AP4 (Socket circuit)	Mts	60	
35		Mts		35	AB1 (Socket circuit)	Mts	60	
36		Mts		36	AB2 (Socket circuit)	Mts	60	
37	Total 2.5mm cable	Mts	160	37	Total 2.5mm cable	Mts	240	400
38	4x16mm PVC/SWA/PVC armoured cable	Mts	100	38	4x16mm PVC/SWA/PVC armoured cable	Mts	60	160
39	4x10mm PVC/SWA/PVC armoured cable	Mts		39	4x10mm PVC/SWA/PVC armoured cable	Mts		0
40	4x6mm PVC/SWA/PVC armoured cable	Mts		40	4x6mm PVC/SWA/PVC armoured cable	Mts		0
41	4x4mm PVC/SWA/PVC armoured cable	Mts		41	4x4mm PVC/SWA/PVC armoured cable	Mts		0
42	Cable terminating lugs	No.	16	42	Cable terminating lugs	No.	16	32
43	Recline cable (25mm)	Mts	60	43	Recline cable (25mm)	Mts	80	140
44	Earth wire for building (16mm)	Mts	70	44	Earth wire for building (16mm)	Mts	50	120
45	Underground marking tape	Mts	100	45	Underground marking tape	Mts	60	160

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DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
BILL OF MATERIAL
FOR TELEVISION PHC

Material quantities required for the electrical installation

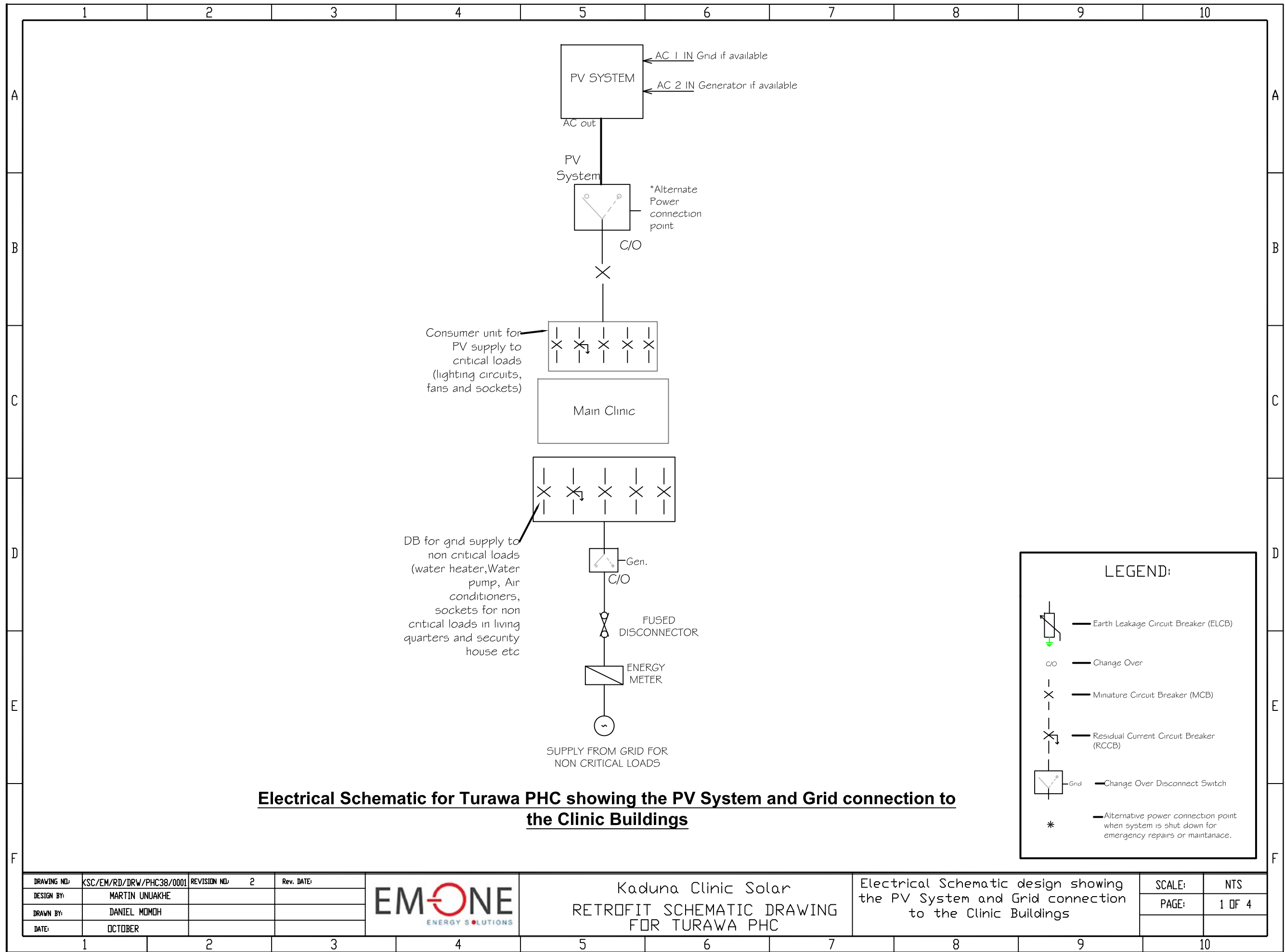
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PAGE:	4 OF 4

KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC38

Electrical System Design for Turawa 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 Turawa PHC showing the PV System and Grid connection to the Clinic Buildings

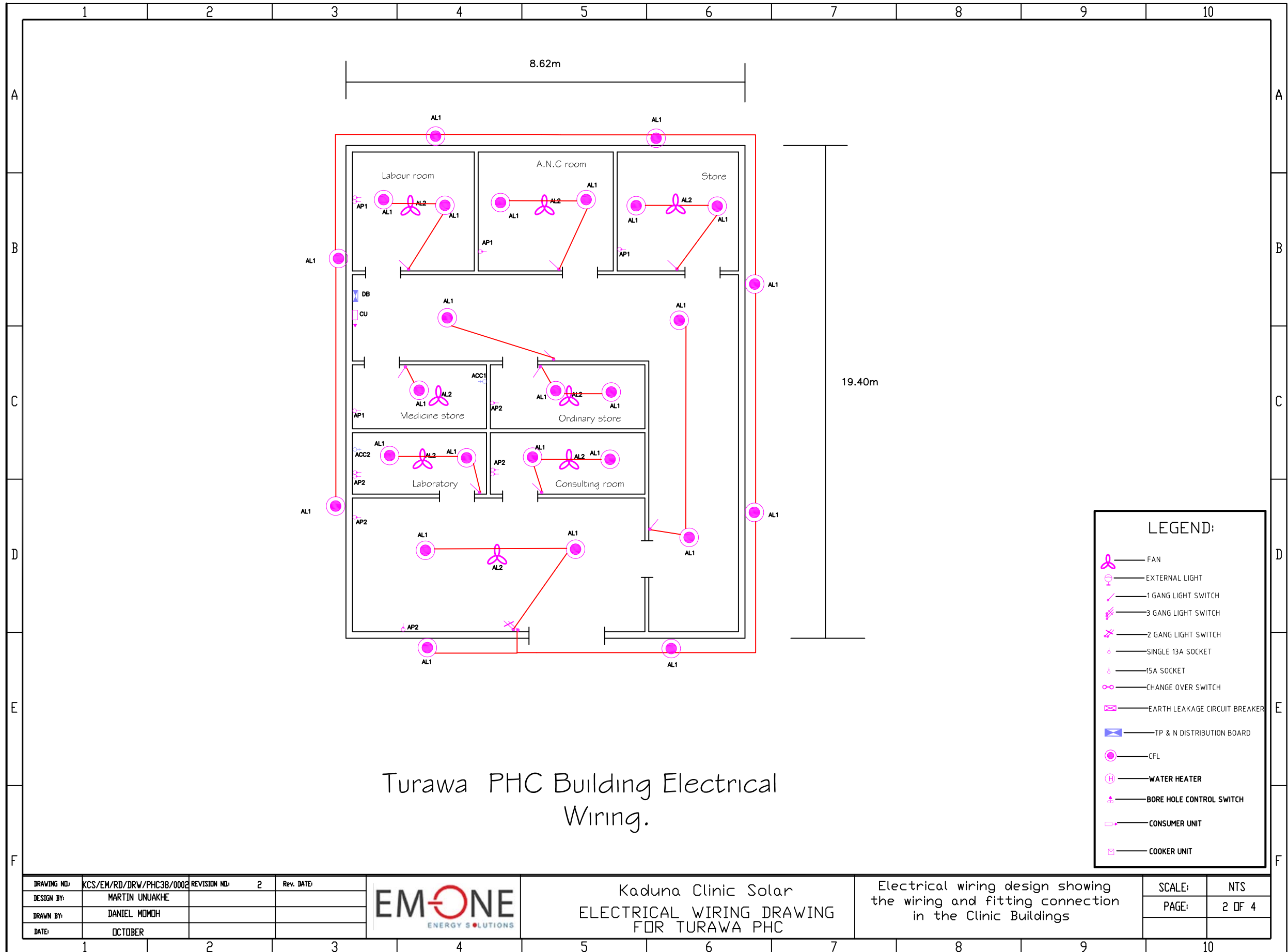
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DESIGN BY:	MARTIN UNUAKHE			
DRAWN BY:	DANIEL MOMOH			
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Kaduna Clinic Solar
RETROFIT SCHEMATIC DRAWING
FOR TURAWA PHC

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

SCALE:	NTS
PAGE:	1 OF 4



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Kaduna Clinic Solar
ELECTRICAL WIRING DRAWING
FOR TURAWA PHC

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

SCALE: NTS
PAGE: 2 OF 4

LOAD TABLE FOR TURAWA PHC

POWER SOURCE: GRID							
MAIN CLINIC- 100A DISTRIBUTION BOARD							TOTAL (W)
CIRCUIT IDENTITY	ACC1	ACC2					
MCB RATING	20A	20A					
DIVERSITY FACTOR	1	1					
LIGHTING CIRCUIT							
COOLING SYSTEM (CEILING FAN)							
13AMP SOCKET FOR EQUIPMENT POWERING							-
15AMP SOCKET FOR EQUIPMENT POWERING	1,770	1,770					3,540
PEAK LOAD (W)							3,540
FINAL SUB-CIRCUIT	15A SOCKET OUTLET		SPARE	SPARE	SPARE	SPARE	
CABLE SIZES IN mm	3x2.5mm						

POWER SOURCE: PV SYSTEM		SYSTEM ID: TURAWA SYS 1					
		CAPACITY: 13,260 KWP					
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	468						468
COOLING SYSTEM (CEILING FAN)		600					600
13AMP SOCKET FOR EQUIPMENT POWERING							
PEAK LOAD (W)							1,068
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 UNUAKHE			
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Kaduna Clinic Solar
LOAD DISTRIBUTION TABLE
FOR TURAWA PHC

Analysis of power distribution
within the Clinic buildings

SCALE:	NTS
PAGE:	3 OF 4

BILL OF MATERIALS FOR TURAWA PHC ELECTRICAL RETROFIT

CLINIC BLOCK				TURAWA TOTAL
S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	7	7
2	18 Watts CFL	No.	26	26
3	Roof mounted luminaire	No.	18	18
4	Wall mounted luminaire	No.	8	8
5	1 Gang light switch	No.	9	9
6	2 Gang light switch	No.	1	1
7	3 Gang light switch	No.		0
8	13 Amp socket single	No.	6	6
9	13 Amp socket double	No.	3	3
10	15 Amp socket	No.	2	2
11	Junction box	No.	45	45
12	Single patress box (flush)	No.	16	16
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	8	8
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
	1.5mm cable (Twin & Earth)			
30	AL1 (Lighting circuit)	Mts	230	
31	AL2 (Lighting circuit)	Mts	120	
32	Total 1.5mm cable	Mts	350	350
	2.5mm cable (Twin & Earth)			
33	AP1 (Socket circuit)	Mts	80	
34	AP2 (Socket circuit)	Mts	80	
35	ACC1 (Socket circuit)	Mts	50	
36	ACC2 (Socket circuit)	Mts	70	
37	Total 2.5mm cable	Mts	280	280
38	4x16mm PVC/SWA/PVC armoured cable	Mts	70	70
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	50	50
44	Earth wire for building (16mm)	Mts	50	50
45	Underground marking tape	Mts	70	70

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Kaduna Clinic Solar
BILL OF MATERIAL
FOR TURAWA PHC

Material quantities required for the electrical installation

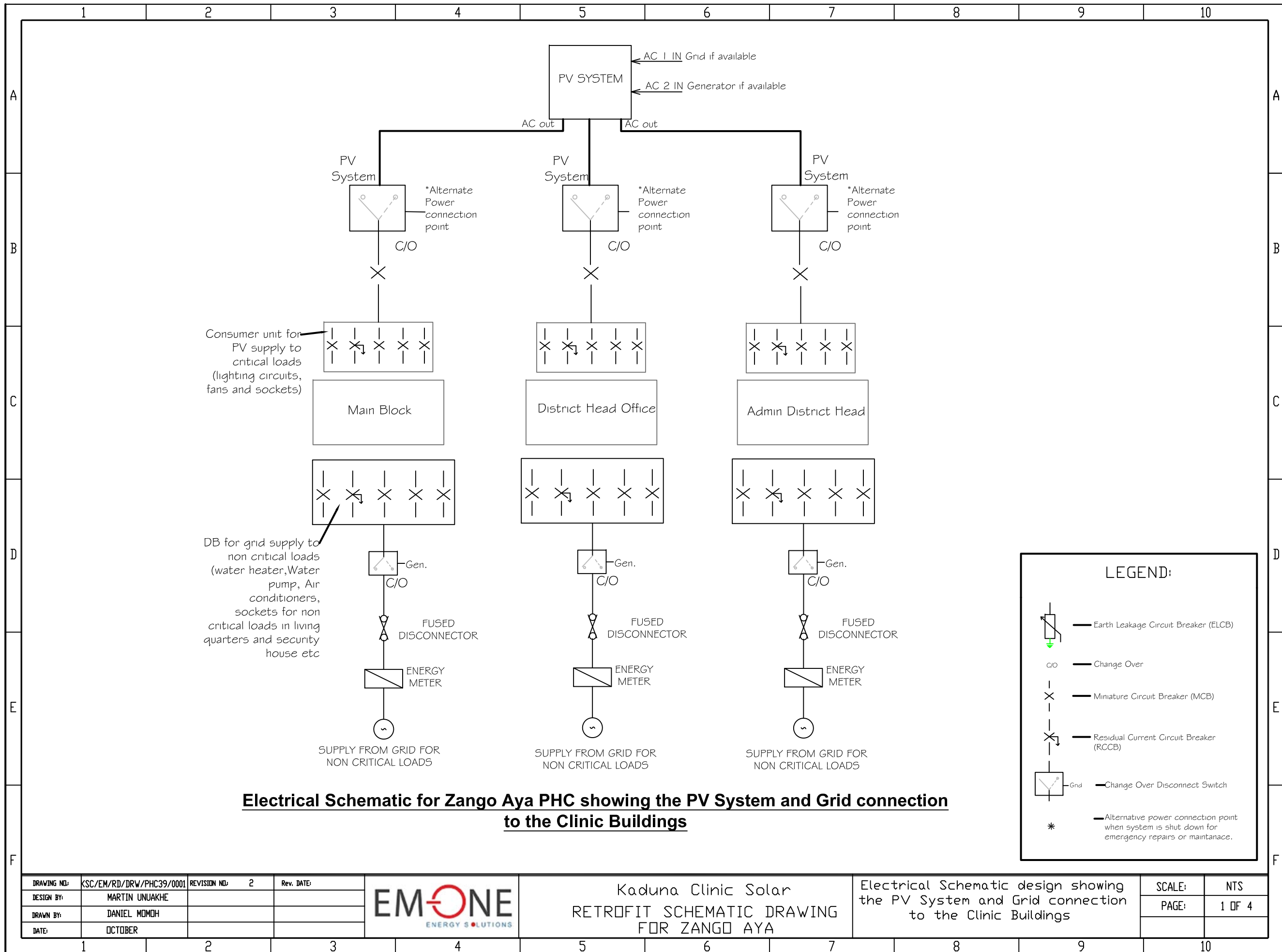
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KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC39

Electrical System Design for Zango Aya 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 Zango Aya PHC showing the PV System and Grid connection to the Clinic Buildings

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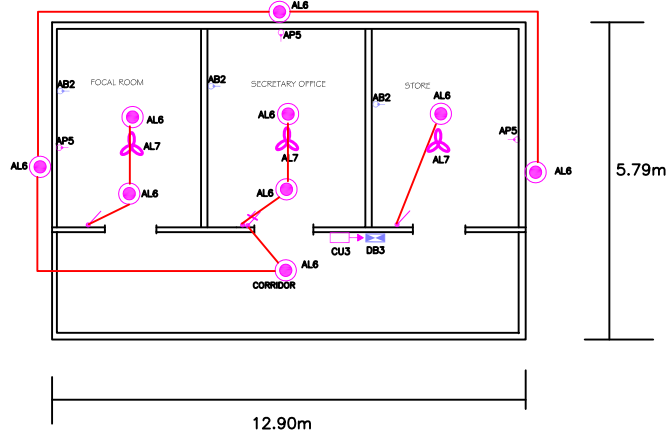


Kaduna Clinic Solar
RETROFIT SCHEMATIC DRAWING
FOR ZANGO AYA

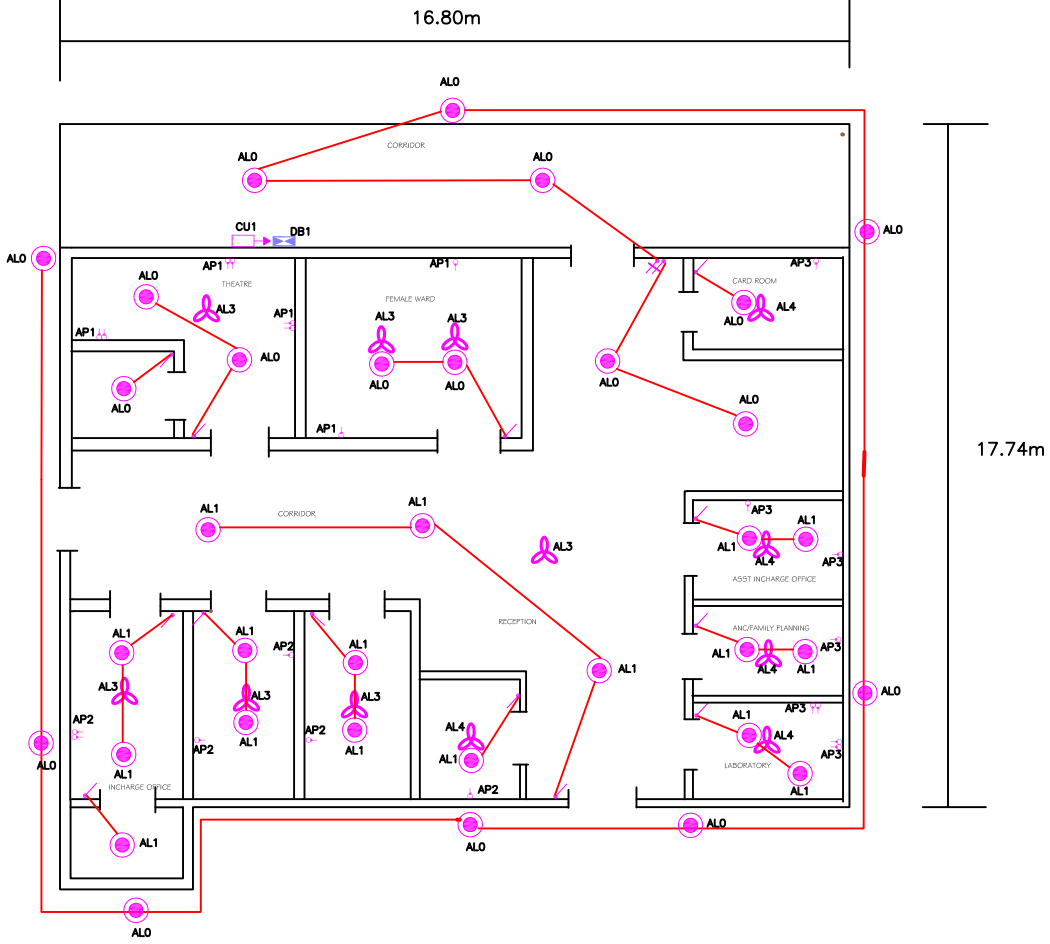
Electrical Schematic design showing the PV System and Grid connection to the Clinic Buildings

SCALE:	NTS
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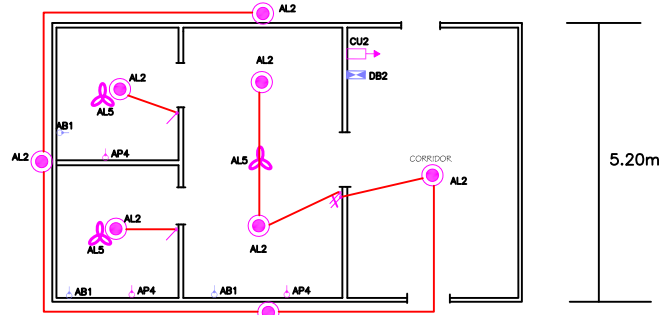
Admin Block



Main Block



District Head office



Zango Aya 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/PHC39/0002	REVISION NO:	2	Rev. DATE:	
DESIGN BY:	MARTIN UNUAKHE				
DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				



Kaduna Clinic Solar
ELECTRICAL WIRING DRAWING
FOR ZANGO AYA

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

SCALE:	NTS
PAGE:	2 OF 4

LOAD TABLE FOR ZANGO AYA PHC

POWER SOURCE: GRID																						
		MAIN CLINIC- 100A DISTRIBUTION BOARD										DISTRICT HEAD OFFICE- 32A DISTRIBUTION BOARD				DISTRICT HEAD ADMIN BLOCK- 32A DISTRIBUTION BOARD				TOTAL (W)		
CIRCUIT IDENTITY												AB1					AB2					
MCB RATING												20A					20A					
DIVERSITY FACTOR												0.6					0.6					
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	13A SOCKET OUTLET	SPARE	SPARE	SPARE	SPARE	13A SOCKET OUTLET	SPARE	SPARE	SPARE	SPARE	
CABLE SIZES IN mm												3x2.5mm					3x2.5mm					

POWER SOURCE: PV SYSTEM		SYSTEM ID: ZANGO AYA SYS 1																				
		CAPACITY: 84,240 KWP																				
		MAIN CLINIC- 100A CONSUMER UNIT										DISTRICT HEAD OFFICE- 32A CONSUMER UNIT				DISTRICT HEAD ADMIN BLOCK- 32A CONSUMER UNIT				TOTAL (W)		
CIRCUIT IDENTITY		AL0	AL1	AL3	AL4	AP1	AP2	AP3				AL2	AL5	AP4			AL6	AL7	AP5			
MCB RATING		10A	10A	10A	10A	20A	20A	20A				10A	10A	20A			10A	10A	20A			
DIVERSITY FACTOR		0.9	0.9	0.9	0.9	0.6	0.6	0.6				0.9	0.9	0.6			0.9	0.9	0.6			
LIGHTING CIRCUIT		324	306									144					162					939
COOLING SYSTEM (CEILING FAN)				450	375								225				225					1,275
13AMP SOCKET FOR EQUIPMENT POWERING						2,200		2,100														4,300
PEAK LOAD (W)																						6,511
FINAL SUB-CIRCUIT		LIGHTING & CEILING FAN CIRCUIT				13A SOCKET OUTLET		SPARE	SPARE			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		3x2.5mm				

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DRAWN BY:	DANIEL MOMOH				
DATE:	OCTOBER				




Kaduna Clinic Solar
LOAD DISTRIBUTION TABLE
FOR ZANGO AYA

Analysis of power distribution
within the Clinic buildings

SCALE: NTS
PAGE: 3 OF 4

BILL OF MATERIALS FOR ZANGO AYA PHC ELECTRICAL RETROFIT

CLINIC BLOCK				DISTRICT HEAD'S OFFICE				ADMIN DISTRICT HEAD				ZANGO AYA TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	11	1	Ceiling fan	No.	3	1	Ceiling fan	No.	3	17
2	18 Watts CFL	No.	35	2	18 Watts CFL	No.	8	2	18 Watts CFL	No.	9	52
3	Roof mounted luminaire	No.	27	3	Roof mounted luminaire	No.	5	3	Roof mounted luminaire	No.	6	38
4	Wall mounted luminaire	No.	8	4	Wall mounted luminaire	No.	3	4	Wall mounted luminaire	No.	3	14
5	1 Gang light switch	No.	13	5	1 Gang light switch	No.	2	5	1 Gang light switch	No.	2	17
6	2 Gang light switch	No.	1	6	2 Gang light switch	No.	1	6	2 Gang light switch	No.	1	3
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.	10	8	13 Amp socket single	No.	6	8	13 Amp socket single	No.	3	19
9	13 Amp socket double	No.	6	9	13 Amp socket double	No.		9	13 Amp socket double	No.		6
10	15 Amp socket	No.		10	15 Amp socket	No.		10	15 Amp socket	No.		0
11	Junction box	No.	65	11	Junction box	No.		11	Junction box	No.	15	80
12	Single patress box (flush)	No.	24	12	Single patress box (flush)	No.	9	12	Single patress box (flush)	No.	6	39
13	Double patress box (flush)	No.	6	13	Double patress box (flush)	No.	0	13	Double patress box (flush)	No.	0	6
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	11	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	Bundles	4	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	Bundles	3	18
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.		19	60A distribution board	No.		0
20	30A distribution board	No.		20	30A distribution board	No.	1	20	30A distribution board	No.	1	2
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.		22	60A consumer unit	No.		0
23	30A consumer unit	No.		23	30A consumer unit	No.	1	23	30A consumer unit	No.	1	2
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.		25	60A Residual current circuit breaker	No.		0
26	30A Residual current circuit breaker	No.		26	30A Residual current circuit breaker	No.	2	26	30A Residual current circuit breaker	No.	2	4
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.		28	60A change over	No.		0
29	30A change over	No.		29	30A change over	No.	2	29	30A change over	No.	2	4
	1.5mm cable (Twin & Earth)				1.5mm cable (Twin & Earth)				1.5mm cable (Twin & Earth)			
30	AL0&AL1 (Lighting circuit)	Mts	300	30	AL2 (Lighting circuit)	Mts	90	30	AL6 (Lighting circuit)	Mts	90	
31	AL3 (Ceiling fan circuit)	Mts	120	31	AL5 (Ceiling fan circuit)	Mts	60	31	AL7 (Ceiling fan circuit)		60	
32	AL4 (Ceiling fan circuit)	Mts	90	32				32				
33	Total 1.5mm cable	Mts	510	33	Total 1.5mm cable	Mts	150	33	Total 1.5mm cable	Mts	150	810
	2.5mm cable (Twin & Earth)				2.5mm cable (Twin & Earth)				2.5mm cable (Twin & Earth)			
34	AP1 (Socket circuit)	Mts	90	34	AP4 (Socket circuit)	Mts	60	34	AP5 (Socket circuit)		60	
35	AP2 (Socket circuit)	Mts	90	35	AB1 (Socket circuit)		60	35	AB2 (Socket circuit)		50	
36	AP3 (Socket circuit)	Mts	100	36				36				
37	Total 2.5mm cable	Mts	280	37	Total 2.5mm cable	Mts	120	37	Total 2.5mm cable	Mts	110	510
38	4x16mm PVC/SWA/PVC armoured cable	Mts	100	38	4x16mm PVC/SWA/PVC armoured cable	Mts		38	4x16mm PVC/SWA/PVC armoured cable	Mts		100
39	4x10mm PVC/SWA/PVC armoured cable	Mts		39	4x10mm PVC/SWA/PVC armoured cable	Mts		39	4x10mm PVC/SWA/PVC armoured cable	Mts		0
40	4x6mm PVC/SWA/PVC armoured cable	Mts		40	4x6mm PVC/SWA/PVC armoured cable	Mts	100	40	4x6mm PVC/SWA/PVC armoured cable	Mts	100	200
41	4x4mm PVC/SWA/PVC armoured cable	Mts		41	4x4mm PVC/SWA/PVC armoured cable	Mts		41	4x4mm PVC/SWA/PVC armoured cable	Mts		0
42	Cable terminating lugs	No.	16	42	Cable terminating lugs	No.	16	42	Cable terminating lugs	No.	16	48
43	Recline cable (25mm)	Mts	50	43	Recline cable (25mm)	Mts	50	43	Recline cable (25mm)	Mts	50	150
44	Earth wire for building (16mm)	Mts	50	44	Earth wire for building (16mm)	Mts	50	44	Earth wire for building (16mm)	Mts	50	150
45	Underground marking tape	Mts	100	45	Underground marking tape	Mts	100	45	Underground marking tape	Mts	100	300

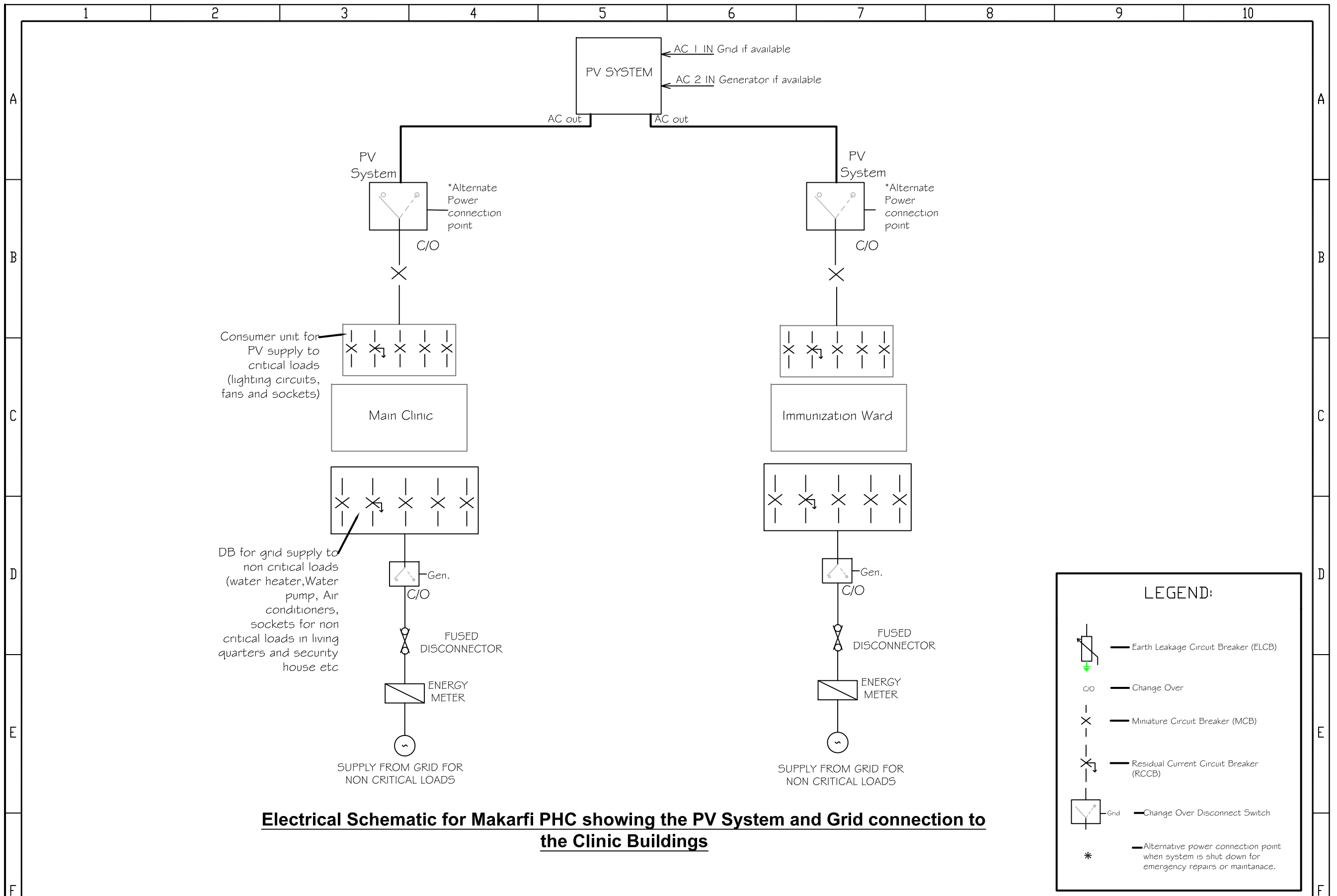
DRAWING NO:	KCS/EM/RD/BOM/PHC39	REVISION NO:	2	Rev. DATE:			Kaduna Clinic Solar BILL OF MATERIAL FOR ZANGO AYA	Material quantities required for the electrical installation	SCALE:	NTS
DESIGN BY:	MARTIN UNUAKHE				PAGE:				4 OF 4	
DRAWN BY:	DANIEL MOMOH									
DATE:	OCTOBER									

KADUNA CLINICS PROJECT
KCS/EM/RD/DRW/PHC40

Electrical System Design for Makarfi 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 Makarfi PHC showing the PV System and Grid connection to the Clinic Buildings

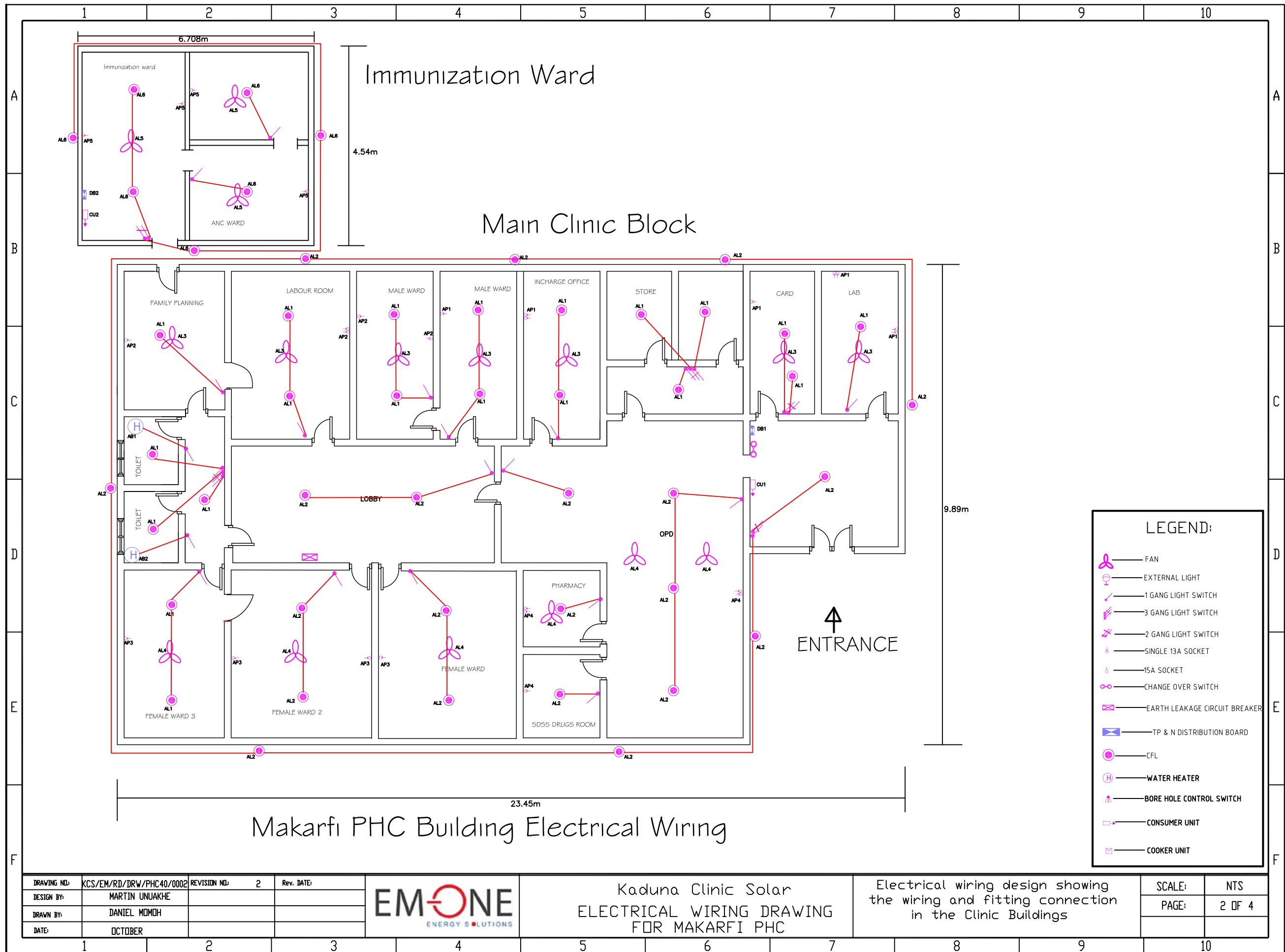
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Kaduna Clinic Solar
RETROFIT SCHEMATIC DRAWING
FOR MAKARFI PHC

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

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Kaduna Clinic Solar
ELECTRICAL WIRING DRAWING
FOR MAKARFI PHC

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

SCALE:	NTS
PAGE:	2 OF 4

BILL OF MATERIALS FOR MAKARFI PHC ELECTRICAL RETROFIT

CLINIC BLOCK				IMMUNIZATION WARD				MAKARFI TOTAL
S/No.	Material	Unit	Quantity	S/No.	Material	Unit	Quantity	Quantity
1	Ceiling fan	No.	13	1	Ceiling fan	No.	3	16
2	18 Watts CFL	No.	41	2	18 Watts CFL	No.	7	48
3	Roof mounted luminaire	No.	33	3	Roof mounted luminaire	No.	4	37
4	Wall mounted luminaire	No.	8	4	Wall mounted luminaire	No.	3	11
5	1 Gang light switch	No.	16	5	1 Gang light switch	No.	2	18
6	2 Gang light switch	No.	2	6	2 Gang light switch	No.	1	3
7	3 Gang light switch	No.	2	7	3 Gang light switch	No.		2
8	13 Amp socket single	No.	10	8	13 Amp socket single	No.	4	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.	77	11	Junction box	No.	14	91
12	Single patress box (flush)	No.	30	12	Single patress box (flush)	No.	7	37
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	13	16	25mm PVC pipes (25 numbers of 3Mts pipe per bundle)	bundle	3	16
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
19	60A distribution board	No.		19	60A distribution board	No.	1	1
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.	1	1
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
1.5mm cable (Twin & Earth)				1.5mm cable (Twin & Earth)				
30	AL1 (Lighting circuit)	Mts	250	30	AL5 (Ceiling fan circuit)	Mts	60	
31	AL2 (Lighting circuit)	Mts	180	31	AL6 (Lighting Circuit)	Mts	80	
32	AL3 (Ceiling fan circuit)	Mts	120	32		Mts		
33	AL4 (Ceiling fan circuit)	Mts	100	33		Mts		
34	Total 1.5mm cable	Mts	650	34	Total 1.5mm cable	Mts	140	790
2.5mm cable (Twin & Earth)				2.5mm cable (Twin & Earth)				
35	AP1 (Socket circuit)	Mts	80	35	AP5 (Socket circuit)	Mts	70	
36	AP2 (Socket circuit)	Mts	70	36		Mts		
37	AP3 (Socket circuit)	Mts	70	37		Mts		
38	AP4 (Socket circuit)	Mts	60	38		Mts		
39	AB1 (Heater)		30	39				
40	AB2 (Heater)	Mts	30	40		Mts		
41	Total 2.5mm cable	Mts	340	41	Total 2.5mm cable	Mts	70	410
42	4x16mm PVC/SWA/PVC armoured cable	Mts	100	42	4x16mm PVC/SWA/PVC armoured cable	Mts	60	160
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	60	47	Recline cable (25mm)	Mts	60	120
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 MAKARFI PHC

Material quantities required for the electrical installation

SCALE:	NTS
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